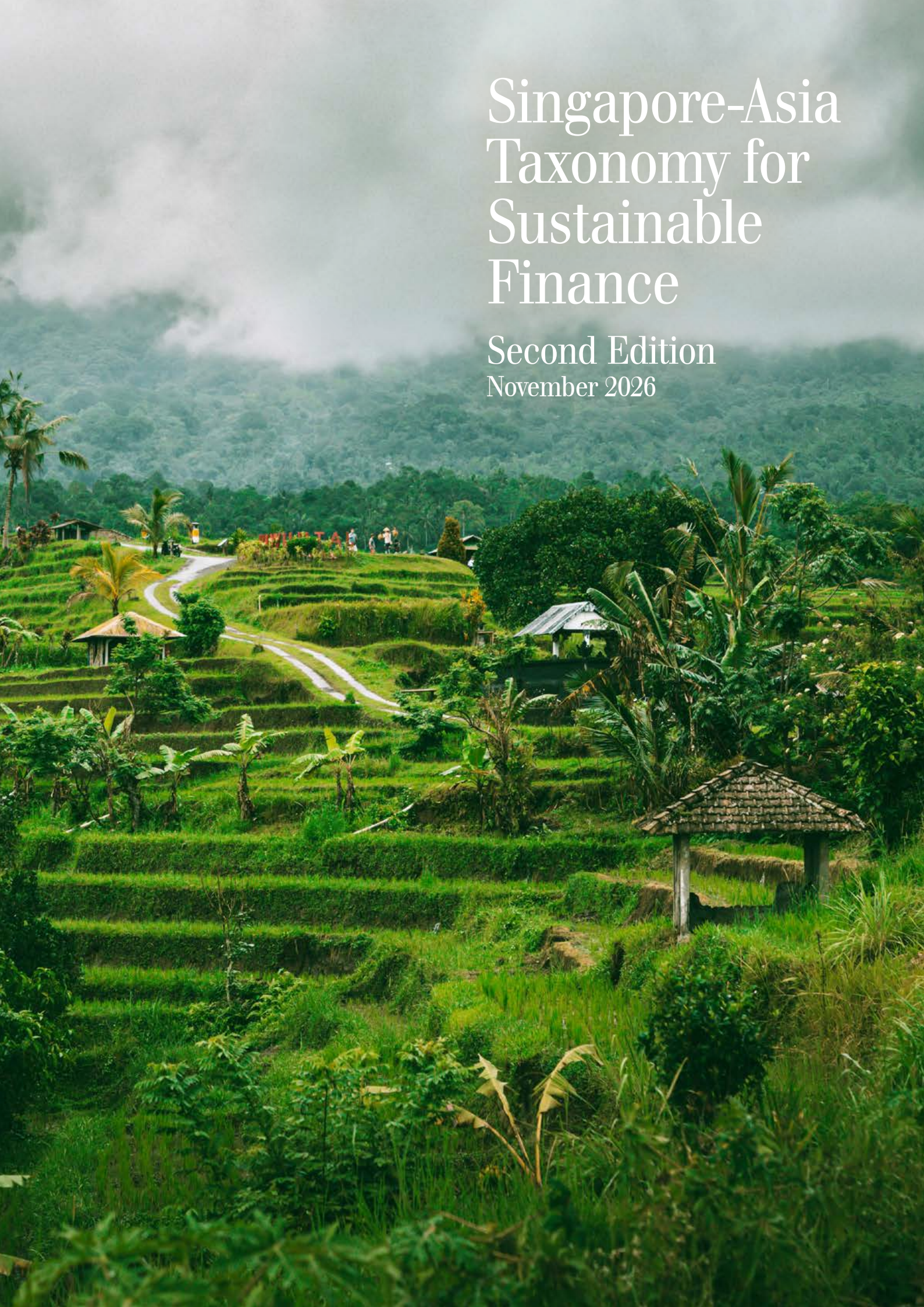
Singapore-Asia Taxonomy for Sustainable Finance

Second Edition

November 2026





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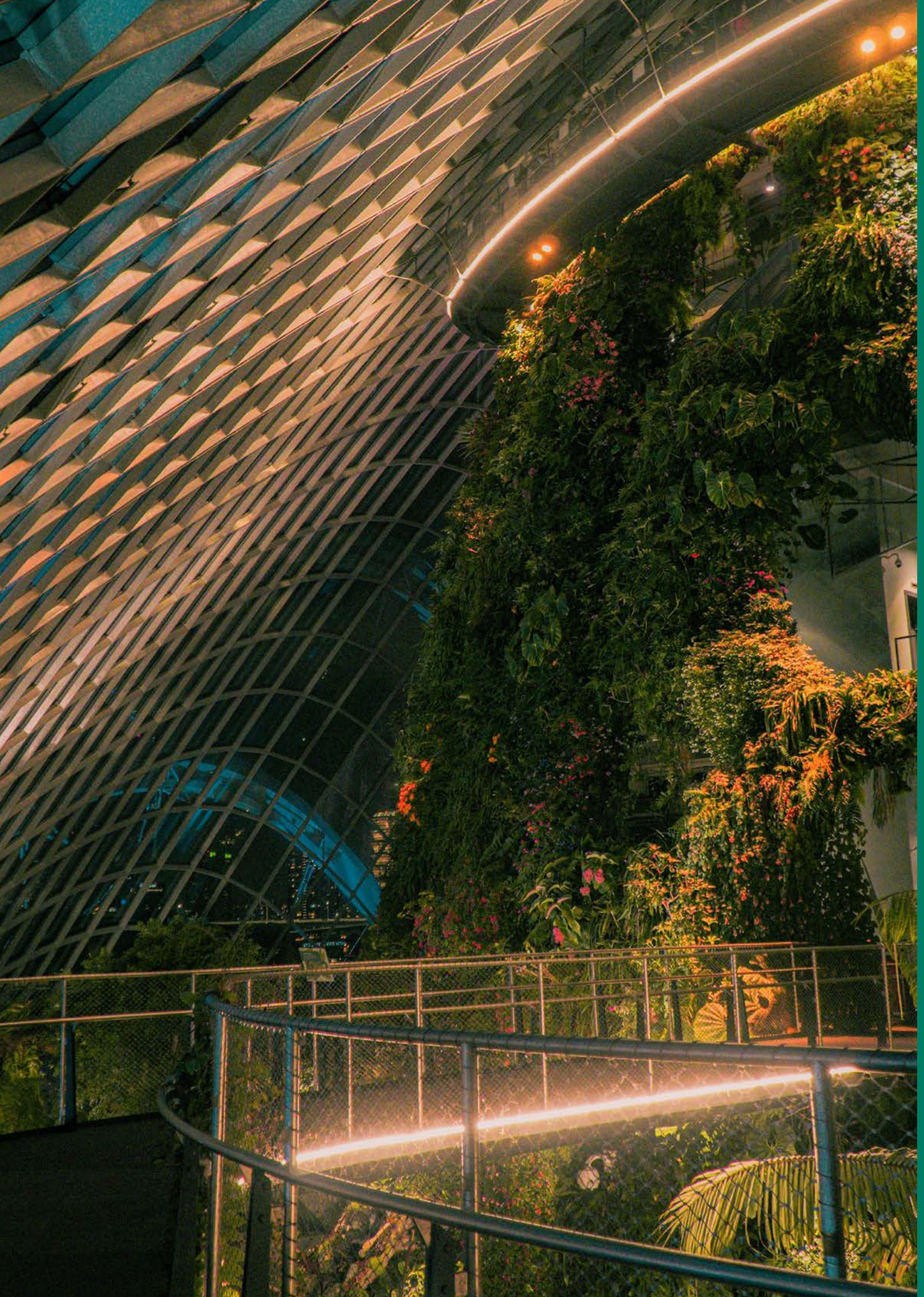
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in partnership with DNV

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Introduction 2026 Edition

Climate change continues to present significant environmental, economic and financial risks globally. Asia, which is home to more than half of the world's population, is warming faster than the global average, according to the World Meteorological Organisation (WMO)[1]. As countries and businesses across the region accelerate decarbonisation efforts while adapting to evolving climate, technological, and market developments, there is an increasing need for credible frameworks to guide capital towards sustainable and transition activities. As an international financial centre, Singapore is well-positioned to support these financing needs across the region through practical, science-based frameworks that strengthen market confidence and facilitate capital mobilisation.

This second edition (2026) of the Singapore-Asia Taxonomy for Sustainable Finance (SAT) builds on the foundation of the first edition[2] launched in December 2023. This revision was coordinated by the Singapore Sustainable Finance Association (SSFA), with support from the Monetary Authority of Singapore (MAS). Developed through extensive engagement with the financial sector, real economy corporates, key enablers, and government agencies, the SAT provides science-based and practical technical screening criteria to support sustainable and transition financing across Singapore and ASEAN.

As decarbonisation pathways, technologies, market practices and international frameworks continue to evolve, it is important that the SAT remains relevant, credible and fit for purpose. The second edition reflects developments in these areas, as well as feedback received from industry stakeholders since the SAT's launch, to ensure that it continues to support the mobilisation of capital towards sustainable and transition outcomes.

The second edition introduces targeted updates across four sectors: Energy, Transport (Water Transport), Industry (Iron and Steel), and Information and Communications Technology (ICT) (Data Centres). Across these sectors, the revisions aim to (i) reflect evolving technologies and decarbonisation pathways, (ii) place greater emphasis on measurable emissions performance and outcomes, and (iii) enhance interoperability with relevant international frameworks.

This revision is also accompanied by an update to the Guidance for Leveraging the Singapore-Asia Taxonomy in Green and Transition Financing (2026 edition). First published by SSFA in July 2025, the guidance supports the practical application of the SAT by addressing implementation challenges, clarifying interpretative issues, and providing expanded guidance on enabling activities across the value chain that support green and transition outcomes.

Together, these revisions will ensure that the taxonomy remains a credible practical guidance for market participants such as asset owners, investment managers, financial institutions, as well as issuers, policymakers, regulators, and other stakeholders to identify and allocate capital to green and transition activities and projects. By providing a credible and transparent classification framework, it supports greater market confidence, facilitates capital mobilisation and promotes consistency in sustainable and transition financing practices across the region.

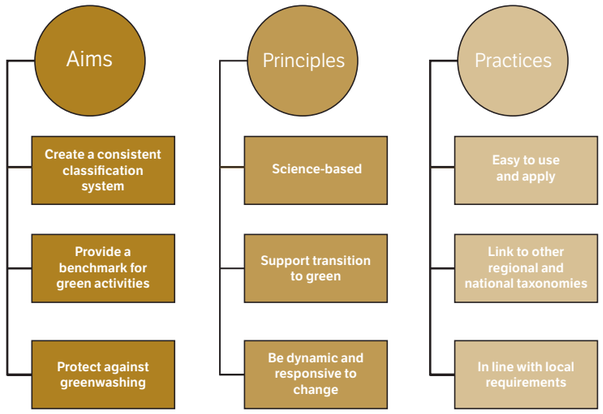
About the Singapore Sustainable Finance Association (SSFA)

The Singapore Sustainable Finance Association (SSFA) is an industry body established by the MAS along with the financial industry in January 2024, building on the successful work of the Green Finance Industry Taskforce (GFIT). SSFA collaborates across the financial and real economy sectors to support the growth of Singapore as a trusted, vibrant, and inclusive sustainable finance centre, welcoming participation from financial services, non-financial sector corporates, academia, non-governmental organisations, policymakers and other industry bodies.

Since its establishment, SSFA has coordinated the maintenance and ongoing development of the SAT, leading initiatives on its practical application, and promoting its best practices on regional and international platforms. This includes publishing the Guidance for Leveraging the Singapore-Asia Taxonomy in Green and Transition Financing, developing the SAT Frequently Asked Questions (FAQ) repository, and running capability-building initiatives for financial institutions, corporates, and other ecosystem participants.

[1] https://wmo.int/news/media-centre/climate-change-impacts-increase-asia
[2] The first edition of the SAT was issued by the Green Finance Industry Taskforce (GFIT), convened by the MAS from November 2019 to April 2023, with technical support and recommendations from the Climate Bonds Initiative (CBI). GFIT was succeeded by the Singapore Sustainable Finance Association (SSFA), established in January 2024.

The Taxonomy's main aims, principles and practices are as follows:



The Taxonomy includes a list of economic activities and projects that are classified as Green (environmentally sustainable), Amber (transition) or Ineligible on the basis of their contribution to at least one of the Taxonomy's five environmental objectives, whilst at the same time not causing any significant harm to the other four.

These five main environmental objectives are aligned with the EU Taxonomy, although at present this Taxonomy has only determined economic activities and technical screening criteria for climate change mitigation. The other four environmental objectives will be added in future iterations.

- Climate change mitigation
- Climate change adaptation
- Protect healthy ecosystems and biodiversity
- Promote resource resilience and circular economy
- Pollution prevention and control

The Taxonomy should allow allocators and providers of capital to align their investments in and lending to different companies, assets and strategies with activities that are classified as green (environmentally sustainable), amber (transition) or ineligible within a flexible classification framework. It is not designed to be an exhaustive or mandatory list of activities or projects for investment, nor does it seek to make any judgments or assessments of the benefits or financial performance of any of the activities and their classification.

Economic activities must meet technical screening criteria under each classification to be aligned under the Taxonomy. The technical screening criteria set requirements for substantial contribution to at least one environmental objective.

Benefits of the Taxonomy

The key benefits of the Taxonomy are:

1 — Provide clarity via a common language for financiers, issuers, policymakers and regulators.

Market participants can use the Taxonomy to express their environmental goals in their investment decisions. Providers of debt and equity capital can align their investing and lending practices with these environmental goals. Companies and project developers can use it to plan and raise finance, developing the pipeline of sustainable investment opportunities. Policymakers and regulators can use it to shape national policies and priorities, as well as direct capital flows to sustainable companies and activities. All can use it to avoid unintended greenwashing.

2 — Help translate commitments to the Paris Agreement and other sustainable investment goals for investors.

The Taxonomy bridges the gap between international goals and financing practices, clearly signalling the types of activities that are consistent with the low-carbon transition, adaptation to climate change and other environmental objectives.

3 — Provide clarity and consistency for financiers, companies and government agencies.

The criteria have been developed by environmental and industry experts and reference the latest Singaporean, ASEAN, EU and international thinking. This allows investors to have clarity, consistency and harmonised reporting for their investments in both Singapore and the global markets.

4 — Support understanding of risk and opportunities based on environmental factors and support different investment styles and strategies for green and transition investment.

Investors marketing environmentally sustainable funds can invest in Taxonomy-eligible activities, engage companies on how they are progressing towards Taxonomy thresholds, or provide their own explanation for how they will achieve the fund's goals. The Taxonomy also allows a better understanding of the environmental risks facing Singaporean companies under a low-carbon transition pathway. Investing in Taxonomy-eligible activities is not mandatory.

5 — Put environmental data in context and make it easier to understand how companies are working towards a low-carbon transition and building resilience to climate change.

Investors need to understand which companies are contributing to the low-carbon transition and which are building resilience to climate change, not just carbon footprints.

6 — Avoid reputational risks.

By screening out economic activities that undermine broader environmental, climate and social objectives, investors can avoid reputational risk and ensure that their strategy is robust.

7 — Incentivise companies.

A science and evidence-based framework to define what is environmentally sustainable provides companies with clear direction. It will help companies access finance for R&D while rewarding those undertaking environmentally sustainable activities.

Assessing the success of the Taxonomy

There are a number of key stakeholders that need to embrace the Taxonomy in order for it to be considered a success; the measures of success therefore relate to these stakeholders. In particular, the following could be considered as useful measures of success:

a) The extent to which the Taxonomy is compatible / consistent with other taxonomies. Given capital is global, as are capital market participants, it is important that the Taxonomy is compatible / consistent with other taxonomies. This does not mean that it is identical, more that the Taxonomy should make use of a consistent approach and language and be inter-operable with other taxonomies. There should not be elements that are incompatible. Efforts at tracking such developments are being conducted by the International Platform on Sustainable Finance.

b) The extent to which new products are developed that (or existing products are modified to) align with the Taxonomy. Given the Taxonomy sets the foundations for directing capital to activities that are demonstrably 'green', one measure of success is the extent to which capital market participants either develop (or modify existing) products to align with or map to the Taxonomy. The number of products that align with or map to the Taxonomy can be easily tracked.

c) The extent to which regulators reference the Taxonomy when approving products or services. Given consumers of products and services have voiced concerns over 'greenwashing' of products, the ability of regulators to refer to a universal reference point (i.e. the Taxonomy) in approving a product as green or otherwise would provide comfort to users. We could see, for example, the development of a labelling system that makes use of the Taxonomy to demonstrate the "green" credentials of a product or service. This can be easily tracked.

d) The extent to which other frameworks / standards reference the Taxonomy. Linking with the point below on the compatibility / consistency with other taxonomies, if this outcome can be achieved then one measure of success is the extent to which other frameworks / standards (as they relate to 'green' bonds etc.) reference the Taxonomy. The Taxonomy, if successful, should become the common language and architecture that underpins products and standards.

e) The extent to which the Taxonomy is embedded within frontline regulatory disclosure requirements. Given this paper identifies a lack of applicable data as a significant hurdle, one measure of success is the way frontline regulators (stock exchanges, for

example) require corporate disclosure that directly maps to the requirements of the Taxonomy. This should include, where possible, information on the "Do No Significant Harm" clause of the Taxonomy. Disclosure requirements can be easily tracked.
f) The extent to which the disclosure requirements present an 'undue burden' on corporates. Disclosing data and information that map to the requirements of the Taxonomy will require effort from corporates; this cannot be avoided. However, one success of the Taxonomy would be the extent to which this effort represents an undue burden. Every effort should be taken so as to ensure that tools and support are available for all issuers, including and in particular small and mid-sized enterprises. This is an issue which can and should be monitored at regular intervals.

g) The extent to which providers of data align with the Taxonomy. Many capital market participants make use of data provide by a third-party research firm when considering their investments. These third-party data providers collect, and aggregate data disclosed by corporates, and then provide it to capital markets participants either as raw data or within a proprietary framework. Given capital market participants will look to these data providers for assistance in understanding activities as they relate to the Taxonomy, it is important that these third-party data providers align their products and services to the Taxonomy, allowing for a fuller implementation of the Taxonomy. This should, where possible, include information on the "Do No Significant Harm" clause of the Taxonomy. This can be easily tracked.

It is recommended that the successful adoption of the Taxonomy be assessed with reference to these measures periodically.

The success of an orderly transition to net zero has a particular significance in Asia. The Taxonomy will play a critical role in financing green and in particular, transition activities that are much needed in Asia. It seeks to provide specific criteria and approach on how to identify and classify activities that can help users to consider green and transition activities that are relevant for the region.

Environmental objectives

The key purpose of developing the Taxonomy for Singapore-based Financial Institutions (FIs) is to encourage the flow of capital to support the low-carbon transition needed to avoid catastrophic climate change, as well as the environmental objectives of Singapore and the ASEAN nations, which are serviced by Singapore-based FIs.

Globally, while taxonomies focus on slightly different objectives based on their jurisdictional context, they are broadly consistent with the six environmental objectives in the EU Taxonomy[3]. In the EU Taxonomy and others, environmental objectives are interlinked – i.e. an activity is included in the Taxonomy if it contributes substantially to one of the objectives while not significantly harming any other objectives.

As the ASEAN region undergoes rapid urbanisation and economic development, it is currently expected to depend on fossil fuels at least in the medium term[4]. The region's rising fossil fuel demand will increase greenhouse gas (GHG) emissions and exacerbate local air pollution. Hence, economic activities that enable the transition from fossil fuels to increase their carbon efficiency and/or to more sustainable energy sources are essential to mitigate climate change. For instance, in Singapore, even with the scale up in solar energy solutions, Singapore will still have a heavy reliance on natural gas in the coming decades due to its limited access to other renewable energy sources. Therefore, it is also important to direct financial resources to activities aimed at making natural gas plants more carbon efficient to support the country's carbon abatement goals. Beyond the energy sector, the supporting the transition of key industry segments whose carbon emissions are hard to abate is important to consider because the decarbonization of sectors such as steel, aluminium, and cement may constitute a large part of ASEAN green/transition financing opportunities due to the required infrastructure buildout over the next decade.

The policy contexts in Singapore and ASEAN countries are different from elsewhere. Thus, a transition taxonomy that is dynamic and captures the transition pathways of entities from high to low or zero carbon intensity is more appropriate.

The Taxonomy intends to cover both green and transition activities with the following five environmental objectives:

1 — Climate change mitigation
2 — Climate change adaptation
3 — Protect healthy ecosystems and biodiversity
4 — Promote resource resilience and circular economy
5 — Pollution prevention and control

[3]The six objectives are: climate change mitigation, climate change adaptation, the sustainable use and protection of water and marine resources; The transition to a circular economy; Pollution prevention and control; The protection and restoration of biodiversity and ecosystems
[4]Source : Renewable Energy Outlook for ASEAN by ASEAN Centre for Energy (ACE) and International Renewable Energy Agency (IRENA)

The current version of the Taxonomy Criteria and thresholds for economic activities are focused on contribution climate change mitigation. Other objectives may be added in future developments.

Objective 1: Climate change mitigation (focus of this Taxonomy)

Mitigating climate change requires reducing the release of GHG emissions in the atmosphere, with the key objective of enacting measures to limit the extent of climate change. An activity can be considered to have met this objective if it makes substantial contribution to:

a) Avoid GHG emissions: These are 'green activities', which are already having very low or near-zero emissions. More capital is required to increase their development and wider deployment.

b) Reduce GHG emissions: These are transition activities that are currently high carbon and critical to the functioning of the economy but are in transition to less carbon-intensive business models. This Taxonomy includes transition activities involving fossil fuels, albeit limited to abated natural gas and managed coal phase-out under certain circumstances. This is because ASEAN governments have highlighted that, while fossil fuels will remain important energy sources for the foreseeable future, companies involved in these activities need to find ways to lower the carbon intensity of their activities. They must significantly improve their performance over time, demonstrated by tracking, monitoring, and disclosing CO_2 equivalent emissions, and their investments must not lock-in carbon intensive assets or processes for the future. They must demonstrate a pathway to approach climate objectives of the country they are operating. Abated natural gas is a relatively clean fossil fuel, as compared to oil or coal, and burning gas results in materially lower emissions of CO_2 (and other air pollutants) for an equivalent amount of energy produced[5]. It has consequently been argued that, in certain circumstances, abated gas will play a role as a transition fuel for some coal-heavy economies.

c) Enable activities that facilitate low-carbon performance or substantial emissions reduction.

d) Enable activities that are engaged in transiting to cleaner energy either through the renewable power generating sources or via decarbonisation technologies such as i) diversification of renewable energy sources (i.e. solar, wind) as a key solution for the region to keep pace with the increasing energy needs in secure and sustainable ways and remains relevant for a smooth transition from major fossil fuel use to clean energy, ii) accelerate clean energy innovations (i.e. battery storage, electrification of transport, carbon capture utilisation and storage), including the development and deployment of carbon capture and sequestration in certain industrial processes.

Climate change mitigation is a key environmental objective for Singapore and the ASEAN nations as seen in their nationally determined contributions (NDCs) under the Paris Agreement. Singapore has aimed to reduce emissions to around 60$MtCO_2e$ in 2030 after peaking emissions earlier and committed to reach net-zero emissions by 2050. The Singapore Green Plan 2030, launched in early 2021, articulates further targets and action plans under its City in Nature, Sustainable Living, Energy Reset and Green Economy pillars to contribute to mitigating climate change.

Singapore aims to increase solar energy deployment by five-fold to a least 2 gigawatt-peak by 2030. However, due to limitations such as its small physical size and land scarcity, Singapore faces challenges in relying on renewable sources to generate sufficient baseload electricity. Therefore, mitigation efforts have also focused on transitioning to natural gas, a comparatively less carbon-intensive fuel, as well as enhancing energy efficiency across the key sectors of power generation, industry, transport, buildings, and households. For example, Singapore has a set the target of reducing peak land transport emissions by 80% by 2050 from the 2016 peak, with vehicle electrification as the main driver.

Other complementary initiatives include the implementation of a carbon tax and development and initiatives related to low-carbon technologies such as hydrogen and carbon capture, utilisation and storage.

Objective 2: Climate change adaptation (not covered in this version)

Climate change adaptation refers to activities that substantially reduce the adverse impact of the current and expected future climate on either (i) other people, nature or assets or (ii) the economic activity itself, in each case without increasing the risk of an adverse impact on other people, nature and assets.

[5]It is recognised that there is also considerable discussion around the issue of methane leakage and natural gas, with scientific evidence growing over time. This is an issue that requires consideration and monitoring.



Adaptation measures respond to physical risks that are mostly location and context specific, hence, it is impossible to produce a stand-alone and exhaustive list of activities. As such, the adaptation approach is a set of guiding principles, which can be applied in any sector.

An economic activity can be considered to meet the objective of climate change adaptation by meeting one, or both, of the following principles:

a) Principle 1: The economic activity implements measures to increase own resilience. E.g. raising building heights above projected sea level rises, installing more efficient cooling facilities in anticipation of an increase in the number of warmer days.

b) Principle 2: The economic activity enables other economic activities to adapt to climate change. E.g. providers of cooling systems for buildings, sensors for flood monitoring.

Additionally, the economic activity should not adversely affect adaptation efforts by others, or increase the physical risks posed to others. E.g. water storage solutions should not deprive others in the communities from accessing water during dry weather.

By the year 2100, it is projected that Singapore could experience an increase in daily mean temperature by 1.4°C to 4.6°C, more frequent and intense heavy rainfall events, and mean sea level rise of up to 1 meter.[6] Singapore has adopted a Resilience Framework that frames its overall approach to climate change adaptation, which involves assessment of risks, formulation of adaptation pathways, prioritisation and implementation of measures. Additionally, under the Resilient Future vision of the Singapore Green Plan, initiatives have been introduced to (i) complete the formulation of coastal protection plans for certain areas by 2030, and (ii) moderate the rise in urban heat.

Objective 3: Protect healthy ecosystems and biodiversity (not covered in this version)

Climate change and biodiversity are interconnected. Climate change has compounded biodiversity losses globally, with around a million plant and animal species threatened with extinction within decades. The IPCC has warned that failure to limit global warming to 1.5°C will long-lasting and in some cases irreversible ecosystem losses.[7] At the same time, the sustainable management of ecosystems and efforts to restore biodiversity is critical to climate change mitigation. For example, conserved or restored habitats such as forests and wetlands are natural carbon sinks and have the added benefit of preventing climatic hazards such as rising sea levels, floods and droughts.[8]

Ecosystem restoration is not only important in terms of reducing the carbon load in the atmosphere. It is also important to protect water basins and support biodiversity, both of which are crucial for food and water security. Ecosystem-based adaptation uses biodiversity and ecosystem services in an overall adaptation strategy. It includes the sustainable management, conservation and restoration of ecosystems to provide services that help people adapt to the adverse effects of climate change.

Examples of ecosystem-based adaptation activities include:

a) Coastal defense through the maintenance and/or restoration of mangroves and other coastal wetlands against flooding and protection of natural carbon sinks.

b) Promote protection, restoration and sustainable use of coastal and marine environment, which provide essential ecological, economic and social services in the ASEAN region.

c) Enhancing sustainable forest management including afforestation, reforestation and maintenance of forest ecosystem health and vitality to increase carbon storage capacity in forest ecosystems.

d) Establishment of diverse agroforestry systems to cope with increased risk from changed climatic conditions.

e) Conservation of agrobiodiversity to provide specific gene pools for crop and livestock adaptation to climate change.

Singapore places strong emphasis on ecosystem and biodiversity protection. As also highlighted earlier, an explicit goal of the City in Nature vision under the Singapore Green Plan is to implement species recovery plans for 100 species of plants and 60 species of animals, restore 30 hectares of forest, marine, and coastal habitats, and enhance habitats in at least 50% of Singapore's gardens, parks, and streetscapes.[9]

[6]Source: The Centre for Climate Research Singapore.
[7]https://wwfint.awsassets.panda.org/downloads/wwf_climate__nature_and_our_1_5c_future_report.pdf
[8]https://www.uncclearn.org/wp-content/uploads/library/unep248.pdf
[9]https://www.nparks.gov.sg/about-us/city-in-nature

As an international finance hub, Singapore is well placed to accelerate sustainable financing to address ecosystems and biodiversity threats. The United Nations Environment Programme (UNEP) estimates that the global investment in nature-based solutions will need to triple in real terms by 2030 and increase four-fold by 2050 if the world is to meet its climate change, biodiversity and land degradation targets as set out in the three Rio Conventions. The 2050 requirement represents cumulative total investment of up to USD 8.1 trillion. On annual terms, this equates to USD 536 billion each year, up from the current USD 133 billon.[10]

Objective 4: Promote resource resilience and circular economy (not covered in this version)

Promoting resource resilience can ensure the safe and secure supply of critical resources such as food and water, and to overcome resource constraints by maximizing resource productivity. On food supply, Singapore's 30 by 30 goal intends to meet 30% of nutritional needs locally by 2030, up from less than 10% today. According to Public Utilities Board (PUB), Singapore's total water demand could almost double by 2065. Apart from ongoing innovations in water and environment technologies to diversify water supply, water conservation strategies continue to play an important role to maximise efficient resource use.

Examples of activities that could contribute significantly to resource efficiency and resilience include:

a) Management of wastes from chemicals, plastics, packaging, electronics, textiles, construction materials, food as well as from oil & gas mining.

b) Promote water pollution control measures and cross-border cooperation prioritising water-related development activities.

c) Eco-friendly consumer packaging.

d) Sustainable food and agriculture technologies to increase shelf life, reduce wastage from farm to table.

The promotion of circular economy strategies can help Singapore strengthen resource resilience and promote environmental sustainability. A circular economy differs from the traditional linear economy (take, make, waste) and seeks to reduce waste, recovers resources at the end of a product's life, and channels them back into production. Singapore may position itself as a regional financing hub for the circular economy transition which requires massive investments to reap its full potential. For instance, an UNDP study estimates that Indonesia needs over USD 20 billion in annual capital investments to unlock circular economy opportunities in five key economic sectors.[11]

Objective 5: Pollution prevention and control (not covered in this version)

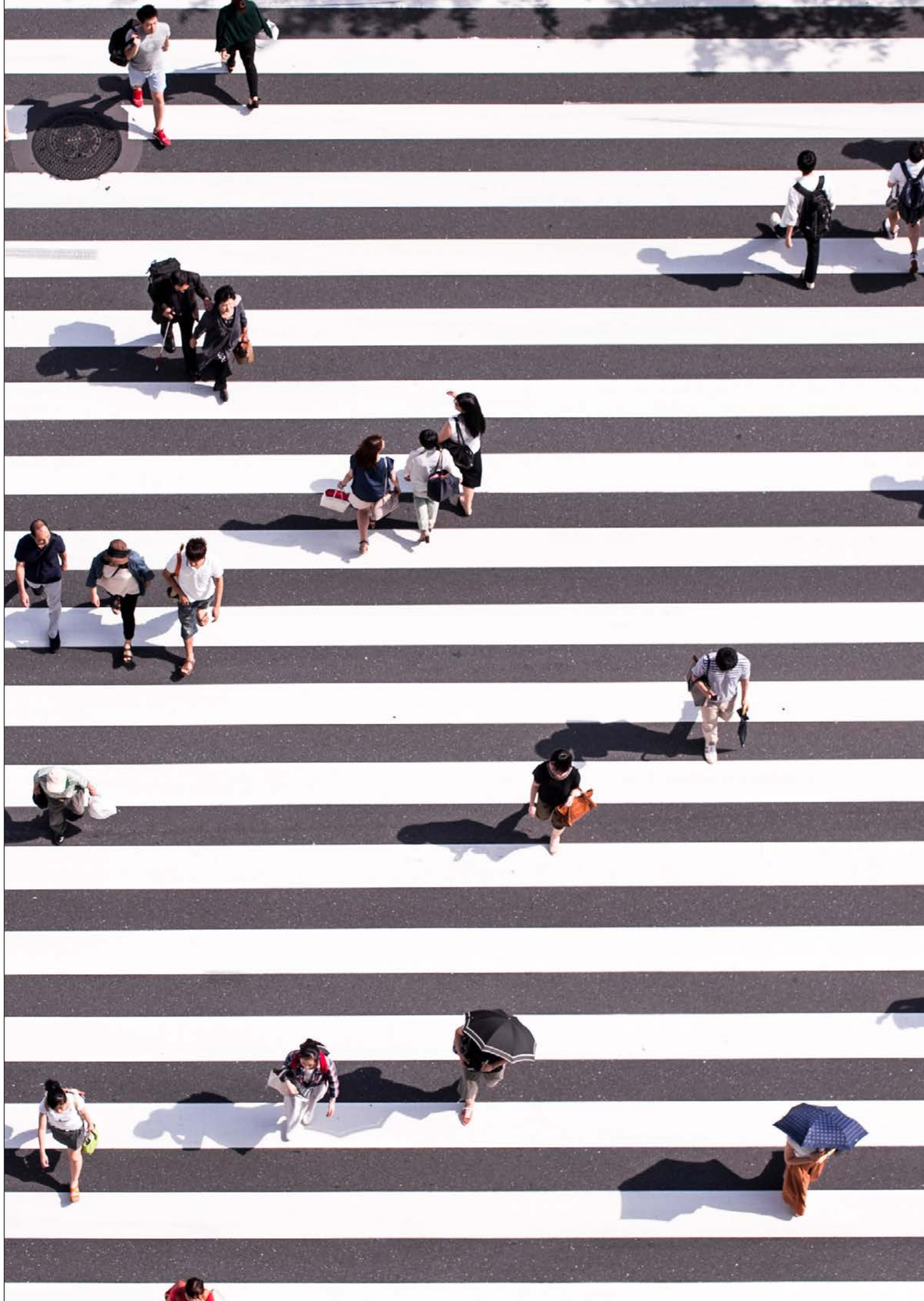
Pollution prevention and control involves practices that prevent, reduce and/or eliminate pollution of air, water or land, and in doing so, mitigate risks or harmful effects to the environment, and to human health. This is important as pollution is a key driver of (i) biodiversity loss and (ii) human diseases. Biodiversity loss as explained earlier is expected to exacerbate global warming through the reduction of natural carbon sinks. Climate change and pollution are thus interconnected; for example, preventing air pollution could contribute to climate change mitigation, while reducing emissions could in turn improve air quality. Pollution is also a significant environmental cause of human diseases which we need to seek to ameliorate. According to the WHO, exposure to air pollution is estimated to cause 7 million premature deaths every year.[12]

Activities that could contribute significantly to pollution prevention and control include those that (i) prevent or reduce direct or indirect pollution; (ii) remediate or improve the state of the environment; or (iii) enable any of the above.

Guiding principles for the development of the Taxonomy

The aim of a taxonomy is to provide a common framework for the classification of economic activities to enable stakeholders in gathering information related to green financing, funding, and investment, as well as gain an understanding of risk management and promote investments that meet robust sustainability goals. A taxonomy should allow stakeholders to determine which financial products and services can be classified as green, or environmentally sustainable, over the long term. Furthermore, it should enable transparent and consistent disclosures by corporates of their own economic activities and environmental profile, which then permits transparent and

[10] https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/36148/SFN_ESEN.pdf
[11] https://www.id.undp.org/content/indonesia/en/home/presscenter/pressreleases/2021/A-New-Report-On-Circular.html
[12] https://www.who.int/news/item/22-09-2021-new-who-global-air-quality-guidelines-aim-to-save-millions-of-lives-from-air-pollution



consistent classifications and disclosures for associated equity and debt investment, financing, and financial products. In doing so, a Taxonomy would enable growth in sustainable products and services by removing ambiguity and uncertainty around classifications and labels, which in turn may stimulate demand for further environmentally sustainable financing and investment. A taxonomy would also facilitate reporting and classification of portfolios by Financial Institutions, which in turn may further stimulate demand for financial products and services.

On top of this, a taxonomy could also help Financial Institutions engage with issuers through a common language; the Taxonomy would allow Financial Institutions and issuers to discuss with reference to a benchmark classification system, based in and informed by science, the contribution of their activities to sustainable development.

Finally, a taxonomy could be helpful for macro-prudential regulators that wish to understand potential risks to financial stability that stem from "unsustainable" activities.

Science-based

The overall objective of the Taxonomy is to help identify investment consistent with achieving the necessary yet ambitious climate actions. The Taxonomy aims to draw a direct bridge between climate science and usable guidance for the financial sector. The criteria for the Taxonomy are hence based on science as far as possible, and on solid data, with references to data sources provided. In specific cases where a reference to scientific data cannot be provided, this is clearly signaled.

The technical screening tables indicate which sources have been used as the basis for the science which include the EU Taxonomy, Science-based Targets Initiative, Transition Pathway Initiative, Climate Bonds Initiative as well as academic sources. The selection of science basis was based on what was readily available and usable in the context. As a priority, EU Taxonomy was considered as the first priority. Other sources were chosen in discussion with the respective working groups, relevant agencies within Singapore and based on available and usable data.

Singapore-focused

This version of the Taxonomy has been developed on the basis of Singapore-based activities, metrics and thresholds. Although different regions should pursue similar environmental objectives - as the environmental issues we face, such as climate change and biodiversity loss, are global challenges, specific pathways, resources, and transition plans will differ by nature of economic, geophysical, and meteorological realities. GFIT decided to look both global and Singapore specific decarbonisation pathways (where available) and set up thresholds accordingly while keeping in mind international interoperability and regional usability considerations.

International and regional interoperability is particularly important given that Singapore-based financial institutions have global portfolios, with notable investments in other ASEAN countries. While GFIT has decided to focus on Singapore usability as a first priority, the majority of metrics are not locally specific and are usable in any country or region.

Economic activity structure

To identify the economic activities to be covered by this Taxonomy, activities are defined on the basis of ISIC codes (level 3 for activity) given the wide coverage and usage of ISIC. Moreover, this would enable interoperability with other taxonomies such as the Common Ground Taxonomy developed by the International Platform for Sustainable Finance which similarly uses ISIC codes.The Taxonomy proposes activity-level criteria and thresholds, using a selection of ISIC codes within each sector. This selection was based on the importance to the Singapore and regional economy, the impact of each activity on GHG emissions (and emission reduction) as well as the ASEAN Taxonomy activity selection (which was also based on similar selection criteria pertaining to the region).

Globally interoperable

Capital is global, so are capital market participants, so a key objective of the Taxonomy is to be as interoperable as possible with other international taxonomies, with a particular focus on the EU Taxonomy and the ASEAN Taxonomy.

The Taxonomy notes that the ASEAN Taxonomy was developed in parallel to this Taxonomy and, while there are similarities, especially with respect to certain green criteria and principles, there also some notable differences. This is due, in part to the more complex structure of the ASEAN Taxonomy with multiple tiers of amber to allow for different levels of adoptions depending on the individual member state's readiness.

Traffic lights: green, amber, and ineligible classifications

The key principle of the Taxonomy is to distinguish between green, amber (transition), and ineligible activities under the traffic light system.[13]

Green activities

The principle for building the traffic light system is to consider the science-based 1.5°C pathway and the EU Taxonomy criteria for substantial contribution to climate change mitigation as a first option for "green" criteria. In certain cases, the metric and thresholds have then been adapted to reflect Singapore and regional specific circumstances.

The Green category definition for the Taxonomy is activities that contribute substantially to climate change mitigation by operating at near zero emissions, or are on a 1.5°C-aligned pathway. This encompasses both activities that are already near zero and those that are not near zero but are aligned with the 1.5°C pathway (See 'Green transition' in Figure 1). The pathway and accompanying thresholds are based on climate science and are consistent with the approach used in the EU Taxonomy where, for example, sectors such as buildings and industry utilise thresholds that are not currently near zero but will ratchet down over time.

Generally speaking, any new activities[14] (e.g. new power plant, new building etc.) have to meet the green criteria. This is consistent with the need for transformational changes for all new infrastructure to meet a 1.5°C pathway. In particular, this would also help to prevent the lock in of higher carbon activities, assets and infrastructure long into the future.

Given that green criteria are not necessarily near zero emissions at this point in time but are consistent with a 1.5°C trajectory, there is sufficient flexibility in the short term for new activities to meet Green thresholds.

Amber activities

The Amber category in the Taxonomy includes activities that are not presently on 1.5°C pathway, but are either:

- Moving towards a Green transition pathway within a defined time frame; or
- Facilitating significant emissions reductions in the short term with a prescribed sunset date.

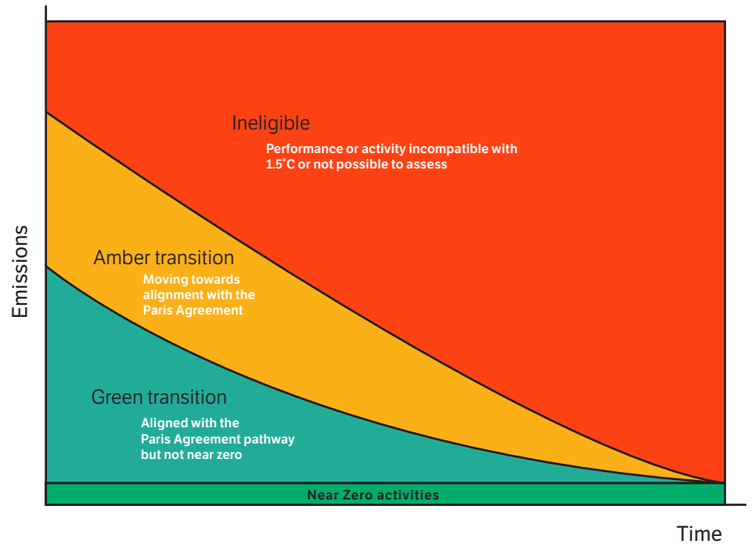


Figure 1: Net-zero pathway for Green, Amber, Ineligible

[13]The Green, Amber and Ineligible thresholds are defined only for the activities within the pre-defined scope of each activity.
[14]New activities are defined as activities that have reached financial investment decision (i.e., date by which investor commitments to invest in activities must be finalised) before 31 Dec 2023. Retrofits to existing infrastructure are not considered new activities but can instead follow criteria for existing activities.

The amber category is, unless otherwise stated, relevant only for transitioning of existing infrastructure and activities and it does not apply to new projects. This is in recognition of the fact that the amber category is, by definition, not aligned with a 1.5°C trajectory and building of new activities with long lifespans beyond the sunset dates, would lock in assets longer into the future, resulting in stranded assets.

Two further issues were discussed in relation to ensuring the robustness of the amber criteria and to ensure that the criteria are not synonymous with greenwashing:

- A transition cannot last indefinitely – at some point in time, the amber activity should be following a 1.5°C pathway to net zero otherwise there is no real impact
- Transition requires change over time and therefore to demonstrate the transition, there is a need to show how change is happening over time but this is difficult to capture in a binary taxonomy threshold that are static at a point in time

To address both issues, Amber criteria have a defined sunset date. At the sunset date, there is no longer an amber category and either the activity is aligned with the 1.5°C pathway (Green category) or it is downgraded to "Ineligible activities" category. As above, this does not mean that the activity has to be zero emissions by the sunset date but rather aligned with the 1.5°C pathway. The intention is that this ensures that transition is not forever and it facilitates change over time by ensuring taxonomy users move towards aligning with Green criteria or risk being ineligible. Generally, the sunset date is 2030 (some industrial sectors have longer sunset dates) and all amber traffic lights will disappear after this time unless stated otherwise in the criteria.

Another addition that was made which is different to other taxonomies is to introduce amber measures – these help to demonstrate change over time and are discussed in more detailed below.

For some activities, there are no Amber criteria. This means that the technological options to operate in line with a 1.5°C pathway are sufficiently developed. Hence, the activity can reasonably meet

Understanding 1.5°C pathways and relationship to Green/Amber thresholds

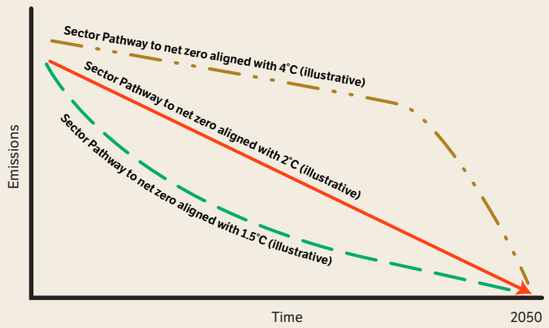


Figure 2: Illustrative 2050 pathways aligned with a range of temperatures

The concept behind the Green criteria as defined above is that they are following a science-based 1.5°C pathway to net zero. This pathway is consistent with the carbon budget allowed for this sector to reach 1.5°C.

A 1.5°C-aligned pathway is not the same as a pathway to net zero by 2050 – focusing on 2050 as the end goal misses the most important concept which is the steepness of the curve. Figure 2 illustrates 2050 transition pathways that are aligned with a net-zero 2050 end point that are aligned with 4°C. In other words, the end points is not as important as the rate of change.

Given the above, the Green criteria are, as far as possible, indicating this 1.5°C pathway. Amber activities are not on this pathway even if they have a downwards trajectory towards 2050. We note that the amber criteria are not necessarily bounded by a temperature alignment (in part due to the lack of granularity of temperature pathways) but intends to recognise movements towards Green.

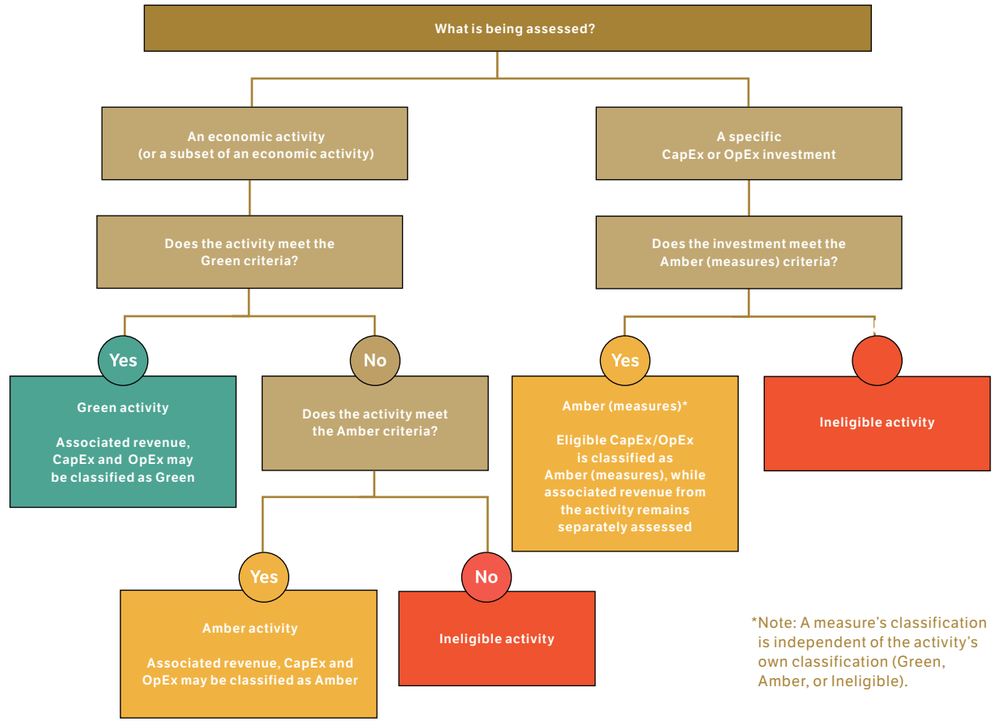


Figure 3: How activities and measures are classified under the Taxonomy

criteria and thresholds to be considered green in line with the Taxonomy.

Amber (measures)

In some sectors of the Taxonomy, Amber (measures) have been introduced to recognise specific interventions that support the transition of an economic activity.

It is important to distinguish between an activity and a measure. An activity is an economic activity, or a defined subset of an economic activity, that may be assessed against the relevant Taxonomy criteria and classified accordingly.

In contrast, a measure is a specific action, technology, project or intervention undertaken to improve the environmental performance of an activity and to support its transition towards alignment with the Taxonomy.

Examples of measures include the installation of carbon capture, utilisation and storage (CCUS) systems, energy efficiency improvements, fuel switching, methane abatement initiatives, and other interventions designed to reduce emissions and support decarbonisation.

Measures are distinct from activities because they do not represent an underlying economic activity in themselves. Rather, they are interventions applied to an activity to support its transition towards meeting either the Green or Amber criteria. As measures are assessed independently of the underlying activity, they may be classified as Amber (measures) even if the activity itself is not classified as Green or Amber.

For this reason, measures are inherently transition-oriented and are classified as Amber Measures. Unlike activities, which may be classified as either Green or Amber depending on their characteristics and performance against the applicable criteria, measures can receive only an Amber classification.

The relationship between activities and measures is illustrated above in Figure 3.

Ineligible activities

The Ineligible activities category concerns activities that are not currently eligible under the Taxonomy.

This means that they are either:

- Activities that do not comply with green or amber criteria. For e.g., activities that are not currently compatible nor moving sufficiently rapidly towards with a 1.5°C-aligned trajectory and will require emissions reductions (incl. Scope 3) to be in line with a green transition pathway (e.g. high-carbon cement producer) or

- Directly unsustainable activities – these are activities that are incompatible with a 1.5°C-aligned pathway and will need to be phased out if emissions (including Scope 3) cannot be reduced (e.g. fossil fuels).

Ineligible activities under the Taxonomy may not always indicate significant harm.

The intention of this Taxonomy and the technical work was not to produce a definitive guide to what significant harm (to climate mitigation) or directly unsustainable activities mean across sectors. In some sectors/activities this is intuitive but in others, the line between ineligible and amber is difficult to define and counterproductive.

This classification therefore indicates performance/thresholds for activities that are not eligible for financing in this Taxonomy. In some cases, this can be implied as harmful and in others, it is less clear. The result remains the same (ineligible) but the perception is different.

For example, emissions of some activities can and should be improved over time – these should receive investment. Other activities are incompatible with 1.5°C and will require phase out. See more information on this approach in Industry Sector.

Further, there are some activities or components of activities that are not yet assessed against and fall outside the scope of this Taxonomy are not eligible for financing but do not necessarily pose significant harm. These activities are not assessed against the traffic light system at this point in time and are not in scope (i.e., they are neither Green, Amber, nor Ineligible).

Pathways for criteria changes

Where possible, thresholds and criteria have been provided for future time periods to provide visibility over how thresholds will change over time following a science-based pathway to net zero. Inclusion of pathways offers the investors and industry planning advantage and greater predictability of potential future conditions, a quality sought from taxonomies that in most cases focused on providing thresholds only for a given point in time.

The Taxonomy notes that these pathways are indicative and may be subject to revisions based on scientific evidence, new available technologies etc. The Taxonomy notes that particularly for criteria far into the future (beyond 2035), there is some uncertainty as to which technologies will be available and the extent to which they are low-carbon. These thresholds should be seen as indicative and may be revised in future iterations.

Sunset dates

The Amber criteria have a sunset date to ensure that transition does not last forever and that the thresholds facilitate movement towards green as illustrated in Figure 4.

The sunset dates for the transition period are generally set at 2030. However, for activities that are very hard to abate, a longer period was given.

The Taxonomy does not anticipate that these sunset dates will be altered unless there is a strong case to do so e.g. they are not aligned with up-to-date transition trends in various industries.

In this way, the Amber category can be seen as a 'catch up' time period or grace period to move to the green pathway. The length of time before the sunset date was based on discussion within the project core team, agencies, industry bodies and research of technology pathways and was seen as an ambitious but realistic time period to move to the Green pathway.

Do No Significant Harm

A set of Do No Significant Harm (DNSH) criteria will be proposed in a separate chapter. To ensure ease of use of the Taxonomy and encourage its adoption, DNSH is currently best practice disclosure in its early implementation phase. However with the evolution of taxonomy, it could potentially be incorporated as a component of eligibility criteria in the future.

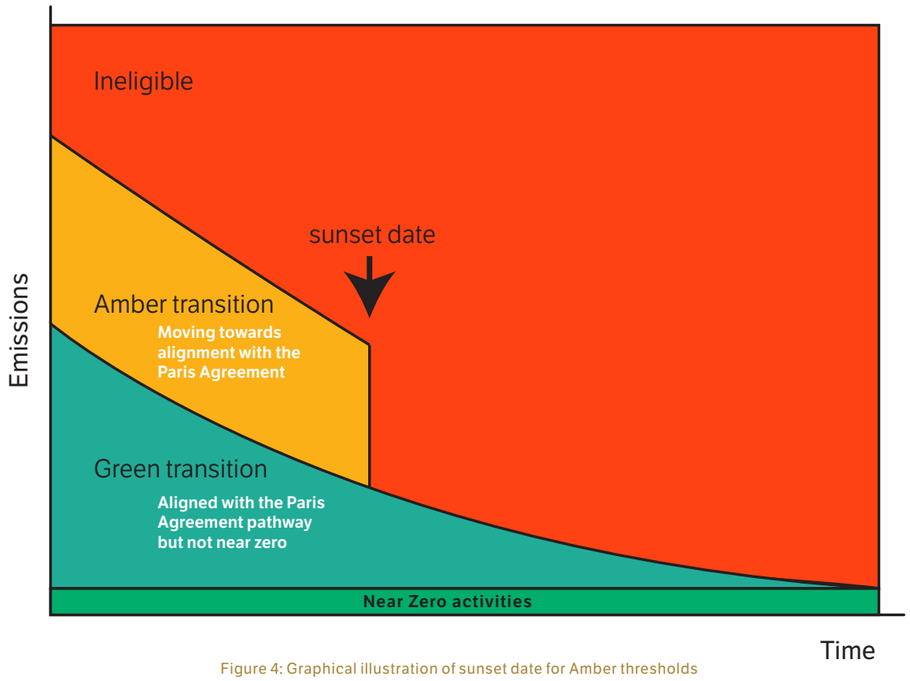


Figure 4: Graphical illustration of sunset date for Amber thresholds

Application of the Taxonomy

The application of the Taxonomy to financial markets, debt instruments such as Green bond/loan, corporate disclosure regulations as well as its voluntary or mandatory status have not yet been decided or put forward for public consultation and are, therefore, at this stage beyond the scope of the Taxonomy.

Further work will be provided on:

- mandatory/voluntary nature of the Taxonomy
- use of Taxonomy in disclosure guidance/regulation
- use of Taxonomy in debt financing such as Green bond/loan
- expectations on frequency of reporting and compliance

Governance and ownership of the Taxonomy

This version of the Singapore-Asia Taxonomy is issued by the SSFA, with technical support and recommendations from DNV. The SSFA project core team is acknowledged above. All relevant Singapore Government agencies and the public via rounds of consultations have also provided input and feedback into the process.

A consensus-based approach has been taken to develop the Taxonomy. Regular meetings and communications were held to discuss and review material points about the Taxonomy. In situations where divergence of views were present, SSFA, MAS and DNV would consider the recommendations from key parties, revise the criteria and the Taxonomy where required with a pragmatic stance, and explain the rationale in the Taxonomy.

This Taxonomy is intended to be a living document and will be revised over time. The precise time periods for review have not yet been finalised and will be published in due course. Future iterations of the Taxonomy, as well as taxonomy maintenance, will fall under the Singapore Sustainable Finance Association (SSFA), convened by MAS.



Technical Screening Criteria

The following section provides technical screening criteria for the following sectors:

1 ENERGY
2 TRANSPORT
3 REAL ESTATE/CONSTRUCTION
4 INDUSTRY
5 FORESTRY
6 CARBON CAPTURE AND STORAGE
7 INFORMATION AND COMMUNICATIONS TECHNOLOGY
8 WASTE
9 WATER
10 AGRICULTURE

1 — Energy 2026 Edition

Context

Global and Southeast Asia

Decarbonisation of electricity generation is critical to achieving the goals of the Paris Agreement and enabling the decarbonisation of other sectors through electrification. Low-carbon electricity technologies are increasingly commercially viable and cost-competitive. However, the pace of power sector decarbonisation varies across Southeast Asia due to country-specific factors such as grid constraints, land availability, policy and regulatory frameworks, and broader system integration challenges.

The Taxonomy adopts an approach that balances international interoperability with thresholds that reflect Southeast Asia's decarbonisation pathway. To support interoperability with other sustainable finance frameworks, including the EU Taxonomy, Green thresholds are aligned with internationally recognised low-carbon electricity benchmarks. Amber thresholds reference the Global Energy and Climate Outlook (GECO) 2024 NDC-LTS scenario[1] which provides a relevant decarbonisation pathway for Southeast Asia. The scenario reflects the implementation of countries' Nationally Determined Contributions (NDCs) and Long-Term Strategies (LTS) and provides a policy-relevant benchmark for the progressive reduction of power-sector emissions intensity over time.

Singapore

Singapore has committed to achieving net-zero emissions by 2050[2,3] and has enhanced its Nationally Determined Contribution (NDC), targeting 45-50 $MtCO_2e$ by 2035, building on its earlier 2030 NDC of around 60 $MtCO_2e$[4]. Given that the power sector accounts for about 40% of Singapore's total carbon emissions, decarbonisation of the sector is critical to achieving these targets[5].

Singapore is an alternative energy-disadvantaged country, and its geographical and resource constraints limit the availability of domestic low-carbon energy sources. High urban density, limited land availability, relatively flat terrain, low wind speeds, and a lack of high-quality hydropower resources restrict large-scale renewable energy deployment. As a result, achieving deep power-sector decarbonisation presents distinct challenges despite Singapore's commitment to reach net-zero emissions by 2050.

As part of its energy transition strategy, Singapore pursues a range of decarbonisation pathways, including solar, low-carbon electricity imports, low-carbon alternatives and natural gas[6]. Singapore has achieved its earlier solar target of at least 2 GWp by 2030 ahead of schedule (as of end-2025) and has since increased its target to 3 GWp by 2030. However, studies have shown that domestic solar resources alone will be insufficient to meet the country's long-term electricity needs. Beyond solar, Singapore aims to import up to 6 GW of low-carbon electricity by 2035, which is around one-third of Singapore's energy demand then.

In the longer term, Singapore is also exploring other low-carbon technologies such as hydrogen, carbon capture, utilisation and storage (CCUS), geothermal energy, bioenergy, and other emerging technologies[7]. The Taxonomy is intended to support and facilitate these national decarbonisation objectives by enabling the mobilisation of capital towards credible transition pathways. At the same time, it is designed to remain technology-agnostic and outcome-focused. Accordingly, eligibility is based principally on emissions outcomes rather than on the adoption of any technology.

[1] https://joint-research-centre.ec.europa.eu/projects-and-activities/global-energy-and-climate-outlook/geco-2024_en
[2] https://www.greenplan.gov.sg/globalcommitment/
[3] https://www.nccs.gov.sg/media/press-releases/singapore-commits-to-achieve-net-zero/
[4] https://www.nccs.gov.sg/media/singapore-submits-2035-nationally-determined-contribution/
[5] https://www.nccs.gov.sg/singapores-climate-action/mitigation-efforts/power/
[6] https://www.ema.gov.sg/content/dam/corporate/resources/industry-reports/energy-2050-committee-report/EMA-Energy-2050-Committee-Report.pdf.coredownload.pdf
[7] https://www.greenplan.gov.sg/key-focus-areas/energy-reset/



TSC overview and methodology

The technical screening criteria are designed to support the decarbonisation of electricity systems while maintaining interoperability with leading international sustainable finance frameworks. Green thresholds are aligned, where appropriate, with internationally recognised low-carbon electricity benchmarks and represent emissions performance consistent with long-term net-zero outcomes.

Amber thresholds reference the GECO 2024 NDC-LTS scenario for Southeast Asia, which reflects the implementation of countries' NDCs and LTS and provides a policy-relevant, regionally specific pathway for power-sector decarbonisation.

The scenario was selected because it remains consistent with the objectives of the Paris Agreement while accounting for Southeast Asia's specific circumstances, including strong projected growth in electricity demand and differing national energy-transition pathways. This provides an appropriate basis for setting Amber thresholds that are both ambitious and regionally relevant. Accordingly, activities are assessed principally on their emissions performance and contribution to decarbonisation outcomes rather than the adoption of any specific technology.

Choice of metrics

To promote consistency with international sustainable finance frameworks, emissions intensity is measured in gCO_2e/kWh. Green thresholds are based on lifecycle greenhouse gas (GHG) emissions, consistent with the international approach. Lifecycle emissions provide a more complete assessment of climate impact by accounting for emissions across the value chain, including upstream fuel production, transportation and other indirect emission sources where relevant.

Amber thresholds are generally based on direct emissions, as these provide a practical and widely available measure of transition performance. However, for certain electricity generation activities, such as hydropower and bioenergy, direct emissions alone may not adequately reflect overall climate impact. For hydropower, lifecycle emissions may include emissions associated with reservoir creation and operation, land-use change, and related infrastructure development. For bioenergy, lifecycle assessments capture both emissions and removals across the value chain, including feedstock cultivation, land-use change, harvesting, processing, transportation, and biomass growth. In such cases, lifecycle-based Amber thresholds will provide a more comprehensive assessment of climate performance.

Where Amber thresholds are based on lifecycle emissions, the thresholds are derived from the underlying direct-emissions pathway using conversion factors based on recognised lifecycle emissions datasets.

Application of thresholds

The thresholds in Table 1 serve two complementary purposes. Green thresholds identify activities that are aligned with long-term net-zero outcomes and represent the desired end-state of the energy transition. Amber thresholds identify activities that contribute meaningfully to a credible transition pathway. The progressive tightening of these thresholds over time reflects the expected decarbonisation of electricity systems across Southeast Asia and ensures that activities classified as Amber continue to make meaningful progress towards lower emissions. Thresholds beyond 2035 are indicative and may be revised in future iterations of the Taxonomy to reflect technological developments, evolving scientific understanding and updated decarbonisation pathways.

Activity criteria and measure criteria

The Taxonomy distinguishes between activity criteria and measure criteria. Activity criteria assess the emissions performance of a new or existing activity or facility as a whole and may be used to classify revenues associated with that activity as Green or Amber. Measure criteria assess investments intended to enable or facilitate future emissions reductions. These measures may include retrofits, upgrades, equipment replacement or enabling infrastructure that support a credible transition pathway, even where the underlying activity has not yet achieved the applicable activity-level threshold.



This distinction recognises that some investments play an important enabling role in decarbonisation, even where resulting emissions reductions may only materialise over time. For example, a hydrogen-readiness retrofit may qualify as an amber measure without resulting in the underlying power generation facility being classified as amber.

Upper thresholds

Table 1 presents the proposed emissions-intensity thresholds for electricity generation until 2050. The direct-emissions Amber thresholds are derived from the GECO 2024 NDC-LTS power-sector emissions-intensity pathway for Southeast Asia, as shown in Figure 5 below. Lifecycle-equivalent Amber thresholds, applicable to hydropower and bioenergy, are derived by applying a conversion factor based on recognised lifecycle emissions datasets.

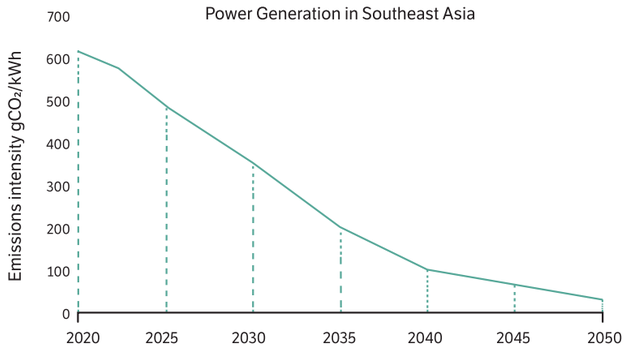


Figure 5: Southeast Asia power-sector emissions intensity pathway under the GECO 2024 NDC-LTS scenario

The Amber thresholds are intended to identify electricity activities that provide a meaningful contribution to power-sector decarbonisation. The declining thresholds over time reflect the expected reduction in emissions intensity across regional electricity systems and ensure that activities classified as Amber remain aligned with the transition pathway. As electricity systems become progressively less carbon-intensive, the emissions performance required for taxonomy alignment correspondingly becomes more stringent.

Table 1 — Criteria for activities: Thresholds for electricity generation activities (gCO_2e/kWh)

gCO_2e/ kWh	Until 31 Dec 2030	1 Jan 2031 – 31 Dec 2035	1 Jan 2036 – 31 Dec 2040	1 Jan 2041 – 31 Dec 2050	Justification
Green (lifecycle emissions)	≤100	≤100	≤90	≤50	International taxonomy practice
Amber (direct emissions)	≤350	≤200	N.A.	N.A.	Based on Global Energy and Climate Outlook (GECO) 2024 NDC-LTS scenario
Amber (lifecycle emissions)	≤375	≤214	N.A.	N.A.	
Ineligible activities	Do not meet Green or Amber Thresholds Exclusions: All solid fossil fuels (coal, petcoke, lignite etc.)				

Table 1 Notes:
- Thresholds from 1 Jan 2036 are indicative but may be subject to change based on new technologies or evolving scientific views.
- Except where otherwise stated, activity must meet applicable thresholds in each year of operation
- Amber (lifecycle emissions) applies only to hydropower and bioenergy, lifecycle emissions are used because the climate impacts of these technologies are not fully captured by direct generation emissions alone. For hydropower, this includes reservoir-related emissions, while for bioenergy it includes emissions and removals across the value chain, including net biogenic effects.
- Amber (direct emissions) applies to all other forms of electricity generation, as well as electricity transmission and distribution.
- In cogeneration activities, heat delivered shall be converted to kWh equivalent (1 MJ = 0.2778 kWh) to ensure a consistent basis for calculating emissions intensity (gCO_2e/kWh).
- Lifecycle GHG emissions are calculated based on project-specific data, using ISO 14067:2018 or ISO 14064-1:2018. Where emissions intensity is used to assess taxonomy eligibility, calculations should be based on representative operating conditions and should not rely solely on temporary operational constraints or curtailment events.
- Quantified lifecycle GHG emissions are verified by an independent third party.
- Where applied, GHG emissions captured and permanently stored through CCS may be taken into account when assessing compliance with the applicable emissions-intensity thresholds.

Applications of activity criteria

For each activity, the Taxonomy sets out green and/or amber criteria. This approach classifies investments at the activity-level, based on their emissions intensity. Activity criteria apply to a facility or to the activity as a whole, and may also be used to classify green and amber revenues.

Applications of measure criteria

For certain activities, the Taxonomy also sets out measure criteria to support the transition of an existing facility towards green. Such measures may include retrofits, conversions, upgrades or other investments that meet the requirements set out in Table 2.1. Investments that meet the measures criteria may be classified as amber and recorded as CapEx or OpEx.

Treatment of enabling activities

The activities defined in this sector do not include enabling activities, such as manufacturing of low-carbon technologies. Please refer to the Industry sector for the specific activities the taxonomy recognises. In addition, SSFA has also updated its Guidance on how enabling activities may be recognised. For more details, please refer here.

Criteria for measures: use of proceeds investments

In addition to the criteria for eligible revenue and whole activities, as described above, certain measures are included here as eligible for use of proceeds investments, typically debt financing via bond/loan format.

Table 2.1 — Criteria for Amber measures: use of proceeds eligible investments

	Until 31 December 2035*
Green measures	Not applicable
Amber measures	Eligible Amber measures include retrofit, CapEx or OpEx investments at existing gas-fired power generation facilities that demonstrate support for or facilitate the reduction of direct emissions from the facility. While implementing these measures may not in itself result in the facility achieving Green or Amber performance thresholds, they support a credible pathway to lower-emission operation. Consistent with Table 1, Amber classification for electricity generation activities sunsets on 1 January 2036, and no measure may be classified as Amber beyond that date. Qualifying measures include, but are not limited to: • Measures at existing power plants to enable the use of low-carbon fuels. • Measures at existing power plants with equipment to capture, transport and/or store greenhouse gas (GHG) emissions. • Measures at existing gas transmission and distribution (T&D) networks to enable low-carbon gases. • Measures at existing gas storage systems to enable low-carbon gases. • Measures which demonstrably reduce electricity transmission and distribution losses, modernise network infrastructure, improve grid efficiency, or support system optimisation. Notes: • Low-carbon gases are defined in Table 2.2. • Whilst the measures must be applied to an existing energy activity, the measures themselves may be new. • Measures do not necessarily need to result in the power station achieving amber criteria defined in Table 1 before 1 January 2036. • Amber classification applies only to the measure itself, not the entire facility.
Ineligible measures	Measures which may support the consumption, transmission, distribution or storage of gases other than low-carbon gases are ineligible, except for measures expressly identified as eligible amber measures in this table.

*Criteria have an initial sunset date of 2035 after which point they will not be applicable. The criteria and sunset dates are not fixed and will be reviewed and possibly revised periodically based on emerging science and technology.

Note: Renewable and low-carbon gases include non-fossil gaseous fuels, such as biomethane and biogas, as well as hydrogen and its derivatives.

Table 2.2 — Definition of low-carbon gas

Types of fuel gas which may be described as low-carbon gas
• Hydrogen • Hydrogen derivatives, such as ammonia • Gaseous fuels derived from feedstock types defined in Activity 1.5: Electricity generation from bioenergy (including cogeneration) • Other synthetic gaseous fuels with the potential to result in electricity generation within the green thresholds defined in Table 1 Note: • Under this definition, a fuel may be classified as a low-carbon gas based on its type and production pathway. • Where synthetic gases are derived from fossil-based feedstocks, there should be a credible basis to demonstrate that their use can support electricity generation within the applicable Green thresholds defined in Table 1, taking into account lifecycle emissions and any associated carbon-abatement measures. • This classification is separate from the emissions thresholds in Table 1. Using such fuels in electricity generation does not automatically confer Green or Amber eligibility: the generation activity itself must independently meet the applicable Table 1 emissions thresholds to be classified as Green or Amber.

References

References are provided to identify the principal source framework used to develop the criteria. Unless expressly stated, users are not required to apply or cross-reference the underlying source taxonomy when assessing eligibility under the Singapore-Asia Taxonomy.

Activity technical screening criteria

1.1. Electricity generation from solar PV and CSP (including cogeneration) 2026 edition

Sector	Energy	
Activity	**Electricity generation using solar PV and CSP (including cogeneration)**	
ISIC Code	3510 Electric power generation, transmission and distribution	
ISIC Description	This class includes the generation of bulk electric power, transmission from generating facilities to distribution centers and distribution to end users. This class includes: • operation of generation facilities that produce electric energy, including thermal, nuclear, hydroelectric, gas turbine, diesel and renewable • operation of transmission systems that convey the electricity from the generation facility to the distribution system • operation of distribution systems (i.e. consisting of lines, poles, meters, and wiring) that convey electric power received from the generation facility or the transmission system to the final consumer • sale of electricity to the user • activities of electric power brokers or agents that arrange the sale of electricity via power distribution systems operated by others operation of electricity and transmission capacity exchanges for electric power	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	All energy generation activities from solar PV and solar CSP are directly eligible.	International taxonomy practice
Amber	N.A.	
Ineligible activities	Operation of facilities dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities).	

1.2. Electricity generation from wind power 2026 edition

Sector	Energy	
Activity	**Electricity generation from wind power**	
ISIC Code	3510 Electric power generation, transmission and distribution	
ISIC Description	As in activity 1.1	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	All energy generation activities from wind are directly eligible.	International taxonomy practice
Amber	N.A.	
Ineligible activities	Operation of facilities dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities).	

1.3. Electricity generation from hydropower 2026 edition

Sector	Energy	
Activity	**Electricity generation from hydropower**	
ISIC Code	3510 Electric power generation, transmission and distribution	
ISIC Description	As in activity 1.1	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	Operation of new or existing facilities that comply with any of the criteria: • Power density greater than 5W/m², or • Facilities meeting the green (lifecycle) threshold as defined in Table 1, or • Run-of-river facilities without an artificial reservoir.	International taxonomy practice
Amber	Operation of existing facilities meeting amber (lifecycle) threshold as defined in Table 1.	GECO 2024 NDC-LTS scenario (SEA)
Ineligible activities	Operation of facilities dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities).	

1.4. Electricity generation from geothermal energy (including cogeneration) 2026 edition

Sector	Energy	
Activity	**Electricity generation from geothermal energy (including cogeneration)**	
ISIC Code	3510 Electric power generation, transmission and distribution	
ISIC Description	As in activity 1.1	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	Operation of new or existing facilities meeting the green (lifecycle) threshold as defined in Table 1.	International taxonomy practice
Amber	Operation of existing facilities meeting the Amber (direct) threshold as defined in Table 1.	GECO 2024 NDC-LTS scenario (SEA)
Ineligible activities	Operation of facilities dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities).	

1.5. Electricity generation from bioenergy (including cogeneration) 2026 edition

Sector	Energy	
Activity	**Electricity generation from bioenergy (including cogeneration)**	
ISIC Code	3510 Electric power generation, transmission and distribution	
ISIC Description	As in activity 1.1	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**

Green	Bioenergy electricity generation activities that comply with these criteria:
	• Electricity generation at new or existing facilities meeting the green (lifecycle) threshold as defined in Table 1, and
	• Feedstock meets the following criteria:
	  ○ Waste (e.g., agricultural, municipal sources), or
	  ○ Feedstock which complies with one of the following standards:
	  – Forest Stewardship Council (FSC)
	  – Biomass Biofuels voluntary scheme (2BSvs)
	  – Bonsucro (Better Sugarcane Initiative)
	  – Roundtable on Sustainable Biomaterials (RSB)
	  – Round Table on Responsible Soy (RTRS)
	  – International Sustainability and Carbon Certification (ISCC and/or ISCC plus).
		International taxonomy practice

Amber	Bioenergy generation activities that comply with these criteria:
	• Electricity generation at existing facilities meeting the amber (lifecycle) threshold as defined in Table 1, and
	• Feedstock meets the following criteria:
	  ○ Waste (e.g., agricultural, municipal sources), or
	  ○ Feedstock which complies with one of the following standards:
	  – Forest Stewardship Council (FSC)
	  – Biomass Biofuels voluntary scheme (2BSvs)
	  – Bonsucro (Better Sugarcane Initiative)
	  – Roundtable on Sustainable Biomaterials (RSB)
	  – Round Table on Responsible Soy (RTRS)
	  – International Sustainability and Carbon Certification (ISCC and/or ISCC plus).
		GECO 2024 NDC-LTS scenario (SEA)

Ineligible activities	Operation of facilities dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities).	

1.6. Electricity generation from ocean energy 2026 edition

Sector	Energy	
Activity	**Electricity generation from ocean energy**	
ISIC Code	3510 Electric power generation, transmission and distribution	
ISIC Description	As in activity 1.1	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	All electricity generation activities from ocean energy are directly eligible.	International taxonomy practice
Amber	N.A.	
Ineligible activities	Operation of facilities dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities).	

1.7. Transmission and distribution (T&D) of electricity 2026 edition

Sector	Energy	
Activity	**Transmission and distribution (T&D) of electricity**	
ISIC Code	3510 Electric power generation, transmission and distribution	
ISIC Description	As in activity 1.1	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**

Green	T&D of electricity that complies with one of the following criteria:
	• Connection of power plants that meet the green (lifecycle) threshold defined in Table 1; or
	• System where:
	  ○ At least 67% of newly connected generation capacity meets the green (lifecycle) threshold in Table 1; or
	  ○ The system grid emissions factor meets the green (lifecycle) threshold in Table 1; or
	• Interconnection between two electricity systems where:
	  ○ At least one system meets the green criteria above thereby facilitating the integration of lower-emissions electricity into carbon-intensive, capacity-constrained, or geographically isolated systems (e.g. island systems); or
	  ○ An inter-country/region direct or grid connection which will facilitate access to existing or new power plants that meet the green threshold in Table 1, where the project can demonstrate through contractual, regulatory, or market-based arrangements that the interconnection is intended and reasonably expected to be used for the import or transfer of electricity from such power plants.
	• All enabling ICT systems and smart management systems are eligible.
	
	Additional requirements:
	• Installed capacity and system emissions intensity must be calculated using a 5-year rolling average. These calculations should generally rely on historical (actual) data. However, forward-looking estimates may be used if they are supported by reliable evidence[8].
		International taxonomy practice

Amber	T&D of electricity that complies with one of the following criteria is eligible: • Connection of power plants that meet the amber (direct) threshold defined in Table 1; or • System where the grid emissions factor meets the amber (direct) threshold in Table 1; or • Interconnection between two electricity systems where ○ At least one system meets the amber criteria above, thereby facilitating the integration of lower-emissions electricity into carbon-intensive, capacity-constrained, or geographically isolated systems (e.g. island systems); or • An inter-country/region direct or grid connection which will facilitate access to existing or new power plants that meet the amber threshold in Table 1, where the project can demonstrate through contractual, regulatory, or market-based arrangements that the interconnection is intended and reasonably expected to be used for the import or transfer of electricity from such power plants. Additional requirements: • System emissions intensity must be calculated using a 5-year rolling average. These calculations should generally rely on historical (actual) data. However, forward-looking estimates may be used if they are supported by reliable evidence[9].	GECO 2024 NDC-LTS scenario (SEA)
Amber (measures)	Measures described in Table 2.1.	Singapore-specific Approach
Ineligible activities	Transmission and distribution infrastructure dedicated to connecting fossil fuel plants to the grid. Transmission and distribution infrastructure dedicated to an inter-country/region direct or grid connection to access existing or new power plants with emissions greater than amber thresholds defined in Table 1.	

[8] Forward-looking estimates may be used where they are supported by objective evidence demonstrating a reasonable basis for the assumptions applied. Such evidence may include models incorporating assets under construction, projects that have reached final investment decision (FID), executed contractual commitments, secured financing arrangements, regulatory approvals, or other equivalent evidence. Estimates should not rely solely on indicative, aspirational or scenario-based projections.
[9] See previous footnote.

1.8. Transmission and distribution (T&D) of low-carbon gases 2026 edition

Sector	Energy	
Activity	**Transmission and distribution (T&D) of low-carbon gases**	
ISIC Code	3520: Manufacture of gas; distribution of gaseous fuels through mains (partial) 4930: Transport via pipeline (partial)	
ISIC Description	This activity falls within two ISIC codes. • 3520: Covers the manufacture of gas and the distribution of natural or synthetic gas to end users through a network of mains. It also includes gas marketers or brokers that arrange gas sales using distribution systems operated by others. • 4930: Covers the transport of gases and other commodities (such as liquids, water, or slurry) via pipelines, including the operation of pump stations. For the purposes of the Singapore Asia Taxonomy, only the T&D of fuel gas, whether via pipelines or gas mains, is in scope. • Gas manufacturing is excluded. • Pipeline transport of other commodities (such as water or slurry) is also out of scope.	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	An activity or measure which complies with one of the following criteria is eligible: • T&D in new or existing networks carrying 100% low-carbon gases, as defined in Table 2.2 • T&D in retrofitted existing gas networks carrying 100% low-carbon gases, as defined in Table 2.2 Networks which carry GHGs must include implementation of leak detection and repair (LDAR) programmes for gas pipelines and related network infrastructure to reduce leakage.	International taxonomy practice
Amber	An activity or measure which complies with one of the following criteria is eligible: • T&D in existing networks carrying 50% vol low-carbon gases, as defined in Table 2.2 • T&D in retrofitted existing gas networks carrying 50% vol low-carbon gases, as defined in Table 2.2 Networks that carry GHGs must include implementation of leak detection and repair (LDAR) programmes for gas pipelines and related network infrastructure to reduce leakage.	GECO 2024 NDC-LTS scenario (SEA)
Ineligible activities	T&D of gases other than low-carbon gases only.	

1.9. Storage of electricity 2026 edition

Sector	Energy	
Activity	**Storage of electricity**	
ISIC Code	3510 Electric power generation, transmission and distribution	
ISIC Description	As in activity 1.1 – note that, whilst ISIC 3510 does not specifically refer to storage of electricity, in the context of the Singapore Asia Taxonomy, this is the most appropriate code	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	The activity is the operation of electricity storage including: • mechanical energy storage systems, or • thermal energy storage systems, or • pumped hydropower storage, or • electrochemical storage systems. Where the activity includes chemical energy storage, the medium of storage complies with the criteria for manufacturing of the corresponding product specified in this document.	International taxonomy practice
Amber	N.A.	
Ineligible activities	N.A.	

1.10. Storage of low-carbon gases 2026 edition

Sector	Energy	
Activity	**Storage of low-carbon gases[10]**	
ISIC Code	See activity 1.8	
ISIC Description	See activity 1.8	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	The activity is one of the following: • Construction of new facilities dedicated to storage of low-carbon gases, as defined in Table 2.2 or • Conversion of existing gas storage facilities into facilities dedicated to storage of low-carbon gases, as defined in Table 2.2. • Operation of facilities dedicated to the storage of low-carbon gas that meets current and/or future green criteria for manufacture of low-carbon gas (e.g., activity 4.4. manufacture of hydrogen).	International taxonomy practice
Amber	Operation of storage systems for hydrogen is classified as amber where: • Stored hydrogen meets the applicable taxonomy criteria for hydrogen production (activity 4.4); and • Associated value chain includes hydrogen conversion (e.g. into carriers) and/or transport activities for which taxonomy thresholds are not yet defined. This classification applies on an interim basis until such thresholds are established.	
Ineligible activities	N.A.	

[10] May include gaseous fuels originating from renewable (non-fossil) and sustainable feedstocks such as waste or other sources that meet relevant taxonomy thresholds.

1.11. Electricity generation from gaseous fuels 2026 edition

Sector	Energy
Activity	**Electricity generation from gaseous fuels (including cogeneration)**
ISIC Code	3510: Electric power generation, transmission, and distribution
ISIC Description	As in activity 1.1
Objective	Climate change mitigation

Traffic Light	Criteria	Reference
Green	The activity complies with all of the following criteria: • Electricity generation at new or existing facilities which meet the green (lifecycle) threshold as defined in Table 1, and • Where any bioenergy component of fuel consumed complies with feedstock criteria shown in activity 1.5	International taxonomy practice

Amber	The activity complies with one of the following criteria:
	• Electricity generation at new or existing power plants that:
	  ○ Meet the amber (direct) threshold as defined in Table 1, and
	  ○ Where any bioenergy component of fuel consumed complies with feedstock criteria shown in activity 1.5; or
	• Operation of new or existing power plants incorporating physical features, retrofits, modifications, or investments that demonstrably support or facilitate the reduction of direct greenhouse gas emissions from the facility. While implementation of such features, modifications or investments may not in itself result in the facility meeting the green or amber thresholds shown in Table 1, they shall support a credible pathway towards lower-emission operation and potential achievement of the green criteria, noting that amber classification sunsets on 1 January 2036, and this activity may not be classified as amber beyond that date. Such features may include, but are not limited to:
	  ○ Capability to consume low-carbon gases, as defined in Table 2.2
	  ○ installation and operation of equipment enabling the capture of greenhouse gas (GHG) emissions from the facility,
	  ○ modifications enabling integration with infrastructure required for future use of low-carbon fuels,
	  ○ modifications enabling future installation, expansion or optimisation of emissions-abatement systems, and/or
	  ○ other physical modifications that demonstrably support achievement of the Green criteria by 1 January 2036.
		GECO 2024 NDC-LTS scenario (SEA)

Amber (measures)	Measures described in Table 2.1.	
Ineligible activities	N.A.	

1.12. District heating and cooling 2026 edition

Sector	Energy
Activity	**District heating and cooling**
ISIC Code	3530 Steam and air conditioning supply
ISIC Description	• Production, collection and distribution of steam and hot water for heating, power and other purposes. • Production and distribution of cooled air. • Production and distribution of chilled water for cooling purposes. • Production of ice, including ice for food and non-food (e.g. cooling) purposes.
Objective	Climate change mitigation

Traffic Light	Criteria	Reference
Green	All activities related to district heating and cooling are eligible.	International taxonomy practice
Amber	N.A.	
Ineligible activities	N.A.	

1.13. Production of heat or cool from waste heat 2026 edition

Sector	Energy
Activity	**Production of heat or cooling from waste heat**
ISIC Code	3530 Steam and air conditioning supply
ISIC Description	This class includes: • Production, collection and distribution of steam and hot water for heating, power and other purposes. • Production and distribution of cooled air. • Production and distribution of chilled water for cooling purposes. • Production of ice, including ice for food and non-food (e.g. cooling) purposes.
Objective	Climate change mitigation

Traffic Light	Criteria	Reference
Green	All activities related to the production of heat or cool from waste heat are eligible.	International taxonomy practice
Amber	N.A.	
Ineligible activities	N.A.	

1.14. Decommissioning of fossil-fuel power plants

Addressed in separate Appendix P.

2 — Transport 2026 Edition

Context

The transport sector is one of the most challenging sectors to decarbonise due to its reliance on energy-dense fuels, long asset lifecycles, high capital investment requirements, and limited commercially mature zero-emission alternatives in certain transport modes. While zero-emission solutions are emerging, deployment remains uneven across the sector and is influenced by technology readiness, infrastructure availability, operational requirements, and cost considerations. Consequently, achieving net-zero emissions will require both accelerated adoption of zero-emission technologies and transition activities that support credible decarbonisation pathways in hard-to-abate segments.

The technical screening criteria for the Transport sector have been developed considering international best practices, relevant regulatory frameworks, and Singapore's decarbonisation objectives. The criteria aim to identify activities that are either already aligned with a low-carbon future (Green category) or represent credible transition pathways towards net zero (Amber category), while avoiding lock-in of emissions-intensive technologies.

Water transport

The Water Transportation criteria cover sea, coastal, and inland water transport, and are anchored in the International Maritime Organisation (IMO)'s 2023 Revised GHG Strategy, which sets the sector's ambition to reach net-zero GHG emissions by or around 2050[1].

The Green criteria identify activities aligned with the sector's long-term decarbonisation pathway, going beyond minimum regulatory compliance where appropriate. The Amber criteria recognise credible transition activities that support emissions reduction and enable vessels to move towards zero- or near-zero-emission operations. The criteria also reflect Singapore's maritime decarbonisation priorities, including the transition of harbour craft towards electrification, B100 biofuel, and other net-zero fuel solutions. Offshore support vessels are included where they support renewable energy development and operations.

This 2026 edition removes the explicit Amber sunset date for water transportation as shipping follows a globally recognised transition pathway under the IMO framework, with requirements expected to tighten progressively towards net zero emissions by or around 2050 (Figure 6). Given the long asset lifecycles, capital intensity, and technical complexity of maritime decarbonisation, a separate taxonomy-specific sunset date could create misalignment with the sector's established transition pathway and reduce investment certainty. Retaining flexibility by removing the

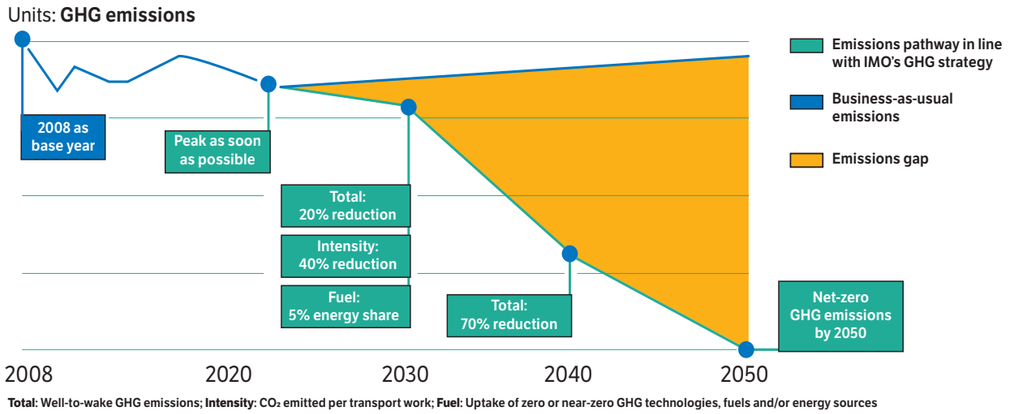


Figure 6: 2023 IMO Strategy on Reduction of GHG Emissions from Ships (Source: DNV July 2023)

[1] https://www.imo.org/en/ourwork/environment/pages/2023-imo-strategy-on-reduction-of-ghg-emissions-from-ships.aspx.

sunset date allows the Taxonomy to continue recognising credible transition activities over the sector's decarbonisation horizon while remaining aligned with IMO ambitions. For newbuild projects, Amber eligibility remains conditional on the vessel demonstrating the ability to be retrofitted or transitioned to zero- or near-zero-emission fuels within five years of financing, in line with IMO ambitions.

The 2026 Edition also removes the restriction on vessels transporting pure fossil fuels under the Amber category. This reflects the hard-to-abate nature of the shipping sector, which remains structurally dependent on fossil fuels in the near to medium term due to technological, operational, and infrastructure constraints. Given the role of vessels in facilitating global trade across a wide range of cargoes, the criteria focus on the emissions performance of the vessel rather than the type of cargo transported. This includes alignment with credible decarbonisation pathways, such as improved energy efficiency, fuel-switch readiness, and alignment with IMO objectives. This approach supports a pragmatic transition by enabling capital to flow towards emissions reductions across the broader fleet while remaining aligned with the sector's long-term decarbonisation trajectory.

Air transport

The Air Transport criteria remain unchanged.

The International Civil Aviation Organisation (ICAO) has adopted a Long-Term Aspirational Goal (LTAG) for international aviation to achieve net-zero carbon emissions by 2050, and has established a Global Framework for Sustainable Aviation Fuel (SAF), Lower Carbon Aviation Fuel (LCAF) and other aviation cleaner energies[2,3]. SAF is also recognised by ICAO as a key decarbonisation lever, supported through policy, regulatory, implementation and financing workstreams. However, ICAO has not yet established internationally agreed, technology-specific thresholds that can be directly adopted.

Given the rapidly developing SAF landscape and the absence of sufficiently mature and globally accepted threshold values, it remains appropriate to retain the existing air transportation criteria. The Taxonomy will continue to monitor ICAO developments for future revisions.

Land transport

The Land Transport criteria continue to support the shift towards low- and zero-emission mobility.

For vehicle segments where commercially viable zero-emission alternatives are already available, the criteria should prioritise Green classification and avoid extending transitional treatment unnecessarily. Amber eligibility is therefore limited to segments where zero-emission solutions are not yet fully mature, commercially viable, or operationally feasible. This ensures that the criteria remain ambitious while recognising practical transition constraints in selected transport segments.

TSC overview and methodology

Category	Main criteria	Additional metrics
Green	**Land transport:** Zero tailpipe emissions **Sea and coastal water transport:** more ambitious than current IMO regulatory requirements for international shipping, while remaining aligned with the IMO's 2023 decarbonisation strategy. **Air transport :** Zero tailpipe emissions aircraft Once ICAO develops a credible, science-based, 1.5°C-aligned pathway, it will be reviewed for inclusion in the Singapore-Asia Taxonomy.	• Percentage improvements; • $gCO_2/t\text{-}km$; • Energy Efficiency Design Index as defined by IMO
Amber	**Road freight transport:** outperforming best-on-the market approach – the EU approach **Sea and coastal water transport:** aligned with the IMO's 2023 Strategy on Reduction of GHG emissions from ships	• Percentage improvement for selected activities
Amber (measures)	**Sea and coastal water transport:** Retrofit and energy efficiency technologies **Air transport :** Sustainable Aviation Fuels	
Ineligible activities	Activities that do not meet Green or Amber criteria.	

[2] https://www.icao.int/environmental-protection/LTAG
[3] https://www.icao.int/environmental-protection/global-framework-saf-lcaf-cleaner-energies

Activity technical screening criteria

2.1. Transport via railways

Sector	Transport	
Activity	**Transport via railways**	
ISIC Code	491	
ISIC Description	This group includes rail transportation of passengers and/or freight using railroad rolling stock on mainline networks, usually spread over an extensive geographic area. Freight rail transport over short-line freight railroads is included here.	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	The activity complies with one of the following criteria: • The trains and passenger coaches/wagons have zero direct (tailpipe) CO_2 emissions; or • The trains and passenger coaches/wagons have zero direct (tailpipe) CO_2 emission when operated on a track with necessary infrastructure and use a conventional engine where such infrastructure is not available (bimode). And • The trains and wagons are not dedicated to fossil fuel transport.	EU Taxonomy criteria. Adopted from the EU Taxonomy, there are no substantial differences between the proposed criteria and the EU Taxonomy for Green category
Amber	• N.A. Electric railway already meets Green criteria.	
Ineligible activities	• Activities that do not meet Green or Amber criteria.	

2.2. Other passenger land transport

Sector	Transport	
Activity	**Other passenger land transport**	
ISIC Code	4922	
ISIC Description	This class includes scheduled long-distance bus services; charters, excursions and other occasional coach services; passenger cars; passenger motorcycles; taxi operation, and airport ground handling vehicles and equipment (for passenger and freight transport). This class also includes other renting of private cars with driver; operation of school buses and buses for transport of employees.	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	• Direct (tailpipe) CO_2 emissions of the vehicle are zero.	Adapted from the EU Taxonomy for zero-emission vehicles. Low-emissions light-duty vehicle threshold set by the EU Taxonomy not applied here given limited period of applicability (2025), and targets set by SG Green Plan for clean vehicles.
Amber	•N.A. (Technology sufficiently advanced for new vehicles to comply with green criteria. Not applicable for existing vehicles given the difficulty in retrofitting existing vehicles.)	
Ineligible activities	• Activities that do not meet Green or Amber criteria.	

2.3. Urban and suburban passenger land transport

Sector	Transport	
Activity	**Urban and suburban passenger land transport**	
ISIC Code	4921	
ISIC Description	This class includes: land transport of passengers by urban or suburban transport systems. This may include different modes of land transport, such as by motorbus, tramway, streetcar, trolley bus, underground and elevated railways etc. The transport is carried out on scheduled routes normally following a fixed time schedule, entailing the picking up and setting down of passengers at normally fixed stops. This class also includes town-to-airport or town-to-station lines; operation of funicular railways, aerial cableways etc. if part of urban or suburban transit systems.	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	For scheduled passenger road transport, the activity complies with the following criteria: • The activity provides urban or suburban passenger transport, and its direct tailpipe CO_2 emissions are zero. For scheduled passenger urban suburban rail transport, the activity complies with one of the following criteria: • The trains and passenger coaches have zero direct tailpipe CO_2 emissions; the trains and passenger coaches have zero direct tailpipe CO_2 emission when operated on a track with necessary infrastructure, and use a conventional engine where such infrastructure is not available (bimode), or • Direct tailpipe CO_2 emissions of the vehicle are zero.	Adapted from the EU Taxonomy for zero-emission vehicles Other requirements set by the EU Taxonomy for M2 and M3 vehicles of EURO VI standard not applied given the limited period of applicability (2025), and targets set by SG Green Plan for clean buses EURO VI is already mandatory for newly registered light and heavy duty vehicles such requirement would not introduce new value.
Amber	• N.A. for existing vehicles given difficulty of retrofit. In line with this, only zero tailpipe are eligible.	
Ineligible activities	• Activities that do not meet Green or Amber criteria	

2.4. Freight transport by road

Sector	Transport	
Activity	**Freight transport by road**	
ISIC Code	4923	
ISIC Description	This class includes all freight transport operations by road; logging haulage; stock haulage; refrigerated haulage; heavy haulage; bulk haulage, including haulage in tanker trucks; haulage of automobiles; transport of waste and waste materials, without collection or disposal. This class also includes furniture removal; renting of trucks with driver; freight transport by man or animal-drawn vehicles.	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	• Direct tailpipe CO_2 emissions of the vehicle are zero; and • Vehicles are not dedicated to fossil fuel transport.	Adapted from the EU Taxonomy – green category entails zero-emission vehicles.
Amber	• Amber category is available only for vehicles dedicated to freight transport having a maximum mass exceeding 3.5t[4] and thresholds are to be revised by 2030 the latest: • A heavy-duty vehicle has specific CO_2 emissions of less than half of the reference CO_2 emissions of all vehicles in the vehicle sub-group to which the vehicle belongs – i.e. has better emissions than 50th percentile of vehicles in the same class, and • Vehicles are not dedicated to fossil fuel transport.	Amber utilises EU provisions around low-emissions heavy-duty vehicles with EU Taxonomy criteria split between green and amber depending on the emission levels.
Ineligible activities	• Activities that do not meet Green or Amber criteria.	

[4] This is noted as the limit because there are limited technological options available for zero tail pipe emissions for vehicles in this category.

2.5. Low-carbon transport infrastructure

Sector	Transport	
Activity	**Transport infrastructure**	
ISIC Code	N.A.	
ISIC Description	N.A.	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**

Green	The objective of the infrastructure (and the associated ancillary activities necessary for construction and operation) that is constructed and operated is dedicated to supporting the development of one or more of the following modes of transport and is listed in the associated category and meets the associated criteria, if available:
	
	Personal mobility or cycle logistics
	• Pavements, bike lanes and pedestrian zones, parking provisions for active mobility modes, electrical charging and hydrogen refueling installations for personal mobility devices.
	
	Rail transport (infrastructure is within the scope of at least one of the bullet points listed)
	• For electrified trackside infrastructure and associated subsystems: infrastructure, installations and related facilities, energy, on-board control-command and signaling, and trackside control-command and signaling subsystems.
	• For new and existing trackside infrastructure and associated subsystems where there is a plan for electrification as regards line tracks, and, to the extent necessary for electric train operations, as regards sidings, or where the infrastructure will be fit for use by zero tailpipe CO_2 emission trains within 10 years from the beginning of the activity: infrastructure, energy, on-board control-command and signaling, and trackside control-command and signaling subsystems.
	• The infrastructure and installations that principally facilitate transshipping freight between the modes: terminal infrastructure and superstructures for loading, unloading and transshipment of goods.
	• Infrastructure, installations and related facilities that principally facilitate the transfer of passengers from rail to rail or from other modes to rail.
	
	Road transport (infrastructure is within the scope of at least one of the bullet points listed)
	• Electric Vehicle (EV) charging solutions (e.g. EV charging points, swap stations, cabinets etc.) which could include, but is not limited to:
	  ○ electricity grid connection upgrades necessary to support the deployment and operation of infrastructure for charging an EV;
	  ○ all other solutions related to optimising and/or providing the necessary electrical capacity to support the deployment and operation of EV charging solutions;
	
	• Hydrogen fueling stations;
	• Electric road systems (ERS)
	• The infrastructure and installations that principally facilitate transshipping freight between the modes: terminal infrastructure and superstructures for loading, unloading and transshipment of goods.
	• The infrastructure, installations, and related facilities that principally facilitate urban and suburban public passenger transport, including associated signaling systems for metro, tram and rail systems.
		EU Taxonomy

	Water transport (infrastructure is within the scope of at least one of the bullet points listed) • Electricity charging, hydrogen-based refueling. • The infrastructure is dedicated to the provision of shore-side electrical power to vessels at berth. • The infrastructure is dedicated to the performance of the port's own operations with zero direct tailpipe CO_2 emissions. • The infrastructure and installations are dedicated to transshipping freight between the modes: terminal infrastructure and superstructures for loading, unloading and transshipment of goods. Airports and air transport (infrastructure is within the scope of at least one of the bullet points listed) • The infrastructure is dedicated to the provision of fixed electrical ground power and preconditioned air to stationary aircraft, as well as electrical charging and hydrogen refueling for aircraft and ground handling vehicles and equipment at the airport. • The infrastructure is dedicated to support and enable zero-emission aviation including but not limited to: electric charging points, electricity grid upgrades, hydrogen refueling stations, resource circularity, renewable energy, optimise energy and systems efficiency to reduce emissions from airport's own operations. • Air traffic management infrastructure / processes / activities dedicated to enable zero-emission aviation.[5]	Adapted from the EU Taxonomy – Green category entails zero-emission vehicles.
Amber	• N.A. (Enabling infrastructure supports green criteria)	
Ineligible activities	• Infrastructure dedicated to the transport or storage of fossil fuels. • Infrastructure used for operation of fossil fuel-based transport (passenger and freight)	

[5] Possible measures include but are not limited to those captured in Appendix M4 of the ICAO's Report on the Feasibility of a Long-term Aspirational Goal. These measures are also in line with ICAO's Global Air Navigation Plan (GANP) and the Aviation System Block Upgrades (ASBUs).

2.6. Sea and coastal water transport 2026 Edition

Sector	Transport
Activity	**Sea and coastal water transport**
ISIC Code	501
ISIC Description	This class includes transport of passengers or freight overseas and coastal waters, whether scheduled or not; operation of excursion, cruise or sightseeing boats; operation of ferries, water taxis etc.; operation of harbour crafts; transport of freight overseas and coastal waters, whether scheduled or not; transport by towing or pushing of barges, oil rigs etc. This class also includes rental of pleasure boats with crew for sea and coastal water transport.
Objective	Climate change mitigation

Traffic Light	Criteria
Green	The activities comply with one or more of the following criteria: • Vessels that are being built or designed to operate exclusively on Zero or Near-Zero (ZNZ)[6] fuels; OR • Vessels that have attained the following Energy Efficiency Design Index (EEDI) value, as prescribed by IMO: ○ **Before 1 January 2028**[7], vessels that have attained an EEDI value 15% below[8] the EEDI requirements applicable on 1 April 2022, and ○ **On or after 1 January 2028**, vessels that have attained an EEDI that is 20 percentage points lower than the EEDI requirements applicable as of 1 April 2022, and must be capable of operating, at least partially, on ZNZ fuels or fuels from renewable sources. AND • For gas-fuelled ships, demonstrate the use of state-of-the-art measures and technologies to mitigate methane slip and/or nitrous oxide slip emissions; OR • The annual average GHG intensity of the energy utilised on board the vessel during the reporting period shall not exceed the following limit:

Table 3 — Annual GHG intensity thresholds for energy used on board (gCO_2e/MJ)[6]

Year	GHG Intensity (g CO_2e/MJ)[9]
2028	77.4
2029	75.6
2030	73.7
2031	69.6
2032	65.5
2033	61.4
2034	57.3
2035 onwards	53.2
2040 onwards	20.5
2045 onwards	14.0

OR
• Specific to harbour craft, all newbuild and retrofit vessels must meet one of the following criteria:
○ Be fully electric, OR
○ Be capable of using pure biodiesel (B100)

[6] With reference to IMO definition, ZNZs stand for "zero or near-zero" emission fuels, technologies or energy sources. As of November 2026, ZNZs have a GHG Fuel Intensity (GFI) of no more than 19.0 gCO_2eq/MJ to 2034 and 14.0 gCO_2eq/MJ from 2035, which is 80% lower than the current average of 93.3 gCO_2eq/MJ. (Source: The IMO Net-Zero Framework – FAQs). Should the IMO revise its thresholds/definitions in the future, the taxonomy will adopt the updated thresholds/definitions accordingly to maintain alignment with the latest international regulatory framework.
[7] For assessment, the specific criteria will be determined based on the shipbuilding contract, and such criteria must fall within five years from the date of the ship financing contract.
[8] "% below EEDI requirements" refers to a relative reduction from the applicable EEDI threshold (e.g., 15% below a requirement of 100 equals 85). "Percentage points below EEDI requirements" refers to an absolute difference between percentage values (e.g., 20 percentage points below a 30% reduction requirement equals a 50% reduction). These terms are not interchangeable and may result in significantly different compliance thresholds.
[9] The GHG intensity threshold is based on the Direct Compliance target of the Greenhouse Gas Fuel Intensity (GFI) metric under the IMO Net-Zero Framework in MARPOL Annex VI. GFI measures well-to-wake GHG emissions per unit of energy used on board a vessel, including fuels, shore power, wind propulsion, and solar energy. The attained GFI must be reported annually under the IMO Data Collection System (DCS).

Traffic Light	Criteria
Green	OR • Specific to vessels dedicated to supporting the installation, maintenance and repair of renewable energy generation, transmission and distribution. Vessels must specifically serve the renewable energy sector, in line with activities classified as "Green" under the Energy Sector's TSC. OR • Specific to the retrofitting of sea and coastal freight and passenger water transport, it must comply with one or more of the following criteria: ○ the retrofitting activity reduces well-to-wake GHG emission intensity of the vessel by at least 15 % expressed in grams of CO_2e per deadweight tonne per nautical mile for freight vessels, or per gross tonnage per nautical mile for passenger vessels, or for other vessel types in tonnes of CO_2e per year under the same operational profile as demonstrated by a comparative calculation for the representative navigation areas (including representative load profiles) in which the vessel is to operate or by means of computational fluid dynamics (CFD), tank tests or similar engineering calculations; ○ The retrofitting activity shall result in the vessel achieving an Energy Efficiency Existing Ship Index (EEXI) that is equivalent to an Energy Efficiency Design Index (EEDI) reference line reduction of at least 10% below the EEXI compliance threshold applicable on 1 January 2023. AND • The vessel is not specifically designed for the transport of fossil fuels.
Amber	Vessels that do not meet the Green criteria at the outset but have a decarbonisation or transition plan in place outlining fuel-switching options and/or retrofit technologies. The Plan should demonstrate alignment with the level of ambition set out in the IMO 2023 Strategy[10] on the reduction of GHG emissions, with implementation targeted within five years from the date of financing and shall provide evidence of the feasibility of the proposed measures. The Plan should include the following: • The expected timeframe (e.g. range of years) within which a significant fuel switch will be required • Required modifications to onboard fuel storage systems, including additional space requirements and associated impacts on cargo-carrying capacity • Required modifications to fuel handling systems, including bunkering arrangements • Required modifications to machinery • Estimated total incremental costs, including both capital and operating expenditures • Estimated emissions reductions relative to the vessel's current technology A progress monitoring and disclosure framework should also be in place and include: • A robust framework to monitor progress against the transition plan, including clearly defined milestones, key performance indicators (KPIs), and timelines. • Regular reporting to financing banks on implementation progress, emissions performance, and any material deviations, supported by transparent disclosure and, where applicable, independent verification. OR Specific to harbour crafts[11] (sunset on 1 January 2030), all newbuild and retrofit vessels must meet one of the following criteria: • Be electric-hybrid, or • Be capable of using blended biodiesel (B50), or • Be a dual fuel vessel capable of deriving at least 50% of energy consumption from renewable sources.
Amber (measures)	Retrofit technologies and/or energy efficiency technologies (EETs)[12] recognised under IMO shall achieve a measurable reduction in greenhouse gas emissions, supported by verifiable evidence demonstrating that the savings are directly attributable to the retrofit technology or EET implemented.
Ineligible activities	• Activities that do not meet Green or Amber criteria.

[10] https://www.imo.org/en/ourwork/environment/pages/2023-imo-strategy-on-reduction-of-ghg-emissions-from-ships.aspx
[11] https://www.mpa.gov.sg/port-marine-ops/harbourcraft-and-pleasure-craft-regulations/licensing-of-harbour-craft-pleasure-craft/licensing-a-harbour-craft
[12] Energy Efficiency Technologies (EETs) are technologies that improve a vessel's energy performance by reducing propulsion power demand, improving hydrodynamic or propulsion efficiency, or generating onboard electricity from recovered or renewable energy sources, consistent with the IMO categorisation under MEPC.1/Circ.896.

2.7 Inland Water Transport 2026 edition

Sector	Transport
Activity	**Inland water transport**
ISIC Code	502
ISIC Description	This class includes transport of passenger or freight via rivers, canals, lakes and other inland waterways, including inside harbours and ports. This class also includes rental of pleasure boats with crew for inland water transport.
Objective	Climate change mitigation

Traffic Light	Criteria
Green	All newbuild and retrofitted inland vessels must meet **one** of the following criteria: • Be fully electric, OR • Be capable of using pure biodiesel (B100), OR • Be compatible with ZNZ[13] fuels AND Vessels are not specifically designed to transport pure fossil fuels.
Amber	All newbuild and retrofitted inland vessels will have to be: • Be electric-hybrid, OR • Be capable of using blended biodiesel (B50), OR • Be a dual fuel vessel capable of deriving at least 50% of energy consumption from renewable sources.
Ineligible activities	Activities that do not meet Green or Amber Criteria.

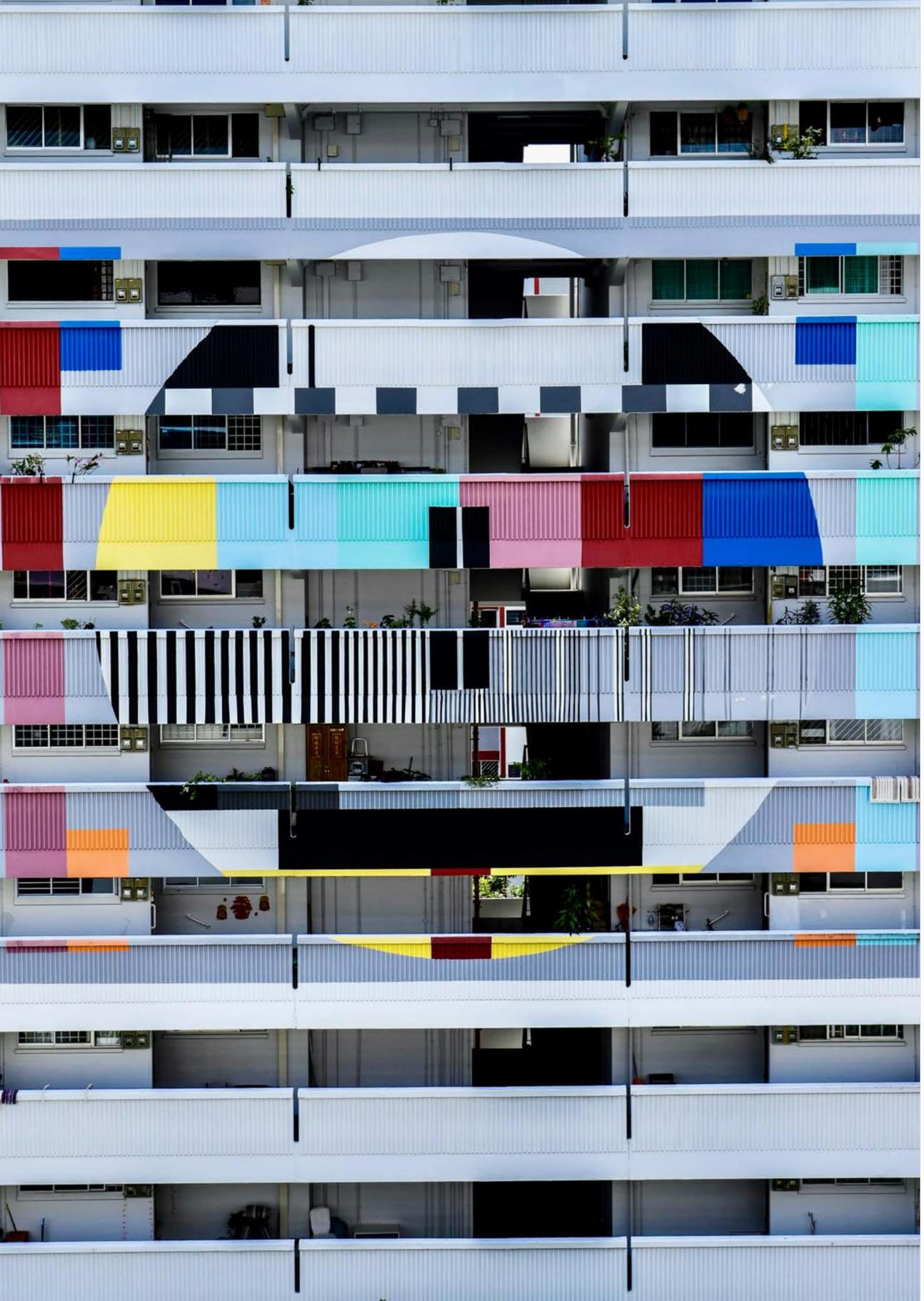
[13] With reference to IMO definition, ZNZs stand for "zero or near-zero" emission fuels, technologies or energy sources. As of November 2026, ZNZs have a GHG Fuel Intensity (GFI) of no more than 19.0 gCO_2eq/MJ to 2034 and 14.0 gCO_2eq/MJ from 2035, which is 80% lower than the current average of 93.3 gCO_2eq/MJ. (Source: The IMO Net-Zero Framework – FAQs). Should the IMO revise its thresholds/definitions in the future, the taxonomy will adopt the updated thresholds/definitions accordingly to maintain alignment with the latest international regulatory framework.

2.8. Air transport

Sector	Transport
Activity	**Freight and Passenger air transport**
ISIC Code	5110 & 5120
ISIC Description	5110: Passenger air transport This class includes transport of passengers by air over regular routes and on regular schedules; charter flights for passengers; and scenic and sightseeing flights. This class also includes renting of air-transport equipment with operator for the purpose of passenger transportation; and general aviation activities, such as: transport of passengers by aero clubs for instruction or pleasure. 5120: Freight air transport This class includes transport freight by air over regular routes and on regular schedules; non-scheduled transport of freight by air; launching of satellites and space vehicles; and space transport. This class also includes renting air-transport equipment with operator for the purpose of freight transportation. This class also includes the vehicles and equipment that support ground activities in airports.
Objective	Climate change mitigation

Traffic Light	Criteria	Reference
Green	Once credible, science-based, and 1.5°C-aligned pathway developed by ICAO becomes available, it will be reviewed for inclusion in the Taxonomy. Pending this development The activity complies with one of the following criteria: • Performed using zero exhaust CO_2 emission aircraft such as those powered by electricity or hydrogen meeting Taxonomy criteria (green) And • Aircrafts are not dedicated to fossil fuel transport.	Not available in any of the currently existing Taxonomies.
Amber (measures)	The follow measures are eligible for CapEx financing: • Purchase/ use of SAF are eligible if it used in the processes (see below)[14], and • Investments in the manufacturing, infrastructure and supply chain for the development of the SAF industry and activities that promote the production and adoption of SAF can be classified as Amber measures. • In addition, manufacturing, infrastructure and supply chain for the development of the SAF industry can be classified as amber measures only if they relate to SAF which meet the feedstock criteria. SAF feedstock • must meet the Singapore Taxonomy Green criteria for biofuels indicated in the relevant section of this Taxonomy, and • the SAF feedstock must be recognised by ICAO as eligible under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and / or certified under the European Union Renewable Energy Directive[15] (EU RED). Sunset date for stated criteria[16]: 2030. Requirements for amber measures will need to be revised at the latest by 2030 to reflect the most recent developments in the SAF technologies and their potential impact on the decarbonisation of the aviation. In addition, the criteria will be revised before 2030 when the development of credible, science-based, and 1.5°C-aligned pathway for the SAF blending (e.g. by ICAO) is available.	EU Taxonomy provisions from the EU Taxonomy have been split between Green (zero-emission) and Amber (time-bound)
Ineligible activities	Activities that do not meet Green or Amber criteria	

[14] For the avoidance of doubt, for blended fuels only the proportionate SAF % can qualify as an amber measure
[15] Recognising that the availability of SAF is currently limited, the inclusion of EU RED certification is to provide flexibility for producers and users in certifying their SAF, especially during this nascent stage where the building up of SAF supply and production is underway.
[16] The sunset date stated under amber measures for air transport applies only to the stated criteria for SAF and not SAF as a measure. Appropriate thresholds for SAF will be considered in subsequent editions to reflect latest developments, recognizing that SAF is a key decarbonisation lever for the international aviation sector that will feature till 2050 and beyond and ICAO is still in the midst of developing an overall decarbonisation pathway for international aviation.



3 — Real Estate/Construction

Context

Metrics for measuring buildings vary around the world and a key challenge for setting buildings criteria and thresholds in taxonomies is to maintain a balance between usability and interoperability. While this is a challenge throughout the Taxonomy, in the buildings sector it is particularly acute given that most regions or countries already have a local buildings code or standard that is already being used locally (although to different degrees around the world). To maintain usability, local standards need to be used to whatever extent possible while also recognising that some of them may be insufficient on their own.

Comparing buildings standards, codes and labels around the world is a huge challenge, not least because buildings labels are scoring methodologies which measure a range of different metrics. Some of these metrics are climate related (energy efficiency, emissions etc) while others are not directly (water consumption, recycling infrastructure etc.). As a result, a building with a high score may receive this for largely non-energy related reasons which would not be aligned with the objective (climate mitigation) in this Taxonomy.

The extent to which non-energy related points can be awarded varies significantly depending on the scheme.

TSC overview and methodology

In the EU, the main metric is Primary Energy Demand (PED). The Taxonomy aims to set defined emissions intensity thresholds in line with Singapore's transition pathway.

Singapore's Green Mark Certification is used in this Taxonomy as a key starting point it is a rigorous and ambitious green building rating system to evaluate a buildings environmental impact and performance with climate mitigation credentials that are broadly aligned with EU approach. It is seen as a highly ambitious scheme internationally and intends to align with the United Nations (UN) Sustainable Development Goals (SDGs), including SDG13 on climate action. It is also used as a benchmark for existing requirements and/or schemes; for example, it being used by GreenGov.SG for all new public sector buildings and existing public sector buildings under retrofit as a key enabler for the public sector to meet government sustainability targets.

Category	Main Technical screening criteria	Additional metrics
Green	• Prevailing Green Mark certification[1] (all levels) • Buildings meeting CBI certification • Other eligible international certification: Edge, NABERS, Australian Green Star – see Table 4 and Table 5	
Amber	• No Amber category for new buildings • For renovation, 30% reduction in emissions or energy consumption (based on energy usage, Primary Energy Demand or GHG emissions) up to 2030 (sunset date) based on Singapore's required emissions intensity transition.	Sunset date of 2030
Ineligible activities	Buildings dedicated to fossil fuel use x (consistent with treatment of fossil fuels in energy; however, this would not apply to indirect activities e.g., a green building will be eligible even if rented by a fossil company).	

[1] The most updated version of Green Mark as of this current Taxonomy iteration is Green Mark 2021.

International certification schemes

To identify international proxies for eligibility, the Taxonomy has made use of the Climate Bonds Initiative research and criteria. This is kept up to date on the website. Some of the regional and international proxies are summarised here for easy viewing. Note that this is not comprehensive, and users are recommended to view the Climate Bonds website for up-to-date information[2].

Table 4 — Residential buildings proxies

Country/ region	Standard/ label/ code	Requirements
Australia	Green Star Homes	Certified by the GBCA and comply with Renewable Energy Pathway A or B and do not include a swimming pool.
China	Evaluation Standard for Green Building	Evaluation Standard for Green Building rating of 3 Star
India	IGBC Green Homes	Buildings certified under the IGBC Green Homes® Rating system v3.0.
International	LEED	Meet all of the following criteria: • LEED Gold OR Platinum and • 30% improvement above the levels in ASHRAE 90.1 and • Only able to be used where a local proxy has not been established • If for a debt instrument: Date of LEED certification must be within 5 years before bond issuance
International	EDGE	• EDGE certified • Only able to be used in developing countries. • If for a bond: 10-year limit on bond tenor
International	Living Building Challenge Certified	**Living Building Challenge Certified**

Table 5 — Commercial buildings proxies

Country/ region	Standard/ label/ code	Requirements
Australia	Australian Proxy for Green Star Buildings	Certified by the GBCA under the Green Star Buildings scheme and comply with the Climate Positive Path. Buildings certified with 6 Star automatically comply. 5 Star rated buildings registered after 2023 will also comply. More information[3]
India	IGBC Net Zero Building rating system	Buildings that achieve a Net Zero Rating under the IGBC Net Zero Building rating system. Buildings in construction and recently completed buildings must provide additional pre-issuance document.
International / USA	LEED	Meet all the following criteria: • LEED Gold OR Platinum and • 30% improvement above the levels in ASHRAE 90.1. • Only able to be used where a local proxy has not been established • If debt instrument : 6-year limit on tenor. • If debt instrument : Date of LEED certification must be within 5 years before bond issuance.
International	EDGE	• EDGE Certified • Only eligible in developing countries
International	Living Building Challenge Certified	• **Living Building Challenge Certified** (all tiers)

[2] https://www.climatebonds.net/standard/buildings/commercial/calculator ; https://www.climatebonds.net/standard/buildings/residential/calculator
[3] https://www.climatebonds.net/files/files/standards/Buildings/Proxies/AUS%20-%20Green%20Star%20Buildings%20proxy%20v1.pdf

Activity technical screening criteria

3.1. Construction of new buildings

Sector	Real Estate	
Activity	**Construction of new buildings**	
ISIC code	F4100	
ISIC description	This class includes: a. Building of complete constructions or parts thereof; civil engineering.	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	• Prevailing Green Mark Certification, or • Office buildings (or portfolio) in Singapore meeting CBI certification criteria[4] • Eligible international certifications – refer to Section 3.3: 'International Certification schemes' above Certificate validity: 5-year maximum limit if the certification does not impose a limit, or has one that is longer than 5 years.	Green Mark is the Singapore buildings standard Key elements of EU Taxonomy criteria
Amber	• N.A. (New buildings need to meet Green criteria)	
Ineligible activities	• Buildings are dedicated to extraction, storage, manufacturing, transport of fossil fuels. For the avoidance of doubt, the above does not include buildings providing office space to fossil companies for administrative or trading activities.	

3.2. Installation, maintenance, repair of equipment

Sector	Real Estate	
Activity	**Installation, maintenance, repair of equipment**	
ISIC code	F4321 / 4322 / 4329	
ISIC description	This class includes: 2. Building installation	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	The activity complies with one of the following criteria: • Installation of renewable energy equipment, renewable energy charging stations and regulation devices or • Installation of equipment within the two highest energy efficiency classes for equipment, as determined by relevant international labelling scheme or Singapore regulation	EU Taxonomy Local/ international labelling scheme rather than EU regulation.
Amber	• N.A. (Technology sufficiently developed to meet Green criteria)	
Ineligible activities	• Buildings are dedicated to extraction, storage, manufacturing, transport of fossil fuels. For the avoidance of doubt, the above does not include buildings providing office space to fossil companies for administrative or trading activities.	

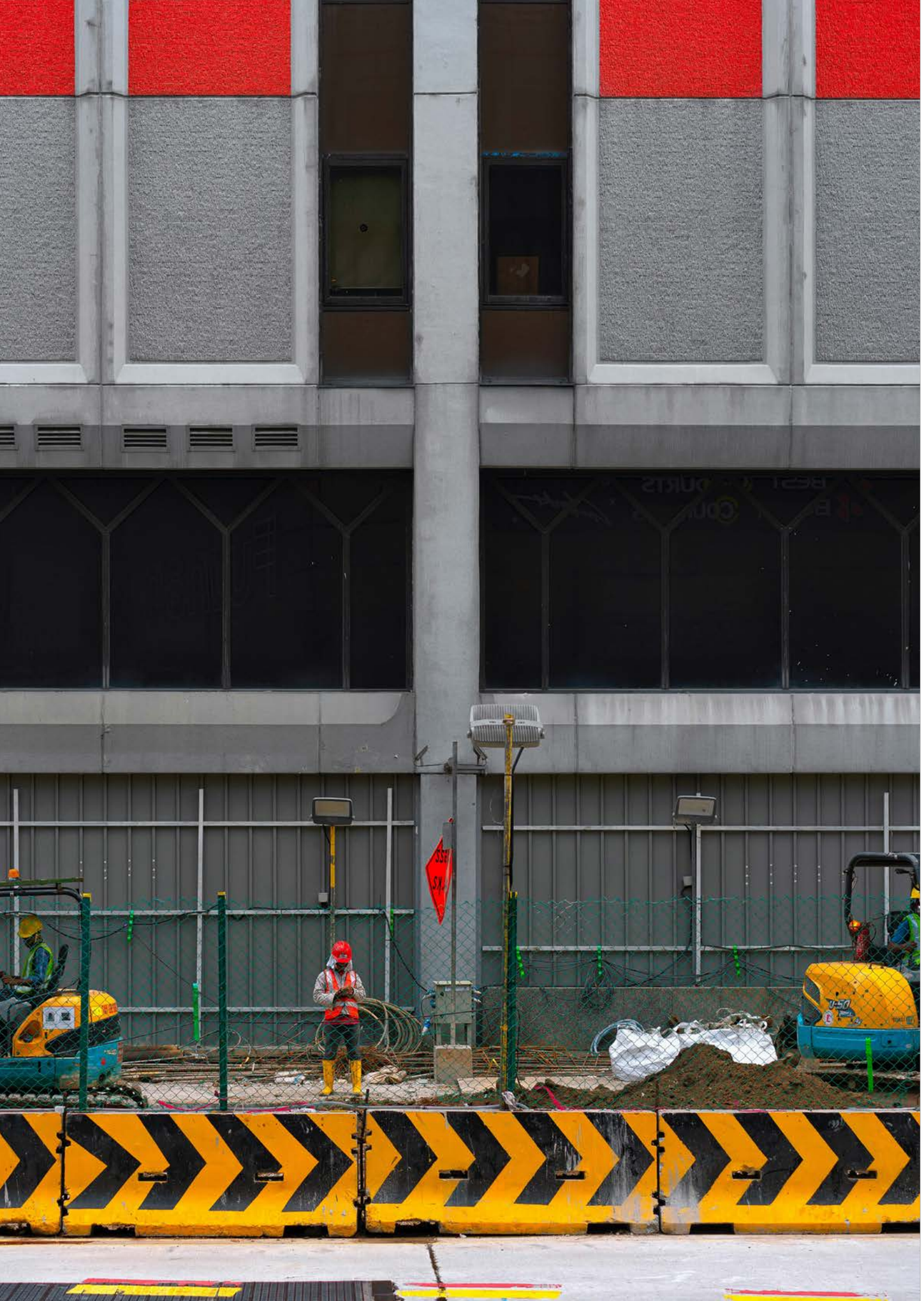
[4] https://www.climatebonds.net/standard/buildings/commercial/calculator#calculator

3.3. Renovation of existing buildings

Sector	Real Estate	
Activity	**Renovation of existing buildings**	
ISIC code	F4100 / F4330	
ISIC description	This class includes: 3. Building completion	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	• The renovations enable to reach the prevailing Green Mark Certification or • Aligns with relevant Climate Bonds Buildings Criteria	Green Mark Singapore Key elements of EU Taxonomy criteria
Amber	• Min 30% reduction in emissions or energy consumption if not meeting Certification standard above (based on energy usage, Primary Energy Demand or GHG emissions) up to 2030 (sunset date)	EU Taxonomy Climate Bonds Taxonomy
Ineligible activities	• Buildings are dedicated to extraction, storage, manufacturing, transport of fossil fuels. For the avoidance of doubt, the above does not include buildings providing office space to fossil companies for administrative or trading activities.	

3.4. Acquisition or ownership of buildings

Sector	Real Estate	
Activity	**Acquisition or ownership of buildings**	
ISIC code	L6810	
ISIC description	This class includes: Real estate activities with own or leased property	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	The activity complies with one of the following criteria: • Prevailing Green Mark Certification, or • The building is within the top 15% of the national or regional building stock expressed as operational Primary Energy Demand (PED) or GHG emissions or energy consumption and demonstrated by evidence which at least compares the performance of the relevant asset to the performance of the national or regional stock and at least distinguishes between residential and non-residential buildings. **The Singapore's Annual Building Energy Benchmarking Report (BEBR) can be a reference source to determine top 15% national stock.**	Green Mark Singapore Key elements of EU Taxonomy criteria
Amber	• The building is within the top 25% of the national or regional building stock expressed as operational Primary Energy Demand (PED) or GHG emissions or energy consumption and demonstrated by evidence. The sunset date for this activity is 2030. **The Singapore's Annual Building Energy Benchmarking Report (BEBR) can be a reference source to determine top 25% national stock.**	
Ineligible activities	• Buildings are dedicated to extraction, storage, manufacturing, transport of fossil fuels. For the avoidance of doubt, the above does not include buildings providing office space to fossil companies for administrative or trading activities.	



4 — Industry

Context

According to IPCC AR6 report, in 2019, about 24% of anthropogenic GHG emissions came from the high-emitting industry sectors[1]. Once indirect emissions from energy use are considered that share increases to 34%. Over the last decade emissions from the industry (and transport) sector increased most rapidly.

Industrial sectors are recognised as amongst the hardest to abate. The high levels of energy required cannot always be met using electrification. Existing fossil fuel sources may be difficult to replace, and the future replacement technologies are at varying stages of commercial development.

Most products from the industrials sectors will be required in a lowcarbon future – steel and aluminium for wind turbines, cement for low-carbon infrastructure etc. Therefore, most activities will not be completely phased out (like coal) but will need to be significantly decarbonised (green steel, green cement etc.). This distinction is important recognising how sector criteria are being developed to enable a successful global transition to net zero.

The IPCC AR6 report highlights that the enormous challenge in achieving a net-zero objective in the coming decade. However, decarbonisation is not impossible, owing to ongoing technological developments, and broad adoption of mitigation, adaptation, and resilience measures across value chains.

The primary levers for decarbonisation include, among others:

- Electrification,
- Non-fossil-based inputs,
- Use of various low-carbon fuels (e.g. hydrogen) for heat applications,
- Use of CCS/CCUS as appropriate with ambitious efficiency targets (e.g. ≥70% in steel).

Importantly, industry faces a dual challenge – on one hand, reducing its own emissions and on the other hand manufacturing the technological solutions that will play an enabling role in the emissions reduction in other areas of whole economy. Thus, it is necessary to steer financial flows both[2]:

- to the activities that have the **highest share in the GHG emissions**, (referred to as hard to abate activities)
  - e.g. manufacturing of iron and steel, of basic chemicals, cement, aluminium and hydrogen[3]
- to the activities that have the **highest share in the GHG emissions**, (referred to as hard-to-abate activities)
  - e.g. manufacturing of renewable energy technologies, low-carbon technologies for transport, energy efficiency equipment for buildings, and production and use of hydrogen etc.

TSC overview and methodology[4]

GREEN
High GHG-emitting sectors

Technical screening criteria – emission thresholds for sectors that are characterised by high GHG emissions (basic chemicals, steel, cement, hydrogen, aluminium) as have been developed based on the 1.5ºC science-based decarbonisation pathways – an approach adapted from Climate Bonds Initiative's criteria.

[1] https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Full_Report.pdf
[2] While manufacture of biofuels has also been identified as a key area for green growth, it is not scoped in this current Taxonomy due to a lack of credible references. Instead, it'll be included in future Taxonomy.
[3] While manufacture of biofuels has also been identified as a key area for green growth, it is not scoped in this current Taxonomy due to a lack of credible references. Instead, it'll be included in future Taxonomy iterations when there is clearer global guidance.
[4] Given the broad scope covered by the manufacturing sectors please refer to detailed sectoral criteria, given that there might be some deviations from the outlined approach and methodology

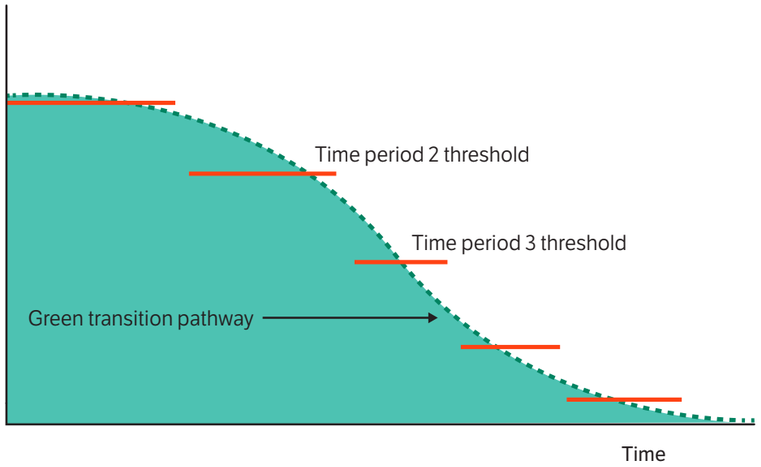


Figure 7: Theoretical example of creation of how thresholds are put forward based on transition

EU Taxonomy thresholds have been used as a starting point for a pathway and the sectoral decarbonisation pathway has been transposed to this starting point to reach net zero by 2050 at the activity level. As far as possible, the thresholds have been projected into the future so that the user can see how the thresholds will change over time as they ratchet down towards 2050 (see Figure 7). This is an extension of the EU approach where the EU criteria are put forward for the current period with the understanding that these will be revised downwards every 5 years (to be confirmed). The approach is intended to provide greater certainty for users to see how activities need to decarbonise to remain green although it is noted that thresholds, particularly those further in the future, are based on today's understanding of the future and what is possible, what may change as new technologies become available etc.

Wherever possible, science-based transition pathways have been adopted from other initiatives, which approach pathway development process with a high degree of scrutiny from academia and industry experts such as these developed by the IEA or the Science-Based Targets Initiative (SBTi).

Basic information about decarbonisation pathways used is provided in the table below – more details can be found in Appendix J.

Manufacturing of low and zero carbon products and technologies

Enabling sectors are those focused on manufacturing of net-zero aligned products and technologies. These sectors have TSC that are more qualitative and less dynamic – not associated directly with decarbonisation pathway, often introducing the links to criteria established for the associated economic activities. The Green thresholds adopted for these activities have been, in most cases, are from the EU Taxonomy.

Table 7 — Decarbonisation pathways based on which Taxonomy criteria have been developed (2026 edition)

Basic chemicals	Teske et al. (2022); ICF and Fraunhofer ISI study for the EC (2021)
Cement	Science-Based Targets initiative
Iron and Steel	IEA Net Zero Emissions by 2050 Scenario (NZE) and Sustainable Development Scenario (SDS)
Hydrogen	MIT Energy Initiative's SESAME platform
Aluminium	International Aluminium Institute based on IEA
Please refer to Table 20 in Appendix J for details	

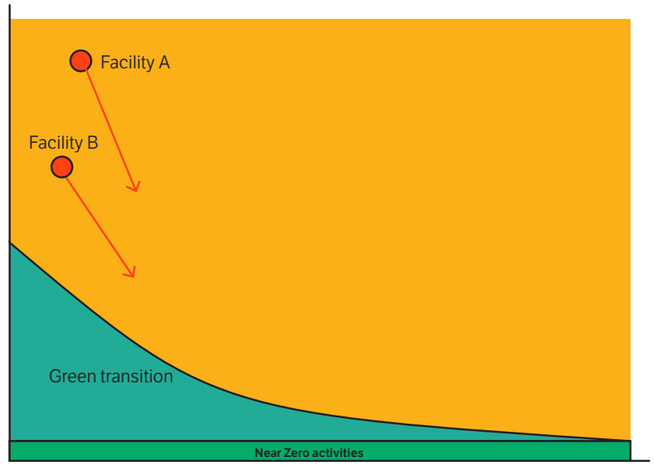


Figure 8: Amber category for industry sectors

Amber and Ineligible activities

Approach to setting TSC for high emitting sectors

Given the scale of the challenge associated with the decarbonisation of the selected industry sectors and lack of technologically and economically feasible low-carbon alternatives, these sectors have been defined as inherently "in transition".

This means that while in other sectors, it makes sense to create a line between ineligible and Amber performance, for most industry sectors, this line is problematic for a few reasons:

1) The data is not available to create a line with any credibility or science basis meaning that the line between ineligible and Amber would be arbitrary;

2) For many activities, performance at the activity level (or, in the case of industry, a plant or facility) will vary significantly but the aim is for all facilities to move to a Green transition pathway within a time period. The starting point is therefore not important compared to the movement towards green over time.

This means that while in other sectors, it makes sense to create a line between ineligible and Amber performance, for most industry sectors, this line is problematic for a few reasons:

1) Transition plans: Rely on plans put in place at the company level towards net zero

2) Measures based approach: Put forward eligible technologies or Green transition 'measures'

Therefore, it has been proposed not to focus on selected activities deemed as harmful/ineligible, but on criteria that would positively reinforce decarbonisation efforts through the establishment of Green category for facilities that meet certain thresholds and Amber category for measures that support emissions reduction, rather than specific economic activities alone.

However, to promote "movement towards green" also of these facilities that do not yet meet the Green criteria, and to ensure that investments in measures are not just an "one-off" initiative, but rather part of strategic



Figure 9: Theory of change behind measures-based approach

planning focused on alignment of the activity with the decarbonisation pathway, for the measures-based approach, the requirement of the 1.5°C-aligned transition plan has been introduced. We recommend for the transition plans to be prepared in line with Transition Finance Principles outlined by the IPSF.[5,6] While today the requirement is for the entities to develop 1.5°C-aligned transition plan, likely, with future revisions of the Taxonomy, further provisions regarding the contents and level of ambition might be introduced.

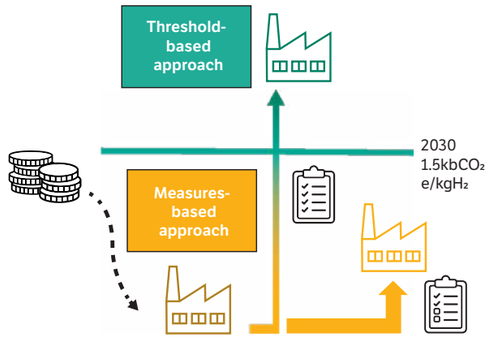


Figure 10: Measures-based approach for Amber category for selected sectors

APPROACH TO SETTING TSC FOR MANUFACTURING OF LOW-CARBON PRODUCTS AND TECHNOLOGIES

In most cases, there is no Amber category but new activities, and thus manufacturing of associated new products and technologies, have to meet thresholds set for Green category. Activities that do not meet Green TSC are classified as Ineligible activities.

Table 8 — Usability implications of measures-based approach to Amber category

Type of activities	Activities	Green	Amber (measures)	Ineligible activities
High emitting activities	Manufacture of basic chemicals	X	X	X
	Manufacture of cement	X	X	X
	Manufacture of aluminum	X		
	Manufacture of hydrogen	X	X	X
Enabling activities	Manufacture of plastics in primary form	X		X
	Manufacture of batteries	X		X
	Manufacture of renewable energy technologies	X		X
	Manufacture of equipment for the production and use of hydrogen	X		X
	Manufacture of low-carbon technologies for transport	X		X
	Manufacture of energy efficiency equipment for buildings	X		X
	Manufacture of other low-carbon technologies	X		X

[5] https://finance.ec.europa.eu/system/files/2022-11/221109-international-platform-sustainable-report-transition-finance_en.pdf
[6] While the requirement for the entity to have a 1.5°C-aligned transition plan has been introduced just for the investments in measures that are classified as Amber transition plans are regarded as best practice and development of the 1.5°C, science-based transition plan is encouraged for all entities.

Impact on usability of measures-based approach – promoting transition of hard-to-abate sectors

The Amber category that applies to investment measures cannot, however, be used to assess revenues. It can only be used for the purpose of defining the alignment of CapEx. Such an approach has a major upside in that by acknowledging individual decarbonisation efforts rather than solely end-effects, it could help fast-track emissions reduction from hard-to-abate sectors. To further leverage that effect, TSC require that measures are implemented by 2035, limiting the timeframe for enabling meaningful, but nevertheless insufficient, from the net-zero perspective, improvements. This short-term period aims to offer an opportunity to reward positive climate impacts, while low and zero-emission technologies remain under-developed and expensive.

Table 9 — Usability implications of measures-based approach to Amber category

	Criteria for Amber (measures)	Criteria for Amber	Criteria for Green
Taxonomy end-use: CapEx	Specific measures (each of them might have additional measure-specific criteria)	CapEx is eligible if a given activity currently meets the Amber criteria, and the measure will help to achieve Green criteria (so assume need to assess transition plan/ CapEx plan)	CapEx is eligible if a given activity currently meets the Green criteria, and the measure will help to keep below the future Green criteria (so assume need to assess transition plan/ CapEx plan)
Taxonomy end-use: Revenue	N.A.	Revenue is eligible if activity meets the Amber criteria	Revenue is eligible if activity meets Green criteria

Interoperability with Climate Bonds Initiative and EU Taxonomies – rationale for selection of pathways designed by Climate Bonds Initiative

In most cases, for enabling activities, TSC have been adapted from the EU Taxonomy. However, given that EU thresholds are highly EU-specific, and that they lack forward-looking emissions reduction pathways, CBI criteria have been used for the development of TSCs for highly emissive sectors.

Uptake of global decarbonisation pathways (e.g. IEA's) by CBI criteria helps to ensure their universal application and thorough engagement of technical and industry experts in the criteria development process enhances their usability by stakeholders.

However, to increase interoperability between taxonomies, EU thresholds have been used as a starting point for ratcheting ambition up to net zero. Such approach encourages also pro-active approach given that EU thresholds have been based on achievements of best performers. Additionally, CBI criteria offer increased stringency due to the presence of cross-cutting requirements focused on e.g. feedstock or energy-used.

User guide for measures and activity

The Taxonomy proposes different criteria for CapEx (Amber measures) and for revenue (Amber activities). These are potentially eligible for Amber category within sustainable finance (noting that some international investors may choose not to invest in Amber) for a labelled bond.

However, revenues generated from the activity will not be eligible as Amber activities under any disclosure guidelines/requirements until they meet the Amber thresholds.

Activity technical screening criteria

4.1. Manufacture of basic chemicals

Sector	Industry
Activity	**Manufacture of basic chemicals**
ISIC code	2011
ISIC description	This class includes the manufacture of chemicals using basic processes, such as thermal cracking and distillation. The output of these processes are usually separate chemical elements or separate chemically defined compounds.
Objective	Climate change mitigation
Reference	**Green:** Adapted from Climate Bonds' Criteria for Basic Chemicals sectors. Pathway followed and relevant references for projection of the thresholds has been described in detail the Basic Chemicals Criteria Background Paper. Wherever applicable, the EU Taxonomy thresholds have been used as a starting point for the decarbonisation pathway. **Amber:** Adapted from Climate Bonds' Criteria for Cement sector. Detailed methodology can be found in the CBI's Basic Chemicals Criteria Background Paper.

Further information on methodology used can be found at the Climate Bonds Initiative's website: https://www.climatebonds.net/standard/basic-chemicals in the Criteria Document and Background Paper

Traffic Light	Criteria
Green	Facility must comply with the following headline requirements • Activities need to meet specific carbon or energy intensity thresholds defined in Table 9, and • At least 50% of annual production by volume is on the list of basic chemicals in scope, and And if Facilities are using fossil gas, hydrogen, CO_2 or biomass as feedstock they are eligible only if they meet the following criteria: • **Fossil gas**: Only eligible for existing facilities prior to 2030. • **Hydrogen** meets the Taxonomy criteria (Green category) for hydrogen production. • **Biomass** complies with the criteria applicable for biomass sourcing set out in the Taxonomy Bio-energy criteria (Green category). • **CO_2** used satisfies the criteria described in Table 9 (e.g. CO_2 from ammonia production should not be used for urea production) And if Facilities are using fossil gas, hydrogen, biomass, or heat supplied from alternative sources as a fuel source they are eligible only if they meet the following criteria: • **Fossil gas**: Only eligible for existing facilities prior to 2030. • **Hydrogen**: The hydrogen used meets the Taxonomy criteria for hydrogen production (Green category). • **Biomass**: The bio-energy complies with the Taxonomy Bio-energy criteria (Green category). Only secondary organic streams are eligible. • **Facilities using heat supplied from alternative sources**, such as geothermal, solar thermal, and waste heat recovery: The heat source must comply with the Taxonomy most up to date criteria for each source of energy (Green category).

Green

Table 10 — Basic chemical-specific carbon and energy intensity thresholds

Type	Criteria			
	2022–2029	**2030–2039**	**2040–2049**	**2050–2059**
Ammonia	Uses hydrogen, as feedstock, that meets the Taxonomy criteria for hydrogen production (Green category) or ammonia is recovered from wastewater. CO_2 from ammonia production should not be used for urea production.	Uses hydrogen, as feedstock, that meets the Taxonomy criteria for hydrogen production (Green category) or ammonia recovered from wastewater. CO_2 from ammonia production should not be used for urea production.	Uses hydrogen, as feedstock, that meets the Taxonomy criteria for hydrogen production (Green category) or ammonia recovered from wastewater. CO_2 from ammonia production should not be used for urea production.	Uses hydrogen, as feedstock, that meets the Taxonomy criteria for hydrogen production (Green category) or ammonia recovered from wastewater. CO_2 from ammonia production should not be used for urea production.
Nitric acid	0.038tCO_2e/t nitric acid	0.021tCO_2e/t nitric acid	0.011tCO_2e/t nitric acid	0.007tCO_2e/t nitric acid
Chlorine	2.45MWh electricity/t chlorine or carbon intensity of the electricity used meets the Taxonomy criteria for electricity generation (Green category)	1.85MWh electricity/t chlorine or carbon intensity of the electricity used meets the Taxonomy criteria for electricity generation (Green category)	Carbon intensity of the electricity used meets the Taxonomy criteria for electricity generation (Green category)	Carbon intensity of the electricity used meets the Taxonomy criteria for electricity generation (Green category)
Carbon black	1.141tCO_2e/t carbon black	0.63tCO_2e/t carbon black	0.34tCO_2e/t carbon black	0.20tCO_2e/t carbon black
Disodium carbonate/ soda ash	0.789tCO_2e/t disodium carbonate/ soda ash or carbon intensity of the electricity used meets the Taxonomy criteria for electricity generation (Green category)	0.44tCO_2e/t disodium carbonate/ soda ash or carbon intensity of the electricity used meets the Taxonomy criteria for electricity generation (Green category)	0.23tCO_2e/t disodium carbonate/ soda ash and carbon intensity of the electricity used meets the Taxonomy criteria for electricity generation (Green category)	0.14tCO_2e/t disodium carbonate/ soda ash and carbon intensity of the electricity used meets the Taxonomy criteria for electricity generation (Green category)
High value chemicals (ethylene, propylene, butadiene)	0.51tCO_2e/t high value chemical	0.28tCO_2e/t high value chemical	0.15tCO_2e/t high value chemical	0.09tCO_2e/t high value chemical
Aromatics BTX (benzene, xylene and toluene)	0.0072tCO_2e/t aromatics BTX[7]	0.0040tCO_2e/t aromatics BTX[7]	0.0021tCO_2e/t aromatics BTX[7]	0.0012tCO_2e/t aromatics BTX[7]

[7] BTX measured as complex weighted throughput. Refer to: https://www.concawe.eu/publication/report-no-912 /

	Production of methanol	Uses hydrogen, as feedstock, that meets the Taxonomy criteria for hydrogen production (Green category)	Uses hydrogen, as feedstock, that meets the Taxonomy criteria for hydrogen production (Green category)	Uses hydrogen, as feedstock, that meets the Taxonomy criteria for hydrogen production (Green category)	Uses hydrogen, as feedstock, that meets the Taxonomy criteria for hydrogen production (Green category)

The following emissions should be accounted for when comparing to the thresholds in Table 8.

- Nitric acid, and soda ash: Scope 1 emissions which include all direct emissions from the production processes: emissions generated during the chemical reactions, emissions from fuel combustion on-site.
- Carbon black, HVC and aromatics: Scope 1 as defined above, plus Scope 2 emissions which includes indirect emissions from the energy imported from off-site.
- Methanol and ammonia: GHG emissions are for the lifecycle emissions of hydrogen used as feedstock.
- Chlorine: The benchmark is for the electricity intensity of the process. No GHG accounting is required for chlorine. Following 2040, electricity must be from renewable sources.

Amber (measures)

Amber category is applicable until 2035 – all eligible decarbonisation measures must be implemented prior to 2035

Criteria:
- Eligible measures are listed in Appendix K together with the associated criteria

Criteria are applicable within production facility where:
- At least 50% of annual production is on the list of basic chemicals in scope
- Company has a transition plan aligned with 1.5ºC.

Ineligible activities

Facilities or measures in which:
- The energy source is coal or coal derivatives or dedicated crops, primary organic streams, and wood and/or
- The feedstock is coal or coal derivatives.

4.2. Manufacture of cement

Sector	Industry
Activity	**Manufacture of cement**
ISIC code	2394
ISIC description	
Objective	Climate change mitigation
Reference	**Green:** Pathway based on a starting point (in 2020) of the EU Taxonomy thresholds for cement. Sectoral decarbonisation pathway from Science-Based Targets Initiative has been applied to this starting point to reach net zero by 2050. Pathway followed and relevant references for projection of the thresholds has been described in detail in section 4.3.1. of the CBI's Cement Criteria Background Paper **Amber:** The proposed approach is adapted from Climate Bonds' Criteria for Cement sector. Detailed methodology can be found in the CBI's Cement Criteria Background Paper

Further information on methodology used can be found at the Climate Bonds Initiative's website: https://www.climatebonds.net/standard/cement in the Criteria Document and Background Paper

Traffic Light | **Criteria**

Green

Facility must comply with the following headline requirements:

- Activities need to meet specific emissions intensity thresholds defined in Table 10, More detailed calculations and methodology can be found in Appendix A.

And if
facilities are using biomass, hydrogen', or waste as a fuel source they are eligible only if they meet the following criteria:

- **Hydrogen**: The hydrogen used meets the Taxonomy criteria (Green category) for hydrogenproduction.
- **Biomass**: The biomass used complies with the criteria applicable for biomass sourcing set out in the Taxonomy Bio-energy criteria (Green category).
- **Waste-Derived Fuels, including Municipal Solid Waste (MSW)** must meet Taxonomy criteria (Green category) and

  1) All waste of recycling potential must be removed prior to burning in line with the waste hierarchy and

  2) Municipal solid waste will not be eligible as a fuel type after 2035

And if
the plant uses Carbon Capture and Storage (CCS) equipment on site, it must comply with Taxonomy criteria for CCS Storage (Green category)

Table 11 — Selected threshold values forming the emissions pathway for cement production facilities (tCO_2/t cementitious product)

Cement class	2025	2030	2040	2050
32.5	0.341	0.298	0.222	0.073
42.5	0.416	0.363	0.271	0.089
52.5	0.470	0.410	0.306	0.101

More detailed information, thresholds for other years and methodology (incl. scope of emissions used in meeting the pathway) can be found in Appendix A.

Amber (measures)

Eligible decarbonisation measures or retrofitting activities (capital investments) must be implemented prior to 2035

And
Constitute one or more of the following measures:

- Installation, upgrade and operation of precalciners

Traffic Light	Criteria
Amber (measures)	• Installation, upgrade, and operation of heat recovery systems • Installation, upgrade, and operation of digitised control equipment or infrastructure. This may include: ○ Sensors and measurement tools (including software to allow real-time and close control of processes to improve efficiency) ○ Communication and control (including advanced software and control rooms, and automation of plant processes) • Installation, upgrade, and operation of testing equipment. For example: ○ Automated XRD systems • Electrification of heat (for example, electrified kiln processes) • Installation, upgrade, retrofit and operation of measures which achieve emissions savings equivalent to the emissions decrease for facilities over the life-span of the debt instrument • Installation, upgrade, and operation of carbon capture and storage equipment that is aligned with Taxonomy criteria (Green category) • Infrastructure, revamps or modifications of equipment needed for the production of cement using hydrogen as a fuel, that is aligned with Taxonomy criteria for hydrogen (Green category) And Measures are applicable within production facility where company has a transition plan aligned with 1.5°C.
Ineligible activities	Facilities or measures in which: • The energy source is coal or coal derivatives or dedicated crops, primary organic streams, and wood

4.3. Manufacture of basic iron and steel 2026 Edition

Context and methodology notes

Today, global steel production is dominated by three main production routes: Blast Furnace-Basic Oxygen Furnace (BF-BOF) (~70% of global production); Electric Arc Furnace (EAF) (~25% of global production); and Direct Reduced Iron-Electric Arc Furnace (DRI-EAF) (~5% of global production)[8]. Asia's steel plant fleet is young relative to the global average[9], meaning most of the region's capacity will still be online in 2050. It is therefore critical that new facilities are designed to avoid carbon lock-in, and that existing facilities are retrofitted to reduce emissions.

Low-carbon steel production technologies are at varying stages of development and deployment, with further innovations expected to become commercially viable over time. As the iron and steel sector progresses towards net zero, steelmaking is expected to adopt a broader range of production pathways involving different combinations of technologies and operational approaches. The maturity and feasibility of these technologies vary by jurisdiction and facility. For example, the commercial readiness of CCUS remains uncertain, and the availability of CO_2 transport and storage infrastructure differs significantly across the region.

In the 2026 edition, to accommodate this evolving technological landscape, the criteria have been updated to adopt emissions-intensity-based thresholds that enable a technology-agnostic assessment approach. This allows facilities to be assessed based on achieved emissions performance, regardless of the specific technologies or production routes employed. Such an approach recognises emissions reductions delivered through different pathways while avoiding the risk of favouring or discouraging specific technologies and innovations. The emissions intensity thresholds are assessed using facility-level direct (Scope 1) emissions associated with crude steel production. Indirect emissions from purchased electricity are not included in the emissions intensity calculation. This reflects the intention of the criteria to assess the operational emissions performance of steelmaking facilities consistently across different production routes and technology pathways.

To support this approach, recent studies have identified a range of potential iron and steel production archetypes that may emerge as the sector decarbonises. Table 12 presents a non-exhaustive set of illustrative archetypes, reflecting possible combinations of technologies, feedstocks, and production processes.

To acknowledge ongoing decarbonisation efforts, existing facilities that do not meet Green criteria at the outset but are designed to achieve full alignment over time can be classified as Amber. New iron and steel facilities can also be eligible for Amber if they commence operations before the end of 2030. This recognises the practical challenges of deploying low-emissions steelmaking technologies in the near term, which remain at varying stages of maturity and commercial readiness. It also reflects analysis by the Mission Possible Partnership indicating that a net-zero pathway for the sector remains achievable even if large-scale deployment of near-zero-emissions steelmaking is limited before 2030, provided that investments are directed towards near-zero-emissions technologies thereafter[10]. The Amber criteria therefore provide a framework for recognising meaningful near-term emissions reductions while supporting the sector's longer-term transition towards lower-carbon steel production pathways.

Existing BF-BOF facilities face technical and economic challenges in aligning with a 1.5°C pathway. These facilities will need to implement additional decarbonisation measures over time. However, meaningful near-term emissions reductions can still be achieved through operational improvements, energy efficiency measures, and the adoption of lower-emission technologies where feasible. The Amber criteria therefore recognise the importance of supporting emissions reductions during the sector's transition toward lower-carbon steel production pathways.

Table 12 — Examples of Eligible Assets (non-exhaustive)

The following are examples of iron and steel production assets, and combinations thereof, that could potentially meet the direct emissions intensity threshold. The list is non-exhaustive and reflects a range of both incremental improvements and breakthrough technologies.

Eligible asset archetypes include:

- Best Available Technology Blast Furnace–Basic Oxygen Furnace (BF–BOF)
  - With co-injection and CCS/CCUS
- Direct Reduced Iron–Electric Arc Furnace (DRI–EAF)
  - DRI–EAF with hydrogen and/or biomethane
  - DRI–EAF with CCS
  - DRI–EAF using 100% green hydrogen
- Direct Reduced Iron–Melt Basic Oxygen Furnace (DRI–Melt BOF)
  - With hydrogen and/or CCS
- Smelting Reduction
  - Smelting reduction with CCS
- Electrolysis-based Routes
  - Electrolyser–EAF
  - Electro-winning–EAF

[8] https://business.columbia.edu/insights/climate/cki/steel/overview
[9] https://www.agora-industry.org/publications/decarbonising-steel-in-southeast-asia
[10] Mission Possible Partnership https://dvvfw3pu42z1e.cloudfront.net/assets/custom/010856/downloads/Making-Net-Zero-Steel-possible-steel.pdf

According to the United Nations Industrial Development Organisation (UNIDO), around 70% of coal-fired blast furnaces globally are expected to require reinvestment by 2030[11] . Steel producers can either invest in 'relining' (extension of the lifespan of the investment) or switch to alternative technologies. Relining is discouraged within these criteria as it risks locking in assets that are not compatible with a low-carbon future. After 2030, facilities will be required to decarbonise more aggressively. Accordingly, the Amber criteria are designed to encourage producers to pursue alternative technologies that reduce emissions intensity, rather than prolonging reliance on coal-based processes that may risk becoming stranded over time.

Taken together, the criteria seek to encourage immediate emissions reductions while providing a pathway for the deployment of low-emissions steelmaking technologies needed to achieve deep decarbonisation over time.

Sector	**Industry**	
Activity	**Manufacture of basic iron and steel**	
ISIC code	2410	
ISIC description	This class includes operations of conversion by reduction of iron ore in blast furnaces and oxygen converters or of ferrous waste and scrap in electric arc furnaces or by direct reduction of iron ore without fusion to obtain crude steel which is smelted and refined in a ladle furnace and then poured and solidified in a continuous caster in order to produce semi-finished flat or long products, which are used, after reheating, in rolling, drawing and extruding operations to manufacture finished products such as plate, sheet, strip, bars, rods, wire, tubes, pipes and hollow profiles.	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	The activity complies with one of the following criteria: • Facilities must comply with the following direct (Scope 1) emissions intensity for the production of crude steel: Table 13a: Green thresholds (tCO_2e/t crude steel) **2025-2030** | **2031-2040** | **2041-2050** < 1.12 tCO_2e/t steel | < 0.90 tCO_2e/t steel | < 0.60 tCO_2e/t steel • Electric Arc Furnaces (EAF) using at least 70% scrap as total inputs are automatically eligible AND • Must comply with applicable cross-cutting criteria listed in Table 24 of Appendix M.	Emissions intensity thresholds are set with reference to the IEA NZE Scenario[12] and the IEA SDS Scenario[13]. The thresholds also reference the expected transitional and green technology archetypes presented in the Mission Possible Partnership Net-zero steel initiative.

[11] Iron and Steel: What is the state of decarbonization technologies? - UNIDO
[12] Direct CO_2 intensity of the iron and steel sector in the Net Zero Scenario, 2010-2030 – Charts – Data & Statistics - IEA
[13] Iron and Steel Technology Roadmap – Analysis - IEA

Amber	Eligible assets that are not meeting the criteria stated in the Green Criteria can be classified as Amber only if the activity complies with one of the following criteria: • Existing facilities must comply with the following direct (Scope 1) emission intensity for the production of crude steel: Table 13b: Amber thresholds, existing facilities (tCO_2e/t crude steel) **2025-2030** | **2031-2040** | **2041-2050** < 1.80 tCO_2e/t steel | < 1.20 tCO_2e/t steel | Not Applicable • New facilities must comply with the following direct (Scope 1) emission intensity for the production of crude steel: Table 13c: Amber thresholds, new facilities (tCO_2e/t crude steel) **2025-2030** | **2031-2040** | **2041-2050** < 1.80 tCO_2e/t steel | Not Applicable | Not Applicable • Non-coal-based DRI-EAF Facilities are automatically eligible AND • Must comply with applicable cross-cutting criteria listed in Table 24 Appendix M AND • Have a transition plan aligned with 1.5°C.	Given the capital-intensive nature of steelmaking, the end of a plant's investment cycle typically represents the most suitable point to refurbish facilities and transition to low-carbon production technologies.
Ineligible activities	Facilities not complying with cross-cutting criteria (see Appendix M), incl. facilities using: • coal for on-site electricity generation– for clarity, will refer to captive coal-fired power plant (CFPP). • dedicated crops, primary organic streams, and wood when using biomass as a reducing agent and/or for energy generation • CCUS for production of products that release the CO_2 immediately when these are used (such as in urea, carbonated beverages, or fuels), or for enhanced oil recovery, and the production of other forms of fossil energy sources.	

4.4. Manufacture of hydrogen

Additional notes:

1. Thresholds for Green criteria for Manufacturing of hydrogen assess and pertain only to the cradle-to-site emissions.

2. Lifecycle GHG assessment for hydrogen production includes cradle-to-gate emissions, and transportation emissions to the site where a product will be used, unless it is instead converted into a carrier form before transportation. It means that the GHG accounting includes scope 1, 2 and partial Scope 3 emissions. System boundaries are shown in Figure 12 below.[14]

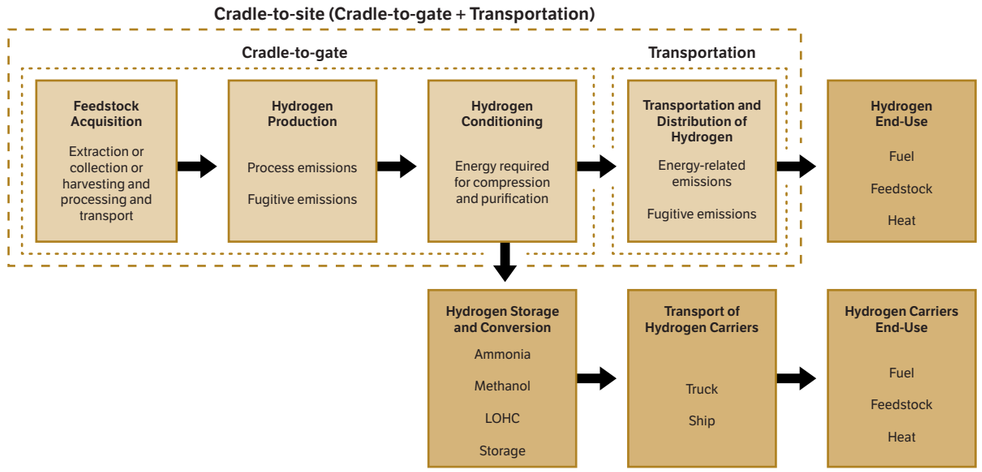


Figure 12: Systems Boundaries for GHG Accounting

3. If hydrogen is converted to ammonia or other carriers before transportation, that conversion is out of scope and therefore for this criteria is only up to the point before it is converted is relevant and should meet the proposed threshold. The conversion, transportation, and storage following are not currently in scope due to a lack of global guidance, although additional research is going into developing criteria for those parts of the process separately.

Sector	Industry
Activity	**Manufacture of hydrogen**
ISIC code	
ISIC description	
Objective	Climate change mitigation
Reference with international best practice / taxonomies / methodologies	• **Green:** The proposed approach is adapted from Climate Bonds' Criteria for hydrogen sector. Pathway followed and relevant references for projection of the thresholds has been described in detail in section 4.3.2. of the CBI's Hydrogen Criteria Background Paper. EU Taxonomy criteria have been adapted as a starting point for the decarbonisation pathway. • **Amber:** The proposed approach is adapted from Climate Bonds' Criteria for hydrogen sector. Detailed methodology can be found in the CBI's Hydrogen Criteria Background Paper

Further information on methodology used can be found at the Climate Bonds Initiative's website: https://www.climatebonds.net/standard/hydrogen-production in the Criteria Document and Background Paper

[14] In cases, where ammonia is used as a hydrogen carrier - fugitive emissions have not been yet taken into account

Traffic Light	Criteria
Green	Facility must comply with the following requirements: • Hydrogen production must meet specific carbon intensity thresholds (Table 14). • To demonstrate compliance with any of the emissions intensity thresholds set in Table 14, issuers are required to carry out a lifecycle assessment (see Appendix N). • Facilities must meet the requirements listed in Table 25 in Appendix N depending on the feedstock and : a. The feedstock is not coal or coal derivatives. b. Biomass from primary sources is not eligible as a feedstock. Wood and other dedicated crops are not eligible (only waste biomass sources are eligible). • Facilities must meet the requirements listed in Table 25 in Appendix N for different electricity sources. • Facilities using CCS or CCU must meet the criteria in Table 25 in Appendix N. Facilities that meet the specific intensity thresholds presented in Table 25 in Appendix N, do not have to meet the following requirements associated with CCS/CCU listed in Table 25 in Appendix N: The minimum capture rate from process and energy emission streams should be 90% or emissions reduction at the facility level have to be at least 50%. Note: Use of fossil gas as a feedstock by facilities following 2030 is not recommended but given substantial uncertainty regarding availability of low-carbon green hydrogen, it is not a criterion at this stage. This will be re-evaluated in future iterations.
Amber (measures)	Amber category is applicable until 2035 – all eligible decarbonisation measures must be implemented prior to 2035. **Criteria**: Eligible measures are listed in Appendix N (Table 25) together with the associated criteria. Criteria are applicable within production facility where company has a transition plan aligned with 1.5˚C.
Ineligible activities	**Facilities or measures for which:** • The energy source is oil, coal or coal derivatives and/or • The feedstock is coal or coal derivatives and/or • The energy source is biomass from primary sources and/or • The use of wood and other dedicated crops is enabled.

Table 14 — Hydrogen carbon intensity thresholds (see Appendix J for references and further details)

Asset Type	Criteria			
	2022 ($kgCO_2e/kgH_2$*)	2030 ($kgCO_2e/kgH_2$*)	2040 ($kgCO_2e/kgH_2$*)	2050 ($kgCO_2e/kgH_2$*)
Production of hydrogen	3	1.5	0.6	0

*To demonstrate compliance with any of the emissions intensity thresholds set in Table 14, the lifecycle assessment in line with the methodological notes provided in the Appendix J.

4.5. Manufacture of aluminium

Sector	Industry
Activity	**Manufacture of aluminium**
ISIC code	2420
ISIC description	
Objective	Climate Change Mitigation
Reference with international best practice / taxonomies / methodologies	**Green:** Pathway based on a starting point (in 2020) of the EU Taxonomy thresholds for aluminium. 1.5ºC-aligned sectoral decarbonisation pathway of the of the International Aluminium Institute (IAI) has been applied to this starting point focusing on the emissions scope by the EU Taxonomy. Pathway followed and relevant references for projection of the thresholds has been described in detail in IAI model

Traffic Light	Criteria
Green	The activity complies with one of the following criteria: **Primary aluminium** where the economic activity complies with two of the following criteria until 2025 and with all of the following criteria after 2025: • the GHG emissions do not exceed CO_2e emissions intensity thresholds presented in Table 15. • the average carbon intensity for the indirect GHG emissions does not exceed Green criteria set in the Taxonomy for Green category. • the electricity consumption for the manufacturing process does not exceed 14.86MWh/t Al. or **Secondary aluminium** – all eligible.
	Table 15 — Hydrogen carbon intensity thresholds (see Appendix J for references and further details)

Asset Type	CO_2e emissions intensity (CO_2e per tonne of aluminum manufactured)				
	2018	2030	2035	2040	2050
Production of Primary Aluminium through electrolysis	1.484	1.185	0.826	0.520	0.311

Amber (measures)	Amber category is applicable until 2035 – all eligible decarbonisation measures must be implemented prior to 2035. **Criteria**: Decarbonisation measures that enable the facility to increase share of renewable energy used by the facility. Criteria are applicable within production facility where company has a transition plan aligned with 1.5ºC.
Ineligible activities	N.A.

4.6. Manufacture of plastics in primary form

Sector	Industry
Activity	**Manufacture of plastics in primary form**
ISIC code	
ISIC description	
Objective	Climate change mitigation
Reference with international best practice / taxonomies / methodologies	**Green:** Approach adapted from the EU and South African Taxonomies

Traffic Light	Criteria
Green	The activity complies with one of the following criteria: • the plastic in primary form that is fully manufactured by mechanical recycling of plastic waste is directly eligible, without any further requirements incl. these focused on GHG emissions accounting; • where mechanical recycling is not technically feasible or economically viable, the plastic in primary form is fully manufactured by chemical recycling of plastic waste and the lifecycle GHG emissions of the manufactured plastic, excluding any calculated credits from the production of fuels, are lower than the lifecycle GHG emissions of the equivalent plastic in primary form manufactured from fossil fuel feedstock. Lifecycle GHG emissions are calculated using ISO 14067:2018 or ISO 14064-1:2018. Quantified lifecycle GHG emissions are verified by an independent third party. • derived wholly or partially from renewable feedstock and its lifecycle GHG emissions are lower than the lifecycle GHG emissions of the equivalent plastics in primary form manufactured from fossil fuel feedstock. Lifecycle GHG emissions are calculated using ISO 14067:2018 or ISO 14064-1:2018. Quantified lifecycle GHG emissions are verified by an independent third party. And Food or feed crops are not used as bio-based feedstock for the manufacture of plastic in primary form. And At least 90% of the produced plastic must not knowingly be used for single use consumer products.
Amber	N.A.
Ineligible activities	Activities that do not meet the criteria outlined in the Green category

4.7. Manufacture of batteries

Sector	Industry
Activity	**Manufacture of batteries**
ISIC code	
ISIC description	Manufacture of rechargeable batteries, battery packs and accumulators for transport, stationary, on-grid, and off-grid energy storage, and other industrial applications. Manufacture of respective components (battery active materials, battery cells, casings, and electronic components). And Recycling of end-of-life batteries. And Where economic activity enables repurposing of batteries into facilities that store electricity, the technical screening criteria outline in the Taxonomy for energy storage apply.
Objective	Climate change mitigation
Reference with international best practice / taxonomies / methodologies	**Green:** Approach adapted from the EU Taxonomy taking into account emerging level of regulatory ambition in the EU regarding the recycled materials content
Traffic Light	**Criteria**
Green	The activity complies with one of the following criteria: • The economic activity manufactures and repurposes rechargeable batteries, battery packs and accumulators (and their respective components), including from secondary raw materials, that result in substantial GHG emission reductions in transport, stationary, on grid and off-grid energy storage and other industrial applications. • Recycling of end-of-life batteries.
Amber	N.A.
Ineligible activities	Activities that do not meet the criteria outlined in the Green category.

4.8. Manufacture of renewable energy technologies

Sector	Industry
Activity	**Manufacture of renewable energy technologies**
ISIC code	
ISIC description	
Objective	Climate change mitigation
Reference with international best practice / taxonomies / methodologies	**Green:** Approach adapted from the EU Taxonomy
Traffic Light	**Criteria**
Green	The economic activity manufactures renewable energy technologies meeting the criteria set out in the Taxonomy (Green category).
Amber	N.A.
Ineligible activities	Activities that do not meet the criteria outlined in the Green category

4.9. Manufacture of equipment for the production of hydrogen through electrolysis

Sector	Industry
Activity	**Manufacture of equipment for the production and use of hydrogen**
ISIC code	
ISIC description	
Objective	Climate change mitigation
Reference with international best practice / taxonomies / methodologies	**Green:** Approach adapted from the EU Taxonomy
Traffic Light	**Criteria**
Green	The economic activity manufactures equipment to produce hydrogen through electrolysis
Amber	N.A.
Ineligible activities	Activities that do not meet the criteria outlined in the Green category.

4.10. Manufacture of low-carbon technologies for transport

Sector	Industry
Activity	**Manufacture of low-carbon technologies for transport**
ISIC code	
ISIC description	
Objective	Climate change mitigation
Reference with international best practice / taxonomies / methodologies	**Green:** Approach adapted from the EU Taxonomy
Traffic Light	**Criteria**
Green	The economic activity manufactures low-carbon transport vehicles and their respective key components, fleets and vessels meeting the criteria set out in the Taxonomy (Green category). Manufacturing of measures that can be classified as Amber for water and air transport (as per 2.8–2.10 sections of the Taxonomy) is eligible as Green only until 2030.
Amber	N.A.
Ineligible activities	Activities that do not meet the criteria outlined in the Green category

4.11. Manufacture of energy efficiency equipment for buildings

Sector	Industry
Activity	**Manufacture of energy efficiency equipment for buildings**
ISIC code	
ISIC description	
Objective	Climate change mitigation
Reference with international best practice / taxonomies / methodologies	**Green:** Approach adapted from the EU Taxonomy to account for potential geographical differences
Traffic Light	**Criteria**
Green	The economic activity manufactures one or more of the following products and their key components:[15] a) household appliances falling into the highest two classes of energy efficiency in accordance with local market standards b) light sources rated in the highest two classes of energy efficiency in accordance with local market standards c) space heating and domestic hot water systems rated in the highest two classes of energy efficiency in accordance with local market standards d) cooling and ventilation systems rated in the highest two classes of energy efficiency in accordance with local market standards e) presence and daylight controls for lighting systems; f) heat pumps g) façade and roofing elements with a solar shading or solar control function, including those that support the growing of vegetation; h) energy-efficient building automation and control systems for residential and non-residential buildings; i) zoned thermostats and devices for the smart monitoring of the main electricity loads or heat loads for buildings, and sensoring equipment; j) products for heat metering and thermostatic controls for individual homes connected to district heating systems, for individual flats connected to central heating systems serving a whole building, and for central heating systems; k) district heating exchangers and substations compliant with the district heating/cooling distribution activity set out in the Taxonomy (green category); l) products for smart monitoring and regulating of heating system, and sensoring equipment.
Amber	N.A.
Ineligible activities	Activities that do not meet the criteria outlined in the Green category

[15] The list of products and their components is likely to be revised in time

4.12. Manufacture of other low-carbon technologies for household sector

Sector	Industry
Activity	**Manufacture of other low-carbon technologies**
ISIC code	
ISIC description	
Objective	Climate change mitigation
Reference with international best practice / taxonomies / methodologies	**Green:** Approach aligned with the energy rating system introduced by the National Environment Agency of Singapore for regulated goods[16].
Traffic Light	**Criteria**
Green	For the household sector: Manufacturing of regulated goods that meet the highest performance level for a given good in energy rating system introduced by the National Environment Agency of Singapore or internationally available equivalent.
Amber	N.A.
Ineligible activities	Activities that do not meet the criteria outlined in the Green category

[16] https://www.nea.gov.sg/our-services/climate-change-energy-efficiency/energy-efficiency/household-sector



5 — Forestry

Context

The forestry sector has immense potential to provide environmental services that are extremely important in the fight against climate change. Forestry can also play an important role in the local economy through sustainable and regenerative systems. Forests can not only sequester and mitigate emissions of GHG, but they also play an important role in keeping biodiversity assets intact.

Afforestation, reforestation, and forest management to maximise carbon sequestration are recognised as key strategies for climate change mitigation in line with a 1.5°C pathway through removing CO_2 from the atmosphere and slowing global warming. However, the actual mitigation effect of forestry activities is influenced by many factors, such as location, scale and management effectiveness.

Climate change mitigation in the forestry sector is also strongly linked to avoiding deforestation and land-use change. Peat fires are also a major contributor to GHG emissions in Indonesia (40% of the total in 2005 and, in 2015, rivalling daily emissions in the U.S.) and could add an estimated 1 billion tons to the country's carbon footprint. The total carbon content of forests has been estimated at 861Gt of carbon for 2011, which is more than the amount of carbon in the entire atmosphere. According to the IPCC in its Sixth Assessment Report, reducing and/or preventing deforestation is the mitigation option with the largest and most immediate carbon stock impact in the short term.

TSC overview and methodology

Due to the diversity embedded in the forestry sector, the approach to identifying green agricultural practices and activities does not consider quantitative metrics and/or criteria.

Instead, it classifies activities and sub-activities according to the "traffic light" methodology where green are activities that are encouraged, amber are activities that should either be phased out or changed over time, while the rest are considered ineligible activities. This approach is similar to the one used for the construction of the Colombian Taxonomy.

Categorisation of activities

For the forestry sector, it is possible to group activities in three big groups, defined by the objectives and outputs of each operation in the sector.

The activities here have been mapped and grouped as follows:

- **Sustainable forest management** – a system that ensures that forests supply goods and services meet both present-day and future needs and contribute to the sustainable development of communities;
- **Forestry plantation** – type of managed forest in which the trees are planted (as opposed to naturally regenerated), of the same age and generally of the same species, and are intended to maximise the production of wood fibre;
- **Conservation, restoration and maintenance** – actions needed to protect and assure that environmental services are provided by natural/ pristine forests.

How to use these criteria

The criteria have been designed to be applicable to granular green activities as well as to the wider level. For example, some of the criteria are suitable for green use of proceeds instruments, such as green bonds, where a bond is raised for a specific project or asset (e.g. nurseries) while others (e.g. the proxy certification standards) are applicable at the forestry project level and could be used as part of corporate disclosure to classify green revenues. Note that for an activity to be effectively considered as green, it should be in line with the relevant related guidelines in one or more of the listed credible certification schemes (e.g. Forest Stewardship Council – FSC and Programme for the Endorsement of Forest Certification – PEFC).

Activity technical screening criteria

5.1. Sustainable forest management

Sector	Forestry	
Activity	**Sustainable forest management**	
ISIC Code	A 0200	
ISIC Description	Forestry	
Objective	Identify Green, Amber, and Ineligible assets, projects and related activities related to sustainable forest management.	
Traffic Light	**Criteria**	**Alignment with international best practice/ taxonomies/ methodologies**
Green	• Land acquisition/refinancing if sustainable forest management practices are being carried out or being implemented as certified by credible international schemes (see list aside); or • Equipment and costs incurred by the activities – pre and post extraction, including primary processing that is either powered by renewable energy or appear amongst the most energy efficient in the country – as certified by local energy efficiency standards; or • Conservation, restoration and maintenance; or • Nurseries[1] – required for the adoption of Integrated Farm Management (IFM[2]) practices – organic and biofertilisers/ biocontrol – and that seeds and seedlings are sourced in sustainably managed areas; or • Adoption and maintenance of monitoring technology that enables the tracking of the forest extracts and its conservation status.	Aligned to CBI Taxonomy; Colombian Taxonomy applies a similar approach; Credible green certification schemes for sustainable forest management: • Forest Stewardship Council (FSC); • Programme for the Endorsement of Forest Certification (PEFC);
Amber	• Land acquisition with the purpose of adopting sustainable forest management practices as defined and certified by credible national schemes (see list aside); or • Extraction of timber products that would be used as biomass or feedstock for heat generation and biofuels (Phase out by 2030).	Amber certification schemes: • National certifications in ASEAN (to be considered AMBER until national schemes are assessed).
Ineligible activities	• Exploitation of timber and non-timber products from any species that would lead to or further its threatened conservation status.	

[1] Nurseries are defined any facility designated to produce tree seedlings grown under favourable conditions until they are ready for planting.
[2] Integrated Farm Management (IFM) is a site specific farm business approach that uses the best of modern technology and traditional methods (as defined by IFMA)

5.2. Forestry plantation

Sector	Forestry	
Activity	**Forestry plantation**	
ISIC Code	A 0200	
ISIC Description	Forestry	
Objective	Identify green, amber, and ineligible assets, projects and related activities related to forestry plantation.	
Traffic Light	**Criteria**	**Alignment with international best practice / reference from other taxonomies or methodologies**
Green	• Equipment and costs incurred by the activities (equipment must be powered by renewable energy or appear amongst the most energy efficient in the country – as certified by local energy efficiency standards); or • Use of organic and biofertilisers; or • Use of physical and biocontrol of pathogens, pests and weeds; • Conservation, restoration and maintenance; • Nurseries – required the adoption of IFM practices – organic and biofertilisers/biocontrol – and that seeds and seedlings are sourced in sustainably managed areas; • Adoption and maintenance of monitoring technology that enables the tracking of the forest extracts.	Aligned to CBI Taxonomy; Colombian Taxonomy applies a similar approach; Credible certification schemes: • Forest Stewardship Council (FSC); • Programme for the Endorsement of Forest Certification (PEFC); • National certifications in ASEAN (to be considered Amber until national schemes are properly assessed).
Amber	• Plantation of forests with the goal of extracting timber products that would be used as biomass or feedstock for heat generation and biofuels (Phase out by 2030); • Nutrient management plan based solely on chemical fertilisers (Phase out by 2030 and shift to IFM); • Phytosanitary management plan based solely on chemicals (Phase out by 2030 and shift to IFM).	• Aligned to CBI Taxonomy; • EU Taxonomy does not include agriculture; • Colombian Taxonomy applies a similar approach;
Ineligible activities	• Use of chemicals listed in the Stockholm Convention 1a or 1b in the WHO classification of pesticides by hazard or not in compliance with the Rotterdam Convention; • Operations on land that has been converted from high carbon stock (HCS[4]) after Jan 1, 2010.	• Aligned to CBI Taxonomy; • EU Taxonomy does not include agriculture; • Colombian Taxonomy applies a similar approach

[3] Biocontrol comprises using living organisms or natural substances to prevent or reduce damage caused by harmful organisms (animal pests, weeds and pathogens).
[4] High carbon stock (HCS) land assessment was developed for the purpose of avoiding land use change due to oil palm conversion that resulted in net carbon losses. As a result, any land use with more than the average C stock per hectare of oil palm, i.e., more than 35tC/ha, is considered high carbon stock. Forest classification types can be used as a proxy for the classification. For example, in Indonesia, lands classified as "Mostly young re-growth forest, but with occasional patches of older forest within the stratum," or above in terms of biomass are considered HCS land.

5.3. Conservation, restoration, and maintenance of natural/pristine forests

Sector	**Forestry**	
Activity	**Conservation, restoration, and maintenance of natural/pristine forests**	
ISIC Code	A 0200	
ISIC Description	Forestry	
Objective	Identify Green, Amber, and Ineligible assets, projects and related activities related to conservation, restoration, and maintenance of forests extracts.	
Traffic Light	**Criteria**	**Alignment with international best practice / reference from other taxonomies or methodologies**
Green	• Land acquisition with the purpose of conservation, restoration and maintenance; • Equipment and costs incurred by the activities (equipment must be powered by renewable energy or appear amongst the most energy efficient in the country – as certified by local energy efficiency standards); • Use of organic and biofertilisers (only relevant for restoration/ replanting of natural forest); • Use of physical and biocontrol[5] of pathogens, pests and weeds; • Nurseries[6] – required the adoption of Integrated Farm Management (IFM – find definition below[7]) practices – organic and biofertilisers/ biocontrol – and that seeds and seedlings are sourced from native species in sustainably managed areas; • Adoption and maintenance of monitoring technology that enables the tracking of the forest extracts and its conservation status.	Aligned to CBI Taxonomy; Colombian Taxonomy applies a similar approach;
Amber	N.A.	
Ineligible activities	N.A.	

[5] It is expected the all types of biological management required by the forestry project are guided by credible technical assistance.
[6] Any facility designated to produce tree seedlings grown under favourable conditions until they are ready for planting.
[7] Integrated Farm Management (IFM) is a site specific farm business approach that uses the best of modern technology and traditional methods (as defined by IFMA)





6 — Carbon Capture and Storage

Context

Carbon capture and storage/sequestration (CCS) is the process of capturing carbon dioxide (CO_2) before it enters the atmosphere, transporting it and storing it in underground geological formations. CCS includes a range of different process and technology options to capture and store CO_2. According to IEA, CCS is an important decarbonisation lever for hard-to-abate sectors and will contribute to achieving global climate goals.

Singapore is studying emerging low-carbon technologies such as Carbon Capture Utilisation and Storage (CCUS) This includes the study "Carbon Capture, Storage, and Utilisation: Decarbonisation Pathways for Singapore's Energy and Chemicals Sectors"[1] which was commissioned by the government and concluded in June 2021.

Singapore does not have any known suitable reservoirs for the permanent storage of CO_2 in its subsurface, but analysis of the geological storage potential in neighbouring countries indicates an estimated regional storage potential of 84.8 Giga tons[2] (Singapore's annual emissions are approximately 0.5Gigatons[3]. Currently, Singapore is targeting at least 2 million tons of carbon capture by 2030 and more than 6 million tons/year by 2050, as it transforms its Jurong Island downstream oil hub into an energy and chemicals park.

As a relatively mature technology, CCS is gaining traction as a decarbonisation lever in recent decades. However, scientists have exercised caution in promoting the role of CCS across the economy. While it is broadly agreed that CCS will play a role, there remain economic viability constraints, uncertainty around the long term nature of storage and limits to storage reservoirs and capacity (in the short-to medium term).

There is no universally adopted classification of CCS activities and no ISIC codes for them, but based on the examples of other taxonomies (Climate Bonds, EU and South Africa) activities can be classified the following way:

- **Point-source capture of CO_2** is the process of capturing CO_2 from a large emissions source – e.g. an industrial facility. Most CCS projects utilise point source capture given the higher concentrations of CO_2 make the capture process more efficient. Point-source capture is listed here for completeness of the process but it cannot be viewed as a standalone activity because it is never carried out separately from a certain industrial or power generation activity. Its main goal is to decrease the emissions of the activity it is linked to. Point-source capture is not a separate activity in other taxonomies and is mostly mentioned in this Taxonomy as a part of industrial activities criteria.
- **Transportation of captured CO_2** can be done by various means, including pipelines, ships, railroad cisterns or trucks.
- **Permanent sequestration of captured CO_2** includes injecting of CO_2, removed by point- or direct air capture of CO_2 within an underground geological formation, whereby the fraction of carbon dioxide stored through mineral carbonation that is retained after 1000 years is virtually certain to be 100%. As a consequence, the need for monitoring the disposal sites will be limited in the case of mineral carbonation (IPCC Special Report).
- **Research, development and innovation for CCS-related technologies**. Research activities that are related to CCS are included in the Taxonomy to underline the importance of the development of this field.

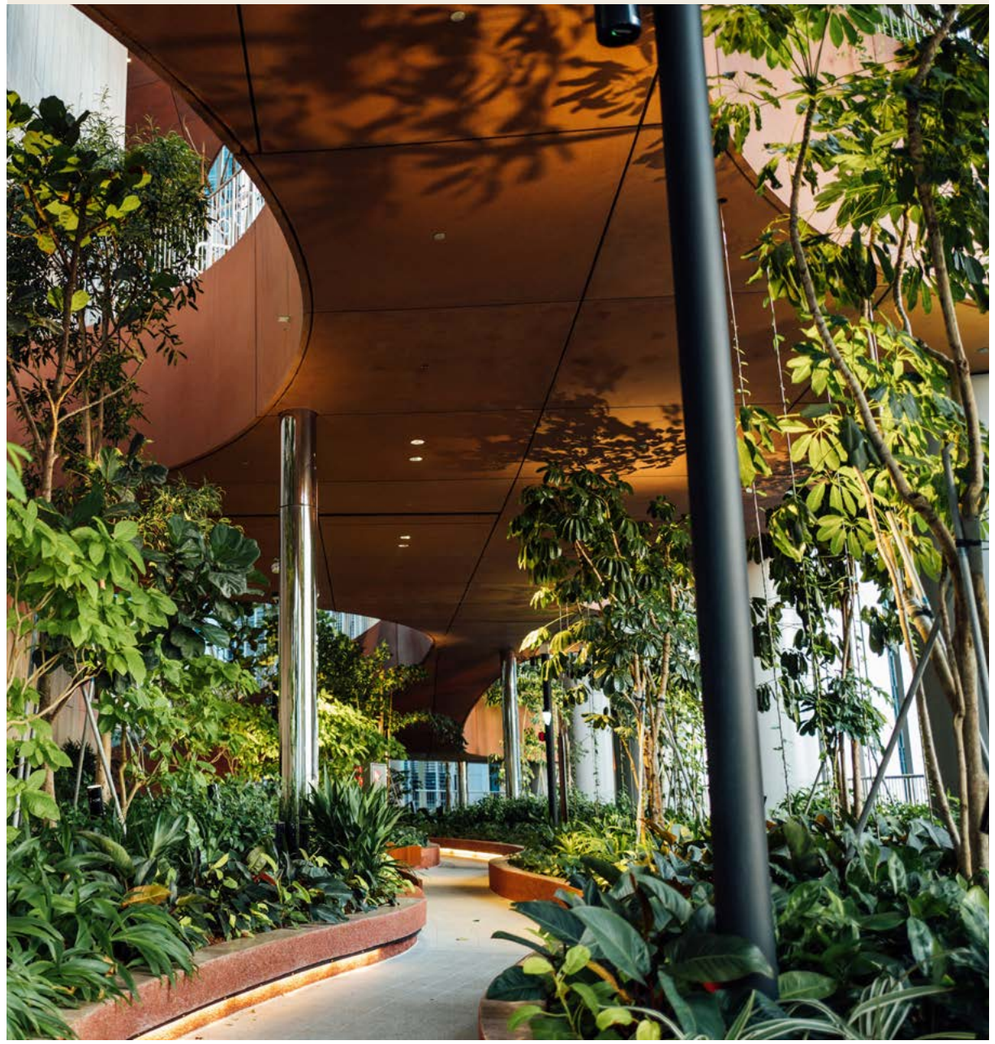
[1] https://file.go.gov.sg/carbon-capture-utilisation-and-storage-decarbonisation-pathway-for-singapore-energy-and-chemical-sectors-pdf.pdf
[2] Ibid.
[3] 1 Gigaton = 1,000,000,000 Tonnes

Utilisation of CO_2

Captured CO_2 may either be transported and stored or used on-site by industrial processes that require a source of carbon. Huge quantities of CO_2 are currently used each year, mainly in in the fertiliser industry and for enhanced oil recovery while new utilisation pathways in the production of CO_2-based synthetic fuels, chemicals and building aggregates are gaining momentum.

Utilisation is not included in this first version of the Taxonomy for a number of reasons including the nascent stage of the technologies, as well as the fact that the use of CO_2 does not always result in emissions reductions and are therefore not compatible with a low-carbon future. There also remains a lack of guidance in this area to leverage for this phase of work.

For these reasons, the precautionary principle was applied, and utilisation is not eligible within this Taxonomy. This may well change in the future as clearer guidelines become available.



TSC overview and methodology

Metrics used:

- Point-source capture of CO_2: compatibility of the targeted industrial or power generation activity with the corresponding green criteria elsewhere in taxonomy.
- Captured CO_2 transportation: rate of leakages. Proper construction properties of the vessel and leakage detection system can prevent captured CO_2 from leaking back into the atmosphere.
- Permanent sequestration of captured CO_2: Proper arrangement of the geological formation for CO_2 storage, the establishment of reliable surveillance systems and prevention of leakage are key metrics in assessing the efficiency of sequestration.
- Research, development, and innovation for CCS-related technologies: Research and development activities have a metric of technology readiness level (TRL) which employs a scale from 1 to 10 to indicate how far the technology stands from being utilised commercially

Activity technical screening criteria

6.1. Point-source capture of CO_2

Sector	**Carbon capture and storage**	
Activity	**Point-source capture of CO_2**	
ISIC Code	No code	
ISIC Description	The capture of CO_2 from a point source in an industrial or power generation facility	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference**
Green	The activity complies with all of the following criteria: • Point-source capture of CO_2 is eligible only as a complementary activity for the activities in the Taxonomy (for example, in the Industry section), and • Point-source capture of CO_2 is eligible as green if it makes the target activity compatible with the green criteria for a specific activity. Applicability of this option to each individual sector can be found in a specific activity article (relevant for sections related to the production of cement, iron and steel, hydrogen, basic chemicals). For reference to CCS in other parts of the Taxonomy, see: • 1.12 Electricity generation from fossil gaseous fuels • 4.2 Manufacture of cement • 4.3 Manufacture of basic iron and steel • 4.4 Manufacture of hydrogen	Not present in any other taxonomy. Added for clarity as cross-reference article as per request of the consultation group
Amber	The activity complies with all of the following criteria: • Point-source capture of CO_2 is eligible only as a supplementary activity for the activities in the present taxonomy (for example, in the Industry section), and • Point-source capture of CO_2 is eligible as amber if it makes the target activity compatible with the amber criteria for a specific activity. Applicability of this option to each individual sector can be found in a specific activity article (relevant for sections related to the production of cement, iron and steel, hydrogen, basic chemicals, as well as energy generation from gas).	
Ineligible activities	N.A.	

6.2. Transportation of captured CO_2

Sector	Carbon capture and storage	
Activity	**Transportation of captured CO_2**	
ISIC Code	No code	
ISIC Description	Captured CO_2 transportation via pipelines, ships, railroad cisterns or trucks.	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference with international best practices/reference / methodologies**
Green	The activity complies with all of the following criteria: • The CO_2 transported[4],from the installation where it is captured to the injection point leads to: ○ If transported by sea: CO_2 leakages[5], less than 3% of the mass of CO_2 transported regardless of the distance, and less than 2% after 2035, or ○ If transported via pipeline: CO_2 leakages, less than 0.5% of the mass of CO_2 transported. • The CO_2 is delivered to a permanent CO_2 storage site that meets the criteria for underground geological storage of CO_2 set out in Section 6.3. • Appropriate leak detection systems are applied and a monitoring plan is in place, with the report verified by an independent third party • The activity may include the installation of assets that increase flexibility and improve the management of an existing network.	Adopted from the EU Taxonomy
Amber	The activity complies with all of the following criteria: • Retrofitting of the existing CO_2 transportation systems in order to bring down the leakage rate from the current rate to the rate specified in the Green category is eligible as Amber • The starting leakage rate may not be above 10% of the mass of CO_2 transported regardless of the mode of transportation • The CO_2 is delivered to a permanent CO_2 storage site that meets the criteria for underground geological storage of CO_2 set out in Section 6.3. • Appropriate leak detection systems are applied and a monitoring plan is in place, with the report verified by an independent third party • The activity may include the installation of assets that increase flexibility and improve the management of an existing network. • Sunset date for this activity is designated as 2030	Based on the Climate Bonds research as per request of consultations group
Ineligible activities	• Transportation or retrofitting of transportation systems that do not comply with relevant Green and Amber criteria are designated as Ineligible.	

6.3. Permanent sequestration of captured CO_2

Sector	Carbon capture and storage	
Activity	**Permanent sequestration of captured CO_2**	
ISIC Code	No code	
ISIC Description	Permanent storage of captured CO_2 in appropriate underground geological formations. This activity does not include nature based sequestration activities.	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference with international best practices/reference / methodologies**
Green	• Operation of a permanent CO_2 storage facility is eligible if the facility complies with requirements and recommendations of ISO 27914:2017 for geological storage of CO_2.	Adopted from the EU Taxonomy
Amber	• N.A.[6]	
Ineligible activities	• Construction of new facilities that fail to comply with ISO 27914:2017 is designated as ineligible.	

6.4. Research, development, and innovation for CCS-related technologies, including direct air capture

Sector	Carbon capture and storage	
Activity	**Research, development, and innovation for CCS-related technologies**	
ISIC Code	No code	
ISIC Description	The research applied research and experimental development of solutions, processes, technologies, and business models and other products dedicated to carbon capture, transportation and storage	
Objective	Climate change mitigation	
Traffic Light	**Criteria**	**Reference with international best practices/reference / methodologies**
Green	The activity complies with one of the following criteria: • The activity researches, develops or provides innovation for technologies, products or other solutions that are dedicated to carbon capture, transportation and storage, • The implementation of the technologies, products or other solutions being researched for carbon capture, transportation and storage has the potential to result in overall net GHG emissions reductions once commercialised Or • Either one of the following criteria is met: ○ Where the researched, developed or innovated technology, product or other solution is at Technology Readiness Level (TRL) 1 to 7, lifecycle GHG emissions are evaluated in simplified form by the entity carrying out the research. The entity demonstrates one of the following, where applicable: (a) a patent not older than 10 years associated with the technology, product or other solution, where information on its potential has been provided; or (b) a permit obtained from a competent authority for operating the demonstration site associated with the innovative technology, product or other solution for the duration of the demonstration project, where information on its potential has been provided, Or ○ Where the researched, developed or innovated technology, product or other solution is at TRL 8 or higher, lifecycle GHG emissions are calculated using ISO 14067:2018 or ISO 14064-1:2018 and are verified by an independent third party.	Adapted from the EU Taxonomy, but expanded in scope (EU Taxonomy only contains research for DAC technology, not for the whole spectrum of CCS)
Amber	• N.A. (R&D activities that do not meet Green criteria are not eligible for finance.)	
Ineligible activities	• N.A.	

[4] Transportation of CO_2 may be carried out through pipeline or by seagoing vessel from the point of capture to the point of injection into storage or utilisation facility.
[5] Leakages are defined as fugitive losses due to equipment leaks, accidents, sabotage and exploitation issues.
[6] Note: No Amber criteria are available for storage of CO_2 as the criteria are binary – either it meets the ISO standard or it does not, If it does not, it is presumed not to be investible and therefore red.

7 — Information and Communications Technology 2026 Edition

Context

Information and Communications Technology (ICT) is recognised as a key enabling sector across major sustainable finance taxonomies, including the ASEAN, EU and other national frameworks. While the sector is typically less emissions-intensive compared to sectors (e.g., energy and transport), ICT supports digitalisation, operational efficiency and decarbonisation across the wider economy.

While ICT can help reduce emissions in other sectors by enabling more efficient use of energy and resources, some studies suggest these benefits could exceed ICT's own emissions footprint[1]. Actual reductions depend on implementation and may be partly offset by increased consumption. This is particularly relevant, as the sector's emissions footprint is expected to grow with rising demand for cloud computing, artificial intelligence (AI), data processing, connectivity, and digital services. Estimates of ICT's contribution to global GHG emissions generally range between approximately 1.7% and 4%, depending on the scope of activities and lifecycle emissions included[2].

Under the ISIC classification (Section J), ICT encompasses publishing activities, telecommunications, and data processing and hosting services. Within the Singapore-Asia Taxonomy, data centres have been identified as the most material ICT sub-sector for climate mitigation due to their growing energy demand and emissions footprint.

From a functional perspective, ICT activities can be broadly categorised into hardware and software components. Hardware-related activities include designing, building, and operating digital infrastructure, as well as storing, processing, and transmitting data through data centres, servers, networking equipment, cooling systems, and related facilities. Software-related activities include developing digital solutions that support emissions reductions across other sectors through analytics, automation and operational optimisation, as well as software optimisation measures that improve the energy efficiency of ICT infrastructure and services.

Data centres are a critical component of Singapore's digital infrastructure and the wider Southeast Asian digital economy. Singapore remains one of the region's leading data centre hubs, hosting more than 70 cloud, enterprise and colocation facilities[3]. As demand for cloud computing, artificial intelligence (AI), digital services, and data storage continues to increase, the Singapore Government has identified data centres as foundational infrastructure supporting the country's digital economy and Smart Nation ambitions.

Recognising that data centres are resource-intensive, Singapore has mapped out a sustainable growth pathway for the sector through the Green Data Centre Roadmap and rolled out various measures including the refreshed BCA-IMDA Green Mark certification for data centres and industry standards[4]. New data centres are also required to be best-in-class in energy efficiency and allocated capacity through capacity allocation exercises such as the Data Centre – Call for Application (DC-CFA). These efforts reflect Singapore's commitment to work with the data centre sector to grow sustainably and contribute to its strategic and economic priorities.

TSC overview and methodology

Metrics for data centres

There are several aspects that affect the emissions profile of a data centre:

[1] https://www.eprints.lancs.ac.uk/id/eprint/158061/1/ClimateImpactOfICT_Paper.pdf
[2] https://openknowledge.worldbank.org/entities/publication/a8feecdd-5f79-412a-834f-6f45903e18a5
[3] https://www.imda.gov.sg/resources/press-releases-factsheets-and-speeches/factsheets/2024/charting-green-growth-for-data-centres-in-sg
[4] https://www.imda.gov.sg/-/media/imda/files/news-and-events/media-room/media-releases/2024/05/green-dc-roadmap.pdf



Power Usage Effectiveness (PUE) and Water Usage Effectiveness (WUE). Data centres consume a significant amount of energy and water. To capture these impacts relative to IT workload, the Taxonomy uses both PUE and WUE. Lower values generally indicate better performance, although trade-offs can arise between the two metrics. For example, water-based cooling systems can achieve lower PUE values but often consume more water. In contrast, air-cooled systems, often used by data centres in water-constrained locations, require more energy while using minimal water consumption.

Recognising the trade-off between energy and water efficiency, the Taxonomy establishes a relationship between PUE and WUE. This allows data centres located in water-constrained circumstances to meet slightly less stringent PUE requirements. The relationship and respective thresholds were informed by publicly available data, industry research, input from Working Group members and modelling of cooling technologies under conditions representative of Southeast Asia.

The resulting thresholds are designed to remain broadly aligned with the sustainability outcomes of the BCA-IMDA Green Mark framework while providing flexibility for facilities outside Singapore. This approach encourages optimisation of overall resource efficiency, avoids incentives to improve one metric at the expense of the other, and supports continuous improvements in both energy and water performance. The Green criteria are intended to represent leading industry practice, while Amber criteria provide a transition pathway for facilities that demonstrate strong but not yet best-in-class performance.

Refrigerant Global Warming Potential (GWP). Refrigerants used in data centre cooling systems can be potent greenhouse gases if released into the atmosphere. Historically, many cooling systems have relied on hydrofluorocarbons (HFCs), which can have global warming potentials (GWPs) hundreds or thousands of times greater than carbon dioxide. Consequently, refrigerant selection and leak management are important considerations in reducing the climate impact of data centres.

International regulations are increasingly driving a transition to lower-GWP refrigerants. Global initiatives such as the Kigali Amendment[5], together with regulations in major jurisdictions including the European Union, United States and Japan, are progressively restricting the use of higher-GWP refrigerants and encouraging adoption of lower-GWP alternatives. These developments indicate a clear long-term trend towards refrigerants with significantly lower climate impacts.

The Taxonomy therefore includes requirements for both refrigerant GWP and refrigerant leakage rates. The Green criteria require refrigerants with a GWP not exceeding 675 for facilities commencing operation before 1 January 2028 and 150 thereafter (or applicable national standards, whichever is more stringent). The 675 threshold broadly aligns with current international regulatory approaches, while the 150 threshold reflects the direction of travel of major refrigerant regulations and the increasing availability of ultra-low-GWP refrigerants. The Amber criteria apply the same GWP threshold of 675.

In addition, both Green and Amber facilities must implement leak prevention measures and minimise refrigerant leakage rates. Cooling systems should be designed, installed, operated and maintained in accordance with recognised industry good practices and standards, such as ISO 5149, recognising that effective refrigerant management is necessary alongside the use of lower-GWP refrigerants.

Architecture, design, and maintenance efficiency. These practices contribute to the environmental performance of data centres by influencing energy consumption, resource use, and associated emissions. Measures such as sustainable material selection, efficient space utilisation, energy-efficient lighting, and optimised cooling systems can improve a facility's overall sustainability profile. For activities seeking to qualify as Green, these considerations are addressed through recognised Green Building Certifications (GBCs) incorporated within the technical screening criteria.

Metrics for software

Software is not, in itself, the source of material emissions, but it can drastically improve the emission profile of other activities ("greening by IT") – i.e. it is an enabling activity. Accordingly, the most relevant performance indicators relate to how effectively the software delivers the intended emissions-reduction outcomes.

Recent developments in the IT sector have also launched a movement for "greening of IT" itself to improve the energy efficiency of IT solutions, maximise their use, minimise their carbon footprint and meet compliance requirements.

Development of such software is a nascent field. While such solutions may contribute less directly to the Taxonomy's climate objectives, they remain important in improving the environmental performance of ICT systems.

Thus, software optimisation is recognised as an Amber criteria-compliant activity, with no additional thresholds.

Interoperability with other taxonomies

Given the global nature of data centre investment and financing, market participants may refer to multiple taxonomies concurrently. As such, interoperability with other taxonomies is particularly relevant for this sector. The following section highlights key points of alignment and divergence with other major frameworks.

The EU Taxonomy provides dedicated technical screening criteria for ICT-related activities, including data centres and software solutions. For data centres, the EU Taxonomy adopted a largely standards-based approach, relying on recognised frameworks such as the European Code of Conduct on Data Centre Energy Efficiency and related CEN-CENELEC standards[6], while allowing alternative measures that achieve equivalent outcomes.

Regional frameworks have adopted different approaches. ASEAN Taxonomy Version 4 includes ICT as an enabling sector and establishes dedicated technical screening criteria for ICT activities[7]. Compared with the EU Taxonomy's standards-based approach, the ASEAN Taxonomy places greater emphasis on operational performance metrics, including PUE-based criteria for data centre activities.

Earlier versions of Indonesia's Taxonomy for Sustainable Finance (TKBI) principally addressed data centres through the Construction and Real Estate sector. However, TKBI Version 3, published in February 2026, introduced a dedicated ICT enabling sector and corresponding technical screening criteria that broadly align with ASEAN Taxonomy Version 4[8].

Similarly, the Climate Bonds Taxonomy recognises ICT as a relevant sector but does not currently provide dedicated sector criteria for data centres or software activities. While the Climate Bonds Initiative has developed criteria for Buildings and other infrastructure sectors that may be relevant to certain aspects of data centre development, these criteria are not specific to data centre operations[9].

Overall, the proposed Singapore-Asia Taxonomy sits between these approaches. Like the EU Taxonomy, it recognises data centres as a distinct economic activity rather than solely as a building asset. At the same time, its proposed criteria are more directly performance-based, drawing on specific operational metrics and thresholds that are more comparable to the direction taken in the ASEAN Taxonomy.

Activity technical screening criteria

7.1. Data processing, storage, transmission, and management [2026 Edition]

Sector	ICT
Activity	**Data processing, storage, transmission, and management**
ISIC code	6311
ISIC description	Provision of infrastructure for hosting, data processing services and related activities, specialised hosting activities such as web hosting, streaming services, application hosting; application service provisioning; general time-share provision of mainframe facilities to clients; data processing activities such as complete processing of data supplied by clients or generation of specialised reports from data supplied by clients; provision of data entry services
Objective	Climate change mitigation

[5] https://ozone.unep.org/kigali-amendment-overview

[6] https://publications.jrc.ec.europa.eu/repository/handle/JRC141521
[7] https://www.theacmf.org/images/downloads/pdf/ASEAN%20Taxonomy%20Sustainable%20Finance%20V4_06Nov25.pdf
[8] https://keuanganberkelanjutan.ojk.go.id/keuanganberkelanjutan/en/ArticleList/View/2045/taksonomi-untuk-keuangan-berkelanjutan-indonesia-tkbi-versi-3
[9] https://www.climatebonds.net/our-expertise/climate-bonds-standard-and-certification-scheme/sector-criteria/buildings

<table>
<tr><th>Traffic Light</th><th>Criteria</th><th>Reference</th></tr>
<tr><td>Green</td><td>New or existing data centres located in Singapore must fulfil the following criteria:

• Data centre must comply with the prevailing BCA-IMDA Green Mark Scheme for Data Centres Platinum Rating criteria[10]. Compliance with those criteria is verified through the attainment and maintenance of a valid Green Mark certification.

New or existing data centres located outside Singapore must fulfil the following criteria[11,12]:

• Average annual PUE no greater than 1.4 – 0.0545 x WUE (see table below),
• Where annual average WUE may be no greater than 2.2.

Table 16 — PUE Green Threshold Adjustment for WUE

<table><tr><th>WUE</th><th>PUE</th><th>WUE</th><th>PUE</th></tr><tr><td>0</td><td>1.400</td><td>1.2</td><td>1.335</td></tr><tr><td>0.2</td><td>1.389</td><td>1.4</td><td>1.324</td></tr><tr><td>0.4</td><td>1.378</td><td>1.6</td><td>1.313</td></tr><tr><td>0.6</td><td>1.367</td><td>1.8</td><td>1.302</td></tr><tr><td>0.8</td><td>1.356</td><td>2</td><td>1.291</td></tr><tr><td>1</td><td>1.346</td><td>2.2</td><td>1.280</td></tr></table>
All new or existing data centres must fulfil the following criteria:

• The GWP of refrigerants used in the data centre cooling system must not exceed
○ 675 for data centres starting operation before 1 January 2028,
○ 150 for data centres starting operation on or after 1 January 2028, or
○ meet applicable national standards/regulations, whichever is lower.
• In all cases, the cooling system shall incorporate leak prevention measures and be designed, installed, operated, and maintained in accordance with recognised industry good practices and standards, such as ISO 5149, to minimise refrigerant leakage and achieve a maximum annual refrigerant leakage rate of less than 2% of the total refrigerant charge.

If the project includes constructing a new facility, the facility must be compliant with the relevant Green Building Criteria (activity 3.1) of the current Taxonomy.</td><td>Compatible with international taxonomies in majority of cases. Label and PUE target are adapted from the Singaporean certification schemes with consideration to industry benchmarking and stakeholder consultation.</td></tr>
<tr><td>Amber</td><td>Existing data centres located in Singapore must fulfil the following criteria:

• Data centre must comply with the prevailing BCA-IMDA Green Mark Scheme for Data Centres GoldPLUS Rating criteria. Compliance with those criteria is verified through the attainment and maintenance of a valid Green Mark certification. Existing data centres located outside Singapore must fulfil the following criteria[13]:
• Average annual PUE no greater than 1.45 - 0.04545 x WUE (see table below),
• Where annual average WUE may be no greater than 2.3.

Table 17 — PUE Amber Threshold Adjustment for WUE

<table><tr><th>WUE</th><th>PUE</th><th>WUE</th><th>PUE</th></tr><tr><td>0</td><td>1.450</td><td>1.4</td><td>1.386</td></tr><tr><td>0.2</td><td>1.441</td><td>1.6</td><td>1.377</td></tr><tr><td>0.4</td><td>1.432</td><td>1.8</td><td>1.368</td></tr><tr><td>0.6</td><td>1.423</td><td>2</td><td>1.359</td></tr><tr><td>0.8</td><td>1.414</td><td>2.2</td><td>1.350</td></tr><tr><td>1</td><td>1.405</td><td>2.3</td><td>1.345</td></tr><tr><td>1.2</td><td>1.395</td><td></td><td></td></tr></table></td><td>Amber criteria are developed through discussions with the relevant experts during the consultation phase. PUE targets are adapted from the Singapore building certification schemes.</td></tr>
</table>

[10] https://www1.bca.gov.sg/sustainability/greenmark/other-green-mark-schemes
[11] PUE and WUE will be estimated in a manner comparable to those used in BCA-IMDA Green Mark Scheme for Data Centres: performance of new data centres shall be determined using energy modelling software and for existing DCs, PUE and WUE performance data for past 12 months shall be submitted.
[12] The PUE-WUE relationships (Green: PUE ≤ 1.40 – 0.0545 × WUE; Amber: PUE ≤ 1.45 – 0.04545 × WUE) were derived using industry data and calibrated against the sustainability outcomes of the BCA-IMDA Green Mark Scheme for Data Centres. The formulas recognise the trade-off between energy and water efficiency, subject to maximum PUE thresholds of 1.40/1.45 and maximum WUE thresholds of 2.2/2.3 for Green and Amber activities respectively.
[13] See footnotes on the Green category

<table>
<tr><th>Traffic Light</th><th>Criteria</th><th>Reference</th></tr>
<tr><td>Amber</td><td>All existing data centres must fulfil the following criteria:
• The GWP of refrigerants used in the data centre cooling system must not exceed
○ 675, or
○ meet applicable national standards/regulations, whichever is lower.

• In all cases, the cooling system shall incorporate leak prevention measures and be designed, installed, operated, and maintained in accordance with recognised industry good practices and standards, such as ISO 5149, to minimise refrigerant leakage and achieve a maximum annual refrigerant leakage rate of less than 2% of the total refrigerant charge. Project retrofitting must place existing data centres on a clear pathway to achieve compliance with green criteria by 1 January 2030[14].</td><td></td></tr>
<tr><td>Ineligible activities</td><td colspan="2">Not compatible with either of the Green or Amber criteria.</td></tr>
</table>

7.2. GHG-related solutions and software

Sector	ICT
Activity	**GHG-related solutions and software**
ISIC code	6201; 6202
ISIC description	This class includes the writing, modifying, testing and supporting of software; designing the structure and content of, and/or writing the computer code necessary to create and implement systems software (including updates and patches), software applications (including updates and patches), databases and web pages; customising of software, i.e. modifying and configuring an existing application so that it is functional within the clients' information system environment ; planning and designing computer systems that integrate computer hardware, software and communication technologies; provision of on-site management and operation of clients' computer systems and/or data processing facilities, as well as related support services
Objective	

Traffic Light	Criteria	Reference with international best practice / reference taxonomies
Green	The activity complies with all of the following criteria: • Data-driven solutions and software for GHG emission reductions are considered to make a substantial contribution to climate change mitigation because of the lifecycle emissions reductions they enable through affecting various emission-related processes • Lifecycle GHG emissions and net emissions are calculated using ISO 14064-2:2019 or similar methodology • Quantified lifecycle GHG emission reductions are verified by an independent third party which transparently assesses how the standard criteria, including those for critical review, have been followed when the value was derived.	Compatible with the EU Taxonomy
Amber	• Solutions and software that contribute substantially to reducing carbon footprint of the IT industry through reengineering IT products and processes to improve their energy efficiency, maximise their use, minimise their carbon footprint and meet compliance requirements.	Adopted based on suggestion from the consultations phase
Ineligible activities	• N.A.	

[14] A clear pathway to Green compliance may be demonstrated through appropriate supporting evidence, including retrofit plans, approved capital expenditure programmes, procurement activities, contractual commitments, technical specifications, or other evidence demonstrating a credible and time-bound programme expected to achieve compliance with the Green criteria by 1 January 2030.



8 — Waste

Context

The Waste sector, and specifically solid waste management, has the potential to support other sectors of the economy in reducing greenhouse gas emissions through waste prevention, separate hazardous waste collection, waste reuse and recycling.

In Singapore, around 6.94MTs of Municipal Solid Waste (MSW) was generated in 2021, with an overall recycling rate of 55%. Most of the waste is attributed to non-domestic sources (74%), and around 80% of total MSW is treated by Waste-to-Energy (WtE) plants (NEA, 2022). Currently, there are four WtE plants, a transfer station and one offshore landfill. Given Singapore's land constraints, there is limited space inland for additional MSW facilities. Nonetheless, Singapore aims to be a zero-waste nation by strengthening its climate, resource and economic resilience and adopt a circular economy approach to sustainable waste and resource management (NEA, 2022).

To achieve this, Singapore practises source segregation for co-mingled and single fractions. Since 2001, the National Recycling Programme (NRP) has been in place which collects commingled recyclables (paper, plastic, glass and metals) in a blue recycling bin for materials recovery. The Code of Practice on Environmental Health (COPEH), provides guidelines to address environmental health concerns in the design of buildings, and stipulates minimum design criteria on refuse and recyclables collection. In 2019, Singapore passed the Resource Sustainability Act (RSA), which set the foundations for Extended Producer Responsibility (EPR) frameworks to be implemented and address three key waste streams –e-waste, food waste and packaging waste (including plastics). As of 2022, we have put in place EPR for e-waste, and will roll out EPR for other waste streams (e.g. plastics and packaging waste) in phases. These efforts move us closer to achieving a circular economy where materials/ resources are recovered at the upstream while the residual waste is sent for energy recovery.

The Singapore Taxonomy for the Waste sector is developed for Singapore-based Financial Institutions (FIs) to guide business activities in

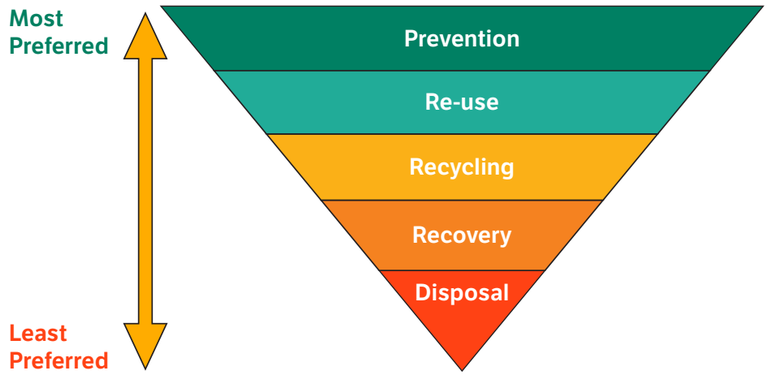


Figure 13: Waste Hierarchy

Singapore and regionally. It includes key activities for the management of post-consumer MSW, etc., which have a substantial contribution to mitigating climate change and moving towards a circular economy. The following economic activities and assets were identified for this sector:

- Collection and transport of non-hazardous waste
- Biowaste treatment: composting of biowaste
- Biowaste treatment: anaerobic digestion
- Waste-to-Energy (WtE)
- Landfill gas capture and utilisation (not directly applicable to Singapore) Material recovery facilities

The waste hierarchy acts as a guide for developing criteria across the sector. The top level of these activities is highly encouraged with limited, or no criteria attached. Moving further down to recovery and disposal, these are the least preferred methods of eliminating waste but allowed in certain circumstances, with more stringent criteria.

WtE activity is focused primarily based on incineration technology and was considered based on the relevance for Singapore. The metrics and thresholds for this activity ensure that recycling is still prioritised over incineration. Other waste-to-energy technologies such as pyrolysis, gasification that can produce alternate and sustainable fuels or chemicals are not covered currently in the Taxonomy as these technologies are still under development. However, such technologies are covered under the R&D activities in the Taxonomy. The activity of landfill gas capture and utilisation was included considering its relevance for ASEAN countries.

We note here that in Singapore's context, waste is first sent for incineration, and the incineration ash is subsequently landfilled together with non-incinerable waste. Landfilling of waste with methane capture has been included here as it provides guidance for such projects at the regional level.

TSC overview and methodology

The criteria for the sector considers the waste management hierarchy to ensure adequate management of the MSW by prioritising recycling over energy recovery or landfilling. Separation at source or at an intermediate facility are promoted to ensure better and efficient recycling. WtE has been included considering the local context, however, the thresholds are strict to ensure that only efficient plants are considered. Additionally, direct disposal of waste at WtE plants without pre-sorting or segregating of recyclables is not considered under Green or Amber categories.

The metrics chosen for activities related to collection and transportation and biological treatment of waste (composting and anaerobic digestion) are qualitative, as the climate mitigation effect is an inherent result of the economic activities. The mitigation of GHG emissions occur by the process of transformation of waste into by-products such as biogas or compost. The collection and transportation of waste to recycling facilities enables recycling and material recovery. However, the metrics include ensuring quality checks on the processes such as methane leakage monitoring, adequate use of by-products, ensuring sorting of waste, among others.

For Material Recovery Facilities, a minimum recovery efficiency was established to ensure that recycling is prioritised. For WtE, quantitative criteria related to energy efficiency and bottom ash recovery are established.

As in EU and Climate Bonds Taxonomy, the corresponding activities in Waste sector are primarily qualitative and incorporates criteria to ensure adequate process efficiencies (e.g., reducing methane leakage in composting plants). The green criteria primarily support segregation of waste at source for effective recovery and recycling. The collection and transportation of non-hazardous waste for energy recovery directly without any material recovery for recycling has been defined as Amber as it is preferred to establish a waste value chain with intermediate sorting and processing to enhance recovery and recycling, as well as lower GHG emissions.

For WtE plants, the net thermal efficiency of the plants is expected to be above 25% and the bottom ash recovery of metal is expected to be at least 75% for Green classification, as this ensures net GHG emissions through enhanced energy recovery. Similarly, the green criteria for Material recovery facilities is expected be above 50%, so as to have significant material recovery that can foster a sustainable waste value chain, with economically feasible and environmentally supportive recycling sector. The 50% efficiency in intermediate sorting also prevents majority of waste entering the landfill and allows for net GHG emission reductions through high quality of waste recycling.
The sunset date for Amber for activities under the Waste sector will be until 2030 unless stated otherwise.

Note: Pre-sorting refers to a process where the input waste has undergone sorting of recyclables at an intermediate facility such as a Material Recovery Facility (MRF) or undergone segregation prior to any waste treatment or disposal. Residual waste refers to non-recyclable fraction of the waste. Segregation refers to separating waste into different fractions such as biowaste, recyclables, etc.

Activity technical screening criteria

8.1. Collection and transport of non-hazardous waste

Sector	Waste	
Activity	**Collection and transport of non-hazardous waste**	
ISIC code	E3811	
ISIC description	Collection of Non-Hazardous Waste	
Objective	Net GHG emission reductions through reuse and high quality recycling of waste, which are enabled by the separate collection and transport of source-segregated non-hazardous waste fractions	
Traffic Light	**Criteria**	**Reference with international best practice / reference taxonomies**
Green	**The activity complies with the following criteria:** • Collection and transportation of non-hazardous waste that is segregated at source or at an intermediate sorting facility that is intended for preparation for reuse or recycling operations, and • Includes waste collection containers, transfer stations, transportation vehicles and other related infrastructure. Criteria for vehicles (if required) are defined under the activities of Transportation sector in Chapter 2	Compatible with EU Taxonomy criteria
Amber	**The activity complies with the following criteria:** • Collection and transportation of non-hazardous waste for energy recovery directly without any material recovery for recycling, and • Includes waste collection equipment and other related infrastructure. • The criteria for vehicles is defined under the activities of Transportation sector.	
Ineligible activities	**The activity complies with the following criteria:** • Collection and transportation of non-hazardous waste directly for disposal to landfills, and • Does not include adequate equipment for collections and transportation.	

8.2. Biowaste treatment: composting of biowaste

Sector	Waste	
Activity	**Biowaste treatment: composting of biowaste**	
ISIC code	E3821	
ISIC description	Treatment and Disposal of Non-Hazardous Waste	
Objective	Net GHG emission reduction through production and use of digestate as fertiliser/soil improver, displacing synthetic fertilisers and increasing carbon sequestration in soils.	
Traffic Light	**Criteria**	**Reference with international best practice / reference taxonomies**
Green	**The activity complies with the following criteria:** • The bio-waste that is composted is source segregated and collected separately, and • Ensure efficient operations to avoid methane leakage (e.g., improper aeration or mixing), and • The compost produced is used as fertiliser or soil improver.	Compatible with EU Taxonomy criteria
Amber	**The activity complies with all of the following criteria:** • Receiving unsegregated waste at site but sorting before composting the organic fraction, and • Ensure efficient operations to avoid methane leakage (e.g., improper aeration or mixing), and • The compost produced is used as fertiliser or soil improver.	
Ineligible activities	**The activity is described by any of the following:** • Waste is neither segregated at source nor pre-sorted, or • Lack of proper aeration system, or • Compost quality is poor and is not suitable for application to soil.	

8.3. Biowaste treatment: anaerobic digestion

Sector	Waste	
Activity	**Biowaste treatment: anaerobic digestion**	
ISIC code	E3821	
ISIC description	Treatment and Disposal of Non-Hazardous Waste	
Objective	Net GHG emission reduction through controlled production and utilization of biogas in various forms and applications, often displacing fossil fuels	
Traffic Light	**Criteria**	**Reference with international best practice / reference taxonomies**
Green	**The activity complies with all of the following criteria:** • The bio-waste that is used for anaerobic digestion is source segregated and collected separately, and • The produced biogas is used directly for the generation of electricity or heat or upgraded to bio-methane for injection in the natural gas grid or used as vehicle fuel or as feedstock in chemical industry, and • The produced digestate – ○ from biowaste (excl. sewage sludge) from single digestion facilities is used as fertiliser or soil improver, either directly or after composting or any other treatment as permitted by the applicable regulations, or ○ from anaerobic digestion of sewage sludge will be further processed and not disposed directly in landfills. Incineration is also fine because it allows energy recovery, and after incineration this gets converted to ash which can be landfilled, or ○ from co-digestion facilities must be processed further to ensure resource recovery and cannot be disposed directly, and • A monitoring and contingency plan is in place in order to minimise methane leakage at the facility, and • Woody waste must be segregated before or after processing and sent to an eligible treatment plant (such as composting or biomass-based energy plants).	Compatible with EU Taxonomy criteria

Amber	**The activity complies with all of the following criteria:** • Waste is not source separated but pre-sorted at facility, and • A monitoring and contingency plan is in place in order to minimise methane leakage at the facility, and • The produced biogas is flared directly without use of energy, and • The produced digestate – ○ from biowaste (excl. sewage sludge) from single digestion facilities is used as fertiliser or soil improver, either directly or after composting or any other treatment as permitted by the applicable regulations, or ○ from anaerobic digestion of sewage sludge will be further processed and not disposed directly in landfills. Incineration is also fine because it allows energy recovery, and after incineration this gets converted to ash which can be landfilled, or ○ from co- digestion facilities must be processed further to ensure resource recovery and cannot be disposed directly, and • The rejects from pre-sorting facility are disposed at Taxonomy-eligible facilities, and • The sunset date for Amber criteria is 2025[1].	
Ineligible activities	**The activity is described by any of the following:** • Waste is not source segregated or pre-sorted, or • No methane detection system installed, or • The produced biogas is flared directly, or • Digestate is not used as fertiliser or soil improver.	

[1] The ultimate aim is to avoid total flaring of biogas without energy recovery. It is allowed in the short term to allow plants to implement equipment to allow energy use. A two-year transition period is considered sufficient for implementing the retrofit.

8.4. Waste to Energy (Incineration)

Sector	Waste	
Activity	**Waste to Energy (Incineration)**	
ISIC code	E3821, E3822	
ISIC description	Treatment and Disposal of Non-Hazardous Waste	
Objective		
Traffic Light	**Criteria**	**Reference with international best practice / reference taxonomies**
Green	**The activity complies with all of the following criteria:** • Residual or pre-sorted waste only, and • Plant efficiency ≥25%, and • Bottom ash recovery with at least 75% recovery of metal from ash. This activity could take place in an off-site location. • Note: R&D investments related to developing and testing new and emerging technologies are eligible. These include but are not limited to pyrolysis and gasification that can produce alternate and sustainable fuels or chemicals.	Partially aligned to Climate Bonds Taxonomy
Amber	**The activity complies with all of the following criteria:** • Unsegregated waste, but with pre-sorting at an intermediate facility to recover high quality recyclables before processing in the Waste-to-Energy plant, and • Plant efficiency between 10% and 25%, till 2030, and • Partial bottom ash recovery with some recovery of metal from ash (at least 50%).	
Ineligible activities	**The activity is described by any of the following:** • Waste directly used in waste to energy facilities without any pre-sorting, or • Metal recovery in bottom ash is <50%, or • Plant Efficiency less than 10%	

8.5. Landfill gas capture and utilisation

Sector	Waste	
Activity	**Landfill gas capture and utilisation**	
ISIC code	E3821, E3822	
ISIC description	Treatment and Disposal of Non-Hazardous Waste Treatment and Disposal of Hazardous Waste	
Objective	Net GHG emission reduction through the capture and utilization of landfill gas in various forms and applications, often displacing fossil fuels.	
Traffic Light	**Criteria**	**Reference with international best practice / reference taxonomies**
Green	**The activity complies with all of the following criteria:** • The landfill cell where gas capture is implemented is permanently closed and will not receive waste, and • The produced biogas is used directly for the generation of electricity or heat or upgraded to bio-methane for injection in the natural gas grid or used as vehicle fuel or as feedstock in chemical industry, and • A monitoring and contingency plan is in place in order to minimise methane leakage at the facility.	Aligned to EU Taxonomy criteria
Amber	**The activity complies with all of the following criteria:** • The landfill cell where gas capture is implemented is permanently closed and will not receive waste, and • Biogas is flared without use for generation of heat/electricity or biomethane production, and • The sunset date for Amber criteria is 2025.	
Ineligible activities	**The activity is described by any of the following:** • Operational landfill cells that are receiving unprocessed MSW, or • Biogas is not captured or flared without use for generation of heat/electricity or biomethane production.	

8.6. Material recovery facilities

Sector	Waste	
Activity	**Material recovery facilities**	
ISIC code	E3830	
ISIC description	Material Recovery	
Objective	The activity supports separation of recyclable components in the waste stream, thus displacing the use of primary raw materials in production processes.	
Traffic Light	**Criteria**	**Reference with international best practice / reference taxonomies**
Green	**2023–2030** **The activity complies with all of the following criteria:** • The activity results in a recovery efficiency of at least 50%. The sorted waste may then be used as secondary raw materials that are suitable for the substitution of virgin materials in production processes. • All facilities and equipment such as conveyor belts, compactors, pelletisers, air classifiers, magnetic belts, and other infrastructure requird for material recovery are eligible. **2030–2050*** To be provided in future iterations Note: The thresholds are proposed to increase ahead of 2030 to 2035, taking reference from international best practices (currently 80% but may be revised in 2030) and Singapore's national targets (currently targeted at 70% overall recycling rate at the system level by 2030	The threshold of 50% is compatible with EU Taxonomy criteria
Amber	**The activity complies with all of the following criteria:** • The activity results in a recovery efficiency of at least 40%. The sorted waste stream may then be converted into secondary raw materials that are suitable for the substitution of virgin materials in production processes, and • Allowed till 2030 after which the facilities must meet the Green criteria.	
Ineligible activities	• Recovery efficiency of the Material Recovery Facility is less than 40%.	

9 — Water

Context

The water sector is intrinsically integrated and interrelated with other sectors, and across every Sustainable Development Goal (SDG). Investment in water sector is pivotal to building climate resilience across sectors and strengthening international peace and security. The World Bank estimates that sustained negative growth will occur in some regions due to water related losses in agriculture, health, income and property (World Bank, 2016).

Water and energy use are also highly correlated. Reducing leakages and increasing energy efficiency are also important to meeting climate mitigation goals. This is particularly important in the desalination process which is energy intensive or where water is transported over great distances. For example, in California, the water system uses approximately 20% of the state's electricity and 30% of its natural gas to pump, convey, treat, and heat water[1].

At the same time, poor access to safe drinking water and sanitation can lead to innumerable premature deaths and negatively affect a region's economy. The activities within the water sector for a sustainable finance Taxonomy shall primarily involve processes for efficient design of water collection, treatment, supply and wastewater treatment, with specific focus on increasing energy efficiency and reducing leakage losses.

In Singapore, current water demand is 440 million gallons per day (mgd). This is set to almost double by 2065, with the non-domestic sector being the major source of demand growth, increasing from about half of our total water consumption today to about two-thirds by 2065. The increase in water demand would be met by the installation, upgrading and effective operation of NEWater, desalination plants and distribution network (PUB, 2022). In Singapore, rainwater and used water are collected and conveyed through separate systems, ensuring that our waterways are free of pollution. Rainwater collected in local catchment areas is stored in 17 reservoirs and treated at our local waterworks to produce potable water. It is then distributed through 6,600km of pipeline network to both households and industries.

Used water is collected via 3,600km of public sewers and deep tunnel sewerage systems and is sent to the four water reclamation plants for treatment (PUB, 2022). The treated used water effluent is further purified using advanced membrane technologies and ultra-violet disinfection to produce NEWater at NEWater plants. Singapore also has desalination plants which produces potable water.

Singapore is a compact city state that is highly urbanised and densely populated. Singapore has the third highest population density in the world at 8,377people/km² and is one of the most water stressed countries in the world due to a lack of land to store and capture rainfall. Hence, the operating conditions of water and wastewater treatment infrastructure face unique challenges such as urbanised watershed as well as the lack of space for water infrastructure and deployment of renewable energy sources.

Competing land use compels Singapore to build deeper or multi-storey plants. For example, the Deep Tunnel Sewerage System (DTSS) project allows used water to be conveyed by gravity to centralised water reclamation plants and frees up some 880 hectares of land for higher value land use. However, this necessitates the construction of deeper Influent Pumping Stations (IPS) to pump used water from some 50m – 60m deep to the treatment processes in the centralised water reclamation plants.

Over the years, PUB has developed NEWater and desalinated seawater as two additional National Taps to enhance Singapore's water resilience. Technological advancement, such as Membrane Bioreactor (MBR) has made wastewater treatment processes more land

[1] https://www.ppic.org/publication/water-and-energy-in-california/



efficient, as there is no longer a need for large secondary sedimentation tanks in the Water Reclamation Plants (WRPs). In addition, MBR produces treated effluent that is of much better quality than that required to meet local discharge standards, and consistent and reliable supply of NEWater. In the context of NEWater production in Singapore, MBR also allows the overall treatment efficiency of water reuse to be improved, as the conventional treatment processes in a WRP and a NEWater Factory are shortened by two processes, saving both land and treatment costs.

The activities in water sector for Singapore have been defined as follows:

- **Plants:** Construction, extension and operation of new water collection and treatment systems
- **Plants:** Renewal of water collection and treatment systems
- **Distribution network:** Construction, extension and operation of new water collection and treatment systems
- **Distribution network:** Renewal of water collection and treatment systems (distribution networks)
- **Plant:** Construction, extension and operation of wastewater collection and treatment
- **Collection network:** Renewal of wastewater collection and treatment
- **Plants:** Desalination systems

The activities align with ISIC — Section E: Water supply, Sewerage, Waste Management and Remediation Activities. The Water collection, treatment and supply related activities align with E3600 and Wastewater sewerage related activities align with E3700.

TSC overview and methodology

The metrics chosen for the water sector consider improvements in efficiencies of systems based on energy efficiency or net energy consumption or through reduction of leakages. The efficiencies are measured based on population equivalent or m^3 of water produced or treated. The metrics for distribution networks are based on leakage indices.

For desalination systems, the metrics are based on net GHG emissions measured per m^3 of potable water produced. Net energy consumption may take into account measures to decrease energy consumption, such as source control (pollutant load inputs), and as appropriate, onsite or offsite renewable energy generation (such as hydraulic, solar and wind energy).

For water collection and treatment systems, the threshold is based on net energy consumption per m^3 of water produced for supply. The renewal of existing collection and treatment systems must meet the green or amber thresholds for the activity. Alternatively, the activity can be considered meeting the amber criteria if it demonstrates at least 20% improvement in energy efficiency over existing systems (measured over a period of 3 years). The net energy reduction can also be achieved using measures to decrease energy consumption, such as source control (pollutant load inputs), and, as appropriate, onsite or offsite renewable energy generation (such as hydraulic, solar and wind energy).

Similarly, for construction of wastewater systems, the criteria are based on energy consumption per population equivalent or m^3 of wastewater treated. For renewal of wastewater systems, the activity must meet the green or amber thresholds for the activity. Alternatively, the activity can be considered meeting the amber criteria if it demonstrates a minimum improvement of at least 20% in terms of net energy consumption compared to the baseline (measured over a period of 3 years). The net energy reduction can also be achieved using measures to decrease energy consumption, such as source control (pollutant load inputs), and, as appropriate, onsite or offsite renewable energy generation (such as hydraulic, solar and wind energy).

For desalination, potable water and wastewater activities, the criteria are based on net energy consumption and the plants can procure renewable energy to reduce the net GHG emissions and energy consumption. The focus, however, must first be on improving the efficiencies to meet the thresholds.

The Green criteria defined for wastewater collection and treatment are based on plant capacity and are detailed in Table 15. These thresholds are drawn from the EU Taxonomy limits. The amber criteria are developed considering data from the wastewater plants in Singapore.

Table 18 — Thresholds defined for wastewater collection and treatment for Green category

Water treatment plant capacity (population equivalent – p.e.)	Net energy consumption of wastewater treatment plant (kWh/p.e. per annum[2])
Less than 10,000	35
Greater than 10,000 and lesser than 100,000	25
Greater than 100,000	20

*The thresholds for distribution networks are based on reducing leakages in the systems for the segment of the network that is renewed.

The threshold for desalination systems is aligned to Climate Bonds and EU criteria, wherein the average carbon intensity of energy used to power the plant must be at or below 100gCO_2e/kWh over the remaining lifetime of the asset. Desalination plants can meet the thresholds through reduction in carbon intensity of energy source and/or through improvements in energy efficiency.

Both new and existing projects are considered in the Amber category. The sunset date for Amber activities under the Water sector will be 2035 unless stated otherwise.

Activity technical screening criteria

9.1. Construction, extension and operation of new water collection and treatment systems (abstraction and treatment systems)

Sector	Water	
Activity	**Construction, extension and operation of new water collection and treatment systems**	
ISIC Code	E3600	
ISIC Description	Water supply, Sewerage, Waste Management and Remediation Activities: **Water collection, treatment, and supply.** Note: The activity excludes energy associated with pumping of potable water from the water treatment plant to the distribution network.	
Objective	Substantial contribution to GHG emissions savings through low specific energy consumption in the water collection, treatment and supply system.	
Traffic Light	**Criteria**	**Reference: international best practice/reference/ taxonomies**
Green	• The **net average energy consumption for abstraction and treatment** equals to or is lower than **0.5kWh/m³** of water produced for supply. • Net energy consumption may consider measures that decrease energy consumption, such as source control (pollutant load inputs), and, as appropriate, onsite or offsite energy generation (such as hydraulic, solar and wind energy).	EU Taxonomy threshold and European benchmarking
Amber	• The net average energy consumption for abstraction and treatment equals to or is lower than **0.7kWh/m³** produced water supply. • Net energy consumption may take into account measures decreasing energy consumption, such as source control (pollutant load inputs), and, as appropriate, onsite or offsite energy generation (such as hydraulic, solar and wind energy).	
Ineligible activities	• Does not meet Green or Amber criteria	

[2] 1 PE is defined as 200L/day or 73m^3/year.

9.2. Renewal of water collection, treatment and supply systems (abstraction and treatment systems)

Sector	Water	
Activity	**Renewal of water collection, treatment and supply systems**	
ISIC Code	E3600	
ISIC Description	Water supply, Sewerage, Waste Management and Remediation Activities: **Water collection, treatment and supply** Note: The activity excludes energy associated with pumping of potable water from the water treatment plant to the distribution network.	
Objective	Substantial contribution to GHG emissions savings through low specific energy consumption in the water collection, treatment and supply system.	
Traffic Light	**Criteria**	**Reference**
Green	• For renewal systems that meet the Green criteria established in Section 9.1	
Amber	**The activity complies with one of the following criteria:** • For renewal systems that meet the Amber criteria established in Section 9.1 • The difference in the **net average energy efficiency of the system must be increased by at least 20%** compared to own baseline performance averaged for previous three years, including abstraction and treatment, measured in kWh per m^3 produced water supply and that established in the Green criteria category for Section 9.1. The efficiency must be achieved after the completion of commissioning and optimisation phase.	The second criteria aligns with the EU Taxonomy criteria
Ineligible activities	• Does not meet Green or Amber criteria	

9.3. Construction, extension and operation of water collection, treatment and supply systems (distribution networks)

Sector	Water	
Activity	**Construction, extension and operation of water collection, treatment and supply systems (distribution networks)**	
ISIC Code	E3600	
ISIC Description	Water supply, Sewerage, Waste Management and Remediation Activities: **Water collection, treatment and supply**	
Objective	Substantial contribution to GHG emissions savings through low specific energy consumption in the water collection, treatment and supply system	
Traffic Light	**Criteria**	**Reference: international best practice/reference/ taxonomies**
Green	• The distribution loss (%) is less than 10% for the segment of the network	
Amber	• The distribution loss (%) is less than 20% for the segment of the network	
Ineligible activities	• Does not meet Green or Amber criteria	

Note: Distribution losses (%) = % Accounted For Water (AFW-real losses) + % Unaccounted for Water (UWF-unaccounted losses) [3].

[3] AFW is based on quantity of known leaks, while UFW = Demand – Sales – AFW.

9.4. Renewal of water collection, treatment and supply systems (distribution networks)

Sector	Water	
Activity	**Renewal of water collection, treatment, and supply systems (distribution networks)**	
ISIC Code	E3600	
ISIC Description	Water supply, Sewerage, Waste Management and Remediation Activities: **Water collection, treatment and supply**	
Objective	Substantial contribution to GHG emissions savings through low specific energy consumption in the water collection, treatment and supply system	
Traffic Light	**Criteria**	**Reference: international best practice/reference/ taxonomies**
Green	• For renewal systems that meet the green criteria established in Section 9.3	
Amber	**The activity complies with one of the following criteria:** • For renewal systems that meet the Amber criteria established in Section 9.3 • For distribution systems, the leakage levels must be reduced by at least 20% for the segment of the network compared to own baseline performance averaged for previous three years, and that established in the Green category for Section 9.3. The efficiency must be achieved after the completion of commissioning and optimisation phase.	The second criteria aligns with the EU Taxonomy criteria.
Ineligible activities	• Does not meet Green or Amber criteria	

9.5. Desalination Systems

Sector	Water	
Activity	**Desalination Systems**	
ISIC Code	E3600	
ISIC Description	Water supply, Sewerage, Waste Management and Remediation Activities: **Water collection, treatment, and supply** Note: The activity excludes energy associated with pumping of potable water from the water treatment plant to the distribution network.	
Objective	Substantial contribution to GHG emissions savings through low specific energy consumption in the water collection, treatment and supply system	
Traffic Light	**Criteria**	**Reference**
Green	• The average carbon intensity of energy used to power the plant must be at or below 350gCO_2/m³ of potable water produced, or • The energy used for the desalination plant must have carbon intensity less than 100gCO_2/kWh over the remaining lifetime of the asset. • The carbon intensity threshold is based on the trajectory established in the energy sector.	EU Taxonomy and Climate Bonds Taxonomy criteria
Amber	• The energy consumption of desalination plants must be less than 3.5kWh/m³ of potable water produced till 2025. Between 2025 and 2030, energy consumption must be less than 3 kWh/m³; and between 2030 to 2035, energy consumption must be less than 2.5kWh/m³. • Beyond 2035, the plants must meet the Green criteria.	
Amber (measures)	The following technologies are eligible as individual measures until 2035. ○ Investments in improving energy efficiency of pumps and motors ○ High pressure speed pumps ○ Variable Frequency drives (VFD) and switchgear ○ High efficiency energy recovery devices (e.g., Isobaric ERDs) ○ Automation and instrumentation systems ○ Investments in Taxonomy-aligned energy generation (e.g., solar, ocean, wind, etc.)	
Ineligible activities	• Does not meet Green or Amber criteria	

* Amber criteria have an initial sunset date of 2035 after which point they will not be applicable. The criteria and sunset dates are not fixed and will be reviewed and possibly revised periodically based on emerging science and technology.

9.6. Construction, extension and operation of wastewater collection and treatment

Sector	Water	
Activity	**Construction, extension and operation of wastewater collection and treatment**	
ISIC Code	E3700	
ISIC Description	Water supply, Sewerage, Waste Management and Remediation Activities: **Sewerage**. Note: The activity excludes energy requirements associated with pumping of sewage via Deep Tunnel Sewerage System (DTSS) to the wastewater treatment plant.	
Objective	Net GHG emission reduction through optimisation of wastewater treatment thus substituting sanitation systems with higher GHG emissions.	
Traffic Light	**Criteria**	**Reference**
Green	• The net energy consumption of the wastewater treatment plant equals to or is **lower than: 35kWh/p.e.** per annum for treatment plant capacity below 10,000p.e.; **25kWh/p.e.** per annum for treatment plant capacity between 10,000 and 100,000p.e.; **20kWh/p.e.** per annum for treatment plant capacity above 100,000p.e. Net energy consumption of the operation of the waste water treatment plant may take into account measures decreasing energy consumption relating to source control (reduction of storm water or pollutant load inputs), and, as appropriate, onsite or offsite renewable energy generation. • For the construction and extension of a wastewater treatment plant or a waste water treatment plant with a collection system, which are substituting more GHG-intensive treatment systems (such as septic tanks, anaerobic lagoons), an assessment of the direct GHG emissions is performed to establish that the new systems is more efficient.	EU Taxonomy criteria
Amber	• The net energy consumption of the wastewater treatment plant equals to or is **lower than 68kWh/p.e.** per annum, and is applicable for all treatment plant capacities. Net energy consumption of the operation of the wastewater treatment plant may take into account measures decreasing energy consumption relating to source control (reduction of storm water or pollutant load inputs), and, as appropriate, renewable energy generation. The sunset is 2035, beyond which the plants must meet the Green criteria.	
Ineligible activities	• Does not meet Green or Amber criteria	

9.7. Renewal of wastewater collection and treatment

Sector	Water	
Activity	**Renewal of wastewater collection and treatment**	
ISIC Code	E3700	
ISIC Description	Water supply, Sewerage, Waste Management and Remediation Activities: **Sewerage**	
Objective	Net GHG emission reduction through optimization of wastewater treatment thus substituting sanitation systems with higher GHG emissions.	
Traffic Light	**Criteria**	**Reference**
Green	• For renewal systems that meet the Green criteria established in Section 9.6	
Amber	**The activity complies with one of the following criteria:** • For renewal systems that meet the amber criteria established in Section 9,6, no additional requirements apply or • The difference in the **net average energy consumption of the system must be reduced by at least 20%** compared to own baseline performance averaged for previous three years, including abstraction and treatment, measured in kWh per m3 produced water supply and that established in the green category for Section 9.6. The net energy consumption is estimated in terms of kWh/p.e.	The second criteria aligns with EU Taxonomy criteria.
Ineligible activities	• Does not meet Green or Amber criteria	



10 — Agriculture

Context

Agriculture accounts for an estimated 34% of all anthropogenic GHG emissions worldwide (Crippa et al., 2021). In 2019, emissions within the farm gate (crop and livestock production, including on-farm energy use) accounted for 7.2GtCO_2 eq. yr–1, while emissions from land-use change accounted for 3.5GtCO_2eq. yr–1. In brief, 65% of all emissions within the agri-food sector are related to primary food production (Tubiello et al., 2022). In addition to the high carbon footprint, traditional agricultural practices are drivers of biodiversity loss and water/soil degradation (Benton et al., 2021; Hunke et al., 2014). At the same time, agriculture is one of the sectors most vulnerable to the impacts of climate change (Tao et al., 2011). Recent extreme events have demonstrated how food production systems can be affected by shifting global climate; heat waves in southern Asia have destroying wheat crops and severe drought in southern Brazil has severely damaged the soybean crop.

Meanwhile, by 2050, it is projected that the global population will increase to 10 billion resulting in a 50% increase in food demand, with global grain demand projected to double. Income growth in low- and middle-income countries are driving changes in diets towards more emissions-intensive animal-based products, much of it grain fed. While the need to increase crop yields is clear, how this will be achieved is less obvious given the likely negative impacts of climate change and the evidence that yields of major crops have been levelling off in large parts of the major producing countries (Ray et al., 2012).

To reduce the impact of food production on the environment, the sector must shift to a more sustainable footing. Generally, 'sustainable' activities are understood as those that are capable of meeting the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland report; 1987). However, a standard narrative on what constitutes sustainable agriculture is yet to emerge due to the complexity of the sector. Production systems are often referred to as "sustainable", but the absence of agreed definitions mean that the risk of incremental changes to business-as-usual and of greenwashing is substantial. The goal of this document is to provide a common understanding on low-carbon agricultural operations for the Singapore context as a guide for the financial sector.

Levers for reducing emissions from the agriculture sector

For the following agriculture criteria, the focus is on reducing the GHG emissions relating to agriculture. There are a number of levers available to reduce emissions from agriculture which we are trying to target through these criteria. These include, but not only:

- Less emission intensive crops and animal production
- Reduced use of chemicals
- Increased use of bio solution
- Use of organic fertilisers
- Use of low-carbon equipment
- Better monitoring of environmental conditions
- Plant breeding dedicated to achieve better yields and resilience

There are, of course, other environmental goals that are important when referring to agriculture — such as reduced leaching of chemicals etc. Where these are aligned with climate goals, they are also tackled here but they are not the focus on this phase of work.

To safeguard Singapore's food security, the Singapore Food Agency (SFA) adopts a multi-pronged approach which includes diversifying food import sources and increasing local production. SFA also takes a risk-based approach to food safety which is guided by science and consistent with international standards. SFA has in place an integrated farm-to-fork food safety system to ensure that food is safe for consumption.

More than 90% of Singapore's food supply is imported, with only about 1% of Singapore's land set aside for agricultural use. Given Singapore's heavy reliance on imports, a key strategy to enhance its food security is import source diversification.

In addition, local farms play an important role in the nation's food security as local production serves as a buffer by reducing dependence on imports during supply disruptions. The local agri-food sector is predominantly made up of farms, producing hen shell eggs, vegetables, and seafood.

However, the agri-food industry in Singapore is nascent where land and resource constraints have prompted farms to adapt technology and innovative ways to 'grow more with less', in a sustainable way. In consultation with the Singapore Food Agency (SFA), context was provided by SFA in terms of its work to anchor high productivity farming players in our local ecosystem. Our farms are harnessing technology and innovation to strive towards productivity, climate-resilience and resource efficiency. These farms are also able to employ climate control technologies, increasing their resilience to climate changes.

SFA is facilitating industry development and growth in capability and capacity through the '30 by 30' vision. Areas of tech and innovation adoption include:

(i) Catalysing adoption of technology/ innovation to elevate productivity levels;
(ii) Growing more with less (to overcome resource costs like energy and manpower);
(iii) Pushing circular economy (to grow in a sustainable manner);
(iv) Closing the system production (to strengthen agri-inputs resilience) and
(v) Climate change adaptation (e.g. coastal protection for Lim Chu Kang).

TSC overview and methodology

Due to the diverse characteristics of agricultural operations, the approach to identifying green agricultural practices and activities does not easily lend itself to quantitative metrics and/ or thresholds.

Instead, it classifies activities and sub-activities according to the "traffic light" methodology where green are activities that are encouraged, amber are activities that should either be phased out or changed over a period of time, while the rest are considered ineligible activities. This approach is similar to the one used for the construction of the Colombian Taxonomy.

Categorisation of activities

The agriculture sector is diverse containing a wide variety of activities and a huge range of crops and animals that can be raised or grown. Despite this diversity, many activities exhibit similar characteristics, making it possible to group them together for simplicity of the Taxonomy.

The activities here have been mapped and grouped using ISIC as a guide as follows:

- **Crops (perennial and non-perennial, ISIC codes A011 and A012):** Palm (oil), coffee, cocoa, tea, rubber trees, nuts, fruits, rice, wheat, soybeans, corn, cassava, sugar cane, sugar beet, tobacco, vegetables.
- **Animal production (ISIC A014):** Bovine cattle and poultry (meat and eggs).

The criteria have been designed to be applicable to granular green activities as well as to the wider level (production unit). For example, some of the criteria are suitable for green use of proceeds finance, such as green bonds, where a bond is raised for a specific project or asset (e.g. machinery) while others (e.g. the proxy certification standards) are applicable at the crop level or famer level and could be used as part of corporate disclosure to classify green revenues.

For a listed activity to be effectively considered as Green, it should be in line with the relevant related guidelines in one or more of the listed credible certification schemes — e.g. if the criteria requires low-carbon soy production then it must meet the requirements of low-carbon soy production under the appropriate schemes. Evidence that these requirements have been met, could either be by certification under the scheme itself or verification of against individual components of the scheme by a third party.

Each bullet on the list represents a credible certification scheme most adapted to certify one or more activities listed on the left column (e.g. sugarcane production — Bonsucro certification scheme). Eligible Green activities should adopt guidelines from one or more of the listed schemes.

Each bullet on the list is eligible on its own unless otherwise stated. The sunset date for Amber activities under the Agriculture sector will be until 2030 unless stated otherwise. New projects/ measures are eligible under the Amber category.

Activity technical screening criteria

10.1. Perennial and non-perennial crops

Sector	Agriculture	
Activity	**Perennial crops (Palm (oil), coffee, cocoa, tea, rubber trees, nuts, fruits); Non-perennial crops (rice, wheat, soybeans, corn, cassava, sugar cane, sugar beet, tobacco, vegetables) includes conventional, protected and hydroponic systems**	
ISIC Code	A 0111, A 0112, A 0113	
ISIC Description	Perennial and non-perennial crops	
Objective	Identify Green, Amber and Ineligible operations dedicated to the production of perennial and non-perennial crops.	
Traffic Light	**Criteria**	**Alignment with international best practice/taxonomies or methodologies**
Green	The activity must meet one of the following criteria: • Agricultural equipment powered by renewable energy; or • Agriculture equipment that appears amongst the most resource efficient in the country e.g. in terms of electricity, water, land, labour efficiency; or • Low-carbon crop management: regenerative agriculture, organic farming, precision agriculture, agroforestry, controlled environments, as certified by eligible schemes (see list aside**us management of protected and hydroponic agriculture facilities (refer to Climate Bonds • Criteria for Protected Agriculture and Water Infrastructure for best practices); or • Use of organic and biofertilisers; or • Use of physical and biocontrol of pathogens, pests and weeds; or • Nurseries related to low-carbon crop management; or • Adoption and maintenance of monitoring and tracking technology (with the goal of enhancing predictability and precision in agricultural operation, and thus being a resilience and adaptation measure); or • Use of superior inputs which enables production with less resources e.g. superior seeds obtained through plant breeding (conventional breeding and genetic engineering with focus on productivity and resilience).	Aligned to Climate Bonds Taxonomy, EU Taxonomy does not include agriculture, Colombian Taxonomy applies a similar approach. **Eligible certification schemes**: • Roundtable of Sustainable Palm Oil (RSPO) • Indonesian Sustainable Palm Oil (ISPO) • Malaysia Sustainable Palm Oil (MSPO) • Palm Oil Innovation Group (POIG) • UTZ Certified and Rainforest Alliance • International Sustainability and Carbon Certification (ISCC) • Singapore Good Agricultural Practice (SG GAP) Certification; • Singapore Clean and Green Certification; • IFOAM Standard • Cocoa Certification — Conservation Alliance • Bonsucro • Global GAP • Roundtable on Responsible Soy (RTSR) • Proterra Foundation • Sustainable Rice Platform (SRP) • Climate-Friendly Rice Certification (AgriCapture) • RSB Standard • Smartcane BMP • Climate Bonds Protected Agriculture (Mexico) and Water Infrastructure Criteria[1]

[1] Note: that there is currently very limited guidance on protected agriculture around the world, criteria may be used as a proxy until additional guidance becomes available.

Amber	The activity must meet one of the following criteria: • Nutrient management plan based solely on chemical fertilisers for soil-based cultivation is eligible if there is a plan to phase out chemical fertilisers over time, and • By 2030, no nutrient management plan based solely on chemical fertilisers for soil-based cultivation will be eligible – and should shift to integrated approach[2] Or • Phytosanitary management plan based solely on chemicals (Phase out by 2030 and shift to integrated approach[3]).	Aligned to Climate Bonds Taxonomy. EU Taxonomy does not include agriculture. Colombian Taxonomy applies a similar approach.
Ineligible activities	• Use of chemicals listed in the Stockholm Convention 1a or 1b in the WHO classification of pesticides by hazard or not in compliance with the Rotterdam Convention[4]; • Operations on land that has been converted from high-carbon stock (HCS[5]) after Jan 1, 2010.	Aligned to Climate Bonds Taxonomy. EU Taxonomy does not include agriculture. Colombian Taxonomy applies a similar approach.

[2] Integrated Farm Management (IFM) is a site-specific farm business approach that uses the best of modern technology and traditional methods (as defined by IFMA).
[3] Ibid
[4] https://www.pic.int/default.aspx
[5] As defined by High Carbon Stock Approach – https://highcarbonstock.org/ HCS land are mainly primary forests, and not young regenerative forests.

10.2. Animal production

Sector	**Agriculture**	
Activity	**Animal production (bovine cattle and poultry)**	
ISIC Code	A 0121, A 0122, A 0140	
ISIC Description	Animal production	
Objective	Identify Green, Amber and Ineligible operations dedicated to animal production.	
Traffic Light	**Criteria**	**Alignment with international best practice/reference from other taxonomies or methodologies**
Green	• Agricultural equipment powered by renewable energy; or • Agriculture equipment that appears amongst the most resource efficient in the country e.g. in terms of electricity, water, land, labour efficiency; or • Low carbon livestock management: regenerative agriculture, organic farming, precision agriculture, agroforestry, controlled environments, as certified by eligible schemes (see list aside); or • Food additives with the aim of reducing methanogenesis from enteric fermentation (e.g. 3-NOP and seaweed) • Adoption and maintenance of monitoring and tracking technology (with the goal of enhancing predictability and precision in agricultural operation, and thus being a resilience and adaptation measure); • Bio-digesters (Bio-septic tank); • Use of superior inputs which enables production with less resources, e.g. those obtained through pasture and animal breeding (with focus on productivity and resilience).	Aligned to Climate Bonds Taxonomy; EU Taxonomy does not include agriculture; Colombian Taxonomy applies a similar approach. **Eligible certification schemes:** • The Global Roundtable for Sustainable Beef (GRSB) • Sustainable Poultry Network (SPN – USA) • PoutryCARE
Amber	• Nutrient management plan (grazing crops) based solely on chemical fertilisers (Phase out by 2030 and shift to integrated approach; or • Phytosanitary management (grazing crops) plan based solely on chemicals (Phase out by 2030 and shift to integrated approach).	Climate Bonds Taxonomy. Colombian Taxonomy applies a similar approach.
Ineligible activities	• Use of chemicals listed in the Stockholm Convention 1a or 1b in the WHO classification of pesticides by hazard or not in compliance with the Rotterdam Convention; • Operations on land that has been converted from high-carbon stock (HCS) after Jan 1, 2010; • Use of feed that is related to non-eligible operations under the perennial and non-perennial crops standards (under Section 10.1).	Climate Bonds Taxonomy. Colombian Taxonomy applies a similar approach.



Taxonomy in Practice

Preamble

A key principle of this Taxonomy is that of the interoperability with other regional and national taxonomies. Capital is global, as are capital market participants, and it is therefore important that the Taxonomy is both consistent and compatible with other taxonomies, particularly the EU Taxonomy and the ASEAN Taxonomy. In drafting the Taxonomy, the approach, metrics and language adopted should be similar to other taxonomies. In particular, the structural underpinnings of this Taxonomy will be seen to be largely consistent with the EU Taxonomy.

While the Taxonomy represents current thinking around climate, transition, and activity thresholds, it is not designed to be static. It is not only permissible, but also desirable, that the Taxonomy be iterated in the future to reflect new initiatives and understandings, particularly in regard to the thresholds used for transition. Thresholds that are viewed as appropriate in this version may be less appropriate in years to come, and as such periodic updates will be necessary.

Mandatory use of the Taxonomy

It is important to note that the Taxonomy is not mandatory or contained in any regulation at the time of publishing. It is intended to be voluntary for use in the first years as adoption grows. The following sections outline how the Taxonomy could be used by different users now and in the future.

Users of the Taxonomy

By business line: it is anticipated that Singapore-based Financial Institutions providing debt and/or equity capital, including both public and private capital, would be the primary users of the Taxonomy; while it can also be used by companies, regulators, policymakers, and other financial market participants that need to define green activities.

By geography: It will be primarily applicable to the provision of finance to companies in ASEAN member states (Indonesia, Malaysia, Philippines, Singapore, Thailand, Brunei, Laos, Myanmar, Cambodia and Vietnam), with the main focus on Singapore.[1]

Primary Users: Financial Market Participants

a. **Financial Institutions:** These are intended as the primary users of the Taxonomy and include equity fund management, debt fund management, alternative investment management, private equity, venture capital, infrastructure financing, investment-linked insurance products, among others (see full list below).

While these would be the primary, direct users of the Taxonomy, the ultimate end "users" would be the clients of the Financial Institutions outlined above. The Taxonomy is designed to assist in their decision making when allocating capital to financial institutions, investment funds and other vehicles that are aligned with their overall environmental objectives and the long-term development of a green, sustainable, economy.

Secondary Users: Companies, Industry Regulators and Policymakers

a. **Companies:** Companies can use the Taxonomy to help align their businesses to green economic activities, which may help them access green financing opportunities, bring sustainable investment opportunities to the market, and/or help them in their investment decisions. Taxonomy reporting can also be harmonized with reporting for other frameworks, including TCFD, CDP, and SBTi, to provide a comprehensive assessment of a company's performance on sustainability and environmental objectives.

b. **Financial Service Providers:** The Taxonomy can also be used by providers of services to these financial institutions and companies,

[1] This geographic scope would refer to the nexus of operations, rather than strict issuer-driven geographic classification. For example, entities incorporated in Cayman but with substantial or an overwhelming majority of operations in ASEAN would be covered.

including ESG ratings or scores providers, ESG researchers and financial or non-financial data providers.

c. **Regulators:** A Taxonomy can be helpful for macro-prudential regulators that wish to understand potential risks to financial stability that stem from "unsustainable" activities, as well as direct capital flows to green investment and promote financing to support Singapore's main environmental objectives.

d. **Academic Institutions and Policymakers:** The Taxonomy may have additional applications beyond these, including for example academic research and the development of national environmental policy.

Table 19 — Users and Uses of the Taxonomy

Primary user	
Asset Managers	Financial institutions and asset managers that provide financial products that are aligned with Taxonomy activities, including retail and institutional fund offerings, savings products and pensions. a. Equity funds, bond funds, ETFs, fund-of-funds, real estate funds, private equity and venture capital funds, infrastructure funds, portfolio management.
Secondary users: financials	
Asset Owners	Allocating and managing assets in line with Taxonomy activities, aligning investments with green companies and projects, as well as helping the institution to achieve its environmental objectives.
Insurance	Managing insurance assets and allocating to external fund managers in line with the Taxonomy's Green activities, helping the institution to achieve its environmental objectives, as well as offering insurance products that are aligned with the Taxonomy. b. Insurance-based investment products
Investment banking	Ensuring capital raising for corporate and public clients is in line with the Taxonomy and funding is aligned with green activities and the institution's environmental objectives. Support the promotion of green lending and funding operations. c. Portfolio management, index funds, primary issuance/corporate financing.
Commercial banking	Ensuring lending for corporate and public clients is in line with the Taxonomy and loans are aligned with green activities and the institution's environmental objectives. Support the promotion of green lending and funding operations. d. Project finance, lending and corporate financing.
Retail banking	Ensuring lending and retail financial products are aligned with Taxonomy and overall environmental objectives. e. Mortgages, car loans, building loans.
Secondary users: others	
Regulators	Support regulatory interventions to help align investment flows with eligible green activities and companies. Support new climate and sustainability reporting disclosures for companies and financial institutions to ensure alignment with the Taxonomy and national environmental objectives and green activities. Avoid reputational risk for the financial market of 'greenwashing'.
Policymakers and government agencies	Align national policies and financial flows at an economic level towards green activities and meeting national environmental objectives. Monitor and assess overall corporate and economic progress towards meetings national environmental priorities.
Companies	Align company development plans and investment priorities towards green and transition activities and associated financing opportunities. Assess and report companies' activities and disclosures against Taxonomy criteria and long-term business alignment.

Financial institutions

While the Taxonomy is not, at the time of publishing, mandated for any institutions, Financial Institutions can use the it to report on the degree to which their investments, products or range of transactions (in the case of single loans, etc.) are aligned with the Taxonomy and the environmental objectives to which the undertaking contributes.

In doing so, the Financial Institution can assess the alignment (or percentage alignment) of the activity or issuer being financed, aggregate these alignments to the portfolio or product level, and disclose aggregate alignment accordingly.

At the initial stage, Financial Institutions can identify investments that are eligible under the Taxonomy classifications and then determine whether they are aligned with the different Taxonomy classifications (Green, Amber and Ineligible). This will be partly dependent upon company reporting.

Over the next few years, investors are recommended to report eligibility and alignment of their investments with the Taxonomy using the activity classification for eligibility and additional data, where available, for alignment. Where investors do not have the source information from the underlying investee company, they can use the terms "potentially aligned" or "estimated aligned".

Over the long term, as companies begin to report activity-level financial data and metrics on the alignment of their activities using the technical screening criteria, investors should report both eligibility and alignment of their investments with the Taxonomy.

Companies

Companies can report revenues and/or expenditure, including data that justifies the performance of economic activities it operates in. An economic activity is considered eligible to the Taxonomy if included in the technical annex. An economic activity is considered to be aligned to the Taxonomy when it can demonstrate it meets the technical screening criteria. DNSH criteria are best efforts disclosure in the initial years of taxonomy implementation.

a. **Revenue breakdown by Taxonomy-eligible activities**, or capital expenditure (CapEx) and/or operating expenditure (OpEx) allocation to each Taxonomy-eligible activity;

b. **Performance against the technical screening criteria,** or environmental management data where this is an acceptable proxy for compliance with the technical screening criteria — including DNSH assessment;

c. **Management data on social issues:** Labour rights policies, management systems, audits, reporting.

At present, there is limited company disclosure on the breakdown of a company's revenue, capital expenditures and operating expenditures by activity level and, by extension, its alignment with the Taxonomy technical screening criteria. Additional company disclosure will therefore be required to determine an issuers' actual alignment with the overall environmental objectives and threshold.

Geographical Alignment

The Taxonomy is designed to focus primarily on Singapore, as well as being applicable to other ASEAN countries. It has been constructed to align with the EU Taxonomy and other international taxonomies to ensure interoperability, harmonisation, and to provide standardised reporting, classification criteria and due-diligence requirements.

The technical screening criteria, thresholds and transition pathways have been determined based on Singapore's Green Plan 2030 and Enhanced Nationally Determined Contribution and Long-Term Low-Emissions Development Strategy (2020), as well as the Singapore government's goals for a sustainable economy and its associated policies, legislation and regulations.

As a result, these may not be appropriate or achievable in the short term for companies in other markets or international investments. Financial institutions are, however, still encouraged to seek out international investments and projects that are aligned with the Taxonomy criteria and standards. As such:

a. International investments which meet the Green or Amber taxonomy technical screening criteria can still be classed as aligned with the Taxonomy for reporting purposes.

b. International investments which do not meet the Green or Amber taxonomy technical screening criteria will be classed as Ineligible under the Taxonomy classification.

For international investments that do not fall into the scope of the Taxonomy, these will be classed as Ineligible under the Taxonomy.

Sector Reporting

The chapter in the Taxonomy on **Sectors** deals in more detail with the sector classification system chosen, and the sectors covered by the Taxonomy. The ISIC system has been selected as a starting point for the Taxonomy development as it is comprehensive in its coverage of economic sectors worldwide. It is acknowledged that many financial market participants use other classification systems, such as the Global Industry Classification System (GICS) or Industry Classification Benchmark (ICB), and a mapping of alternative classification systems to the selected ISIC sectors will be provided.

Green, Amber & Ineligible activities classification

The chapter of the Taxonomy on **Classification** deals in more detail with the way that green, amber and ineligible activities should be assessed in the context of alignment and the technical screening criteria. This Taxonomy by design allows for capital to be deployed in a way that recognizes the differing economic, social, and technological contexts of ASEAN member states, and acknowledges that capital being deployed to make substantial (but alone insufficient) progress towards a desired end-state is both legitimate and desirous. For example, a power plant that is retrofitting carbon capture and storage technology. The activity itself may not meet thresholds for alignment, but the project to decarbonise would be consistent with the one of the Environmental Objectives.

In this instance, the CapEx that is incurred would potentially be eligible for alignment. However, the revenue of the underlying activity (in this example power generation) would not.

The DNSH criteria are detailed in a separate annex. This assesses in more detail the way that investors must assess if an activity is doing harm to a different environmental objective.

The Taxonomy establishes certain minimum safeguards that are applicable to all assessments — investors must determine that the issuer is compliant with for example the OECD Guidelines on Multinational Enterprises (MNEs)[2] and the UN Guiding Principles on Business and Human Rights, with specific reference to the ILO Core Labour Conventions.[3]

Definitions

What is revenue?

Revenue or net turnover means the amounts derived from the sale of products and the provision of services after deducting sales rebates and value added tax and other taxes directly linked to turnover. Overall turnover is equivalent to a firm's total revenues over a defined period.

Turnover ratios are used by financial analysts to understand a company's efficiency and profitability based on data found in financial statements.

Use: The primary way of aggregating from an economic activity to a company level. Some companies may need to aggregate from asset to economic activity level.

What is CapEx?

Capital expenditure (CapEx) is a payment for goods or services recorded, or capitalised, on the balance sheet instead of expensed on the income statement.

Use: Aside from helping investors analyse a company's investment in its existing and new fixed assets, capital expenditures can give an indication of a company's strategy for improving environmental performance and resilience.

What is OpEx?

Operating expenses (OpEx) are shorter-term expenses required to meet the ongoing operational costs of running a business.

While revenue is an indicator of ongoing operations and activities, and is the primary indicator for alignment, where new investment is being made in a technology to better align an issuer, then CapEx would be a more appropriate indicator.

The use of revenue, CapEx, or OpEx is dependent on the vehicle being financed. In particular, where capital is being extended to fund a particular activity or project, then CapEx would be more appropriate.

[2] See: https://www.oecd.org/corporate/mne/
[3] See: https://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang--en/index.htm

What is an activity?

When a company offers goods or services, it is performing an economic activity. The universe of economic activities is described using ISIC codes, which cover 21 broad sectors and with four further levels of differentiation. At the fourth level, 615 classes of economic activity are identified. The ISIC codes map directly to the EU's NACE classification system. Any economic activities that are not directly covered by ISIC codes, such as buildings, have been identified as a cross-cutting activity for both climate change mitigation and adaptation, in line with the EU Taxonomy.

What is a project?

For economic activities that do not meet the technical screening criteria for alignment with the Taxonomy, the financing of improvement measures (CapEx and, if relevant, OpEx) can be counted as Taxonomy-aligned if they are part of an implementation plan to meet the activity threshold over a defined time period.

How is this aggregated to the company level?

At the issuer level, net turnover from aligned activities would be aggregated to determine issuer level alignment. For example, one activity representing 45% and another representing 15% of issuer/company revenue may be aligned, but an activity representing 40% of revenue may not. In this case, an issuer/company would be determined as having 60% revenue alignment.

For projects, following completion, the company can claim 100% of the turnover associated with the project as being aligned with the Taxonomy if it meets the technical screening criteria for Green or Amber. During the project timeframe, it is only the project itself which is considered to be aligned with the Taxonomy and so the turnover associated with the project cannot be classed as aligned until completion.

Step by step guide

- An assessment of the activity or issuer being financed.
- Three tiers of assessment: activity, project, and company/issuer (please refer to Definitions box for more detail).

a. An activity refers to an economic activity as categorised using the UN ISIC[4] framework.

b. A project refers to a smaller project that is undertaken within the context of an activity.

c. A company/issuer refers to an entity which issues a capital markets instrument, for example debt issuance, equity issuance, and so on, or raises financing from a financial institution such as loans or project financing.

1) In the case of an **activity** (i.e., where capital is extended to an issuer to finance a specific activity), the financial Institution must:

a. Determine that the activity (rather than that company/issuer) falls within one of the target sectors (Energy, Transportation, or Buildings);

b. Examine the activity to determine alignment with one of the Environmental Objectives,

c. Disclosure as best practice that the activity does not breach DNSH criteria or minimum social safeguards.

2) In the case of a **project** (i.e. where capital is expected to an issuer to finance a specific project), the financial institution must:

a. Determine whether the project falls within one of the target sectors;

b. Examine whether it contributes to an improvement in the alignment of the activity to one of the five Environmental Objectives (whether from Amber to Green, 'dark Amber' to 'light Amber', or Ineligible to Amber). For example, a power plant that is retrofitting scrubbers or carbon capture and storage technology. Even if the activity itself does not currently meet the criteria for alignment with the Environmental Objective, the project can be considered to be aligned if it brings the activity into alignment upon completion.

c. Disclose as best practice that the project does not breach DNSH requirements or minimum social safeguards.

3) In the case of a **company/issuer** (i.e., where an investment is made in or a loan extended to a company or other pooled vehicle), the Financial Institution must:

[4] International standard industrial classification of all economic activities (ISIC), developed by the United Nations Statistics Division. https://unstats.un.org/unsd/classifications/Econ/ISIC.cshtml.

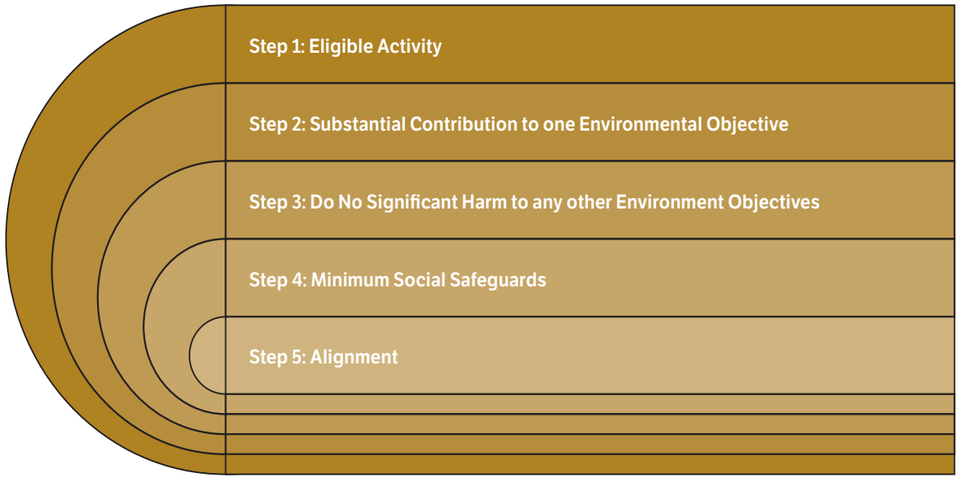


Figure 14: Step by Step Guide to Taxonomy Assessment

a. Determine the extent to which the company/ issuer's activities fall within one of the target sectors;

b. Assess the proportion of revenue (or CapEx/ OpEx) that is aligned with one (or more) of the Environmental Objectives; and then

c. Disclose as best practice that the company/ issuer's activities that are aligned with the Taxonomy DNSH criteria or minimum social safeguards.

Note: At present, the Taxonomy only covers climate change mitigation as an Environmental Objective, with the remaining four expected to be added in future iterations of the Taxonomy. As such, activities, projects and a company/issuer can only currently be classified as being aligned with climate change mitigation, although DNSH criteria should be considered for all of the remaining four Environmental Objectives. DNSH requirements are detailed in a separate annex of this Taxonomy.

Economic Activity Eligibility and Alignment

Eligibility under the Taxonomy is assessed by economic activity according to its ISIC Classification (see Appendices for more details). Economic activities will be classed as 'Ineligible' under the Taxonomy if the economic activity does not fall within the scope of the Taxonomy (currently limited to the Energy, Transportation and Buildings sectors).

- If the eligible activity already meets the Green technical screening criteria for at least one of the five environmental objectives, then it can be considered to be aligned as a Green activity under the Taxonomy as long as it also does no significant harm to the other four environmental objectives and complies with minimum safeguards.

- If the eligible activity is not aligned with the Green technical screening criteria, then the activity is assessed against the amber, or transition, technical screening criteria and, if it also does no significant harm to the other four environmental objectives, can be considered to be aligned as an amber, or transition, activity under the Taxonomy.

- Eligible activities which are aligned with either the Green or Amber technical screening criteria. Users are recommended to provide disclosure against DNSH tests and to prepare for DNSH requirements should they be mandatory in the future. In the future, a breach the DNSH requirements for the remaining four environmental objectives will result in the activity being classified as Ineligible under the Taxonomy.

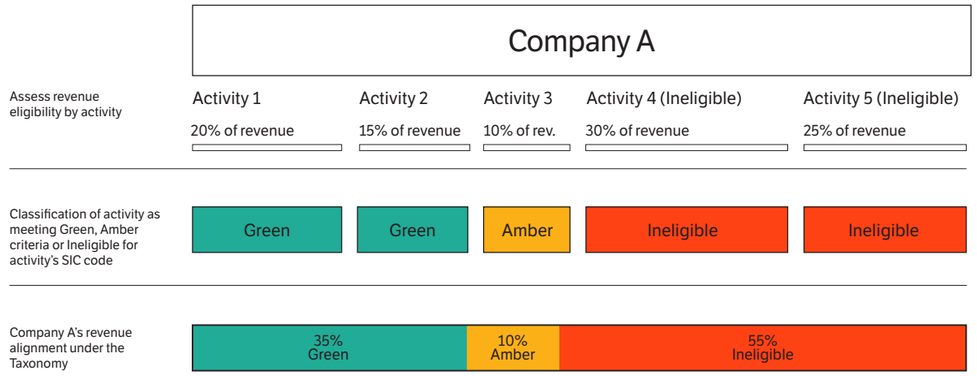


Figure 15: Determining a Company's Eligibility and Alignment

- If the eligible activity is not aligned with either the Green or Amber technical screening criteria, it is classified as Ineligible under the Taxonomy.

Company Taxonomy Reporting and Eligibility

Non-financial companies may disclose the proportion of their economic activities that align with the Taxonomy criteria. The translation of environmental performance into financial variables (revenue/turnover, CapEx and OpEx) allows investors and financial institutions to have clear and comparable data to help them with their investment and financing decisions. The main reporting options for non-financial companies would be:

- **Taxonomy-aligned Revenues** represents the proportion of the net turnover derived from products or services that are from activities that are aligned with the Green or Amber technical screening criteria for at least one of the six environmental objectives of the Taxonomy.

- **Taxonomy-aligned CapEx** represents the proportion of the capital expenditure of an activity that is either already Taxonomy-aligned or is part of a credible plan to extend or reach Taxonomy alignment.

- **Taxonomy-aligned OpEx** represents the proportion of the operating expenditure associated with taxonomy-aligned activities or to the CapEx plan. The operating expenditure covers direct non-capitalised costs relating to research and development, renovation measures, short-term lease, maintenance and other direct expenditures relating to the day-to-day servicing of assets of property, plant and equipment that are necessary to ensure the continued and effective use of such assets.

The plan that accompanies both the CapEx and OpEx reporting should be disclosed at the economic activity aggregated level.

To determine overall Taxonomy alignment at an entity level, the proportion of eligible revenues from each activity which meets the technical screening criteria for Green, Amber or Ineligible classifications should be aggregated to give the total revenues that are aligned with each classification as shown below.

Financial Institution Taxonomy Reporting and Portfolio Alignment

After constructing a portfolio of investments, financial institutions would aggregate this information to a portfolio level, using this information to determine (and disclose) how much of a product is aligned with the Taxonomy. Whilst regulatory activity is not within scope of this Taxonomy, one outcome could be that regulators provide thresholds for alignment, whereby portfolios with a green alignment greater than x% would be permitted to identify as a "green" product, but those with an alignment is lower than x% would

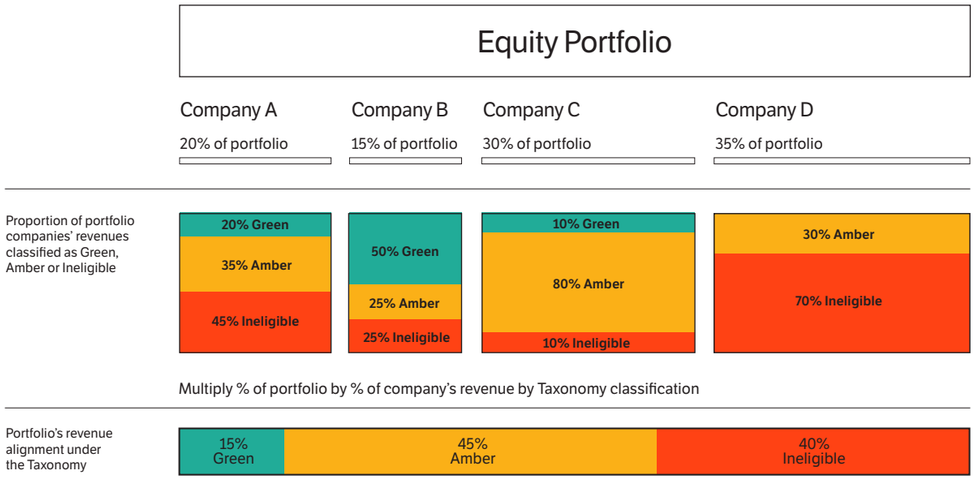


Figure 16: Determining an Equity Portfolio's Eligibility and Alignment

not. Regulators would be able to set a threshold for determining whether a product is "green" based on the percentage alignment that sits under a product. Ultimately, the end objective is to understand how much of the capital being allocated is "green".

Equity investments

For equity investments, company revenue is used as the main proxy for equity exposure to Taxonomy-aligned economic activities. In order to calculate total portfolio alignment, the calculation is the weight of the asset within the portfolio multiplied by the proportion of the company revenue which is eligible and aligned with each Taxonomy alignment classification (Green, Amber, and Ineligible) for inclusion under the Taxonomy.

Debt capital

The approach for general debt capital is broadly the same as for equity investments, with revenue being used as a proxy for portfolio exposure to Taxonomy-aligned economic activities, where appropriate. For corporate debt and/or bonds which are being used to fund Taxonomy-aligned projects, then 100% of the investment can be classed as Taxonomy-aligned where it commits to meeting the technical screening criteria for the environmental objective at the maturity of the project.

Reporting and Disclosures

What would disclosure look like?

Financial Institutions would report the degree of alignment of an investment portfolio or financial product with the Taxonomy, on a weighted basis.

It is currently envisaged that Financial Institutions should disclose:

- **General alignment:** How products have used the Taxonomy to classify investments, on a narrative basis;
- **Overall ESG objective:** How that usage is consistent with the specified product-level ESG outcomes (for example, in the case of an environmental fund, or a climate fund);
- **Proportion of aligned investment:** The percentage of the product that is assessed to be aligned with the Taxonomy;
- **Data usage:** The way that data has been utilised, either publicly disclosed, via engagement, or estimated;
- **Taxonomy Environmental Objective:** The environmental objectives (and their exposure) to which the product contributes;
    - For example, percentage of the product which contributes to climate change mitigation, or percentage of the product which contributes to climate change adaptation, and so on.
- **Alignment assessment:** How due diligence was carried out, the technical screening criteria were assessed, and the number of portfolio companies that were estimated to substantially contribute but which failed the DNSH test (and how the Financial Institution intends to address this failure, either through portfolio construction or engagement);
- **Other factors:** Reasons for a low-level or alignment, where the outcome deviates from what might reasonably be expected from the specified product-level ESG outcomes (for example, in the case of an environmental fund, or a climate fund); and
- **Engagement objective:** How engagements are undertaken in the context of the Taxonomy (for example, to focus on issuers with low alignment, or to engage for continued momentum from an issuer operating within a "Transition" activity).

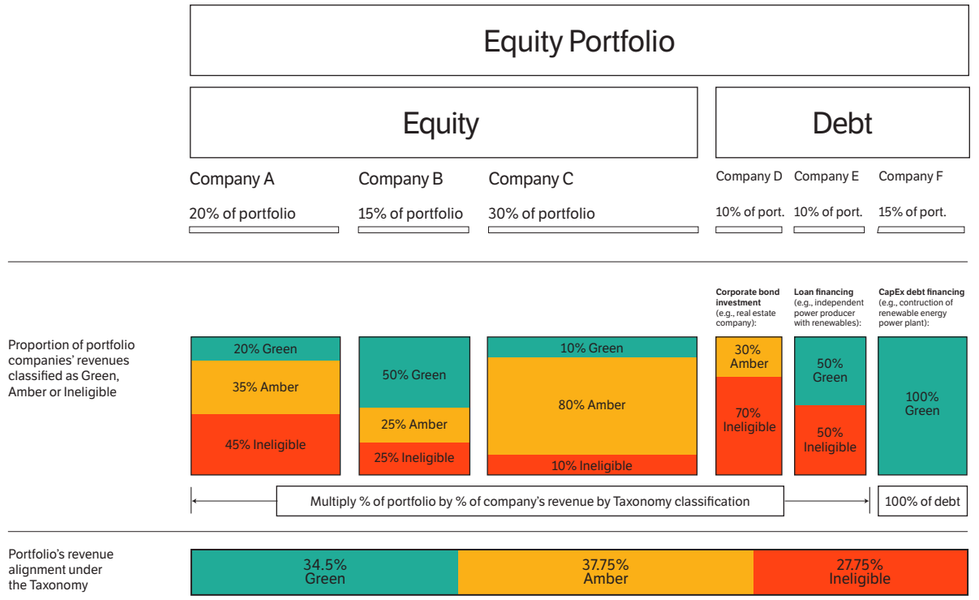


Figure 17: Determining a Mixed Asset Portfolio's Eligibility and Alignment

In doing so, Financial Institutions need to aggregate the alignment of the issuers / companies within the product.

After aggregating activity alignment at the issuer level, this alignment is then aggregated at the portfolio level on a weighted basis.

The Financial Institution should also clearly label in fund / product / equivalent documents where a metric other than revenue, CapEx, or OpEx has been used to assess alignment. Whilst these metrics are assumed to be sufficient in the majority of cases, there may be very uncommon cases where an alternate measurement might be used. Financial Institutions should ensure that an internal governance process is established to govern the use alternative metrics so as to ensure a robust process remains in place.

This would be helpful for regulators and exchanges in thinking about disclosure requirements.

What disclosure is recommended from Companies?

The success of the Taxonomy will be enabled by high quality disclosure from issuers, with this ideally aligned with other reporting standards and frameworks, such as the International Sustainability Standards Board (ISSB) and GRI, and frameworks, such as TCFD and CDP.

Issuers should disclose sufficient information so as to allow investors to assess alignment with the Taxonomy, using internationally-recognised data and metrics from the organisations listed above or more specific frameworks such as the World Green Building Council for Net Zero framework, GRESB, and Climate Bond Initiative.

This information would be disclosed both in listing documents (for example, prospectus documents) and on an ongoing basis via annual reports or equivalent (incluing dedicated non-financial or sustainability reports).

Specifically, issuers should disclose the percentage of their business that is aligned with the Taxonomy (by way of revenue, CapEx or OpEx), the specific Environmental Objective/Objectives with which the company is aligned, and the ways in which the issuer has ensured compliance with the minimum safeguards as described in the relevant DNSH section of the Taxonomy.

The issuer should present such information on an activity-by-activity basis, where the issuer is involved in more than one activity.

Where an issuer claims alignment, it should provide the requisite revenue, CapEx, or OpEx data on an activity-by-activity basis.

Whilst these disclosures are not currently a regulatory requirement, issuers wishing to attract "green" capital would be motivated to make such disclosures. One additional outcome of the Taxonomy as discussed earlier is that regulators consider incorporating mandatory regulatory disclosures that are aligned with and would facilitate consideration of Taxonomy alignment.

Taxonomy Reporting Recommendations/ Expectations in Practice

At present, the Taxonomy is only considering the first environmental objective, climate change mitigation, with subsequent environmental objectives to follow in future iterations of the Taxonomy. This means promoting activities that are already low carbon or can contribute to a transition to a low-carbon economy. Under this assessment, the recommended reporting elements are as follows:

Green Activities

Where the issuer is reporting alignment with an activity determined to be Green, the issuer should describe (both quantitatively and qualitatively) how the activity meets the technical screening criteria for climate change mitigation, any external verification or due diligence of these metrics, and the level of associated revenue/turnover.

Transition/Amber Activities

Where the issuer is reporting alignment with an activity determined to be amber (transition), there is a particular emphasis on the issuer to describe (both quantitatively and qualitatively) the way that such an activity is aiding in transition.
In general:

- The issuer should outline the current alignment of the activity or project with the transition thresholds and the operational plan to transition the activity or project to the Green thresholds, including target date(s) and final Environmental Objectives.

- The issuer could also provide more information about CapEx/OpEx requirements to meet that objective/threshold or feasibility plan of meeting the threshold.

Ineligible activities

Where an economic activity does not meet the technical screening criteria for Green or Amber, then the activity will, by default, be classed as ineligible as this is neither currently aligned with a low-carbon economy or has a transition pathway to alignment.

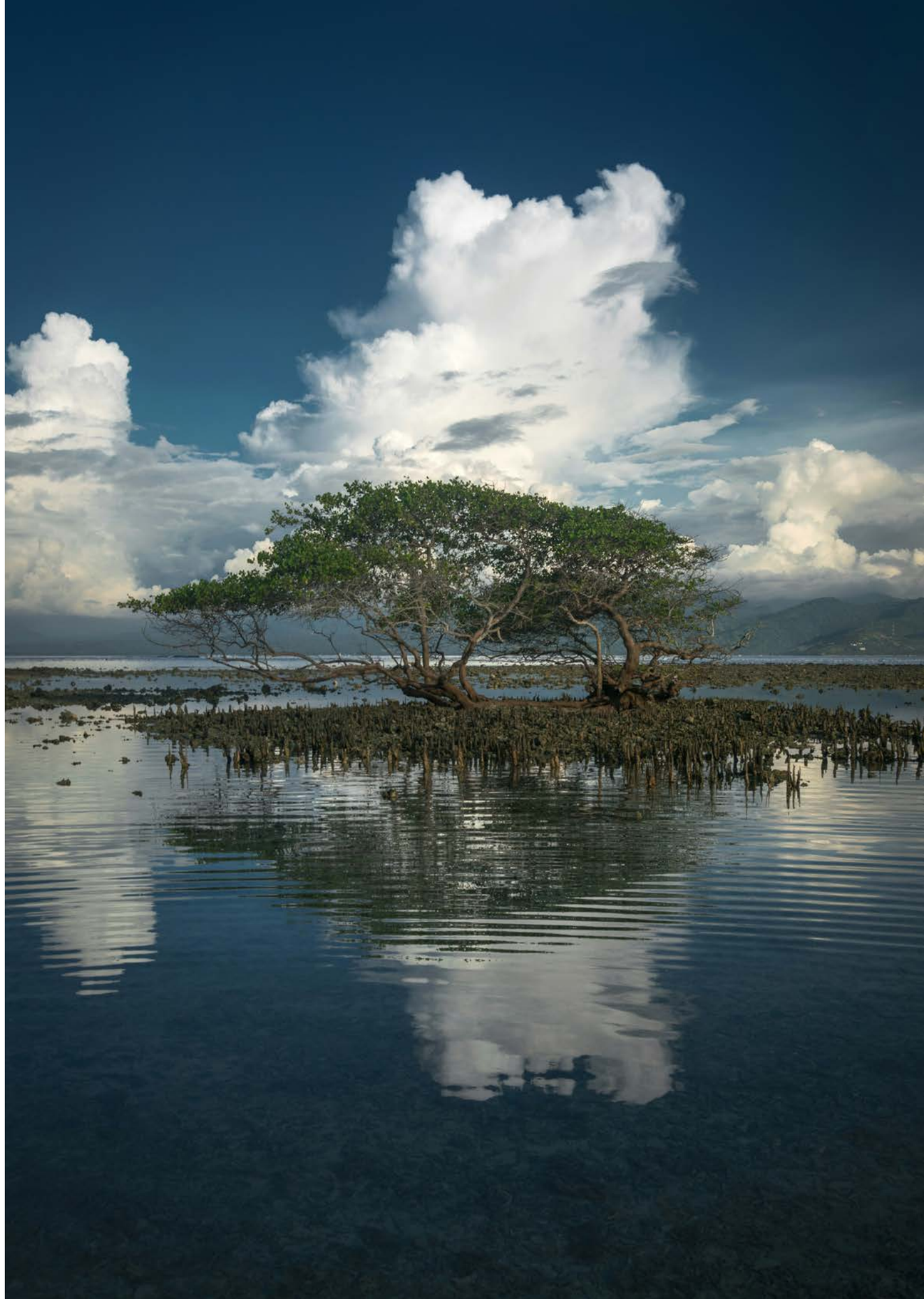
Economic activities will be classed as 'Ineligible' under the Taxonomy if the economic activity does not fall within the scope of the Taxonomy.

Do No Significant Harm

To be classed as aligned, an economic activity has to meet the technical screening criteria for that activity. It is also recommended for all users of the Taxonomy to provide disclosures about how DNSH requirements are met (or not met).

The DNSH assessment is to ensure that, at the same time as an economic activity or project is making a substantial contribution to one of the five Environmental Objectives under the Taxonomy, it is not doing so through practices or policies which would cause potential or actual harm to any of the other four Environmental Objectives.

While compliance with the DNSH tests are not compulsory in the early implementation of the Taxonomy, in the future this may be required so that if there is no identifiable approach or option to mitigate this potential harm, then the activity will be classed as 'ineligible' under the Taxonomy.



DNSH requirements are detailed in its own chapter. For the purposes of this section, the discussion on DNSH and case studies provided below are to help users of the Taxonomy understand how the DNSH requirements are intended to work.

The DNSH sections of the Classification chapter are designed to help in assisting financiers, highlighting the issues, the principal harm that could possibly come, and the metrics to be monitoring.

The due diligence process includes: understanding the risk associated with an activity or project, with reference to the activity or project, and its location, and potential social impact; and assessing the metrics that need to interrogated.

Note that this DNSH-based due diligence does not end at the point of investment. Investors are expected to continually monitor indicators and engage with issuers to understand the way that materiality, probability and risk management have evolved. Investors should also remain apprised of new and emerging risks to the issuer.

Minimum Social Safeguards

The Taxonomy establishes certain minimum safeguards that are applicable to all assessments – investors should determine that the issuer is compliant with the OECD Guidelines on Multinational Enterprises (MNEs)[5] and the UN Guiding Principles on Business and Human Rights, with specific reference to the ILO Core Labour Conventions.[6]

In this instance, the "OECD Due Diligence Guidance for Responsible Business Conduct"[7] is a helpful guide for investors. The Guidance states:

"The OECD Guidelines for MNEs acknowledge and encourage the positive contributions that business can make to economic, environmental and social progress, but also recognise that business activities may result in adverse impacts related to corporate governance, workers, human rights, the environment, bribery, and consumers. Due diligence is the process enterprises should carry out to identify, prevent, mitigate and account for how they address these actual and potential adverse impacts in their own operations, their supply chain and other business relationships, as recommended in the OECD Guidelines for MNEs. Effective due diligence should be supported by efforts to embed RBC into policies and management systems, and aims to enable enterprises to remediate adverse impacts that they cause or to which they contribute."[8]

Case Studies

Case study: Off-shore wind farm, equity financed

Principles for substantial contribution to climate mitigation

Off-shore wind energy is considered to make a substantial contribution to climate change mitigation by providing zero-emissions energy and are classified as Green under the Taxonomy. Company A makes 20% of its revenue from off-shore wind farms and 80% of its revenue from thermal coal-fired power stations.

Financial institution portfolio reporting:

The offshore wind farm activity automatically falls under the Green classification; the financial institution would then check that the company does not breach the DNSH tests and disclose key considerations.

For company A, which makes 20% of its revenue from its offshore wind farm activity and 80% from its thermal coal-fired power station activity, 20% of its revenue will be classified as green and the remainder as Ineligible.

For portfolio reporting, if this company accounts for 5% of the financial institution's equity portfolio, then the financial institution will report 1% of its portfolio as Green and 4% as Ineligible (weight in portfolio x% of Green revenues).

Case study: Freight transportation, equity financed

Principles for substantial contribution to climate mitigation

Freight transportation currently accounts for a significant proportion of carbon emissions from transportation in Singapore and the wider ASEAN region so reducing tailpipe emissions from this source would make a substantial contribution to climate change mitigation. Company B makes 100% of its revenues from freight transportation, with 10% from its local, electric-powered delivery fleet and 90% from its revenues from energy-efficient long distance delivery trucks.

The Taxonomy classifies freight transportation with zero direct tailpipe emissions as green, as long as the vehicles are not used to transport fossil fuels, while heavy-duty vehicles that have specific CO_2 emissions of less than half of the reference CO_2 emissions of all vehicles in the vehicle sub-group to which the heavy-duty vehicle belongs are classified as Amber, as long as they are also not used to transport fossil fuels.

Financial institution portfolio reporting:

The electric-powered transportation activity automatically falls under the green classification. The Financial Institution then should take steps to satisfy itself that the company does not breach the DNSH tests on pollution and the circular economy to classify this company's activity as Green under the Taxonomy.

For the truck delivery activity, the company needs to provide both current CO_2 emissions as well as a credible transition pathway for its delivery fleet to reach zero tailpipe emissions by the sunset date in order to be classified as amber under the Taxonomy. The Financial Institution should also satisfy itself that the company does not breach the DNSH requirements on pollution and the circular economy for this activity.

In total, for company B, 10% of its revenue will be classified as Green and the remainder as Amber.

For portfolio reporting, if this company accounts for 10% of the financial institution's equity portfolio, then the Financial Institution will report 1% of its portfolio as Green and 9% as Amber (weight in portfolio x% of Green and Amber revenues).

Case study: Construction of new buildings, debt financed

Principles for substantial contribution to climate mitigation

Construction of energy and resource efficient new buildings can make a substantial contribution to climate change mitigation by reducing GHG emissions from the operational and construction phase of the building lifecycle and this should be measured by appropriate indicators of energy and GHG emissions both in the operational phase and along the lifecycle (including embodied emissions).

- The Taxonomy relies on the Singapore's Green Mark 2021 certification standards as well as the energy intensity of the buildings to assess eligibility for Green or Amber classification.
- A new building is eligible when it meets the Green Mark 2021 certification standard, which requires construction companies to meet set parameters on the design, construction and operation of buildings to increase energy efficiency and enhanced environmental performance.
- A new building can only be classified as green or ineligible under the Taxonomy as it is not considered possible for a new building to transition to Green over time.
- The construction of new buildings for the purpose of occupation by fossil fuel extraction, transporting transport of fossil fuels or manufacturing of fossil fuels activities (either for actual extraction, transporting, manufacturing and/or administrative purpose) are excluded.

Financial Institution portfolio reporting:

If the new building

- Meets the Green Mark 2021 criteria;
- Meets the DNSH and minimum social safeguards requirements;

It will be classed as Green under the Taxonomy, with 100% of the value of the debt to finance the construction of the new building classified as Green in the financial institution's portfolio.

Conclusion

It is envisaged that some criteria and methods outlined in this Taxonomy will need periodic revision, while other areas could entail further progression subject to industry development and technology advancement down the road. There could also be changes on the economic activities in and out of scope as transition moves along. The Taxonomy would allow monitoring capital flows towards sustainable finance and facilitate greater growth of green finance in Singapore and the broader ASEAN region.

[5] See: https://www.oecd.org/corporate/mne/
[6] See: https://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang--en/index.htm
[7] See: http://mneguidelines.oecd.org/OECD-Due-Diligence-Guidance-for-Responsible-Business-Conduct.pdf
[8] See: http://mneguidelines.oecd.org/OECD-Due-Diligence-Guidance-for-Responsible-Business-Conduct.pdf, p15

Do No Significant Harm

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Introduction

The Do No Significant Harm (DNSH) assessment ensures that while the economic activities make substantial contribution to climate change mitigation, they do not cause significant harm to all other environmental objectives of the Taxonomy.

The other environmental objectives of Singapore Taxonomy are as follows:

- Climate change adaptation
- Protect healthy ecosystems and biodiversity
- Promote resource resilience and circular economy
- Pollution prevention and control

Climate change adaptation refers to activities that substantially reduce the adverse impact of the current and expected future climate on either

(i) other people, nature or assets or
(ii) the economic activity itself, in each case without increasing the risk of an adverse impact on other people, nature and assets.

Across all activities, the generic DNSH criteria for climate change adaptation objective are as follows (as referred from EU Taxonomy):

Table 18 — Do no significant harm to climate change adaptation (EU Taxonomy)

Criteria	Description
1. Reducing material physical climate risks	**The economic activity must reduce all material physical climate risks to the activity to the extent possible and on a best effort basis.**
1.1	The activity integrates physical and non-physical measures aimed at reducing – to the extent possible and on a best effort basis – all material risks that have been identified through a climate risk assessment. • For existing activities, the implementation of those physical and non-physical measures may be phased and executed over a period of up to 5 years. • For new activities, implementation of these measures must be met at the time of design and construction.
1.2	The above-mentioned climate risk assessment has the following characteristics: • considers both current weather variability and future climate change, including uncertainty; • is based on robust analysis of available climate data and projections across a range of future scenarios; • is consistent with the expected lifetime of the activity
2. Supporting system adaptation	**The economic activity and its adaptation measures do not adversely affect the adaptation efforts of other people, nature and assets.**
2.1	The economic activity and its adaptation measures do not increase the risks of an adverse climate impact on other people, nature and assets or hamper adaptation elsewhere. Consideration should be given to the viability of 'Green' or 'nature-based-solutions' over 'grey' measures to address adaptation.
2.2	The activity is consistent with sectoral, regional, and/or national adaptation efforts.

1. Energy sector

1.1. Energy from solar PV and CSP (including electricity, heat, cool)

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the installation and operation of photovoltaic (PV) panels relate to:

- The PV installation siting: impacts on ecosystems and biodiversity if built in a designated conservation area or other areas with important ecosystem and biodiversity value.
- The impacts from the production and end-of-life management of the PV systems and its component/materials: potentially significant environmental impacts are associated with the sourcing/production of materials and components of PV systems.

The main potential significant harm to other environmental objectives from CSP is associated with:

- the construction of the installation and the substantial land-take associated with the installation
- impact on birdlife from the high temperatures generated by the plant
- impact of the cooling system on water resources

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.

Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment) – including ancillary services, e.g. transport infrastructure and operations).
	• Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented (i.e.: avoid possible collision of birds and visual impacts, generated by the change in landscape, due to the construction and operation of wind farms)
	• For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area.
	
	• For such sites/operations, ensure that:
	  ○ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6;
	  ○ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and
	  ○ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented

Pollution prevention and control	• Identify and manage risks related to water quality and/or water consumption at the appropriate level. • Avoid possible negative impacts of the cooling system on water resources.
Promote resource resilience and circular economy	• Ensure PV panels, CSP installations and associated components have been designed and manufactured for high durability, easy dismantling, refurbishment, and recycling, aligned to international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality). • Ensure reparability of the solar photovoltaic (PV) installation or plant thanks to accessibility and exchangeability of the components.

1.2 Wind power generation

Do no significant harm assessment

In spite of the crucial contribution of wind energy to mitigating climate change, there may be conflicts arising between its deployment and nature conservation at a local level. The main environmental exposures to be considered as a DNSH criteria, in the most stringent sense, include:
- Underwater noise created in the installation of bottom-fixed offshore wind turbines;
- The composite waste generated from both on- and offshore wind turbine blades at the end of their lifetime;
- The possible disturbance, displacement or collision of birds and bats by the construction and operation of wind farms.
- The possible deterioration of water ecosystem associated to the construction of wind farms

The possible visual impacts created by landscape change in the installation of wind turbines.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented (i.e.: avoid possible collision of birds and visual impacts, generated by the change in landscape, due to the construction and operation of wind farms) • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure any required mitigation measures for avoiding underwater noise created by the installation of offshore wind turbines • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality). • State ambition to maximise recycling at end of life based on waste management plans, dismantling/decommissioning processes at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation), aligned to international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system).

1.3 Hydropower generation

Do no significant harm assessment

The main environmental impacts associated with hydropower installations are:

- Emissions to water and generation of waste during construction.
- Impacts on biodiversity associated with fragmentation of ecosystems and changes to habitat.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented (i.e. avoid fragmentation of ecosystems and hydrological and hydrogeological regimes, affecting species migration pathways) • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Establishing a River Basin Management Plan and ensure compliance with applicable IFC's and World Bank Group's environmental and social standards. Parameters and acceptable limits/ranges and necessary sampling and measuring frequency addressing the quality of freshwaters in order to support fish life, should be observed as per international and national standards. • Avoid discharges to water bodies during hydropower construction.
Promote resource resilience and circular economy	For new projects: Ensure implementation of a River Basin Management Plan and ensure that an appropriate cumulative impact assessment or equivalent study has been undertaken that identifies and addresses any significant regional or basin-level environmental and social impacts, in compliance with international standards and guidelines (ex: IFC and World Bank Environmental and social standards, San José Declaration on Sustainable Hydropower; Hydropower sustainability Secretariat's Hydropower Sustainability Guidelines on Good International Industry Practice; EIB's Environmental, Climate and Social Guidelines on Hydropower Development), preferably at the strategic planning stage. Such a study must consider all of the planned infrastructure developments in the basin, for example as part of a hydropower cascade at the scale of the river catchment, involving all relevant stakeholders. Ensure that the following conditions are met based on ground evidence: • All practical steps are taken to mitigate the impacts. • The project has been recognised of overriding public interest and/or it is proven that the benefits of the project outweigh its impacts. • There are no significantly environmentally better option. • The project does not show significant adverse impact on upstream or downstream water bodies. • This applies to newly built hydropower and extension of existing hydropower. Construction of new hydropower should not lead to increase fragmentation of rivers, consequently refurbishment of existing hydropower plant and rehabilitation of existing barriers should be prioritised. Construction of small hydropower (<10MW) should be avoided. During operation: • All necessary mitigation measures should be implemented to reach good ecological status or potential, in particular regarding ecological continuity and ecological flow. Priority should be given to nature-based solutions. • Aligned to IFC's and World Bank Group's environmental and social standards. General impact: Operation of the hydropower plant must adhere to the principles of the UNECE Convention on the Protection and Use of Transboundary, Watercourses and International Lakes.

1.4. Geothermal energy generation (including electricity, heat, cool)

Do no significant harm assessment

The main potential significant harm to other environmental objectives from production of electric energy from high-enthalpy geothermal system is associated with:

- Non-condensable geothermal gases with specific environmental threats, such as H_2S, CO_2, and CH_4, are often released from flash-steam and dry-steam power plants. Binary plants ideally represent closed systems, and no steam is emitted.
- Possible emissions to surface and underground water

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented (i.e. avoid fragmentation of ecosystems and hydrological and hydrogeological regimes, affecting species migration pathways) • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality). • Discharges to water bodies should comply with individual license conditions for specific operations, where applicable, and/or national threshold values in line with the international standards and guidelines. • Emissions to air: the operations of high-enthalpy geothermal energy systems should ensure that adequate abatement systems are in place to comply with international standards and guidelines. (ex: IFC's Environmental, Health, and Safety Guidelines for Geothermal Power Generation. ISO 14001:2015 Environmental management systems — Requirements with guidance for use). Thermal anomalies associated with the discharge of waste heat should not exceed 3°K for groundwater environments or 1.5°K for surface water environments, respectively.



1.5. Bioenergy power generation (including electricity, heat, cool)

Do no significant harm assessment

The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the SO_2, NOx dust and other emissions control and the avoidance of direct impacts on sensitive ecosystems, species or habitats.

Intelligent pathways for cascading use are environmentally superior and preferable to single use.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented (i.e. avoid fragmentation of ecosystems and hydrological and hydrogeological regimes, affecting species migration pathways) • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international standards and guidelines. (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 13065:2015: Sustainability Criteria for Bioenergy) • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Implement measures concerning waste management as per international standards and guidelines (ex: IFC EHS Guidelines: Air emissions and ambient air quality; KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

1.6. Electricity generation from ocean energy

Do no significant harm assessment

The main potential significant harm to other environmental objectives from ocean energy is associated with:
• Construction, deployment, operation and maintenance of ocean energy installations can impact on marine ecosystems and biodiversity.
• Pollution from lubricants and anti-fouling paints and emissions from maintenance and inspection vessels

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	Measures in place to minimise toxicity of anti-fouling paint and biocides as per international standards and guidelines. (ex: International Convention on the Control of Harmful Anti-fouling Systems on Ships; ISO 13073).
Promote resource resilience and circular economy	State ambition to maximise recycling at end of life based on waste management plans, dismantling/ decommissioning processes at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation), aligned to international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system).

1.7. Transmission and distribution of electricity

Do no significant harm assessment

The impacts of transmission and distribution lines are a function of the spatial alignment of the grid, the structures and conductors required for various voltages, the extent to which pre-existing corridors are used, and how the transmission and distribution lines are operated and maintained. The most common environmental impacts of electricity transmission and distribution infrastructure are visual, ecosystem and land use. In the cases of underground offshore electricity lines, water and marine resources may be impacted.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented • Underground power lines: Avoid routings with heavy impact on marine and terrestrial ecosystems and follow the principles of IFC General EHS Guidelines for construction site activities.
Pollution prevention and control	Overground high voltage lines: • For construction site activities follow the principles of IFC General EHS Guideline. • Respect applicable norms and regulations to limit impact of electromagnetic radiation on human health. (ex: 1998 ICNIRP (International Commission on Non-Ionizing Radiation Protection)) • Do not use PCBs Polyclorinated Biphenyls.
Promote resource resilience and circular economy	State ambition to maximise recycling at end of life based on waste management plans, dismantling/ decommissioning processes at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation), aligned to international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system).

1.8. Transmission and distribution of renewable and low-carbon gases

Do no significant harm assessment

The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the NOx and CO emissions control and the avoidance of direct impacts on sensitive ecosystems, species or habitats.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Fans, compressors, pumps and other equipment used comply, where relevant, with the top class requirements of the energy label, and with implementing regulations and represent the best available technology. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

1.9. Storage of energy and green hydrogen

Do no significant harm assessment

The energy storage activities differ considerably in their physical, chemical and biological bases and forms, which result in divergent environmental impacts in each case.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	The activity complies with international standards, particularly if the storage is above five tonnes. (ex: ISO 19884 Gaseous Hydrogen – Cylinders and tubes for stationary storage; IEC 63341-2 Railway applications – Rolling stock – Fuel cell systems for propulsion -Part 2: Hydrogen storage system; ISO 16111 Transportable Gas Storage Devices - Hydrogen Absorbed in Reversible Metal Hydrides).
Promote resource resilience and circular economy	State ambition to maximise recycling at end of life based on waste management plans, dismantling/ decommissioning processes at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation), aligned to international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system).

1.10. Electricity generation from hydrogen

Do no significant harm assessment

The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the NOx and CO emissions control and the avoidance of direct impacts on sensitive ecosystems, species or habitats.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international standards and guidelines. (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

1.11. Energy production from natural gas

Do no significant harm assessment

The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the NOx and CO emissions control and the avoidance of direct impacts on sensitive ecosystems, species or habitats.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international standards and guidelines. (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

1.12. District heating and cooling systems

Do no significant harm assessment

Key environmental aspects to be considered for the investments in Distribution of District Level Heating and Cooling are summarised as follows:

- For the construction of the mains, the potential significant harms to the environmental objectives are constituted by the typical potential harms connected to construction of facilities in general. This includes inter alia, terrestrial habitat alteration, loss of valuable ecosystem, land consumption, overburden disposal, negative effects on biodiversity, emissions of particles and NOx, noise and hazardous materials.
- For the operation of the district heating networks, potential significant impacts are considered low. They relate mainly to the potential impact of underground district heating networks on drinking water/ground water systems and local ecosystems through corrosion products from corrosion of the distribution system elements and applied water additives that may be non-biodegradable.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Fans, compressors, pumps and other equipment used must comply, where relevant, with the top class requirements of the energy label, and represent the best available technology. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

1.13. Production of heat or cool from waste heat

Do no significant harm assessment

Key environmental aspects to be considered for the production of heat/cool using waste heat are generally moderate and should mostly be covered by considerations at the heat / cool source.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Pumps and whatever kind of equipment used should comply, where relevant, with the top class requirements of the energy label, and representing the best available technology. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

1.14. Decommissioning of fossil fuel-based power plants

Do no significant harm assessment

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented (i.e. avoid fragmentation of ecosystems and hydrological and hydrogeological regimes, affecting species migration pathways) • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international standards and guidelines. (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality). • Implement measures concerning waste management as per international standards and guidelines (ex: IFC EHS Guidelines: Air emissions and ambient air quality; KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system).

2. Transport

2.1. Transport via railways

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the operation of rail transport activities are attributed to air pollution, noise and vibration, water use. Direct emissions of air pollutants are not an issue of concern in the case of electrified rail, but only where (very efficient) diesel or hybrid engines would meet the CO_2e-threshold defined to ensure substantial mitigation of GHG emissions

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	Engines for the propulsion of railway locomotives (RLL) and engines for the propulsion of railcars (RLR) must comply with latest applicable standards (currently stage V) of Non-Road Mobile Machinery Regulation. Minimise noise and vibrations of rolling stock, thresholds in line with Noise Regulations. Align with national and international emission standards. Ex: (ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 13.040.50: Transport Exhaust emissions;).
Promote resource resilience and circular economy	Ensure proper waste management both at the use phase (maintenance) and the end-of-life for the rolling stock, e.g. reuse and recycle of parts like batteries, in compliance with international and national legislation on hazardous waste generation, management and treatment. (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system). Measures are in place to manage waste in accordance with the waste hierarchy, in particular during maintenance

2.2. Other passenger land transport

Do no significant harm assessment

Key environmental aspects to be considered for investments on passenger cars and light commercial vehicles are the following:

- Direct emissions to air from the exhaust gases of internal combustion engine: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions
- Indirect emissions to air from the production of fuels and energy carriers. However, this is out of the control of vehicles manufacturers and operators.
- Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle.
- Recycling of materials in order to reduce consumption of critical raw materials and impact on ecosystems and natural capital

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	• Vehicles must comply with the emission thresholds for clean light-duty vehicles. • Tyres must comply with noise and tyre abrasion regulations. • Vehicles must comply with regulations on the sound level of motor vehicles and of replacement silencing systems. (ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 13.040.50: Transport Exhaust emissions; ISO 362 Measurement of noise emitted by accelerating road vehicles; ISO 28580:2018 - Passenger car, truck and bus tyre rolling resistance measurement method — Single point test and correlation of measurement results).
Promote resource resilience and circular economy	Compliance with international and national legislation on hazardous waste generation, management and treatment. Special focus on critical raw materials recovery from batteries. (ex: ISO 14001:2015 Environmental management systems; ISO 22628:2002 Road vehicles — Recyclability and recoverability; Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989): Basel Action Network Standard for Responsible Recycling and Reuse of Electronic Equipment, known as e-Stewards). Measures are in place to manage waste both in the use phase (maintenance) and the end-of-life of the fleet, including through reuse and recycling of batteries and electronics (in particular critical raw materials therein), in accordance with the waste hierarchy.

2.3. Urban and suburban passenger land transport

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the operation of urban and suburban passenger land transport (public transport) are summarised as follows:

- Direct emissions to air from the exhaust gases of internal combustion engine: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions;
- Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle or rolling stock.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	• Buses must comply with the latest applicable standards of Non-Road Mobile Machinery Regulation. • Vehicles must comply with the emission thresholds for clean light-duty vehicles. • Tyres must comply with noise and tyre abrasion regulations. • Vehicles must comply with regulations on the sound level of motor vehicles and of replacement silencing systems. • Minimise noise and vibrations of rolling stock by applying thresholds on pass-by noise in dB in line with national norms. (ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 13.040.50: Transport Exhaust emissions; ISO 362 Measurement of noise emitted by accelerating road vehicles; ISO 28580:2018 - Passenger car, truck and bus tyre rolling resistance measurement method — Single point test and correlation of measurement results).
Promote resource resilience and circular economy	• For both Maintenance and end-of-life management of vehicles or rolling stock, ensure compliance with international and national legislation on hazardous waste generation, management and treatment.(ex: ISO 14001:2015 Environmental management systems; ISO 22628:2002 Road vehicles — Recyclability and recoverability; Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989): Basel Action Network Standard for Responsible Recycling and Reuse of Electronic Equipment, known as e-Stewards). • Ensure that measures are in place to manage waste both in the use phase (maintenance) and the end-of-life of the fleet, including through reuse and recycling of batteries and electronics (in particular critical raw materials therein), in accordance with the waste hierarchy.

2.4. Freight transport by road

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the operation of freight road transport are summarised as follows:
- Direct emissions to air from the exhaust gases of internal combustion engine: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions
- Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	• Vehicles must comply with the emission thresholds for clean light-duty vehicles. • Tyres must comply with noise and tyre abrasion regulations. • Vehicles must comply with regulations on the sound level of motor vehicles and of replacement silencing systems (ex: (IFC EHS Guidelines: Air emissions and ambient air quality; ISO 13.040.50: Transport Exhaust emissions; ISO 362 Measurement of noise emitted by accelerating road vehicles; ISO 28580:2018 - Passenger car, truck and bus tyre rolling resistance measurement method — Single point test and correlation of measurement results).
Promote resource resilience and circular economy	Compliance with international and national legislation on hazardous waste generation, management and treatment. Special focus on critical raw materials recovery from batteries. (ex: ISO 14001:2015 Environmental management systems; ISO 22628:2002 Road vehicles — Recyclability and recoverability; Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989): Basel Action Network Standard for Responsible Recycling and Reuse of Electronic Equipment, known as e-Stewards). Measures are in place to manage waste both in the use phase (maintenance) and the end-of-life of the fleet, including through reuse and recycling of batteries and electronics (in particular critical raw materials therein), in accordance with the waste hierarchy.



2.5. Transport infrastructure

Do no significant harm assessment

The main potential significant harm to other environmental objectives from infrastructure activities are attributed to noise and vibration pollution, water contamination, waste generation and impacts on biodiversity (habitat and wildlife) and land use consumption with ecosystem impacts specifically:

- Contamination of water during construction and unsustainable use of water during construction and operations
- Unsustainable use of resources during constructions, e.g. generation of high amount of waste, no recycling/reuse of construction waste
- Noise pollution can be relevant for both rolling stock and railway infrastructure as noise can be generated by both rolling stock and poor conditions of rail tracks.
- Construction of infrastructure can cause significant harm when taking place in protected areas or areas of high biodiversity values outside protected areas.
- Infrastructure can cause fragmentation and degradation of the natural and urban landscape due to the "barrier" effects of the infrastructure and can involve risks of wildlife accidents caused by collisions. Railway infrastructure (in particular tunnels) can cause change and degradation of hydromorphological conditions of water bodies and therefore have impacts on aquatic ecosystems.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	Infrastructure for low carbon transport is land use intensive and is a major factor of ecosystem deterioration and biodiversity loss. Projects should ensure that: • Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment). • Such impact assessments should, at the very least, identify, evaluate, and mitigate any potential negative impacts of the designated activities, projects, or assets on ecosystems and its biodiversity. • Invasive plants are appearing very often along transport infrastructure and are sometimes even spread duo to transport infrastructure, which might negatively impact natural ecosystems (e.g. natural fauna). Care should be taken not to spread any invasive plants through proper maintenance. • Wildlife collisions is a problem and should be considered. Solutions developed for should be applied for the detection and avoidance of potential traps that may cause the unnecessary death of animals. • Mitigation options exist and different types of measures can be beneficial for wildlife, such as: ◦ Wildlife warning systems combined with heat sensors can reduce the number of collisions. ◦ Fences along areas with high strike risk. ◦ Viaducts, tunnels, overpasses and bridges, etc. ◦ Warning signals that are triggered by approaching traffic, particularly in areas of high strike risk.
Pollution prevention and control	• Minimise noise and vibrations from use of infrastructure by introducing open trenches/wall barriers/other measures and comply with national and international standards. (Ex: ISO/TS 21929-2, Sustainability in building construction – Sustainability indicators – Part 2: Framework for the development of indicators for civil engineering works). • Minimise noise, dust, emissions pollution during construction/maintenance works. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Re-use parts and use recycled material during the renewal, upgrade and construction of infrastructure. • At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material) generated on the construction site must be prepared for re-use, recycling and other material recovery, including backfilling operations using waste to substitute other materials. • Activities aligned with international standards. Ex: ISO 20887:2020 – Sustainability in buildings and civil engineering works. • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

2.6. Sea and coastal water transport

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the operation of sea and coastal water transport are summarised as follows:

- Direct emissions to air of carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NOx), and particulate matter (PM), as well as noise emissions
- Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vessel.
- Direct and indirect emission of pollutants in water.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Releases of ballast water containing non-indigenous species are prevented in line with the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM). • Measures are in place to prevent the introduction of non-indigenous species by biofouling of hull and niche areas of ships taking into account the IMO Biofouling Guidelines. • Noise and vibrations are limited by using noise reducing propellers, hull design or on-board machinery in line with the guidance given in the IMO Guidelines for the Reduction of Underwater Noise.
Pollution prevention and control	• Engines in vessels must comply with latest applicable standards of Non-Road Mobile Machinery Regulation. • As regards the reduction of sulphur oxides emissions and particulate matters, vessels comply with Regulation 14 of Annex VI to the IMO MARPOL Convention. • As regards nitrogen oxides (NOx) emissions, vessels comply with Regulation 13 of Annex VI to IMO MARPOL Convention. Tier II NOx requirement applies to ships constructed after 2011. Only while operating in NOx emission control areas established under IMO rules, ships constructed after 1 January 2016 comply with stricter engine requirements (Tier III) reducing NOx emissions. • Discharges of black and grey water comply with Annex IV to the IMO MARPOL Convention. • Measures are in place to minimise toxicity of anti-fouling paint and biocides. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Compliance with international and national legislation on hazardous waste generation, management and treatment. Special focus on critical raw materials recovery from batteries. (ex: ISO 14001:2015 Environmental management systems; ISO 22628:2002 Road vehicles — Recyclability and recoverability; Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989): Basel Action Network Standard for Responsible Recycling and Reuse of Electronic Equipment, known as e-Stewards). • Measures are in place to manage waste, both in the use phase and in the end-of-life of the vessel, in accordance with the waste hierarchy. • For battery-operated vessels, those measures include reuse and recycling of batteries and electronics, including critical raw materials therein. • The ship is operated in accordance with Annex V to the International Convention for the Prevention of Pollution from Ships of 2 November 1973 (the IMO MARPOL Convention), in particular with a view to producing reduced quantities of waste and to reducing legal discharges, by managing its waste in a sustainable and environmentally sound manner. • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).



2.7. Inland water transport

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the operation of inland passenger and freight water transport are summarised as follows:

- Direct emissions to air of carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NOx), and particulate matter (PM), as well as noise emissions
- Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vessel.
- Direct and indirect emission of pollutants in water.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	The activity should not lead to releases of ballast water containing aquatic invasive species.
Pollution prevention and control	• Engines in vessels must comply with latest applicable standards of Non-Road Mobile Machinery Regulation. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Compliance with international and national legislation on hazardous waste generation, management and treatment. Special focus on critical raw materials recovery from batteries. (ex: ISO 14001:2015 Environmental management systems; ISO 22628:2002 Road vehicles — Recyclability and recoverability; Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989): Basel Action Network Standard for Responsible Recycling and Reuse of Electronic Equipment, known as e-Stewards). Measures are in place to manage waste, both in the use phase and in the end-of-life of the vessel, in accordance with the waste hierarchy, including the control and management of hazardous materials on board of ships and ensuring their safe recycling. • For battery-operated vessels, those measures include reuse and recycling of batteries and electronics, including critical raw materials therein. • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

2.8. Freight air transport

Do no significant harm assessment

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Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18, ensuring that changing climate conditions do not compromise safety or airworthiness of the operation of an aircraft. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	• Amendment 13 of Volume I (noise), Chapter 14, of Annex 16 to the Chicago Convention; • Amendment 10 of Volume II (engine emissions), Chapters 2 and 4 of Annex 16 to the Chicago Convention;
Promote resource resilience and circular economy	• Measures are in place to prevent generation of waste in the use phase (maintenance, operation of air transport services with regards to catering waste) and manage any remaining waste in accordance with the waste hierarchy. • Measures are in place to manage and recycle waste in the end-of life of the fleet, including through decommissioning contractual agreements with aircraft recycling service providers, ensuring that measures are in place to segregate and treat components and materials in order to maximise recycling and reuse in accordance with the waste hierarchy and airworthiness regulations.

2.9. Passenger air transport

Do no significant harm assessment

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Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18, ensuring that changing climate conditions do not compromise safety or airworthiness of the operation of an aircraft. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	• Amendment 13 of Volume I (noise), Chapter 14, of Annex 16 to the Chicago Convention; • Amendment 10 of Volume II (engine emissions), Chapters 2 and 4 of Annex 16 to the Chicago Convention;
Promote resource resilience and circular economy	• Measures are in place to prevent generation of waste in the use phase (maintenance, operation of air transport services with regards to catering waste) and manage any remaining waste in accordance with the waste hierarchy. • Measures are in place to manage and recycle waste in the end-of life of the fleet, including through decommissioning contractual agreements with aircraft recycling service providers, ensuring that measures are in place to segregate and treat components and materials in order to maximise recycling and reuse in accordance with the waste hierarchy and airworthiness regulations.

3. Real Estate/Construction

3.1. Construction of new buildings

Do no significant harm assessment

The main potential for significant harm to the other environmental objectives associated with the construction of new buildings is determined by:

- Lack of resistance to extreme weather events (including flooding), and lack of resilience to future temperature increases in terms of internal comfort conditions.
- Excessive water consumption due to inefficient water appliances.
- Landfill and/or incineration of construction and demolition waste that could be otherwise recycled/reused.
- Presence of asbestos and/or substances of very high concern in the building materials.
- Presence of hazardous contaminants in the soil of the building site.
- Inappropriate building location: impacts on ecosystems if built on greenfield and especially if in a conservation area or high biodiversity value area.
- Indirect damage to forest ecosystems due to the use of timber products originating form forests that are not sustainably managed.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	The new construction must not be built on protected natural areas, such as land designated as Natura 2000, UNESCO World Heritage and Key Biodiversity Areas (KBAs), or equivalent as defined by UNESCO and/or the International Union for Conservation of Nature (IUCN) under the following categories: • Category Ia: Strict Nature Reserve • Category Ib: Wilderness Area • Category II: National Park Buildings that are associated supporting infrastructure to the protected natural area, such as visitor centres, museums or technical facilities are exempted from this criterion. The new construction must not be built on arable or greenfield land of recognised high biodiversity value and land that serves as habitat of endangered species (flora and fauna) listed on the IUCN Red List. At least 80% of all timber products used in the new construction for structures, cladding and finishes must have been either recycled/reused or sourced from sustainably managed forests as certified by third-party certification audits performed by accredited certification bodies, e.g. FSC/PEFC standards or equivalent.
Pollution prevention and control	• Ensure that building components and materials do not contain asbestos nor substances of very high concern as per national and international standards. • If the new construction is located on a potentially contaminated site (brownfield site), the site must be subject to an investigation for potential contaminants. • Non-road mobile machinery used on the construction site should comply with national and international standards
Promote resource resilience and circular economy	• At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material) generated on the construction site must be prepared for re-use or sent for recycling or other material recovery, including backfilling operations that use waste to substitute other materials. • All relevant water appliances (shower solutions, mixer showers, shower outlets, taps, WC suites, WC bowls and flushing cisterns, urinal bowls and flushing cisterns, bathtubs) must be water efficient as per national or international water labelling systems (ex: WELS, WaterSense).

3.2. Installation, maintenance, repair of equipment

Do no significant harm assessment

The main potential for significant harm to the other environmental objectives associated with individual measures is determined by:

- Excessive water consumption due to inefficient water appliances.
- The handling of building components that are likely to contain substances of concern (e.g. asbestos containing materials) and of any hazardous construction and demolition waste arising from the building renovation;
- Ensuring the future possibility of reusing and recycling building component and materials through careful selection of components/materials that prioritises recyclable materials and avoids hazardous substances.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	Ensure that building components and materials do not contain asbestos nor substances of very high concern as per national and international standards. In case of addition of thermal insulation to the existing building envelope: a building survey must be carried out in accordance with national legislation by a competent specialist with training in asbestos surveying and in identification of other materials containing substances of concern. Any stripping of lagging that contains or is likely to contain asbestos, breaking or mechanical drilling or screwing and/or removal of insulation board, tiles and other asbestos containing materials shall be carried out by appropriately trained personnel, with health monitoring before, during and after the works, in accordance with national legislation.
Promote resource resilience and circular economy	

3.3. Renovation of existing buildings

Do no significant harm assessment

The main potential for significant harm to the other environmental objectives associated with the renovation of existing buildings is determined by:

- Lack of resistance to extreme weather events (including flooding), and lack of resilience to future temperature increases in terms of internal comfort conditions.
- Excessive water consumption due to inefficient water appliances.
- Landfill and/or incineration of construction and demolition waste that could be otherwise recycled/reused.
- Presence of asbestos and/or substances of very high concern in the building materials.
- Presence of hazardous contaminants in the soil of the building site.
- Inappropriate building location: impacts on ecosystems if built on greenfield and especially if in a conservation area or high biodiversity value area.
- Indirect damage to forest ecosystems due to the use of timber products originating form forests that are not sustainably managed.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	The new construction must not be built on protected natural areas, such as land designated as Natura 2000, UNESCO World Heritage and Key Biodiversity Areas (KBAs), or equivalent as defined by UNESCO and / or the International Union for Conservation of Nature (IUCN) under the following categories: • Category Ia: Strict Nature Reserve • Category Ib: Wilderness Area • Category II: National Park Buildings that are associated supporting infrastructure to the protected natural area, such as visitor centres, museums or technical facilities are exempted from this criterion. The new construction must not be built on arable or greenfield land of recognised high biodiversity value and land that serves as habitat of endangered species (flora and fauna) listed on the IUCN Red List. At least 80% of all timber products used in the new construction for structures, cladding and finishes must have been either recycled/reused or sourced from sustainably managed forests as certified by third-party certification audits performed by accredited certification bodies, e.g. FSC/ PEFC standards or equivalent.
Pollution prevention and control	• Ensure that building components and materials do not contain asbestos nor substances of very high concern as per national and international standards. • If the new construction is located on a potentially contaminated site (brownfield site), the site must be subject to an investigation for potential contaminants. • Non-road mobile machinery used on the construction site should comply with national and international standards.
Promote resource resilience and circular economy	• At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material) generated on the construction site must be prepared for re-use or sent for recycling or other material recovery, including backfilling operations that use waste to substitute other materials. • All relevant water appliances (shower solutions, mixer showers, shower outlets, taps, WC suites, WC bowls and flushing cisterns, urinal bowls and flushing cisterns, bathtubs) must be water efficient as per national or international water labelling systems (ex: WELS, WaterSense).

3.4. Acquisition or ownership of buildings

Do no significant harm assessment

The main potential for significant harm to the other environmental objectives associated with the acquisition or ownership of buildings is determined by:

- Lack of resistance to extreme weather events (including flooding), and lack of resilience to future temperature increases in terms of internal comfort conditions.
- Excessive water consumption due to inefficient water appliances.
- Presence of asbestos and/or substances of very high concern in the building materials.
- Presence of hazardous contaminants in the soil of the building site.
- Inappropriate building location: impacts on ecosystems if built on greenfield and especially if in a conservation area or high biodiversity value area.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	The new construction must not be built on protected natural areas, such as land designated as Natura 2000, UNESCO World Heritage and Key Biodiversity Areas (KBAs), or equivalent as defined by UNESCO and/or the International Union for Conservation of Nature (IUCN) under the following categories: • Category Ia: Strict Nature Reserve • Category Ib: Wilderness Area • Category II: National Park Buildings that are associated supporting infrastructure to the protected natural area, such as visitor centres, museums or technical facilities are exempted from this criterion. The new construction must not be built on arable or greenfield land of recognised high biodiversity value and land that serves as habitat of endangered species (flora and fauna) listed on the IUCN Red List. At least 80% of all timber products used in the new construction for structures, cladding and finishes must have been either recycled/reused or sourced from sustainably managed forests as certified by third-party certification audits performed by accredited certification bodies, e.g. FSC/ PEFC standards or equivalent.
Pollution prevention and control	If the property is located on a potentially contaminated site (brownfield site), the site must be subject to an investigation for potential contaminants.
Promote resource resilience and circular economy	

4. Industry

4.1. Manufacture of iron and steel

Do no significant harm assessment

The main potential significant harm to other environmental objectives from iron and steel production is associated with:
- emissions to air from coke-making and smelting operations, especially particulate matter (dust), oxides of nitrogen, sulphur dioxide, carbon monoxide, chlorides, fluorides, volatile organic compounds, polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzodioxins/furans, and heavy metals;
- emissions to water of hydrocarbons and suspended solids;
- water consumption for quenching and cooling operations in water stressed areas;
- the potential to impact local ecosystems and biodiversity due to the polluting emissions (if not properly mitigated) and due to the large land footprint of the operations and associated ancillary activities; and
- wastes and by products from the coking and smelting operations including, tar and benzole.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international standards and guidelines for iron and steel production (e.g. for pH, total suspended solids (TSS), chemical oxygen demand (COD), chromium (total) and heavy metals, for sulphur dioxide – SO_2, nitrogen oxide – NOx, particulate matter, polychlorinated dibenzo-dioxins/furans, mercury (Hg), hydrogen chloride (HCL) and hydrogen fluoride (HF) (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Implement measures concerning waste management to minimise and manage waste and material use as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product.; ETP Clean Energy Technology Guide). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

4.2. Manufacture of basic chemicals

Do no significant harm assessment

The main potential significant harm to other environmental objectives from manufacture of inorganic basic chemicals:

Carbon black:
- polluting emissions to air, especially volatile organic compounds (VOC) and dust;
- the use of water in water stressed areas for cooling purposes; and
- the generation of wastes.

Disodium Carbonate (soda ash):
- the generation of process effluents (e.g. calcium chloride in aqueous solution), by products and wastes with the potential to pollute groundwater and surface water bodies as well as soils;
- polluting air emissions;
- the use of water in water scarce areas for cooling purposes; and
- impacts on ecosystems and biodiversity from the disposal of wastes and by-products (primarily calcium carbonate, gypsum, sodium chloride and calcium chloride, although there can be trace amounts of toxic materials such as mercury, cadmium, arsenic and zinc depending on the source of the raw materials (e.g. limestone) for the production process) which create 'waste beds'.

Chlorine:
- polluting emissions to air (e.g. chlorine);
- process water effluents which can contain oxidising agents (e.g. chlorine)
- the use of water in water stressed areas; and
- the generation of wastes
- Due to the intrinsic hazard properties of chlorine it is recommended to further assess when Chlorine could be considered part of the solution to achieving zero pollution (toxic free environment) and therefore should not excluded from the Taxonomy due to DNSH implications

The main potential significant harm to the environment from the production of other organic chemicals is associated with:
- polluting emissions to air and water from the production process;
- vulnerable ecosystems might be damaged by the construction and/or operation of the production facilities;
- the use of water resources for production purposes (e.g. cooling water) in water stressed areas;
- the generation of hazardous wastes

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented

Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international and national standards and guidelines (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use;). A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Implement measures concerning waste management to minimise and manage waste and material use, especially hazardous manufacturing waste as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

4.3. Manufacture of cement

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the manufacture of cement is associated with:
- Polluting emissions to air associated to the consumption of fossil fuels and calcinations reaction in the cement kiln;
- Water consumption at production facilities located in water-stressed areas;
- Potential for soil and groundwater contamination associated with the handling and storage of (hazardous) wastes used as fuel substitute ('secondary' fuels) in the cement production process;

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.

Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations).
	• Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.
	• For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area.
	
	• For such sites/operations, ensure that:
	  ○ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6;
	  ○ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and
	  ○ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented

Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international standards and guidelines for the Production of Cement, Lime and Magnesium Oxide. (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Ensure implementation of a recognised environmental management system (ISO 14001, EMAS, or equivalent). • Exclusion of refuse derived fuels for cement production. Co-incineration of waste has significant impacts on health and the environment due to the polluting nature of the associated emissions, and higher emissions ceiling for cement plants in comparison with dedicated waste incineration plants. Furthermore, promoting waste as eligible fuel source may undermine waste minimisation efforts in other sectors. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	Cement manufacturing plants accept alternative fuels such as SRF originating from waste, as well as secondary raw materials such as recycled concrete aggregates (RCA). For cement production sites using hazardous wastes as alternative fuels, ensure a waste management plan and Implement measures concerning waste management to minimise and manage waste and material use as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; ETP Clean Energy Technology Guide). Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

4.4. Manufacture of hydrogen

Do no significant harm assessment

The main potential significant harm to other environmental objectives from manufacture of hydrogen is, in practical terms, inseparable from the potential for significant harm created by the hydrocarbon refining activity more generally and is associated with:

- polluting emissions to air (in the case of hydrogen production via electrolysis, there is an indirect environmental impact associated with the generation of electricity);
- water used for cooling might lead to local resource depletion, dependent of the local scarcity of water resources; and
- the generation of wastes (e.g. spent catalysts and by-products of the various physical and chemical treatment processes used in purifying the hydrogen produced via hydrocarbon processing)

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Where manufacture of hydrogen takes place within the context of an oil and gas refining installation, ensure appropriate measures are in place to minimise and manage waste and material use in accordance with international standards and guidelines for the Refining of Mineral Oil and Gas (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; ETP Clean Energy Technology Guide). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

4.5. Manufacture of aluminium

Do no significant harm assessment

The main potential significant harm to other environmental objectives from manufacture of aluminium is associated with:

- the potential for significant air emission impacts: perfluorocarbons, fluoride gases, polycyclic aromatic hydrocarbons (PAHs), and particulate matter (e.g. unused cryolite). Hydrogen fluorides can be toxic to vegetation;
- the toxic, corrosive and reactive nature of waste generated by the used linings (cathodes) from the electrolytic cells (known as spent pot lining (SPL)). Dissolved fluorides and cyanides from the SPL material can create significant environmental impacts including groundwater contamination and pollution of local watercourses;
- the ability (or lacking thereof) of aluminium manufacturing plants to incorporate aluminium scrap (including scrap from their own manufacturing processes) in the production process; and the potential to impact ecosystems as a result of the land footprint of the site and from polluting emissions.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air (e.g. sulphur dioxide - SO_2, nitrogen oxide - NOx, particulate matter, Total Organic Carbon (TOC), dioxins, , mercury (Hg), hydrogen chloride (HCL), hydrogen fluoride (HF), Total Fluoride, and (PFCs) polyfluorinated hydrocarbons (PFCs)) are prevented / minimised as per international standards and guidelines (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products) • A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Implement measures concerning waste management to minimise and manage waste and material use as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; ETP Clean Energy Technology Guide). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality). • In order to avoid risks to circular economy, aluminium manufacturing plants need to be able to process aluminium scrap. In order to avoid unnecessary resource and energy consumption, the aluminium scrap collection and sorting activities should be optimised for separation on an alloy specific basis. If scrap alloys are mixed, the functionality of the recycled material is restricted, and valuable alloying elements may be lost.

4.6. Manufacture of batteries

Do no significant harm assessment

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Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Implement measures concerning waste management to minimise and manage waste and material use, especially hazardous manufacturing waste as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials – Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product.; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ETP Clean Energy Technology Guide). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

4.7. Manufacture of plastics in primary form

Do no significant harm assessment

The main potential significant harm to other environmental objectives from production of plastics in primary form is associated with:
• polluting emissions to air and water from the production process;
• vulnerable ecosystems might be damaged by the construction and/or operation of the production facilities;
• the use of water resources for production purposes (e.g. cooling water) in water stressed areas); and
• the generation of hazardous wastes

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Implement measures concerning waste management to minimise and manage waste and material use, especially hazardous manufacturing waste as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality). • A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent).

4.8. Manufacture of renewable energy technologies

Do no significant harm assessment

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Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Implement measures concerning waste management to minimise and manage waste and material use, especially hazardous manufacturing waste as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ETP Clean Energy Technology Guide). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

4.9. Manufacture of equipment for the production and use of hydrogen

Do no significant harm assessment

The main potential significant harm to other environmental objectives from manufacture of hydrogen is, in practical terms, inseparable from the potential for significant harm created by the hydrocarbon refining activity more generally and is associated with:
- polluting emissions to air (in the case of hydrogen production via electrolysis, there is an indirect environmental impact associated with the generation of electricity);
- water used for cooling might lead to local resource depletion, dependent of the local scarcity of water resources; and
- the generation of wastes (e.g. spent catalysts and by-products of the various physical and chemical treatment processes used in purifying the hydrogen produced via hydrocarbon processing)

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ISO 19884; IEC 63341-2 ; ISO 16111). • A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Where manufacture of hydrogen takes place within the context of an oil and gas refining installation, ensure appropriate measures are in place to minimise and manage waste and material use in accordance with international standards and guidelines for the Refining of Mineral Oil and Gas (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; ETP Clean Energy Technology Guide). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

4.10. Manufacture of low-carbon technologies for transport

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the manufacture of low-carbon technologies for transport is associated with:
- the (potential) use of toxic substances and generation of toxic wastes (both at the manufacturing stage as well as at other stages of the product/equipment lifecycle); and
- the potential for polluting emissions to air, water and soil from the manufacturing process.

Depending on the product/equipment being manufactured, there may, also be issues with respect to the embodied carbon and the demand for certain metals and materials (e.g. rare earth metals) which are in limited supply and may have significant environmental impact issues associated with the mining phase.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international standards and guidelines and compliance with restricted chemicals and hazardous substances regulations. (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Where applicable, vehicles do not contain lead, mercury, hexavalent chromium and cadmium, in accordance to national and international guidelines. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Implement measures concerning waste management to minimise and manage waste and material use as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; ETP Clean Energy Technology Guide). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

4.11. Manufacture of energy efficiency equipment for buildings

Do no significant harm assessment

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Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Implement measures concerning waste management to minimise and manage waste and material use, especially hazardous manufacturing waste as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ETP Clean Energy Technology Guide). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality.

4.12. Manufacture of other low-carbon technologies

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the manufacture of low-carbon technologies is associated with:
- the (potential) use of toxic substances and generation of toxic wastes (both at the manufacturing stage as well as at other stages of the product/equipment lifecycle); and
- the potential for polluting emissions to air, water and soil from the manufacturing process.

Depending on the product/equipment being manufactured, there may, also be issues with respect to the embodied carbon and the demand for certain metals and materials (e.g. rare earth metals) which are in limited supply and may have significant environmental impact issues associated with the mining phase.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international standards and guidelines and compliance with restricted chemicals and hazardous substances regulations. (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Where applicable, vehicles do not contain lead, mercury, hexavalent chromium and cadmium, in accordance to national and international guidelines. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Implement measures concerning waste management to minimise and manage waste and material use as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; ETP Clean Energy Technology Guide). • Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality.

5. Forestry

5.1. Sustainable Forest Management

Do no significant harm assessment

Key environmental aspects span across all other five objectives and are summarised as follows:
- ability of forests to adapt to a changing climate;
- impact on water resources as well as on water quality;
- pollution to water, air, and soil, and risks associated from the use of pesticides and fertiliser;
- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

Note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Take measures to ensure sustained or improved long term conservation status at the landscape level. • In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. • No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation • Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity. • Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. • Forests are monitored and protected to prevent illegal logging, in compliance with national laws. • Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations. • Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change. • Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations).
Pollution prevention and control	• Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilisers to what is needed to prevent leeching of nutrients to waters. • Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard. • Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen. Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ISO/TC 134, Fertilisers and soil conditioners; ISO 27065, Protective clothing – Performance requirements for protective clothing worn by operators applying liquid pesticides; FAO's The International Code of Conduct on Pesticide Management; Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade, the Minamata Convention on Mercury, the Montreal Protocol on Substances that Deplete the Ozone Layer, and of active ingredients). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).



5.2. Forestry plantation

Do no significant harm assessment

Key environmental aspects span across all other five objectives and are summarised as follows:
- ability of forests to adapt to a changing climate;
- impact on water resources as well as on water quality;
- pollution to water, air, and soil, and risks associated from the use of pesticides and fertiliser;
- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

Note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Take measures to ensure sustained or improved long term conservation status at the landscape level. • In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. • No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation . • Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity. • Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. • Forests are monitored and protected to prevent illegal logging, in compliance with national laws. • Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations. • Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change. • Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations).
Pollution prevention and control	• Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilisers to what is needed to prevent leeching of nutrients to waters. • Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard; • Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen. Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ISO/TC 134, Fertilisers and soil conditioners; ISO 27065, Protective clothing – Performance requirements for protective clothing worn by operators applying liquid pesticides; FAO's The International Code of Conduct on Pesticide Management; Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade, the Minamata Convention on Mercury, the Montreal Protocol on Substances that Deplete the Ozone Layer, and of active ingredients). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

5.3. Conservation, restoration and maintenance

Do no significant harm assessment

Key environmental aspects span across all other five objectives and are summarised as follows:
- ability of forests to adapt to a changing climate;
- impact on water resources as well as on water quality;
- pollution to water, air, and soil, and risks associated from the use of pesticides and fertiliser;
- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

Note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Take measures to ensure sustained or improved long term conservation status at the landscape level. • In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. • No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation • Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity. • Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. • Forests are monitored and protected to prevent illegal logging, in compliance with national laws. • Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations. • Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change. • Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations).
Pollution prevention and control	• Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilisers to what is needed to prevent leeching of nutrients to waters. • Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard. • Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen. Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ISO/TC 134, Fertilisers and soil conditioners; ISO 27065, Protective clothing – Performance requirements for protective clothing worn by operators applying liquid pesticides; FAO's The International Code of Conduct on Pesticide Management; Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade, the Minamata Convention on Mercury, the Montreal Protocol on Substances that Deplete the Ozone Layer, and of active ingredients). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

6. Carbon Capture and Storage

6.1. Direct air capture of CO_2

Do no significant harm assessment

The main environmental impacts associated with Capture of Anthropogenic Emissions are due to chemicals/technologies used to capture carbon.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented (i.e.: avoid possible collision of birds and visual impacts, generated by the change in landscape, due to the construction and operation of wind farms) • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ○ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ○ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ○ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent); Follow all the requirements of national and international standards to ensure emissions to air, water and soil are prevented / minimised and in particular: ○ Prevent release during operation by implementing permanent leakage detection systems. ○ Avoid loss of ammonia. ○ Minimise the formation of secondary aerosol and the production of tropospheric ozone. Fans, compressors, pumps and other equipment, must comply, where relevant, with the top class requirements of the energy label, and represent the best available technology. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

6.2. Captured CO_2 Transportation

Do no significant harm assessment

The main environmental impacts associated with Capture of Anthropogenic Emissions are due to chemicals/technologies used to capture carbon.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented (i.e.: avoid possible collision of birds and visual impacts, generated by the change in landscape, due to the construction and operation of wind farms) • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent); Follow all the requirements of national and international standards to ensure emissions to air, water and soil are prevented / minimised and in particular: ◦ Prevent release during operation by implementing permanent leakage detection systems. ◦ Avoid loss of ammonia. ◦ Minimise the formation of secondary aerosol and the production of tropospheric ozone. • Fans, compressors, pumps and other equipment, must comply, where relevant, with the top class requirements of the energy label, and represent the best available technology. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

6.3. Permanent sequestration of captured CO_2

Do no significant harm assessment

The main environmental impacts associated with sequestration of CO_2 are due to:
• the risk of leakage
• the long-term lack of geological containment of the reservoirs, central issues regarding the monitoring and the interrelation of carbon with physical, chemical and geological conditions in the reservoir is still a debated argument, however the safety of CO_2 storage may be assured with the implementation of specific rules and requirements

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented (i.e. avoid possible collision of birds and visual impacts, generated by the change in landscape, due to the construction and operation of wind farms) • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent). Follow all the requirements of national and international standards to ensure emissions to air, water and soil are prevented / minimised and in particular: ◦ Prevent release during operation by implementing permanent leakage detection systems. • Fans, compressors, pumps and other equipment, must comply, where relevant, with the top class requirements of the energy label, and represent the best available technology. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

6.4. Research, development and innovation for CCS-related technologies

Do no significant harm assessment

Activities falling in this category are mostly based on research and development, with negligible physical impact.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	
Promote resource resilience and circular economy	

6.5. Point-source capture of CO_2

Do no significant harm assessment
The main environmental impacts associated with Capture of Anthropogenic Emissions are due to chemicals/technologies used to capture carbon.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented (i.e.: avoid possible collision of birds and visual impacts, generated by the change in landscape, due to the construction and operation of wind farms) • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent); Follow all the requirements of national and international standards to ensure emissions to air, water and soil are prevented / minimised and in particular: ◦ Prevent release during operation by implementing permanent leakage detection systems. ◦ Avoid loss of ammonia. ◦ Minimise the formation of secondary aerosol and the production of tropospheric ozone. • Fans, compressors, pumps and other equipment, must comply, where relevant, with the top class requirements of the energy label, and represent the best available technology. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

7. Information and Communications Technology

7.1. Data processing, storage, transmission and management

Do no significant harm assessment
The main DNSH risks are related to lifecycle considerations, from manufacturing of equipment, to disposal.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent). • Refrigerants employed in the refrigeration systems must meet the national regulatory requirement
Promote resource resilience and circular economy	• The production of servers, storage devices and network technology also consumes a great deal of energy and thus emits CO_2. The equipment used should meet the requirements of the national and international standards for servers and data storage products. • When electrical and electronic equipment reaches its end of service, the waste electrical and electronic equipment is collected and managed by an authorised operator and treated according to the waste hierarchy. • Implement measures concerning waste management to minimise and manage waste and material use, especially hazardous manufacturing waste as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS): is a voluntary product standard for tracking and verifying the content of recycled materials in a final product. ; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ETP Clean Energy Technology Guide).

7.2. GHG-related solutions and software

Do no significant harm assessment
Activities falling in this category are mostly based on small-scale data processing and storage, with negligible physical impacts.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	
Promote resource resilience and circular economy	

8. Waste

8.1. Collection and transport of non-hazardous waste

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

• emissions of collection vehicles that cause harm to human health and the environment
• mixing source segregated waste fractions that could impair subsequent material recovery and recycling.
Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	If waste collection is carried out by trucks, vehicles must comply with emission guidelines. (ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products).
Promote resource resilience and circular economy	Avoid mixing different source segregated waste fractions in waste storage and transfer facilities.

8.2. Biowaste treatment: composting of biowaste

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

• emissions of collection vehicles that cause harm to human health and the environment
• mixing source segregated waste fractions that could impair subsequent material recovery and recycling.
Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	• Composting plant emissions to air and water are within national and international guidelines (ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • The site has a system in place that prevents leachate reaching groundwater. • The resulting compost meets the requirements for fertilising materials as per national rules on fertilisers/soil improvers for agriculture use.
Promote resource resilience and circular economy	



8.3. Biowaste treatment: Anaerobic digestion

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

• emissions of collection vehicles that cause harm to human health and the environment
• mixing source segregated waste fractions that could impair subsequent material recovery and recycling.
Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	• AD plant emissions to air and water are within national and international guidelines (ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Emissions to air (e.g. SOx, NOx) after combustion of biogas are controlled, abated (when needed) and within the limits set by national legislation. • The resulting digestate meets the requirements for fertilising materials as per national rules on fertilisers/soil improvers for agriculture use.
Promote resource resilience and circular economy	

8.4. Waste to Energy

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

• emissions of collection vehicles that cause harm to human health and the environment
• mixing source segregated waste fractions that could impair subsequent material recovery and recycling.
Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Ensure emissions to air, water and soil are prevented / minimized as per international standards and guidelines. (Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015 Environmental management systems — Requirements with guidance for use; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	Avoid mixing different source segregated waste fractions in waste storage and transfer facilities. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).



8.5. Landfill gas capture and utilisation

Do no significant harm assessment
The main potential significant harm linked to this activity is related to emissions resulting from the energetic utilisation of landfill gas, such as sulphur dioxide, nitrous oxide and particulates. Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	• The permanent closure and remediation as well as the after-care of old landfills, where the landfill gas capture system is installed, are carried out following the national and international provisions. (Ex: 13.030.40 INSTALLATIONS AND EQUIPMENT FOR WASTE DISPOSAL AND TREATMENT; Global Methane Initiative's International Best Practices Guide for Landfill Gas Energy Projects). • Emissions to air (e.g. SOx, NOx) after combustion of landfill gas are controlled, abated (when needed) and within the limits set by national legislation.
Promote resource resilience and circular economy	

8.6. Material recovery facilities

Do no significant harm assessment
Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	
Pollution prevention and control	
Promote resource resilience and circular economy	

9. Water

9.1. Construction, extension and operation of new water collection and treatment systems

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

• water abstraction.
• possible detrimental effects to ecosystems.

Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to national standards or ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national or international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented, in accordance to national standards. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with national or international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ○ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ○ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ○ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	Identify and manage risks related to water quality and/or water consumption at the appropriate level, in accordance to national standards.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per national or international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

9.2. Renewal of water collection, treatment and supply systems

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

• water abstraction;
• possible detrimental effects to ecosystems.
Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to national standards or ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national or international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented, in accordance to national standards. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with national or international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ○ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ○ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ○ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	Identify and manage risks related to water quality and/or water consumption at the appropriate level, in accordance to national standards.
Promote resource resilience and circular economy	Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per national or international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

9.3. Construction, extension and operation of new water supply systems (distribution networks)

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

- water abstraction.
- possible detrimental effects to ecosystems.

Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to national standards or ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national or international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented, in accordance to national standards. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with national or international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	Identify and manage risks related to water quality and/or water consumption at the appropriate level, in accordance to national standards.
Promote resource resilience and circular economy	• Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per national or international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

9.4. Renewal of water supply systems (distribution networks)

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

- water abstraction;
- possible detrimental effects to ecosystems.

Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to national standards or ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national or international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented, in accordance to national standards. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with national or international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	Identify and manage risks related to water quality and/or water consumption at the appropriate level, in accordance to national standards.
Promote resource resilience and circular economy	Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per national or international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

9.5. Construction, extension and operation of wastewater collection and treatment

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

- emissions to water from wastewater treatment
- combined sewer overflow in case of heavy rainfall
- sewage sludge treatment
- possible detrimental effects to ecosystems.

Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to national standards or ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national or international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented, in accordance to national standards. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with national or international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Discharges to receiving waters meet the requirements laid down by national provisions stating maximum permissible pollutant levels from discharges to receiving waters. • Appropriate measures have been implemented to avoid and mitigate excessive storm water overflows from the waste water collection system, which may include nature-based solutions, separate storm water collection systems, retention tanks and treatment of the first flush. • Ensure emissions to water are within the ranges set in national and international standards. • Implement appropriate measures to avoid and mitigate combined sewer overflow in case of heavy rainfall, such as Nature-based solutions, separate rainwater collection systems, retention tanks and/or treatment of the first flush. • Ensure sewage sludge is managed/used (e.g. anaerobic digestion, land application) according to relevant international and respective national legislation. (ex: ISO/TC 224 Drinking water, wastewater and stormwater systems and services; ISO/TC 275 Sludge recovery, recycling, treatment and disposal; ISO/TC 275 Sludge recovery, recycling, treatment and disposal).
Promote resource resilience and circular economy	

9.6. Renewal of wastewater collection and treatment

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

- emissions to water from wastewater treatment
- combined sewer overflow in case of heavy rainfall
- sewage sludge treatment
- possible detrimental effects to ecosystems.

Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to national standards or ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national or international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented, in accordance to national standards. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with national or international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Discharges to receiving waters meet the requirements laid down by national provisions stating maximum permissible pollutant levels from discharges to receiving waters. • Appropriate measures have been implemented to avoid and mitigate excessive storm water overflows from the waste water collection system, which may include nature-based solutions, separate storm water collection systems, retention tanks and treatment of the first flush. • Ensure emissions to water are within the ranges set in national and international standards. • Implement appropriate measures to avoid and mitigate combined sewer overflow in case of heavy rainfall, such as Nature-based solutions, separate rainwater collection systems, retention tanks and/or treatment of the first flush. • Ensure sewage sludge is managed/used (e.g. anaerobic digestion, land application) according to relevant international and respective national legislation. (ex: ISO/TC 224 Drinking water, wastewater and stormwater systems and services; ISO/TC 275 Sludge recovery, recycling, treatment and disposal; ISO/TC 275 Sludge recovery, recycling, treatment and disposal).
Promote resource resilience and circular economy	



9.7. Desalination systems

Do no significant harm assessment	
The main potential significant harm linked to this activity is related to: • water abstraction; • possible detrimental effects to ecosystems. Compliance with relevant international and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement	
Objectives	**Criteria**
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to national standards or ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national or international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations). • Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented, in accordance to national standards. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with national or international standards (e.g. IFC Performance Standard 6) – based on the conservation objectives of the protected area. • For such sites/operations, ensure that: ◦ a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6; ◦ all necessary mitigation measures are in place to reduce the impacts on species and habitats; and ◦ a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented
Pollution prevention and control	• Discharges to receiving waters meet the requirements laid down by national provisions stating maximum permissible pollutant levels from discharges to receiving waters. • Appropriate measures have been implemented to avoid and mitigate excessive storm water overflows from the water collection system, which may include nature-based solutions, separate storm water collection systems, retention tanks and treatment of the first flush. • Ensure emissions to water are within the ranges set in national and international standards. • Implement appropriate measures to avoid and mitigate combined sewer overflow in case of heavy rainfall, such as Nature-based solutions, separate rainwater collection systems, retention tanks. • Identify and manage risks related to water quality and/or water consumption at the appropriate level, in accordance to national standards.
Promote resource resilience and circular economy	Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per national or international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

10. Agriculture

10.1. Perennial crops

Do no significant harm assessment

Key environmental aspects to be considered for investments in growing of perennial crops span across all other five objectives and are summarised as follows:
- ability of farming systems to adapt to a changing climate;
- impact on water quantity, water quality and water ecosystems;
- impacts on air quality;
- inefficiencies in the production system including nutrient management;
- pollutant and nutrient run-off and leaching;
- impacts on habitats and species, e.g. through conversion of areas, intensification of existing arable land, and invasive alien species.

Note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Activities ensure the protection of soils, particularly over winter, to prevent erosion and run-off into water courses/bodies and to maintain soil organic matter. • Activities do not lead to the conversion, fragmentation or unsustainable intensification of high-nature-value land, wetlands, forests, or other areas of high-biodiversity value. This includes highly biodiverse grassland spanning more than one hectare that is: i) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority. • Activities should not ○ result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern; ○ contravene existing management plans or conservation objectives. ○ Where activities involve the production of novel non-native or invasive alien species, their cultivation should be subject to an initial risk assessment and ongoing monitoring in order to ensure that sufficient safeguards are in place to prevent escape to the environment. • Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations).
Pollution prevention and control	• Activities ensure that nutrients (fertilisers) and plant protection products (e.g. pesticides and herbicides) are targeted in their application (in time and area treated) and are delivered at appropriate levels (with preference to sustainable biological, physical or other non-chemical methods if possible) and with appropriate equipment and techniques to reduce risk and impacts of pesticide use on human health and the environment (e.g. water and air pollution) and the loss of excess nutrients. • The use only of plant protection products with active substances that ensure high protection of human and animal health and the environment. • Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ISO/TC 134, Fertilisers and soil conditioners; ISO 27065, Protective clothing – Performance requirements for protective clothing worn by operators applying liquid pesticides; FAO's The International Code of Conduct on Pesticide Management; Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade, the Minamata Convention on Mercury, the Montreal Protocol on Substances that Deplete the Ozone Layer, and of active ingredients). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Activities should minimise raw material use per unit of output, including energy through increased resource use efficiency. • Activities should minimise the loss of nutrients (in particular nitrogen and phosphate) leaching out from the production system into the environment. • Activities should use residues and by-products the production or harvesting of crops to reduce demand for primary resources, in line with good agricultural practice. • Implement measures concerning waste management to minimise and manage waste and material use, especially hazardous manufacturing waste as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS); Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products;). Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

10.2. Non-perennial crops

Do no significant harm assessment

Key environmental aspects to be considered for investments in growing of non-perennial crops span across all other five objectives and are summarised as follows:
- ability of farming systems to adapt to a changing climate;
- impact on water quantity, water quality and water ecosystems;
- impacts on air quality;
- inefficiencies in the production system including nutrient management;
- pollutant and nutrient run-off and leaching;
- impacts on habitats and species, e.g. through conversion of areas, intensification of existing arable land, and invasive alien species.

Note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Activities ensure the protection of soils, particularly over winter, to prevent erosion and run-off into water courses/bodies and to maintain soil organic matter. • Activities do not lead to the conversion, fragmentation or unsustainable intensification of high-nature-value land, wetlands, forests, or other areas of high-biodiversity value. This includes highly biodiverse grassland spanning more than one hectare that is: iii) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or iv) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority. • Activities should not ○ result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern; ○ contravene existing management plans or conservation objectives. • Where activities involve the production of novel non-native or invasive alien species, their cultivation should be subject to an initial risk assessment and ongoing monitoring in order to ensure that sufficient safeguards are in place to prevent escape to the environment. • Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations).
Pollution prevention and control	• Activities ensure that nutrients (fertilisers) and plant protection products (e.g. pesticides and herbicides) are targeted in their application (in time and area treated) and are delivered at appropriate levels (with preference to sustainable biological, physical or other non-chemical methods if possible) and with appropriate equipment and techniques to reduce risk and impacts of pesticide use on human health and the environment (e.g. water and air pollution) and the loss of excess nutrients. • The use only of plant protection products with active substances that ensure high protection of human and animal health and the environment. Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ISO/TC 134, Fertilisers and soil conditioners; ISO 27065, Protective clothing – Performance requirements for protective clothing worn by operators applying liquid pesticides; FAO's The International Code of Conduct on Pesticide Management; Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade, the Minamata Convention on Mercury, the Montreal Protocol on Substances that Deplete the Ozone Layer, and of active ingredients). • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Activities should minimise raw material use per unit of output, including energy through increased resource use efficiency. • Activities should minimise the loss of nutrients (in particular nitrogen and phosphate) leaching out from the production system into the environment. • Activities should use residues and by-products the production or harvesting of crops to reduce demand for primary resources, in line with good agricultural practice. • Implement measures concerning waste management to minimise and manage waste and material use, especially hazardous manufacturing waste as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS); Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products;). Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

10.3. Animal Production

Do no significant harm assessment

The activity livestock production captures a distinct set of sub-activities that would include intensive and extensive forms of livestock rearing, as well as the management of permanent grassland. These come with different key environmental aspects that need to be considered for investments in this sector, summarised as follows:
- ability of farming systems to adapt to a changing climate;
- impact on water quantity, water quality and water ecosystems incl. waste water treatment from intensive rearing;
- manure treatment;
- Emissions of pollutants (such as methane, ammonia, dust, odour, noise) to air, water and soil, in particular in the case of intensive rearing;
- impact on habitats and species.

Note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.

Objectives	Criteria
Climate change adaptation	• Refer to the screening criteria for DNSH to climate change adaptation: Table 18. • Also, can refer to ISO Standard for Adaptation to climate change: ISO 14091:2021 — Guidelines on vulnerability, impacts and risk assessment.
Protect healthy ecosystems and biodiversity	• Activities ensure the protection of soils, particularly over winter, to prevent erosion and run-off into water courses/bodies and to maintain soil organic matter. • Activities do not lead to the conversion, fragmentation or unsustainable intensification of high-nature-value land, wetlands, forests, or other areas of high-biodiversity value. This includes highly biodiverse grassland spanning more than one hectare that is: v) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or vi) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority. • Activities should not ○ result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern; ○ contravene existing management plans or conservation objectives. ○ lead to overgrazing other forms of degradation of grasslands. Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with national and international standards (e.g IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks; Convention of Biological Diversity (CBD) Voluntary guidelines on biodiversity-inclusive impact assessment)) – including ancillary services, e.g. transport infrastructure and operations).
Pollution prevention and control	• Activities ensure that nutrients (fertilisers) and plant protection products (e.g. pesticides and herbicides) are targeted in their application (in time and area treated) and are delivered at appropriate levels (with preference to sustainable biological, physical or other non-chemical methods if possible) and with appropriate equipment and techniques to reduce risk and impacts of pesticide use on human health and the environment (e.g. water and air pollution) and the loss of excess nutrients and the loss of excess nutrients through leaching, volatilisation or oxidisation.. • The use only of plant protection products with active substances that ensure high protection of human and animal health and the environment. • Ensure emissions to air, water and soil are prevented / minimised as per international and national standards Ex: IFC EHS Guidelines: Air emissions and ambient air quality; ISO 14001:2015; Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products; ISO/TC 134, Fertilisers and soil conditioners; ISO 27065, Protective clothing – Performance requirements for protective clothing worn by operators applying liquid pesticides; FAO's The International Code of Conduct on Pesticide Management; Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade, the Minamata Convention on Mercury, the Montreal Protocol on Substances that Deplete the Ozone Layer, and of active ingredients). • Ensure that mitigation and emission reduction techniques for feeding and housing of livestock and for manure storage and processing are applied, as recommended in the UNECE Framework Code for Good Agricultural Practice for Reducing Ammonia; • Where manure is applied to the land, activities should comply with the limit of 170kg nitrogen application per hectare per year, or alternatively, the derogated threshold as per national standards. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.
Promote resource resilience and circular economy	• Activities should use residues and by-products and take any other measures to minimise primary raw material use per unit of output, including energy. • Activities should minimise the loss of nutrients from the production system into the environment. • Implement measures concerning waste management to minimise and manage waste and material use, especially hazardous manufacturing waste as per international standards and guidelines (ex: KAPSARC Guide to circular economy, French standard, XP X30-901, Circular economy – Circular economy project management system; ISO/TC 323 (In development Scenario 2); ISO/AWI 59014: Secondary materials — Principles, sustainability and traceability requirements ; Global Recycled Standard (GRS); Strategic Approach to International Chemicals Management (SAICM); ISO 11014:2009(en) Safety data sheet for chemical products;). Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented as per international standards and guidelines. (ex: UNEP International Water Quality Guidelines for Ecosystems (IWQGES); ISO 13.060: Water Quality).

Appendices

APPENDIX A.
APPENDIX B.
APPENDIX C.
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Appendix A
Detailed mapping of CAIT to ISIC

GHG Emissions Sectors	Data source	IPCC/CAIT sector and subsectors[1,2]	Mapped ISIC Category[3]	2000 (sector)	2000 (subsector)	ASEAN GHG Emissions (% Total) 2013	2014	2015	2016	2017	2018
Total Emissions ($MtCO_2$)						**3,348**	**3,789**	**3,912**	**3,522**	**3,580**	**3,890**
Agriculture (IPCC Category 4)	FAO	4A Enteric Fermentation (Methane production from herbivores as a by-product of digestive and microbial activity inside the animal's gut) 4A1 Cattle (a. Dairy; b. Non-dairy)	A012 Farming of animals A0121 Farming of cattle, sheep, goats, horses, asses, mules and hinnies; dairy farming A0122 Other animal farming; production of animal products A013 Growing of crops combined with farming of animals (mixed farming) A014 Agricultural and animal husbandry service activities, except veterinary activities A050 Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing	16.0%	2.0%	15.4%	13.6%	13.2%	14.9%	15.2%	13.9%
		4A2 Buffalo 4A3 Sheep 4A4 Goats 4A5 Camels and Llamas 4A6 Horses 4A7 Mules and Asses 4A9 Swine 4A10 Poultry 4A10 Other									
		4B Manure Management (Methane and nitrous oxide produced from the decomposition of manure) 4B1 Cattle (a. Dairy; b. Non-dairy) 4B2 Buffalo 4B3 Sheep 4B4 Goats 4B5 Camels and Llamas 4B6 Horses 4B7 Mules and Asses 4B8 Swine 4B9 Poultry 4B10 Anaerobic 4B11 Liquid Systems 4B12 Solid Storage and Drylot 4B13 Other			1%					
		4C Rice Cultivation (Methane emitted from anaerobic decomposition of organic material in flooded rice fields) 4C1 Irrigated (a. continuously flooded; intermittently flooded) 4C2 Rainfed 4C3 Deepwater (a. 50-100cm; 100am water depth) 4C Other	A011 Growing of crops; market gardening; horticulture A0111 Growing of cereals and other crops A0112 Growing of vegetables, horticultural specialties and nursery products A0113 Growing of fruit, nuts, beverage and spice crops A013 Growing of crops combined with farming of animals (mixed farming)		6%						
		4D Agricultural Soils i. Emission and removal of methane/ nitrous oxides from agricultural soil ii. Nitrous oxide emissions from fertilisers iii. Nitrogen fixation			4%					

[1] World Resources Institute. (2015). CAIT Country Greenhouse Gas Emissions: Sources & Methods. Pg 16. Retrieved from: http://cait.wri.org/docs/CAIT2.0_CountryGHG_Methods.pdf

[2] Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Reporting Instructions. Retrieved from: https://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ri.pdf.

[3] International Standard Industrial Classification of All Economic Activities (ISIC) Revision 3. (1989). Retrieved from: https://unstats.un.org/unsd/classifications/Econ/Download/In%20Text/ISIC_Rev_3_english_structure.txt

GHG Emissions Sectors	Data source	IPCC/CAIT sector and subsectors		Mapped ISIC Category	2000 (sector)	2000 (subsector)	ASEAN GHG Emissions (% Total) 2013	2014	2015	2016	2017	2018
Total Emissions ($MtCO_2$)							**3,348**	**3,789**	**3,912**	**3,522**	**3,580**	**3,890**
Agriculture (IPCC Category 4)	FAO	4E Prescribed Burning of Savannas (Burning of savannas to control the growth of vegetation, remove pests and weeds, promote the nutrient cycle and to encourage the growth of new grass for animal grazing) iv. CH_4, CO, N_2O, and NO_x emitted	Other Agricultural Sources	No direct mapping under ISIC, but can be put under ISIC categories mapped to CAIT 4A — 4D as savanna burning is both for crop and livestock growth		0%	15.4%	13.6%	13.2%	14.9%	15.2%	13.9%
		4F Field Burning of Agricultural Residues 4F1 Cereals 4F2 Pulse 4F3 Tuber and Root 4F4 Sugar Cane 4F5 Other		Same as ISIC mappings for CAIT 4C and 4D (as it is related to the growing of crops)		0%						
		4G Other		Any other emission source/ sink from agricultural activities		0%						
Bunker Fuels (Referred to as 'International Bunkers') in CAIT document (Not a sector under IPCC)	IEA	1A3ai Aviation Bunkers 1A3di Marine Bunkers v. In CAIT, emissions from Aviation and Marine Bunkers are summed into a single yearly estimate for International Bunkers vi. International Bunkers are shown as a sector, but not included in total national emissions, in accordance with IPCC Guidelines vii. Note that IEA reported transport emissions for world total includes international marine bunkers and international aviation bunkers, which are not included in transport at a national or regional level		I611 Sea and coastal water transport I621 Scheduled air transport I622 Non-scheduled air transport Note that the Bunker Fuels sector refers only to emissions released when fuel is used for international bunkers I612 Inland water transport is excluded as being inland, it likely only refers to domestic water transport	–	–	5.8%	5.1%	5.3%	6.3%	6.5%	6.0%

GHG Emissions Sectors	Data source	IPCC/CAIT sector and subsectors		Mapped ISIC Category	2000 (sector)	2000 (subsector)	ASEAN GHG Emissions (% Total) 2013	2014	2015	2016	2017	2018
Total Emissions ($MtCO_2$)							**3,348**	**3,789**	**3,912**	**3,522**	**3,580**	**3,890**
Industrial Processes (IPCC Category 2) While the document by the World Resources Institute states that data under CAIT in in the Industrial sector only includes cement, adipic acid, etc., the IPCC Guidelines document includes the full range of IPCC subsections	CDIAC (for cement)	2A Mineral Products 2A1 Cement production 2A2 Lime Production 2A3 Limestone and Dolomite 2A4 Soda Ash Production and Use 2A5 Asphalt Roofing 2A6 Road Paving with Asphalt 2A7 Other	Cement	ISIC Division 26 D26 Manufacture of other non-metallic mineral products D261 Manufacture of glass and glass products 269 Manufacture of non-metallic mineral products D2691 Manufacture of non-structural non-refractory ceramic ware D2692 Manufacture of refractory ceramic products D2693 Manufacture of structural non-refractory clay and ceramic products D2694 Manufacture of cement, lime and plaster D2695 Manufacture of articles of concrete, cement and plaster D2696 Cutting, shaping and finishing of stone D2699 Manufacture of other non-metallic mineral products n.e.c.	5.1%	3.1%	4.2%	3.9%	4.0%	5.2%	5.5%	5.4%
	EPA	**2B Chemical Industry** 2B1 Ammonia Production 2B2 Nitric Acid Production 2B3 Adipic Acid Production 2B4 Carbide production 2B5 Other	Adipic and Nitric Acid Production	ISIC Division 24 D24 Manufacture of chemicals and chemical products D241 Manufacture of basic chemicals D2411 Manufacture of basic chemicals, except fertilisers and nitrogen compounds D2412 Manufacture of fertilisers and nitrogen compounds D2413 Manufacture of plastics in primary forms and of synthetic rubber D242 Manufacture of other chemical products D2421 Manufacture of pesticides and other agro-chemical products D2422 Manufacture of paints, varnishes and similar coatings, printing ink and mastics D2423 Manufacture of pharmaceuticals, medicinal chemicals and botanical products D2424 Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations D2429 Manufacture of other chemical products D243 Manufacture of man-made fibres		0.7%						

GHG Emissions Sectors	Data source	IPCC/CAIT sector and subsectors		Mapped ISIC Category	2000 (sector)	2000 (subsector)	ASEAN GHG Emissions (% Total) 2013	2014	2015	2016	2017	2018
Total Emissions ($MtCO_2$)							**3,348**	**3,789**	**3,912**	**3,522**	**3,580**	**3,890**
Industrial Processes (IPCC Category 2) While the document by the World Resources Institute states that data under CAIT in in the Industrial sector only includes cement, adipic acid, etc., the IPCC Guidelines document includes the full range of IPCC subsections	EPA	**2C Metal Production** 2C1 Iron and Steel Production 2C2 Ferroallloys Production 2C3 Aluminium Production 2C4 SF6 Used in Aluminium and Magnesium Founders 2C5 Other	Other Industrial Non-Agriculture	ISIC Division 27 D27 Manufacture of basic metals D271 Manufacture of basic iron and steel D2710 Manufacture of basic iron and steel D272 Manufacture of basic precious and non-ferrous metals D2720 Manufacture of basic precious and non-ferrous metals D273 Casting of metals D2731 Casting of iron and steel D2732 Casting of non-ferrous metals		0.5%	4.2%	3.9%	4.0%	5.2%	5.5%	5.4%
		2D Other Production 2D1 Pulp and Paper 2D2 Food and Drink		ISIC Division 15 and 29 D15 Manufacture of food products and beverages D151 Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats D1511 Production, processing and preserving of meat and meat products D1512 Processing and preserving of fish and fish products D1513 Processing and preserving of fruit and vegetables D1514 Manufacture of vegetable and animal oils and fats D152 Manufacture of dairy products D1520 Manufacture of dairy products D153 Manufacture of grain mill products, starches and starch products, and prepared animal feeds D1531 Manufacture of grain mill products D1532 Manufacture of starches and starch products D1533 Manufacture of prepared animal feeds D154 Manufacture of other food products D1541 Manufacture of bakery products D1542 Manufacture of sugar D1543 Manufacture of cocoa, chocolate and sugar confectionery D1544 Manufacture of macaroni, noodles, couscous and similar farinaceous products D1549 Manufacture of other food products n.e.c. D155 Manufacture of beverages D1551 Distilling, rectifying and blending of spirits; ethyl alcohol production from fermented materials D1552 Manufacture of wines		0.0%						

GHG Emissions Sectors	Data source	IPCC/CAIT sector and subsectors		Mapped ISIC Category	2000 (sector)	2000 (subsector)	ASEAN GHG Emissions (% Total)					
							2013	2014	2015	2016	2017	2018
Total Emissions ($MtCO_2$)							**3,348**	**3,789**	**3,912**	**3,522**	**3,580**	**3,890**
Industrial Processes (IPCC Category 2) While the document by the World Resources Institute states that data under CAIT in in the Industrial sector only includes cement, adipic acid, etc., the IPCC Guidelines document includes the full range of IPCC subsections	EPA	2D Other Production 2D1 Pulp and Paper 2D2 Food and Drink	Other Industrial Non-Agriculture	D1553 Manufacture of malt liquors and malt D1554 Manufacture of soft drinks; production of mineral waters D29 Manufacture of machinery and equipment D291 Manufacture of general purpose machinery D2911 Manufacture of engines and turbines, except aircraft, vehicle and cycle engines D2912 Manufacture of pumps, compressors, taps and valves D2913 Manufacture of bearings, gears, gearing and driving elements D2914 Manufacture of ovens, furnaces and furnace burners D2915 Manufacture of lifting and handling equipment D2919 Manufacture of other general purpose machinery D292 Manufacture of special purpose machinery D2921 Manufacture of agricultural and forestry machinery D2922 Manufacture of machine-tools D2923 Manufacture of machinery for metallurgy D2924 Manufacture of machinery for mining, quarrying and construction D2925 Manufacture of machinery for food, beverage and tobacco processing D2926 Manufacture of machinery for textile, apparel and leather production D2927 Manufacture of weapons and ammunition D2929 Manufacture of other special purpose machinery D293 Manufacture of domestic appliances D2930 Manufacture of domestic appliances		0.5%	4.2%	3.9%	4.0%	5.2%	5.5%	5.4%
		2E Production of Halocarbons and Sulphur Hexafluoride 2E1 By-Product Emissions 2E2 Fugitive Emissions 2E3 Other	All Fluorinated Gases	Possibly ISIC Class 2411 or 2429 D2411 Manufacture of basic chemicals, except fertilisers and nitrogen compounds D2429 Manufacture of other chemical products n.e.c.		0.0%						

GHG Emissions Sectors	Data source	IPCC/CAIT sector and subsectors		Mapped ISIC Category	2000 (sector)	2000 (subsector)	ASEAN GHG Emissions (% Total) 2013	2014	2015	2016	2017	2018
Total Emissions ($MtCO_2$)							**3,348**	**3,789**	**3,912**	**3,522**	**3,580**	**3,890**
Industrial Processes (IPCC Category 2) While the document by the World Resources Institute states that data under CAIT in in the Industrial sector only includes cement, adipic acid, etc., the IPCC Guidelines document includes the full range of IPCC subsections	EPA	2E Consumption of Halocarbons and Sulphur Hexafluoride 2F1 Refrigeration and Air Conditioning 2F2 Foam Blowing 2F3 Fire Extinguishers 2F4 Aerosols 2F5 Solvents 2F6 Other	All Fluorinated Gases	ISIC category not stated		0.0%	4.2%	3.9%	4.0%	5.2%	5.5%	5.4%
		2G Other										
Land-Use Change and Forestry (IPCC Category 5)	FAO	Total emissions and removals from forest and land use change activities Land Use Total (Forest land, cropland, grassland and biomass burning) **5A Changes In Forest And Other Woody Biomass Stocks** (Emissions and removals of CO_2 from decreases or increases in biomass stocks due to forest management, logging, fuelwood collection, etc.) 5A1 Tropical Forests (a. Wet/ very moist, b. Moist, short dry season, c. Moist, long dry season, d. Dry, e. Mountain moist, f. Mountain dry, g. Plantations, h. Other) 5A2 Temperate Forests (a. Coniferous, b. Broadleaf, c. Plantations, d. Other) 5A3 Boreal Forests (a. Mixed Broadleaf/Coniferous, b. Coniferous, c. Forest Tundra) 5A4 Grasslands/ Tundra 5A5 Other		A020 Forestry, logging and related service activities	20.2%	(-) 20.3%	28.1%	34.4%	34.2%	24.5%	22.8%	25.8%
		5B Forest and Grassland Conversion (Burning and decay of biomass from the conversion of existing forests and natural grasslands to other land uses) 5B1 Tropical Forests (a. Wet/ very moist, b. Moist, short dry season, c. Moist, long dry season, d. Dry, e. Mountain moist, f. Mountain dry, g. Plantations, h. Other) 5B2 Temperate Forests (a. Coniferous, b. Broadleaf, c. Plantations, d. Other) 5B3 Boreal Forests . (a. Mixed Broadleaf/Coniferous, b. Coniferous, c. Forest Tundra) 5B4 Grasslands/ Tundra 5B5 Other			46.0%						

GHG Emissions Sectors	Data source	IPCC/CAIT sector and subsectors	Mapped ISIC Category	2000 (sector)	2000 (subsector)	ASEAN GHG Emissions (% Total) 2013	2014	2015	2016	2017	2018
Total Emissions ($MtCO_2$)						**3,348**	**3,789**	**3,912**	**3,522**	**3,580**	**3,890**
Land-Use Change and Forestry (IPCC Category 5)	FAO	5C Abandonment of Managed Lands (Removal of CO_2 from the abandonment of formerly managed lands, e.g. croplands and pastures) 5C1 Tropical Forests 5C2 Temperate Forests 5C3 Boreal Forests 5C4 Grasslands/Tundra 5C5 Other	A020 Forestry, logging and related service activities		(-) 13.2%	28.1%	34.4%	34.2%	24.5%	22.8%	25.8%
		5D CO_2 Emissions and Removals from Soil (Emissions and removals of CO_2 in soil associated with land-use change and management, including liming of agricultural soil)			13.4%						
		5E Other (Emissions and removals of CO_2 from land use or land-use change activities which not included under the categories provided above)			9.4%						
Waste (IPCC Category 6)	EPA	Total emissions from solid waste disposal on land, wastewater, waste incineration and any other waste management activity	O90 Sewage and refuse disposal, sanitation and similar activities	12.2%	3.1%	5.9%	5.4%	5.3%	6.0%	6.0%	5.6%
		6A Solid Waste Disposal on Land Only applicable for methane gas released by soiled waste in landfills 6A1 Managed Waste Disposal on Land 6A2 Unmanaged Waste Disposal Sites 6A3 Other			0.4%						
		6B Wastewater Handling Methane from wastewater treatment and nitrous oxides from human sewage 6B1 Industrial Wastewater 6B2 Domestic and Commercial Wastewater 6B3 Other 6C Waste Incineration is not listed under CAIT			0.2%						
		6D Other Applies to other non-agricultural sources of methane and nitrous oxides			7.3%						
Energy (o/w) (IPCC Category 1)	IEA	Divided into the subcategories below: • Electricity and Heat • Manufacturing and Construction • Transportation • Other Fuel Combustion • Fugitive Emissions		46.8%		40.5%	37.6%	38.1%	43.2%	44.1%	43.3%

GHG Emissions Sectors	Data source	IPCC/CAIT sector and subsectors	Mapped ISIC Category	2000 (sector)	2000 (subsector)	ASEAN GHG Emissions (% Total) 2013	2014	2015	2016	2017	2018
Total Emissions ($MtCO_2$)						**3,348**	**3,789**	**3,912**	**3,522**	**3,580**	**3,890**
Electricity and Heat11 (IPCC Category 1A1)	IEA	Electricity & heat plants (fossil fuels) i. 1A1a Public plants (electricity, heat, CHP) **Public Electricity and Heat Production:** The sum of emissions from public electricity generation, public combined heat, power generation and public heat plants ii. 1A Autoproducers (electricity, heat, CHP) Autoproducers may be in public or private ownership, and should be assigned to the sector where they were generated This contradicts the allocation of autoproducers to the electricity and heat category by CAIT	E40 Electricity, gas, steam and hot water supply E401 Production, collection and distribution of electricity E402 Manufacture of gas; distribution of gaseous fuels through mains D232 Manufacture of refined petroleum products D233 Processing of nuclear fuel		14.2%	16.0%	15.3%	15.6%	18.3%	18.1%	18.9%
		Other Energy Industries (fossil fuels) (IPCC 1A1b, 1A1c) **1A1b Petroleum Refining** All combustion activities supporting the refining of petroleum products 1A1c Manufacture of Solid Fuels and Other Energy Industries Combustion emissions from fuel use during the manufacture of secondary and tertiary products from solid fuels including production of charcoal									
Manufacturing & Construction (IPCC Category 1A2)	IEA	1A2 Manufacturing Industries & Construction Emissions from combustion of fuels in industry including combustion for the generation of electricity and heat 1A2a Iron and Steel (ISIC 271,2731) 1A2b Non-Ferrous Metals (ISIC 272,2732) 1A2c Chemicals (ISIC 24) 1A2d Pulp, Paper and Print 1A2e Food Processing, Beverages and Tobacco 1A2f Other The remaining emissions from fuel combustion in industry should be reported here, including emissions from the construction branch	**D271 Manufacture of basic iron and steel** D2731 Casting of Iron and Steel D272 Manufacture of basic precious and non-ferrous metals D2732 Casting of Non-Ferrous Metals D24 Manufacture of Chemicals and Chemical Products D21 Manufacture of Paper and Paper Products D22 Publishing, Printing and Reproduction of Recorded Media D15 Manufacture of Food Products and Beverages D16 Manufacture of Tobacco Products F45 Construction Any other fuel combustion under ISIC category D (Manufacturing)		7.2%	6.8%	7.4%	7.7%	8.3%	7.9%	7.2%

GHG Emissions Sectors	Data source	IPCC/CAIT sector and subsectors	Mapped ISIC Category	2000 (sector)	2000 (subsector)	ASEAN GHG Emissions (% Total) 2013	2014	2015	2016	2017	2018
Total Emissions ($MtCO_2$)						**3,348**	**3,789**	**3,912**	**3,522**	**3,580**	**3,890**
Transportation (IPCC Category 1A3)	IEA	**1A3 Transport** Emissions from the combustion and evaporation of fuel for all transport activities NOTE: Excludes fuel used in international transport (international bunker fuels) 1A3aii Civil Aviation (Domestic) 1A3b Road Transportation All combustion and evaporative emissions arising from fuel use in road vehicles, including the use of agricultural vehicles on highways • Cars • Light Duty Trucks • Heavy Duty Trucks and uses • Motorcycles • Evaporative Emissions from Vehicles 1A3c Railways Includes emissions from both freight and passenger traffic routes 1A3d Navigation Emissions from fuels used to propel water-borne vessels, including hovercraft and hydrofoils • National Navigation (Emissions from fuel used for navigation of all vessels not engaged in international transport, except fishing) 1A3e Other Transportation Combustion emissions from all remaining transport activities including pipeline transportation, ground activities in airports and harbours • Pipeline Transport • Off-road	I60 Land transport; transport via pipelines I601 Transport via railways I602 Other land transport I6021 Other scheduled passenger land transport I6022 Other non-scheduled passenger land transport I6023 Freight transport by road I603 Transport via pipelines I61 Water transport I611 Sea and coastal water transport I6110 Sea and coastal water transport I612 Inland water transport I62 Air transport I621 Scheduled air transport I622 Non-scheduled air transport		8.5%	10.1%	9.2%	8.7%	10.5%	10.8%	10.2%
Other Fuel Combustion (IPCC Category 1A4, 1A5)		1A4 Other Sectors (fossil fuels) Emission from combustion activities as described below Assumption made that 1A4a and 1A4b have been placed under the 'Building' emissions category instead (last row of this table) 1A4c Agriculture/ Forestry/ Fishing • Stationary • Off-road Vehicles and Other Machinery • Fishing	Any carbon dioxide, methane or nitrous oxide emissions resulting from the combustion of fossil fuels for the following possible activities: ISIC Category A: Agriculture, hunting and forestry ISIC Category B: Fishing Any other fuel-burning activity not mentioned in other sections			2.5%	2.2%	2.2%	2.3%	2.3%	2.1%
	EPA	Biomass Combustion (considered under IPCC 1A5) **1A5 Other (not elsewhere specified)** All remaining emissions from non-specified fuel combustion									
	EPA	1A5 Stationary and Mobile Sources **1A5 Other (not elsewhere specified)** a) Stationary b) Mobile (vehicles and other machinery, marine and aviation not included elsewhere)									

GHG Emissions Sectors	Data source	IPCC/CAIT sector and subsectors	Mapped ISIC Category	2000 (sector)	2000 (subsector)	ASEAN GHG Emissions (% Total) 2013	2014	2015	2016	2017	2018
Total Emissions ($MtCO_2$)						**3,348**	**3,789**	**3,912**	**3,522**	**3,580**	**3,890**
Fugitive Emissions (IPCC Category 1B1, 1B2)	EPA	1B2c Gas Venting/ Flaring 1B2 Oil & Natural Gas Systems 1B1 Coal Mining 1B1, 1B2 Other Energy Sources 1B2 Oil and Natural Gas Total fugitive emissions from oil and gas activities. Fugitive emissions may arise from equipment exhaust (non-combustion), leakages, upsets and mishaps at any point in the chain from production through final use 1B2a Oil Fugitive emissions from the following activities in the oil industry: • Exploration • Production • Transport • Refining/ Storage • Distribution of Oil Products • Other 1B2b Natural Gas ◦ Production/ Processing ◦ Transmission/ Distribution ◦ Other Leakage 1B2c Venting and Flaring The release/ combustion of excess gas at facilities for the production of oil or gas and for the processing of gas • Oil • Gas • Combined (in cases where oil and gas cannot be separated)	Fugitive emissions from the following oil and gas activities: C11 Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying D232 Manufacture of refined petroleum products		3.1%	2.7%	2.6%	2.9%	2.8%	2.5%	3.1%
Building (Absent in CAIT document)		Possibly: 1A4a Commercial/ Institutional Emission from fuel combustion in commercial and institutional buildings (All activities included in ISIC 4103, 42, 6, 719, 72, 8, 91-96)	ISIC 4103, 42, 6, 719, 72, 8, 94, 96 mentioned in Revised IPCC Guidelines document cannot be found K72 Computer and related activities O91 Activities of membership organizations O92 Recreational, cultural and sporting activities O93 Other service activities P95 Private households with employed persons			1.6%	1.4%	1.5%	1.7%	1.9%	1.7%
		1A4b Residential All emissions from fuel combustion in households (Activities included in ISIC 5, 11, 12, 1302) 14	ISIC 1302 mentioned in Revised IPCC Guidelines document cannot be found								

Data Source: World Resource Institute and CAIT (2013 onwards data), UNFCCC (2010 data)

*Categorisation of sectors to ISIC is made by comparing and matching CAIT/ IPCC sector descriptions with ISIC sector descriptions

ISIC sections highlighted in green are the recommended mappings provided by the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories

Instances where sectors listed in WRI document (pg 16, CAIT Country Greenhouse Gas Emissions: Sources & Methods) matches the sectors listed under Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories



Appendix B

GHG Emission of Main ASEAN Economies

% of total emissions	Singapore					
Sectors	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Total Emissions (Mt)	**214.0**	**214.5**	**225.3**	**238.8**	**248.6**	**247.9**
Agriculture	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bunker Fuels	72.2%	71.7%	72.2%	73.2%	73.5%	73.1%
Industrial Processes	21.1%	21.3%	20.8%	19.9%	19.6%	19.7%
Land-Use Change and Forestry	5.4%	5.7%	5.7%	5.6%	5.6%	5.9%
Waste	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Energy (o/w)	1.3%	1.4%	1.3%	1.3%	1.3%	1.3%
Building	0.3%	0.3%	0.3%	0.3%	0.2%	0.2%
Electricity/Heat	11.7%	11.4%	11.0%	10.6%	10.5%	10.4%
Fugitive Emissions	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Manufacturing/Construction	5.5%	5.9%	5.7%	5.5%	5.5%	5.7%
Other Fuel Combustion	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Transportation	3.0%	3.1%	3.2%	3.0%	2.8%	2.8%

% of total emissions	Indonesia					
Sectors	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Total Emissions (Mt)	**1,640.9**	**2,021.1**	**2,075.1**	**1,458.6**	**1,471.7**	**1,709.6**
Agriculture	10.6%	8.9%	8.8%	13.1%	13.3%	11.7%
Bunker Fuels	0.3%	0.2%	0.2%	0.4%	0.4%	0.3%
Industrial Processes	28.8%	25.2%	24.6%	35.1%	37.3%	35.0%
Land-Use Change and Forestry	1.8%	1.5%	1.5%	2.4%	2.5%	2.2%
Waste	51.1%	57.9%	58.7%	40.2%	37.6%	42.9%
Energy (o/w)	7.3%	6.2%	6.1%	8.9%	8.9%	7.8%
Building	1.4%	1.1%	1.2%	1.6%	1.7%	1.5%
Electricity/Heat	10.3%	9.6%	9.4%	14.2%	14.9%	14.2%
Fugitive Emissions	2.0%	1.7%	1.6%	2.3%	2.1%	1.8%
Manufacturing/Construction	4.8%	4.4%	4.8%	5.8%	6.8%	6.7%
Other Fuel Combustion	2.0%	1.6%	1.7%	2.1%	2.2%	1.8%
Transportation	8.3%	6.8%	5.9%	9.2%	9.6%	9.0%

% of total emissions Sectors	Malaysia 2013	2014	2015	2016	2017	2018
Total Emissions (Mt)	**183.0**	**214.1**	**200.7**	**386.7**	**374.3**	**397.2**
Agriculture	8.1%	7.0%	7.4%	3.9%	3.9%	3.6%
Bunker Fuels	4.7%	4.0%	4.4%	2.1%	2.5%	2.3%
Industrial Processes	127.3%	114.1%	122.2%	62.4%	62.9%	63.5%
Land-Use Change and Forestry	9.0%	8.2%	9.0%	4.8%	5.2%	5.0%
Waste	-59.4%	-42.4%	-52.8%	21.6%	20.1%	20.5%
Energy (o/w)	10.2%	9.0%	9.8%	5.2%	5.4%	5.2%
Building	2.5%	1.9%	2.0%	1.1%	1.4%	0.9%
Electricity/Heat	62.2%	55.7%	61.5%	30.6%	29.2%	31.6%
Fugitive Emissions	11.7%	9.9%	11.0%	5.7%	5.7%	5.2%
Manufacturing/Construction	15.9%	13.4%	14.4%	7.7%	8.7%	8.9%
Other Fuel Combustion	3.3%	2.8%	2.8%	1.1%	1.7%	1.6%
Transportation	31.8%	30.4%	30.5%	16.3%	16.2%	15.3%

% of total emissions Sectors	Thailand 2013	2014	2015	2016	2017	2018
Total Emissions (Mt)	**411.3**	**408.5**	**411.3**	**427.6**	**446.0**	**450.1**
Agriculture	18.5%	17.2%	15.7%	14.3%	15.8%	15.3%
Bunker Fuels	3.4%	3.6%	3.8%	3.9%	3.8%	4.2%
Industrial Processes	65.4%	65.1%	65.6%	62.2%	59.7%	58.5%
Land-Use Change and Forestry	9.3%	10.2%	11.1%	13.0%	14.3%	16.0%
Waste	0.4%	0.9%	0.7%	3.7%	3.5%	3.2%
Energy (o/w)	3.0%	3.0%	3.0%	2.9%	2.8%	2.8%
Building	1.8%	1.7%	1.6%	1.5%	1.5%	1.5%
Electricity/Heat	27.9%	27.8%	26.8%	25.8%	23.3%	23.5%
Fugitive Emissions	3.1%	3.2%	3.2%	3.0%	2.9%	2.8%
Manufacturing/Construction	12.3%	12.4%	13.2%	11.4%	11.1%	9.8%
Other Fuel Combustion	5.1%	5.2%	5.1%	4.3%	4.0%	4.1%
Transportation	15.2%	14.8%	15.8%	16.2%	16.9%	16.9%

% of total emissions Sectors	Vietnam 2013	2014	2015	2016	2017	2018
Total Emissions (Mt)	**251.0**	**264.0**	**308.2**	**333.3**	**331.7**	**368.8**
Agriculture	28.2%	26.2%	23.4%	21.3%	21.5%	19.3%
Bunker Fuels	0.9%	0.8%	1.0%	0.9%	1.0%	1.2%
Industrial Processes	61.2%	63.5%	66.9%	64.9%	64.3%	67.3%
Land-Use Change and Forestry	10.0%	10.1%	9.5%	10.2%	10.8%	10.1%
Waste	-8.0%	-8.0%	-7.1%	-3.4%	-3.6%	-3.3%
Energy (o/w)	7.6%	7.4%	6.4%	6.0%	6.1%	5.5%
Building	4.3%	4.0%	4.5%	3.9%	4.8%	4.3%
Electricity/Heat	17.7%	20.1%	23.1%	23.9%	21.6%	29.6%
Fugitive Emissions	8.1%	7.8%	6.7%	6.0%	5.8%	5.1%
Manufacturing/Construction	17.7%	18.8%	20.5%	18.9%	19.4%	17.3%
Other Fuel Combustion	1.7%	1.6%	1.4%	1.2%	1.3%	1.1%
Transportation	11.7%	11.3%	10.7%	10.9%	11.5%	9.8%

% of total emissions Sectors	Philippines 2013	2014	2015	2016	2017	2018
Total Emissions (Mt)	**186.1**	**193.5**	**202.9**	**216.1**	**233.4**	**239.9**
Agriculture	32.2%	31.1%	29.1%	27.3%	26.6%	25.6%
Bunker Fuels	2.0%	1.8%	1.8%	1.9%	2.2%	2.1%
Industrial Processes	51.4%	52.6%	54.2%	56.0%	56.9%	57.7%
Land-Use Change and Forestry	6.3%	6.7%	7.2%	7.5%	7.5%	7.8%
Waste	1.3%	1.3%	1.2%	1.2%	1.1%	1.0%
Energy (o/w)	6.8%	6.6%	6.4%	6.2%	5.8%	5.7%
Building	3.1%	3.4%	3.2%	3.7%	4.0%	4.2%
Electricity/Heat	24.0%	24.8%	25.6%	25.9%	27.5%	29.4%
Fugitive Emissions	0.4%	0.3%	0.3%	0.3%	0.2%	0.2%
Manufacturing/Construction	7.1%	7.2%	7.0%	7.8%	7.6%	6.4%
Other Fuel Combustion	3.1%	3.0%	3.0%	2.9%	2.8%	2.7%
Transportation	13.7%	13.8%	15.2%	15.4%	14.7%	14.9%

Appendix C
ISIC Rev 1 Finalised Sectors

Sectors chosen	ISIC Subsectors		Description
Agriculture and Forestry/Land Use	A	0111	Growing of cereals and other crops n.e.c.
	A	0112	Growing of vegetables, horticultural specialties and nursery products
	A	0113	Growing of fruit, nuts, beverage and spice crops
	A	0121	Farming of cattle, sheep, goats, horses, asses, mules and hinnies; dairy farming
	A	0122	Other animal farming; production of animal products n.e.c.
	A	0130	Growing of crops combined with farming of animals (mixed farming)
	A	0140	Agricultural and animal husbandry service activities, except veterinary activities
	A	0150	Hunting, trapping and game propagation including related service activities
	A	0200	Forestry, logging and related service activities
	A	0500	Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing
Construction/Real Estate	F	4510	Site preparation
	F	4520	Building of complete constructions or parts thereof; civil engineering
	F	4530	Building installation
	F	4540	Building completion
	F	4550	Renting of construction or demolition equipment with operator
	K	7010	Real estate activities with own or leased property
	K	7020	Real estate activities on a fee or contract basis
Transportation and Fuel	I	6010	Transport via railways
	I	6021	Other scheduled passenger land transport
	I	6022	Other non-scheduled passenger land transport
	I	6023	Freight transport by road
	I	6030	Transport via pipelines
	I	6110	Sea and coastal water transport
	I	6120	Inland water transport
	I	6210	Scheduled air transport
	I	6220	Non-scheduled air transport
Energy, including upstream	D	2320	Manufacture of refined petroleum products
	D	2330	Processing of nuclear fuel
	E	4010	Production, collection and distribution of electricity
	E	4020	Manufacture of gas; distribution of gaseous fuels through mains
Industrial	D	151	Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats
	D	152	Manufacture of dairy products
	D	153	Manufacture of grain mill products, starches and starch products, and prepared animal feeds
	D	154	Manufacture of other food products
	D	155	Manufacture of beverages
	D	241	Manufacture of basic chemicals
	D	242	Manufacture of other chemical products
	D	243	Manufacture of man-made fibres
	D	261	Manufacture of glass and glass products
	D	269	Manufacture of non-metallic mineral products n.e.c.
	D	271	Manufacture of basic iron and steel
	D	272	Manufacture of basic precious and non-ferrous metals
	D	273	Casting of metals
	D	291	Manufacture of general purpose machinery
	D	292	Manufacture of special purpose machinery
	D	293	Manufacture of domestic appliances n.e.c.
Information and Communications Technology	I	6420	Telecommunications
Waste/Circular Economy	O	9000	Sewage and refuse disposal, sanitation and similar activities
Carbon Capture and Sequestration	–	–	–

Appendix D
NACE Rev 1 Finalised Sectors

Sectors Chosen	NACE Subsectors		Description
Agriculture and Forestry/Land Use	A	1.11	Growing of cereals and other crops n.e.c.
	A	1.12	Growing of vegetables, horticultural specialties and nursery products
	A	1.13	Growing of fruit, nuts, beverage and spice crops
	A	1.21	Farming of cattle, dairy farming
	A	1.22	Farming of sheep, goats, horses, asses, mules and hinnies
	A	1.23	Farming of swine
	A	1.24	Farming of poultry
	A	1.25	Other farming of animals
	A	1.30	Growing of crops combined with farming of animals (mixed farming)
	A	1.41	Agricultural service activities
	A	1.42	Animal husbandry service activities. except veterinary activities
	A	1.50	Hunting, trapping and game propagation, including related service activities
	B	2.01	Forestry and logging
	B	2.02	Forestry and logging related service activities
	B	5.01	Fishing
	B	5.02	Operation of fish hatcheries and fish farms
Construction/ Real Estate	F	45.11	Demolition and wrecking of buildings; earth moving
	F	45.12	Test drilling and boring
	F	45.21	General construction of buildings and civil engineering works
	F	45.22	Erection of roof covering and frames
	F	45.23	Construction of highways, roads, airfields and sport facilities
	F	45.24	Construction of water projects
	F	45.25	Other construction work involving special trades
	F	45.31	Installation of electrical wiring and fittings
	F	45.32	Insulation work activities
	F	45.33	Plumbing
	F	45.34	Other building installation
	F	45.41	Plastering
	F	45.42	Joinery installation
	F	45.43	Floor and wall covering
	F	45.44	Painting and glazing
	F	45.45	Other building completion
	F	45.50	Renting of construction or demolition equipment with operator
	K	70.11	Development and selling of real estate
	K	70.12	Buying and selling of own real estate
	K	70.20	Letting of own property
	K	70.31	Real estate agencies
	K	70.32	Management of real estate on a fee or contract basis
Transportation and Fuel	I	60.10	Transport via railways
	I	60.21	Other scheduled passenger land transport
	I	60.22	Taxi operation
	I	60.23	Other land passenger transport
	I	60.24	Freight transport by road
	I	60.30	Transport via pipelines
	I	61.10	Sea and coastal water transport
	I	61.20	Inland water transport
	I	62.10	Scheduled air transport
	I	62.20	Non-scheduled air transport
	I	62.30	Space transport
Energy, including upstream	D	23.20	Manufacture of refined petroleum products
	D	23.30	Processing of nuclear fuel
	E	40.10	Production and distribution of electricity
	E	40.20	Manufacture of gas; distribution of gaseous fuels through mains
Industrial	D	15.1	Production, processing and preserving of meat and meat products
	D	15.2	Processing and preserving of fish and fish products
	D	15.3	Processing and preserving of fruit and vegetables
	D	15.4	Manufacture of vegetable and animal oils and fats
	D	15.5	Manufacture of dairy products
	D	15.6	Manufacture of grain mill products, starches and starch products
	D	15.7	Manufacture of prepared animal feeds
	D	15.8	Manufacture of other food products
	D	15.9	Manufacture of beverages
	D	24.1	Manufacture of basic chemicals
	D	24.2	Manufacture of pesticides and other agro-chemical products
	D	24.3	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
	D	24.4	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
	D	24.5	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
	D	24.6	Manufacture of other chemical products
	D	24.7	Manufacture of man-made fibres
	D	26.1	Manufacture of glass and glass products
	D	26.2	Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products
	D	26.3	Manufacture of ceramic tiles and flags
	D	26.4	Manufacture of bricks, tiles and construction products, in baked clay
	D	26.5	Manufacture of cement, lime and plaster

Sectors Chosen	NACE Subsectors		Description
	D	26.6	Manufacture of articles of concrete, plaster and cement
	D	26.7	Cutting, shaping and finishing of stone
	D	26.8	Manufacture of other non-metallic mineral products
	D	27.1	Manufacture of basic iron and steel and of ferro-alloys
	D	27.2	Manufacture of tubes
	D	27.3	Other first processing of iron and steel and production of non-ECSC26 ferro-alloys
	D	27.4	Manufacture of basic precious and non-ferrous metals
	D	27.5	Casting of metals
	D	29.1	Manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and cycle engines
	D	29.2	Manufacture of other general purpose machinery
	D	29.3	Manufacture of agricultural and forestry machinery
	D	29.4	Manufacture of machine-tools
	D	29.5	Manufacture of other special purpose machinery
	D	29.6	Manufacture of weapons and ammunition
	D	29.7	Manufacture of domestic appliances n.e.c.
Information and Communications Technology	I	64.20	Telecommunications
Waste/Circular Economy	O	90.00	Sewage and refuse disposal, sanitation and similar activities
Carbon Capture and Sequestration	-	-	-

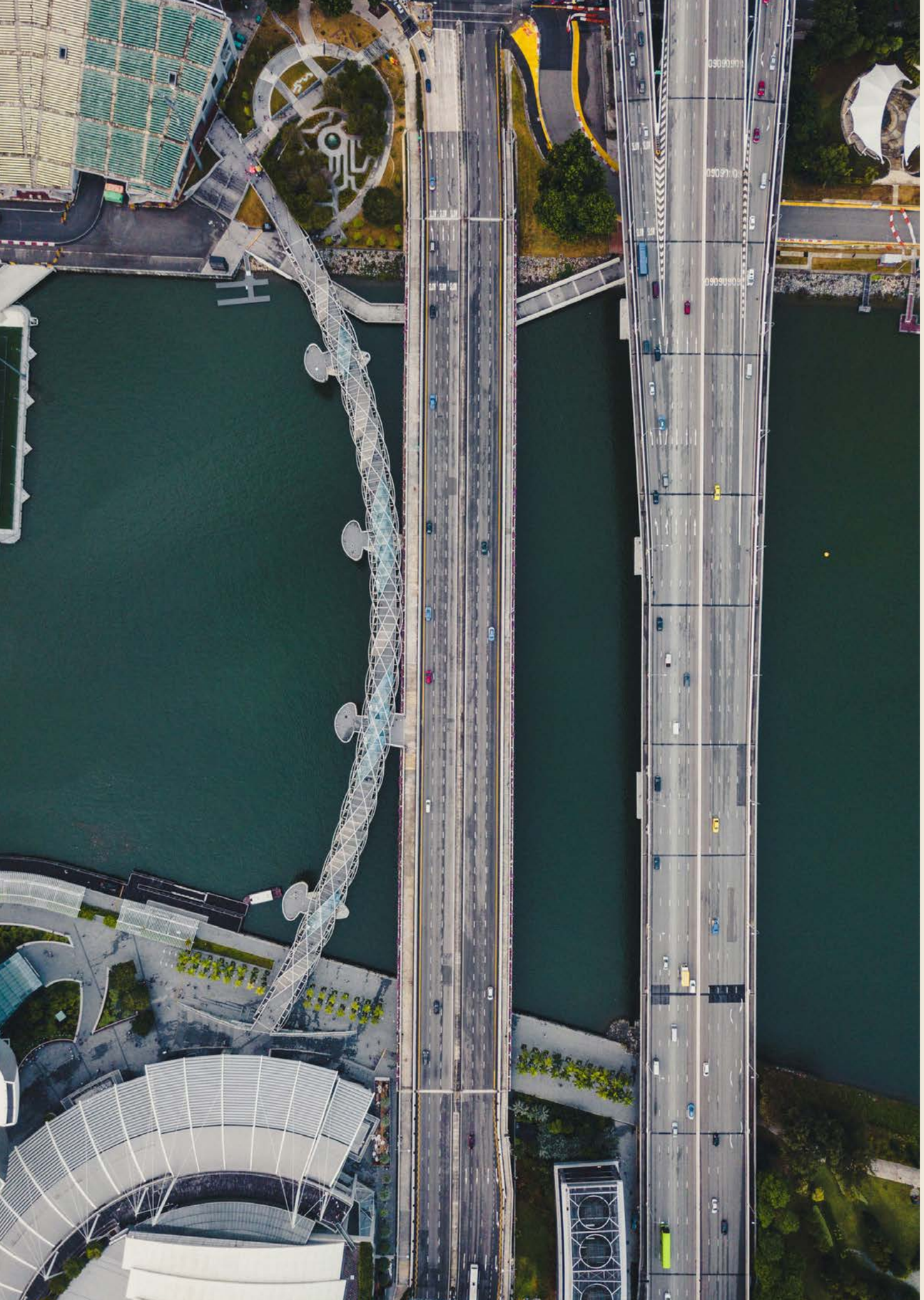
Appendix E

NACE Rev 2 Finalised Sectors

Sectors Chosen	NACE 2 Subsectors		Description
Agriculture and Forestry/Land Use	A	1.1	Growing of non-perennial crops
	A	1.2	Growing of perennial crops
	A	1.3	Plant propagation
	A	1.4	Animal production
	A	1.5	Mixed farming
	A	1.6	Support activities to agriculture and post-harvest crop activities
	A	1.7	Hunting, trapping and related service activities
	A	2.1	Silviculture and other forestry activities
	A	2.2	Logging
	A	2.3	Gathering of wild growing non-wood products
	A	2.4	Support services to forestry
	A	3.1	Fishing
	A	3.2	Aquaculture
Construction/ Real Estate	F	41.1	Development of building projects
	F	41.2	Construction of residential and non-residential buildings
	F	42.1	Construction of roads and railways
	F	42.2	Construction of utility projects
	F	42.9	Construction of other civil engineering projects
	F	43.1	Demolition and site preparation
	F	43.2	Electrical, plumbing and other construction installation activities
	F	43.3	Building completion and finishing
	F	43.9	Other specialised construction activities
	L	68.1	Buying and selling of own real estate
	L	68.2	Rental and operating of own or leased real estate
	L	68.3	Real estate activities on a fee or contract basis
Transportation and Fuel	H	49.1	Passenger rail transport, interurban
	H	49.2	Freight rail transport
	H	49.3	Other passenger land transport
	H	49.4	Freight transport by road and removal services
	H	49.5	Transport via pipeline
	H	50.1	Sea and coastal passenger water transport
	H	50.2	Sea and coastal freight water transport
	H	50.3	Inland passenger water transport

Sectors Chosen	NACE 2 Subsectors		Description
	H	50.4	Inland freight water transport
	H	51.1	Passenger air transport
	H	51.2	Freight air transport and space transport
Energy, including upstream	C	19.2	Manufacture of refined petroleum products
	C	24.46	Processing of nuclear fuel
	D	35.1	Electric power generation, transmission and distribution
	D	35.2	Manufacture of gas; distribution of gaseous fuels through mains
	C	10.1	Processing and preserving of meat and production of meat products
	C	10.2	Processing and preserving of fish, crustaceans and molluscs
	C	10.3	Processing and preserving of fruit and vegetables
	C	10.4	Manufacture of vegetable and animal oils and fats
	C	10.5	Manufacture of dairy products
	C	10.6	Manufacture of grain mill products, starches and starch products
	C	10.7	Manufacture of bakery and farinaceous products
	C	10.8	Manufacture of other food products
	C	10.9	Manufacture of prepared animal feeds
	C	20.1	Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms
	C	20.2	Manufacture of pesticides and other agrochemical products
	C	20.3	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
	C	20.4	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
	C	20.5	Manufacture of other chemical products
	C	20.6	Manufacture of man-made fibres
	C	23.1	Manufacture of glass and glass products
	C	23.2	Manufacture of refractory products
	C	23.3	Manufacture of clay building materials
	C	23.4	Manufacture of other porcelain and ceramic products
	C	23.5	Manufacture of cement, lime and plaster
	C	23.6	Manufacture of articles of concrete, cement and plaster
	C	23.7	Cutting, shaping and finishing of stone
	C	23.9	Manufacture of abrasive products and non-metallic mineral products n.e.c.
	C	24.1	Manufacture of basic iron and steel and of ferro-alloys
	C	24.2	Manufacture of tubes, pipes, hollow profiles and related fittings, of steel
	C	24.3	Manufacture of other products of first processing of steel
	C	24.4	Manufacture of basic precious and other non-ferrous metals
	C	24.5	Casting of metals
	C	28.1	Manufacture of general-purpose machinery
	C	28.2	Manufacture of other general-purpose machinery
	C	28.3	Manufacture of agricultural and forestry machinery
	C	28.4	Manufacture of metal forming machinery and machine tools
	C	28.9	Manufacture of other special-purpose machinery

Sectors Chosen	NACE 2 Subsectors		Description
Information and Communications Technology	J	60.1	Radio broadcasting
	J	60.2	Television programming and broadcasting activities
	J	61.1	Wired telecommunications activities
	J	61.2	Wireless telecommunications activities
	J	61.3	Satellite telecommunications activities
	J	61.9	Other telecommunications activities
	J	62	Computer programming, consultancy and related activities
	J	63.1	Data processing, hosting and related activities; web portals
	J	63.9	Other information service activities
Carbon Capture and Sequestration	-	-	-



Appendix F

EU Taxonomy sectors

Detailed list of 67 activities reviewed by the TEG

Agriculture and Forestry

- Growing of perennial crops
- Growing of non-perennial crops
- Livestock production
- Afforestation
- Rehabilitation, Restoration
- Reforestation
- Existing forest management

Manufacturing

- Manufacture of low-carbon technologies
- Manufacture of cement
- Manufacture of aluminium
- Manufacture of iron and steel
- Manufacture of hydrogen
- Manufacture of other inorganic basic chemicals
- Manufacture of other organic basic chemicals
- Manufacture of fertilisers and nitrogen compounds
- Manufacture of plastics in primary form

Electricity, gas, steam and air conditioning supply

- Production of Electricity from Solar PV
- Production of Electricity from Concentrated Solar PV
- Production of Electricity from Wind Power
- Production of Electricity from Ocean Energy
- Production of Electricity from Hydropower
- Production of Electricity from Geothermal
- Production of Electricity from Gas Combustion
- Production of Electricity from Bioenergy
- Transmission and Distrubution of Electricity
- Storage of Energy
- Manufacture of Biomass, Biogas or Biofuels
- Retrofit of Gas Transmission and Distribution Networks
- District Heating/Cooling distribution
- Installation and operation of Electric Heat Pumps
- Cogeneration of Heat/Cool and power from Concentrated Solar Power
- Cogeneration of Heat/Cool and power from Geothermal Energy
- Cogeneration of Heat/Cool and power from Gas Combustion
- Cogeneration of Heat/Cool and power from Bioenergy
- Production of Heating and Cooling from Concentrated Solar Power
- Production of Heating and Cooling from Geothermal Energy
- Production of Heating and Cooling from Gas Combustion
- Production of Heating and Cooling from Bioenergy
- Production of Heating and Cooling using Wasted Heat

Water, waste and sewerage remediation

- Water collection, treatment and supply
- Centralised wastewater treatment systems
- Anaerobic digestion of sewage sludge
- Separate collection and transport of non-hazardous waste in source segregated fractions
- Anaerobic digestion of bio-waste
- Composting of bio-waste
- Material recovery from waste
- Landfill gas capture and energetic utilisation
- Direct Air Capture of CO_2
- Capture of anthropogenic emissions
- Transport of CO_2
- Permanent sequestration of captured CO_2

Buildings

- Construction of new buildings
- Renovation of existing buidlings
- Individual renovation measures, installation of renewable on-site and professional scientific and technical activities
- Acquisition of buildings

Information and Communication Technologies (ICT)

- Data processing, hosting and related activities
- Data-driven solutions for GHG emissions reductions

Transport

- Passenger Rail transport (Interurban)
- Freight Rail transport
- Public transport
- Infrastructure for low-carbon transport
- Passenger cars and commercial vehicles
- Freight transport services by road
- Interurban scheduled road transport
- Inland water passenger transport
- Inland freight passenger transport
- Construction of water projects

Appendix G

Methodology behind Carbon Trajectory Modelling for Singapore

Impetus & Scientific Basis

Carbon modelling in the context of Taxonomies

Multiple approaches and methodologies exist for carbon modelling. Choosing an appropriate approach generally rests on the use case and the available data to create a robust model. For the purposes of defining products and taxonomies, we require a method that will allow different technologies to be objectively compared.



Appendix H
Sectoral Decarbonisation Approach (SDA)[4]

We recommend use of the SDA, a widely adopted methodology used by the Transition Pathway Initiative (TPI) and the Science Based Targets Initiative (SBTi).

Utilising the SDA offers several advantages:

- **Global context and alignment.** Greenhouse gas reduction targets are aligned with global climate scenarios and goals. A company/entity is thus able to determine its level of ambition required under different futures, and make necessary plans of action.

- **Sectoral application.** Each sector of industry has inherent characteristics, such as mitigation potential and growth rate relative to economic and population growth. The SDA takes these factors into account and allocates an appropriate carbon budget.

- **Comparability.** The volume of activity taking place in a sector controls its total volume of emissions. However, in the SDA we can more easily make comparisons between desirable technologies and interventions by considering emissions intensity (emissions per unit activity). For example, the kilotonne CO_2e per megawatt-hour of electricity generated.

- **Scalability.** The SDA acknowledges that companies and sectors do not remain static, and remains applicable even when the size of a company or sector is forecast to change over time. As an example, in the case of commuter transport, carbon allocation should scale by the share of passengers and distance travelled.

Global Scenarios

The SDA is built on global scenarios developed and curated by internationally recognised bodies such as the International Energy Agency (IEA), the International Institute for Applied Systems Analysis (IIASA) and the Intergovernmental Panel on Climate Change (IPCC). Widely accepted scenarios include (but are not limited to):

- IEA Reference Technology Scenario (RTS)

- IEA 2°C Scenario (2DS)

- IEA Beyond 2°C Scenario (B2DS)

- Family of scenarios supporting the IPCC Special Report on Global Warming of 1.5°C (SR1.5)

While there may be a large array of scenarios tabled by agencies, thinktanks and academia, they are fundamentally premised on suites of models[5] that encompass economic activity, energy usage, greenhouse gas emissions and climate effects.

They are not meant to be used as hard predictions/forecasts, but as guide rails for possible outcomes shaped by policy, economic and technological changes in the decades ahead.

As a basis for initial planning, we recommend the use of the IEA RTS, IEA 2DS and IPCC SR1.5-aligned models at the global scale for their robustness and the accessibility of their data. These global scenarios may be updated for future planning and refinement when more data becomes available to policymakers.

Business-As-Usual (BAU) and Mitigation Scenarios

The degree of intervention is the difference between projected BAU trajectory and carbon mitigation scenarios.

Here, we choose a takeoff point of 2019 as the latest year of audited statistical data.

Input specific to Singapore

In applying the SDA, we must localise the models with Singapore-specific and sector-specific data input. To this purpose, we draw on the public-access and credible datasets at the highest resolution available.

Data Hierarchy

Government-sourced datasets (i.e. from the Department of Statistics, contributing agencies and publications on national strategy) are preferred over data collated by NGOs or thinktanks. Time series data is preferred over single-year snapshot data quoted in documents. Where able, we have also cross-compared data presented in different publications (e.g. energy and emissions from Singapore's National Communications and associated reporting to the UNFCCC) to ensure robustness. For forward projections on economic and sector activity, at the macro-level we use GDP projections in line with government planning norms. Where this is not available (such as for the 2030–2050 window), we take reference from regional growth projections consistent with global scenarios.

Sector-specific projections are discussed in the following sections.

Electricity generation sector

Activity. This is expressed in terms of megawatt-hours (MWh) generated. The strong positive correlation between GDP (as a proxy for economic activity) and electricity demand is well-documented across world economies, and also holds true for Singapore. Although energy efficiency measures have decreased the slope of consumption relative to activity, the correlation coefficient is approx. 0.99. We may therefore model future electricity consumption for Singapore based on GDP projection estimates up to 2050.

Emissions Intensity. The carbon intensity of Singapore's electricity generation is directly related to its fuel mix for energy generation, which is currently dominated by the use of natural gas. Historically, since liberalisation of the energy market in the late 1990s, natural gas has grown in usage driven purely by market forces and has equilibrated to account for ~80-90% of electricity generation. This has been incorporated into models.

Downstream implications. Electricity is a source of secondary emissions in the Buildings and Transport sectors, and the emissions intensity from has been held consistent in these end-use sectors.

[4] The SDA method was developed by a partnership comprising CDP, WRI & WWF under the Science Based Targets initiative, with technical support from Ecofys.
[5] Energy-Emissions models and Integrated Assessment Models.

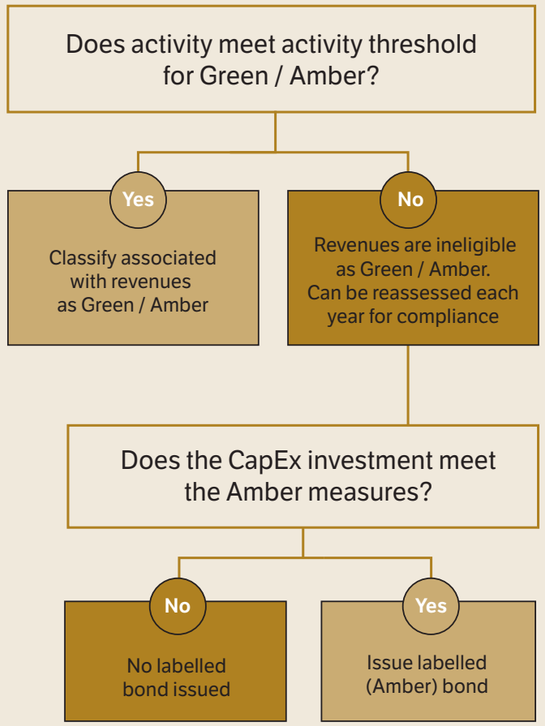
Appendix I

User guidance for Amber measures

The Taxonomy proposes different criteria for use of proceeds (Amber measures) and for revenue (Amber activities). These are potentially eligible for Amber category within sustainable finance (noting that some international investors may choose not to invest in Amber) for a sustainable bond.

However, revenues generated from the activity will not be eligible as Amber activities under any disclosure guidelines/requirements until they meet the Amber thresholds.

This will work as follows:



Appendix J

Overview of hard-to-abate sectors — decarbonisation pathways

Table 20 — Decarbonisation pathways for selected sectors

Sector	Decarbonisation pathway	
Manufacture of iron and steel (2026 edition)	The decarbonisation pathway referenced in the Taxonomy's technical screening criteria is based on the International Energy Agency (IEA) Iron and Steel Technology Roadmap. It represents an intermediate trajectory between the IEA Sustainable Development Scenario (IEA SDS) and Net Zero Emissions by 2050 Scenario (IEA NZE). The pathway has been adapted to assess Scope 1 direct emissions only.	
Manufacture of basic chemicals	Hydrogen	There are numerous end-to-end hydrogen production pathways, however they are tailored to energy source, conversion technology, transport method selected. Thus, is preferable to develop pathway agnostic carbon emission benchmarks. Climate Bonds has presented the projection of decreasing threshold values performed to ensure that assets and activities are aligned to a transition pathway that contributes to the 1.5˚C target. These benchmarks have 2030, 2040, and 2050 targets that get stricter over time to offer guidance to investors and industry on how emissions should reduce in upcoming decades. Hydrogen production carbon intensity benchmarks can be met by different energy sources and technology options, as has been verified using carbon intensity values estimated by MIT Energy Initiative's SESAME platform.
	Chlorine	2030 threshold was established based on an updated value proposed in a European Union study[6] 2040 and 2050 – thresholds have been designed as qualitative requirements to ensure the process delivers low-carbon chlorine by using renewable power, given that the main source of emissions in the Chlorine process come from indirect emissions due to the electricity usage
	Other basic chemicals	The determination of the carbon emission thresholds in these criteria was done based on the alignment to a 1.5˚C decarbonisation pathway for the entire chemical sector recently published by Teske et al. (2022)[7] With the reduction rates from Teske et al.'s pathway and taking as basis the thresholds for 2022, the thresholds were extrapolated to 2019 first using the 4.7% annual reduction to have the 2019 base value, afterwards, the aforementioned reduction rates were applied to calculate the 2030, 2040 and 2050 thresholds.
Manufacture of cement	The SBTi Cement sector guidance[8] was chosen as the most suitable for cement company pathways. It is 1.5˚C-aligned, being based on a Sectoral Decarbonisation Approach (SDA) reflecting robust IEA modelling of sector-specific carbon budgets, taking into consideration the cost of decarbonising each sector	
Manufacture of hydrogen	There are numerous end-to-end hydrogen production pathways, however they are tailored to energy source, conversion technology, transport method selected. Thus, is preferable to develop pathway-agnostic carbon emissions benchmarks. Climate Bonds has presented the projection of decreasing threshold values performed to ensure that assets and activities are aligned to a transition pathway that contributes to the 1.5˚C target. These benchmarks have 2030, 2040 and 2050 targets that get stricter over time to offer guidance to investors and industry on how emissions should reduce in upcoming decades. Hydrogen-production carbon intensity benchmarks can be met by different energy sources and technology options, as has been verified using carbon intensity values estimated by MIT Energy Initiative's SESAME platform.	

[6] EU (2021). Support study for the preparation of energy efficiency benchmarks in the context of the Revised ETS State Aid Guidelines. https://ec.europa.eu/competition-policy/system/files/2021-11/kd0121322enn_ETS_efficiency_benchmarks.pdf
[7] Teske, S., Niklas, S., Talwar, S. et al. 1.5°C pathways for the Global Industry Classification (GICS) sectors chemicals, aluminium, and steel. SN Appl. Sci. 4, 125 (2022). https://doi.org/10.1007/s42452-022-05004-0
[8] https://sciencebasedtargets.org/resources/files/Cement-guidance-public-consultation.pdf

Appendix K
Specific measures for chemical production

Table 21 — Criteria for eligible decarbonisation measures or retrofitting activities

Area	Eligible measure (Note that measures are eligible on their own)	Description
Various		
Energy efficiency measures	Revamps, modifications or acquisition of equipment (boilers, furnaces, reactors, heat exchanger, distillation columns and other separation units, etc.)	At least a 30% improvement in energy efficiency.
Switching to low carbon process technologies	Revamps, modification and acquisition of equipment and other infrastructure needed for the implementation and operation of low-carbon process technologies.	The alternative processes technology does not release direct process CO_2 emissions, e.g., methane pyrolysis, catalytic partial oxidation of methane to methanol.
Carbon Capture and Storage	Infrastructure related to CO_2 capture of emissions from the basic chemicals production, transportation and storage	• The minimum capture rate from process and energy emission streams should be 90% or emissions reduction at the facility level have to be at least of 50%. • The CO_2 will be transported and stored in line with the Taxonomy criteria (Green category)
Relating to feedstock used		
Switch to hydrogen as a feedstock	Infrastructure for production of basic chemicals using hydrogen Or Refurbishment and retrofitting of facilities to use hydrogen Or Acquisition of equipment to produce basic chemicals using hydrogen	Starting from 2030, the hydrogen to be used meets the Taxonomy criteria for hydrogen production (Green category)
Using biomass as a feedstock	Biomass used complies with the criteria applicable for biomass sourcing set out in the Taxonomy Bio-energy criteria (Green category) Infrastructure for production using biomass Or Refurbishment and retrofitting of facilities to use biomass Or Acquisition of equipment to produce basic chemicals using biomass	
Using CO_2 as a feedstock	Infrastructure for production using CO_2 as a feedstock Or Refurbishment and retrofitting of facilities to use CO_2 as a feedstock Or Acquisition of equipment to produce basic chemicals using CO_2 as a feedstock	1. The source of CO_2 sources is either: • Direct emissions from chemical production; Or • Direct emissions from other industrial activities 2. The basic chemical produced is used for the manufacture of durable products (e.g. construction materials stored in buildings, or recyclable products e.g. PET). 3. If the basic chemical produced is used for products that release the CO_2 immediately when the products are used (such as in urea, carbonated beverages, or fuels), the capital investment is not eligible. 4. CO_2 is not used for enhanced oil recovery, and the production of other forms of fossil energy
Use of recycled material as feedstock (e.g. using olefins recovered from plastics chemical recycling processes)	Infrastructure for the production using recycled feedstock Or Refurbishment and retrofitting of facilities using recycled feedstock Or Acquisition of equipment to produce basic chemicals using recycled feedstock	Recycled material should: a) represent at least 20% of the feedstock in regions without local recycling regulations or with lower recycled content requirements. b) represent more than 20% of the feedstock in regions with local recycling regulations. If the region has a higher recycled content percentage, it should prevail. c) have lower cradle-to-gate emissions than the virgin material.
Relating to energy used		
Electrification of the processes	Revamps, modifications and acquisition of equipment (furnaces, reactors, separators, etc.) and other infrastructure necessary for electrification of the processes	Electricity must be low-carbon and comply with the most up to date Taxonomy criteria for electricity grids (Green category)
Heat supplied from geothermal, solar thermal or waste heat recovery systems	New heat exchange equipment, such as evaporators, furnaces, boilers, etc., Or Revamps or modifications to heating related equipment in existing process	Heat supply complies with the most up to date Taxonomy criteria for the relevant source of energy (Green category)
Using hydrogen as an energy source	Revamps or modifications to equipment (boilers, furnaces, burners, etc.) in existing utilities system required for the use of hydrogen as fuel Or Infrastructure for the production of a basic chemical in scope using hydrogen as an energy source	Starting from 2030, the hydrogen to be used meets the Taxonomy criteria for hydrogen production (Green category)
Using biomass as an energy source	Revamps or modifications to equipment (boilers, furnaces, burners, etc.) in existing utilities system required for the use of biomass as fuel Or Infrastructure for the production of a basic chemical in scope using biomass as an energy source	The bio-energy complies with the Taxonomy Bio-energy criteria (Green category) Only secondary organic streams are eligible. Wood and other dedicated crops are not eligible.

Appendix L
Cement: Additional methodology and tables

The facility is eligible if its emissions intensity, adjusted using the relevant correction factor (Table 23), is lower than the relevant facility-level emissions intensity threshold (Table 22).

Table 22 — Threshold values forming the emissions pathway for all cement production facilities

Year	Carbon intensity (tCO_2/t cementitious product)	Year	Carbon intensity (tCO_2/t cementitious product)	Year	Carbon intensity (tCO_2/t cementitious product)	Year	Carbon intensity (tCO_2/t cementitious product)
2022	0.448	2029	0.374	2036	0.253	2043	0.125
2023	0.437	2030	0.363	2037	0.234	2044	0.107
2024	0.427	2031	0.345	2038	0.216	2045	0.089
2025	0.416	2032	0.326	2039	0.197	2046	0.071
2026	0.406	2033	0.308	2040	0.179	2047	0.054
2027	0.395	2034	0.289	2041	0.161	2048	0.036
2028	0.384	2035	0.271	2042	0.143	2049	0.018
						2050	0

Table 23 — Correction factors to determine the carbon intensity of the production

Cement class	Expected emissions (tCO_2eq/t cementitious product)	Correction factor
32.5	0.550	1.18
42.5	0.649	1.00
52.5	0.748	0.87

Worked example 1 – One single cement grade produced on site

- A single facility produces cement of strength class 32.5 (correction factor of 1.18 per Table 23).
- The facility's emissions intensity is 0.416tCO_2/t cementitious product.
- The corrected emissions intensity is 0.491tCO_2/t cementitious product (0.416 × 1.18). This is the number compared to the pathway thresholds

Worked example 2 – Multiple cement grades produced on site

- A single facility produces several cement products of varying strength grades. In an example year, it produces 4,000 tonnes of 42.5 cement, and 6,000 tonnes of 52.5 cement.
- The weighted average grade is: ((42.5 × 4,000) + (52.5 × 6,000)) / (4,000 + 10,000) = 48.5

  48.5 is not an industry standard grade but is simply for the purposes of working out the expected emissions using the above linear relationship between cement class and emissions.
- This linear relationship above assumes that for every increase in cement grade (megapascals) by 1, emissions increase by 0.099 tCO_2/t cementitious product.
- The expected emissions of a 48.5 cement is: (48.5 - 42.5) × 9.9 = 0.708tCO_2/t cementitious product.
- The conversion factor is 0.649/0.708 = 0.92
- The facility's emissions intensity is 0.416tCO_2/t cementitious product.
- The corrected emissions intensity is 0.383tCO_2/t cement (0.416 × 0.92)

Appendix M
Cross-cutting criteria for iron and steel

Table 24 — Cross-cutting criteria

Eligible assets	Facility-specific mitigation criteria
Fossil gas	Using fossil gas both as reducing agent and for energy generation, is only eligible for existing facilities prior to 2030. To qualify after 2030 such facilities would have to use fossil gas combined with CCUS measures that meet the Taxonomy criteria for CCS and: ○ Utilisation of direct CO_2 emissions from steel production is used for the manufacture of durable products and does not lead to enhanced oil recovery and the production of other forms of fossil energy sources. 1. Projects using fossil gas (even if) combined with CCUS should demonstrate that on-site activities: MRV (monitoring, reporting and verification), and mitigation measures for methane leaks as per the best practice recommended.[9] Any venting or burning within the limits of the steel plant shall be avoided, except in emergency situations, in such case it shall be reported and accounted in the GHG assessment. 2. Projects using fossil gas (even if) combined with CCUS should demonstrate that upstream activities: provide evidence of having in place MRV (monitoring, reporting and verification), and mitigation measures for methane leaks as per the best practice recommended.[10]
Coal	Using coal both as reducing agent and fuel in the steelmaking process, is only eligible for existing facilities prior to 2030. After 2030, facilities would have to use coal combined with CCUS measures that meet the Taxonomy criteria for CCS and utilisation of direct CO_2 emissions from steel production is used for the manufacture of durable products and does not lead to enhanced oil recovery and the production of other forms of fossil energy sources. Projects using coal should demonstrate: 3. Upstream activities: provide evidence of having in place MRV (monitoring, reporting and verification), and mitigation measures for methane leaks as per the best practice recommended.[11]
Biomass	Facilities using biomass as a reducing agent are only eligible if they use the following sources of biomass (NB dedicated crops are not eligible): • Agricultural residues: feedstocks need to be certified under approved best practice standards.[12] • Plantation wood: the wood plantation shall demonstrate to meet the requirements set out for “plantation forestry” of the Climate Bonds Forestry Criteria.[13] And Facilities using biomass as fuel are only eligible if they use secondary organic streams. Wood and other dedicated crops are not eligible. The production of the biofuel must be demonstrated to meet the Taxonomy criteria for biofuels.
CCS/CCUS	Facilities using CCUS are only eligible if the CCS meets Taxonomy criteria for CCS and utilisation of direct CO_2 emissions from steel production is used for the manufacture of durable products (e.g. construction materials stored in buildings, or recyclable products e.g. PET). CO_2 should not be used for products that release the CO_2 immediately when these are used (such as in urea, carbonated beverages, or fuels), nor for enhanced oil recovery, and the production of other forms of fossil energy sources.

[9] Best practice can be found in the report: Best Practice Guidance for Effective Methane Management in the Oil and Gas Sector. Monitoring, Reporting and Verification (MRV) and Mitigation. United Nations Economic Commission for Europe. 2019 https://unece.org/fileadmin/DAM/energy/images/CMM/CMM_CE/Best_Practice_Guidance_for_Effective_Methane_Management_in_the_Oil_and_Gas_Sector__Monitoring__Reporting_and_Verification__MRV__and_Mitigation-_FINAL__with_covers_.pdf
[10] ibid
[11] ibid

[12] Feedstocks used are certified under one of the following, pre-approved best practice standards: RSB; RTRS; FSC; ISCC, ISCC Plus; Climate Bonds Agriculture Criteria. Alternatively, please see Climate Bonds Bioenergy criteria 3.3.2. Requirement 2: Feedstocks certified under approved best practice standards, Option B https://www.climatebonds.net/files/files/Bioenergy%20Criteria%20Document%20Aug%202022.pdf
[13] https://www.climatebonds.net/files/files/standards/Forestry/Crit%20Forestry%20Criteria%20document_July%202020.pdf
[14] ISO standards available at: www.iso.org/standard/38498.html; www.iso.org/standard/37456.html



Appendix N

Hydrogen: Additional information

Methodological notes for Lifecycle Assessment (LCA)

1 — The lifecycle assessment should follow the latest releases of ISO std (ISO 14040, ISO 14044 for lifecycle assessment, and ISO 14067 for product carbon footprint). The Recommendation 2013/179/EU will be acceptable for assets located in the EU. Results should be verified by an independent third party.

2 — GHG emissions must be estimated for a purity of 99.9% vol, and a gauge pressure of at least 3MPa using correction factors. For pressures higher than 3MPa, additional energy compression emissions must be included as well.

3 — The methodology factor in a Global Warming Potential for a period of 100 years (GWP100) for methane should be 30.[15]

4 — GHG emissions accounting:

E total = E1+E2+E3+E4+E5-E6+E7+E8

E total: Total emissions

E1: Upstream feedstock related emissions (including sourcing , processing, transport and storage)

E2: Upstream energy related emissions (including sourcing, processing, transport and storage)

E3: Fugitive emissions (Including hydrogen emissions)

E4: Process emissions

E5: CCS emissions related to energy consumption and leakages

E6: Carbon emissions captured

E7: Compression and purification emission (Energy required to compress and purify hydrogen)

E8: Transportation emissions to the site where hydrogen will be used (energy and electricity related emissions, and fugitive emissions during transportation)

Additional Guidance for different production pathways up to the point of production[18]:

The International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE) methodology working paper contains guidelines to a calculation method for GHG accounting for the following production pathways up to the point of production[19]:

1— Steam Methane Reforming combined with CCS: **Appendix P1 of IPHE working document**

2 — Biomass as a feedstock combined with CCS: **Appendix P5 of IPHE working document**

3 — Manure-based production: **P5.4** Bio-digestion

4 — Land fill gas-based production: **P5.4** Bio-digestion

5 — Biomass from secondary sources: **P.5.5** Biomass gasification.

6 — The IPHE working document also has guidelines for emission sources and allocation for biomass-based production:

1 – Emissions sources in Biomass-Based Hydrogen Routes/CCS: **Appendix P.5.6**

2 – Allocation for the Biomass/CCS pathway: **Appendix P.5.7**

[15] Sixth Assessment Report — IPCC
[16] Depending on the feedstock, it can be extraction, cultivation, or collection
[17] Transportation infrastructure emissions are not included
[18] The IPHE methodology will develop guidelines for transport emissions accounting in the coming months.
[19] www.iphe.net/_files/ugd/45185a_6159cefcd88f4d9283ab0e60f4802cb4.pdf

Table 25 — Eligible measures for Hydrogen

Area	Activity	Mitigation criteria
Various		
Carbon Capture and Storage	Infrastructure related to CO_2 capture of emissions from the hydrogen production, transportation, and storage	1. The minimum capture rate from process and energy emission streams should be 90% or emissions reduction at the facility level have to be at least of 50%.[20] (Note: Capture rate is not equivalent to emissions reduction at the facility level given that the latter may depend on multiple emission sources) 2. Issuers must present a quantitative performance report of the CCS operations, including the following information[21]: 1. Intended capture rate capacity, maximum capture rate capacity, annual capture of CO_2, annual transport of CO_2, annual storage of CO_2. 2. Issuers must demonstrate MRV (monitoring, reporting and verification), and mitigation measures for methane leaks on site and upstream. 3. There is evidence[24] that demonstrates the CO_2 will be suitably transported and stored in line with the Taxonomy criteria for CCS.
Carbon Capture and Utilisation	Infrastructure related to capture, transportation, and utilisation of CO_2 emissions from the hydrogen production.	1. The minimum capture rate from process and energy emission streams should be 90% or emissions reduction at the facility level have to be at least of 50%.[25] 2. Issuers must present a quantitative performance report of the CCS operations, including the following information[26]: 3. Intended capture rate capacity, maximum capture rate capacity, annual capture of CO_2, annual transport of CO_2, annual utilisation of CO_2. 4. Issuers must demonstrate MRV (monitoring, reporting and verification), and mitigation measures for methane leaks on site and upstream[27]. 5. There is evidence[28] that demonstrates the CO_2 will be suitably transported in line with the Taxonomy criteria for CCS. Utilisation 6. CO_2 must be used for the manufacture of durable products (e.g. construction materials stored in buildings, or recyclable products that will not be incinerated as a final disposal alternative). 7. CO_2 should not be used for products that release the CO_2 immediately when the products are used (such as in urea, carbonated beverages, or fuels) 8. CO_2 is not used for enhanced oil recovery, and the production of other forms of fossil energy sources.
Electrification of processes	Revamps, modifications and acquisition of equipment and other infrastructure necessary for electrification of the processes	Automatically eligible

[20] A minimum capture rate must be demonstrated only for specific investments on CCS or CCU infrastructure. Entire facilities that have CCS embedded do need to meet this requirement if the facility meet the carbon intensity benchmark in Table 8
[21] CCS performance report must be verified by an independent party
[22] Zhang et al, 2021. https://pubs.acs.org/doi/pdf/10.1021/acs.estlett.2c00296
[23] Additional guidance can be found in the report Best Practice Guidance for Effective Methane Management in the Oil and Gas Sector. Monitoring, Reporting and Verification (MRV) and Mitigation. United Nations Economic Commission for Europe. 2019 https://unece.org/fileadmin/DAM/energy/images/CMM/CMM_CE/Best_Practice_Guidance_for_Effective_Methane_Management_in_the_Oil_and_Gas_Sector__Monitoring__Reporting_and_Verification__MRV__and_Mitigation-_FINAL__with_covers_.pdf
[24] Either directly from the facility or through contracts or agreements with a third party
[25] A minimum capture rate must be demonstrated only for specific investments on CCS or CCU infrastructure. Entire facilities that have CCS embedded do need to meet this requirement if the facility meet the carbon intensity benchmark in Table 14
[26] CCS performance report must be verified by an independent party
[27] www.dnv.com/news/dnv-gl-launches-certification-framework-and-recommended-practice-for-carbon-capture-and-storage-ccs--108096 Monitoring alternatives include satellite-based or drone-based measurement. Additional guidance can be found in the report Best Practice Guidance for Effective Methane Management in the Oil and Gas Sector. Monitoring, Reporting and Verification (MRV) and Mitigation. United Nations Economic Commission for Europe. 2019 https://unece.org/fileadmin/DAM/energy/images/CMM/CMM_CE/Best_Practice_Guidance_for_Effective_Methane_Management_in_the_Oil_and_Gas_Sector__Monitoring__Reporting_and_Verification__MRV__and_Mitigation-_FINAL__with_covers_.pdf
[28] Either directly from the facility or through contracts or agreements with a third party

Area	Activity	Mitigation criteria
Relating to feedstock used		
Using biomass as a feedstock	Infrastructure to produce hydrogen using biomass. Refurbishment and retrofitting of facilities to use biomass Acquisition of equipment to produce hydrogen using biomass	The biomass used complies with the criteria applicable for biomass sourcing set out in the Taxonomy criteria for bioenergy. Only secondary organic streams are eligible. Wood and other dedicated crops are not eligible.
Using manure-biomethane	Infrastructure to produce hydrogen using landfill gas Refurbishment and retrofitting of facilities using landfill gas as a feedstock Acquisition of equipment to produce hydrogen using landfill as a feedstock	Issuers must demonstrate MRV (monitoring, reporting and verification), and mitigation measures for methane leakages on site and upstream . Landfill gas complies with the Taxonomy criteria for waste management for landfill gas recovery.

Area	Activity	Mitigation criteria
Relating to electricity source		
Using Wind, solar, hydro, geothermal energy-based electricity	Infrastructure to produce hydrogen using renewable energy sources Refurbishment and retrofitting of facilities using renewable energy sources Acquisition of equipment to produce electrolytic hydrogen using renewable energy sources	Renewable energy produced on site must comply with the most up to date Taxonomy criteria for the relevant source of energy. Issuers must demonstrate the use of only additional renewable electricity. To do that, issuers can implement the following options: 1. Renewable-based captive power generation, or 2. A power purchase agreement demonstrating a commercial link of the electrolyser with new renewable power capacity; or 3. Excess of renewable-based electricity that would have been otherwise curtailed. Further, temporal and geographical correlation between the additional renewable electricity generation and the electrolyser electricity consumption must be demonstrated. 1. Temporal correlation: Issuers must demonstrate that the electricity is produced and used simultaneously, on a monthly basis, using telemetry measurement techniques. Renewable electricity that has been locally stored can be used as well. 2. Geographic correlation: Issuers must demonstrate physical capacity to transport the electricity from the renewable generation plant to the electricity consumption site. The electricity must not pass a zone of grid congestion.
Using low-carbon electricity	Infrastructure for the production of hydrogen using electricity from the grid.	The carbon intensity of the electricity grid must ensure that the production process is in compliance with the total carbon intensity benchmark in Table 14.

Appendix O

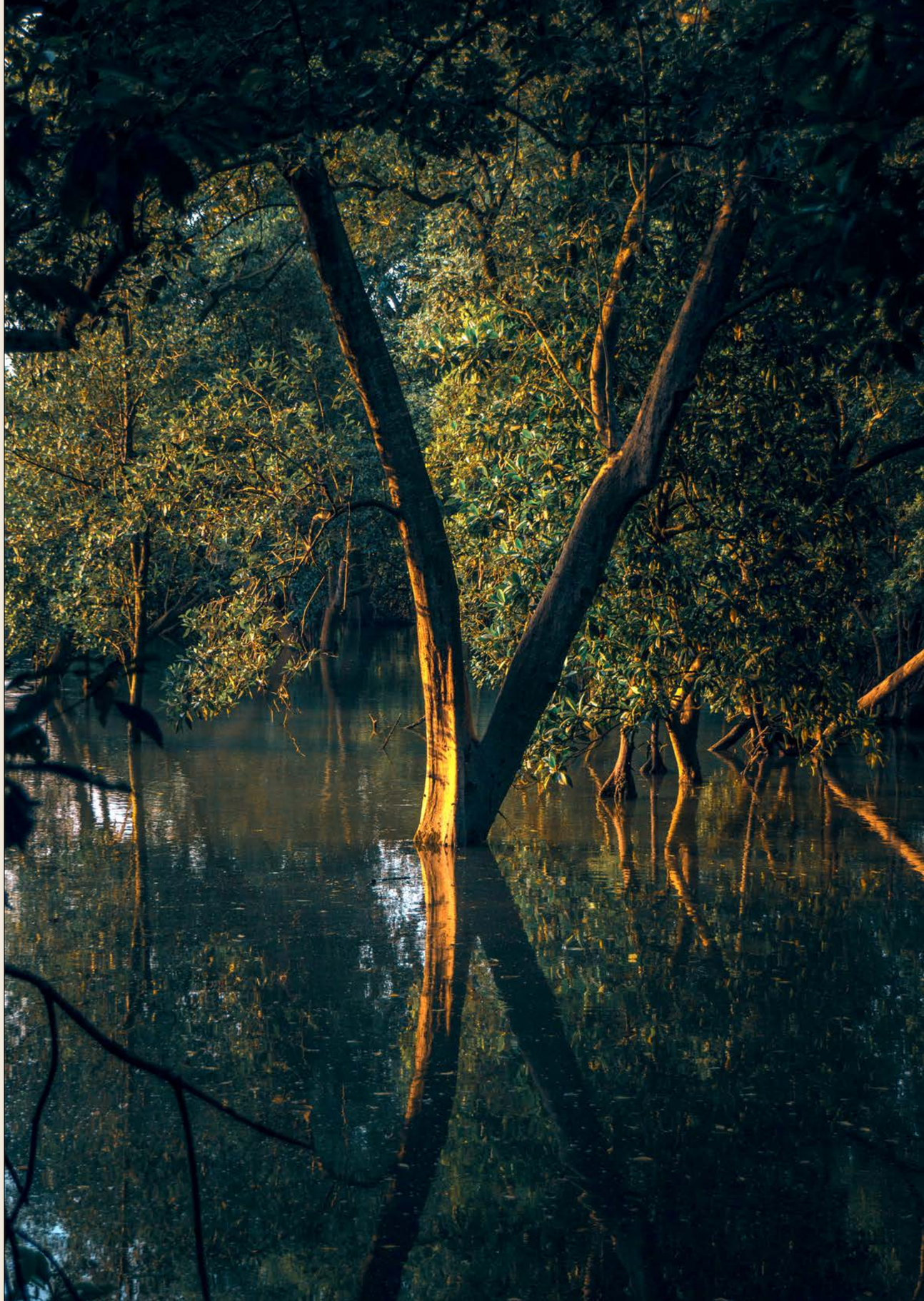
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Appendix P
Criteria for the early and managed phase-out of coal-fired power plants

Context

IEA's 2021 report indicated that, to be aligned with a 1.5˚C scenario, about 100GW of coal-fired plants need to be phased out during 2021-2030, from both developed and emerging economies.[29]

For coal to green transition the challenge is dual: the focus is not just on scaling-up already zero-emission solutions, but also on how to quickly phase out coal. To date, this phase-out thinking is absent in the green finance discussions despite the vital role it has to play in reducing global emissions.

More countries commit to coal phase-out: at COP26, more than 40 economies from both developed and developing countries and more recently, according to Powering Past Coal Alliance, nearly 50 governments pledged to phase out coal; however, not all are fully aligned with the IEA Net Zero Emissions by 2050 Scenario, where all OECD countries need to phase out coal by 2030, and the rest of the world by 2040.

...but the phase-out ambition level is often questionable: in many instances, coal retirement pledges refer to plants that operate at or near the end of their full life span, those already sitting idle or long overdue for decommissioning. The challenge is to align the ambition of the 1.5°C objective with an actionable strategy required to fast-track the decommissioning and retirement of the plants that still have a long remaining operational lifetime and remain economically competitive, which could be due to lock in of long-term contracts.

Innovative climate finance tools, often labelled coal transition mechanisms (CTMs), could help to accelerate the coal to green transition: these would allow investors to wind down coal assets and their obligations, whilst placing climate change mitigation and just transition objectives at the heart of the solution.

The demand for CTMs is increasing: CTMs have gained momentum in key coal markets, ranging from securitization transactions in the U.S. to comprehensive coal transition packages such as the Just Energy Transition Partnerships that have been launched and implemented in South Africa, Indonesia and Vietnam for now. However, these mechanisms are still in the early stages of design; credibility and wide acceptance have yet been established by many financial institutions, agencies, and key stakeholders. There is a need for clear guidance on the credible use of climate finance to support the coal transition in the power sector to build confidence and enable the scalability of these tools.

Nevertheless, there is no 1.5˚C-aligned, science-based classification system that is currently available to define investments eligible as climate finance under coal transition schemes. While green finance classification systems have provided some clarity in other areas, few of the already developed taxonomies or frameworks offer a robust approach towards the coal transition process. In particular, better guidance is required on what acceptable ambition levels for transition of coal assets would be and how to commit

[29] World energy outlook 2021, IEA (2021)

to them. Even more rarely addressed is the issue of Just Transition, following the UNFCCC's definition, understood as transition that enables "transformation of the economy and economic system in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind".[30]

The global effort to incorporate transition dimension into taxonomies and frameworks does not yet entirely account for assets, such as coal power plants, that pose significant harm to climate objectives, or address the phase-out process. Importantly, in its recent report,[31] the EU Platform on Sustainable Finance explicitly recommends developing technical screening criteria for potential decommissioning/closure of assets that do not have technological possibility of transitioning away from significantly harmful performance levels.[32] Similarly, GFANZ recommends development of criteria for credible coal phaseout.[33]

High-level guidance is not sufficient: existing guidelines on what the credible early coal phase-out means (developed by e.g. GFANZ, Sierra Club) offer only high-level principles. However, the history of development of sustainable investment eligibility criteria has been away from broad-based guidance towards more stringent thresholds due to persistent concerns around greenwashing and usability. Framework[34] outlined in the recent paper by Climate Bonds Initiative, Climate Policy Initiative and RMI begins to address these issues by recommending robust and stringent criteria and initial methodology for the assessment of the CTM's credibility.

Mainstreaming climate finance for coal transition requires detailed evaluation criteria: lack of specific, universal criteria and thresholds associated with each of the activities means that 1.5°C-aligned coal-transition activities will have to be defined independently for each transition process. This increases operational costs, as financial institutions may not have the time and resource to evaluate projects form a wide variance nor use the effect of scale throughout the process to prevent greenwashing claims.

- Credible standards will help market uptake: to increase usability of coal transition debt vehicles it is necessary to identify robust set of criteria that will ensure investments are aligned with a 1.5°C-aligned transition pathway. These need to be:

- Granular: to the extent possible needed to provide detailed information on what is eligible as 'aligned with science-based, 1.5°C-algined targets'. This reduces the need for interpretation and therefore avoid greenwashing.

- Publicly available: they are available publicly and are not based on proprietary methodologies. They can be broadly understood, commonly accepted, and used across by a variety of different users.

- Science-based: to ensure credibility, the criteria have to be based on science as far as possible rather than purely on national priorities or opinions if these are not science-based.

- Future-proof: in a climate context, science-based means criteria are focused on investments that are in line with the pathway that allows for limiting global warming to 1.5°C above the pre-industrial levels.

- Just and inclusive: to the extent possible need to incorporate solutions ensuring a Just Transition

[30] Implementation of just transition and economic diversification strategies: a compilation of best practices from different countries, UNFCCC (2023)
[31] Final Report on Taxonomy extension options supporting a sustainable transition, EU Platform on Sustainable Finance (2022)
[32] Recommendation 10. The Platform recommends developing technical screening criteria for potential 'decommissioning/closure of...' Article 19 (3)-type activities, as well as for other activities for which no technological possibility of improving their environmental performance to avoid significant harm exists. It should be noted that whilst respecting The Polluter Pays Principle, it may be possible to add 'decommissioning of...' in the next Delegated Act, similar to activities such as 'renovation of...' or 'Renewal of...'. This would provide technical clarity on this topic, albeit indirectly, and could incentivise access to green finance for these activities without changing the Taxonomy Regulation
[33] The Managed Phaseout of High-emitting Assets: How to facilitate the early retirement of high-emitting assets as part of a Just Transition to a net-zero world, GFANZ (2022)
[34] Guidelines for financing a credible coal transition: A framework for assessing the climate and social outcomes of coal transition mechanisms, CPI, CPI, and RMI (2022)

Requirements of the hybrid approach

Following the approach devised by the Guidelines for financing a credible coal transition: A framework for assessing the climate and social outcomes of coal transition mechanisms, to determine the substantial contribution of a phase-out activity to climate change mitigation objective, it is necessary for criteria to address the following questions:

- Coal plant eligibility/coal asset identification: Is it credible, from climate perspective, to provide transition finance for the given coal plant?
- Coal transition pathways: Does the coal transition pathway proposed by the phase-out process support 1.5°C goals?
- Social protection: Does the transaction include a strategy, plan and provisions to support a just transition? Is the phase-out activity aligned to the Just Transition principles which will address social consequences and look to provide new economic opportunities for affected communities and stakeholders?

To answer these, it is necessary to devise facility level criteria to determine the level of ambition for the phase-out process, and on top of that, the entity and system level criteria that provide necessary safeguards to protect against perverse outcomes.

Assessment of the credibility of early coal phase-out requires tools that go beyond the scope of taxonomies. While taxonomies are tools that determine sustainability of individual economic activities, it is the transition plans allow for verification of a credible, 1.5°C-aligned transformation of the entity. Therefore, using the Taxonomy and its traffic lights labelling system would not be sufficient, to comprehensively evaluate the credibility of the early coal phase-out process. Guidance on what constitutes credible coal phase-out calls for a hybrid approach to marry these two perspectives.

The criteria for early coal phase-out complement the Taxonomy's effort to develop a credible approach what constitutes a transition finance. While the Amber category defined for the Taxonomy focuses on the "transition within" concept (activities that will be required beyond 2050 but will require extensive decarbonisation to be aligned with net-zero), the early coal phase-out criteria aim to operationalise "transition away" approach (managing and fast-tracking the decline of emissions-intensive economic activities for which there is an alternative).

Therefore, early coal phase-out will not be classified using the traffic light system of the Taxonomy but will instead be considered separately under the Taxonomy. Investments towards early coal phase will be eligible as transition finance.

Importantly, the main objective of these criteria is to support early coal phase-out deals under existing or planned CTMs by providing guidelines that help to ensure their credibility from the perspective of 1.5°C-oriented transition to decarbonised economy. While we acknowledge that there might be climate benefits from the phase-out of coal-fired power plants that might not be entirely compliant with the proposed 1.5°C-aligned criteria, at this point in time, these fall outside of the scope of this document.

CTMs and frameworks governing early coal phase-out processes are in the nascent stage of development. Acknowledging limitations of the proposed criteria, the document will need to be revised on a regular basis as more bodies of work become available. Proposed facility and entity level criteria are thus to be valid for a limited period of time – until 2027. After 2027, a new, revised criteria accounting for new developments in the field should replace the current document. Early coal phase-out criteria will be phased-out by 2035. Beyond 2030 they will be applicable only for the early phase-out of CFPPs in emerging economies.

Box 1. Estimating fair value of the coal plant and emissions savings

While comprehensive guidance on the methodologies for estimating fair value of the coal plant (a.ii) and positive absolute emissions savings (a.iii) would offer stakeholders greater clarity on how to ensure alignment with the criteria, both of these requirements are context specific and often still, at this nascent stage of CTM development, require a case by case evaluation, making it difficult to offer top down criteria. Thus, it is advised for CTM frameworks that are tailored to local specificities to offer detailed guidelines on which methodologies stakeholders are expected to use and how to use them. Such guidelines should be aligned with the criteria entailed in this document.

"Measuring the fair value of coal assets can be complex. Fair value assessments often incorporate current and future market and regulatory conditions, which can be subject to volatility and speculation. As a result, fair value assessments can be inherently subjective, and each valuation approach brings specific miscalculation risks. Given the benefits and misevaluation risks of different approaches, the appropriate fair value methodology will depend on market and ownership structures, and the quality and availability of financial reporting data."

"Quantitative emissions savings methodologies are an important area for future work, particularly if CTM transactions will involve results-based carbon finance or generate carbon offsets. Coal plant owners and financial institutions may also wish to provide a quantitative estimate of emissions savings to lend greater transparency to the transaction. Future work could explore whether specific emissions savings thresholds would be appropriate to lend further credibility to transactions."

Source: Climate Bonds Initiative, Climate Policy Initiative and RMI (2022), Guidelines for financing a credible coal transition: A framework for assessing the climate and social outcomes of coal transition mechanisms.

Early coal phase-out criteria — the Hybrid approach[35]

The coal-fired power plant can be considered as aligned with this guidance and potentially suitable for a managed coal phase-out process, if it meets the following conditions:

1) all of the facility-level criteria, and
2) all of the entity-level criteria.

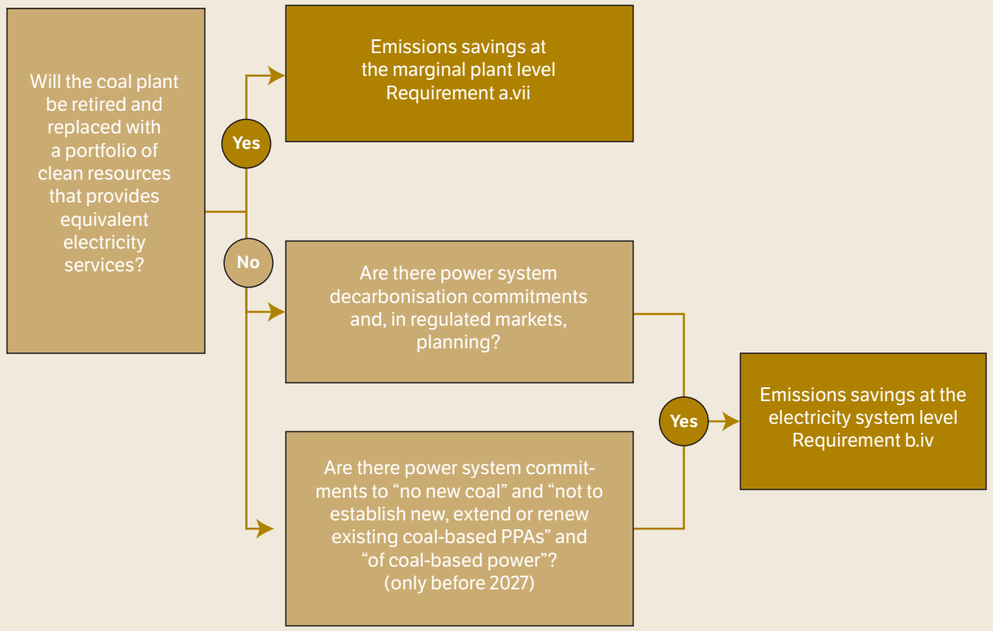
a. Facility-level criteria — the Taxonomy approach

The coal-fired power plant can be considered as aligned with the facility-level criteria if it meets all of the following requirements:

i. The financial close or final investment decision of the coal plant, understood as the point in time at which all the financing agreements have been signed, has been made prior to December 2021.
ii. The fair value of the coal plant is positive at the time of the proposed coal transition.[36] The fair value needs to be independently verified or acknowledged by internationally recognised bodies or programmes.
iii. The early coal phase-out results in positive absolute emissions savings over the expected total lifetime of the coal plant compared with a case without it. The emissions savings need to be independently verified or acknowledged by internationally recognised bodies or programmes.[37]
iv. The phase-out of unabated coal combustion at the coal plant is aligned with, or happens earlier than 1.5°C-aligned coal phase-out deadlines. In advanced economies, this means the coal plant retires at the latest by 2030, and in other countries by 2040, in line with the International Energy Agency's Net Zero pathway.[38] Should a country have a national coal phase-out target that is earlier, national targets should be adhered to instead.

[35] The following criteria have been based on and adapted from the working paper published by Climate Bonds Initiative, Climate Policy Initiative and RMI entitled: Guidelines for financing a credible coal transition: A framework for assessing the climate and social outcomes of coal transition mechanisms. Please refer to the paper for detailed rationale and main drivers and methodological discussion behind of each of below-listed requirements. In instances, where additional resources have been used, please refer to footnotes for more details.
[36] For the discussion on different methodologies for estimating fair value please see: Guidelines for financing a credible coal transition: A framework for assessing the climate and social outcomes of coal transition mechanisms
[37] For the discussion on different methodologies for estimating emissions saving please see: Guidelines for financing a credible coal transition: A framework for assessing the climate and social outcomes of coal transition mechanisms
[38] Location of the plant itself determines which phase-out date applies.

Figure 18 — Overview of requirements focused on coal plant's generation replacement.



v. Coal plant has to be retired at or before 25 years of operations at the latest.[39] Retirement has to comply with phase-out requirements in point a.iv. Earlier of the phase-out dates that result from the two criteria (a.iv and a.v) is binding.

vi. Investments made as part of the early coal phase-out process do not extend the expected lifetime for coal combustion[40]. Early coal phase-out has to lead to cessation of fossil fuel–based activities of a plant in line with the timeline specified in points iv and v.

vii. Coal plant's generation is replaced 1-for-1 with a portfolio of clean resources that provides equivalent electricity services within the electricity system[41] and:

1. Clean resources are defined as resources with a lifecycle emissions intensity of 100gCO_2e/kWh or less,
2. Clean resources have to meet Taxonomy criteria for Green category and DNSH criteria.
3. Replacement is based on historical dispatch — i.e. real utilisation of coal capacity based on historical data, rather than nameplate capacity,
4. Replacement resources could include new resources dispatched elsewhere on the local grid (e.g., clean generation or demand-side energy efficiency or battery storage that reduces the system's generation needs at a level equivalent to the coal plant's electricity provision) or retrofits of the original plant to run on a different type of energy source (e.g., renewable power or, where it meets the 100gCO_2e/kWh threshold, burning clean fuels),
5. It needs to be proved that replacement resources would be dispatched at a similar level as the retired generation (e.g., through an assessment of expected dispatch based on clearing prices in wholesale markets).

[39] World energy outlook 2021, IEA (2021)
[40] Refers to both abated and unabated coal combustion – all operations of the coal-fired power plant
[41] The replacement generation need not be developed by the existing coal plant owner but could be done through a partnership with another company or the government

If the requirement a.vii cannot be met (regardless of whether for reasons related to facility/entity plans or grid and energy system capacities and/or planning (e.g. overcapacity)) and the coal plant is retired and not replaced with a portfolio of clean resources that provides equivalent electricity services, then entity and system level requirement b. iv. has to be met. All other facility, entity and system level requirements have to be met.

viii. The coal plant, at a facility level as a minimum, has a just transition plan either as a separate document or as an element embedded into the Transition Plan (requirement b.iii) to mitigate impacts on key stakeholders including workers, electricity customers, and the local community. The just transition plan is designed in line with global best practices devised by internationally recognised bodies, organisations and initiatives,[42] based on the principles outlined in the Paris Agreement and by the International Labour Organisation's Guidelines[43] as well as local laws and regulations. Just transition plan should, inter alia, require the facility owner to:

1. Provide advance notice, of at least six months, or according to local laws and regulations whichever is earlier, of coal plant closure and communicate clear timelines for phase-out,
2. Engage in stakeholder consultations and dialogues,
3. Commit to conduct environmental and social impact assessments of the coal plant closure on its workers, direct supply chain workers, communities and ecosystem,[44]
4. Report on and develop plans to minimise adverse impacts on communities,
5. Develop a worker transition plan that would support relief and reskilling opportunities to affected workers,
6. Consider energy affordability and accessibility aspects of the early coal phase-out
7. Conduct remediation and reclamation.

b. Entity and system level criteria — the Transition Planning approach

The coal-fired power plant can be considered as aligned with the entity- and system-level criteria if it meets all of the following requirements:

Entity-level criteria:

Entity level criteria apply to all actors who have shares in the given coal plant, who are planning purchase of such shares or who had such shares, which they sold, but prior to the sale benefited in any extent from the early coal phase-out scheme. New owners of the coal plant, that is a beneficiary of the early coal phase-out process, need to be aligned with the entity-level criteria and commit to maintaining compliance of the facility with the facility-level criteria.

i. The coal plant owner has an entity-level commitment to no new abated and unabated coal power plant development or procurement globally, beyond their plants that have reached financial close or final investment decision by December 2021 (as per a.i.).
ii. The coal plant owner has an entity-level commitment not to establish new or extend existing fossil-fuel based Power Purchase Agreements beyond these that have been signed by December 2023.
iii. The entity has a Paris Agreement (PA)-aligned transition plan that follow the principles of transition finance outlined by International Platform on Sustainable Finance[45]. The transition plan needs to be independently verified or acknowledged by internationally

[42] Examples include: Assessing a Just Transition: Measuring the Decarbonization and Energy Transformation that Leaves No One Behind, World Benchmarking Alliance, February 2021, https://assets.worldbenchmarkingalliance.org/app/uploads/2021/02/Just-transition-Approach-ReportFebruary-2021.pdf.; and Nick Robins, Translating Just Transition Ambitions into Investor Action, Grantham Research Institute on Climate Change and the Environment, London School of Economics, September 2021, https://www.lse.ac.uk/granthaminstitute/wpcontent/uploads/2021/07/Translating-just-transition-ambitions-into-investor-action_POLICY-BRIEF_8_pages.pdf;
[43] Guidelines for a just transition towards environmentally sustainable economies and societies for all, ILO (2016)
[44] Integrated utilities could also be expected to assess and report on impacts to ratepayers, including any distributional or energy access impacts
[45] Transition Finance Report, International Platform on Sustainable Finance (2022)

recognised bodies or programmes. Acknowledging that this may pose to be a challenge for many of the entities that are in the transition process, it is not expected for the entities to be PA aligned today, but to develop a plan on how to be aligned with that target. The alignment needs to happen by 2030 at the latest.

Power-system-level criteria:

iv. If the coal plant is retired and not replaced with a portfolio of clean resources that provides equivalent electricity services (see facility-level requirement a.vii), at least one of the following requirements set at the power system level has to be met:

1. **Requirement 1**: 1.5°C-aligned, science-based power-sector-level decarbonisation commitments and plans at a national or sub-national level – with a boundary entailing the entire power system in which the entity operates[46]. While these commitments would not necessarily be expected to be fully aligned with 1.5°C to receive support from a CTM today, such a commitment would support a ratcheting process to achieve 1.5°C ambition over time and by 2030 the latest.

2. **Requirement 2**: Consists of the following set of power-system-level commitments that all have to be met to prove the alignment with criteria.

   Commitments will be at a national or sub-national level — with a boundary entailing the entire power system in which the entity operates.

   a. Commitment to no new abated and unabated coal power plant development or procurement globally, beyond the plants that have reached financial close or final investment decision by October 2023, and
   b. Commitment to not establish new or extend existing Power Purchase Agreements with power plants that do not meet Green criteria for the Taxonomy beyond these that have been signed by October 2023, and
   c. Commitment not to increase international imports of power beyond the levels recorded by October 2023, from grids that have energy intensity higher than existing grid.

Requirement 2 is only applicable until 2030 and will not be extended beyond the current version of criteria.

Detailed recommendations on how to ensure that the transactions related to early coal phase-out provide transparency and an accountability mechanism to climate and social outcomes can be found in the Guidelines for financing a credible coal transition: A framework for assessing the climate and social outcomes of coal transition mechanisms.

[46] For the discussion on the examples of how such demonstration of emissions savings could look please see: Guidelines for financing a credible coal transition: A framework for assessing the climate and social outcomes of coal transition mechanisms. CBI, CPI, and RMI (2022).

