
**Environmental performance
evaluation — Green debt
instruments —**

**Part 3:
Taxonomy**

*Évaluation de la performance environnementale — Titres de créance
verts —*

Partie 3: Taxinomie





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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 4, *Environmental performance evaluation*.

A list of all parts in the ISO 14030 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document provides a taxonomy of eligible projects, assets and supporting expenditures for use by issuers and originators of green debt instruments. Projects, assets and supporting expenditures included in this document are assumed to be eligible as long as any specific thresholds or criteria are met and any applicable exclusions are respected. The taxonomy addresses sector criteria, rationale for eligibility, potential environmental benefits and environmental performance indicators.

NOTE In this document, the wording “projects, assets and supporting expenditures” used together or individually has the same meanings and covers all projects, assets and supporting expenditures financed by a bond, a loan or other debt instrument.

The objective of the taxonomy is to identify projects, assets and supporting expenditures that contribute to one or more environmental objectives, while doing no significant harm (DNSH) to other environmental objectives. Issuers, borrowers or lenders are informed by:

- a) the taxonomy of eligible projects, assets and supporting expenditures that are anticipated to contribute to climate change mitigation, including guidance on DNSH assessments (see [Clause 5](#));
- b) guidance on climate change adaption by economic sector (see [Annex A](#));
- c) examples of thresholds and exclusions that may be applied to specific economic sectors (see [Annex B](#));
- d) guidance on other suitable taxonomies (see [Annex C](#)).

Users of this document can apply threshold values and exclusions identified in the taxonomy in [Annex B](#) or the taxonomy selected by the user (see ISO 14030-1:2021, 5.1, and ISO 14030-2:2021, 5.1). If a different taxonomy is used, threshold values are explained and justified.

Subclause [5.4](#) provides sector examples for the taxonomy nominated projects, assets and supporting expenditures.

This document encourages the mitigation and adaptation pathway forward to contribute to a low-carbon and resilient society. Economic activities can themselves contribute to environmental objectives or can enable other activities to contribute to environmental objectives.

Within the taxonomy, eligible investment categories and subcategories are either:

- economic activities that can be decarbonized or that support decarbonization; or
- projects, assets and supporting expenditures that can enable improved environmental performance in another economic activity and are performed to avert a substantial negative impact on the environment.

The taxonomy facilitates decision-making on what economic activities are sustainable, with the aim of helping investors to identify sustainable investment opportunities. It is intended that the green taxonomy presented in this document will serve as a holistic tool that captures all relevant environmental objectives. Although most requirements relate to climate mitigation or climate adaptation, this document addresses other environmental aspects, issues and objectives relevant to each included sector.

This document recognizes that all sectors must become more climate resilient to achieve adaptation objectives and avoid maladaptation. As a result, the adaptation approach is a set of guiding principles and qualitative screening criteria which can be applied in any sector. However, to be included in the taxonomy, an economic activity must also avoid significant harm to the six other environmental objectives (see [5.3](#)).

This document recognizes that all sectors must become more climate resilient. As a result, the do no significant harm (DNSH) section of each table in the taxonomy includes a set of considerations for addressing issues related to the eligible project and asset categories.

To provide guidance for projects, assets and supporting expenditures that are being financed with the specific purpose of promoting adaptation, this document includes guidance for adaptation by sector in [Annex A](#).

This document defines sector categories or subcategories and describes the rationale for their inclusion in the taxonomy. It provides examples of thresholds and exclusions in [Annex B](#).

Different types of finance support projects, assets and supporting expenditures that contribute to environmental or sustainable development objectives. In this taxonomy, debt instruments may either finance the acquisition, manufacture, development, distribution, operation and maintenance or refinance the listed projects, assets and supporting expenditures. The taxonomy provides a framework for classifying all potential projects, assets or supporting expenditures against a comprehensive set of environmental objectives. In addition, all eligible projects, assets and supporting expenditures have to consider the state of the local environment.

The objective of the taxonomy is to identify activities with positive environmental benefits.

It may be used as a separate resource or by users of ISO 14030-1 and ISO 14030-2 who can:

- select this document as their taxonomy and refer to its tables when establishing environmental performance indicators;
- adopt thresholds and exclusions detailed in [Annex B](#).

This document requires issuers to evaluate and avoid harm to related environmental aspects.

The taxonomy focuses on activities within sectors. For this reason, environmental aspects are evaluated at the level of projects and assets. If buildings or materials are needed to finance the projects and assets, the evaluation is made at the level of the different potential environmental aspects, taking into account the life cycle perspective, including all upstream and downstream resource flows.

The taxonomy's objective is to identify eligible projects, assets and supporting expenditures. Users of this document, or of another appropriate taxonomy, will obtain greater confidence that interested parties will consider financed projects, assets and supporting expenditures to be green.

To substitute high carbon intensity processes, some technologies can be implemented. The best available option should be taken in light of various circumstances of countries and regions.

Users of this document can adopt:

- thresholds and exclusions from [Annex B](#);
- local, regional or international regulations;
- provisions found in other taxonomies.

[Figure 1](#) outlines the relationship between the four parts of the ISO 14030 series.

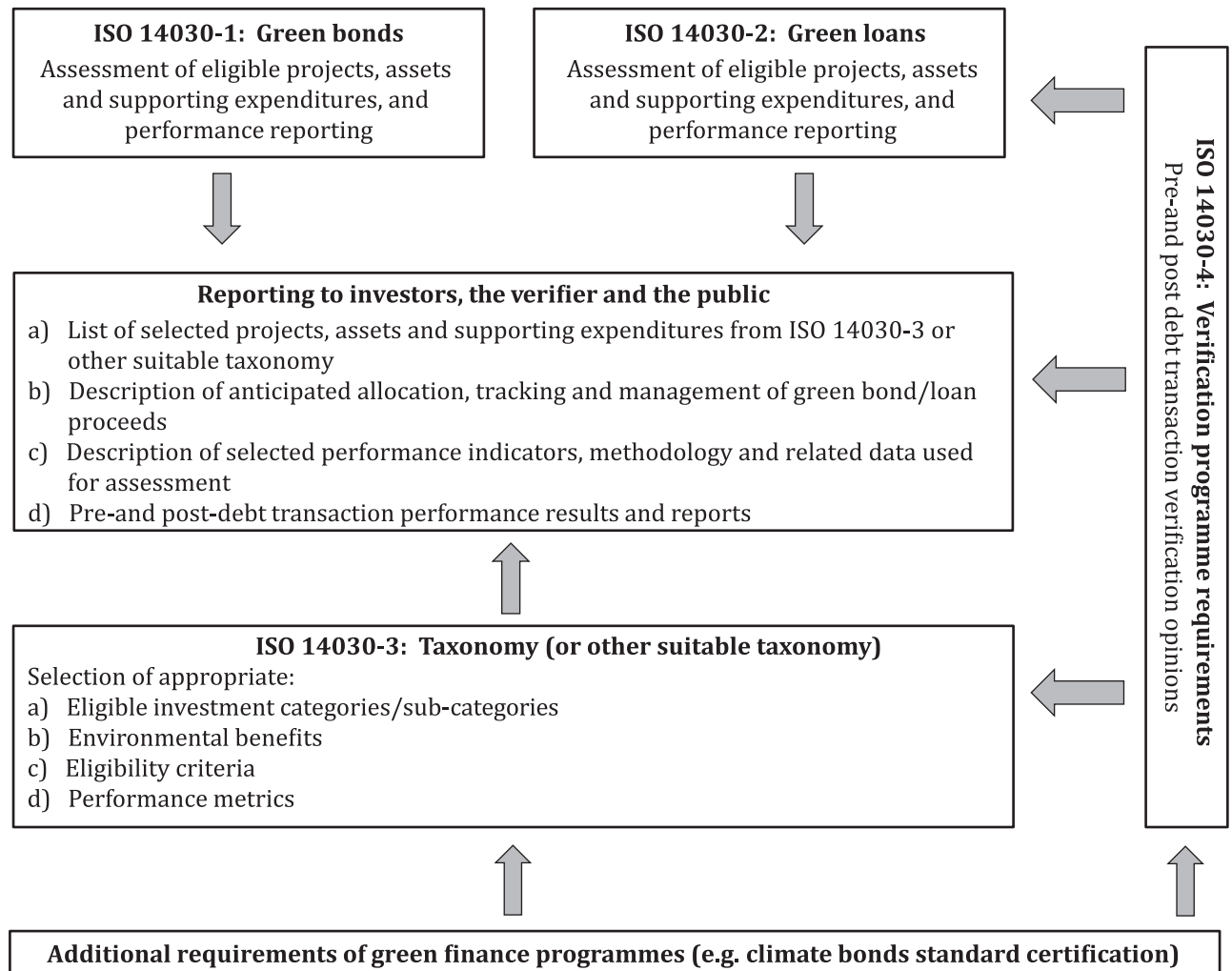


Figure 1 — Relationship between the parts of the ISO 14030 series

Environmental performance evaluation — Green debt instruments —

Part 3: Taxonomy

1 Scope

This document defines a taxonomy of eligible investment categories for designation as green debt instruments, including bonds and loans.

This document categorizes economic sectors and establishes criteria for determining the eligibility of projects, assets and supporting expenditures. It provides guidance on adaptation by sector in [Annex A](#). It provides examples of thresholds and exclusions in [Annex B](#).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13065, *Sustainability criteria for bioenergy*

ISO 14030-1:2021, *Environmental performance evaluation — Green debt instruments — Part 1: Process for green bonds*

ISO 14030-2:2021, *Environmental performance evaluation — Green debt instruments — Part 2: Process for green loans*

ISO 14064-2, *Greenhouse gases — Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements*

ISO 14067, *Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification*

International Finance Corporation (IFC) Performance Standard 6, *Biodiversity Conservation and Sustainable Management of Living Natural Resources*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14030-1, ISO 14030-2 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1.1 Terms related to economy and finance

3.1.1.1

debt instrument

obligation that enables a party to raise funds by promising to repay a *lender* ([3.1.1.5](#)) in accordance with the terms of a contract

3.1.1.2

green debt instrument

debt instrument ([3.1.1.1](#)) whose net proceeds or an amount equivalent to the net proceeds will be exclusively applied to finance or re-finance in part or in full new or existing eligible projects, assets and supporting expenditures

3.1.1.3

issuer

entity responsible for fulfilling the contractual obligations of the bond or other *debt instrument* ([3.1.1.1](#))

3.1.1.4

borrower

person or company who has contracted a loan

3.1.1.5

lender

institution or other entity that makes funds available to a *borrower* ([3.1.1.4](#)) with the expectation that those funds will be repaid

Note 1 to entry: In the context of this document, the term “lender” is generic and includes all financial organizations who make loans to individuals, small- and medium-sized enterprises, independently to the investees.

Note 2 to entry: “Lenders” may include chartered banks, insurance companies, cooperative banks, crowdfunding companies, revolving credit companies, Islamic banks, individuals and solidarity-based finance providers.

3.1.2 Terms related to the environment

3.1.2.1

environment

surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans and their interrelationships

Note 1 to entry: In this document, the phrase “in which an organization operates” should be understood as “inherent to or affected by the eligible projects, assets or supporting expenditures associated with the *green debt instrument* ([3.1.1.2](#))”.

[SOURCE: ISO 14001:2015, 3.2.1, modified — Notes 1 and 2 to entry have been deleted and a new Note 1 to entry has been added.]

3.1.2.2

ecosystem

dynamic complex of plant, animal and micro-organism communities, and their non-living *environment* ([3.1.2.1](#)) interacting as a functional entity

EXAMPLE Deserts, coral reefs, wetlands, rain forests, boreal forests, grasslands, urban parks, cultivated farmlands.

Note 1 to entry: Ecosystems can be influenced by human activity.

[SOURCE: ISO 14008:2019, 3.1.6]

3.1.2.3**ecosystem service**

benefit people obtain from *ecosystems* ([3.1.2.2](#))

Note 1 to entry: These are generally distinguished into provisioning, regulating, supporting and cultural services. Ecosystem services include the provisioning of goods (e.g. food, fuel, raw materials, fibre), regulating services (e.g. climate regulation, disease control), and non-material benefits (cultural services) (e.g. spiritual or aesthetic benefits). The supporting services are necessary for the production of all other ecosystem services (e.g. soil formation, nutrient cycling, water cycling) and are also referred to as “ecosystem functions”.

Note 2 to entry: Ecosystem services are sometimes called “environmental services” or “ecological services”.

[SOURCE: ISO 14008:2019, 3.2.11]

3.1.2.4**protected area**

geographically defined area which is designated or regulated and managed to achieve specific conservation *objectives* ([3.1.4.1](#))

3.1.3 Terms related to environmental impacts**3.1.3.1****impact**

result of a change or existing condition that may be adverse or beneficial

[SOURCE: ISO 15392:2019, 3.17, modified — “neutral” has been deleted after “adverse”.]

3.1.3.2**environmental impact**

impact ([3.1.3.1](#)) to or conservation of the *environment* ([3.1.2.1](#)), wholly or partially resulting from eligible projects, assets or supporting expenditures

3.1.3.3**environmental benefit**

gain related to the *environment* ([3.1.2.1](#))

Note 1 to entry: A positive effect on the environment that protects or restores natural habitats or *ecosystems* ([3.1.2.2](#)), or mitigates further environmental harm.

[SOURCE: ISO 14050:2020, 3.12.2, modified — “internal and external” has been deleted from before “gain”. Note 1 to entry has been added.]

3.1.3.4**indicator**

quantitative, qualitative or binary variable that can be measured or described, representing the status of operations, management, conditions or *impacts* ([3.1.3.1](#))

[SOURCE: ISO 14031:2021, 3.4.1]

3.1.3.5**environmental performance**

performance related to the management of environmental aspects

[SOURCE: ISO 14001:2015, 3.4.11, modified — Note 1 to entry has been deleted.]

3.1.3.6**environmental performance indicator****EPI**

indicator ([3.1.3.4](#)) that provides information about an organization’s *environmental performance* ([3.1.3.5](#))

Note 1 to entry: In this document, “organization” refers to an eligible project, asset or supporting expenditure.

[SOURCE: ISO 14031:2021, 3.4.5, modified — Note 1 to entry has been added.]

3.1.4 Terms related to environmental management

3.1.4.1

objective

result to be achieved

[SOURCE: ISO 14001:2015, 3.2.5, modified — The notes to entry have been deleted.]

3.1.4.2

environmental objective

objective ([3.1.4.1](#)) that relates to the *environment* ([3.1.2.1](#)) that is associated with eligible projects, assets and supporting expenditures

3.1.4.3

prevention of pollution

use of *processes* ([3.1.4.8](#)), practices, techniques, materials, products, services or energy to avoid, reduce or control (separately or in combination) the creation, emission or discharge of any type of pollutant or waste, in order to reduce adverse *environmental impacts* ([3.1.3.2](#))

Note 1 to entry: Prevention of pollution can include source reduction or elimination, process, product or service changes, efficient use of resources, material and energy substitution, reuse, recovery, recycling, reclamation and treatment.

[SOURCE: ISO Guide 64:2008, 2.7]

3.1.4.4

BAT

best available technique

best available technology

commercially available technology that is recognized by relevant authorities to reduce negative *environmental impacts* ([3.1.3.2](#)), including CO₂ emissions

Note 1 to entry: In some countries and regions, regional or country-based BAT directories authorized by regional/national governments or relevant authorities are available for the manufacturing sector.

3.1.4.5

circular economy

economy that is restorative and regenerative by design, and which aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles

[SOURCE: ISO 20400:2017, 3.1]

3.1.4.6

climate change mitigation

mitigation

human intervention to reduce greenhouse gas (GHG) emissions or enhance GHG removals

[SOURCE: ISO 14080:2018, 3.1.2.1, modified — The preferred term “mitigation” has been added, and “to reduce greenhouse gas (GHG) emissions or enhance GHG removals” has replaced “to reduce the sources or enhance the sinks of greenhouse gases (GHGs)”.]

3.1.4.7

monitoring

determining the status of a system, a *process* ([3.1.4.8](#)) or an activity

[SOURCE: ISO 14001:2015, 3.4.8, modified — Note 1 to entry has been deleted.]

3.1.4.8**process**

set of interrelated or interacting activities which transforms inputs into outputs

[SOURCE: ISO 14001:2015, 3.3.5, modified — Note 1 to entry has been deleted.]

3.1.4.9**taxonomy**

classification with sector criteria and a rationale for eligibility based on potential *environmental benefits* (3.1.3.3) and *environmental performance indicators* (3.1.3.6) for the described projects, assets and supporting expenditures

3.1.4.10**adaptation to climate change****climate change adaptation****adaptation**

process of adjustment to actual or expected climate and its effects

Note 1 to entry: In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities.

Note 2 to entry: In some natural systems, human intervention can facilitate adjustment to expected climate and its effects.

[SOURCE: ISO 14090:2019, 3.1, modified — The preferred term “adaptation” has been added.]

3.1.4.11**certification scheme**

certification system related to specified products, to which the same specified requirements, specific rules and procedures apply

Note 1 to entry: The rules, procedures and management for implementing product, process and service certification are stipulated by the certification scheme.

[SOURCE: ISO/IEC 17067:2013, 3.2]

3.2 Abbreviated terms

BAT	best available technology/best available technique
CATC	Clean Air Technology Center
CCS	carbon capture and storage
CHP	combined heat and power
CoP	coefficient of performance
CSP	concentrated solar power
DNSH	do no significant harm
EIA	environmental impact assessment
GHG	greenhouse gas
GWP	global warming potential
KBA	key biodiversity area
LCA	life cycle assessment

MSC	Marine Stewardship Council
NEDC	New European Driving Cycle
PV	Photovoltaic
SFM	sustainable forest management
T&D	transmission and distribution
WLTP	Worldwide Harmonised Light Vehicle Test Procedure

4 Principles

4.1 Precautionary principle

Significant risks to the environment, natural habitats, biodiversity, and human health and welfare are avoided, reduced and mitigated.

4.2 Evidence-based science

Methods utilize an evidence-based approach derived from peer reviewed scientific research.

4.3 Biodiversity protection

Land use activities that aim to offset carbon emissions improve environmental quality thereby promoting three types of biological diversity: genetic diversity, species diversity and ecosystem diversity. A healthy biodiversity effectively mitigates climate change.

Policies and resources are directed to promote biological diversity which comprises genetic diversity, species diversity and ecosystem diversity.

4.4 Life cycle perspective

A life cycle perspective is applied which considers all relevant stages of an activity's life cycle as well as a comprehensive set of environmental indicators.

5 Taxonomy

5.1 General

The taxonomy in this document covers the sector criteria, rationale for eligibility, potential environmental benefits and environmental performance indicators for the described projects, assets and supporting expenditures.

5.2 Use of the taxonomy

Users of this document shall apply thresholds and exclusions, in the form of numeric values, technical requirements or others. These can be those identified in [Annex B](#) or in a suitable taxonomy selected by the user.

The reason for using a suitable taxonomy other than this document should be explained and justified, e.g. by reference to national or regional legislation.

Guidance on the recognition of other suitable taxonomies is provided in [Annex C](#).

[Subclause 5.4](#) provides details on eligibility criteria used to determine whether nominated assets or projects are eligible to be funded by a green debt instrument (refer to ISO 14030-1:2021, 5.1) or a green loan (refer to ISO 14030-2:2021, 5.1).

Suggested impact reporting metrics shall be used for environmental performance reporting as set out in ISO 14030-1:2021, 8.2.2, and ISO 14030-2:2021, 6.5.4 and 7.5.4.4.

NOTE The content identified in [5.4](#) is not exhaustive.

5.3 Environmental and social evaluation

Issuers, borrowers or lenders shall evaluate projects, assets and supporting expenditures against one or more environmental objectives taking into account the precautionary principle (see [4.1](#)), also referred to as “DNSH”. Users of this document shall determine whether the projects, assets or supporting expenditures will do significant harm to any of the six environmental objectives:

- a) climate change mitigation;
- b) climate change adaptation;
- c) sustainable use and protection of water and marine resources;
- d) transition to a circular economy, waste prevention and recycling;
- e) control and prevention of pollution;
- f) protection and restoration of ecosystems and biodiversity.

The evaluation should determine whether the projects, assets or supporting expenditures would lead to the displacement of indigenous people or impact their historical lands. The projects, assets or supporting expenditures should also not infringe upon workers’ rights under the International Labour Organization (ILO). If the evaluation identifies such impacts, the project, asset or supporting expenditures shall not be considered eligible.

NOTE Minimum social safeguards are defined in the principles and rights set out in the eight fundamental conventions identified in the ILO’s Declaration on Fundamental Rights and Principles at Work^[25].

The taxonomy should apply a life cycle perspective to reflect the environmental impact of manufacturing activities. This approach should consider, where applicable, the sourcing of raw materials, the use of renewable or recycled materials and end-of-life recycling, processing and manufacturing, any relevant transportation, and the end-of-life fate of the waste materials, co-products or final product, whether this is recovery, reuse, remanufacture, recycling or disposal. In addition, the use stage should be considered where appropriate. For each of the life cycle stages and environmental impacts, unintended consequences should be avoided, whereby the impact is shifted from one stage to another or to another environmental impact. Unintended consequences regarding depletion of energy or mineral resources, or other environmental impacts that arise in the course of a transition shall be addressed by the DNSH criteria (see [5.4](#)).

Climate change mitigation shall be assessed for each activity for the sector activities given in this document, and the issuer shall document the DNSH of the other environmental aspects.

See [Annex A](#) for guidance on addressing the objective “climate change adaptation”.

5.4 Classification of activities within sectors and subsectors

5.4.1 Agriculture, forestry and fishing

5.4.1.1 General

The sector includes:

- growing of perennial and non-perennial crops;
- fisheries;
- organic farms;
- afforestation/rehabilitation, restoration/reforestation and improved forest management.

5.4.1.2 Agriculture

General requirements for projects, assets and supporting expenditures in this sector include the following:

- Demonstration of conformity with applicable management practice criteria (e.g. a farm sustainability management plan which describes the management practices being deployed, taking into account crop husbandry requirements, farm pedo-climatic conditions and their coverage on the farm).
- Establishment of a carbon stock and GHG emissions baseline for the farm, against which carbon stock and GHG emission changes can be measured and compared.
- Performance of a carbon audit to assess where action is needed. A carbon management plan shall set out the management practices that will deliver the expected net GHG emissions reduction/carbon sequestration.
- A carbon management plan that is part of a farm's broader sustainability plan.

5.4.1.3 Forestry

The scope of this sector emphasizes carbon storage in forest ecosystems through forest management activities including harvesting. The selected activities represent interventions at different stages of a forest's economic life cycle, which include:

- afforestation;
- reforestation;
- restoration/rehabilitation;
- existing forest management.

The transfer from "afforestation" or "reforestation" criteria to the criteria set for existing forest management follows a sustainable management system as soon as possible.

The taxonomy sets out the following cumulative qualitative and quantitative mitigation criteria to be implemented, which shall result in GHG sequestration and soil and biodiversity maintenance or improvement.

- a) Conformity with SFM requirements which is defined as "the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems".

- b) The establishment of a GHG inventory baseline for carbon pools.
- c) The demonstration of permanent and steady progress shall be reported through a forest management plan (or equivalent) at 10-year intervals. Carbon stocks shall increase or be maintained in relation to the carbon baseline over a period of 20 years or the criteria established in nationally or internationally recognized protocols, e.g. VCS/VERRA or under the UNFCCC.
- d) In some cases, fire is used as a management practice which increases plant species diversity (consider fire-adapted plants). Likewise, it leads to formation of carbon black which increases the stock of soil carbon.

5.4.1.4 Agriculture, forestry and fishing areas

The taxonomy for other agriculture, forestry and fishing is given in [Tables 1](#) to [4](#).

Table 1 — Growing of perennial and non-perennial crops

Sector classification and activity	
Macro-sector	Agriculture, forestry and fishing
Description	Growing of perennials including grapes, tropical and sub-tropical fruits, citrus fruits, stone fruits, other tree and bush fruits and nuts, oleaginous fruits, beverage crops, spices, aromatics and drug and pharmaceutical crops. Growing of non-perennial crops including cereals, upland and paddy rice, leguminous crops and oil seeds, vegetables, melons, roots and tubers, sugar cane and fibre crops. Wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year, excluding paddy fields. This classification can be applied to finance the transition from common practice agriculture activities to organic farms and forests.
Sector criteria	
Potential environmental benefits	Growing of perennial crops: It is recognized that CO₂ sequestration represents the largest mitigation potential available to the agriculture sector at global scale, while emission savings of non-CO₂ emissions can be more important. Growing of non-perennial crops: Key environmental aspects to be considered for investments in growing of non-perennial crops span across all other five objectives and are summarized as: — the ability of farming systems to adapt to a changing climate; — the impact on water quantity, water quality and water ecosystems; — the impact 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); — avoidance or reduction of net GHG emissions from production and related practices; — maintenance of existing sinks and increased sequestration (up to saturation point) in above- and below-ground carbon stocks;

Table 1 (continued)

	— avoidance, reduction and management of the use of agricultural chemicals; — avoidance, reduction and management of fertilizer; — management of water consumption and wastewater; — management of waste materials.
Environmental performance indicators	Environmental performance indicators can include the following: — Area over which essential management practices are deployed on the farm (%). — Per cent reduction in net GHG emissions (gCO₂e) over a specified period, compared to emissions at the start of that period. — Absolute GHG emissions compared to average within the same sector. — Increasing carbon stock (tC/ha) over a specified period. For soils specifically, where saturation levels have been reached, no further increase in carbon content is expected. In this case, existing levels should be maintained. The indicator for GHG emissions is gCO₂e. Using relative GHG indicators (i.e. % change in gCO₂e/ha or % change in gCO₂e/unit of production) is possible, where these can be made relative to a counterfactual on the same farm or project. — Area over which agriculture chemicals and fertilizer management are deployed on the farm (%). — Amount or percentage of reduction of the purchasing, and use of agriculture chemicals and fertilizer (%). — Water consumption (m³) or water use intensity (m³/ha), considering water scarcity of the locality. — Wastewater (m³). — Amount or percentage of reduction of waste materials (%).
Rationale	
Growing of perennial crops: In the context of agriculture, low-carbon is a means to ensure that even where net GHG emissions cannot be reduced to zero, they can be compensated through increased removals (through carbon sequestration) on farmed land. It is not always possible to achieve a low-carbon economy on an individual farm in all cases, particularly where they specialize. In other cases, it can be more feasible. Furthermore, one opportunity for emission reductions in the agriculture sector as a whole is to switch from higher emitting activities to lower emitting activities (e.g. reducing cattle numbers and increasing legume production as an alternative source of protein, increasing energy and nutrient recovery), with a corresponding consumption switch between agricultural commodities. GHG accounting at the farm level is helpful.	

Table 1 (continued)

Growing of non-perennial crops:	
In respect to non-perennial cropland production, key sources of emissions are emissions associated with soil management and the application of fertilizers, methane emissions from rice cultivation, and avoided emissions embedded in crop waste.	
With respect to management practices that substantially mitigate GHG emissions:	
a) there is sufficient existing scientific knowledge and consensus on the mitigation effects and interactions with other environmental and food security objectives;	
b) the scale, certainty and consistency of mitigation effects is sufficiently demonstrated.	
Agricultural biomass and cover crop yields are delivered to processors for conversion to fuels and chemicals.	
DNSH assessment (to evaluate impacts that are not the core environmental objective)	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under "sector criteria" above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation (see Clauses A.1 and A.2).
(3) Water	Activities should not lead to a decrease in: — water availability in catchments where this is a concern and should be in line with the objective to maintain adequate water levels; — water quality within a catchment area should be in keeping with the objective of good chemical and ecological status.
(4) Circular economy	Activities should minimize: — waste or losses from the production or harvesting of crops, in line with good agricultural practice; — raw material uses per unit of output, including energy; — the loss of nutrients from the production system; — the impacts on other local activities, including recreation or education.
(5) Pollution	— Activities that ensure the protection of soils 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 farmland, wetlands, forests or other areas of high-biodiversity value.
(6) Ecosystems	Activities should not: — result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern; — fail to comply with 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 sufficient safeguards are in place to prevent escape into the environment.

Table 2 — Fisheries

Sector classification and activity	
Macro-sector	Agriculture, forestry and fishing
Description	Fisheries
Sector criteria	
Potential environmental benefits	Preserve fisheries based on sustainable criteria [such as the Marine Stewardship Council (MSC) sustainable fishery label, the Aquaculture Stewardship Council (ASC), Best Aquaculture Practices (BAP), Global Good Agricultural Practices (GGAP) and Marine Eco-Label Japan (MEL)]. Reduce energy consumption in fishing fleets using hybrid wind/motor propulsion systems. Use renewable energy (wind, solar and ocean energy). Potential negative impacts: — food insecurity; — impact on fishermen's livelihoods.
Environmental performance indicators	Environmental performance indicators can include: — CO₂e per tonnes of fish sold; — sustainable fisheries management label; — extent to which the fishery is maintained on a self-sustaining basis.
Rationale	
Wild production, based on sustainable criteria defined in programmes such as: The Marine Ingredients Organisation (IFFO), Alaska Seafood Marketing Institute (ASMI), Responsible Fisheries Management (RFM), Iceland Responsible Fisheries, Fair Trade USA, and MEL (Marine Eco-Label Japan); or if it is under full assessment in the MSC programme; or if it is in a fishery improvement project (FIP) that is making good progress (i.e. with a progress rating of A, B, or C using the Sustainable Fisheries Partnership's FIP evaluation tool). Farmed production: certified by one of the following programmes: Aquaculture Stewardship Council (ASC), Best Aquaculture Practices (BAP), Global Good Agricultural Practices (GGAP); or if it is in a formal aquaculture improvement project (AIP).	
DNSH assessment (to evaluate impacts that are not the core environmental objective)	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under "sector criteria" above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation.
(3) Water	Minimize risks related to local water quality or local water consumption.
(4) Circular economy	Ensure appropriate measures are in place to minimize and manage waste, energy and material use in construction, maintenance and decommissioning phases.
(5) Pollution	Avoid eutrophication of water bodies and leakage of hazardous substances.
(6) Ecosystems	For planning and constructing infrastructure in a protected area, or which includes activities outside a protected area but likely to have a significant negative impact on its biodiversity, ensure that an appropriate assessment based on the conservation objectives of the protected area has been conducted in compliance with one of the following: — International Finance Corporation (IFC) Performance Standard 6, <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>; — an equivalent national standard. For such operations, ensure that a site-level biodiversity management plan exists and is implemented.

Table 3 — Organic farms

Sector classification and activity	
Macro-sector	Agriculture, forestry and fishing
Description	Organic farms
Sector criteria	
Potential environmental benefits	Avoid or reduce net GHG emissions (including those from inputs used on the farm) through the application of appropriate management practices. Maintain and increase existing carbon stocks for a period equal to or greater than 20 years through the application of appropriate management practices. Sustainably high microbial population, prevention of leaching. Demonstrate the use of compost for soil. Demonstrate agricultural production using soil, not hydroponics or rock wool cultivation. Demonstrate no use of banned agriculture chemicals from the specific period of years before sowing or planting. Demonstrate avoidance, reduction and management in the use of agriculture chemicals. Demonstrate avoidance, reduction and management of fertilizer. Demonstrate no use of genetic recombination technology, where applicable.
Environmental performance indicators	Environmental performance indicators can include: — proportion of the livestock operation for which mitigation practices are deployed (%); — per cent reduction in net GHG emissions (gCO₂e) over a specified period, compared to emissions at the start of that period; — area over which appropriate management practices are deployed on the organic farm (%); — increasing carbon stock (tC/ha) over a specified period; — number of native species and their populations during the period when organic farming is operated.
Rationale	
Opportunities for substantial mitigation and contributions to a net zero-carbon economy An overarching goal of the taxonomy is to enable it to be consistent with the underlying goal of a net zero-carbon economy by 2050. The objective for this sector is to reduce net GHG emissions from farming practices and management, including cropland management, grazing land management, restoration of cultivated organic soils and restoration of degraded lands. Three annual compliance checks are proposed to ensure progress is being made and mitigation is being delivered in practice, and also to reduce the burden necessary on operators. This compliance checking is required for management practice checking, carbon stock change and GHG reductions. To prepare a farm sustainability management plan, a carbon calculator can be used, or the plan can also be prepared using other nutrient decision-support tools. The reduction in net GHG emissions (gCO₂e) is in line with the following trajectory: — essential management practices are deployed consistently over the applicable livestock operation or permanent grassland area each year; — above- and below-ground carbon stocks increase progressively over a 20-year period.	

Table 3 (continued)

For soils specifically, where saturation levels have been reached, no further increase in carbon content is expected. In this case, existing levels should be maintained.	
Presence or absence supporting notes:	
— To demonstrate conformity with the essential management practices criteria, it will be necessary to establish a farm sustainability management plan which describes the management practices being deployed and their coverage on the farm. — A carbon audit is necessary in order to also assess where action is needed, and this shall be accompanied by a carbon management plan to set out the management practices that will deliver net GHG emission reductions and carbon sequestration. — This carbon management plan is part of the broader farm sustainability plan. Emissions, sinks and management practices are all to be audited at three-year intervals to confirm ongoing conformity with these requirements.	
DNSH assessment (to evaluate impacts that are not the core environmental objective)	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation
(3) Water	Minimize risks related to local water quality or local water consumption.
(4) Circular economy	Ensure appropriate measures are in place to minimize and manage waste, energy and material use in construction, maintenance and decommissioning phases.
(5) Pollution	Avoid substances that cause eutrophication of water bodies or pollute the soil.
(6) Ecosystems	For planning and constructing infrastructure in a protected area, or which includes activities outside a protected area but likely to have a significant negative impact on its biodiversity, ensure that an appropriate assessment based on the conservation objectives of the protected area has been conducted in compliance with one of the following: — IFC Performance Standard 6, <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>; — an equivalent national standard. For such operations, ensure that a site-level biodiversity management plan exists and is implemented.

Table 4 — Afforestation/rehabilitation, restoration/reforestation/existing forest management

Sector classification and activity	
Macro-sector	Agriculture, forestry and fishing
Description	Afforestation is the establishment of forest through planting or deliberate seeding on land that, until then, was under a different land use. It implies a transformation of land use from non-forest to forest. Restoration and rehabilitation are any intentional activity that initiates or accelerates the recovery of an ecosystem from a degraded state. Reforestation is the re-establishment of forest through planting or deliberate seeding on land classified as forest. It implies no change of land use, includes planting/seeding of temporarily unstocked forest areas as well as planting/seeding of areas with forest cover. It includes coppice from trees that were originally planted or seeded. It excludes natural regeneration of forest. In the context of the taxonomy, the category “reforestation” applies in cases following extreme events (wind throws, fires, etc.), and not as part of a normal, legally binding obligation to reforest after harvesting. Existing forest management shall maintain or increase carbon stocks of above- and below-ground carbon over time.

Table 4 (continued)

Sector criteria	
Potential environmental benefits	Afforestation increases carbon stocks of above- and below-ground carbon overall compared to a counterfactual with no conversion to forest. Restoration and rehabilitation maintains or increases carbon stocks of above- and below-ground carbon. Reforestation increases overall carbon stocks of above- and below-ground carbon. SFM criteria include: — identify and apply forest management practices that increase or maintain existing carbon stocks from above- and below-ground carbon overall, while maintaining or improving the soil quality, and biodiversity; — maintain or improve the long-term capacity of the forest to deliver multiple services (e.g. ecosystem services, timber production); — do not convert high carbon stock land (i.e. primary forest, peatlands, wetlands, grasslands) which has this status on or before January 2008; — regenerate harvested forests. Other criteria are as follows: — Establish a baseline GHG inventory of carbon pools at the beginning of the afforestation/reforestation activity. — Demonstrate continued conformity with the SFM requirements and increase or maintain carbon sinks from above-ground carbon over time, supported by and disclosed through a forest management plan (or equivalent) at five-year intervals. Methods to demonstrate conformity with SFM requirements include self-declarations provided by the organization, second party assessments conducted by interested parties and certification by a third party. Organizations using the ISO 14030 series should determine which level of conformity assessment is suitable to their needs. All the criteria apply together.
Environmental performance indicators	SFM criteria as described above. GHG inventory baseline is calculated for above-ground carbon pools, based on the “gain-loss” or on the “difference of carbon stocks” for species per m³/year/ha, carbon convertible. NOTE Calculating the GHG inventory baseline requires knowledge of the area, the species and the number of trees (in case of planting). The increment based on the growth-yield curves gives the approximate number of how many m³/year/ha are available for increment. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories^[27].
Rationale	
Existing forests A substantial portion of forestry activities will fall under the bracket of existing forest management. Existing forest management is recognized in the taxonomy, provided it can demonstrate maintenance of high carbon stocks in multiple pools and overall improvement in forest carbon sinks. Forestry can deliver GHG emission mitigation and protect carbon storage through sequestration of carbon during tree growth. Carbon is fixed above ground and below ground in the vegetation, soil, litter and dead wood derived from the forest in line with the lifetime of these pools. The management of existing forests and forest rehabilitation activities can deliver substantial mitigation through: — an increase or maintenance in the forest capacity to sequester carbon from above-ground and below-ground carbon pools; — maintenance or increase of the soil quality, soil carbon and biodiversity.	

Table 4 (continued)

The approach taken to determine metrics relies on cumulative criteria: 1. SFM requirements that ensure the maintenance or increase of carbon sinks of above- and below-ground carbon through management practices. Above-ground carbon refers to shoot carbon, litter and dead wood, while below-ground carbon refers to root carbon. Soil carbon in severely burnt land also covers black carbon. 2. GHG measurement of sequestration in carbon pools. Calculating the GHG inventory baseline requires knowledge of the area, species and the number of trees (in the case of planting). Growth-yield curves provide the approximate increase of carbon stocks in m³/year/ha. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories^[27], which recommends recalculation of the amount of carbon sequestered; 1 tonne of biomass represents approximately 0,5 tonnes of carbon. Further, 1 tonne of carbon equals 3,67 tonnes of carbon dioxide. Land use, land-use change and forestry (LULUCF)-compliant country-level reporting or landscape management-level reporting may be used to emphasize that the goal can be to perform at a scale above the single forest stand. Absence of landscape management access will in turn require disclosure at the single forest stand. The forest taxonomy allows forest owners and companies to explain and document on which level they report. 3. Demonstration of permanence and performance. Demonstration of permanence and steady progress with respect to criteria 1 and 2 is reported through a forest management plan (or equivalent) at five-year intervals. Considering the impact of climate conditions and changing environments, underperformance resulting from natural disturbance (<i>force majeure</i>) can be excluded from impacting the achievement of the thresholds and will not result in nonconformity with taxonomy criteria.	
DNSH assessment (to evaluate impacts that are not the core environmental objective)	
Key environmental aspects span across all other five objectives and are summarized as: — the ability of forests to adapt to a changing climate; — the impact on water resources as well as on water quality; — the pollution to water, air and soil, and the risks associated from the use of pesticides and fertilizers; — the impact on biodiversity and ecosystems from intensive cultivation; — the conversion of land of high ecological value to forests and illegal logging. The DNSH criteria should be considered in combination with SFM requirements. Organizations using this document should determine which level of conformity assessment is suitable to their particular needs. Conformity may be documented in a forest management plan (or equivalent).	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation (see Clauses A.3 and A.4).
(3) Water	Identify, disclose and address any water-related risks (e.g. in relation to quality of discharges into watercourses, wetlands and quantitative impacts of water use on groundwater and surface water bodies).
(4) Circular economy	Not applicable

Table 4 (continued)

(5) Pollution	Minimize the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, with the exception of occasions when this is needed to control pest and disease outbreaks. It is important to adapt the use of fertilizers to what is needed to prevent leeching of nutrients to waters. Well-documented and verifiable measures should be taken to avoid the use of active ingredients that are listed in the Stockholm Convention^[33], the Rotterdam Convention^[32], the Montreal Protocol on Substances that Deplete the Ozone Layer^[31], or that are listed as Class Ia or Ib in the WHO recommended classification of pesticides by hazard^[35]. Prevent pollution of water and soil in forests, and undertake clean-up measures when necessary. Choose trees and vegetation with low emissions of biogenic ozone precursors.
(6) Ecosystems	Take measures to ensure sustained or improved conservation status at the landscape level. In designated conservation areas, actions should be demonstrated to be in line with 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. Develop a forest management plan (or equivalent) that includes provisions for zoning conservation areas, and for maintaining biodiversity. Evaluate ecosystem services with the aim to not decrease the amount and quality of ecosystem services provided. Monitor and protect forests to prevent illegal logging.

5.4.2 Manufacturing

5.4.2.1 Inclusion of manufacturing

Manufacturing is the second largest contributor to CO₂e emissions but is also able to produce the products and technologies that can contribute to net GHG emission reductions in other sectors of the economy. Thus, it is a fundamental part of the low-carbon economy.

5.4.2.2 Subjects covered

The economic activities covered in this document include both “greening of” and “greening by” activities. “Greening of” activities include the manufacturing of aluminium, iron and steel, cement and chemicals. These sectors account for a high share of industrial net GHG emissions and offer large potential for net GHG emission reductions in future new production processes and by use of these materials in low-carbon applications, which may be shown by LCA.

“Greening by” activities include the manufacturing of products, key components, equipment and machinery that are essential to a number of key renewable energy technologies (bioenergy, geothermal power, hydropower, CSP, solar PV technology, wind energy and ocean energy, low-carbon transport vehicles, fleets and vessels), and energy efficiency equipment for buildings and other low-carbon technologies that result in substantial GHG emission reductions in further sectors of the economy, including private households.

Due to the nature of manufacturing, and in order to undertake a proper systematic value chain approach in the taxonomy, close linkages have been made with the energy, transport, agriculture and building sectors. Where possible, circularity considerations in so far as they affect net GHG emissions and a broader value chain approach have been considered.

5.4.2.3 Sector criteria and thresholds

Issuers, borrowers and lenders should apply a life cycle perspective to better reflect the environmental impact of manufacturing activities to produce all materials – as well as their co-products – with qualitative or quantitative thresholds and exclusions applied (see [Annex B](#) or taxonomy otherwise selected by the user).

For “greening by” activities, this uncomprehensive list is complemented by additional criteria that allow any other product, component, equipment or technology to be considered eligible if the overall benefits in terms of net GHG emission reductions are proven by life cycle assessment or carbon footprinting (e.g. ISO 14040, ISO 14044 and ISO 14067).

For “greening of” activities, the criteria focus instead on reducing the net GHG emissions caused by manufacturing activities up to the levels of performance achieved by best performers. The criteria cover direct and indirect emissions (see ISO 14064-1).

Additionally, the taxonomy also supports the transition of economic activities in these high emitting sectors towards reaching the adopted thresholds. It recognizes expenditures in energy efficiency measures, process improvements and all other mitigation measures in these sectors as eligible if the measures support closing the gap between the current level of efficiency and the level considered “substantially contributing to mitigation objectives” as defined by the adopted thresholds.

In the manufacturing sector, it is difficult to avoid using fossil resources in certain processes. In those cases, the introduction of CCS technologies or BAT can be a feasible option. Additionally, if CCS enables an economic activity in the manufacturing sector to meet its screening criteria, the installation of CCS technology can be considered taxonomy-eligible once the screening criteria have been met. This also applies to overall economic activity. Carbon capture and utilization (CCU), where the captured CO₂ is utilized as a feedstock (e.g. for a chemical process), may also qualify if substantial mitigation impacts can be demonstrated by reducing emissions towards meeting the activity criteria (e.g. the use of CO₂ for enhanced oil extraction would not qualify).

Within the “greening by” and “greening of” activities, resource efficiency is also considered because it contributes to meeting the criterion of proving substantial emission reductions through life cycle assessment or carbon footprinting.

5.4.2.4 Manufacturing areas

The taxonomy for manufacturing is given in [Tables 5](#) to [14](#).

Table 5 — Energy and resource efficiency common to manufacturing

Sector classification and activity	
Macro-sector	Manufacturing in general
Description	Energy and resource efficiency in manufacturing
Sector criteria	
Potential environmental benefits	Demonstrate substantial GHG emission reductions for both new and upgrades of existing industrial facilities and production processes through improvements in energy and resource efficiency or other mitigation measures. Implementation of defined BATs or energy efficiency technologies meeting high standards such as CHP, efficient compressed air, variable-speed drives, etc.
Environmental performance indicators	Environmental performance indicators can include: — % reduction in GHG emissions per unit of production; — % reduction in energy consumption per unit of production.

Table 5 (continued)

Rationale	
The principles and potential quantitative metrics over a defined baseline related to improvements in existing manufacturing facilities as well as to the construction of efficient new manufacturing facilities. They apply to GHG reductions from energy efficiency, resource efficiency and other measures in manufacturing sectors that are not covered by sector-specific criteria in the taxonomy.	
DNSH assessment (to evaluate impacts that are not the core environmental objective)	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaption.
(3) Water	Limitation of the use of water resources to clean or refresh the process based on water resource management.
(4) Circular economy	Waste and by-products, especially hazardous waste, are managed in line with waste treatment management.
(5) Pollution	Ensure emissions to air and water are within the best practice range set for energy and resource efficient processes. Ensure implementation of a recognized environmental management system (e.g. ISO 14001 or equivalent).
(6) Ecosystems	For operations located in a protected area, or which include activities outside a protected area but likely to have a significant negative impact on its biodiversity, ensure that an appropriate assessment based on the conservation objectives of the protected area has been conducted in conformity with one of the following: — IFC Performance Standard 6, <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i> ; — an equivalent national standard. For such operations, a site-level biodiversity management plan shall be implemented.

Table 6 — Manufacture of low-carbon technologies

Sector classification and activity	
Macro-sector	Manufacturing
Description	Manufacture of: — products, key components and machinery that are essential for eligible renewable energy technologies; — eligible low-carbon transport vehicles, fleets and vessels; — eligible energy efficiency equipment for buildings; — other low-carbon technologies that result in GHG emission reductions in other sectors of the economy (including private households).
Sector criteria	
Potential environmental benefits	The manufacture of low-carbon technologies that result in substantial GHG emission reductions in other sectors of the economy (including private households) are eligible.
Environmental performance indicators	See B.3.1 .

Table 6 (continued)

Rationale	
The manufacture of low-carbon technologies that result in substantial GHG emission reductions in other sectors of the economy (including private households) is eligible if they demonstrate substantially higher net GHG emission reductions compared to the best performing alternative technology/product/solution available on the market on the basis of a recognized/standardized cradle-to-grave carbon footprint (e.g. ISO 14067, ISO 14040, ISO 14044 or ISO 14025). The list of specific eligible technologies is coherent with the eligible activities in other sections of the taxonomy, namely energy, transport and buildings. In some cases, the list is less broad than the eligible activities in the corresponding section of the taxonomy due to limited resources to explore in this phase the implications for use in other sectors of the same products, components, equipment and infrastructure. Further analysis is required to ensure no perverse incentives occur. For transport, the manufacture is focused on the production of “low-carbon” or “zero-carbon” vehicles, fleets or vessels, so that either revenue from sales of eligible vehicles or expenditure on investments in manufacturing capacity specifically relating to eligible vehicles can be identified.	
DNSH assessment (to evaluate impacts that are not the core environmental objective)	
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 life cycle); — for polluting emissions to air, water and soil from the manufacturing process. Depending on the product/equipment being manufactured, there can 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 can have significant environmental impact issues associated with the mining phase.	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation.
(3) Water	Limitation of the use of water resources to clean or refresh the process based on water resource management.
(4) Circular economy	Low-carbon technologies are an opportunity to reorganize the chain of value and promote some short local relationships in the chain of production. Low-carbon technologies shall be involved in the circular economy to recycle, reuse, remanufacture and maintain the long-term life of products (e.g. long-term availability of spare parts) and reduce raw material consumption.
(5) Pollution	Conformity with restriction of chemicals and the restriction of hazardous substances or the equivalent for equipment manufactured.
(6) Ecosystems	Low-carbon technologies should not harm ecosystems more than the technologies currently in use.

Table 7 — Manufacture of cement and alternative binders

Sector classification and activity	
Macro-sector	Manufacturing
Description	Manufacture of cement
Sector criteria	
Potential environmental benefits	The manufacturing of cement is associated with significant CO₂ emissions. Minimizing process emissions through energy efficiency improvements and switch to alternative fuels, promoting the reduction of the clinker-to-cement ratio and the use of alternative clinkers and binders can contribute to the mitigation objective. The manufacturer shall source raw materials from sites following best quarrying practices.

Table 7 (continued)

Environmental performance indicators	Environmental performance indicators can include: - specific emissions (tCO₂e/t of clinker); - specific emissions (tCO₂e/t of cement or alternative binder).
Rationale Cement production is responsible for more than 70 % of the sector emissions and concrete is the most significant application for the use of cement. Cement is the main constituent of concrete. The content of cement in the concrete and total net GHG emissions can vary significantly based on the specifications of the application that concrete will be used for. For this reason, concrete is not covered by the taxonomy. Cement manufacture includes three main stages: - raw materials preparation; - clinker production; - grinding of clinker with other components such as gypsum, fly ash, ground granulated blast furnace slag (GBFS) and fine limestone to produce the finished cement. Typically, 30 % to 40 % of direct CO₂ emissions comes from the combustion of fuels. The remaining 60 % to 70 % comes from the chemical reactions involved in converting limestone to calcium oxide. Reducing emissions from the manufacturing process of cement can therefore positively contribute to the mitigation objective. Electricity: Indirect emissions from the use of electricity during clinker and cement production. The main users of electricity in cement plants are mills (grinding of cement, milling of raw materials) and exhaust fans (kiln/raw mill and cement mill, which together account for more than 80 % of the electrical energy usage). Electricity demand in cement plants ranges from 90 kWh/t to 150 kWh/t cement. As the cement plant operates under high O₂ concentration or pre-treats during clinker production by utilizing alternative fuels and raw materials, it is not always possible to achieve the expected range of thermal energy intensity of clinker. A global average electric energy demand for cement manufacturing of 104 kWh/t cement was reported by the Cement Sustainability Initiative (CSI) for the years 2012 to 2014. The CSI data covers more than 900 plants worldwide, and all technologies and clinker and cement types. The variations in the data are significant. The 10 % best in class show figures of 85 kWh/t cement and below, while the 90 % percentile amounted to 129 kWh/t cement. Taking into account that decarbonization of the cement sector will run in parallel with decarbonization of the energy sector, it is expected that the electricity required for cement manufacture in the near future will come from renewable sources and thus a specific threshold for specific electricity consumption is not proposed. Based on the above-mentioned information and sources, it is expected that the best-in class plants have specific electricity consumption of 85 kWh/t cement. - Improving energy efficiency: Thermal energy intensity of clinker and the electric intensity of cement can be reduced by deploying existing state-of-the-art technologies in new cement plants and retrofitting existing facilities to improve energy performance levels when economically viable. - Switching to alternative fuels: The life cycle carbon intensity of cement clinker can be reduced significantly using biomass and waste materials as fuels in cement kilns. The clinker-burning process offers good conditions for using different types of waste materials replacing parts of the consumption of carbon-intensive fossil fuels. A wide range of different types of wastes can be used as fuel but as these can replace primary fuel in cement kilns, a consistent waste quality is essential (e.g. adequate calorific value, metal, halogen, ash content). - Reducing the clinker to cement ratio: Increasing the use of blended materials and the market deployment of blended cements is very important for the decarbonization of the sector and alignment with a low-carbon pathway. This requires substitution of cement clinker by mineral additives such as fly ash, silica fume, blast-furnace slag or limestone. The amount of clinker substitute that can be blended in the cement depends on the type of substitute and the type of cement produced. Some mineral additives, e.g. granulated blast furnace slag (GBFS), allow for substitution levels of over 70 %. Revision of the cement and concrete standards, building codes and public procurement regulations would be required in order to allow more widespread use of blended cements with very high substitution of clinker (e.g. > 60 %) while ensuring product reliability and durability at final application in an individual country or region.	

Table 7 (continued)

— Alternative clinkers and binders: Alternative clinker formulations (e.g. belite, CSA, BCSA, CACS, MOMS) and alternative binders (e.g. alkali-activated binders) could offer potential opportunities for CO₂ emission reductions by using different mixes of raw materials or alternatives compared to Portland cement. Their commercial availability and applicability differ widely. Further efforts are required to support the demonstration, testing and earlier stage research for alternative clinkers and binders and to develop standards to facilitate market deployment. The specification of the benchmark based on tonne of binder will allow investments in these types of novel alternative binders to be considered for eligibility. — Potential for soil and groundwater contamination associated with the handling and storage of (hazardous) wastes used as a fuel substitute (“secondary” fuels) in the cement production process and raw material substitutes such as slags, industrial residues, non-ferrous products, sludges, because if they are not well contained they can contribute to soil and groundwater pollution. — Renewable energy generation and use: In the production of cement, the use of electricity from renewable energy sources could be also explored as a measure to reduce the electric intensity of the final cement product. This can be achieved through different strategies including implementing renewable-based captive power generation, power purchase agreements that ensure electricity imports are provided from renewable sources or demand-side response strategies that enable a flexible electricity demand (e.g. a flexible operating strategy of grinding plants throughout the day). Various renewable-based options are available for cement manufacturers including wind power, solar PV power, solar thermal power and small hydropower generation. Potential deployment of these technologies in cement plants is highly dependent on local conditions. — Transportation emissions: The emissions from transportation are excluded as these represent only a small percentage of the total emissions of cement manufacture.	
DNSH assessment (to evaluate impacts that are not the core environmental objective) The main potential significant harm to other environmental objectives from cement manufacturing is associated with: — polluting emissions to air associated to the consumption of fossil fuels and calcination reactions in the cement kiln; — water consumption at production facilities located in areas of water scarcity; — potential for soil and groundwater contamination associated with the handling and storage of (hazardous) wastes used as a fuel substitute (“secondary” fuels) in the cement production process.	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation.
(3) Water	For operations situated in areas of water scarcity, ensure that water use/conservation management plans, developed in consultation with relevant (local) interested parties, exist and are implemented.
(4) Circular economy	Cement manufacturing plants accept alternative fuels such as solid recovered fuels (SRFs) originating from waste, as well as secondary raw materials such as recycled concrete aggregates (RCAs). For cement production sites using hazardous wastes as alternative fuels, ensure a waste management plan that meets International Standards exists and is implemented.
(5) Pollution	Ensure emissions to air and water are within the best practice ranges set for the production of cement, lime and magnesium oxide. Ensure implementation of a recognized environmental management system (e.g. ISO 14001 or equivalent).

Table 7 (continued)

(6) Ecosystems	For operations located in a protected area, or which include activities outside a protected area but likely to have a significant negative impact on its biodiversity, ensure that an appropriate assessment based on the conservation objectives of the protected area has been conducted in conformity with one of the following: — IFC Performance Standard 6, <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>; — an equivalent national standard. For such operations, a site-level biodiversity management plan shall be implemented.
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Table 8 — Manufacture of aluminium

Sector classification and activity	
Macro-sector	Manufacturing
Description	Manufacture of aluminium
Sector criteria	
Potential environmental benefits	The manufacturing of aluminium is a highly energy intensive process. The CO₂ emissions related to the production of aluminium are primarily energy indirect emissions (i.e. from the generation of the electricity used). Aluminium manufacturing is eligible if relying on low-carbon electricity and reduced direct emissions. Additionally, all aluminium recycling is eligible due to significantly lower emissions than primary production.
Environmental performance indicators	Environmental performance indicators can include: — GHG emissions per unit of production: tCO₂e/t aluminium (direct emissions); — energy efficiency for the electrolysis: MWh/t primary aluminium production; — average GHG emissions associated with electricity production per unit of electricity used: gCO₂e/kWh (indirect emissions).
Rationale	
Emissions related to the production of aluminium are primarily related to the use of electricity. Electricity costs contribute to more than 50 % of the production costs. Consequently, there is a strong incentive for the aluminium industry to aim for improving energy efficiency. The key action for aluminium production to make a substantial contribution to climate change mitigation is to increase its share of the use of low-carbon electricity. It is acknowledged that aluminium production facilities can play an important role in stabilizing electricity grids by active management of electricity demand. This can result in substantial mitigation contributions, e.g. by limiting the need for electricity storage facilities. However, given the lack of available metrics to quantify these impacts, these benefits are not taken into account at this stage. It is also acknowledged that aluminium will play a role in a low-carbon economy, in particular enabling light-weight products and electrification (including transmission wires with low conductivity losses). Such applications could also be considered eligible under the activity “manufacture of other low-carbon technologies” provided they can demonstrate substantial emission reductions according to the criteria for that activity. All aluminium recycling and the manufacture of aluminium products with high recycling rates is considered to make a substantial contribution to climate change mitigation because of its association with much lower emissions than primary production. The emissions covered are as follows: — Direct emissions: all direct GHG emissions related to the production (the processes’ direct GHG emissions and the emissions due to fuel use for on-site energy production). — Indirect emissions as a minimum: GHG emissions related to electricity consumption for the electrolysis process and related emissions from the generation of electricity used.	

Table 8 (continued)

DNSH assessment (to evaluate impacts that are not the core environmental objective)	
The main potential significant harm to other environmental objectives from the 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 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; — potential to impact ecosystems as a result of the land footprint of the site and from polluting emissions to air.	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation.
(3) Water	Manage the discharge resulting from the refining of bauxite and extraction of aluminium referred to as “red mud.” For operations situated in areas of water scarcity, ensure that water use/conservation management plans, developed in consultation with relevant (local) interested parties, exist and are implemented.
(4) Circular economy	Measures are in place to minimize and manage waste (including hazardous waste) and material use in accordance with the non-ferrous metals industries. Alloy-specific aluminium sorting should be required to facilitate recycling.
(5) Pollution	Manage the discharge resulting from the refining of bauxite and extraction of aluminium referred to as “red mud.” Emissions to air [e.g. sulfur dioxide (SO₂), nitrogen oxide (NO_x), particulate matter, total organic carbon (TOC), dioxins, mercury (Hg), hydrogen chloride (HCL), hydrogen fluoride (HF), total fluoride and perfluorinated hydrocarbons (PFCs)] are within the best practice ranges for the non-ferrous metals industries. Ensure implementation of a recognized environmental management system (e.g. ISO 14001 or equivalent).
(6) Ecosystems	Manage the discharge resulting from the refining of bauxite and extraction of aluminium referred to as “red mud.” For operations located in a protected area, or which include activities outside a protected area but likely to have a significant negative impact on its biodiversity, ensure that an appropriate assessment based on the conservation objectives of the protected area has been conducted in conformity with one of the following: — IFC Performance Standard 6, <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>; — an equivalent national standard. For such operations, a site-level biodiversity management plan shall be implemented.

Table 9 — Manufacture of iron and steel

Sector classification and activity	
Macro-sector	Manufacturing
Description	Manufacture of iron and steel
Sector criteria	
Potential environmental benefits	Manufacturing of iron and steel at the level of performance achieved by best performing plants (e.g. using BAT) is considered to make a substantial contribution to climate change mitigation.
Environmental performance indicators	Environmental performance indicators can include: — net GHG emissions improvement (tCO₂e)/t product; — energy consumption (MJ)/t product.
Rationale	
In the long term, the iron and steel making industry should aim at implementing breakthrough technologies (characterized by ultra-low CO₂ emissions). Some of these technologies have already been demonstrated at the pilot scale but most are still in the early stages of development. Until these technologies become commercially available, requiring steel makers globally to apply current BAT would achieve significant CO₂ emission reductions in the sector. Once the technologies become commercially available, they will become part of BAT for steel production and accessible for implementation. Currently the uptake of BAT in the iron and steel sector varies around the world. Improving the performance of iron and steel plants globally to the level of BAT would bring significant benefits both in energy efficiency and CO₂ emission reductions. In the meantime, finance for BAT plays an important role especially in emerging economies where demand for steel continues to increase and new and additional production capacity expansion is being planned. This activity focuses on the greening of iron and steel manufacturing due to its high contribution to global net GHG emissions. The potential of “greening by” products made of iron and steel can be addressed by applying ISO 14040 and ISO 14044. Another important aspect of steel is its recyclability, which can be addressed by conducting life cycle inventory (LCI) studies of steel products based on ISO 20915. In addition, mentioning it in the specific description of a company and its product portfolio and through other activities such as “manufacture of other low-carbon technologies” where, according to the criteria given for this activity, the manufacturer can prove the overall environmental benefits over the whole life. Production of steel using scrap steel leads to significantly lower emissions both in the basic oxygen furnace (BOF) and electric arc furnace (EAF) processes, i.e. in the manufacturing phase of the life cycle. Production of some steels such as high alloy or stainless steels, which require higher amounts of alloying elements, will require more virgin material input. All steel recycling and the manufacture of steel products with high recycling rates are considered to make a substantial contribution to climate change mitigation. It is acknowledged that steel will play a role in a low-carbon economy, by enabling lighter weight products through the use of high strength steels, enabling renewable energy, etc.	
DNSH assessment (to evaluate impacts that are not the core environmental objective)	
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, sulfur dioxide, carbon monoxide, chlorides, fluorides, volatile organic compounds, polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzo-dioxins/furans and heavy metals; — emissions to water of hydrocarbons and suspended solids; — water consumption for quenching and cooling operations in areas of water scarcity; — the potential to impact local ecosystems and biodiversity due to polluting emissions (if not properly mitigated) and due to the large land footprint of the operations and associated ancillary activities.	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation.
(3) Water	For operations situated in areas of water scarcity, ensure that water use/conservation management plans, developed in consultation with relevant (local) interested parties, exist and are implemented.

Table 9 (continued)

(4) Circular economy	Measures are in place to minimize and manage waste (including hazardous waste) and material use in accordance with iron and steel production. Even though almost all steel products are recycled as scrap and used for making new steel products so far, it is important to advance the recycling system. In order to avoid irretrievable loss of alloying elements and unnecessary resource and energy consumption, steel scrap shall be collected and sorted and used accordingly in steel production.
(5) Pollution	Ensure emissions to water and air are within the best practice ranges for iron and steel production [e.g. for pH, total suspended solids (TSS), chemical oxygen demand (COD), chromium (total) and heavy metals, sulfur dioxide (SO₂), nitrogen oxide (NO_x), particulate matter, polychlorinated dibenzo-dioxins/furans, mercury (Hg), hydrogen chloride (HCL), hydrogen fluoride (HF)]. Ensure implementation of a recognized environmental management system (e.g. ISO 14001 or equivalent).
(6) Ecosystems	For operations located in a protected area, or which include activities outside a protected area but likely to have a significant negative impact on its biodiversity, ensure that an appropriate assessment based on the conservation objectives of the protected area has been conducted in conformity with one of the following: — IFC Performance Standard 6, <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>; — an equivalent national standard. For such operations, a site-level biodiversity management plan shall be implemented.

Table 10 — Manufacture of hydrogen

Sector classification and activity	
Macro-sector	Manufacturing
Description	Manufacture of hydrogen
Sector criteria	
Potential environmental benefits	The manufacturing of hydrogen is a highly carbon-intensive activity within the chemical industry. Therefore, reducing emissions from the manufacturing activity itself can positively contribute to mitigation objectives.
Environmental performance indicators	Environmental performance indicators can include: — emission factor: net GHG emissions per unit of production: tCO₂e/t hydrogen; — performance for electricity use: MWh/t hydrogen; — emissions factor, net GHG emissions per unit of production for electricity used: gCO₂e/kWh.
Rationale	
Currently, almost 96 % of industrially produced hydrogen is manufactured via steam reforming using fossil fuels: 48 % natural gas, 30 % liquid hydrocarbons and 18 % coal. Steam reforming is a mature process, associated with high CO₂ emissions and incompatible with the strategy for long-term GHG emission reductions. Minimizing emissions from hydrogen manufacturing, by promoting low-carbon emission production processes, can positively contribute to the mitigation objective.	
DNSH assessment (to evaluate impacts that are not the core environmental objective)	
The main potential significant harm to other environmental objectives from the manufacture of hydrogen is, in practical terms, inseparable from the potential for significant harm created by hydrocarbon refining activities more generally and is associated with:	

Table 10 (continued)

— 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 can lead to local resource depletion, dependent of the local scarcity of water resources; — 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).	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation.
(3) Water	For operations situated in areas of water scarcity, ensure that water use/conservation management plans, developed in consultation with relevant (local) interested parties, exist and are implemented.
(4) 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 minimize and manage waste and material use in accordance with the BAT conclusions of the refining of mineral oil and gas.
(5) Pollution	Ensure that emissions to air are within the best practice ranges for the refining of mineral oil and gas and for the chemical industry (e.g. for large volume inorganic chemicals: ammonia, acids and fertilizers). Ensure implementation of a recognized environmental management system (e.g. ISO 14001 or equivalent).
(6) Ecosystems	For operations located in a protected area, or which include activities outside a protected area but likely to have a significant negative impact on its biodiversity, ensure that an appropriate assessment based on the conservation objectives of the protected area has been conducted in conformity with one of the following: — IFC Performance Standard 6, <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>; — an equivalent national standard. For such operations, a site-level biodiversity management plan shall be implemented.

Table 11 — Manufacture of inorganic basic chemicals

Sector classification and activity	
Macro-sector	Manufacturing
Description	Includes manufacture of: — carbon black; — disodium carbonate (soda ash); — chlorine.
Sector criteria	
Potential environmental benefits	Reducing the emissions from the manufacturing of carbon black and soda ash and improving energy efficiency and switching to low-carbon electricity in the manufacturing of chlorine can positively contribute to the climate change mitigation objective.
Environmental performance indicators	For carbon black and soda ash, environmental performance indicators can include: — net GHG emissions (tCO₂e)/t product; — net GHG emissions shall be calculated according to the methodology used for benchmarks. For the manufacturing of chlorine, environmental performance indicators can include: — electricity use: MWh/t chlorine (alternating current at “X” kA/m²).

Table 11 (continued)

	Carbon intensity of the electricity used for chlorine manufacturing: gCO₂e/kWh. For the manufacturing of all chemicals covered in this activity, the selected metric is: — emission factor: net GHG emissions per unit of production (tCO₂e/t); — water metric: water consumption per unit of production (m³/ton); — effluents metric: effluents generation per unit of production (m³/ton); — waste metric: waste generation per unit of production (m³/ton).
Rationale	
The carbon black manufacturing process accounts for approximately 3,4 % of the net GHG emissions from the chemical sector, while the manufacturing of soda ash accounts for 1,5 % of the emissions. Reducing the manufacturing emissions for carbon black and soda ash and improving energy efficiency in the manufacturing of chlorine can positively contribute to the mitigation objective. The absolute performance approach has been proposed in order to identify the maximum acceptable carbon intensities of the manufacturing processes of carbon black and soda ash that the activities should comply with in order to be able to substantially contribute to the mitigation objective. Product benchmarks have been selected as thresholds for the manufacturing of carbon black and soda ash. They reflect the average performance of the 10 % most efficient installations in a sector. All direct emissions related to production (the process direct emissions and the emissions due to fuel use for energy production) are covered. NOTE According to the methodology to calculate related benchmarks, emissions from electricity are considered where direct emissions and indirect emissions from electricity are to a certain level interchangeable (as is the case for carbon black but not for soda ash). For the manufacturing of chlorine, the process shall be based on low-carbon electricity.	
DNSH assessment (to evaluate impacts that are not the core environmental objective)	
The main potential significant harm to other environmental objectives from the manufacture of carbon black is associated with: — polluting emissions to air, especially volatile organic compounds (VOCs) and dust; — the use of water for cooling purposes in areas of water scarcity; — generation of waste. The main potential significant harm to other environmental objectives from the manufacture of soda ash is associated with: — 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 areas of water scarcity 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”. The main potential significant harm to other environmental objectives from the manufacture of chlorine is associated with: — polluting emissions to air (e.g. chlorine); — process water effluents that can contain oxidizing agents (e.g. chlorine); — use of water in areas of water scarcity; — generation of waste.	

Table 11 (continued)

(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation.
(3) Water	For operations situated in areas of water scarcity, ensure that water use/conservation management plans, developed in consultation with relevant (local) interested parties, exist and are implemented.
(4) Circular economy	Wastes and by-products, especially hazardous manufacturing wastes, are managed in line with waste treatment best practices for large volume inorganic chemicals-solids and other industries.
(5) Pollution	Ensure polluting emissions to air are within best practice ranges for chemicals and other industries. Ensure implementation of a recognized environmental management system (e.g. ISO 14001 or equivalent).
(6) Ecosystems	For operations located in a protected area, or which include activities outside a protected area but likely to have a significant negative impact on its biodiversity, ensure that an appropriate assessment based on the conservation objectives of the protected area has been conducted in conformity with one of the following: — IFC Performance Standard 6, <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>; — an equivalent national standard. For such operations, a site-level biodiversity management plan shall be implemented.

Table 12 — Manufacture of organic basic chemicals

Sector classification and activity	
Macro-sector	Manufacturing
Description	Manufacture of the following organic chemicals: — high volume chemicals: — acetylene; — ethylene; — propylene; — butadiene; — aromatics: — mixed alkylbenzenes and mixed alkylnaphthalenes; — cyclohexane; — benzene; — toluene; — o-Xylene; — p-Xylene; — m-Xylene and mixed xylene isomer; — ethylbenzene; — cumene;

Table 12 (continued)

	— biphenyl, terphenyls, vinyltoluenes, other cyclic hydrocarbons excluding cyclanes, cyclenes, cycloterpenes, benzene, toluene, xylenes, styrene, ethylbenzene, cumene, naphthalene and anthracene; — benzol (benzene), toluol (toluene) and xylol (xylenes); — naphthalene and other aromatic hydrocarbon mixtures (excluding benzole, toluole, and xylene); — vinyl chloride; — styrene; — ethylene oxide; — monoethylene glycol; — adipic acid; — organic chemicals: — industrial monocarboxylic fatty acids and acid oils from refining; — saturated acyclic monocarboxylic acids and their derivatives; — unsaturated monocarboxylic, cyclanic, cyclenic or cycloterpenic acyclic polycarboxylic acids and their derivatives; — aromatic polycarboxylic and carboxylic acids with additional oxygen functions and their derivatives, except salicylic acid and its salts.
Sector criteria	
Potential environmental benefits	The manufacturing of organic chemicals is associated with significant CO ₂ emissions. Minimizing process emissions and promoting the manufacturing of organic chemicals with renewable feedstock can contribute to the mitigation objective.
Environmental performance indicators	For the manufacturing of all chemicals covered in this activity [except for chemicals listed in a) to d) below], the selected metric is: — net GHG emissions per unit of production (tCO₂e/t) based on a carbon footprint study in accordance with ISO 14067. Separate eligibility criteria apply to the following organic compounds: a) industrial monocarboxylic fatty acids; acid oils from refining; b) saturated acyclic monocarboxylic acids and their derivatives; c) unsaturated monocarboxylic, cyclanic, cyclenic or cycloterpenic acyclic polycarboxylic acids and their derivatives; d) aromatic polycarboxylic and carboxylic acids with additional oxygen functions, and their derivatives, except salicylic acid and its salts. The organic compounds listed in a) to d) above shall be eligible if they meet the following criteria: — manufacturing of the organic chemicals shall be wholly or partially based on renewable feedstock; — the carbon footprint shall be substantially lower compared to the carbon footprint of the same chemical manufactured from fossil fuel feedstock. Any forest biomass used in the process is committed to sustainable forest management (SFM) certification. For the purpose of applying these criteria, renewable feedstock refers to biomass, industrial biowaste or municipal biowaste. The manufacturing of organic chemicals is associated with significant CO₂ emissions. Minimizing process emissions and promoting the manufacture of organic chemicals with renewable feedstock can contribute to the mitigation objective.

Table 12 (continued)

Rationale
The manufacturing of high value chemicals, aromatics, ethylene chloride, vinyl chloride, ethylbenzene, styrene, ethylene oxide, mono ethylene glycol and methanol accounts for significant emissions in the chemical sector. Steam cracking is the main industrial process for manufacturing high value chemicals but is also the most energy intensive one in the chemical industry. Reducing emissions from the manufacturing process of organic chemicals can therefore positively contribute to the mitigation objective. The absolute performance approach has been proposed in order to identify the maximum acceptable carbon intensity that the activity should comply with in order to be able to substantially contribute to the mitigation objective. Note on electricity: According to the methodology to calculate benchmarks, emissions from electricity are considered where direct emissions and indirect emissions from electricity are to a certain level interchangeable. The thresholds have been aligned with the work undertaken in the respective forestry subgroup. The following principles have been applied where biomass use is relevant: — All sustainable forestry management requirements have legislation as minimum baseline. The forest taxonomy includes this overarching principle. — The taxonomy does not include forest plantations because of the mitigation focus. The international guiding principles against deforestation provided by the United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD)^[34] is recognized as an overarching principle. Manufacturing of chemicals: — industrial monocarboxylic fatty acids; and acid oils from refining; — saturated acyclic monocarboxylic acids and their derivatives; — unsaturated monocarboxylic, cyclanic, cyclenic or cycloterpenic acyclic polycarboxylic acids and their derivatives; — aromatic polycarboxylic and carboxylic acids with additional oxygen functions, and their derivatives, except salicylic acid and its salts. It is possible to propose a framework to facilitate sustainable investment that includes “switching to use of renewable materials” to provide a substantial contribution to climate change mitigation. The innovative bio-based chemical sector can contribute to that objective. Therefore, additional criteria have been specified to identify the conditions under which the manufacturing process of organic chemicals, when based on renewable feedstock such as biomass, can substantially contribute to the mitigation objective. Bio-based chemicals are defined as chemical products that are wholly or partly derived from materials of biological origin (e.g. biomasses, feedstock, plants, algae, crops, trees, marine organisms, biological waste). Given their expected limited environmental footprint in comparison to their traditional counterparts, bio-based chemicals have recently emerged on markets as valid, environmentally friendly alternatives to standard chemicals.
DNSH assessment (to evaluate impacts that are not the core environmental objective)
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 damage by the construction and/or operation of the production facilities; — the use of water resources for production purposes (e.g. cooling water) in areas of water scarcity; — the generation of hazardous waste.

Table 12 (continued)

(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation.
(3) Water	For operations situated in areas of water scarcity, ensure that water use/conservation management plans, developed in consultation with relevant (local) stakeholders, exist and are implemented.
(4) Circular economy	Waste and by-products, especially hazardous waste, are managed in line with waste treatment management.
(5) Pollution	Ensure polluting emissions to air, soil and water are best practice ranges as set out in the following documents, as applicable: — large volume organic chemicals (LVOC); — common wastewater and waste gas (CWW); — emissions from storage (EFS); — refining of mineral oil and gas (REF); — waste treatment (WT); — waste incineration (WI). Ensure implementation of a recognized environmental management system (e.g. ISO 14001 or equivalent).
(6) Ecosystems	For operations located in a protected area, or which include activities outside a protected area but likely to have a significant negative impact on its biodiversity, ensure that an appropriate assessment based on the conservation objectives of the protected area has been conducted in conformity with one of the following: — IFC Performance Standard 6, <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>; — an equivalent national standard. For such operations, a site-level biodiversity management plan shall be implemented.

Table 13 — Manufacture of fertilizers and nitrogen compounds

Sector classification and activity	
Macro-sector	Manufacturing
Description	Manufacture of: — anhydrous ammonia; — nitric acid; — alternative organic fertilizers from natural sources.
Sector criteria	
Potential environmental benefits	The manufacturing of ammonia and nitric acid is highly carbon intensive. Therefore, reducing emissions from the manufacturing activity itself can positively contribute to the mitigation objective. Alternative organic fertilizers from natural sources are better for the environment.
Environmental performance indicators	Metric for nitric acid manufacturing: — emission factor: tCO₂e/t nitric acid. Net GHG emissions shall be calculated in accordance with ISO 14064-2. Metric for ammonia manufacturing:

Table 13 (continued)

	— direct emissions: tCO₂/t ammonia; — combined CO₂ emissions (indirect emissions): tCO₂/t ammonia. For the calculation of emissions from the manufacturing process of ammonia, both steps (i.e. production of the intermediate product hydrogen and synthesis of the ammonia) are considered.
Rationale	
Reducing emissions from manufacturing processes can positively contribute to the mitigation objective. The ammonia sector is expected to substantially contribute to net GHG emissions reduction, notably by using hydrogen produced from electrolysis. During the manufacturing process of nitric acid, the main type of GHG generated is nitrous oxide and, by applying the available technologies, it is possible to achieve more than 80 % of emission reductions. The selected metric for nitric acid is the emission factor, in terms of net GHG emissions per unit of production.	
DNSH assessment (to evaluate impacts that are not the core environmental objective)	
The main potential significant harm to the environment from the production of nitric acid or ammonia production is associated with: — polluting emissions to air [especially nitrous oxide (N₂O), nitrogen oxides (NO_x) and ammonia (NH₃)] from the production process; — vulnerable ecosystems can be damaged by the construction or operation of production facilities; — the use of water resources for production purposes (especially for cooling processes) in areas of water scarcity; — the generation of hazardous wastes (e.g. spent catalyst material).	
(1) Climate mitigation	Activities within this sector/subsector are considered to contribute to this environmental objective, subject to the eligibility requirements described under “sector criteria” above.
(2) Adaptation	Reducing material physical climate risks and supporting system adaptation.
(3) Water	For operations situated in areas of water scarcity, ensure that water use/conservation management plans, developed in consultation with relevant (local) interested parties, exist and are implemented.
(4) Circular economy	Wastes and by-products, especially hazardous wastes, are managed in line with waste treatment best management practices.
(5) Pollution	Ensure polluting emissions to air [e.g. nitrous oxide (N₂O), nitrogen oxides (NO_x) and ammonia (NH₃)] and water are within best practice ranges. Ensure implementation of a recognized environmental management system (e.g. ISO 14001 or equivalent).
(6) Ecosystems	For operations located in a protected area, or which include activities outside a protected area but likely to have a significant negative impact on its biodiversity, ensure that an appropriate assessment based on the conservation objectives of the protected area has been conducted in conformity with one of the following: — IFC Performance Standard 6, <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>; — an equivalent national standard. For such operations, a site-level biodiversity management plan shall be implemented.

Table 14 — Manufacture of plastics in primary form

Sector classification and activity	
Macro-sector	Manufacturing
Description	Manufacture of plastics in primary form
Sector criteria	
Potential environmental benefits	The manufacturing of plastics is associated with significant life cycle CO ₂ emissions. Materials recirculation and manufacture of polymers with renewable feedstock can contribute to reduce CO ₂ emissions from the plastic sector.
Environmental performance indicators	Manufacture of plastics in primary form shall conform with at least one of the following three criteria and, when relevant with the additional criteria, as given below: 1. Plastics in primary form shall be manufactured by mechanical recycling. 2. Plastics in primary form shall be manufactured by chemical recycling. When applying criterion 2, the carbon footprint of plastics in primary form, manufactured by chemical recycling, shall be lower when compared to the carbon footprint of plastics in primary form manufactured with fossil fuel feedstock. For criteria 1 and 2, the carbon footprint calculation should also account for the avoided GHG emissions from the combustion, incineration or degradation of plastic waste. 3. Manufacture of plastics in primary form shall be wholly or partially derived from renewable feedstock and the carbon footprint of plastics in primary form, manufactured wholly or partially from renewable feedstock, shall be lower when compared to the carbon footprint of plastics in primary form manufactured with fossil fuel feedstock. For the purpose of applying criterion 3, renewable feedstock refers to biomass, industrial biowaste or municipal biowaste. The activity shall conform with the following additional criteria. If feedstock is biomass (excluding industrial and municipal biowaste): — a full traceability of sourcing through the corresponding chain of custody management system shall be in place and its requirements fulfilled; — any forest biomass used in the process shall conform with the appropriate taxonomy where applicable; — any forest biomass used in the process shall be sourced from sustainable forests (methods to demonstrate conformity with SFM requirements include self-declarations provided by the organization, second-party assessments conducted by interested parties and certification by a third party); — forest biomass coming from irrigated forest plantations shall not be used; — any biomass used in the process shall be subject to a transparent, credible chain of custody as defined in ISO 13065; — the biomass shall not come from agricultural land that has been the subject of land use change from forest or pasture since 2008; — in particular for forest biomass, small-scale palm oil cultivators operating in existing forest plantations should be eligible if they receive their fair share of profits. If feedstock is industrial biowaste (including waste from food or feed industries) or municipal biowaste, any solid biowaste used in the manufacturing process shall originate from source-segregated and separately collected (non-hazardous) waste streams (i.e. shall not be separated from mixed residual waste).