FACTSHEET: ENERGY

Version 1 (November 2023)

AIM OF THE FACTSHEET

The benchmark factsheet is designed for companies or investors to assess a sector's impact on biodiversity. Companies can use the factsheet **to compare their impacts** (*e.g.* assessed with the Global Biodiversity Score tool) to the sector average or to estimate their impacts and main pressures on biodiversity. Also, investors can use it **to screen their biodiversity impact**, or rate specific companies' performance against sectoral benchmarks. Finally, factsheets will help nourish the work of the EU Taxonomy by identifying low impact companies. It is supported by a technical annex and a reading guide.

WHAT DOES THE SECTOR INCLUDE?

The Energy sector refers to the **section D of NACE rev 2**, and includes the production of electricity by coal, gas, nuclear, hydro, wind, petroleum and other oil derivative, biomass and waste, solar photovoltaic, solar thermal, tide, wave, ocean and geothermal, the transmission, distribution and trade of electricity, the manufacture of gas, the distribution of gaseous fuels through mains, and steam and hot water supply. The extraction of raw materials is not included but is part of the Upstream Scope 3 impacts.

EXIOBASE INDUSTRY	NACE rev2 CODE
Electricity, gas, steam and air conditioning supply	D.35 Electricity, gas, steam and air conditioning supply

KEY MESSAGES

➤ The Energy sector is a **highly impacting industry** for which most dynamic impacts occur within the Scope 1. Most static impacts (excluding impacts due to Climate change) occur within the Upstream Scope 3 and the Climate change static impacts occur mostly within the Scope 1.

➤ There is a **high variability** of the impact intensity within the industry depending on the technology used.

➤ The key impact drivers to monitor and reduce are mainly **Climate change and Land use**. For the aquatic impacts, the key drivers include also Wetland conversion and Land use in catchment of wetlands (linked to pollution).

KEY FIGURES

Scope 1 terrestrial static intensity:
2.4 MSA.m²/kEUR

Scope 1 terrestrial dynamic intensity:
19 MSA.m²/kEUR

Vertically integrated terrestrial static intensity:
200 MSA.m²/kEUR

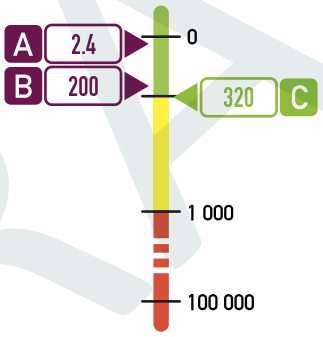
Vertically integrated terrestrial dynamic intensity:
25 MSA.m²/kEUR

Ecosystem services dependency score:

Scope 1	Upstream Scope 3
16%	13%

TERRESTRIAL STATIC PERFORMANCE OF THE SECTOR(1)

Intensity (MSA.m²/kEUR)



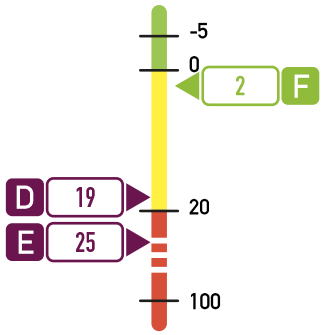
A Sectoral Scope 1 terrestrial static intensity

B Sectoral Vertically integrated (Scope 1, 2, 3 Upstream summed) terrestrial static intensity

C Global Scope 1 terrestrial static intensity compatible with a safe operating space

TERRESTRIAL DYNAMIC PERFORMANCE OF THE SECTOR(1)

Intensity (MSA.m²/kEUR)



D Sectoral Scope 1 terrestrial dynamic intensity

E Sectoral Vertically integrated (Scope 1, 2, 3 Upstream summed) terrestrial dynamic intensity

F World average Scope 1 terrestrial dynamic intensity

BIODIVERSITY FOOTPRINT

Realm	Accounting category	Impact intensity – MSA.m²/kEUR		Impact intensity – MSAppb/bEUR		Impact intensity – MSAppb*/bEUR(2)	
		Scope 1	Vertically integrated	Scope 1	Vertically integrated	Scope 1	Vertically integrated
Terrestrial	Dynamic	19	25	150	190	150 – 290(3)	250 – 400(3)
	Static	2.4 – 960(3)	200 - 1 200(3)	18 - 7 200(3)	1 500 - 9 000(3)		
Aquatic	Static	0.13	15	12	1 400		

(1) The aquatic static impact is not presented here because of its lower materiality. The aquatic dynamic impact is not included in this factsheet due to the lack of reliability of the results.
(2) The aquatic dynamic results are excluded from the calculation of the impact intensity in MSAppb*/bEUR. They are available in the technical annex if needed.
(3) The upper end includes an estimation of the climate change terrestrial static impact (see technical annex for calculation methodology). The other figures and charts presented on the factsheet do not include this climate change terrestrial static impact, unless stated otherwise.

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KEY ISSUES OF THE SECTOR

ECOSYSTEM SERVICES DEPENDENCIES OF THE ENERGY SECTOR(1)

The direct dependencies of the sector are calculated by the ENCORE model, a tool developed to provide knowledge on sectors' dependency on various ecosystem services (see the technical annex for the methodology).

The highest Scope 1 dependence of the sector is the ecosystem service "**surface water**" (dependency score of 56 %) which is provided through freshwater resources from collected precipitation and water flow from natural sources. This dependency is very high for three industries in particular: hydropower production, nuclear and thermal power stations (for cooling purposes), and water services.

The service "**flood and storm protection**" (dependency score of 48 %) is the second highest dependency score and provides sheltering, buffering and attenuating effects of natural and planted vegetation.

The figures displayed in the box "Key figures" are an aggregated score over all ecosystem services: 16 % for Scope 1 and 13 % for Upstream Scope 3.

HOW DOES THE SECTOR CONTRIBUTE TO CHANGES IN THE STATE OF NATURAL CAPITAL ?

The burning of fossil fuels is widely known to be a **major cause of climate change** through the emission of greenhouse gases, presenting a significant impact on biodiversity globally. In 2020, the electricity sector was responsible for 12.3 Gt CO_2 emissions, representing 36% of all energy related emissions. Coal represents one-third of electricity supply but three-quarters of the sector CO_2 emissions. In second came natural gas both in terms of electricity supply and CO_2 emissions in the sector (World Energy Outlook 2021).

In terms of Scope 1 L**and use**, the area required per unit of energy varies according to local circumstances and technology but is **typically greater for renewable energy**, excluding biomass, than for natural gas, coal or nuclear energy. However, land use from non-renewable energy is more intensive with important impacts throughout the upstream life cycle, especially on existing water resources. Non-biomass renewables typically have smaller Land use impacts: while the area required is more important, non-intensive land use often allows other simultaneous uses, with grazing and even agricultural production possible within wind or photovoltaic farms (Global Land Outlook 2017). See technical annex for details.

OPPORTUNITIES

Climate considerations are **pushing the sector toward renewable energy** to limit greenhouse gas emissions. Indeed, the decarbonisation of the economy is based on a rapid scale up of renewables.

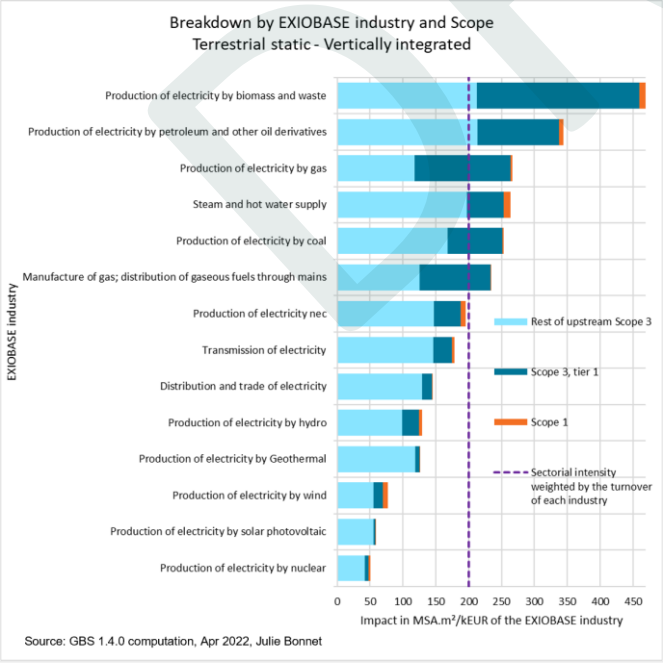
While the potential risk on biodiversity of this scale up is important, especially in terms of land use, actions can be taken **to mitigate the sector's impact on biodiversity**. Unlike for other energy sources, the abundance of solar and wind energy provides **flexibility in project siting,** allowing the use of already converted or disturbed land or offshore locations away from high sensitivity areas (IUCN 2021).

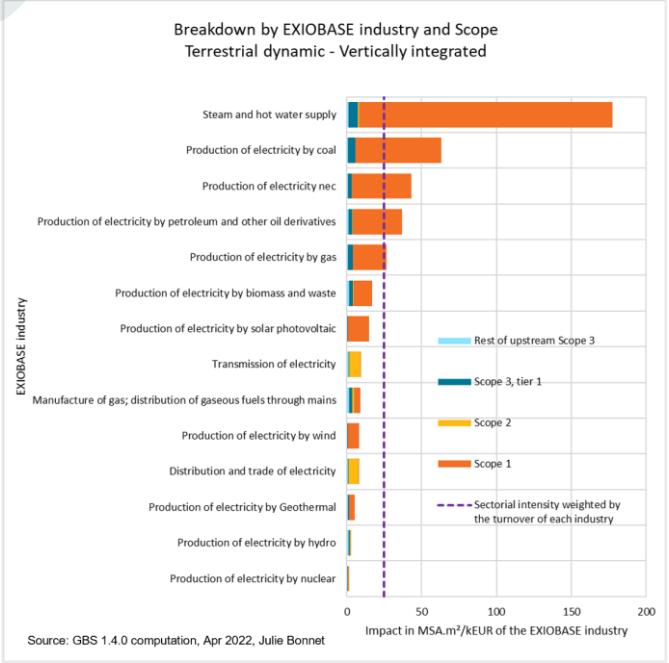
SCOPE AND INDUSTRY BREAKDOWN

Here is presented the breakdown of the terrestrial static and dynamic impacts by Scope and EXIOBASE industry.

For all industries, the majority of the **static impacts occurs within the Upstream Scope 3**. The sector's upstream footprint is largely due to the Land use of the following commodities: woodlogs, mining of coal and lignite, extraction of natural gas and extraction of crude petroleum. These commodities are consistent with the industries with the biggest impact. The impact of the EXIOBASE industry "Production of electricity by biomass and waste" is the most important and is mostly due to the cultivation of biomass.

On the other hand, almost all the **dynamic impacts occur within the Scope 1**. The industry "Steam and hot water supply" is the most impactful, as steam and hot water are still generated mostly from fossil sources. Non-renewable electricity production industries are behind.





(1) See the technical annex and factsheet template for more information on dependency scores.

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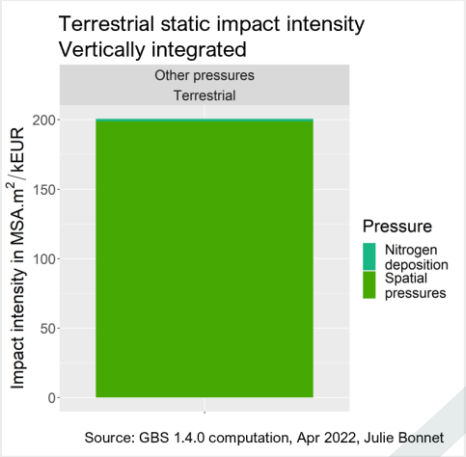
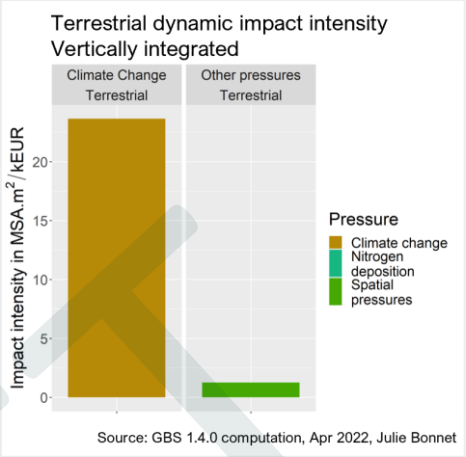
IMPACT DRIVERS BREAKDOWN[1]

The following paragraph presents the shares of each pressure for the terrestrial dynamic and static impact. The Climate change pressure is reported separately from other pressures. This allows to distinguish between impacts already tackled through a company's climate policy and the non-climate impacts it needs to tackle through additional actions. The spatial pressures include Land use, Encroachment and Fragmentation. These terrestrial impacts are mostly due to the pressures Climate change and Land use.

The aquatic impacts, not reported here, are mostly due to pollution (*via* Land use in catchment of wetlands) and land use (*via* Wetland conversions). The graphs presenting the aquatic static impacts can be found in the technical annex.

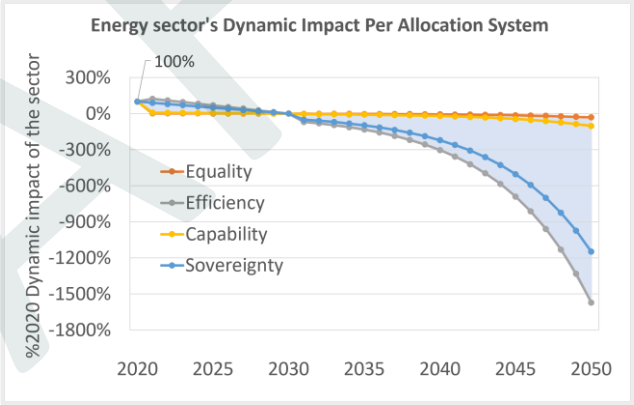




SCIENCE BASED TARGETS FOR BIODIVERSITY

The global post-2020 biodiversity framework aims to reach at least **a global no net loss of biodiversity in 2030** (interpreted as a global dynamic impact of 0 in 2030) and **restore biodiversity between 2030 and 2050** (interpreted here as a return to the "zone of functional integrity of the Earth system" by 2050). This global budget needs to be allocated to economic sectors and companies. Different allocation approaches (listed below) can be used to allocate efforts: these methods lead to different sectoral trajectories.

ALLOCATION	APPROACH	DATA USED
Equality	Everyone has the same right	Number of employees in the sectors (2010)
Efficiency	Cost-effectiveness	Restoration cost (EUR/[MSA.m²])
Capability	Industries' ability to pay	Turnover (MEUR) (2011)
Sovereignty	Grandfathering	2020 dynamic impact (MSA.km²/year)



The Energy sector has the **highest effort to achieve in the efficiency allocation**. This can be explained by low restoration costs. The sovereignty approach also leads to high efforts as the sector represents 19 % of the 2020 dynamic impact.

POSSIBLE ACTIONS TO REDUCE THE IMPACT ON BIODIVERSITY

SCOPE 1	Apply the mitigation hierarchy (avoid, reduce, restore & offset) to all impacts from energy activities Avoid the implantation of power plants in important biodiversity areas Support the transition to renewables and low carbon power Wind power: favour smaller number of large turbines with greater energy output, design the infrastructures and operate them to reduce impacts (*e.g.* shutdown on demand to minimize collision risk, installation of Bird Flight Diverters on transmission lines)[2] (IUCN 2021) Solar photovoltaic: develop agrivoltaic technology
SCOPE 2	Distribution, transmission and trade of electricity: optimise the process to reduce energy losses Encourage Power Purchase Agreements toward renewables
UPSTREAM SCOPE 3	Choose the timing of power plants construction activities to avoid disturbing biodiversity during sensitive periods (*e.g.* during breeding seasons) (IUCN 2021) Biomass: Favour low impact raw materials, such as residues, by-products, or raw materials with lower Land use impact Research lower impact substitutes for current raw materials Mining: Plan ecological rehabilitation strategies when decommissioning assets
DOWNSTREAM SCOPE 3	End of life: Choose the timing of decommissioning activities to avoid disturbing biodiversity during sensitive periods (IUCN 2021) Offshore wind: consider (if legislation allows) leaving infrastructure in place if there is a biodiversity/ecosystem services benefit such as the reef effect associated with foundation/scour protection (IUCN 2021) Incentivise energy sobriety and energy efficiency (*via* energetic renovations for example) (CDC Biodiversité 2020)

(1) The EXIOBASE land use inventory data of the production of electricity are not connected to the GBS, thus underestimating the Scope 1 Land use impacts.
(2) These types of impacts are not yet evaluated by the GBS but should be considered by companies (see technical annex).

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ENVIRONMENTAL SAFEGUARDS

Some impacts and pressures are not covered by the figures displayed in this benchmark factsheet (partly due to limitations in the Global Biodiversity Score tool used to obtain them). They should not be ignored when defining the biodiversity action plan.

- **Avoid locating activities on or near sites of high environmental value** or establish a specific management plan. For instance, avoid deforestation and encroachment on protected areas.
- **Restore habitats** during operations and/or after operations (IFC 2012).
- Conduct a **systematic review** to identify priority ecosystem services, meaning those on which project operations are most likely to have an impact and those on which the project is directly dependent (e.g., water) (IFC 2012).

See the GBS review report "Quality assurance" for the full list of environmental safeguards to implement (CDC Biodiversité 2020; IFC 2012).

The **EU Taxonomy Climate Delegated Act**, published in the official journal in December 2021, describes conditions for activities within the "Energy" sector to make a substantial contribution to the climate objectives. Here are some examples of technical screening criteria:

➤ **Climate change mitigation**: a threshold of 100g CO_2e/kWh is proposed for electricity generation and heat production.

➤ **Climate change adaptation**: the economic activity has implemented physical and non-physical solutions ('adaptation solutions') that substantially reduce the most important physical climate risks that are material to that activity.

This first delegated act also describes in further details conditions of **Do No Significant Harm (DNSH)** for the six objectives. They are reported in the benchmark factsheet's technical annex. A second delegated act for the 4 remaining objectives should be published in 2022.

BIODIVERSITY FOOTPRINT ASSESSMENT

GENERAL OBJECTIVES OF A GBS-BASED ASSESSMENT

The factsheet helps companies of each sector to understand their most material impacts. However, a Biodiversity Footprint Assessment is more company specific and allows to calculate the companies' impacts on biodiversity. Indeed, a GBS-based assessment uses companies' data (emissions, land use or other pressures and also raw materials and products purchased and produced by the companies) to calculate biodiversity impacts.

Thus, a GBS-based Biodiversity Footprint Assessment allows to:

- **Assess quantitatively the biodiversity footprint** generated by the activity of the company or by its investment portfolio and to **assess the contribution of the company to global biodiversity erosion**;
- Understand to which impacts drivers on biodiversity the company contributes
- Provide elements for a **short-term** and a **mid-term action plan to reduce the footprint** on biodiversity and alleviate the contribution of the company to biodiversity erosion
- **Anticipate future mandatory biodiversity footprint disclosure** in France and in the European Union (action 30 of the French National Biodiversity Plan, post-2020 Biodiversity Agenda)

Limitations: The assessment does not consider some pollution impact drivers nor the existence of invasive species, the impacts on genetic and marine biodiversity

HOW TO LEAD A BIODIVERSITY FOOTPRINT ASSESSMENT BASED ON THE GLOBAL BIODIVERSITY SCORE?

A GBS-based assessment can be led by **various organisms**:

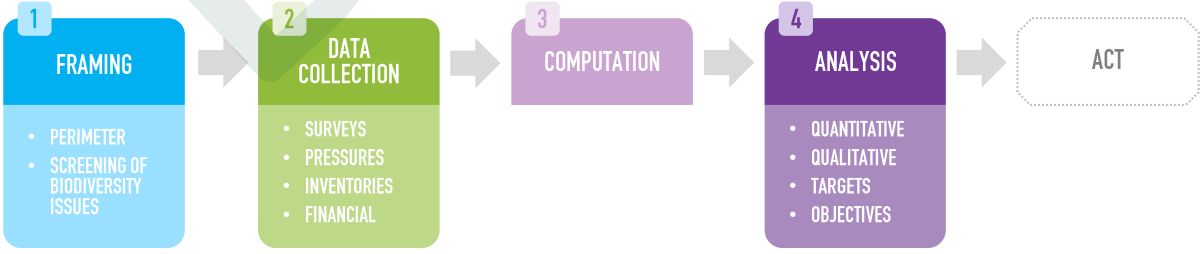
- The company itself, after being trained to use the GBS
- CDC Biodiversité or external GBS-trained assessors (list available here), instructed by the company
- A GBS-trained non-financial rating agency

A biodiversity footprint assessment follows **4 main steps**, as shown below:

- The **framing** step validates the scope of the assessment, particularly in terms of **Scopes and assessed pressures**.
- During the **data collection** step, the **methodological choices** are validated: assumptions applied, proxies used, possible limits identified
- The **computation** uses the refined analysis and the pressure-impact relationships of the GBS tool to compute impacts.
- The **analysis** step explains the results obtained with the GBS by **identifying major impacts** as well as the **main sources of these impacts**. It is also an opportunity to identify objectives and **impact reduction actions, aligned with international recommendations**.

The **relevance** of the assessment depends on:

- The inclusion of direct operations and value chain impacts
- The consistency and transparency of the data and methodology used
- The appropriate quality assurance and complete disclosure of the results



Energy factsheet version 1.0, August 2022. GBS computations: GBS 1.4.0, April 2022, Julie Bonnet.

More information
About the GBS: https://www.cdc-biodiversite.fr/le-global-biodiversity-score/
About the factsheets: https://www.cdc-biodiversite.fr/documentation-gbs/
Measuring the contributions of business and finance towards the post-2020 global biodiversity framework (CDC Biodiversité, 2020)
Establishing an ecosystem of stakeholders to measure the biodiversity performance of human activities (CDC Biodiversité, 2021)
The sources are referenced in the section "Energy" of the technical annex.