Industry-led carbon footprinting methodology for offshore wind

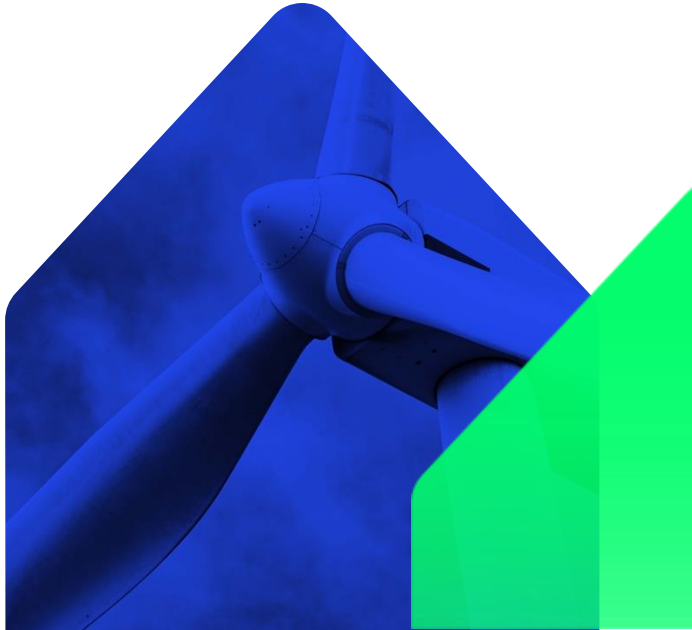
Wind Offshore 2026, Helsinki

26 March 2026

Wind Offshore 2026, Helsinki

Agenda

1. About the Carbon Trust
2. Carbon emissions in offshore wind
3. Sustainability JIP industry guidance
4. Q&A



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The Carbon Trust

Our mission is to accelerate the move to a decarbonised future.

5

supporting clients
across 5 continents

350+

experts and consultants

20

years of experience in
sustainability consultancy

The Carbon Trust

Offshore Wind

Our mission is to accelerate the move to a decarbonised future

We believe offshore wind has a critical role to play in delivering a low carbon energy system, as a global competitive technology.

We have accelerated **cost reduction** and **stimulated the supply chain** by working with industry and governments **since 2008**.

The Carbon Trust

Offshore Wind

Joint Industry Programmes (JIP) Accelerators

- Pre-competitive space to tackle industry-wide challenges
- Standard setting (e.g. Cable Burial Risk Assessment, 66kV/132kV)
- Technology demonstration (e.g. bird collision avoidance campaign)
- Competition and innovator support

Market agnostic

Generic solution for OSW

The Offshore Wind Accelerator (OWA) — 2008
Carbon Trust's flagship collaborative RD&D programme for bottom-fixed offshore wind.

The Floating Wind JIP (FLW JIP) — 2016
The Floating Wind JIP Overcomes challenges and advance opportunities for commercial scale floating wind

The Offshore Renewables JIP (ORJIP) — 2011
Offshore Renewables JIP aims to reduce consenting and environmental risks for offshore projects.

The Integrator — 2020
The Integrator is designed to examine the interplay between offshore wind, existing infrastructure, and other technologies to highlight opportunities for innovation investment.

Sustainability JIP (SUSJIP) — 2023
The Sustainability joint industry programme aims to decarbonise offshore wind farm developments and support developers to achieve net zero targets.

Market Specific

Addressing specific market challenges

National Offshore Wind R&D Consortium (NOWRDC), 2018
Prioritize, support, and promote R&D activities that reduce cost and risk of offshore wind development projects in the U.S.

Philippines Offshore Renewables Accelerator (PHORA), 2021
Accelerates offshore wind development in the Philippines by conducting impactful research that resolves barriers to offshore wind.

Viet Nam Offshore Wind Centre of Excellence (COE), 2023
Aims to create local economic opportunities for Viet Nam by lowering the cost of offshore wind. Carbon Trust developed the scoping phase of the COE.

Advisory

Specialist advice for governments and industry:

- New market opportunities
- Domestic economic benefits
- Sustainable accelerated OSW development

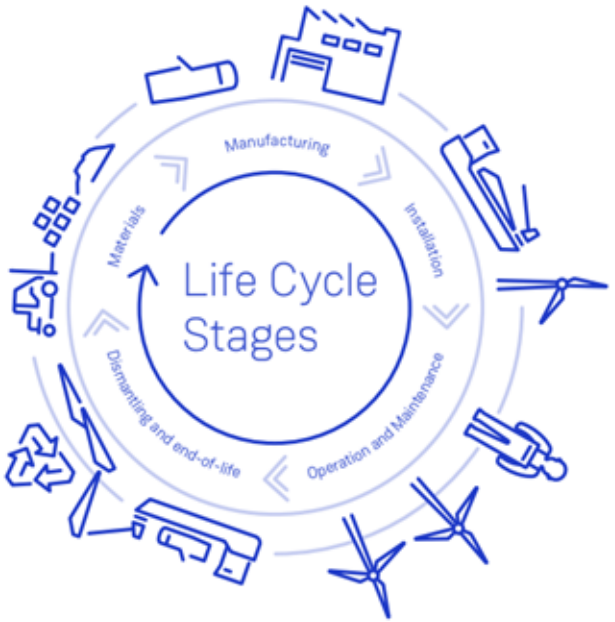
The Sustainability Joint Industry Programme

Objective and structure

- A **developer-funded** and **developer-led** collaborative programme to accelerate decarbonisation action across future fixed and floating projects for a net-zero OSW industry.
- Drive for industry alignment of measuring carbon footprints using the **OSW Product Carbon Footprinting Industry Guidance.** Interface with relevant initiatives and parties to enable an industry-wide shift.
- Drive industry change by **implementing key decarbonisation activities** through collaboration.
- A **united developer voice on decarbonisation action** will help influence the wider industry on targets and decarbonisation ambitions in the OSW sector.

Sustainability

The challenge in offshore wind



Siemens Gamesa, Environmental Product Declaration

Generating electricity from renewable offshore wind reduces CO2 emissions by 1.6Mt CO2 emissions per GW [1].

So, what's the challenge?

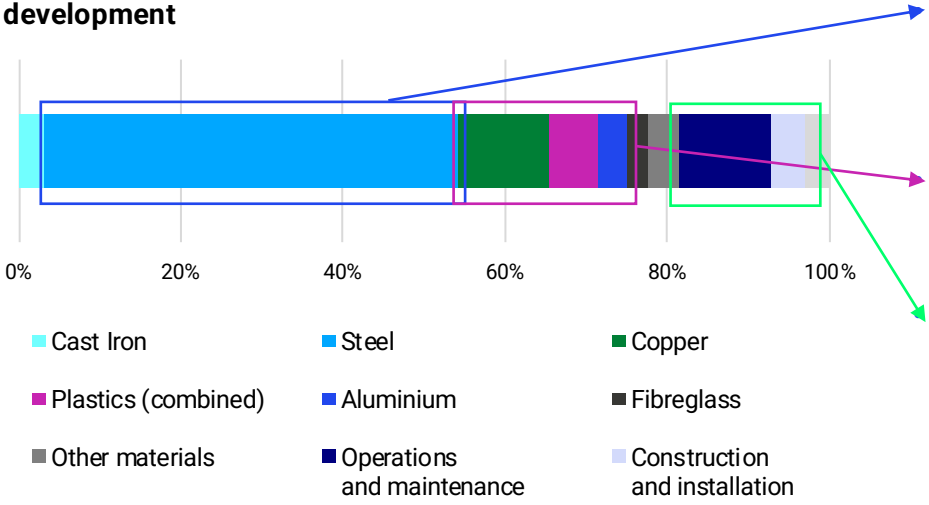
- Total GHG emissions for the lifetime of an offshore wind farm are much lower than a coal-based power plant. However, **GHG emissions are produced throughout the lifecycle.**
- The capacity required to meet long term climate targets will mean significant release of GHG emissions.
- **Offshore wind projects in development now will shape the sector's standards and impact through 2050.**
- The offshore wind industry is experiencing pressure from investors to decarbonise assets.
- Non-price criteria in offshore wind leasing auctions is likely to include sustainability aspects.

[1] of natural gas displacement. *IEA, 2020*

Sustainability

Emission sources for an average OSW farm

Baseline composition of emission sources for an average OSW development



Offshore wind decarbonisation pathway

Steel contributes **over 50% of life cycle carbon emissions** for an average OSW development. This represents the area where the most significant reductions are required to achieve Net Zero.

Embodied emissions from **other materials (copper, plastics, cast iron, and aluminium)** contribute **24%** to a development's total footprint.

15-20% of emissions are produced by **construction, installation and operation and maintenance activities** throughout an OSW development's lifetime. This reflects the emissions associated with the vessel fuels required for these offshore activities.

The emissions profile of an OSW farm can vary based on factors such as project size, distance from shore, the choice of foundation material and design.

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Carbon emissions in offshore wind

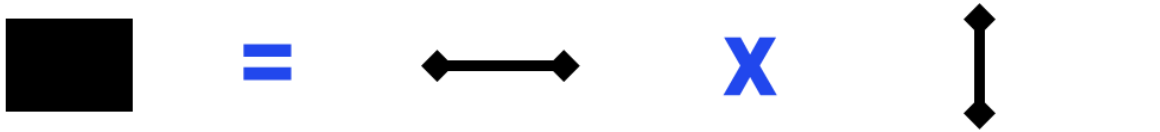
What is carbon footprinting?

A carbon footprint is the total greenhouse gas (GHG) emissions caused **directly** or **indirectly** by an individual, product, system or organisation across its **full life cycle.**

The climate impact from emissions of different GHGs are expressed in the same unit, **carbon dioxide equivalents (CO2e)** for ease of calculation and interpretation.

CARBON FOOTPRINT

Activity impact = *volume of input* X *carbon intensity of input*



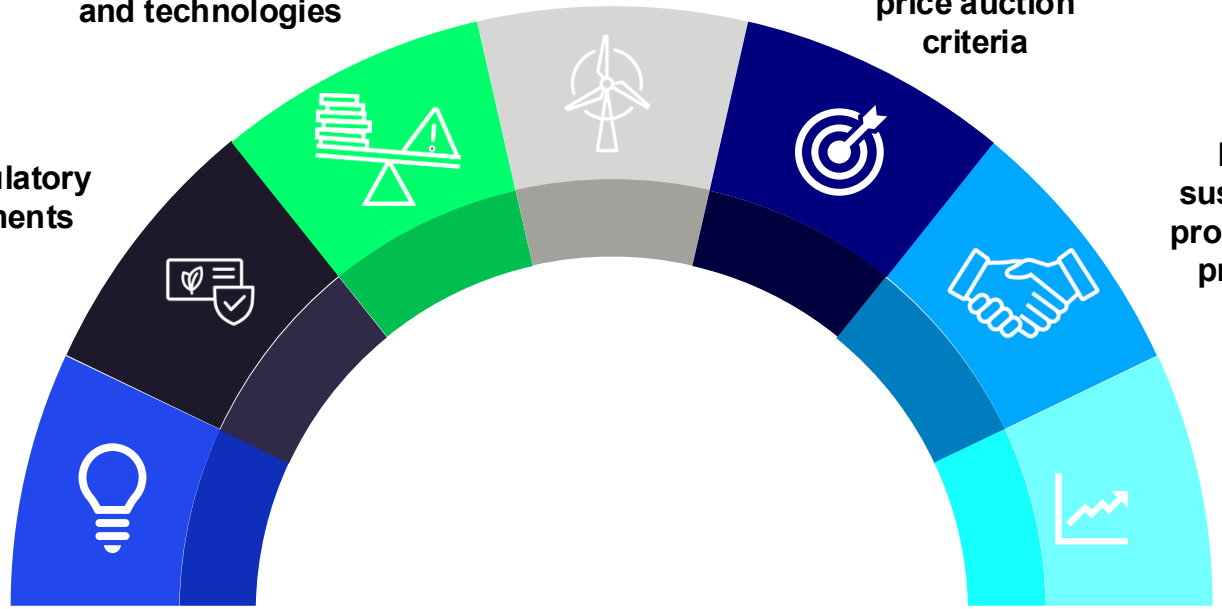
Carbon emissions
(tons of CO_2e)

Activity data
(tonnes; kWh; litres; km etc.)

Emission Factor
(CO_2e per Activity unit)

Relevant stages in a life cycle carbon footprint for offshore wind energy:

Why measure carbon footprints for Offshore Wind developments?



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Sustainability JIP industry guidance

Measuring the carbon footprint of an offshore wind farm

Lack of industry guidance for carbon footprinting for offshore wind → Different interpretations of cross-sectoral standards → Reduced consistency and comparability across the sector →

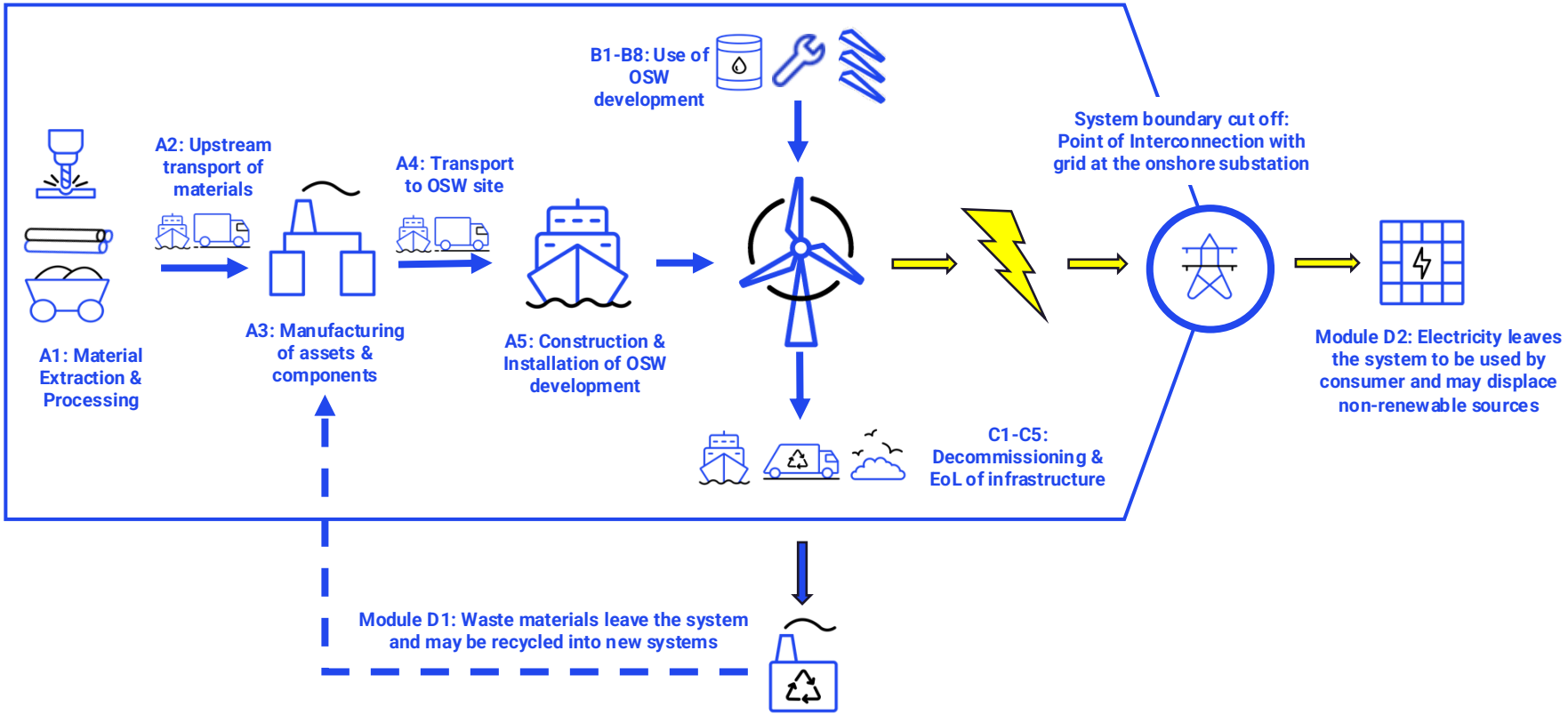
SUS JIP is closing this gap by developing the '**Offshore Wind Industry Product Carbon Footprinting Guidance**'

The aims of the **Product Carbon Footprinting guidance** are to provide:

- **Sector specific rules for the application of the relevant standards** for Product Carbon Footprints (PCFs) to an Offshore Wind development (ISO 14067, GHG Protocol Product Standard).
- **Standard assessment criteria** to harmonise the calculation approach within the industry.
- A framework for developers to **calculate and report** different emissions metrics.
- A framework to **improve data quality** and data exchange.

A freely available **OSW product carbon footprinting guidance document**, and **calculator tool** published in 2024, revised in 2026.

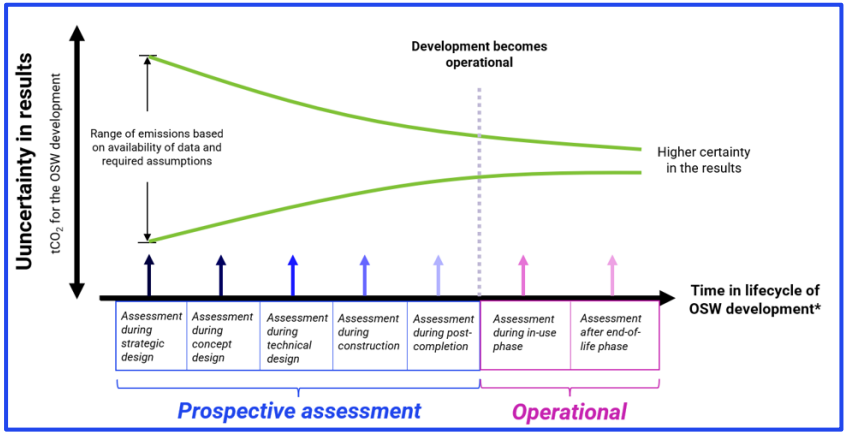
Scope & system boundary for a carbon footprint

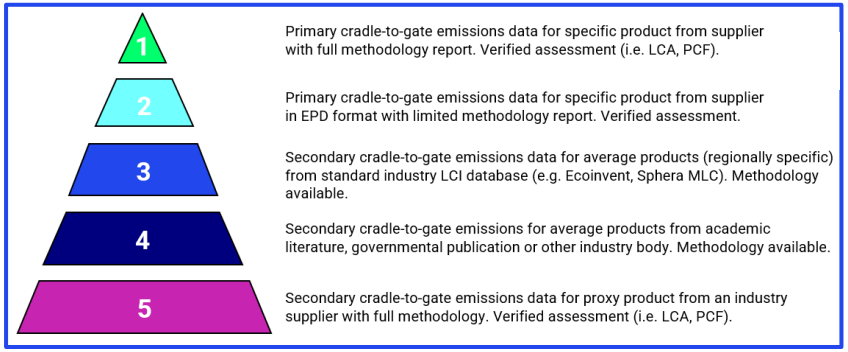


***Source**: OSW Industry PCF Guidance, pg. 23*

Emission factors

Data quality and requirements





Data quality

- Currently, **most emissions data is based on industry averages**. While a good starting point, we promote the use of **supplier-specific activity data** by advising on how to collaboratively seek primary data with appropriate timings.

**This timeline is not proportional to the full lifecycle of an OSW development*

Data requirements

- For improved decision-making, **the industry must work together to increase confidence and accuracy** on how to decarbonise by using supplier-specific data.
- The process to improving data quality and realising carbon reductions will be both **collaborative** and **iterative** and should trickle up the full supply chain.

SUSJIP Phase 2

(2025-2026) Objectives

Measurement

To refine the OSW Industry Product Carbon Footprint methodology to **provide additional clarity through and expert working group**.

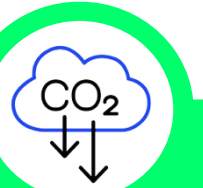
Seek **international adoption** and recognition.

Data

Improve carbon emission data and monitoring practices by addressing common challenges with developers and suppliers in data gathering.

Create a **supplier guidance annex** to the methodology focused on components.

Decarbonisation action



Steel decarbonisation.

Use open industry dialogue and economic assessment to develop recommendations and next steps for the OSW industry to drive forward a **Green Steel Action Plan (GSAP).**

Circularity

Refurbished parts have numerous operational benefits but has legal and commercial uncertainties.

The **RECLAIM** project assess the legal risks associated with adopting refurbished turbine parts and reviews existing certification processes.

Achieving OSW decarbonisation action

- The emissions from OSW represent a **small fraction of the total emissions associated with electricity generation**.
- It is still important that the industry **takes accountability for further reducing lifecycle emissions** and adopting economic models that account for environmental and social impacts as it scales.
- Achieving this will require **integrating low carbon materials** and **practices into** designs and development processes, supported by **harmonised methodology** and **standardised**, **high-quality data**.
- Deeper **cooperation** and action are required **between all stakeholders**, including governments and regulators, developers, financial institutions and supply chain companies.

*Significant **cross-sector collaboration** is required to unlock the decarbonisation potential of the offshore wind industry. A holistic view of the value chain is essential.*

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Thank you for listening

Contact us

Luisa Amorim

Manager, Offshore Wind

luisa.amorim@carbontrust.com

Mary Harvey

SUSJIP Programme Manager

mary.harvey@carbontrust.com