Well-to-Facility-Gate emissions for products produced at Mongstad

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Equinor has announced an ambition to become a net-zero company by 2050. It sets a clear strategic direction and demonstrates Equinor's continued commitment to long-term value creation in support of the Paris Agreement. We are reducing our own emissions and working with suppliers and partners, influencing them to do the same.

To achieve further transparency on our greenhouse gas (GHG) emissions, Equinor documents the carbon footprint of liquid products produced at Mongstad refinery. This note provides an explanation of the methodology used to quantify the carbon footprint of products produced at the refinery. Carbon footprint information will be included in cargo documentation to customers.

What is the carbon footprint of a product?

The carbon footprint of a product is obtained by allocating Equinor's scope 1, 2 & 3 (category 1 and 4) greenhouse gas emissions (GHG), as defined by GHG protocol standard[1], in grams carbon dioxide equivalents (gCO_2e) per energy content of the product in Megajoules (MJ). The footprint is calculated in a Well-to-Facility-Gate (WFG) perspective, and includes emissions from upstream oil and gas production, upstream transportation and midstream processing at the refinery. Both Co_2 and methane are included, using a global warming potential of 25 to covert methane to CO_2 equivalents. Gas export and injection are generally the main energy consuming operations at an offshore installation. To process and produce oil, the associated gas needs to be handled either by gas injection or gas export. These are integrated and complex processes, thus it is assumed that production of oil and gas are equally energy demanding operations. For scope 2, a location-based factor is used to reflect the average emissions intensity from the Norwegian grid. The methodology Equinor use to quantify the carbon footprint of products has been verified by DNV Business Assurance Norway AS.

Key drivers to Equinor's carbon efficient value chain

There are several factors contributing to decarbonize a product, both in the upstream and midstream segment of the value chain. Longstanding ban on routine flaring and carbon taxation are key drivers to the low upstream footprint of crude oil production. In addition, having subsea welded pipelines, short distances to main markets and refinery, as well as hydropower electricity at both Mongstad and selected offshore installations contributes further to reduce emissions.

Regulatory	• Ban on routine flaring since 1971 • Carbon taxation since 1991 • EU ETS regulation
Technology	• Energy optimisation and energy management in design and operation • Hydropower electricity at selected offshore installations and Mongstad refinery • Subsea welded pipelines
Natural Factors	• Proximity to main markets and Mongstad refinery • Reservoir properties, hydrocarbon type, pressure, basin maturity and scale benefits

1 GHG protocol standard - Corporate Value Chain (Scope 3) Standard | Greenhouse Gas Protocol (ghgprotocol.org)

Calculating the carbon footprint of a product

Upstream production of crude oil

The refinery's crude slate consists of Equinor operated and non-operated crude blends, mostly from the Norwegian Continental shelf (NCS). As the crude slate composition may vary from month to month, an annual average is used to balance out the variations. The footprint of crude blends is obtained by allocating Equinor's scope 1 and 2 GHG emissions (gCO_2e) associated with the production of crude oils in the crude blends, to the energy content of the crude (MJ). This allocation principle is also used for blends feeding into the plants at Kollsnes and Sture, providing Vestprosess processing facility at Mongstad with condensate. A lower heating value (LHV) of 1boe = 5.7GJ is used to convert barrels of oil equivalents (boe) to Megajoules (MJ)[2]. Emissions from imported bio components (Equinor's scope 3 category 1), are defined by accompanying Proof of Sustainability (PoS) certificates. For imported feedstock where this information is not available, values from European Commission's Joint Research Centre has been used[3].

Upstream transportation of crude oil to Mongstad refinery

Crude blends feeding into the Mongstad refinery is either transported by pipeline or by ship. The pipeline export pumps are located at the installations, and thus the associated emissions are accounted for in the footprint figures from upstream production of crude oil. Reported voyage data has been used for the crude blends being shipped to the refinery. The transportation footprint is obtained from reported fuel consumption and cargo quantities, giving emission per tonnes cargo transported. From there, tonnes cargo is converted to MJ using a Lower Heating Value (LHV) for the specific cargo type. The voyage consists of a ballast leg, port stays and laden leg(s). For imported feedstock (Equinor's scope 3 category 4) where transportation footprints is not available, values from European Commission's Joint Research Centre have been used[3].

Midstream processing of crude oil to refined products at Mongstad refinery

Mongstad refinery consists of several process units and utility systems. The footprint from midstream processing is mainly dependent on the type and number of processing steps involved in the production of each product. The footprint of crude blends, Vestprosess condensate and imported feedstock are allocated to the relevant process units on an energy basis (MJ). For all processing units, Equinor's scope 1 and 2 GHG emissions in gCO_2e/h are divided by the energy output in MJ/h to quantify the respective unit's footprint (gCO_2e/MJ). The footprint is further allocated to all outgoing products from the individual units and processes. Process data from latest year(s) with stable operations is used to obtain the footprint of the products produced.

Downstream transportation and the use of products produced at Mongstad

Footprint information about downstream transportation of products from the refinery to consumers and the use of produced products, requires information that is not available prior to the voyage when the cargo documentation is issued. These footprints can be estimated after voyage.

[2] Norwegian Petroleum Directorate
[3] JRC Well-To-Tank report v5 (2020)

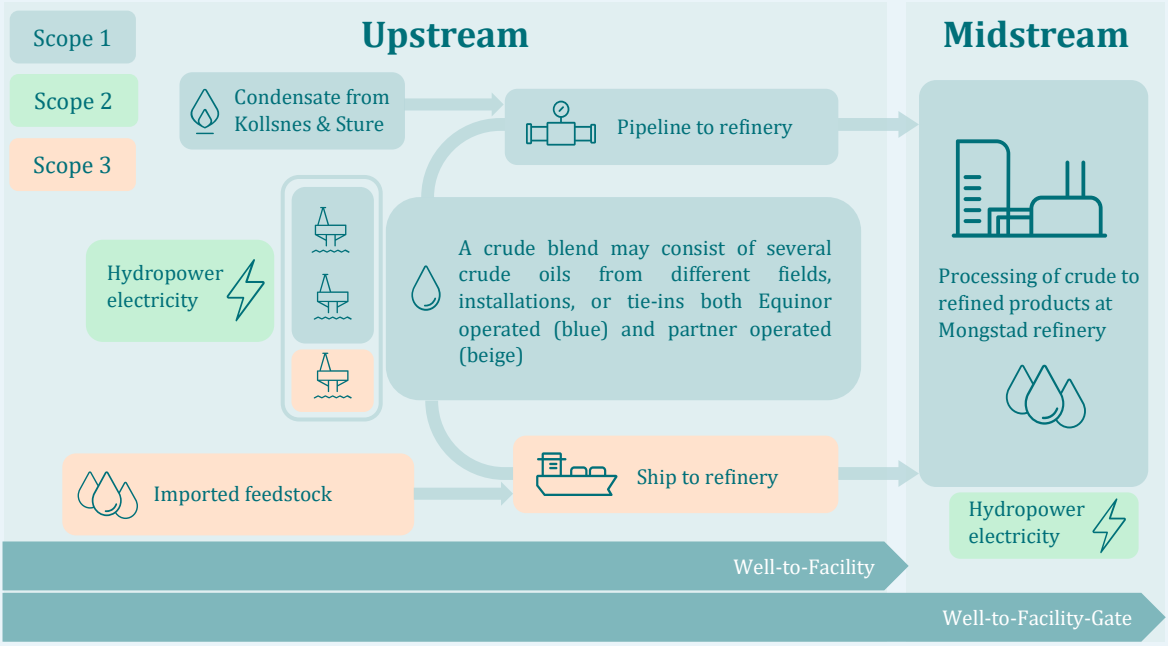

Figure 1: Value chain for products produced at Mongstad from Equinor's accounting perspective