

Dow Benelux

Sector	Revenue	Emissions	Pledge	Transparency	Integrity
Chemicals	€ 54.1 bn (Dow Chemical Company, 2022)	112.0 MtCO ₂ e (DCC, 2022) 3.5 MtCO ₂ e (S1, Benelux, 2022)	Carbon neutrality for S1, S2 and S3 plus product benefits by 2050	Moderate	Low

1. Tracking & disclosure of emissions

112.0 MtCO₂e (DCC, 2022)
3.5 MtCO₂e (S1, Benelux, 2022)

● Subsidiaries are covered.

Major emissions sources
Most of Dow Chemical Company's emissions stem from purchased goods and services (S3, category 1), followed by manufacturing of chemicals (S1).

Disclosure
Dow Chemical Company discloses data on S1, S2 and S3 for the period 2020-2022. It reports S2 using both a market-based and location-based approach. The reported total uses the upper boundary. S3 categories are published in full, excluding categories 9 and 10. The company also discloses data on other non-GHG climate forcers. For Dow Benelux, S1 emissions are only available through GHG registries. The Terneuzen site claims no S2 emissions due to Dow-owned gas-fired cogeneration plant ELSTA (counted as S1). No data on S3.

Transparency & Integrity

Category	DCC	Dow Benelux
S1	27.3	3.5
S2	4.2	0?
S3 upstream	48.5	?
S3 downstream	32.1	?

2. Setting emission reduction targets

Headline target or pledge Carbon neutrality for S1, S2 and S3 plus product benefits by 2050

Short- & medium-term targets (up to 2030)

Short-term targets are identified:

Scope coverage 1 2 3 **Subsidiary level (Dow Terneuzen):** For S1 and S2, the company aims for a reduction of 1.7 MtCO₂ (42.5%) by 2030 at the Terneuzen site. No targets for S3 emissions or other locations found. Because the full scope of Dutch emissions is unknown, the available data does not facilitate an assessment.

Subsidiary level ? by 2030

Group level: For S1 and S2, Dow aims for a reduction of 2 MtCO₂ by 2025 and 5 MtCO₂ by 2030 (base year 2020). In 2020, the full value chain emissions of Dow were 120.9 MtCO₂e (2023a, p. 201). A reduction of 5 MtCO₂e (4,1%) falls short of a 1.5°C-trajectory.

Own emission reductions (compared to full value chain in 2020) Group level ~4% by 2030 (2020 baseline)

Long-term vision (beyond 2030)

Long-term targets are identified:

Scope coverage 1 2 3 **Subsidiary level (Dow Terneuzen):** For S1 and S2, Dow aims to reduce 95% of the operational CO₂ emissions from its Terneuzen facility by 2050. Other Dutch facilities are covered by the corporate 'carbon-neutral' target.

Own emission reductions (compared to full value chain in 2020) ? by 2050 **Group level:** All emission scopes are included in the carbon-neutrality target for 2050. The company does not prominently specify what portion of that target will be achieved through emission reductions.

Transparency	Integrity
Moderate	Low
Low	?

3. Reducing own emissions		Transparency	Integrity
Emissions reduction measures	To reduce emissions at its Terneuzen facility, Dow Benelux plans <i>i</i>) the use of existing technologies such as the construction of a hydrogen plant and Carbon Capture & Storage, <i>ii</i>) production of on-site hydrogen, and <i>iii</i>) using new technologies. No details on measures taken at other facilities or for S3 emissions.	Moderate	Low
Renewable electricity procurement	The Terneuzen site utilizes electricity from Dow-owned gas-fired ELSTA plant. No further disclosure on renewable electricity procurement for Dow Benelux. Dow Chemical Company has expanded its access to renewable capacity to approximately 40 percent of purchased energy.	Moderate	Low

4. Climate contributions & offsetting		Transparency	Integrity
Responsibility for unabated emissions	No information identified on how the company takes responsibility for unabated emissions	Low	Low
Climate contributions	- No climate contributions identified.	N/A	Low
Offsetting claims today	- No offsetting claims identified.	N/A	N/A
Offsetting plans for the future	No disclosure as to what extent future targets shall depend on offsetting.	Low	?

RATINGS **Transparency** refers to the disclosure of information. **Integrity** refers to the quality and credibility of the approach.
Overall Average of sections 1-4 ■High ■Reasonable ■Moderate ■Low ■Very Low;
Sections 1-4 Average of criteria in each section ■■■■■; **Rating criteria** See methodology for rating criteria ■■■■.

Source: SEO Amsterdam Economics' interpretation of identified public documentation from Dow Chemical Company & Dow Benelux

Dow Benelux

Dow Benelux is a chemical company located in the Netherlands and a subsidiary of the US multinational Dow Chemical Company. The company operates eight facilities across the Benelux region, of which three are operated by Dow Benelux. In its annual report we find that the parent company aims to achieve carbon neutrality by 2050. To contribute to this objective, Dow Benelux is concentrating on reducing operational CO₂ emissions (S1 and S2) by 95 percent at its Terneuzen industrial park, the largest European manufacturing site. Specific emission reduction targets for other locations in the Netherlands and Belgium or for non-CO₂ GHG are not disclosed. The company's plans to reduce its emissions do not exclude offsetting or neutralization.

About the tracking and disclosure of emissions of Dow

- Dow Chemical Company transparently reports on all three emission scopes. However, for Dow Benelux, limited information on emissions is found. Dow Chemical Company reports on its S1, S2 and S3 emissions (112.0 MtCO_{2e} in total for 2022). S2 emissions are reported using both a market-based and location-based approach, and S3 emissions are reported for all categories excluding 9 and 10. S3 emissions make up the largest part of Dow Chemical Company's emissions, namely 71.9 percent (80.6/112.0 MtCO_{2e}). Dow Chemical Company also reports on non-GHG emissions (Dow, 2023a, p. 201). Dow Chemical Company states that it currently reports on GHG emissions of approximately 100 sites globally. To put this in perspective, the company mentions that it owns 104 manufacturing sites (2023a, p. 7, p. 176).
- The company operates eight facilities across Belgium and the Netherlands, of which three are operated by Dow Benelux, a subsidiary of Dow Chemical Company (Dow, 2023c). According to the EU Emission Trading Scheme (ETS), the subsidiary's installations emitted 3.5 MtCO_{2e} in 2022 (NEA, 2022; Climate Registry, 2023). However, these emissions include only S1 emissions. S2 and S3 emissions are not reported. Given the shares of its parent company, we expect S3 to be the largest share of the emissions of Dow Terneuzen. Dow Terneuzen is Dow's largest production facility in Europe and its second-largest production site worldwide (Dow, 2023d).

About the emission reduction targets of Dow

- Dow Chemical Company has set a carbon-neutrality target for 2050, covering all subsidiaries including Dow Benelux. This long-term neutrality target includes S1, S2 and S3, including offsets from product benefits and hence covering the full scope of emissions (Dow, 2023a, p. 13). Dow's progress report (2023a, p. 14) illustrates a carbon reduction path towards net zero for its S1 and S2 emissions, but not its S3 emissions. In its documents, the company does not prominently specify what portion of that target will be achieved through emission reductions and what portion will be achieved through offsets from product benefits.
- To achieve its long-term target, Dow Chemical Company has set interim targets. The first target aims to reduce annual carbon emissions by 2 MtCO₂ by 2025 and by 5 MtCO₂ by 2030 versus its 2020 baseline. In its latest progress report, the company estimates its 2020 value chain emissions at 120.9 MtCO_{2e} (2023a, p. 201). A reduction of 5 MtCO_{2(e)} by 2030 therefore equals approximately 4.1 percent. Both interim targets only cover S1 and S2 (Dow, 2023a, p. 13). With these current reduction targets the company is not aligned with global 1.5°C-benchmarks and sector benchmarks. Lastly, we note that Dow Chemical Company has not set a base year for S3 yet (2023a, p. 177). This makes it difficult to measure progress.
- Dow Benelux has prioritized its emission reduction efforts specifically for its industrial park in Terneuzen. Dow Benelux's reduction strategy contributes to Dow Chemical Company's commitment to carbon-neutral operations by 2050. In publications for the Benelux, Dow (2023e) also speaks of "CO₂ [neutrality]" specifically

as well as about “climate neutrality”, implying non-CO₂ GHG may also be covered. The interim targets for Dow Benelux include a 1.7 MtCO₂ (42.5 percent) reduction of operational CO₂ emissions at the Terneuzen site between 2021 and 2030 (Dow, 2023a, p. 16, 2023f). In an infographic, Dow Benelux presents its long-term commitment to eliminate 95 percent of its operational CO₂ emissions at Terneuzen by 2050 (Dow, 2023f). Both targets do not include S3 (which is likely to be the major source of emissions) or any of the other two locations (nor the other five sites operated by Dow Chemical Company).

To reduce emissions at its Terneuzen facility, Dow presented its roadmap towards carbon-neutrality called Multi Generation Plan in June 2021. It includes an approach that takes place in three phases (or generations). In 2028, Dow aims for an annual reduction of 1.4 MtCO₂ emissions through the construction of a hydrogen plant and carbon capture & storage (CCS). In the second generation (2030), an additional reduction of 0.3 MtCO₂ is targeted by producing on-site hydrogen (Dow, 2023e). This leads to a total reduction of 1.7 MtCO₂ by 2030. Dow has officially documented this target reduction goal in an Expression of Principles that was signed by the Dutch Minister of Economic Affairs and Climate Policy (Rijksoverheid, 2022). Finally, the third generation relies on the implementation of technological advancements aimed at substituting fuel consumption during the production process. Dow Chemical Company is currently exploring various technologies (e.g. powering the cracker with electricity) that could bring emissions to near zero, provided that clean and sustainable sources of electricity are used. With the third generation, Dow aims to achieve “climate neutrality” (Dow, 2023e). It is not clear how this target of climate neutrality of Dow Benelux relates to the target of carbon neutrality of Dow Chemical Company. Furthermore, no details on measures taken at other facilities or for S3 emissions are reported.

Dow Chemical Company, on the other hand, collaborates with suppliers and logistics partners in an attempt to decrease emissions. In Dow Chemical Company's ESG report, references are made to several measures aimed at reducing S3 emissions. These measures include collaboration with suppliers to track and account for carbon in the supply chain, as well as optimizing transportation (Dow, 2021; Dow, 2023a, p. 17). Detailed information about these measures, including expected emission reductions, could not be identified. For Dow Benelux, limited information is provided regarding its efforts to reduce S3 emissions.

On renewable energy

In 2022, more than 40 percent of electricity purchased globally comes from renewable sources (Dow, 2023a, p. 114).¹ Of the purchased renewable electricity consumed, approximately 95 percent is derived from wind energy, hydropower installations or solar energy (Dow, 2023a, p. 114). Biomass and landfill gas account for the remaining 5 percent. In 2015, Dow set a target to contract 750 MW of renewable power capacity by 2025, a target that has been achieved with more than 1,000 MW of renewable power in 2022. Although Dow expects variations in this amount year on year, it expects to maintain achievement of this target. The Terneuzen site utilizes electricity from Dow-owned gas-fired ELSTA plant. No further information is disclosed on (renewable) electricity procurement for Dow Benelux.

On climate contributions and offsetting

Dow Chemical Company and Dow Benelux have not disclosed their approach to taking responsibility for unabated emissions through climate contributions and offsetting claims, as part of their efforts to achieve carbon neutrality. However, Dow Benelux's Multi Generation Plan outlines a target of reducing operational CO₂ emissions by 95 percent at the Terneuzen facility (Dow, 2023e). This could suggest that the subsidiary may rely on offsets or neutralization measures for the remaining 5 percent of the plant's S1 and S2 emissions in 2022 in order to achieve

¹ (14.95 million GJ / 36.74 million GJ) * 100 percent = 40.1 percent

carbon neutrality. Also, it is still unclear if non-CO₂ GHG emissions will remain by 2050 or if these are covered under the Benelux-specific statements on 'climate neutrality'. No further information is provided. At the group-level, Dow Chemical Company has not provided any information regarding whether or to what extent its carbon-neutrality commitment is dependent on neutralization methods such as offsetting.

Sources:

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Dow Benelux

Low

Integrity assessment for short- and medium-term target(s) towards 2030

What do the short- and medium-term targets actually mean?

What are the targets for the short to medium term?

Dow Chemical Company

- By 2025, Dow will reduce its net annual carbon emissions (S1 and S2) by 2 MtCO₂(e) versus its 2020 baseline (Dow, 2023b, p. 16).
- By 2030, Dow will reduce its net annual carbon emissions (S1 and S2) by 5 MtCO₂(e) versus its 2020 baseline (Dow, 2023b, p. 16).

Dow Benelux (Terneuzen) - covered by the interim targets of Dow Chemical Company (Dow, 2023b).

- By 2028, operational emissions (S1 and S2) are expected to decrease by 1.4 MtCO₂(e) versus its 2021 baseline (Dow, 2023g), a 35 percent reduction of CO₂ emissions.
- By 2030, operational emissions (S1 and S2) are expected to decrease by 1.7 MtCO₂(e) versus its 2021 baseline (Dow, 2023g), a 42.5 percent reduction of CO₂ emissions.

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

Dow Chemical Company

- The company has committed to achieving a net emission reduction of 4.1 percent by 2030 (compared to 2020) across its entire value chain. This is calculated as a 15 percent reduction in S1 and S2 emissions, which make up 28 percent of the company's total emissions (Dow, 2023b, p. 16, p. 176).

Dow Benelux (Terneuzen)

- Dow Benelux offers insufficient emissions data to accurately calculate the extent of the emissions reduction impact by 2030 throughout its complete value chain.

Do these targets cover both the short term (within 5 years) and medium term (up to 2030)?

Medium targets are set both for Dow Chemical Company (in 2025) and for Terneuzen (2028)

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

Global benchmarks: The expected 4.1 percent reduction of own emissions (the parent company) seems not to be in line with global benchmarks, which demand a 48 percent reduction of CO₂ and a 43 percent reduction of GHG emissions. Dow Chemical Company also does not specify what share of its interim target will be achieved using neutralisation measures, such as offsetting and carbon dioxide removals. We are unable to evaluate the integrity of Dow Benelux's interim target to reduce emissions from its Terneuzen facility by 1.7 MtCO₂(e) by 2030, compared to a 2021 baseline, in the context of global efforts required to limit global warming below 1.5°C. In the absence of targets for all other Dutch and Belgian production sites and with no coverage of S3 emissions, Dow Benelux is likely not aligned with global efforts to limit global warming below 1.5°C.

Sector-level benchmarks: Sectoral benchmarks for chemical industries require a 52 percent reduction by 2030 across S1, S2 and S3 compared to a 2019 baseline (Teske, 2022, p. 322). Specifically for the subsector of 'inorganic chemicals and consumer products' a reduction across the full value chain of 54 percent is needed (Teske, 2022, p. 322). However, Teske (2022) reports zero MtCO₂e emissions in 2019 across S3 for this subsector, which is not in line with Dow's current indirect emission levels. Apart from this study, there are few benchmarks specifically for the chemical industry.



Integrity assessment for long-term target(s) (post-2030)

What do the long-term targets actually mean?

What are the targets for the long term beyond 2030?

For Dow Chemical Company:

- By 2050, Dow intends to be carbon neutral (S1, S2 and S3 plus product benefits). It is not clear which part of this is reached by offsetting (including offsets from product benefits) and which part by absolute emission reduction.
- Dow Benelux's activities are covered by this target (Dow, 2023b).

Dow Benelux:

- By 2050, Dow Benelux aims to achieve a CO₂ reduction of 95 percent (Dow, 2023f).
- By 2050, Dow Benelux aims to achieve CO₂ neutrality and climate neutrality (Dow, 2023e).

How do these targets equate to emission reductions across the value chain (compared to a 2019 baseline)?

In its commitment to carbon neutrality, Dow has not set a specific target for deep emission reductions. This keeps the possibility open for potentially contentious neutralisation measures to achieve its goal.

Do these emission reduction commitments align with a 1.5°C trajectory for the sector according to available literature?

Sector-level benchmarks: Teske (2022, p. 322) considers an 85 percent reduction for chemical industries and a 100 percent reduction for the subsector of 'inorganic chemicals and consumers products' sufficient to limit global warming to 1.5°C. Neither Dow Benelux nor Dow Chemical Company explain why they consider the 2050 carbon-neutrality target aligned with the Paris Agreement's temperature limit of 1.5°C. We are unable to evaluate the integrity of Dow Benelux's commitment to bring operational carbon emissions (S1 and S2) from its Terneuzen facility to net zero by 2050. Hence, both on a global and on a sector-level no assessment can be made.