



HALDOR TOPSOE



SDG7 Energy Compact of Haldor Topsoe

A next Decade Action Agenda to advance SDG7 on sustainable energy for all, in line with the goals of the Paris Agreement on Climate Change

SECTION 1: AMBITION

1.1. Ambitions to achieve SDG7 by 2030. [Please select all that apply, and make sure to state the baseline of each target]

(Member States targets could be based on their NDCs, energy policies, national five-year plans etc. targets for companies/organizations could be based on their corporate strategy)

<input type="checkbox"/> 7.1. By 2030, ensure universal access to affordable, reliable and modern energy services.	Target(s): Time frame: Context for the ambition(s):
<input type="checkbox"/> 7.2. By 2030, increase substantially the share of renewable energy in the global energy mix.	Target(s): 1. Enable and accelerate the transition to renewable energy with a particular focus on hard-to-abate sectors (fuels and chemicals) 2. Bring energy-efficient electrolysis technology (Solid Oxide Electrolysis Cell, SOEC) to the global market by 2023 through large-scale production - a key enabling technology for the production of Green Hydrogen Time frame: 1. 2021--2030/ 2. 2023 Context for the ambition(s): Electrification of the global energy systems, based on renewable electricity from wind turbines, solar panels, or hydropower, is an important part of the solution. However, direct electrification cannot be used for all purposes, so the world needs essential fuels and chemicals similar to the ones we know today, but made from renewable feedstocks. Topsoe is one of very few companies in the world that has deep insight into the production of both green hydrogen, ammonia, methanol and so-called e-fuels from renewable electricity – these carbon-neutral chemicals and fuels are the most promising green substitutes for fossil-based fuels and chemicals. Electrolysis is key in the production of Green Hydrogen, and does not exist in large scale today.
<input type="checkbox"/> 7.3. By 2030, double the global rate of improvement in energy efficiency.	Target(s): 1. Continue to drive improvements in energy efficiency for production of conventional fuels and chemicals (ammonia, methanol, and hydrogen) 3. Bring the most energy-efficient electrolysis technology (SOEC) to the global market by 2023 through large-scale production – a key enabling technology for the production of Green Hydrogen Time frame: 1. On-going, 2. 2023 Context for the ambition(s): Topsoe is the global leader in energy efficient technologies to produce clean transportation fuels as well as ammonia, methanol, and hydrogen. Electrolysis is key in the production of Green Hydrogen, and does not exist in large scale today. The SOEC electrolysis is 30% more efficient than conventional electrolyzers on the market today.

<input type="checkbox"/> 7.a. By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.	Target(s): 1. Together with academia, strategic partners, customers and off-takers, Topsoe will accelerate the pace of transition towards renewable energy, especially within end-use sectors such as heavy industry and heavy-duty transportation, maritime and aviation. 2. Topsoe cooperates with a range of different organizations, among these is the science-based target initiative where Topsoe has committed to set ambitious reduction targets across its value chain. Time frame: 1. 2030 / 2. 2030 Context for the ambition(s):
<input type="checkbox"/> 7.b. By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programs of support.	Target(s): Time frame: Context for the ambition(s):

1.2. Other ambitions in support of SDG7 by 2030 and net-zero emissions by 2050. [Please describe below e.g., coal phase out or reforming fossil fuel subsidies etc.]

Target(s): 1. Significantly reduce greenhouse gas emissions across Topsoe’s value chain consistent with the Paris Agreement of 1.5°C; Science-based targets for scope 1, 2 and 3 in the making 2. Achieve annual CO ₂ reduction of 297,000-410,000 tonnes (2023), increasing to 483,000-667,000 tonnes (2030) with Topsoe’s electrolysis technology (SOEC) Time frame: 1. 2022 / 2. 2023/2030 Context for the ambition(s):

SECTION 2: ACTIONS TO ACHIEVE THE AMBITION

2.1. Please add at least one key action for each of the elaborated ambition(s) from section 1. [Please add rows as needed].

Description of action (please specify for which ambition from Section 1)	Start and end date
<p>SDG 7.2: <u>To drive the transition of hard-to-abate sectors into the renewable future.</u></p> <ul style="list-style-type: none"> - we will deliver enabling technologies within 1) green hydrogen, ammonia and methanol, 2) e-fuels, 3) renewable diesel and jet fuel from waste and bio-mass and 4) battery materials - we will continue to reinvest 8-10% of annual revenue in Research & Development <p><u>To bring our innovative SOEC electrolysis technology to the global market,</u></p> <ul style="list-style-type: none"> - we will build the world’s largest Solid Oxide Electrolysis Cell production plant with a capacity of 500 MW, and later scale up to 5 GW (the largest electrolyzers in operation today are in the scale of 10-20 MW) 	 2021-2030 On-going 2022-2023/2026-2030

<p>SDG 7.3: <u>To enable further improvements in energy efficiency for the production of conventional fuels and chemicals.</u></p> <ul style="list-style-type: none"> - we will deliver enabling and transitional technologies within hydrogen, ammonia and methanol - we will continue to reinvest 8-10% of annual revenue in Research & Development <p><u>To bring the most energy-efficient SOEC electrolysis technology to the global market.</u></p> <ul style="list-style-type: none"> - we will build the world's largest Solid Oxide Electrolysis Cell production plant with a capacity of 500 MW, and later scale up to 5 GW (the largest electrolyzers in operation today are in the scale of 10-20 MW) 	<p>On-going On-going</p> <p>2022-2023/2026-2030</p>
<p>SDG 7.a:</p> <ul style="list-style-type: none"> - Participate in various strategic commercial partnerships and alliances, e.g. <i>Green Fuels for Denmark</i> and <i>Getting to Zero Coalition</i>. - Set science based GHG reduction targets for Scope 1, 2 and 3, consistent with the Paris Agreement - Collaborate with customers and suppliers for decarbonization of value chain. 	<p>On-going</p> <p>2022 2022-2040</p>

SECTION 3: OUTCOMES

3.1. Please add at least one measurable and time-based outcome for **each** of the actions from section 2. *[Please add rows as needed]*

Outcome	Date
Topsoe's GHG footprint reduced by 15 % (~25,000 tonnes CO ₂ e) compared to 2019 baseline (Scope 1 and 2)	2021
The production output of the installed SOEC-based electrolysis capacity of 500 MW has an annual CO ₂ reduction potential of estimated 297,000-410,000 tonnes (when compared to grey hydrogen)	2023
The production output of the installed SOEC-based electrolysis capacity of 5GW has an annual CO ₂ reduction potential of estimated 483,000-667,000 tonnes (when compared to grey hydrogen)	2026-2030
Significant reduction of GHG emissions across Topsoe's value chain (Scope 1, 2 and 3) consistent with the Paris Agreement of 1.5°C (science based targets in the making)	2030

SECTION 4: REQUIRED RESOURCES AND SUPPORT

4.1. Please specify required finance and investments for **each** of the actions in section 2.

Topsoe continues to re-invest 8-10% of its yearly revenue into Research & Development.

4.2. [For countries only] In case support is required for the actions in section 2, please select from below and describe the required support and specify for which action.

[Examples of support for Member States could include: Access to low-cost affordable debt through strategic de-risking instruments, capacity building in data collection; development of integrated energy plans and energy transition pathways; technical assistance, etc.]

<input type="checkbox"/> Financing	Description
<input type="checkbox"/> In-Kind contribution	Description

<input type="checkbox"/> Technical Support	Description
<input type="checkbox"/> Other/Please specify	Description

SECTION 5: IMPACT

5.1. Countries planned for implementation including number of people potentially impacted.

Topsoe's presence is global - EU, North America, Pacific (Australia), Middle East, South America and Asia.
People impacted – N/A

5.2. Alignment with the 2030 Agenda for Sustainable Development – Please describe how **each** of the actions from section 2 impact advancing the SDGs by 2030.

[up to 500 words, please upload supporting strategy documents as needed]

Building on more than 80 years of perfecting chemistry, today Topsoe is a world-leading provider of energy-efficient technologies, catalysts, services, and hardware to produce essential chemicals and fuels. Our technologies help chemical and refining industries improve energy-efficiency and also enable the use of renewable feedstocks and energy sources. Our main contributions are to SDGs 13, 7, 3, 8 and 12.

Electrification of the global energy systems, based on renewable electricity from wind turbines, solar panels, or hydropower, play an important role in reducing global greenhouse gas emission and combatting climate change. However, direct electrification cannot be used for all purposes, so the world needs essential fuels and chemicals similar to the ones we know today, but made from renewable feedstocks. Topsoe is one of very few companies in the world that has deep insight into the production of both green hydrogen, ammonia, methanol and so-called e-fuels from renewable electricity – these carbon-neutral chemicals and fuels are the most promising green substitutes for fossil-based fuels and chemicals. This makes Topsoe uniquely positioned to accelerate the energy transition in these hard-to-abate sectors, because our solutions provide low-carbon or even carbon-neutral fuels and chemicals very similar to the ones in use today. With our strategic vision to be recognized as the global leader in carbon emission reduction technologies by 2024, we have set out to take a lead role in the global transition of these industries into the renewable future.

5.3. Alignment with Paris Agreement and net-zero by 2050 - Please describe how **each** of the actions from section 2 align with the Paris Agreement and national NDCs (if applicable) and support the net-zero emissions by 2050.

[up to 500 words, please upload supporting strategy documents as needed]

All of the above actions are driven by an overall strategic vision for Topsoe to take a lead role in the energy transition and contribute significantly towards the decarbonization of hard-to-abate sectors in support of reaching net zero emissions by 2050; by bringing new low-carbon/carbon free technologies to market and by providing transitional technologies to further reduce energy consumption and the GHG footprint of industry. We will track our global impact using science-based methodology and approach.

SECTION 6: MONITORING AND REPORTING

6.1. Please describe how you intend to track the progress of the proposed outcomes in section 3. Please also describe if you intend to use other existing reporting frameworks to track progress on the proposed outcomes.

Company performance and progress are reported every year as part of Topsoe's Sustainability Report and Annual Report.

SECTION 7: GUIDING PRINCIPLES CHECKLIST

Please use the checklist below to validate that the proposed Energy Compact is aligned with the guiding principles.

I. Stepping up ambition and accelerating action - Increase contribution of and accelerate the implementation of the SDG7 targets in support of the 2030 Agenda for Sustainable Development for Paris Agreement

I.1. Does the Energy Compact strengthen and/or add a target, commitment, policy, action related to SDG7 and its linkages to the other SDGs that results in a higher cumulative impact compared to existing frameworks?

Yes No

I.2. Does the Energy Compact increase the geographical and/or sectoral coverage of SDG7 related efforts? Yes No

I.3. Does the Energy Compact consider inclusion of key priority issues towards achieving SDG7 by 2030 and the net-zero emission goal of the Paris Agreement by 2050 - as defined by latest global analysis and data including the outcome of the Technical Working Groups? Yes No

II. Alignment with the 2030 agenda on Sustainable Development Goals – Ensure coherence and alignment with SDG implementation plans and strategies by 2030 as well as national development plans and priorities.

II.1. Has the Energy Compact considered enabling actions of SDG7 to reach the other sustainable development goals by 2030? Yes No

II.2. Does the Energy Compact align with national, sectoral, and/or sub-national sustainable development strategies/plans, including SDG implementation plans/roadmaps? Yes No

II.3. Has the Energy Compact considered a timeframe in line with the Decade of Action? Yes No

III. Alignment with Paris Agreement and net-zero by 2050 - Ensure coherence and alignment with the Nationally Determined Contributions, long term net zero emission strategies.

III.1. Has the Energy Compact considered a timeframe in line with the net-zero goal of the Paris Agreement by 2050? Yes No

III.2. Has the Energy Compact considered energy-related targets and information in the updated/enhanced NDCs? Yes No

III.3. Has the Energy Compact considered alignment with reaching the net-zero emissions goal set by many countries by 2050? Yes No

IV. Leaving no one behind, strengthening inclusion, interlinkages, and synergies - Enabling the achievement of SDGs and just transition by reflecting interlinkages with other SDGs.

IV.1. Does the Energy Compact include socio-economic impacts of measures being considered? Yes No

IV.2. Does the Energy Compact identify steps towards an inclusive, just energy transition? Yes No

IV.3. Does the Energy Compact consider measures that address the needs of the most vulnerable groups (e.g. those impacted the most by energy transitions, lack of energy access)? Yes No

V. Feasibility and Robustness - Commitments and measures are technically sound, feasible, and verifiable based a set of objectives with specific performance indicators, baselines, targets and data sources as needed.

V.1. Is the information included in the Energy Compact based on updated quality data and sectoral assessments, with clear and transparent methodologies related to the proposed measures? Yes No

V.2. Has the Energy Compact considered inclusion of a set of SMART (specific, measurable, achievable, resource-based and time based) objectives? Yes No

V.3. Has the Energy Compact considered issues related to means of implementation to ensure feasibility of measures proposed (e.g. cost and financing strategy, technical assistant needs and partnerships, policy and regulatory gaps, data and technology)? Yes No

SECTION 8: ENERGY COMPACT GENERAL INFORMATION

8.1. Title/name of the Energy Compact

Perfecting chemistry for a better world

8.2. Lead entity name (for joint Energy Compacts please list all parties and include, in parenthesis, its entity type, using entity type from below)

Haldor Topsoe

8.3. Lead entity type

Government

Local/Regional Government

Multilateral body /Intergovernmental Organization

Non-Governmental Organization (NGO)

Civil Society organization/Youth

Academic Institution /Scientific Community

Private Sector

Philanthropic Organization

Other relevant actor

8.4. Contact Information

Louise Bjerregård Nielsen, Head of Sustainability, Haldor Topsoe, lbjn@topsoe.com

8.5. Please select the geographical coverage of the Energy Compact

Africa Asia and Pacific Europe Latin America and Caribbean North America West Asia Global

8.6. Please select the Energy Compact thematic focus area(s)

Energy Access Energy Transition Enabling SDGs through inclusive just Energy Transitions Innovation, Technology and Data Finance and Investment.

SECTION 9: ADDITIONAL INFORMATION (IF REQUIRED)

Please provide additional website link(s) on your Energy Compact, which may contain relevant key documents, photos, short video clips etc.

- Company website: <https://www.topsoe.com/>
- Topsoe press release - SOEC production plant: <https://blog.topsoe.com/haldor-topsoe-to-build-large-scale-soec-electrolyzer-manufacturing-facility-to-meet-customer-needs-for-green-hydrogen-production>
- Annual Report <https://www.topsoe.com/AR20>
- Sustainability Report <https://www.topsoe.com/SR20>