Public consultation on the Creos Gas and Hydrogen Scenario Report

FEDIL Position

10th of August 2026 - VFR

General observations

FEDIL welcomes the publication of the *Gas and Hydrogen Scenario Report* and supports Creos' decision to assess several possible development pathways rather than relying on a single demand forecast.

The report provides a useful and transparent basis for discussion. In particular, FEDIL welcomes:

- the differentiation between industrial, transport, building and power-sector demand;
- the recognition that future hydrogen demand will be geographically concentrated;
- the identification of the industrial cluster in the south-west of Luxembourg as a strategic demand node;
- the acknowledgment that a limited number of industrial stakeholders will ultimately determine a substantial part of the hydrogen infrastructure requirement;
- the report's recognition of the considerable uncertainty surrounding hydrogen availability, affordability and technology uptake.

The report therefore represents an important contribution to Luxembourg's future network planning. Nevertheless, FEDIL considers that additional work is required before the scenarios can constitute a sufficiently robust basis for determining the timing, capacity and financing of hydrogen infrastructure.

Our comments concentrate on three issues of particular importance to industrial consumers:

1. industrial demand projections should be based more explicitly on the maturity of actual industrial projects;
2. hydrogen infrastructure should be planned jointly with electricity and CO_2 infrastructure;
3. network development should be conditional on a credible supply, affordability and financing framework.

The following chapters discuss the three comments in detail.

1. Base industrial network planning on actual project maturity

The report correctly concludes that future industrial hydrogen demand will be concentrated among a limited number of industrial anchor consumers, primarily in the south-west of Luxembourg.

This concentration is particularly relevant for the steel sector, which is one of the largest industrial consumers of natural gas in Luxembourg and therefore represents significant potential for substitution with hydrogen. Network planning should consequently be developed in close collaboration with these anchor industrial users from the earliest stages, taking into account the maturity, timing and scale of their decarbonization projects. Their investment decisions and commitment to hydrogen technologies will largely determine actual demand.

However, the industrial demand curves in the report are presented mainly through scenario assumptions aligned with the 2024 NECP and informed by stakeholder consultations. The report does not transparently reconcile these projections with individual industrial projects, their maturity or their expected commissioning dates.

While these scenarios produce materially different results for overall hydrogen demand, much of the difference is driven by assumptions concerning heavy road transport. The variation in industrial hydrogen demand is considerably smaller. The scenarios therefore provide only a limited range for the specific question that is most relevant to industrial network planning: which industrial sites will consume hydrogen, at what date and in what volume?

The Government's industrial decarbonization roadmap[1] *(étude Schwartz)* provides complementary bottom-up information based on projects identified by industrial companies. This information should not automatically be interpreted as firm or contractually committed demand. Projects may remain conditional on technology availability, funding, hydrogen prices, infrastructure, permitting and corporate investment decisions.

Nevertheless, the roadmap represents an important indication of potential industrial demand and should be explicitly reconciled with Creos' top-down modeling.

FEDIL therefore recommends that Creos complement the existing scenarios with a site-based industrial demand assessment distinguishing between:

- **committed demand**, supported by a final or advanced investment decision;
- **probable demand**, linked to mature projects that remain dependent on specified enabling conditions;
- **potential demand**, based on earlier-stage or alternative decarbonization projects.

For each category, the analysis should indicate:

- the expected annual volume;
- the earliest realistic connection date;
- the geographical location;
- the relevant industrial process;
- the principal investment dependencies;
- the alternative pathway available to the company, such as electrification, CCUS or another fuel.

This would allow the network plan to distinguish between an identified technical requirement and actual bankable demand.

FEDIL thus recommends reconciling Creos' top-down industrial hydrogen projections with the Government's bottom-up industrial decarbonization roadmap and publishing low, central and high industrial-demand cases based on the maturity of individual projects and anchor-customer commitments.

This assessment should be updated regularly as projects move from identified potential to investment decisions and binding offtake commitments.

2. Plan hydrogen, electricity and CO_2 infrastructure jointly

The report recognizes that direct electrification is expected to remain the principal decarbonization pathway across most sectors. It also acknowledges that electricity-grid development will affect the extent to which gaseous energy vectors are required.

FEDIL supports this system-wide perspective. However, the industrial scenarios should go further by integrating the interaction between three major infrastructure requirements:

- reinforcement of the electricity network;
- development of hydrogen transmission and connection infrastructure;
- development of CO_2 collection and transport solutions for CCUS.

For several energy-intensive installations, hydrogen, electrification and CCUS are not additive assumptions. They are competing or complementary decarbonization pathways.

[1] Schwartz and Co: Roadmap for the Decarbonisation of the Luxembourg Manufacturing Industry, 14.01.2026 (see annexe)

We believe that the choice made by an industrial operator will directly affect the demand placed on each network.

This is particularly important in the south-western industrial cluster. The same limited number of sites may require:

- high-capacity electricity connections for process electrification;
- additional electricity for carbon capture equipment;
- hydrogen connections for high-temperature heat or feedstock;
- CO_2 transport infrastructure to enable permanent storage or utilization.

Planning these infrastructures independently creates a risk of inconsistent assumptions. A hydrogen network could be sized based on demand attributed to projects that ultimately select electrification, CCUS or another fuel pathway, while electricity planning could underestimate the power required for both process electrification and carbon capture. Conversely, insufficient hydrogen or CO_2 infrastructure could eliminate otherwise viable industrial decarbonization options.

FEDIL does not take a position at this stage on which entity should ultimately develop or operate a CO_2 network. However, responsibilities for planning, coordination and infrastructure interfaces need to be clarified. As for the projected CO_2 volumes, the above-mentioned *Schwartz & Co* roadmap established at the beginning of this year shall provide some insights.

The analysis should therefore include an integrated industrial infrastructure balance showing, for each scenario:

- industrial hydrogen demand;
- industrial electricity demand;
- electricity required for domestic electrolysis;
- electricity required for carbon capture;
- expected CO_2 capture volumes;
- potential CO_2 transport routes;
- interaction between HY4Link and possible CO_2 infrastructure serving the same cluster.

The scenario framework should also test whether and how different rates of CCUS deployment would change industrial hydrogen demand. This is necessary to determine how the approximately 1.1 TWh of industrial hydrogen demand identified in *Schwartz and Co's* bottom-up industrial roadmap relates to the different industrial demand levels modeled by Creos, and whether that volume should be regarded as a central estimate, an upper range or a demand level conditional on the non-deployment of alternative technologies.

FEDIL thus suggests that Creos and the Luxembourg Government first assess hydrogen, electrification and CCUS as interdependent industrial pathways. Then, the network scenarios should quantify how the development of one pathway affects demand for the others and should identify the infrastructure requirements of the south-western industrial cluster in an integrated manner.

The resulting analysis should feed into coordinated electricity, hydrogen and CO_2 infrastructure planning, with clear institutional responsibilities and a common implementation timeline.

3. Link network development to supply, affordability and risk-sharing

FEDIL supports the timely development of HY4Link and the strategic objective of connecting Luxembourg to the emerging European hydrogen backbone. Given Luxembourg's limited domestic renewable-energy potential and its status as a net energy importer, access to cross-border hydrogen infrastructure will likely be necessary for the decarbonization of certain industrial processes.

However, the timely development of infrastructure alone will not ensure that hydrogen becomes a viable option for industrial decarbonization.

Industrial demand will materialize only if companies have sufficient visibility regarding:

- the date at which hydrogen will be available;
- the volumes that can be supplied;
- the origin and carbon intensity of the hydrogen;
- compliance with applicable certification and sustainability requirements;
- the delivered price at the industrial site;
- the structure and duration of supply contracts;
- network connection and usage tariffs;
- the allocation of volume and price risks during market ramp-up.

The report itself acknowledges that Luxembourg will likely depend heavily on imported hydrogen and that significant uncertainty remains regarding production volumes, import routes and market development. It also notes the challenge associated with guarantees of origin, hydrogen purchase agreements and the availability and affordability of hydrogen technologies.

These uncertainties are particularly important because the initial hydrogen network will depend on a very small number of industrial users. In practice, the timing and realization of a limited number of anchor industrial projects may determine the economic viability of the network as a whole. Infrastructure development, tariff design and commissioning schedules should therefore be closely aligned with the maturity and expected ramp-up of these projects.

Moreover, without an appropriate risk-sharing mechanism, early users could be exposed to disproportionate network costs. Excessively high tariffs would then prevent the very demand on which the network investment case depends.

FEDIL therefore considers that the hydrogen network financing model must be developed in parallel with the technical network plan.

The financing framework should provide:

- long-term tariff visibility;
- a mechanism for covering initial underutilisation of the network;
- appropriate public risk-sharing during market ramp-up;
- protection against stranded-asset costs being concentrated on early industrial users;
- transparent connection conditions;
- coordination between network support and support for industrial CAPEX and OPEX;
- regular review as the customer base and transported volumes develop.

The report discusses the German hydrogen core-network financing model and the use of an amortisation account supported by a public guarantee. FEDIL considers that the principles behind this model should be examined for Luxembourg, while taking account of the much smaller number of potential users and the specific cross-border nature of the Luxembourg network.

The timing of infrastructure should also be clarified. The report anticipates the beginning of hydrogen uptake and the commercial availability of certain hydrogen technologies around 2030, envisages a French interconnection supplying the south-western industrial cluster by 2032, and states more generally that the need for dedicated hydrogen transport infrastructure is expected to emerge between 2035 and 2040. A single, coherent implementation sequence is needed.

This sequence should distinguish clearly between:

1. planning and permitting;
2. investment decision;
3. construction;
4. commissioning of the cross-border interconnection;
5. connection of individual industrial customers;
6. availability of certified hydrogen in sufficient volumes.

To bring it all together, FEDIL supports timely connection to the European hydrogen backbone, but investment timing and network capacity should be linked to a credible supply and market-development plan. Creos should clarify the expected commissioning sequence, supply sources, delivered-cost ranges, certification arrangements, anchor-user commitments and the financing mechanism that will protect early industrial users from disproportionate network costs.

The supply-side assessment that the report itself identifies as necessary should inform final network-capacity decisions and the sequencing of irreversible investments.

4. Conclusion

Low-carbon infrastructure will be a decisive factor for the competitiveness of Luxembourg's industry. Access to affordable electricity, hydrogen and CO_2 transport solutions will increasingly determine whether companies can decarbonize, maintain production and invest in Luxembourg.

Infrastructure policy should therefore be treated as a core industrial-policy priority. Electricity, hydrogen and CO_2 networks must be planned in a coordinated manner, aligned with industrial investment cycles and supported by appropriate financing and risk-sharing mechanisms.

The objective must be clear: ensure that the transition strengthens Luxembourg's industrial base by providing timely, cost-competitive and sufficiently flexible infrastructure for different decarbonization pathways.

FEDIL remains available to contribute to a structured dialogue between Creos, the Government and the industrial companies concerned, with the objective of progressively converting identified demand potential into credible projects, investment decisions and long-term energy commitments.

FEDIL - The Voice of Luxembourg's Industry

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Annexe

Schwartz and Co: Roadmap for the Decarbonisation of the Luxembourg Manufacturing Industry, 14.01.2026

Mise à jour de la feuille de route : Décarbonisation de l'industrie luxembourgeoise

Présentation 14.01.2026

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Environnement, du Climat
et de la Biodiversité

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

Agenda

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

- **Bienvenue** (MECB + MECO)
- **Présentation des résultats** (Schwartz and Co)
  - **Discussions**
- **Etapes suivantes** (MECB + MECO)
- **Conclusions**

Schwartz and Co
Strategy Consulting

THE GOVERNMENT
OF THE GRAND DUCHY OF LUXEMBOURG

Roadmap for the Decarbonisation of the Luxembourg Manufacturing Industry

Meeting with stakeholders, 14th January 2026

V1.2

Context and objectives

This roadmap presents the assessment of the decarbonisation potential of the Luxembourg Manufacturing Industry by 2030, 2040 and 2050

Context

- In 2018, the **Luxembourg manufacturing industry was responsible for around 17 % of Luxembourg total GHG emissions** and almost 80 % of the total GHG emissions of the Luxembourg manufacturing industry were caused by installations subject to the EU-ETS. **Luxembourg aims at long term climate neutrality by 2050 at the latest**
- In 2022, Luxembourg Ministry of the Economy, Ministry of Energy and Spatial Planning, and Ministry of Environment, Climate and Sustainable Development have mandated the consortium Schwartz and Co - energieagence to develop the first roadmap for the decarbonisation of the Luxembourg manufacturing industry
- In 2025, Luxembourg Ministry of the Economy, and Ministry of Environment, Climate and Biodiversity have entrusted Schwartz and Co with the task of **updating the 2022 roadmap**

Objectives

- The present roadmap presents :
  - The **identification and estimation of the Luxembourg Manufacturing Industry decarbonisation potential and the related energy consumption evolution** in 2030, 2040 and 2050, as quantifiable today
  - The **identification and estimation of the decarbonisation potential by industry sector and by decarbonisation lever** in 2030, 2040 and 2050
  - The **required annual volumes of low-carbon energy vectors and of captured carbon to reach the estimated decarbonisation potential**
  - **The required hydrogen and CO2 infrastructures to reach the estimated decarbonisation potential**
- This roadmap reflects the current status of the Luxembourg Manufacturing Industry regarding foreseen decarbonisation projects, which are expected to evolve in the coming years

Scope and methodology

63 decarbonisation projects, out of a total of 92 identified projects, have been quantified to assess the decarbonisation potential of the Luxembourg Manufacturing Industry

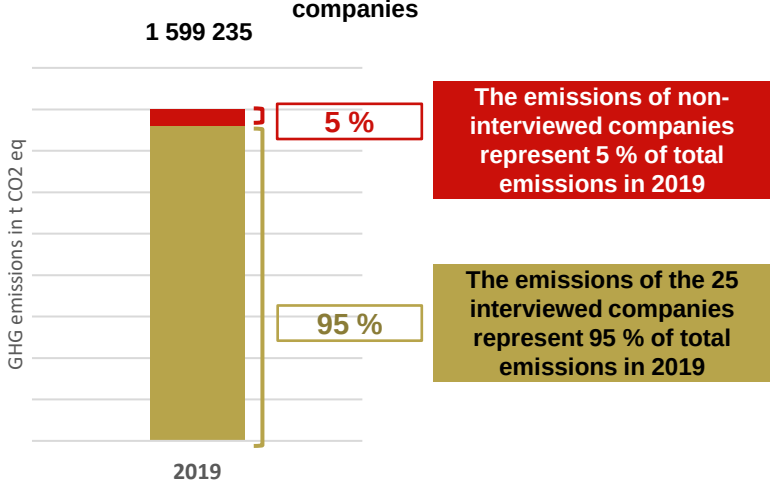
Scope of the roadmap

- The roadmap addresses the Luxembourg manufacturing industry :
  - As defined by the statistical classification NACELUX revision 2, which includes **24 categories at the upper level (C10 to C33)**
  - Supplemented with **4 paving road asphalt production companies (F42)**
- This scope is denominated **the Manufacturing Industry** in the roadmap

Decarbonisation potential estimation

- The decarbonisation potential of the Manufacturing Industry has been estimated through :
  - **Interviews/Surveys with 25 industry top GHG emitters** leading to the documentation of company specific decarbonisation projects (84 projects identified in total)
  - **The design of typical decarbonisation projects** (8 in total) for the rest of the companies, applicable to relevant industry sectors
- Based on the projects' maturity level, 55 out of the 84 specific projects and 8 typical projects have been quantified

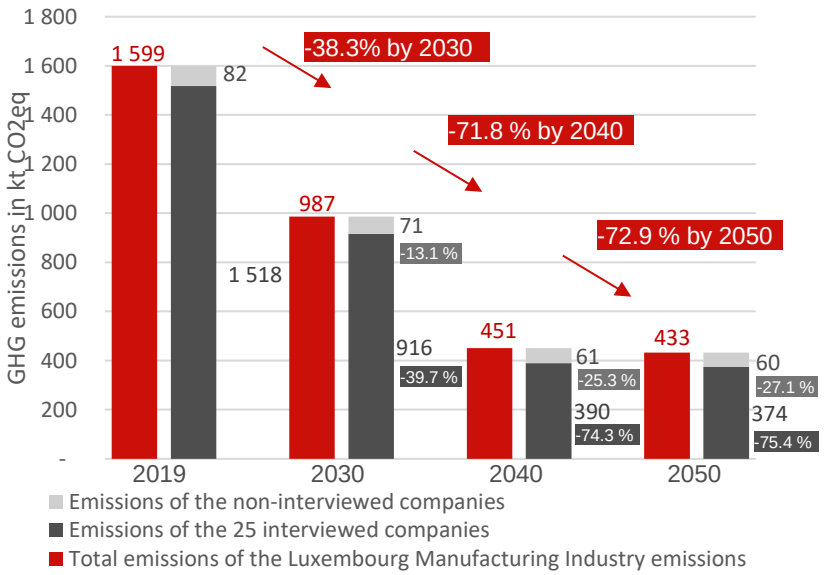
2019 GHG emissions of the Luxembourg Manufacturing Industry and split between interviewed and non interviewed companies



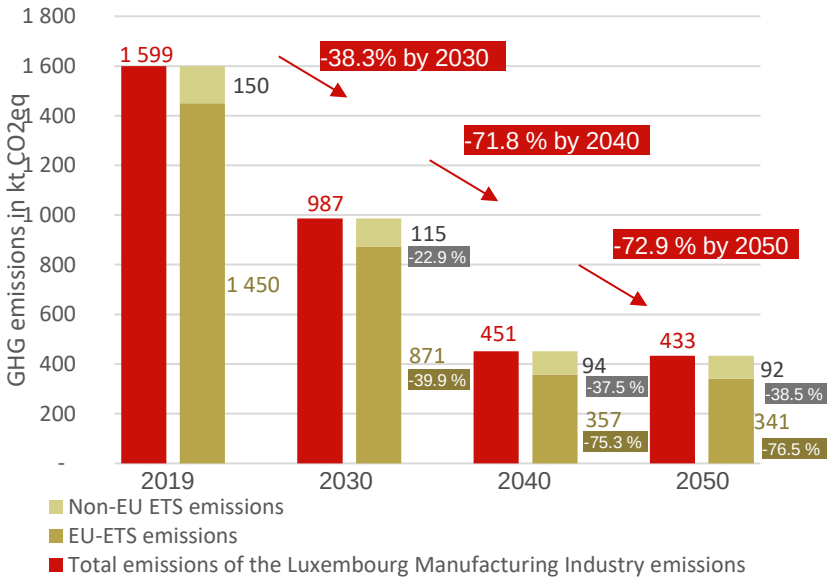
Estimation of the decarbonisation potential for the Luxembourg Manufacturing Industry

Reflecting the current status, the identified decarbonisation potential of the Luxembourg Manufacturing Industry is estimated at 38.3 % in 2030, 71.8 % in 2040 and 72.9 % in 2050, compared to the 2019 GHG emissions*

Decarbonisation potential of the Luxembourg Manufacturing Industry, interviewed and non-interviewed companies



Decarbonisation potential of the Luxembourg Manufacturing Industry, EU-ETS and non EU-ETS emissions



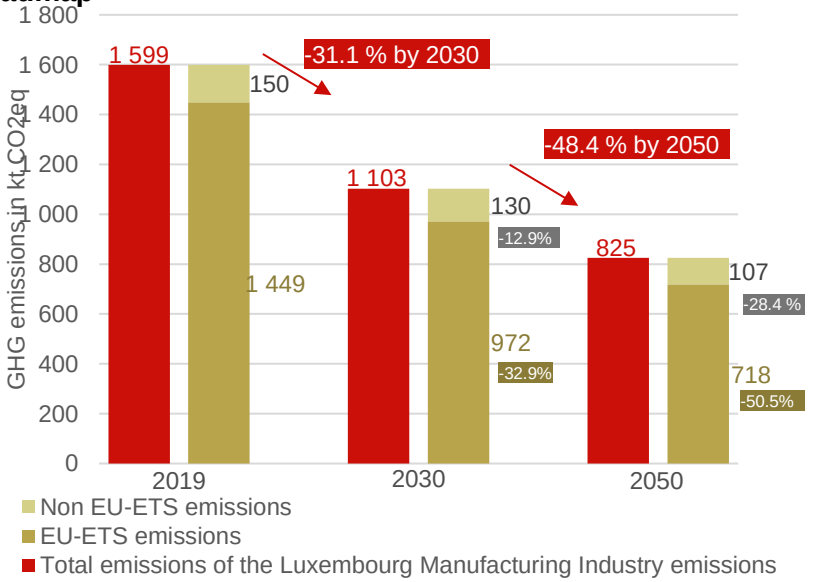
- The **25 interviewed companies include the largest industry players with a high maturity level regarding decarbonisation;** they also **encompass almost all companies** with at least one site subject to the EU-ETS**
- The decarbonisation potential identified is higher for these 2 groups than for non-interviewed companies and non-EU ETS emissions

*Source : 2019 emissions basis computed from Luxembourg's GHG emission inventory 2022 (CO2 eq conversion using AR5 GWPs, and excluding CO2 from biomass) and direct inputs of interviewed companies
**10 out of the 11 companies of the Luxembourg Manufacturing Industry with at least one site subject to the EU-ETS have been interviewed

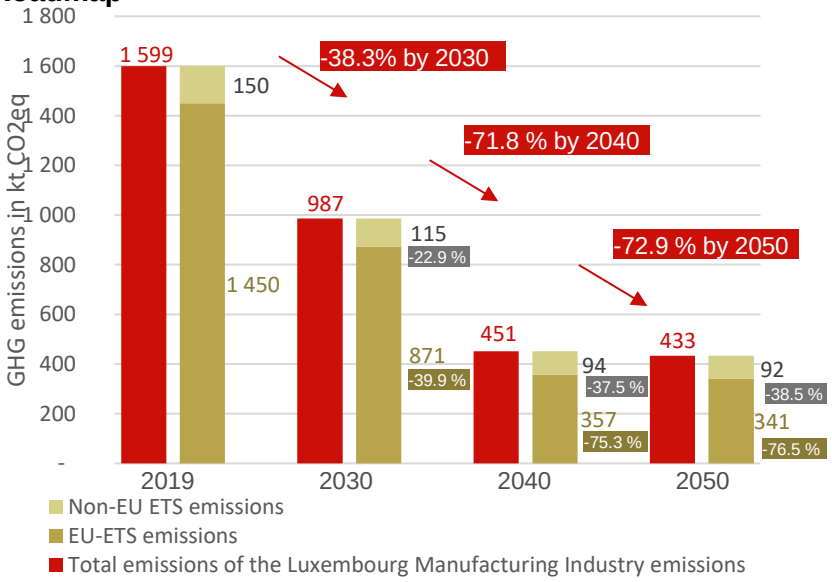
Comparison of the identified decarbonisation potential between the 2022 and 2025 roadmaps

In the 2025 roadmap, the identified decarbonisation potential is 23 % higher than in the 2022 roadmap for 2030, and 51 % higher for 2050

Decarbonisation potential of the Luxembourg Manufacturing Industry, EU-ETS and non EU-ETS emissions from the 2022 Roadmap



Decarbonisation potential of the Luxembourg Manufacturing Industry, EU-ETS and non EU-ETS emissions from the 2025 Roadmap

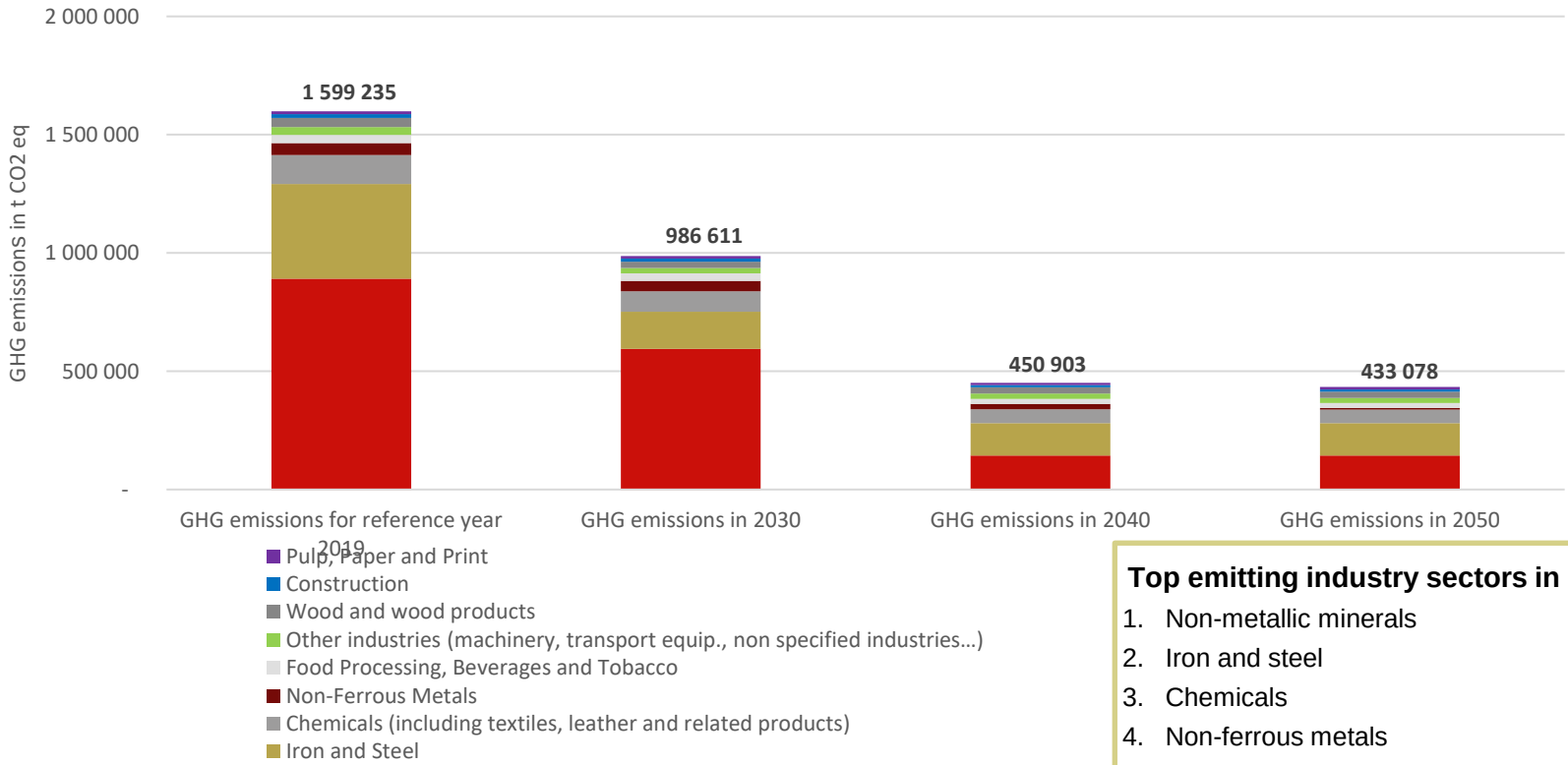


	2022 roadmap	2025 roadmap
Number of quantified projects	40	63
Number of non-quantified projects	29	29
Total	**69**	**92**

Decarbonisation potential by industry sector (1/3)

Overall results

The top 2 emitting industry sectors have a well-defined decarbonisation roadmap representing 88.2 % of the overall identified decarbonisation potential in 2030, 88.1 % in 2040 and 86.8 % in 2050 compared to 2019



Top emitting industry sectors in 2019:

1. Non-metallic minerals
2. Iron and steel
3. Chemicals
4. Non-ferrous metals
5. Food processing, beverages and tobacco

Decarbonisation potential by industry sector (2/3)

Major decarbonisation areas for the top 4 emitting sectors

The top 4 emitting sectors have the highest identified decarbonisation potentials by 2050, cutting their emissions by 53 % up to 87 % compared to 2019

1 Non-metallic minerals

2019 emissions: 891 138 t CO_2 eq

- Decarbonisation potential in 2030: **33 %**
- Decarbonisation potential in 2040: **84 %**
- Decarbonisation potential in 2050: **84 %**

Major decarbonisation areas:

- Install carbon capture plant on site to use the captured carbon or to connect the plant to the required CO2 infrastructure for final storage
- Deployment of melting furnaces using oxy-firing technology
- Install new clinker kiln, increase energy efficiency, the share of low-carbon fuel and the share of decarbonated raw materials for clinker production

2 Iron and steel

2019 emissions: 400 652 t CO_2 eq

- Decarbonisation potential in 2030: **61 %**
- Decarbonisation potential in 2040: **66 %**
- Decarbonisation potential in 2050: **66 %**

Major decarbonisation areas:

- Substitution of natural gas by green hydrogen for high-temperature processes
- Revamping of existing furnaces and optimization of shell concept
- Electrification with the deployment of induction heating systems
- Design of low-carbon products production lines

3 Chemicals*

2019 emissions: 122 686 t CO_2 eq

- Decarbonisation potential in 2030: **29 %**
- Decarbonisation potential in 2040: **53 %**
- Decarbonisation potential in 2050: **53 %**

Major decarbonisation areas:

- Electrification of steam production
- Replace the gas burners to enable hydrogen use
- Increase energy efficiency with the transformation of regenerative thermal oxidation solutions by high-efficiency ones

*Chemicals industry including textiles, leather and related products

4 Non-ferrous metals

2019 emissions: 49 781 t CO_2 eq

- Decarbonisation potential in 2030: **14 %**
- Decarbonisation potential in 2040: **55 %**
- Decarbonisation potential in 2050: **87 %**

Major decarbonisation areas:

- Substitution of natural gas by green hydrogen in melting furnaces
- Replace natural gas by biogas for casting and melting furnaces
- Electrification of medium-temperature processes, for example, by deploying electric or hybrid annealing furnaces

Decarbonisation potential by industry sector (3/3)

Major decarbonisation areas for other sectors

Other industry sectors are expected to cut their GHG emissions by 23 % up to 41 % by 2050, compared to 2019

5 Food processing, beverages and tobacco

2019 emissions: 34 634 t CO_2 eq

- Decarbonisation potential in 2030: **8 %**
- Decarbonisation potential in 2040: **37 %**
- Decarbonisation potential in 2050: **40 %**

Major decarbonisation areas:

- Electrification of steam boilers
- Replacement of fuel oil burners by micro ondulating gas burners, partially powered by biogas
- Equipment upgrades to improve energy efficiency (e.g. variable speed compressor)

6 Other industries*

2019 emissions: 32 766 t CO_2 eq

- Decarbonisation potential in 2030: **30 %**
- Decarbonisation potential in 2040: **32 %**
- Decarbonisation potential in 2050: **32 %**

Major decarbonisation areas:

- Electrification of natural gas boilers where technically possible, or replacement of natural gas boilers by condensing ones
- Waste heat recovery solutions for low and medium-temperature processes for industrial and non-industrial applications
- Electrification of low-temperature processes

7 Wood and wood products industry

2019 emissions: 39 485 t CO_2 eq

- Decarbonisation potential in 2030: **32 %**
- Decarbonisation potential in 2040: **32 %**
- Decarbonisation potential in 2050: **32 %**

Major decarbonisation areas:

- Complete electrification of production lines
- Increase the use of biomass for combustion
- Electrification of industrial vehicle fleets (forklifts, engines, etc.)

8 Road asphalt and PP&P**

2019 emissions: 28 092 t CO_2 eq

- Decarbonisation potential of the road asphalt industry : **8% in 2030, 41% in 2040 and 2050**
- Decarbonisation potential of PP&P in 2030, 2040 & 2050: **23 %**

Major decarbonisation areas:

- Substitution of fossil fuels by green hydrogen to power rotating drum burners
- Increase the production of low-carbon asphalt produced at a lower temperature
- Waste heat recovery solutions for low and medium temperature processes for preheating applications

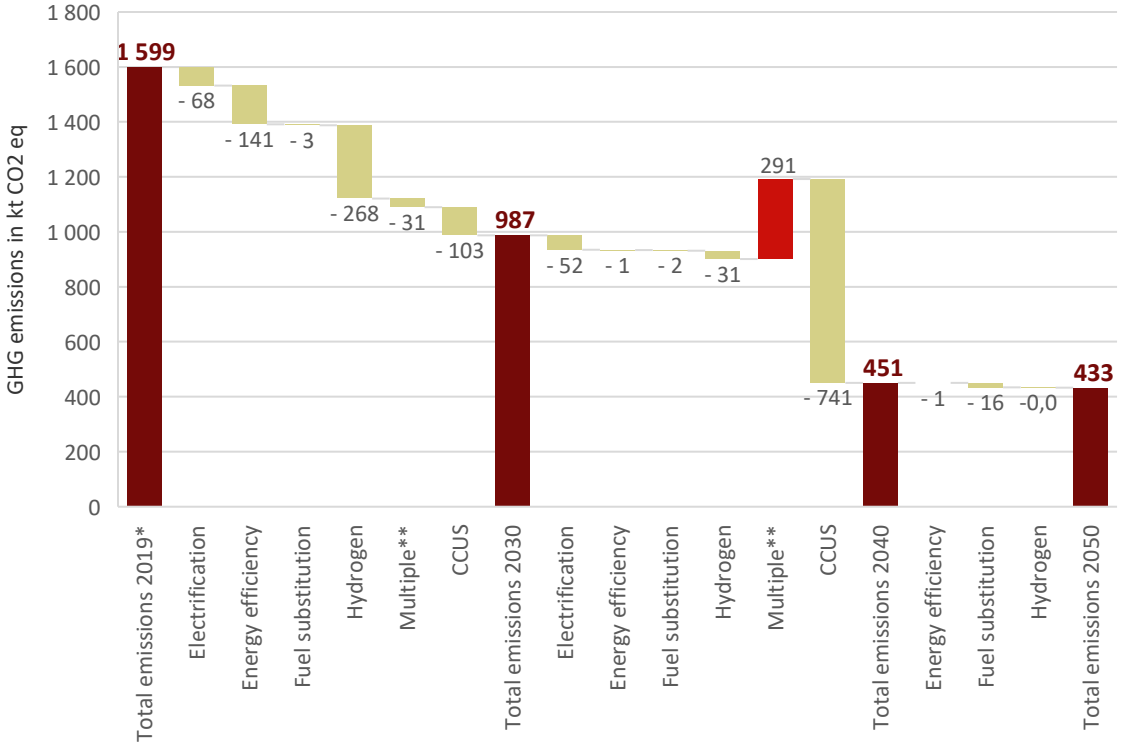
*Including machinery, transport equipment and non-specified industries

** Pulp, Paper and Print

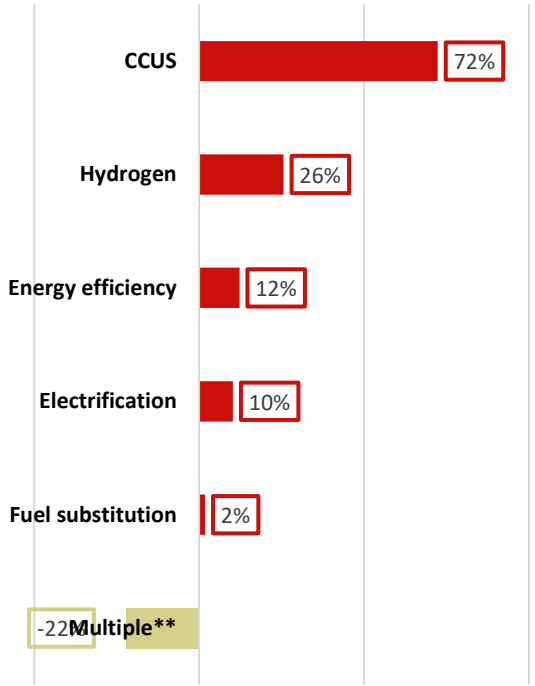
The decarbonisation levers of the Luxembourg Manufacturing Industry

Overall, by 2050, CCUS* appears as the number one decarbonisation lever, followed by hydrogen, energy efficiency and electrification

Potential of each decarbonisation lever applicable to the Luxembourg Manufacturing Industry



Contribution to the decarbonisation potential by 2050



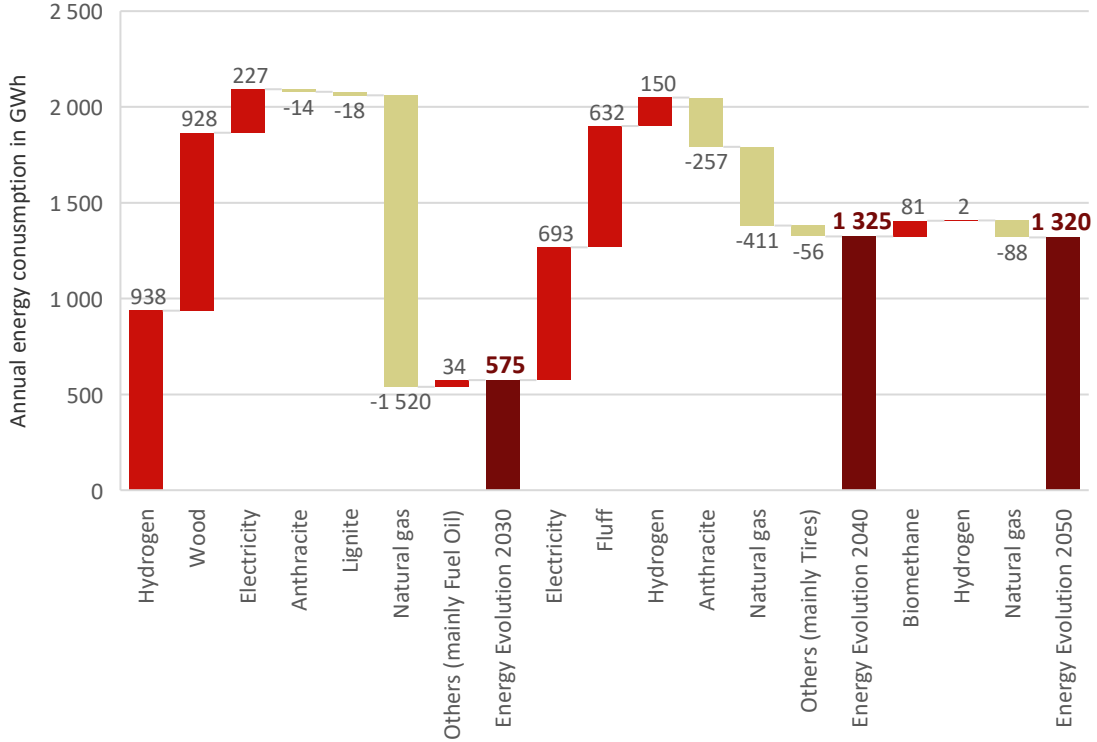
* Carbon Capture Use or Storage

** "Multiple" combines the four following decarbonisation levers : fuel substitution, use of alternative raw material, energy efficiency, electrification ; NB: the emissions for the "Multiple" lever increase between 2030 and 2040 due to the forecasted production capacity increase despite the emissions reduction induced by the identified decarbonisation projects

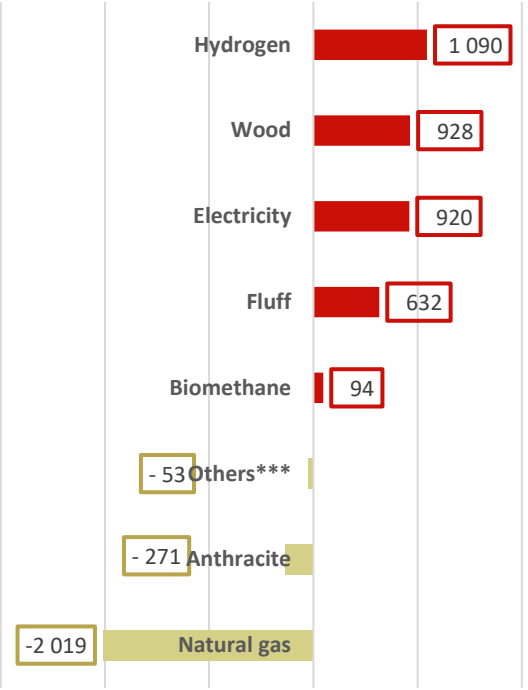
Energy evolution consumption of the Luxembourg Manufacturing Industry

Overall, by 2050, although fossil fuel consumption is decreasing, total energy consumption is increasing by 1 320 GWh, mainly due to the overall increase in production volumes and the commissioning of CCUS projects

Annual energy consumption evolution induced by the decarbonisation projects of the Luxembourg Manufacturing Industry, by energy carriers



Energy consumption evolution to 2050 in GWh



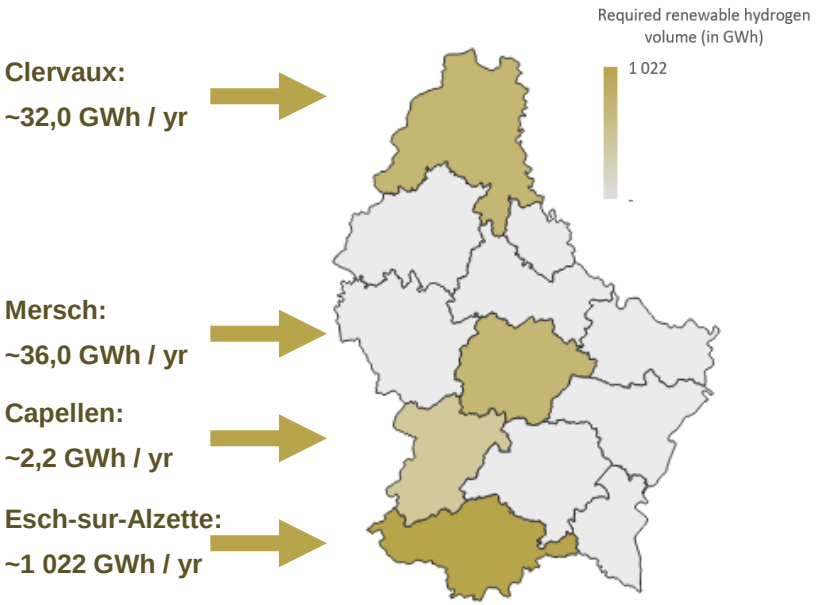
***Others : other energy carriers whose consumption is evolving (mainly tires and solvents)

Required volume of low-carbon energy vectors (1/2)

Renewable / low-carbon hydrogen and renewable electricity

1.1 TWh/yr of renewable / low carbon hydrogen and 0.5 TWh/yr of renewable electricity will be required to achieve the currently assessed decarbonisation potential of the Luxembourg Manufacturing Industry by 2050

Required annual volume of renewable hydrogen per canton by 2050



Renewable / low-carbon hydrogen required volume

- Required volume of renewable / low-carbon hydrogen by milestones to achieve the identified decarbonisation potential:
  - **1 009 GWh / yr** by 2030
  - **1 090 GWh / yr** by 2040
  - **1 092 GWh / yr** by 2050
- Renewable / low-carbon hydrogen needs are entirely distributed between 4 cantons. By 2050:
  - 93.6 % of the demand is located in the Esch-sur-Alzette canton
  - 3.3 % in the Mersch canton
  - 2.9 % in the Clervaux canton
  - 0.2 % in the Capellen canton

Renewable electricity required volume

- Required volume of renewable electricity by milestones to achieve the identified decarbonisation potential:
  - **217 GWh / yr** by 2030 (+227 GWh / yr of additional electricity demand)
  - **462 GWh / yr** by 2040 (+920 GWh / yr of additional electricity demand)
- Main current concerns of industry players regarding their electricity sourcing strategies:
  - **Secure affordable and stable prices**
  - **Security of supply to ensure business continuity**

Required volume of low-carbon energy vectors (2/2)

Biomass, biomethane and avoided natural gas consumption

Based on the identified and quantified decarbonisation potential, 2.0 TWh / yr of natural gas consumption could be avoided by 2050 through its substitution by low-carbon energy vectors and energy efficiency improvements

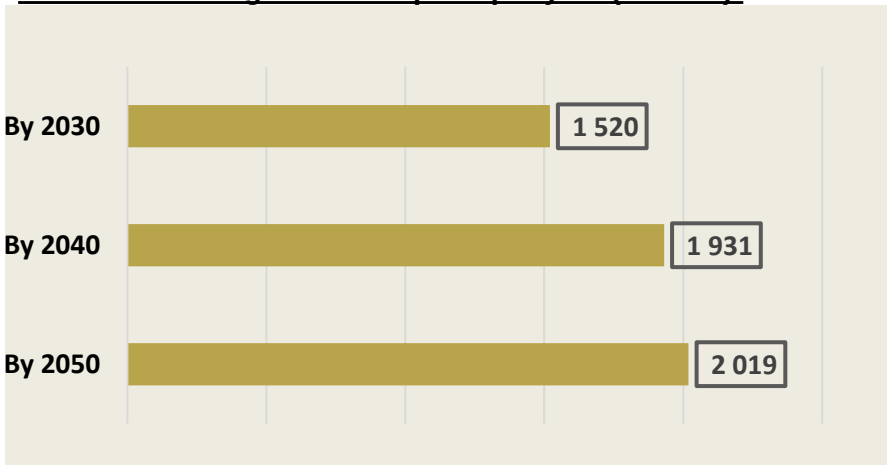
Biomass and biomethane

- By 2030, **928 GWh / yr of biomass** will be required to achieve the identified decarbonisation potential of the Luxembourg Manufacturing Industry
- By 2050, **94 GWh / yr of biomethane** will be required to achieve the identified decarbonisation potential of the Luxembourg Manufacturing Industry
- These two low-carbon energy vectors contribute to the decarbonisation of specific sectors, such as the wood & wood products industry, the food & beverage industries and the non-ferrous metals industry

Avoided natural gas consumption

- The development of low-carbon energy vectors will contribute to the natural gas phase-out of the Luxembourg Manufacturing Industry
- By 2050 **2 019 GWh / yr of natural gas** consumption could be avoided with **energy efficiency** projects and **its substitution** with green hydrogen, biomass, electricity and biomethane

Avoided natural gas consumption per year (in GWh):



Volume of captured CO2

By 2040, the assessed decarbonisation potential of the Luxembourg Manufacturing Industry relies on a volume of 814 ktCO2 / yr of captured CO2 which has to be evacuated from the capture sites to usage or storage sites

Annual volume of captured carbon per canton by 2040

Capellen:
~73.0 ktCO2 / yr

Esch-sur-Alzette:
~740.8 ktCO2 / yr

CO2 captured volume

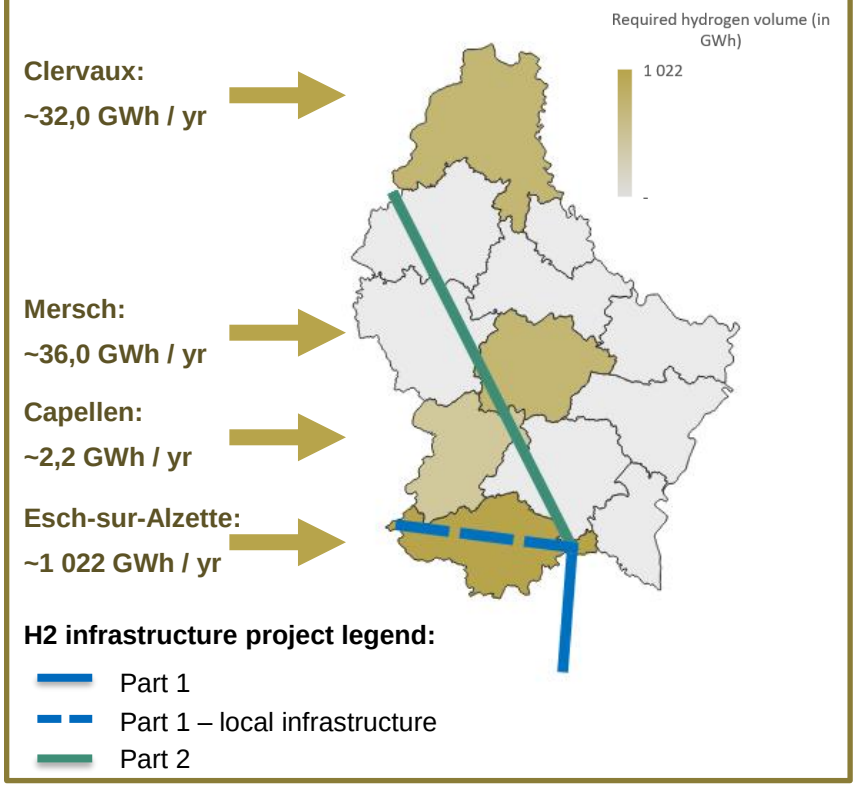
- Estimated volumes of captured carbon to achieve the identified decarbonisation potential:
  - By 2030, **73.0 ktCO2eq / yr** of CO2 to be captured, resulting in a 40.4 GWh / yr increase of the electricity consumption
  - By 2040, **813.8 ktCO2 / yr** of CO2 to be captured, resulting in a 450.0 GWh / yr increase of the electricity consumption
- Captured carbon volumes are entirely distributed between 2 cantons in the south-west of Luxembourg. By 2040:
  - 91.0 % in the Esch-sur-Alzette canton
  - 9.0 % in the Capellen canton

Required infrastructures (1/2)

Hydrogen

Hydrogen connection infrastructures will be required to link consumption sites to the future Luxembourg hydrogen backbone

Required annual volume of hydrogen per canton by 2050 and planned H2 infrastructure projects



Planned H2 infrastructure projects

- The Natran, Creos and Fluxys consortium plans to commission a **hydrogen backbone (the HY4Link project**) in three parts:
  - The first part would connect the Esch-sur-Alzette canton to the French hydrogen network
  - In the meantime, a local infrastructure would cross the Esch-sur-Alzette canton from east to west
  - The second part will cross Luxembourg from south to north, passing through the western cantons to the Belgian border

Additional H2 infrastructure required

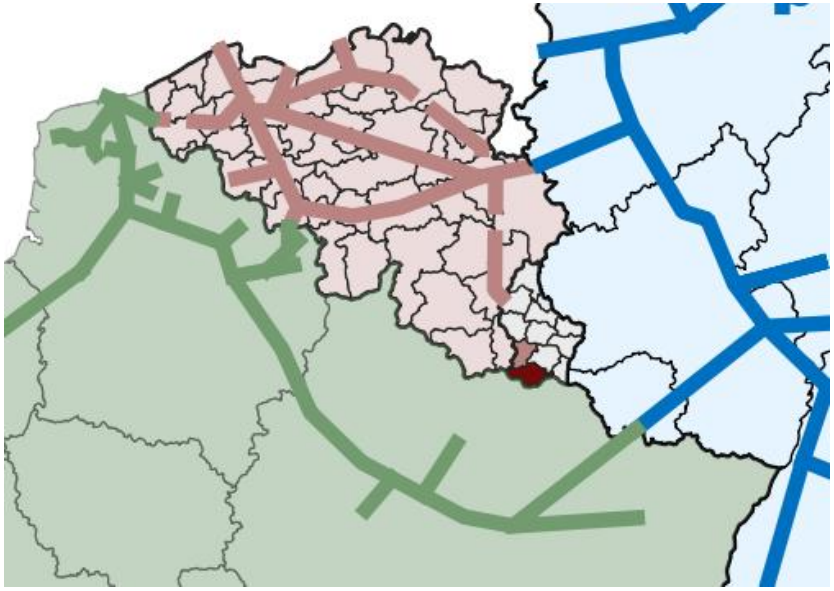
- Hydrogen connection infrastructures will be required **to link consumption sites** in 4 cantons **to the HY4Link hydrogen backbone**
- **The routing of the HY4Link project should be optimised to minimize the overall cost** of the transmission and connection infrastructures

Required infrastructures (2/2)

CO2

A CO2 transmission network linking the CO2 capture sites in the south-west of Luxembourg to the planned Belgian CO2 transmission network is required by 2035

CO2 transportation infrastructure identified projects



CO2 transportation infrastructure legend:

- French project
- German project
- Belgian project
- Belgian extension / alternative route

CO2 transmission infrastructure required

- To date, **the CO2 transmission network projects are still located far from Luxembourg's CO2 capture sites,** situated in the south-west cantons
- To reach the estimated decarbonisation potential, a CO2 transmission network should be developed in Luxembourg to **connect the carbon CO2 sites to CO2 utilisation sites or to final storage sites, by taking advantage of the Belgian extension forecasted, representing the closest identified CO2 transportation grid project:**
  - The Belgian CO2 transmission route is offered by Fluxys to bridge the distance from the CO2 capture sites towards potential CO2 users or final storage sites, situated in the North Sea
  - The development of a Luxembourg CO_2 transmission network to connect the CCU sites to the transmission network planned by OGE in Germany, does not currently appear to be economically viable, as the interconnection is twice as far from the Luxembourg capture sites as the Belgian interconnection

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Prochaines étapes

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

- Encourager, guider et soutenir les entreprises dans leurs efforts de décarbonisation
- Promouvoir les instruments de soutien disponibles afin de
  - Quantifier les projets identifiés mais non-quantifiés
  - Stimuler l'identification de projets supplémentaires
- Initiatives en cours
  - Taskforce H2
  - Taskorce CCUS&CDR
  - Klimapakt fir Betriber
  - Accord volontaire avec la FEDIL

Les aides d'État

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

- Régimes nationaux
  - SME Package Sustainability
    - Aide destinée aux PME pour mettre en œuvre un premier projet à impact positif sur l'énergie, l'eau, les déchets ou l'empreinte carbone. Le montant du projet doit être compris entre 3.000 € et 25.000 €.
  - Fit4Sustainability
    - Permet aux entreprises de réaliser un bilan de l'impact environnemental de leurs activités.
  - Loi du 8 décembre 2025 ayant pour objet le renouvellement du régime d'aides à la protection de l'environnement
    - Renouvelle le régime d'aides à la protection de l'environnement pour se conformer au règlement général d'exemption par catégorie. Nouveaux articles dédiés à la décarbonation.
  - Loi modifiée du 26 juillet 2022 relative au régime d'aides en faveur des entreprises investissant dans des infrastructures pour véhicules à carburants alternatifs
    - Régime d'aides pour les entreprises investissant dans des infrastructures pour véhicules à carburants alternatifs.
- Appels à projets concurrentiels (2026)
  - Production d'électricité à partir de centrales photovoltaïques (autoconsommation)
  - Bornes de recharge
  - Véhicules routiers à émission nulle

LUXINNOVATION
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INNOVATION FUND

Deploying innovative net-zero technologies for climate neutrality

Grants and auctions for projects aiming for the commercial deployment of innovative low-carbon technologies

- New calls opened on the **3rd of December 2025, budget of €5.2Bn**
  - RFNBO & ELC Hydrogen auctions - **€1.3bn,** 100% funding rate, deadline in **February 2026**
  - Decarbonisation of Industrial Process Heat auctions- **€1bn**, 100% funding rate, deadline in **February 2026**
  - Innovation Fund Grant call -**€2.9bn** total budget, 60% funding rate, deadline in **April 2026**
- **Location of the project** has to be **EU/ EEA**, min. CAPEX investment size of **€2.5M** for the grant call

- **Support is available** from the National Contact Point, see with Sanna Alaranta sanna.alaranta@luxinnovation.lu
- **National Infoday** on the **29th of January 2026,** with **Orientation Dialogues at the Chambre de Commerce**.

Register for the Infoday: https://events.luxinnovation.lu/eu-innovation-fund-luxembourg-infoday-

MERCI
pour votre participation!

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Environnement, du Climat
et de la Biodiversité

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie