LUXEMBOURG'S NATIONAL EMISSION TRAJECTORIES

DRAFT REGULATION ON SECTORAL EMISSION REDUCTION TARGETS

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Contents

1 Context

In its climate law of December 15th, 2020, the Luxembourg government targets on reducing greenhouse gas emissions at the national level of 55% by 2030 compared to the 2005 level. This objective includes all the emissions allocated to Luxembourg[1] except those covered by the EU Emissions Trading System (EU ETS) and those resulting from land use, land-use change, and forestry (LULUCF).

The law further defines five specific sectors that shall together contribute to reaching the emission reduction targets. The sectors, (1) energy and manufacturing industry & construction, (2) transport, (3) residential and service sector buildings, (4) agriculture and forestry, (5) waste and wastewater treatment, each received distinct reduction targets for the period 2021-2030. Those sector-specific targets are published by a bill of regulation tabled in July 2021. The regulation prescribes an effective emission reduction for the five sectors together of 55% in 2030 compared to 2005.

The diagrams in Figure 1 show the emission reduction targets for the five sectors compared to 2019. All sectors together are supposed to reduce emissions by 51% compared to 2019, for the industrial sector, a reduction of 52% compared to 2019 is required.

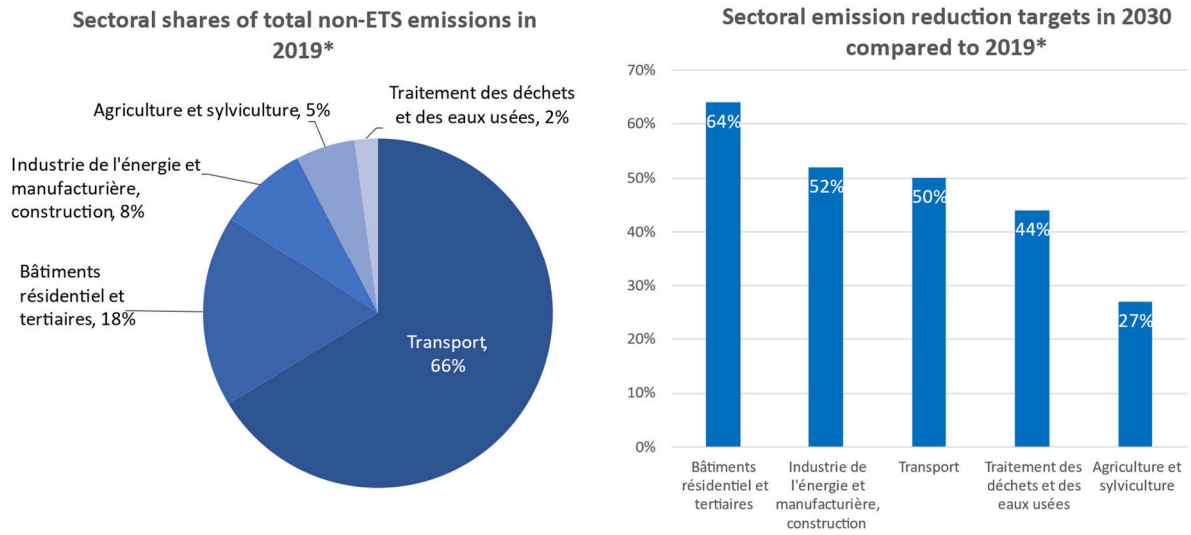

*Figure 1: Luxembourg's emissions per sector in 2019 (left diagram) and the expected sectoral emission reduction efforts (right diagram) – *source: government press release of 22.07.2021*

2 Confident commitments for emission reduction targets

2.1 "The higher, the better" is too simplistic as an approach

FEDIL and its members acknowledge the need to mitigate climate change and are ready to debate on how to reach the national government's ambitious greenhouse gas reduction targets for 2030. The industrial federation welcomes sectoral goals, including the option of compensating reduction achievements between sectors to balance under- and overperformances.

In its climate law, Luxembourg confidently sets a more ambitious emission reduction target than the European Commission's Effort Sharing Regulation (ESR) suggested. The ESR foresees reductions of -50% compared to 2005 for Luxembourg. However, the government

[1] According to EU regulation 2018/842

aims for -55% without explaining the analysis that the national emission reduction targets must be 5% higher than what the EU Commission suggests.

We know that the EU sets emission reduction targets for each Member State following thorough impact assessments. The "Fit for 55" package includes many thousands of pages of such impact assessments. They aim to find the right balance between climate actions and their consequences both economically and socially.

Luxembourg's more ambitious target setting ignores the EU's analysis and its recommendations for emission reduction targets. At the same time, the Luxembourg government does not present its analysis or reasoning to justify the higher ambitions. Even the National Energy and Climate Plan published in 2020 does not present any such arguments. We must thus assume that Luxembourg's government is following an overly simplistic and singular "the higher, the better" approach that deliberately disregards the complexity of the national socio-economic system it is supposed to manage holistically.

FEDIL believes that such a non-factual target setting may harm the social and economic stability of Luxembourg. Yet, we observe that the government seems to be perfectly comfortable and confident with overshooting targets. So far, however, the government has failed to present those robust, sectoral decarbonisation strategies and roadmaps underpinning their confidence.

2.2 Flexibility is necessary to preserve Luxembourg's competitiveness

The bill of regulation defining the national CO2 emission trajectories for the five sectors until 2030 foresees to linearly decrease emissions in all five sectors until 2030. The trajectories are, however, mainly based on the assumption of an economic status quo. Moreover, little attention is paid to how additional emission sources shall be managed and whether the trajectories include a margin for a short-term increase of emissions. Additional emissions may, for example, originate from growth and extension projects of the existing industrial base and new industrial implementation projects. After all, an accomplished climate policy must succeed in growing industrial activities in Luxembourg while making it sustainable at the same time.

For the energy transition to succeed, it is crucial to attract new companies and businesses that correspond to the sustainable vision of the country's economy. Consequently, new industrial implementation and extension projects will most probably be picked and authorised accordingly. Nevertheless, their implementation will not abruptly improve Luxembourg's energy profile. On the contrary, in the short term, they will inflate the national energy profile as they co-exist with the current industrial base during the transition phase before decreasing.

The challenge of climate change mitigation can be described as threefold from an economic and political view: (1) Managing the energy transition of the economy successfully, (2) achieving the EU climate targets while (3) promoting continuous economic growth. It is a huge challenge and only leaves little margin. Luxembourg must, therefore, embrace all remaining flexibility options, including the possibility of acquiring emission quotas from other EU countries to achieve EU climate targets. It must also embrace all technological options, including carbon capture and utilisation.

Rejecting those options will dramatically and unnecessarily reduce Luxembourg's flexibility compared to other EU economies as it will negatively impact the national climate policy's overall costs. Moreover, if Luxembourg maintained this approach, it could not take full advantage of all emission reduction options offered by the EU's Effort Sharing Regulation (ESR). As a matter of fact, the ESR offers the possibilities of banking, borrowing, buying, and selling of emission quotas between the Member States. On top of it, it offers

Luxembourg, together with eight other Member States, who have targets that are significantly above both the Union average and their cost-effective reduction potential, the option to access allowances from the EU ETS.

Further, Luxembourg's government set significantly higher targets for its non-ETS industrial sector (-49% compared to 2015) than what the EU Commission foresees in its assessment of the ESR regulation (-23% compared to 2015). However, Luxembourg's industry is already performing on a relatively high carbon efficiency level. FEDIL thus believes that all the flexibilities offered by the ESR must be considered to decarbonise most cost-effectively. In particular, the possibility to access allowances from the ETS industry must be used to take off pressure from its non-ETS industrial counterparts if necessary.

3 The risks of failing to deliver on commitments

The industry is willing to decarbonise its activities ambitiously. It expects, however, equally ambitious support measures to realise them. This chapter represents the industry's wake-up call to the government's climate policy, which focuses on targets rather than on measures to reach them. The first subchapter identifies and discusses businesses barriers to decarbonise smoothly. The second subchapter then presents and analyses the industry's technical decarbonisation options and their potential to contribute to carbon neutrality.

Both chapters demonstrate the immense, non-trivial challenge of decarbonising the industrial sector. Moreover, they identify the risks of failing to deliver on its commitments for the government unless it considers and addresses the business barriers (see 3.1) and technical limits (see 3.2) of decarbonisation.

3.1 Business barriers to smoothly decarbonise in industry

Luxembourg confidently sets high national emission reduction targets for 2030, targets that surpass the EU Commission's recommendations (see chapter 1). In some sectors, however, delivering on those commitments until 2030 might become a severe challenge for future governments unless comprehensive and sector-specific packages of decarbonisation measures become available soon.

While, for example, the government can shift emissions in the transport sector to neighbourhood countries by progressively increasing fuel prices, its influence in the "energy and manufacturing industry & construction" sector is much less pronounced. In the latter sector, we identified three significant barriers that may give the government a hard time delivering on their set emission reduction targets:

1. For many companies in this sector, the emission reduction targets are not clear. The situation is unlike for companies included in the EU ETS; indirectly, the latter have precise, individual, and specific emission reduction trajectories till 2030 and even beyond. In Luxembourg's non-ETS sector, however, not even the CO_2 price is defined for the period after 2023. Within this context, a business owner or general manager might wonder how much, until when and how he is expected to reduce emissions. Worse, he might not even feel concerned as nothing much seems to happen if he doesn't decarbonise, so why bother if the CO_2 price is low compared to marginal abatement costs and offers no predictable trajectory for the future.
2. Most companies in this sector are SMEs with a national business focus, for example, companies from the construction sector or businesses from the food and dairy industry. Those companies tend to have negligible non-compliance costs due to the CO_2 tax. They can forward these extra costs to their primarily local clients. Therefore, being in a situation with no significant opportunity costs, they do not have much incentive to invest in low carbon technologies except for CSR or corporate image branding.

3. Finally, we have about a dozen companies in this sector whose operations rely on significant fossil energy consumption, primarily natural gas, and which cannot easily forward CO2 emission costs to clients because they are exposed to international trade. Nevertheless, switching to low-carbon technology is no straightforward decision for those companies. A switch would require a significant capital investment (CAPEX) into new production technologies without the perspective of much higher productivity. On the contrary, we expect that most low carbon technologies will entail higher operating costs (OPEX) than traditional technologies with no substantial productivity gains. This combination represents one of the least attractive scenarios for companies to invest in: On the one hand, CAPEX without the perspective for a good return on investment; on the other hand, higher OPEX with no predictability on the national CO2 prices beyond 2023. These are the worst arguments to encourage a low carbon investment.

In conclusion, we can expect that most industrial companies will continue to improve energy efficiency. And while improving energy efficiency is essential, it will not yield the emission savings the government expects (see also chapter 3.2). As a result, we see a significant risk that Luxembourg's government will not meet its emission reduction targets in the "energy and manufacturing industry & construction" sector unless it soon presents a comprehensive package of measures supporting it. Such a package must address all three points described above.

3.2 Technology potentials and limitations for the industry's deep decarbonisation

Despite the challenges described above, industrial companies could reduce their CO2 emissions by combining technical measures described below (see also Figure 2). These measures were identified and assessed by a working group of industry experts associated with the Benelux Business Roundtable in 2021:

1. **Energy efficiency**: Improving energy efficiency is an ongoing measure in the industry. It is the result of incessantly eliminating unproductive activities and losses. It also requires continuously investing in training human resources, upgrading, and renewing the equipment to the best available technologies.

   On our way to the net-zero vision, practitioners estimate that energy efficiency can eliminate 5-10% of emissions by 2050. That would be a good start, but it is far from sufficient even to achieve the emission reduction goals of 2030.

2. **Biomass as feedstock or fuel**: The next best approach is to substitute fossil fuels with renewable ones. Solid biomass (wood), biogas and biomethane can be used for this purpose. However, burning wood for heat production is not unanimously considered sustainable and is considered only a temporary solution for carbon neutrality. Further, biogas and biomethane are difficult to source in large quantities and at competitive prices. Practitioners thus estimate the potential of biomass for decarbonising the industry until 2050 at only around 10-15%. In Luxembourg's industry, we can expect that this theoretic potential will never materialise as authorities are reluctant and slow to grant operating licences for such installations.

3. **Electrification of heat**: Electrifying heat supply is regarded as one of the cleanest ways to heat industrial processes, provided the electricity stems from a renewable energy source. Electrifying furnaces, boilers, and high-temperature heat pumps could reduce emissions between 35-40% in industrial applications. However, we can expect that companies will be reluctant to switch their current fossil fuel heat sources to electricity without significant incentives as the electrification of heat does not bring any productivity gains (unproductive heat). On the contrary, operational costs risk exploding as electricity tends to be more expensive than gas. Currently, electricity is double the price of natural gas.

4. **Hydrogen as fuel or feedstock**: Low carbon hydrogen, made from zero-carbon

electricity, is today often considered as an alternative feedstock or fuel in high-temperature processes. Its potential contribution to industrial CO2 reduction by 2050 is promising. Practitioners estimated it at 25-30%. The challenge is to source low carbon hydrogen in large quantities. Currently, less than 2% of the hydrogen on the market is considered sustainable and low carbon. However, we must rule out hydrogen as a serious contributor to decarbonise Luxembourg's industry until 2030 as the local government's hydrogen strategy only intends to tackle the shortage of sustainable H2 at an industrial scale after 2030.

5. **Carbon capture and storage or use (CCU/S)**: CCU/S may be a solution for sectors that are hard to decarbonise. It can be used in sectors where electrification or hydrogen usage does not represent a solution. These industries are found mainly in the chemicals, metallurgy or cement production, which the EU ETS mainly covers. While for ETS industries, CCU/S represents a non-negligible decarbonisation potential of 20-25% by 2050, it will probably not contribute much to reaching the national CO2 reduction targets we discuss in the present paper. Furthermore, for the time being, Luxembourg's government rules out the use of CC technologies altogether without providing sound justification or analysis.

   The industrial federation reckons that Luxembourg's geographic location, away from natural carbon storages sites, does not make CCS, i.e. the storage of carbon, a viable option. CCU, however, i.e. capturing carbon for use, must remain an option to industries with an incompressible part of CO2 emissions until other solutions are at hand.

6. **Demand circularity**: In some industries, greenhouse gases can be substantially reduced by reusing and recycling materials. We typically speak of plastics, and other chemical products, glass, and metals. Nevertheless, for the overall decarbonisation of industry by 2050, practitioners estimate the impact of demand circularity at a modest 1-5% only.

   In Luxembourg, reuse and recycling are already successfully applied in major industries, such as aluminium, steel, and glass. However, the most significant emitters in those sectors are part of the EU ETS and do not contribute to the national CO2 reduction goals discussed in this paper.

7. **Other innovations**: Other novel technologies such as waste as fuel, inert anode technology smelting, geothermal heat, etc. can help reduce emissions in particular industrial processes only. Moreover, as their use is limited to a relatively small number of applications, their decarbonisation potential for the whole industry is somewhat limited to 1-5%.

3.3 Industry's wake-up call

The previous analysis clearly shows that the industry cannot rely on incremental decarbonisation approaches only to reach the emission reduction targets of 2030. In other words, the straightforward measures the government proposed in the NECP[2] for industrial decarbonisation are not enough. Energy efficiency, switching to biomass as a heat source, or increasing circularity can at the very best yield 20-25% of CO2 reductions depending on the industry. This is still a long way from the 52% emission reductions the government wants to achieve until 2030 in the industrial sector compared to 2019.

Unless the government massively supports the industry to make much more profound changes to tackle decarbonisation, it might not be able in 2030 to report its successful delivery of climate targets in Brussels.

[2] National Energy and Climate Plan published by the government in 2020

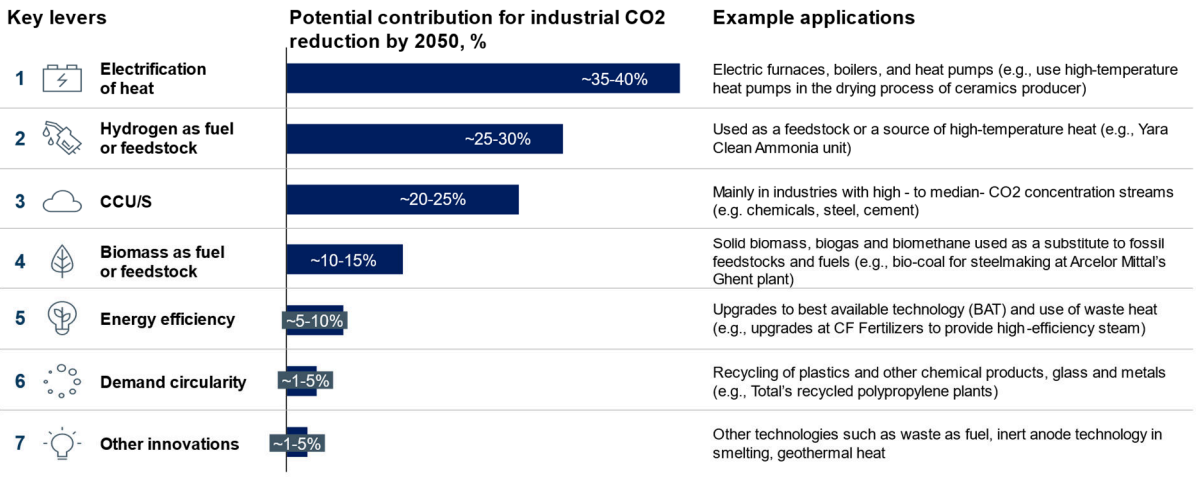

Figure 2: Industry's technical decarbonisation options and their potential contributions by 2050 (source: Benelux Business Roundtable 2021)

Promoting incremental decarbonisation measures stays essential, but we need much bolder measures to reach the 2030 targets in the industry. The government thus needs to open the door and clear the way for rapid and generalised electrification of heat across a broad range of companies from all sectors. Further, low carbon hydrogen or more general, decarbonised gas and CCU deployment must be analysed within the next 12 months and implemented by the end of 2025 where applicable.

For this transformation to materialise, the government must succeed in mobilising colossal capital investments in all industrial sectors. In addition, it must be willing to absorb significant parts of the increasing operational costs that will follow the transition. Finally, it must streamline its authorisation procedures to accelerate the industry's low-carbon modernisation efforts.

The following paragraph proposes measures that can help tackle the energy transition and address the challenges described above.

4 Measures to tackle the low carbon transition in the non-ETS industry

In this chapter, FEDIL proposes nine concrete measures - including sector-specific measures for the construction sector - to reduce Luxembourg's risk of failing to deliver on its ambitions in the non-ETS industrial sector. The measures have been deduced from the challenges described in the previous chapter. They are specifically designed to address the emission reduction barriers and technical limitations identified above (see 3.1 and 3.2).

4.1 Make the CO2 tax progressive for industrial companies

FEDIL proposes to **double the incentive of the CO2 tax** for industrial companies exceeding the threshold of 4100 MWh/year of fossil energy consumption and reduce their CO2 costs by the same level when they invest in greenhouse gas emission savings. This mentioned threshold addresses all non-ETS companies currently included in the tax category C2 for natural gas. Covering around 20% of all non-ETS industrial emissions; this measure could significantly impact national CO2 savings.

Compared to a recent reference year, f. ex. 2019, the tax rates of EUR 25/tonne CO2 in 2022 and EUR 30/tonne C02 in 2023 would be doubled to 50 EUR/tonne C02 in 2022 and EUR

60/tonne Co2 in 2023 on the slice that represents the upper half of the emissions of 2019, the year of reference. The lower half of the emissions would be exempt from the tax, and the regular tax would be levied linearly for the level of CO2 emissions exceeding those of the reference year.

Such a progressive CO2 tax would create a strong incentive to cut in half the emissions of the reference year. Compared to a linear tax on all emissions, it would provide a much better return on climate investments for the industry. The adjusted tax would more quickly reward companies that commit to decarbonisation by exempting the lower half of the base year's emissions. It would address the concern of maintaining the company's competitiveness, knowing that energy is an important production factor. The incentive tax would not affect the amount due by companies that do not reduce their emissions compared to the reference year.

4.2 Provide a Voluntary Agreement Scheme for CO2 reductions

The current Voluntary Agreement between the industry and the government is a scheme that helps to promote energy efficiency efforts across Luxembourg's 50 or so most energy-intensive companies. A similar **Voluntary Agreement on CO2 reductions** should be provided to incentivise a much broader group of companies to reduce emissions. It could be based on the same principle of granting energy cost rebates for achieved CO2 reductions over a defined period. Furthermore, its affiliation could be a precondition for companies to access the progressive CO2 tax as the scheme's auditing practices could be used to monitor the realised CO2 savings.

4.3 Introduce an extraordinary state aid for the electrification of heat

Chapter 3.2 identified the electrification of heat as having the most significant greenhouse gas reduction potential in the industry. At the same time, however, we discussed companies' reluctance to switch to electricity because of the unproductive investment coupled with higher running costs. FEDIL believes that unless significant aid is granted to incentivise the electrification of heat, this option's huge emission saving potential will be lost or materialise much too late.

Current state aid rules are generous when it comes to research and development or smaller investments project. However, they are not adapted to tackle the extraordinary challenge of decarbonising the whole industrial sector timely. A reform of state aid rules is thus necessary. It must incentivise the investment in the electrification of heat and compensate for extra operational costs of electricity. As state aid is regulated at the European level, it is now the time for Luxembourg to seek like-minded allies among Member States to introduce the reform at the currently ongoing revision of the Energy and Environmental State aid guidelines (EEAG). FEDIL believes that such an extraordinary aid, dedicated to the electrification of industrial heat, could become an EU-wide game-changer for the decarbonisation of the industrial sector.

4.4 Make electricity the energy of choice for the industry

On national level, the government should accelerate the electrification of heat by granting industrial companies attractive electricity prices. The government can effectively influence the end-user power price by minimising state-induced price components such as grid charges, renewables surcharges, and other levies. Germany is applying such a model for all electricity consumers. It cross-finances the reduced income from the electricity price by the revenues from the CO2 tax.

Such a reduced price should be granted to Luxembourg companies taking part in the Voluntary Agreement on CO2 reduction as described above and under the condition to electrify significant parts of their energy consumption.

Furthermore, create specifically simplified and accelerated authorisation procedures for the electrification of heat by creating wavers for recurring and standard low-carbon installations.

4.5 Introduce super fiscal deductions for low carbon investments

Make investments in low carbon plant and machinery equipment, including related staff, training, or retraining costs eligible to a **super fiscal deduction.**

The super deduction (SD) mechanism would allow companies to deduct an extra percentage of the eligible costs incurred in addition to the initial deduction of the costs in question, based on common law. The super deduction could thus be equal to up to 100% of the eligible costs with an annual limit set at a certain percentage of the company's taxable income. A higher rate of SD with simplified implementation procedures should be provided to SMEs. The SD could be granted for a period up to 2028 with the possibility of carrying over unused SD capacity to subsequent years. Such SD schemes to promote investments in environmentally friendly technology are already successfully applied in France, Germany, Austria, Greece, Italy, UK and Sweden.

This measure would incentivise companies to invest in low carbon technologies with little to no perspective for a return on investment or higher operational costs than conventional technologies.

4.6 Dynamise energy efficiency

Introduce **tradable energy efficiency certificates**: Dynamise and increase the company's incentives to realise energy savings by directly addressing obliged parties and energy service contractors (ESCOs). Making energy savings tradable has two significant benefits: Firstly, it creates a transparent market for energy savings for obliged parties, ESCOs or other parties. The latter will increase the inflow of cash for companies to finance their energy efficiency efforts. Secondly, it gives obliged parties several options to access energy savings. It creates a liquid market of energy savings where they can purchase certificates or projects from third parties and trade certificates among each other. Tradable energy efficiency certificates schemes have been used in different forms in Italy, France, UK, Denmark and Flanders.

4.7 Promote technology switches to renewable process heat production

Secure, reliable sourcing at predictable prices for biomass, biofuels and biogas by concluding politically backed bilateral agreements with international suppliers. Furthermore, the attractivity of those renewable fuels could be improved by applying minimum levies and offering contracts for difference to balance price volatilities in case of investments related to technology switches. Also, specifically, simplify and accelerate authorisation procedures related to such technology switches.

4.8 Preserve technology neutrality

Authorise carbon capture technologies to decarbonise processes with incompressible emissions and develop local carbon usage applications in collaboration with the public research and development community.

4.9 Specific measures for the construction sector

Together with its members, FEDIL identified three straightforward measures to reduce emissions at construction sites. They rely on improving energy efficiency and fuel switches of construction equipment and machinery:

i. Establish a notification process between the construction company and the grid provider to ensure that **each construction site will be equipped with a grid connection at the latest at the beginning of work**. This will prevent construction companies from running diesel generators to power the building site.

ii. Authorise construction companies to **use explosives at quarries, deconstruction and excavation works**, avoiding them to run many hours of fuel-powered excavation machines and pneumatic drills.

iii. Systematically **require construction companies in public calls for tenders to use biofuels to run their construction equipment**. This measure creates a national level playing field for all market participants, enabling Luxembourg's construction companies to rapidly retrofit their entire fleet to carbon neutrality. On top of that, it would create an element of differentiation compared to competitors from abroad wishing to enter those calls.

Depending on the approach, the above three measures can reduce significant emissions on a construction site. Sectoral experts assessed emission reduction between 5-7% if we only rely on energy efficiency, but they can be close to 80% with fuel switches such as electrification or biofuels.

However, the biggest drivers for emissions in building construction are unrelated to how construction companies organise themselves on the construction site. Instead, they are determined by three construction design specific factors: (1) the volume of excavated soil, (2) the volume of soil moved away from the site, and (3) the volume of new soil moved towards the site. Those three factors determine the running hours of the biggest fuel consumers on a construction site, the excavators. They further define the number of dump truck rides to move soil from and to the site. By tackling these factors, our estimations show that emission savings of around 50-65% are possible even without an expensive switch to biofuels; they would require the following measures:

iv. **Promote upwards constructions** rather than buildings with deep basement floors or underground parking spaces. At the same time, building higher upwards must be authorised to accommodate the lost spaces underground. Public call for tenders and authorisation procedures must be adapted accordingly. Further, emission reductions could be achieved if construction companies would be allowed or even invited to suggest modifications to call for tenders to improve the carbon footprint of the tender. While construction companies are not supposed to comment on calls for tenders in Luxembourg, it is already good practice in France.

v. **Decentralising and multiplying inert waste landfills** can significantly reduce emissions from unavoidable soil transport**s**. Currently, soil transports across Luxembourg cause annually 8100 tonnes of avoidable CO_2 emissions[3] because inert waste landfills are too scarce and far away from most construction sites. Those avoidable emissions are comparable to heating emissions of a city the size of Diekirch.

vi. The climate law attributes emissions from transporting inert waste from construction sites to landfills in the "transport" sector. At the same time, they represent some of the most significant emission reduction potentials for construction companies, whose emission reduction margins on the actual construction site are somewhat limited. It would thus be the wrong signal not to make construction companies benefit from this potential because many construction businesses have their own dump truck fleet.

[3] High noon beim «Bauschutt», écho des entreprises 01, 2020; pages 19ff

Letting construction companies claim emission economies from cutting transport rides would further support the construction sector's circular economy approach. The approach promotes the reuse of old construction material which is already on site. This occurs, for example, at renewals of roads or when a building is deconstructed for a new one. The emissions from the equipment necessary to process the old construction material for reuse could be offset by the avoided transport rides. Thus, the additional emissions to process the old material would not penalise but incentivise circularity.

FEDIL suggests relying on the emission compensation option between sectors as foreseen in the climate law to implement this measure. For example, it could be designed to **make emission reductions realised by construction companies' transport activities attributed to the "transport" sector available to compensate for emission reduction efforts in their construction activity.** The latter being part of the "energy industry, manufacturing and construction" sector.

5 Synthesis

FEDIL and its members wish to contribute to the government's aims in bringing down CO2 emissions by 2030 and reach carbon neutrality by 2050. FEDIL is, however, concerned to see that since the publication of the National Energy and Climate Plan in March 2020, the government keeps on setting increasingly ambitious climate objectives without presenting the underlying evidence-based analysis of their feasibility or impact on Luxembourg's social and economic system. Further, to date, the government has failed to present a comprehensive national decarbonisation strategy, roadmap or package of support measures to echo its ambitious climate objectives for 2030.

In the industrial sector, FEDIL believes that Luxembourg's future governments risk falling short on delivering in 2030 on the ambitious commitments unless current political discussions shift away from overly ambitious target setting towards the actions needed on the ground to achieve them.

In this paper, FEDIL identified tangible business and technical evidence that substantiates the concern about Luxembourg's risks of missing its 2030 climate targets in the industrial sector. The analysis in this paper provides empirical data indicating that incremental decarbonisation efforts in the industry sector can yield at best 20-25% CO2 emission reduction between now and 2050, while the government's target is at 52% until 2030 compared to 2019. This would leave at least a 27% gap to be filled with much more far-reaching and unconventional measures. However, the realisation of such measures seems out of reach without a well-designed legal framework including attractive support instruments. Based on this observation and the decarbonisation barriers identified, we present a catalogue of 9 measures that can bring emission reductions in the industrial sector on track for 2030.

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