

OPC statement on the draft PNEC update

Statement of the Luxembourg Climate Policy Observatory (Observatoire de la politique climatique, OPC) on the first draft of the update of the National Energy and Climate Plan (Plan national intégré en matière d'énergie et de climat du Luxembourg pour la période 2021-2030, PNEC)

Highlights

The draft PNEC update (hereafter "PNEC") provides a valuable overview of Luxembourg's climate policy plans in the coming years. The OPC appreciates this detailed document and the associated modelling, which is an important step forward compared to the first version of the PNEC. This statement contains the OPC's position on the PNEC. Our main points of feedback and critique can be summarized as follows:

- **Integrated solutions are missing:** The focus of the PNEC is on individual, sectoral, incremental measures. There is a lack of a national strategy and vision for integrated solutions that are of cross-sectoral relevance. The current plan largely neglects the need to design and discuss comprehensive and coherent bundles of policies that strategically aim at systemic changes, while motivating citizens to change their current high consumption and high-GHG emitting behaviour towards more climate-resilient lifestyles.
- **Production- versus consumption-based emissions:** The PNEC recognizes the importance of keeping consumption-based emissions in mind. However, both the STATEC modelling included and most measures are aimed at reducing production-based emissions, as included in the official GHG accounting. This will inevitably lead to carbon leakage abroad (externalization of carbon-related damage and pollution) as illustrated for the transport sector below. Inclusion in the PNEC of integrated policies that support the reduction of consumption-based footprint, e.g. by focusing on fostering behavioural changes, is important for attaining the global CO₂ net-zero goal needed to limit global temperature rise to 1.5°C.
- **High danger of carbon leakage in transport sector:** According to STATEC calculations, emission targets in the buildings and industry sectors will most likely not be achieved, whereas the target in the transport sector will be overachieved. Unfortunately, this reduction relies heavily on taxing fuel consumption of the logistics

sector and non-residents. These are thus not real emission reductions but only a shift abroad, i.e. carbon leakage.

The OPC proposes several specific changes to measures in the PNEC. In the following, we present the most important ones:

- **Higher CO₂ tax:** The CO₂ tax should be raised to 200€/t CO₂ considering both scientific evidence and public opinions from the Klima-Biergerrot (KBR). The additional revenue should be used to finance transformational climate protection measures and to relieve vulnerable households and companies.
- **Integrated energy and mobility planning:** Integrated energy planning in municipalities and other instruments that help to design integrated solutions should become mandatory.
- **Agriculture and LULUCF:** From a territorial point of view, these are the most important sectors to reach climate neutrality by 2050 as inscribed in Luxembourg's climate law. While the PNEC is focused on the targets of 2030, the OPC considers that measures proposed in these sectors are not sufficient to lead to climate-resilient development. A clear target for limiting the livestock size in line with the recommendations from the KBR as well as a clear commitment for increasing the carbon absorption capacity in the forestry sector and by agroforestry are required to reach the goal of climate neutrality.
- **Models and scenarios:** Sensitivity analyses for the model results are needed with respect to GDP growth, energy prices and feasibility of policy implementation. Limitations and assumptions of the modelling approach need to be documented and made transparent and publicly accessible.
- **OPC recommendations:** Various other proposals in both the OPC's annual report and the KBR report have not been included in the PNEC. It is desirable that these are either included in future policy plans or at least explained in detail why they are not (currently) being implemented.

Finally, the PNEC is a large and detailed document. The short 30-day duration of the public consultation is insufficient for this. In order to allow for adequate participation of all stakeholders, this duration would have to be significantly extended.

Introduction

The OPC welcomes the initiative of the Luxembourg government to revise the PNEC from 2020 to respond to the new and more ambitious plans and associated target at EU level, including the 'Fit for 55' package and the 'REPowerEU' plan.

The OPC's comments on the revised PNEC, sectoral policy bundles, and individual measures are based on evaluation criteria indicated in the IPCC's 6th Assessment Report (AR6) and in the first report by the OPC published in October 2022. These criteria are intended to ensure accelerated societal learning for successful and rapid transformation to a decarbonized, just and sustainable society.

1. **A balanced approach with respect to promoting Sufficiency, Efficiency, and Renewables (SER).**¹ Shifts in prevailing behaviour patterns at the system level and by individuals require a policy mix that aims at changes in (1) technologies and infrastructure, (2) demand-side behaviours and (3) approaches to governance.²
2. **Attention to a Just Transition by designing measures to avoid enhancing distributional inequities:**³ This calls for public investments that give primacy to public prosperity over individual interests. Examples include favouring public measures promoting shared infrastructures, such as district heat pumps,⁴ and collaborative approaches (including e.g. car sharing cooperatives) over individual subsidies (e.g. for individual e-cars).
3. **A systemic feasibility assessment of measures to avoid maladaptive measures and to give primacy to systemic and integrated solutions.** There can be region-specific interference between energy system transitions and water and food security, or environmental health.⁵ Implications on land use and land use change, given the particular problem of heightened pressures on land in Luxembourg, by extension also on biodiversity and on seasonally ever scarcer water resources, have to be considered of primary importance. Integrated solutions, that are often nature-based, can help to achieve mitigation

¹ IPCC AR6 WG III, 2022, p.957, and OPC, 2022, p.2 (for a definition, see Annex I).

² The IPCC AR6 WG3 2022 illustrates this interplay with respect to urban planning with impacts on residential and transport energy use, and food system and dietary change pp. 97-123.

³ OPC, 2022 p. 3 ; IPCC AR6 WG III, 2022, Technical summary p.127.

⁴ IPCC AR 6 WG III, 2022, Technical summary p.91.

⁵ Demand-side modelling of water suggests we may have reached 'peak water per capita' but there are no technological alternatives to water as for oil.

of climate changes as well as adaptation and progress towards climate-resilient development and a sustainable society.⁶

4. **The extent to which individual measures and sectoral bundles are designed to be 'transformative':** We assess to what extent the bundles of measures are designed to reframe and shift individual and societal goals and prevailing patterns of behaviour. This is best achieved through integrated proposals to transform systems and behaviour away from unsustainable practices.

A future-oriented and comprehensive discussion of current institutional limitations and procedural requirements for adaptive and transformative governance should be in place. This discussion needs to account for the impacts of climate change as well as the occurrence of other potentially disruptive events and accelerating social change.

A key consideration is more effective collaboration across different governance levels, for which the Climate Pact and Nature Pact and synergies between them in Luxembourg hold great potential. Moreover, improved collaboration across governance levels and empowerment of local actors to take place-based actions require carefully designed approaches: flexible measures and possibilities to share impact assessments without stifling local innovation, creativity and change through top-down, overly specific, and stringent measures and burdensome reporting regimes. The OPC will return to this point in its annual report.

In general, the identification of limitations, risks, trade-offs, and potential barriers to implementation, of some of the proposed measures would enhance the chance of successfully reducing emissions to the prescribed target. Such a discussion could include the development of contingency plans. This would increase transparency and hence trust among stakeholders. The government should provide rigorous and reflective discussions of each measure as well as an analysis of interactions of measures across sectors.

⁶ IPCC AR6 WG III, 2022, Technical summary p. 143-145.

STATEC projections and future orientation of this PNEC

General comments

First and foremost, the OPC would like to thank STATEC for the documentation and presentations provided. It is very helpful that the assumptions and calculations, on which the government bases its climate policy, become more transparent.

We note that the emission reduction target of -55% compared to 2005 by 2030 will be achieved in the WAM (with additional measures) scenario. We assume that this result has prompted the government to communicate on the PNEC in a positive way.

However, when looking at the sectors individually the picture looks less positive: We regret that the targets in the buildings and industry sectors are unlikely to be met. According to STATEC calculations, however, the targets in the transport sector will be overachieved. Unfortunately, this reduction is not (only) due to a particularly progressive transport policy, but is mainly based on a reduction in fuel sales to non-residents. These are not real emission reductions but only a shift abroad, i.e. carbon leakage, since while fuel sales to non-residents is very price sensitive, the driving behaviour is much less so. This is firstly unacceptable from an environmental point of view; and secondly, the "success" of this policy depends largely on the neighbouring countries - should they also increase their gasoline prices, fuel sales to non-residents will remain.

Proposals

- We request that the PNEC contain sufficiently stringent measures in the areas of buildings and industry so that the sector targets are achieved individually.
- The PNEC should be modified so that achievement of the overall target is not overly reliant on the reduction of fuel sales to non-residents. In the PNEC's current form, if the estimated emission reductions through the CO₂ tax do not materialize for any reason, then achieving the 55% reduction is in serious jeopardy.

Comments on models and scenarios

We are aware that model results are always based on assumptions and thank STATEC for making them relatively transparent here. Nevertheless, we would like to point out a few weaknesses of the present modelling:

- A publicly available documentation of the models and data sources is missing.
- The assumptions regarding baseline measures (with existing measures - WEM) as well as implementation and impact of the additional measures (WAM) are not very well explained and justified. For example, there is no feasibility assessment for individual policies. The basic assumption seems to be that all measures can be implemented to their full extent in the stated time frames.
- Behavioural changes are not considered or modelled.
- The PNEC offers no sensitivity analyses. These would be necessary because, among other things, the development of some parameters is currently uncertain, e.g., GDP growth, energy prices, policies of neighbouring countries.
- The scope is too narrow, i.e. indirect emissions are not taken into account. This is in line with the PNEC methodology, but falls short from a climate perspective.

Proposals

- The OPC requests that sensitivity analyses be provided with respect to GDP growth, energy prices and feasibility of policy implementation.
- The OPC requests that limitations and assumptions of the modelling approach are documented, made transparent and publicly accessible.

Analysis of policies and measures (sectoral perspective)

Transversal measures

The OPC welcomes the new and improved governance structure that was introduced with the 2020 Climate Law and that was instituted over the last two years. Based on current experiences and the proposed updated PNEC, it seems still to be the case that inter-ministerial collaboration that is based on integrated, systemic and future-oriented thinking across diverse policy areas remains challenging. Responsibilities for such an integrated view may not be clearly assigned. In consequence, the PNEC presents sectoral individual measures in a rather fragmented manner with little consideration of cross-sectoral synergies or trade-offs (ideally linked to an overarching strategy). Such a more integrated approach for developing the national climate and adaptation plans may better be coordinated by the Ministry of State and/or the cabinet of the Prime Minister, rather than by a few or only two ministries.

In terms of the scope, the OPC recommends considering climate mitigation and adaptation in the same process rather than separately. This helps avoid climate mitigation measures that are maladaptive, and stresses integrated over singular solutions towards carbon sequestration and regeneration of resilient ecosystems, including in urban settings. This includes farther-reaching accounting approaches than recommended at EU-level, e.g., consumption-based accounting to avoid maladaptation with accelerating material and energy flows from undesirable policy effects.

These points are taken up in recommendations relating to specific transversal measures.

N° 101 – Loi relative au climat

Both the climate law and the PNEC are focused on the reduction of production-based emissions. We acknowledge that this is mandatory, due to the EU and UNFCCC framework. In the case of Luxembourg, this leads however to a possibility for a major carbon leakage. One key example is the transport sector, which in the current version of the PNEC mainly displaces accounted emissions from Luxembourg to neighbouring countries, but does not lead to a real reduction of emissions. The other major example is the energy sector with the risk that due to increased electricity or hydrogen demand, the industrial emissions currently happening in Luxembourg, might happen in a less efficient way in other countries.

Proposal

Considering the argument above, the OPC recommends to consider broadening the scope to consumption-based emissions in parallel to the official accounting and in all future initiatives related to climate-resilient development. To this aim, the OPC also recommends to develop a legislative framework with sectorial allocations based on consumption-based emissions. This framework should include a set of concrete targets, the allocation of reduction percentages by (economic) sector, the disclosure of a robust and transparent calculation mechanisms, and the associated monitoring process.

N° 102 – Renforcement de la gouvernance climatique au sein de l'administration gouvernementale

Proposals

- Inter-ministerial and inter-departmental cooperation on policy development should be further strengthened, with institutionalised coordination processes and practices, and regular required policy checks for coherence with the 2030 and 2050 climate goals at least every two or three years. As mentioned above, this could be coordinated by the State Ministry instead of "sector" ministries.
- In this respect, the OPC highlights that the government introduced the "Nohaltegkeetscheck"⁷ based on recommendations from the "Conseil Supérieur pour un Développement Durable" (CSDD). The "Nohaltegkeetscheck" should be filled out in a conscientious way, based on consumption-based emissions. The Ministry of State, together with the Parliament, should ensure that no legal act is adopted without passing the check in a serious manner.

N° 103 – Fonds Climat et Energie

Proposal

While the OPC welcomes the work by the Climate and Energy Fund, we recommend to define priority areas to which the funding should be devoted (e.g., projects on education on climate for

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https://mecdd.gouvernement.lu/fr/actualites.gouvernement%2Bfr%2Bactualites%2Btoutes_actualites%2Bcom_muniques%2B2023%2B05-mai%2B10-nohaltegkeetscheck.html

citizens, students, professionals; projects to incentivize behavioural change). The OPC recommends to conduct regular impact assessments to monitor the impact of funding.

N° 105 – CO₂ tax

The current and planned CO₂ tax (max 45€/tCO₂) is too low to have a significant impact. The KBR has proposed an increase of the CO₂ tax to 200€/t CO₂, indicating that citizens could also live well with a higher tax. In recent remarks at the EU Beyond Growth 2023 Conference, Joseph Stiglitz similarly advocated for a higher tax of 150-200 USD/t CO₂.⁸ According to a recent multi-model assessment⁹, prices of 175 to 350 €/tCO₂ are necessary to reach the -55% target on a European level. Although the exact figure is unpredictable and depends on the other measures, it is unlikely that a CO₂ tax of 45€/tCO₂ will lead to substantial emission reductions.

Proposal

The CO₂ tax should be raised to 200€/t CO₂ considering scientific evidence and public opinion from the KBR. The additional revenue should be used to finance transformational climate protection measures and to relieve vulnerable households and companies. A substantial amount of the funds should be used to ensure that vulnerable households have access to cleaner technologies (for e.g. mobility, building renovation). Transparency about such measures is crucial for broader acceptance.

EU ETS 2 (Related to N° 105 'CO₂ tax')

During the official presentation of the PNEC on 17 April 2023, the possibility that Luxembourg will not participate in the EU ETS2 for the time being was mentioned. This was justified with the advantage that revenues would remain in Luxembourg and not go to the EU. From the perspective of European solidarity, such statements may be perceived as problematic. As the richest country according to GDP per-capita, Luxembourg should be committed to transformation throughout the EU.

⁸ <https://www.beyond-growth-2023.eu/lecture/plenary-5/>

⁹ https://ariadneprojekt.de/media/2022/06/Ariadne-Analysis_Carbon-Budget-multi-model-assessment_June2022.pdf

Proposal

We request that Luxembourg actively commits to European solidarity - and does not derogate from European agreements out of self-interest.

N° 106 – Pacte Climat 2.0 avec les communes

As a general comment in response to the following phrase: “A l’avenir, les communes seront encouragés à élargir les missions des “Klimaschäffen” à des éléments liés à la transition juste”. When? It would be good to be more precise about when, rather than ‘à l’avenir’ because this Pacte is supposed to run only until 2030. Will this occur before the 2030 timeframe or not, and what contribution will it make to the just transition between now and 2030?

New measure A: Obligation for energy planning in municipalities

Energy planning (heating, cooling, local electricity production) is necessary in the municipalities to use existing resources as efficiently as possible and focus on common instead of individual solutions. Within the framework of the Pacte Climat (measure 1.2.1 energy planning), the municipalities are encouraged to perform diligent energy planning. As there are still many municipalities without energy planning, municipalities must be obliged to do so. Since most municipalities will probably need external support, the state should support them financially (e.g., by paying 50% of the costs for energy planning from the Climate and Energy Fund).

Proposals

- Introduce an obligation for energy planning in municipalities: Oblige each municipality to introduce a systemic, common energy plan until June 2025. Provide support, but penalize delay.
- Consider a cadaster of energy sources and sinks at national level to have an overview/regular update of existing sources for heat/cold at regional level.

New measure B: Synergies and integrated solutions

Energy plans focus on heating and cooling. This is an important first step to get to more integrated solutions. In addition, synergies between electricity production and district planning need to be explored more systematically. One example is the synergy between the production of solar power, car sharing and the e-transport network.

Proposal

Energy planning in municipalities and other instruments that help to design integrated solutions should become mandatory.

N° 107 – Pacte climat pour les syndicats industriels

Relative to the text: "Ainsi, le secteur de l'assainissement devra veiller à ce que l'énergie annuelle totale utilisée provienne de sources renouvelables et atteigne : 50 % à la fin de l'année 2030 ; 75 % à la fin de l'année 2035 ; 100 % à la fin de l'année 2040".

It is unclear whether these ratios consider renewable energy capacity, which is directly sustained by the Luxembourg government (i.e., new capacity which would not have been built without the support from Luxembourg, ideally in the Greater Region and under direct control of local actors), or include also Guarantee of Origin (GO) certificates. The latter are subject of controversy, as there is scientific evidence that they fail to generate new capacity and can lead to greenwashing and double counting.

Proposal

These ratios shall be reached without the use of Guarantee of Origin (GO) certificates. If not possible in the shorter term, a minimum percentage reached without GOs shall be specified for a defined timeframe.

N° 109 – Stratégie de décarbonation poursuivant l'objectif de la neutralité climatique de l'administration étatique dès 2040

The implementation of this measure is planned from 2024 onwards up to 2040. However, the OPC would recommend to detail what could be the contribution of this measure to the 2030 goal as the PNEC is only providing a general statement, i.e. that "a strategy for decarbonising the state administration will be drawn up in cooperation with all the stakeholders".

N° 110 – Projet de PDAT2023: la réduction progressive de l'artificialisation du sol et la concentration du développement aux endroits les plus appropriés

Net zero additional soil artificialisation shall be reached already in 2040 to be able to capitalize over the last decade until 2050 on the carbon uptake capacity of soils. As pointed out by the OPC in 2022, a policy of net zero land take should already take effect as of 2035 or earlier.

N° 113 – Formation professionnelle au niveau de l'enseignement secondaire dans le cadre de la transition énergétique et climatique

This measure is insufficient from a just transition perspective.

Proposal

- The OPC also requires measures to reskill those already in professional positions to serve the transition, not only those in secondary or finishing secondary education.
- In addition to education on climate change (focusing, e.g., on the consequences of human activity on global temperature), additional training shall be planned in systems thinking and working with futures. Such training allows for considering interdependencies of environmental change, social change and ecological change as well as cross-influences between global and local developments. Education of the psychological drivers behind consumption behaviours is also important. Education shall target students, citizens, politicians, and professionals. Existing seeds for such learning opportunities should be analysed and diversified, e.g., in the form of executive training programs and other.

N° 114 – Sensibilisation, information et conseil des citoyens promouvant le changement comportemental et cadre favorable à l'engagement citoyen

Proposal

The work of the Klima-Agence (or similar body) should be expanded:

- Include adult education and training: on societal transformations; on skills training for the green transition, etc.
- Education and awareness raising should not be targeted *only* to point out lifestyles not aligned to the climate targets or the consequences of consumption behaviours. Instead, it should promote a shift of values, promoting, e.g., solidarity, sharing practices and sufficiency. To this aim, the support from social science and psychology is essential.

This expansion would imply far more than providing information and requires more resources allocated to the Klima-Agence (and/or a refocus or restructuring) for concrete projects and measures that speak to an overarching strategy.

N° 115-118 – Research

The OPC welcomes promoting transdisciplinary research that by definition draws on the natural sciences, social science, engineering and humanities. This is embedded in practice by engaging practitioners, in particular in problem framing and experimentation by exploring alternative courses of action and experimentation.

The current wording of the remit of the National Centre of Excellence in Research (NCER) for the energy transition (Measure N° 115) is heavily focused on developing a digital twin. Whilst a digital twin energy system will have some uses, in the view of the OPC this remit is too narrow to effectively accelerate the transition in practice. The Centre should include a focus on implementation, monitoring and social learning of integrated measures to achieve both mitigation and adaptation also with nature-based solutions in complex social-ecological-technological systems.

To avoid serious risks of maladaptation from too narrow framing, the overarching title and goal would better framed as relating to "Transition Climatique Juste" rather than solely focusing on energy transition. Such work would largely take place in real world labs with practical changes on top and artificial intelligence on tap. Governance as social learning as in measure 116 should be an integral component of this centre. To broach these topics separately seems misguided.

The relation to the planned environmental systems centre at the University of Luxembourg should be clarified as well as the relation to other relevant research departments in LIST, LISER and the University. The development of new research programs should be participatory and involve all researchers, officials and practitioners.

Transport and mobility measures

A transformative mobility system requires integrated action across planning, infrastructure, industry, buildings and energy, with international cooperation necessary for a small country like Luxembourg. In the PNEC, we find mobility policies that are proposed for different timescales and that tackle some of the issues for the transformation of the mobility system, yet these remain insufficient. First, there is a challenge in analysing the impact of the various measures that begin and end at different dates. Second, measures are presented in isolation, not in coherence with other policy measures (such as the 15-minute city proposal presented elsewhere). Third, there is little detail in some of the more transformative measures on how the goals will be achieved (e.g., around bicycle plans under the National Mobility Plan).

We also notice several elements are missing from the transport and mobility measures. For example, there are few incentives to reduce car ownership and reduce the necessity for car use, and we find the measures to phase out polluting mobility modes too slow or weak. In particular, a co-benefit for health would be to ban diesel engines as soon as possible, and certainly in cities. There are also few measures to deal with the freight and logistics transport; few plans mentioning international rail travel; very limited efforts in the aviation sector (e.g., no plan to ban private jets or short-haul flights). Further, the OPC notices that the proposal in our 2022 annual report to prevent new roads being built has not been taken up in the PNEC.

We find that financial incentives for mobility shifts need to go hand-in-hand with infrastructure investments, in an integrated vision. Such an integrated vision of a mobility system should include urban planning, reducing car parking availability and providing proper cycling infrastructure and bike parking for accessing (fully-electrified) public transport.

N° 417 – Carburants durables d’aviation à l’aéroport national

Reducing emissions for air transport needs to go beyond supporting ‘sustainable fuels’ (whose actual sustainability is yet to be proven) and target a reduction of the volume of flight traffic. Other policies to consider include banning short-haul flights, while expanding high-speed, cross-border rail interconnections, and banning private jets.

N° 421 – Avantage fiscal pour les voitures de fonction

This measure hardly provides the transformative incentive required. A more transformational step would include: 1) raising a tax on company cars that are not Battery Electric Vehicles (BEV), possibly

specifying a maximum consumption per driven km, as soon as possible (e.g., 2025); 2) adding a fiscal advantage for companies that switch away from company cars to electric bicycles and public transport. This measure should be analysed in conjunction with policies to create a policy framework that encourages home-working or co-working spaces in a decentralised way and to other transversal policies (such as the 15-minute city proposal).

N° 422 – Leasing social automobile

This measure is a welcome proposal. However, we urge the government to ensure that this be kept for the most isolated and vulnerable members of the population, for whom not having a car is not an option. Otherwise, more transformative policies would support:

- Electric car sharing schemes.
- Public transport interconnections (modal shifts).
- Shift from cars to bikes (e-bike/bike support, subsidies if someone gives up their fossil car).
- 15-minute city, work decentralisation.

New measure C: Ban construction of new roads

As already proposed in the OPC annual report 2022, the construction of new roads should be banned. An exception could be made for already decided projects, which are in process.

New measure D: Reduce speed of cars on Luxembourgish roads

Similar to the KBR, the OPC recommends reducing the speed of cars on Luxembourgish roads, specifically to 100 km/h on motorways, 70 km/h outside settlements, and 30 km/h in settlements. This measure would help to reduce, both for internal combustion engine cars, and for electric cars, CO2 emissions, noise levels, particulate matter and help to increase road safety.

Buildings measures

STATEC forecasts that the sector targets¹⁰ will not be achieved in the buildings sector. In 2022, targets in the buildings sector were not reached. However, rapid action is extremely important precisely in this sector, since heating systems have a lifespan of around 20 years; and as of now, fossil heating systems should no longer be installed.

In order to achieve the climate targets, the PNEC needs to be improved in three areas: First, many measures in the building sector are aimed at individual homeowners. Measures that address the system as a whole (e.g., energy planning, which in particular investigates district heating and cooling potential) require more prominence. Second, the proposed measures are not sufficiently stringent. They need more focus and ambition, including deadlines and enforcement. Third, in addition to sector-specific measures, a higher CO₂ tax (see N° 105) will also help to achieve the sector target.

Overall, measures for this sector entail good ideas and highlight the right keywords, but are of little substance. A range of schemes has no concrete implementation date and has still the status “planned”. Speed and precision of measures are essential to reach decarbonisation targets.

N° 302 – Phase-out chauffages fossiles

It is too late for a voluntary approach. A prohibition-based approach (ban on fossil heating systems) is required now, as heating systems have a lifespan of around 20 years. In order to achieve the climate targets, only non-fossil heating systems may be installed with immediate effect. A ban brings predictability for homeowners and investors. It is also favourable for tenants, as they too can expect their heating systems to become renewable in the near future.

It is important to introduce this ban in a socially and economically acceptable way. Therefore, exemptions should be granted (i) for financial hardship cases and (ii) if the life cycle costs of the renewable system exceed those of the fossil system by about 5%.¹¹ Additional subsidies could be provided in these cases.

¹⁰ For comparison: the sector target is ambitious but comparable with other regions. For example, the canton of Zurich (CH) has a similarly ambitious reduction target for the building sector. Both regions are extremely financially strong and should lead by example.

¹¹ A corresponding regulation is already in place in § 11 of the Energy Act of the Canton of Zurich (CH): <http://www.zhlex.zh.ch/Erlass.html?Open&Ordnr=730.1>

The ban should not only affect space heating but also process heat, i.e., it is also an effective measure to accelerate decarbonisation in the industry sector. Here, too, financial hardship must be avoided.

Proposal

Implement the prohibition-based approach with immediate effect (including the necessary exception clause to make it socially and economically acceptable).

N° 304 – Obligation de rénovation énergétique pour les bâtiments fonctionnels

The stock of offices and other commercial buildings defines a large share in Luxembourg's built environment. The PNEC acknowledges that the functional buildings need to be considered for their contribution to the country's energy transition and respective measures. Yet, measures in the PNEC suggest "less demanding rules" regarding renovations and replacement of heating/cooling systems in some of these buildings. This is despite the role of the EU Energy Performance of Buildings Directive (EPBD) as the foundation for the energy transition in this sector.

Proposal

The OPC suggests to be consistent and ambitious regarding both the renovations of the current housing stock and future offices and functional buildings. Exceptions from renovation obligations (as foreseen in the PNEC) have to be transparent and convincing, and not a convenient fall-back option due to the perceived complexity – and related high costs – of renovations/modernizations.

The PNEC should be more ambitious regarding public buildings, at least regarding the progression of the number of renovated buildings until 2050: To reach 100% of renovations in the foreseeable future, measures need to speed up, ideally coupled with fiscal incentives. Clear renovation targets need to be communicated, monitored and enforced.

N° 309-314 – Régimes d'aides et incitations fiscales

The PNEC outlines many singular measures the OPC applauds. However, the measures are piecemeal and siloed in the sense that responsibility is scattered across different ministries and municipalities. It follows no systematic approach. It is not yet clear how these various measures can and will be coordinated and enforced in an effective manner.

Proposal

Introduce a coherent, time-sensitive strategy for the building sector – including residential and commercial buildings – to enable systematic planning and implementation of the measures across scale and responsibility to enhance transparency and enforcement, as well as financial aid.

New Measure E: Mandatory Energetic passports

Energetic passports (1) allow a better estimation of emissions from building sectors, (2) allow all owners to know the energetic performance of the building they live in, (3) include recommendations on how to increase the energetic performance of the building, and (4) help tenants to choose apartments with better energy performance, as tenants need to cover the energy costs.

Proposal

Make energetic passports mandatory for all buildings in Luxembourg from 2025 onwards (low-income household can get a help from government to pay for them; this would be similar to the introduction of smoke detectors). Additionally, when changing tenant, the new tenant needs to receive a copy of the passport before signing the contract.

Energy supply measures

Energy supply measures are important, and the PNEC makes some good suggestions. However, the overwhelming majority of the measures introduced in the PNEC are planned, not yet existing. The circumstances and conditions of many of the suggested measures are rather opaque, and little light is shed on the time horizon. This is troubling as time is not on our side: The planning of each measure, ensuring the coherence across the suggested measures, and their implementation and enforcement are of high importance and one of the pillars of Luxembourg's decarbonisation strategy.

N° 201 – Rémunérations pour l'électricité produite à partir des sources d'énergie renouvelables

The extension of the scope of beneficiaries of tariffs for PV that has been extended to all stakeholders (including private prosumers) is welcome. The OPC considers this as a first step towards the future development of decentralized and highly efficient energy production-consumption systems.

Proposal

In the future, specific incentives and market mechanisms should be planned to foster the development of energy communities, where individual prosumers collectively produce and consume renewable energy, in a highly integrated manner with buildings and mobility technologies, while contributing to the global management of the grid.

N° 205 – Installer un système photovoltaïque sur tous les bâtiments résidentiels

This measure is in line with the ones promoting electric mobility. The objective should be to foster the building of prosumer communities, where energy is produced and consumed locally, with the additional advantage of awareness raising on the prosumer side about their consumption and needs (link to N° 210).

Proposal

This measure should be coupled with the policy measures promoting electric mobility to maximize its impact. For example, additional incentives could be foreseen whenever the policy measures are cumulated.

N° 209 – Projet d'appel d'offres pour installations photovoltaïques au sol (agri-PV)

This measure is a good starting point towards the multifunctional use of soil, on the one side, and a smart restoration of left-aside land.

Proposal

A synergic combination with measures targeting the agricultural sector and the conservation of biodiversity should be explored. For example, policy measures, which reduce the intensity of agricultural use of land to promote biodiversity, could use agri-PV as a lever for such a reduction. Careful feasibility assessments are warranted and trade-offs have to be subjected to a lifecycle-based cost-benefit analysis.

N° 210 – Cadre de promotion de l'autoconsommation, des communautés et des coopératives énergétiques

The setting up of a framework to promote auto-consumption and energy communities is welcome. However, measures to implement such solutions in practice are needed.

Proposal

To this aim, and also in synergic relation to the comments to measures N°201 and N°205, specific economic incentives should be set up to promote energy communities and auto-consumption so that consuming our own renewable energy produced and/or sharing it with our local community is less expensive, from a lifecycle perspective, than consuming from the grid. Also, the OPC recommends setting up national pilots, like for the case of agri-PV. At national level, this measure would also contribute to lower the dependence, in the short term, on GO certificates.

N° 211 – Cadastre solaire sur le géoportail luxembourgeois

This is an impactful measure, which could be effectively combined with N°209, to maximize its impact.

Proposal

The scope of the solar cadaster could be enlarged to include all pertinent soil, which could be equipped with Agri-PV capacity. This would allow estimating the potential of Agri-PV and set the relative incentives.

N° 217 – Rémunération pour la production d'hydrogène renouvelable

The meaning of the text “la possibilité d'une mise en place d'un mécanisme de compensation pour le secteur du gaz sera analysée” should be clarified. Compliance with EU competition law and avoidance of undue support of monopolies is important.

N° 221 – Mesures de coopération avec des Etats membres de l'UE en matière d'énergie renouvelable: Transferts statistiques

The transfer of statistics should be backed by the proof that the corresponding renewable energy is not double counted in several accounts, thereby undermining the absolute impact of the renewable energy capacity production.

N° 222 – Promotion de réseaux de chaleur et de froid efficaces

A cadaster of energy sources and sinks at national level should be considered (also see "New measure A: Obligation for energy planning in municipalities", p.10), to understand the opportunities for heat/cold exchange at regional level. To this aim, additional ways of heat transport other than via networks should be envisioned, for example Mobile Thermal Energy Storage (M-TES) technologies, which have been demonstrated and proven to be cost-effective.

Industry measures

In the industry sector all hopes seem to lie on energy efficiency improvements. The OPC has difficulties to see how they are expected to happen: As a result of high energy (and carbon) prices or are there other measures that can be expected to lead to these drastic reductions?

Similar to the energy supply measures in the previous section, it is difficult to identify how advanced the formulated measures for the industry really are. Much is in planning, but there are too few concrete measures. Again, despite good ideas, a holistic, integrative approach is missing. Some crucial measures are voluntary and vague. So far, few robust results can be assessed and used as a foundation for ambitious measures for the near future. The industry sector is crucial to Luxembourg's decarbonization ambition, but the majority of these measures do not live up to this challenge. Time and precision to come up with a defined strategy and precise, tangible measures are of essence.

N° 503 – Accord volontaire relatif à l'amélioration de l'efficacité énergétique dans l'industrie (jusqu'à 2023 inclus)

The scheme has been running from 2021-2023, but there is little information about its success and/or need to amend the scheme (and what aspects exactly): How will the energy reduction/efficiency be evaluated at the end of the period? What is the monitoring in place? How can the overall impact of the measure be evaluated?

N° 504 – Accord volontaire relatif à la décarbonation et à l'amélioration de l'efficacité énergétique dans l'industrie (à partir de 2024)

How will the impacts of the energy efficiency and decarbonization measures be monitored?

N° 508 – Obligation de décarbonation par un phase-out fossile accéléré pour les bâtiments fonctionnels d'une surface supérieure à 1.000 m²

With respect to the text "Ces exceptions seront spécifiées dans les législations afférentes aux obligations et interdictions": The exceptions should be clearly quantified, for example based on the efficiency of the measures (t CO₂ avoided/financial investment).

N° 513 – Fit4Sustainability

With respect to the text “Le bilan de l'impact environnemental peut porter sur les volets suivants: décarbonation, eau, circularité”: The scope should be revised as these three topics do not actually reflect the variety and complexity of the environmental impacts generated by an industrial activity. Additional environmental impacts should be considered for a comprehensive environmental assessment. The EU Organisation Environmental Footprint (OEF), using a life cycle assessment approach, offers a reliable, scientifically recognized and widely used framework to this aim.

N° 514 – SME Packages Sustainability

The measure is welcomed and important to support the SMEs in the energy transition. Its responsibilities to implement it, and monitor and assess its success, lie with (too) many different organizations.

Proposal

- Centralize responsibility to increase the efficiency and transparency of this measure. Link it to other measures in a coherent way, where feasible.
- Create incentives for SMEs to encourage competition for innovation (organizational, product, process, etc.) but also to foster collaboration between corporations where possible and feasible to reduce carbon footprints across sectors.

N° 521 – Stratégie économie circulaire "Kreeslafwirtschaft Lëtzebuerg"

With respect to the text “L'application intelligente des principes de l'économie circulaire (EC) est indispensable pour atteindre la neutralité carbone”. Smart applications should include the assessment of the broader environmental impacts of circular systems, which are sometimes non-negligible. Examples are energy requirements for the recycling of some raw materials or the accumulation of toxic substances in plastics recycling.

LULUCF and agriculture measures

For reduction of greenhouse gases, the projections by the Service d'Economie Rurale (SER) for 2030 suggest that the sector would meet the goal given by Luxembourgish climate law, only if all measures develop their effect at 100%. There is no discussion of how the climate neutrality goal for 2050 could be attained.

The measures presented in the PNEC to reduce greenhouse gas emissions in the agriculture sector are either based on already existing measures or planned measures within the new agricultural law and its Plan Stratégique National (PSN). The OPC considers this approach to be completely inadequate.

As recommended by the IPCC specifically with respect to agriculture and food production, a system shift to a sustainable and climate-resilient food system requires the design of a coherent and comprehensive bundle of policies. This set of policies should focus on enhancing sufficiency and efficiency in production and consumption and adopting regenerative practices in agriculture that enhance the climate resilience of ecosystems providing existential services.

Merely investing into more farmers either using food subsidies or adopting organic farming practices is not sufficient, as, in particular, more specialized crops grown for diversification with such practices are difficult or impossible to market. Targeted policies and measures to support social innovation in terms of direct marketing, local food transformation for adding value, improved logistics and distribution of regional produce, and community-supported agriculture that raise awareness of citizens and promote cultural and dietary changes are required. These can only be achieved, if we work outside of silos and integrated societal approaches, that do not only rely on the ministry in charge of agriculture and the ministry in charge of forestry.

In view of these recommendations for a comprehensive strategy, and the ones put forward by the OPC in its first annual report, it was noted that none of the OPCs recommendations were reflected in the revision of the PNEC for this sector. We propose to include the following additional measures (see OPC report for details):

- Shift to balanced, sustainable healthy diets
- Reduce food loss and food waste
- Reduce methane and nitrous oxide emissions in agriculture

- Minimise dependency on production-related inputs
- Increase efficiency in extracting valuable resources

The OPC welcomes the stated ambition in the introduction of the PNEC to increase carbon dioxide removal to -27kt CO₂ per year compared to levels in 2016, 2017 and 2018. It is however unclear how the policies presented in the revised PNEC will allow for achieving this goal. Beyond subsidies, capacity building and awareness raising measures to work with private forest owners should be considered as well as clearer definitions of 'public interest' with respect to proposed conversions of public forested land for other purposes.

N° 701 – Aide favorisant la réduction de la charge de bétail

This measure only gives an incentive to farmers to reduce the cattle number. A clear reduction number as proposed by the KBR ("0,8 unités de bétail par hectare") would be clearer and give a much stronger incentive to all actors, and not only address the methane emissions (as feed additives do) by the sector but offer an integrated solution for water and nature protection. This measure should be accompanied by a promotion of sustainable diets. This could be reached as proposed by the KBR by promoting vegetarian and vegan products of local or regional production in restaurants, canteens and in supermarkets.

N° 702 – Aide favorisant l'utilisation d'additifs alimentaires pour réduire les émissions de méthane dues à la digestion

We strongly oppose this measure and recommend that the Luxembourgish government should not incentivize the use of feed additives in order to reduce methane emissions. The science around these additives is still very scarce, and their effectiveness in the long term needs to be proven, and side-effects on animal and human health remain under-researched. It is not clear if animal health and welfare is guaranteed with these additives. Finally, even if effective, it would only address the methane emissions, not other environmental pressures (such as ammoniac and water) related to a much too high cattle number in Luxembourg.

N° 706 – Prime pour l'instauration d'une agriculture durable et respectueuse de l'environnement

This measure should not only be part of the program, but should become the norm in the next 5 years and obligatory for all farmers in Luxembourg.

N° 710 – Conseil agricole

Agricultural advice can be a very strong way to fundamentally change the agricultural sector to make it more climate resilient. In its present form, however, it does not develop the potential it has. We would thus propose aligning it with the recommendations developed by the OPC in its first report and that it should be equipped with additional financial resources.

N° 810 – Aide favorisant l'agroforesterie sur les terres agricoles

This measure should not only be part of program, but should become the norm in the next 5 years and agroforestry should become obligatory for all farmers in Luxembourg.