OPC Opinion on Luxembourg's draft Adaptation Strategy

Statement of the Luxembourg Climate Policy Observatory (Observatoire de la politique climatique, OPC) on the draft 'Strategy and action plan for adaptation to the effects of climate change in Luxembourg 2025 – 2035' (Stratégie et plan d'action pour l'adaptation aux effets du changement climatique au Luxembourg, 2025 – 2035), henceforth 'Adaptation Strategy'.

1 Introduction

The OPC welcomes the detailed draft Adaptation Strategy, as well as the ample participatory process that has been organised to solicit inputs from diverse experts, professionals, and citizens at large. This statement serves to complement the work to date by directing attention to some blind spots in the current draft strategy and in the summaries of participatory workshops that the OPC deems of strategic importance.

At over 200 pages, this document presents a comprehensive climate change adaptation plan for Luxembourg. The OPC appreciated section 1.3 on adaptive governance and the risk management cycle, as well as the assessment of the 2018-2023 adaptation strategy. The expected impacts of climate change on Luxembourg are presented effectively in Chapter 2, while Chapter 3 succeeds in assessing the adaptation issues across different sectors or fields of action, providing pertinent information on the situation in Luxembourg and comparisons with other countries.

The following comments are intended to further strengthen the Adaptation Strategy.

2 Overarching recommendations

2.1 Adaptation to climate change - a question of national security

The national Adaptation Strategy is a **question of national security** that concerns most sectors of the economy and society. Preparedness for impacts from climate change requires anticipating and responding to diverse crises that are coupled and reinforce each other, the contours of which are already clearly visible: These crises include the climatic and ecological crisis, geopolitical instabilities, and rising social inequities. These coupled crises will progressively impact among other

things the functioning of the economy (including global supply chains and national industries), cause diverse pressures on public finance, impact human health and well-being, and destabilise our food, water and energy systems. Government responsibilities should be attributed accordingly, with **improved interministerial coordination**.

The OPC recommends that the Adaptation Strategy help secure healthy living and working conditions and safeguard the functioning of energy systems, industries and the economy in the face of these coupled crises. Preparedness for extreme weather events needs to take into account these diverse causes of instability in society, the economy, and government (Figure 1).

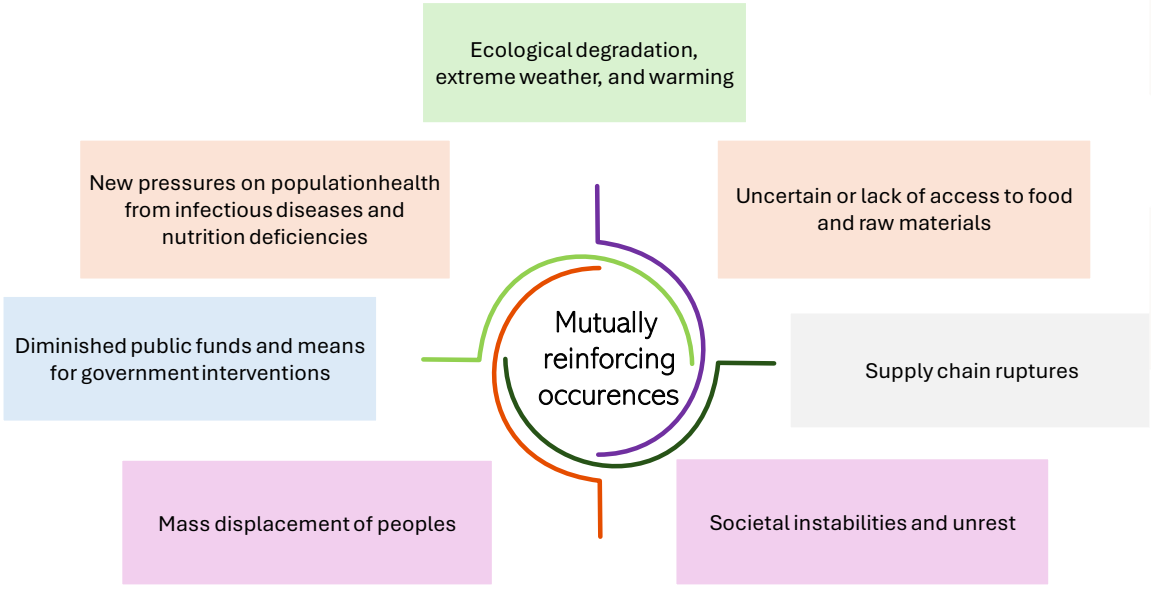

Figure 1. Adaptation to climate change: The polycrisis and its plausible effects in Luxembourg.

2.2 Securing healthy living and working conditions: Resilient and diverse ecological systems regulate climates and buffer impacts from climate change

Whilst efforts to reduce carbon emissions are underway, healthy ecosystems – at the micro-, meso- and macro-scale are necessary to regulate the climate and buffer the impacts of climate change. Reducing human emissions and other impacts on the environment with technological solutions alone will not suffice. Regenerative actions for healthy and climate change resilient ecosystems are equally required. Their development needs to attend to **competing land uses – urban and rural – considering consequences and trade-offs over the short and long-term in interministerial co-decision-processes**.

The OPC recommends developing integrated (cross-sectoral) measures and 'Nature Based' solutions across all land use and cover types.

2.3 Increasing resilience of the Luxembourg energy system, industry and the economy in the face of the polycrisis

Disruptions in the supply (chains) of a wide range of raw materials will increase, affecting the construction and others, as well as the development and maintenance of diverse, large public and private infrastructures. The energy system and the wider economy will be destabilised. **Adaptation requires preparedness for the consequences of escalating climatic, ecological and social instabilities affecting the energy system, industrial production and the economy at large**. This includes robust governance of large-scale private capital investments in sensitive infrastructure.

The OPC recommends targeted preparedness measures to safeguard the functioning of the economy and critical infrastructure in times of enhanced crises.

2.4 Preparedness of a nation - a question of governance and knowledge systems

Resilience depends on the **adaptive capabilities of place-based communities.** This involves regenerating ecological systems where we live and work, and strengthening the resilience of infrastructures. Monitoring and evaluation systems can either help or hinder adaptive governance – particularly in a world where public funding, government intervention and the capacity of welfare systems may be significantly reduced. Addressing this requires an improved information and knowledge system that allows the sharing of lessons learned from decentralised adaptation measures. The KlimaPakt and NaturPakt are promising instruments that could be embedded within a more effective system for knowledge sharing across diverse local initiatives.

The OPC recommends new approaches to governance that prioritise local contexts and contingencies in the development of resilience strategies for place-based communities. Societal actors should be equipped to monitor, interpret and learn from the adopted/implemented measures and their impacts.

2.5 There are significant costs associated with inaction

Adaptation measures are designed to reduce the overall costs associated with the impacts of climate change. Technological, physical, social and political constraints can limits the range of available adaptation options for any given country, meaning that some residual impacts of climate change will remain unavoidable. Delays in implementing climate change mitigation at a global level are likely to increase the adaptation costs borne by individual countries. In essence, the key trade-off lies between the costs of mitigation today and the costs of adaptation in the future (rising cost of inaction).

While international initiatives and regulations are important, effective local action remains essential. Locally grounded adaptation efforts can strengthen community resilience and deliver tangible benefits, even in the absence of adequate global progress.

The concept of the cost of inaction is first mentioned in chapter 3.3.9 (Economics and Finance) and brought up again in chapter 3.3.14 (Biodiversity and Ecosystems).

The OPC recommends introducing the notion earlier, perhaps when the link between mitigation and adaptation is made. Visualizing the cost of inaction helps understand and motivate both ambitious mitigation and early planning of adaptation measures.

2.6 Synergies and trade-offs between adaptation and mitigation measures

The Adaptation Strategy rightly finds that "mitigation and adaptation to climate change must be integrated and planned jointly" (Chapter 1.1), such that the PNEC and the Adaptation Strategy must "present a high degree of coherence". This could be also highlighted at the very beginning of the report. Mitigation is further mentioned at several points throughout the strategy, identifying either synergies or trade-offs.

The OPC recommends indicating for each measure its effect on mitigation (synergistic, neutral, or trade-off). Measures that have a synergistic effect with climate mitigation could also be one criterion to help prioritize measures to take.

2.7 Too extensive a list of measures can crowd out the importance of key measures

There is a trade-off between comprehensiveness and focus, i.e. between providing the most extensive list of measures and only the most important ones.

The OPC recommends shifting the balance more towards focus and prioritization, either by cutting measures (see below) or relegating some measures to a secondary level, thereby elevating and prioritizing the most important measures. Prioritization will help focus government resources where they are needed most, given the urgency of action and scarce resources. In a second step, it will also guide the monitoring and evaluation of progress.

3 Chapters 1 & 2

Chapters 1 and 2 lay out the scientific data basis from relevant IPCC reports. The climatic-geographical conditions of the country of Luxembourg are also comprehensively presented.

The OPC recommends that the topic of health (i.e., communicable as well as non-communicable diseases) be addressed in more detail. The current and expected demographic situation defines a clear vulnerability.

The OPC points out that the description of ecological processes under climate change in section 2.2.5 is incomplete. Under increased temperatures, ectothermic species in particular are expected to benefit from a temperature-driven higher feeding and reproduction rate. This group of species includes in particular insects and consequently herbivores. In current disturbed ecosystems where pest control/predators are naturally absent or with low population density, this leads to higher crop losses. Also not taken into account is the fact that higher temperatures cause crops require shorter vegetation periods, i.e. ripen earlier, and thus build up less biomass, resulting in lower yields. It should be noted, however, that these relationships are considered in the section on forestry.

4 Chapter 3

The OPC welcomes the assessment of the achievements of the objectives of the measures as described on page 100. The OPC agrees that it is difficult to evaluate the actual impact of a measure. Nevertheless, the OPC clearly advises the implementation of such impact-oriented target evaluation and refrain from measures for which such an evaluation is not possible. The OPC sees the danger of a simple evaluation of whether a measure has taken place, which leads to pure actionism and possibly to a waste of resources.

5 Chapter 4

Chapter 4 is extensive and elaborated in varying degrees of detail. The lack of monetary evaluation of the individual measures makes it difficult to prioritise the measures.

5.1 Number and prioritization of measures

Chapter 4 summarizes a total of 131 measures, divided into 17 sectors. The previous adaptation strategy (2018-2023) contained 42 measures. The Adaptation Strategy of the State of Baden-Württemberg, completed with the help of the eco-logic institute, follows a similar structure of the Luxembourg Strategy, with a description of the expected impacts of climate change, followed by an analysis of the impacts on different sectors, and ending with a section on proposed measures. In total, the Baden-Württemberg Adaptation Strategy proposes 102 measures. The French national Adaptation Plan contains 52 measures.

The OPC recommends reducing the number of measures from 131 measures (and perhaps more after the consultation phase) and instead focus on essential actions and direct financial and human resources towards completing those. Below are examples of measures that could be cut or subordinated to a lower level, aside from what a more thorough analysis of measures' importance would yield.

5.2 Measures that imply monitoring

It is striking that **16 measures are not measures that achieve adaptation to climate change** in the narrower sense, but are purely monitoring, data gathering, mapping or even modelling. The monitoring of the success of a measure described in section 3 is therefore the implementation of monitoring, or: a "monitoring of monitoring". It remains unclear whether and how a correct decision on climate adaptation was made based on the monitoring information. The OPC recommends subordinating these measures to those that achieve Luxembourg's adaptation to climate change and thus **only including monitoring measures in the catalogue that are necessary to achieve adaptation goals**.

5.3 Routine Measures

Furthermore, many measures, especially in crisis management and human health, as well as in biodiversity monitoring, appear to be measures that are part of the routine of the respective institutions (which is also pointed out). The OPC does not understand why these measures are listed and recommends keeping only those that are new and different from day-to-day business.

5.4 Measures supporting companies or businesses

Regarding the measures concerning companies, the OPC suggests to reconsider to what extent this is not in the companies' own interest to be aware of the risks of their business model under climate change conditions. As part of risk management, this should be part of the corporate strategy. Additional government measures - as long as these are not critical infrastructure companies - are not the responsibility of the state.

5.5 Climate mitigation measures

The measures for the energy-efficient refurbishment of rental buildings are **climate mitigation measures and therefore not part of the adaptation plan** in the narrower sense. The same applies to the measures on urban spaces and measures 4.7.7, 4.7.8 and 4.8.4.

6 Conclusion

Next to an ambitious mitigation strategy (Luxembourg's National Energy and Climate Plan, PNEC), a thorough and rigorously developed adaptation strategy forms the necessary counterpoint for Luxembourg to effectively combat and face climate change. The OPC commends both the content of the current draft Adaptation Strategy and the inclusive and extensive consultation of experts and the public in seeking to improve the Strategy. It is in this spirit that the OPC submits its recommendations.

Annex

The Greenbelt project - a strategic integrated measure for Luxembourg.

One of the most comprehensive integrated strategies for climate adaptation to date in Luxembourg is the AGGLO-Centre project to develop a Greenbelt around the city of Luxembourg. A rapidly increasing number of cities across Europe are developing surrounding Greenbelts to secure a climate resilient development. Towards this goal the Department for Spatial Planning (DATer) commissioned the AGGLO-Centre project, that developed a series of concrete recommendations towards a Greenbelt to improve climate resilience in and around the City of Luxembourg. Integrated design goals for the Greenbelt include improving:

- **Water management:** Enhancing the functions of terrestrial and aquatic land areas and ecosystems in view of their sponge functions to replenish groundwater bodies, flood prevention, water quality, and pollution management.
- **Air quality and temperature regulation**: The channelling of clean, cool air into denser settlements and the city, and ensuring access to nature for health and well-being of the population. Clean cool air can emerge from land parcels with trees, grasslands, still water bodies, as well as the main rivers flowing through the city and its surroundings. The need to safeguard and expand cool air corridors and ensuring access to green spaces during heat waves for public well-being in the larger cities such as the capital and its surroundings, mandates an adequate evidence base for decisions to invest into restoration of specific land parcels.
- **Biodiversity and ecosystem services** required for food provision in times crisis by countering ecosystem fragmentation. Biodiversity corridors to assist species migration and to enhance ecosystem health and resilience, and diversifying food production. The green belt plans foresee a nationally integrated and contiguous meshwork of tree lines (with hedges), buzz lines for insects, and fish lines (as outlined in the proposed EU nature restoration law). The resulting recommendations for a meshwork of corridors should be made public to open up windows of accountability on land use and land use change in the designated corridor areas. Such data on pressure points and potential corridors could also be used in participatory processes to make calls to owners of relevant land parcels to collaborate on making key stone species relevant connections. An internet platform can support of participatory processes with virtual calls for participation and voting tools to complement social processes with workshops.

Focal points include thus land parcels with trees, grasslands, still water bodies, as well as the main rivers flowing through the city and its surroundings, as well as the exploration how to maximise the sponge potential of the city and its surroundings. **Pilot projects** could include more and larger agroforestry projects to enrich farmland – particularly arable land – with structural elements. Agroforestry systems should be designed to reduce the need for chemical inputs and irrigation on all agricultural land parcels of 5 hectares or more within the Greenbelt. As a starting point, this could apply to publicly owned land). Agroforestry's role along rivers to reduce flood risks and key line design to reduce the risk of soil erosion have already been recognised in the Adaptation Strategy. The main point here is to **design agroforestry projects in an integrated manner** to targeted diversify food production (e.g. walnuts as oil fruit, as well as fruit and berries) at the same time as ensuring corridors for assisted species migration for more resilient biodiversity.

Implications for governance: While individual measures related to biodiversity, cool air corridors, and sponge ecosystems and cities are addressed under sectoral measures, the development, implementation and iterative improvement of such integrated projects/measures require a different process that departs from traditional top-down governmental planning and implementation. Greenbelt implementation requires provisions that engaged citizens can start regenerative initiatives in designed plots of land for 'experimentation'. In such cases, applicable rules can be adapted in dialogue with the authorities *ex ante* for the regenerative projects' needs, without jeopardizing the designation of that land area, freedom to plant or remove plants, or the value of the land parcel throughout the duration of the regenerative initiative. The Greenbelt project presents an opportunity to improve transformative governance processes in Luxembourg as it will require close and effective collaboration across governance levels involving national ministries and diverse public authorities, as well as municipalities and private landowners. The objective should be to further develop and implement the conceptual recommendations derived from the first diagnosis report in a participatory process, heeding recommendations on transformative governance from the 2023 OPC report.