



Observatoire
de la Politique
Climatique

Rapport **20**
annuel **23**



Résumé

PRÉFACE : Il est temps d'agir !

Un message à l'attention du nouveau Gouvernement pour la législature 2023-28

En octobre 2021, le Gouvernement du Grand-Duché de Luxembourg - plus précisément le Gouvernement en conseil - a nommé les membres de l'Observatoire de la Politique Climatique (OPC), qui a été créé conformément à l'article 7 de la loi nationale luxembourgeoise sur le climat. L'Observatoire peut émettre des avis de sa propre initiative.

« La mission de l'OPC consiste à conseiller en matière de projets, actions ou mesures susceptibles d'avoir un impact sur la politique climatique; à évaluer scientifiquement les mesures réalisées ou envisagées en matière de politique climatique et à analyser leur efficacité, ainsi qu'à proposer de nouvelles mesures ; à rédiger à l'attention du Gouvernement un rapport annuel sur la mise en œuvre de la politique climatique ; et à proposer des recherches et études dans tous les domaines ayant traits au climat. »



L'OPC est un conseil scientifique actuellement composé de sept membres choisis parmi des personnes possédant une expertise dans un domaine directement lié au mandat de l'Observatoire. Parmi les autres critères de sélection figurent la complémentarité de l'expertise dans les domaines de connaissance pertinents et la diversité des genres. Les domaines d'expertise des membres actuels vont de la modélisation climatique à l'économie et au financement du climat, en passant par la géographie économique et les sciences politiques, l'analyse multicritère et l'évaluation du cycle de vie, la biochimie et la science des systèmes. Quatre des membres sont basés au Luxembourg et les trois autres à l'étranger. Pour plus de détails sur les experts, voir l'annexe I. Les membres sont nommés pour un mandat de 5 ans en plus de leur emploi principal et disposent d'un budget annuel provenant du budget de l'État.

La mission de l'OPC est soutenue par un Secrétariat, composé deux experts hautement qualifiés dans les projections de gaz à effet de serre (GES), les politiques climatiques et la réglementation environnementale. Le Ministère de l'Environnement, du Climat et du Développement durable héberge le Secrétariat. Le Bureau de l'OPC est composé du président, du vice-président et du Secrétariat.

L'OPC vise à apporter une contribution significative à l'élaboration de la politique et des pratiques en matière de changement climatique d'une manière efficace et scientifiquement fondée. Compte tenu de l'urgence de la situation, la priorité commune de tous ses membres est d'identifier les leviers permettant d'obtenir des changements aussi importants et rapides que possible. L'OPC estime que son mandat juridique ouvert et la diversité de l'expertise et de l'expérience de ses membres lui confèrent des atouts uniques qui lui permettent d'apporter une valeur ajoutée dans des domaines qu'il est particulièrement difficile d'aborder du point de vue d'un seul ministère ou d'une seule organisation. L'OPC est particulièrement bien placé pour répondre à l'évaluation du Groupe d'experts intergouvernemental sur l'évolution du climat (GIEC) selon laquelle « la gouvernance climatique est plus efficace lorsqu'elle interagit entre plusieurs domaines politiques, aide à établir des synergies et à minimiser les compromis », ainsi qu'en reliant différents acteurs à travers les secteurs et les niveaux de gouvernance (national, municipal, niveau des acteurs individuels). En outre, le GIEC souligne qu'une gouvernance efficace reposera sur l'habilitation de divers acteurs à s'engager dans des changements profonds des modes de pensée et d'action dominants.

L'OPC souhaite remercier tout particulièrement Claudia Hitaj et Eric De Brabanter pour leur soutien !



L'urgence climatique : Les enjeux pour le Luxembourg



Plan national intégré de l'énergie et du climat (PNEC)

Alors que les nouvelles d'événements météorologiques extrêmes continuent d'affluer dans le monde entier, il est clair que les effets néfastes du changement climatique, qui se traduisent par des inondations, des sécheresses et des vagues de chaleur, ont commencé à se faire sentir. C'est l'une des principales conclusions du Groupe d'experts intergouvernemental sur l'évolution du climat (GIEC), qui a publié le rapport de synthèse de son 6ème rapport d'évaluation (AR6) en mars de cette année, résumant ainsi les recherches de ses groupes de travail sur les fondements scientifiques du changement climatique, les incidences, l'adaptation et la vulnérabilité, et l'atténuation du changement climatique. L'une des principales conclusions du GIEC est qu'en dépit des efforts croissants déployés pour réduire les émissions de gaz à effet de serre (GES) dans le monde, la concentration de ces émissions dans l'atmosphère continue d'augmenter. En outre, les effets du changement climatique accélèrent d'autres processus de dégradation de l'environnement, notamment l'extinction massive d'espèces, ce qui compromet les services écosystémiques dont dépendent notre économie, notre société et toutes les autres formes de vie.

Lors de la publication du « [Climate Change 2023 : Synthesis Report](#) » (Rapport de Synthèse), le Secrétaire général des Nations Unies, António Guterres, a déclaré que

« la bombe à retardement du climat fait tic-tac » et que « la limite de 1,5°C est réalisable, mais il faudra un bond en avant dans l'action climatique ».¹

À l'instar de M. Guterres, l'Observatoire de la Politique Climatique (OPC) du Luxembourg considère le rapport de synthèse comme un « appel à accélérer massivement les efforts climatiques de tous les pays et de tous les secteurs ».

C'est dans ce contexte que l'OPC réfléchit à l'année écoulée et appelle le Gouvernement luxembourgeois, pour la prochaine législature 2023-28, à prendre toutes les mesures nécessaires pour une transition urgente et juste vers la neutralité carbone.

L'OPC s'en tient aux grands principes qu'elle a énoncés dans son rapport annuel de l'année dernière : (1) réduire la dépendance à l'égard des combustibles fossiles ; (2) mettre en œuvre une transition juste vers un développement résilient au changement climatique ; et (3) mettre en place une gouvernance nouvelle et transformatrice qui rende possible une action ambitieuse en faveur du climat.

Depuis la publication du [rapport annuel 2022](#) de l'OPC, le Gouvernement luxembourgeois a réalisé d'importantes avancées dans le domaine de l'atténuation du changement climatique. Le 21 juillet 2023, le conseil de Gouvernement a adopté le projet de mise à jour du Plan national intégré en matière d'énergie et de climat (PNEC), et l'a transmis le même jour à la Commission européenne.

Bien que l'OPC ait applaudi un grand nombre des 201 mesures présentées dans le projet de mise à jour du PNEC, il a souligné plusieurs problèmes liés aux mesures en termes de portée et d'ambition, de cohérence et de faisabilité de sa mise en œuvre. L'avis de l'OPC sur le projet de mise à jour du PNEC peut être consulté [en ligne](#), et les points forts de cet avis sont présentés à l'annexe 2 du présent rapport.



¹ UN Secretary General. 2023. Secretary-General's video message for press conference to launch the Synthesis Report of the Intergovernmental Panel on Climate Change.

<https://www.un.org/sg/en/content/sg/statement/2023-03-20/secretary-generals-video-message-for-press-conference-launch-the-synthesis-report-of-the-intergovernmental-panel-climate-change>

Recommandations politiques à l'intention du nouveau Gouvernement pour la législature 2023-28

C'est sur la base des grands principes de l'OPC élaborés dans le rapport annuel 2022 et de son avis sur le PNEC que l'OPC présente, dans ce rapport, ses recommandations pour une approche scientifique et factuelle en vue de l'accord de coalition et du plan gouvernemental pour la période législative 2023-28.

Sans une action climatique transformatrice au cours de cette législature, le Luxembourg ne parviendra pas à atteindre les objectifs nationaux de la loi sur le climat de 2020 et les objectifs de l'UE pour 2030 et 2050. De l'avis de l'OPC, le Gouvernement a la possibilité de mettre en œuvre des changements concrets dans les structures de gouvernance et l'action politique afin de garantir une action climatique appropriée, fondée sur la science et des données probantes, comme le demande le GIEC. Le Luxembourg est confronté à certains impacts du changement climatique dans un contexte de volatilité, d'incertitude, de complexité et d'ambiguïté croissantes en ce qui concerne l'économie, l'évolution technologique et le fonctionnement de la société dans son ensemble. **Dans le chapitre 1 intitulé « Governance and policy action for climate resilient development »** l'OPC présente ses recommandations sur la manière de créer un environnement propice à un développement résilient au climat dans un monde turbulent au Luxembourg et au-delà.

Le centre financier luxembourgeois représente à la fois un risque et une opportunité pour le Luxembourg en matière d'action climatique. En l'absence de changement structurel et de réorientation fondamentale vers le financement du développement durable, et en particulier de l'atténuation et de l'adaptation au changement climatique, le principal pilier de l'économie luxembourgeoise reste vulnérable aux risques liés au changement climatique: les investissements dans les combustibles fossiles et autres « actifs délaissés » (« stranded assets ») ne sont pas viables à long ou même à moyen terme et mettent en péril la stabilité économique future.

La taille du secteur financier luxembourgeois représente un risque pour l'économie luxembourgeoise si cette réorientation n'a pas lieu. Mais celle-ci représente également une opportunité pour le Luxembourg d'avoir un impact significatif sur l'action climatique tant au niveau national qu'international. L'OPC invite le nouveau Gouvernement à considérer cette opportunité pour le Luxembourg, car ce n'est que si le secteur financier est réellement durable que le Luxembourg pourra prospérer.

Dans le **chapitre 2 intitulé « Finance for climate resilience »** l'OPC présente des recommandations pour le secteur financier, en soulignant qu'une réorientation du secteur financier est nécessaire à la fois pour la santé de l'économie luxembourgeoise et pour la santé de la planète. C'est grâce à la force de son secteur financier que le Luxembourg peut susciter des changements à l'échelle mondiale.

Actions concrètes pour le nouveau Gouvernement pour la législature 2023-28

Sur la base de son analyse, l'OPC formule une série de recommandations à l'intention du Gouvernement à venir. L'OPC propose des mesures concrètes, fondées sur des données probantes et s'appuyant sur les données scientifiques les plus récentes, qu'il suggère d'inclure dans l'accord de coalition et le plan gouvernemental pour la période législative 2023-28. Une explication plus détaillée et le raisonnement qui sous-tend chacune des recommandations se trouvent dans le rapport principal.



Gouvernance et actions politiques

Objectif 1. De meilleures structures et procédures pour relier l'élaboration et la mise en œuvre des politiques entre les différents domaines politiques, niveaux administratifs et groupes d'acteurs

Le développement résilient au changement tient compte à la fois de la prévention des émissions de carbone pour atténuer le changement climatique et de la préparation aux crises pour s'adapter au changement climatique. Pour ce faire, il faudra améliorer les structures et procédures existantes et en créer de nouvelles afin de mieux relier l'élaboration et la mise en œuvre des politiques entre les différents domaines politiques, niveaux administratifs et groupes d'acteurs. L'objectif est d'accroître l'efficacité de la coopération entre les acteurs à différents niveaux de gouvernement, en se concentrant sur l'autonomisation des acteurs locaux pour la mise en œuvre de politiques locales de développement résilient au changement climatique.

Vers une plus grande cohérence des politiques :

1. Établir la fonction d'un « émissaire pour le climat » rattaché directement au Premier ministre au sein du ministère d'État.

Vers de meilleures connexions entre les niveaux de gouvernance :

2. Rétablir le « Klimabiergerrot » (KBR) avec un nouveau mandat.

3. Orienter le « Klimapakt » et le « Naturpakt » vers une mise en œuvre plus effective.

Amélioration des procédures des structures existantes afin de renforcer la transparence et la prévisibilité :

4. Simplifier et rendre les processus plus transparents pour le « Fonds Climat Énergie » et création d'une catégorie de soutien spécifique pour les projets créatifs.

5. Créer une administration pour les données et informations relatives au climat et à la météorologie.

Soutien politique aux structures et actions de collaboration :

6. Mettre en place des cadres juridiques et des systèmes de subvention pour des investissements ciblés dans des infrastructures et des technologies utilisées collectivement, plutôt que de subventionner principalement des ménages individuels.

7. Soutenir la création de sociétés d'impact sociétal pour une plus grande diversité d'acteurs économiques, en particulier dans les secteurs de l'alimentation, de l'énergie et de l'eau.

Renforcement des capacités grâce à une offre élargie de formation pour les fonctionnaires et à des possibilités d'apprentissage tout au long de la vie pour les autres parties prenantes :

8. Organiser des formations sur les principes de la science du climat, de la gestion du climat et de la réflexion prospective sur les systèmes pour les employés du gouvernement dans le cadre de la filière de formation « tronc commun ».

9. Organiser régulièrement des ateliers de renforcement des capacités pour et avec les parties prenantes.

10. Intégrer la science du climat, l'empreinte carbone et les pistes de décarbonation dans les programmes scolaires et dans la formation des enseignants.



Objectif 2. Concevoir des politiques pour la régénération, des actions transformatrices et tournées vers l'avenir pour la résilience climatique

Il peut y avoir des interférences spécifiques à une région entre les transitions des systèmes énergétiques et la sécurité de l'eau et de l'alimentation, ou la santé environnementale. Dans les approches intégrées, l'utilisation des terres, les écosystèmes associés et les systèmes sociaux sont conçus pour être multifonctionnels afin de contribuer à la santé des écosystèmes et à la santé humaine face à l'accélération du changement climatique.

Adopter des procédures de routine pour éliminer les pratiques non durables et promouvoir des approches adaptées à l'avenir :

11. Étendre le contrôle de la durabilité des nouvelles lois (« Nohaltegekeetscheck ») à toutes les politiques (et pas seulement aux lois), y compris celles relatives à l'atténuation du changement climatique et à l'adaptation à celui-ci, afin de permettre une évaluation systémique de la durabilité et de la faisabilité des mesures.

Concevoir des politiques pour l'expérimentation sur le terrain à l'aide d'approches intégrées :

12. Identifier et rendre accessibles aux acteurs locaux des surfaces appropriées pour la mise en œuvre de mesures climatiques, y compris pour la régénération d'écosystèmes.

13. Permettre l'expérimentation, en particulier pour promouvoir la séquestration du carbone et la santé des écosystèmes.

Responsabiliser et impliquer divers acteurs afin de réaliser des changements à long terme et d'apprendre sur le terrain :

14. Créer et encourager de nouveaux programmes de récompenses pour le développement de la résilience climatique dans le secteur privé et pour les résidents.

15. Outre le « Fonds Climat Energie », développer d'autres sources de revenus et de ressources plus diversifiées pour s'engager dans l'adaptation et l'atténuation à long terme.

16. Instituer des moyens pour permettre aux particuliers d'assurer un service public, y compris dans le domaine de l'action climatique.

Objectif 3. Améliorer la base factuelle des politiques grâce à un suivi bien articulé et à un apprentissage orienté vers l'action

Une dernière série de recommandations vise à améliorer la base de données et de connaissances pour les politiques et les actions locales grâce à un suivi, une évaluation et un apprentissage basé sur l'action en réseau.

Suivi et apprentissage pour une action climatique plus efficace :

17. Créer et soutenir l'expansion des plateformes internet collaboratives existantes pour partager les initiatives et les résultats de la recherche y associée. Cette démarche s'appuiera sur des approches de recherche participative qui rendront accessible au public une combinaison de recherche menée par des experts, de surveillance officielle et de « science citoyenne » pour les évaluations d'impact et la surveillance à long terme des actions climatiques.

18. Améliorer les indicateurs pour mesurer et contrôler les émissions de GES sur l'ensemble du cycle de vie dans tous les secteurs, les incidences sur la biodiversité, les services écosystémiques et les systèmes de paiement pour les services écosystémiques associés, ainsi que le bien-être.

19. Créer un Institut pour le développement résilient au climat au Luxembourg pour 1) développer des programmes de renforcement des capacités, 2) coconcevoir et héberger des plateformes et des réseaux internet pour l'action climatique et 3) coordonner le suivi participatif et la recherche-action transdisciplinaire.

Financement de la résilience climatique

Objectif 1. Mettre en œuvre une stratégie pour l'ensemble de la place financière

La stratégie de durabilité actuelle de la place financière luxembourgeoise manque d'actions concrètes et intégratives ainsi que de crédibilité, faute d'application. L'OPC recommande l'adoption d'une stratégie proactive qui oriente les financements vers la mise en œuvre de mesures d'atténuation et d'adaptation efficaces, qui est critique et vise à aller au-delà des critères ESG.

20. Élaborer et mettre en œuvre une stratégie actualisée en matière de finance durable qui englobe tous les secteurs de la place financière, empêche l'écoblanchiment et accélère considérablement la transition vers la neutralité carbone.

21. Introduire la stratégie de durabilité pour l'ensemble de la place financière luxembourgeoise, y compris la publication des empreintes carbone directes et indirectes, nationales et étrangères.

Objectif 2. Favoriser le renforcement des capacités et le dialogue

Dans l'ensemble du centre financier luxembourgeois, il existe des lacunes en matière de capacité, d'aptitude et d'expertise pour aborder et prendre en compte de manière adéquate les dimensions du climat et de la durabilité. Outre l'éducation et la formation, une campagne visant à encourager le dialogue entre les différents secteurs et groupes de parties prenantes contribuerait à renforcer les capacités et à éviter les réflexions en vase clos.

22. Développer les capacités du secteur financier sur les défis climatiques et environnementaux, sur leurs dimensions scientifiques, techniques et socio-économiques interconnectées, et sur leur relation avec des approches de financement alternatives (allant au-delà de l'ESG).

23. Lancer une campagne globale pour favoriser le dialogue entre les différents secteurs et groupes de parties prenantes au Luxembourg afin de s'accorder sur une compréhension commune de la durabilité et d'éviter les réflexions fragmentaires ou en vase clos.

Objectif 3. Élaborer des normes relatives aux risques liés au changement climatique

Poursuivre le travail de pionnier entamé pour les banques d'importance systémique et développer de nouvelles normes de risque liées au climat (risques de transition, risques physiques et risques économiques) pour toutes les banques commerciales au Luxembourg. Ces nouvelles normes aident à identifier et à réduire les risques liés au climat - et donc les risques économiques - et contribuent à rendre les banques commerciales plus résistantes au changement climatique.

24. Promouvoir une activité bancaire durable en formulant et en appliquant des normes de risque de la plus haute qualité pour toutes les banques.

25. Continuer à suivre la voie de la banque durable et encourager toutes les parties prenantes à y adhérer.

26. Mettre en place une infrastructure de données et d'analyses spatiales en libre accès, fondée sur la science, pour aider toutes les institutions financières basées au Luxembourg à surveiller les risques liés au climat.

Objectif 4. Faire de la « finance made in Luxembourg » la marque d'un véritable développement durable

Le Luxembourg devrait saisir l'opportunité de devenir un leader international pour une véritable finance durable (au-delà de la taxonomie de l'UE). Son centre financier doit mettre à profit son expertise financière unique et de longue date pour innover.

27. Continuer à soutenir la structuration innovante des financements mixtes en faveur du climat à l'étranger et dans le pays.

28. Contrôler les investissements du fonds de pension luxembourgeois (FDC) dans les projets et activités des entreprises pour s'assurer de leur responsabilité.

29. Créer des moyens transparents et crédibles de rendre des comptes.

30. Investir dans la transition juste du Luxembourg et du monde et appliquez les mêmes principes de durabilité que dans l'industrie.

31. Aligner les activités de lobbying et de plaidoyer sur l'objectif de neutralité carbone.



Grands principes pour une
transformation rapide et
juste vers une société
durable et décarbonée



Dans son rapport annuel 2022, l'OPC a présenté ses grands principes pour une transformation rapide et juste du Luxembourg vers une société durable et décarbonée. Alors que le nouveau Gouvernement travaille sur un accord de coalition et planifie la législature 2023-28, l'OPC demande instamment l'adhésion à ces grands principes (figure 1).

transformation vers une société durable et décarbonée

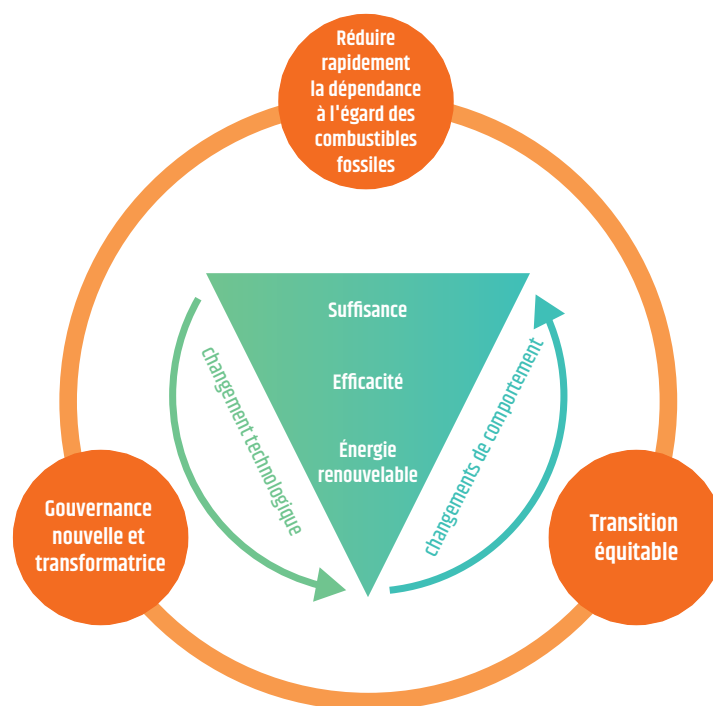


Figure 1 : Grands principes pour une transformation vers une société durable et décarbonée

Recommandations sectorielles

Bâtiments



- Réduire la température ambiante dans les maisons et les bureaux
- Réduire la surface au sol par personne
- Promouvoir les bâtiments résilients
- Exiger des propriétaires qu'ils investissent dans la rénovation des maisons ou des appartements qu'ils louent
- Interdire les systèmes de chauffage fossiles

Transport



- Aménagement du territoire et urbanisme pour réduire l'espace réservé aux voitures
- Élaborer des plans pour une ville de 15 minutes
- Promouvoir le travail à domicile
- Encourager le transfert modal d'un système centré sur la voiture vers un système de mobilité douce et partagée
- Augmenter la part des véhicules électriques (VE) et interdire les véhicules à carburant fossile

Systèmes énergétiques



- Augmenter la capacité de production d'énergie renouvelable et réduire ainsi la dépendance à l'égard des importations en provenance des marchés étrangers.
- Poursuivre et renforcer les mesures en place visant à réduire la demande d'énergie finale
- Mettre fin aux subventions directes/indirectes aux énergies fossiles
- Augmenter la part de la production d'énergie renouvelable

Alimentation, agriculture et sylviculture



- Passage à des régimes alimentaires sains, équilibrés et durables
- Réduire les pertes et les déchets alimentaires
- Réduire les émissions de méthane et d'oxyde nitreux dans l'agriculture
- Réduire la dépendance à l'égard des intrants liés à la production
- Augmenter l'efficacité de l'extraction des ressources précieuses
- Promouvoir la séquestration du carbone dans des forêts saines et résilientes
- Promouvoir la séquestration du carbone sur les terres agricoles dans les structures boisées et le sol
- Promouvoir la restauration des écosystèmes et la plantation d'arbres dans les zones urbanisées
- Réduire la consommation nette de terres d'environ 0,5 ha par jour à 0 ha par an



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PREFACE: The time to act is now! A message to the new Government for the 2023-28 legislature

In October 2021, the Government of the Grand Duchy of Luxembourg – more precisely the Government in Council – nominated the members of the “Climate Policy Observatory” (“Observatoire de la Politique Climatique”, OPC), which was set up in accordance with Article 7 of Luxembourg’s national climate law. The Observatory may issue opinions on its own initiative.

“The OPC’s mission encompasses advising on projects, actions or measures that may have an impact on climate policy; scientifically evaluating the measures carried out or envisaged in the field of climate policy and to analyse their effectiveness, as well as to propose new measures; to write an annual report for the Government on the implementation of the climate policy; and to propose research and studies in relevant fields.”

The OPC is a scientific council currently composed of seven members chosen from individuals with expertise in a field directly related to the Observatory's mandate. Further selection criteria include the complementarity of expertise across relevant fields of knowledge, and gender diversity. Fields of expertise of the actual members range from climate modelling, climate economics and climate finance, economic geography and political science, multicriteria analysis and life-cycle assessment, biochemistry, and system science. Four of the members are based in Luxembourg, with the other three members based abroad. For more details on the experts see Annex I. The members are appointed to serve for 5 years in addition to their main employment elsewhere and dispose of an annual budget from the State budget.

The OPC's mission is supported by a Secretariat, made up of two highly qualified experts in greenhouse gas (GHG) projections, climate policies, and environmental regulation. The Ministry of the Environment, Climate and Sustainable Development hosts the Secretariat. The Bureau of the OPC comprises the President, the Vice-President, and the Secretariat.

The OPC aims to make a meaningful contribution to informing climate change policy and practice in a scientifically sound and effective way. Given the urgency of the situation, it is a shared priority of all its members to identify leverage points to bring about the most far-reaching and rapid changes possible. The OPC believes that its open legal remit and the diversity of expertise and experience of its members give it unique strengths that enable it to add value in areas that are particularly difficult to address from a single ministry or organisation perspective. The OPC is particularly well placed to respond to the assessment of the Intergovernmental Panel on Climate Change (IPCC) stating that "climate governance is most effective when it interacts across multiple policy domains, helps establish synergies and minimize trade-offs", as well as connecting different actors across sectors and governance levels (national, municipal, level of individual actors). Moreover, the IPCC points out that effective governance will rely on the empowerment of diverse actors to engage in making profound changes to prevailing ways of thinking and acting.

The OPC would like to express a special thanks to Claudia Hitaj and Eric De Brabanter for their great support!



Executive Summary
The climate urgency:
What's at stake for
Luxembourg



Integrated National Energy and Climate Plan (PNEC)

As news of extreme weather events all around the world continue to pour in, it is clear that the damaging effects of climate change through floods, droughts, and heatwaves have begun. This is one of the main findings of the IPCC, which published the synthesis report of its 6th Assessment Report (AR6) in March of this year, summarising the research of its working groups on the physical science basis of climate change, impacts, adaptation and vulnerability and mitigation of climate change. Another of the IPCC's main findings is that while efforts to curb GHG emissions across the world grow, the concentration of GHG emissions in the atmosphere is still increasing. Moreover, impacts of climate change accelerate other processes of environmental degradation, including the mass extinction of species, undermining ecosystem services that our economy, society, and all other life forms depend on.

Upon release of the "[Climate Change 2023: Synthesis Report](#)" (Synthesis Report), the United Nations Secretary General, António Guterres, stated that

"the climate time bomb is ticking" and that the "1.5°C limit is achievable, but it will take a quantum leap in climate action".¹

Like Guterres, the Luxembourg Climate Policy Observatory ("Observatoire de la Politique Climatique", OPC) views the Synthesis Report as a "clarion call to massively fast-track climate efforts by every country and every sector."

It is against this backdrop that the OPC reflects on the past year and calls on the Luxembourg Government for the next legislative period 2023-28 to take all necessary measures for the urgent and just transition to net zero.

The OPC stands by the main principles it put forth in last year's annual report: (1) to reduce the dependence on fossil fuels; (2) to implement a just transition towards a climate-resilient development; and (3) to bring about a new and transformative governance that makes ambitious climate action possible.

Since the OPC published its [2022 annual report](#), the Government of Luxembourg has made important advances in the area of climate change mitigation. On 21 July 2023, the Government council adopted the draft update of the Integrated National Energy and Climate Plan ("Plan national intégré en matière d'énergie et de climat", PNEC), and transmitted it the same day to the European Commission.

While the OPC applauded many of the 201 measures presented in the draft updated PNEC, the OPC highlighted several issues with the measures in terms of scope and ambition, coherence, and feasibility of the path for implementation. The OPC's statement on the draft PNEC update can be found [online](#), and the highlights are presented in Annex 2 of this report.



Policy recommendations for the incoming Government for the legislative period 2023-28

It is on the basis of the OPC's main principles elaborated in the 2022 annual report and its advice on the PNEC, that the OPC lays out in this report its recommendations for a science- and evidence-based approach to the coalition agreement and the Government's plan for the legislative period 2023-28.

Without transformative climate action in this legislative period, Luxembourg will fail to reach the national goals of the 2020 climate law and the EU goals for 2030 and 2050. In the view of the OPC, the Government has the opportunity to implement concrete changes in governance structures and policy action to ensure appropriate, science- and evidence-based climate action as called for by the IPCC. Luxembourg faces certain impacts of climate change in a setting of increasing volatility, uncertainty, complexity and ambiguity with regards to the economy, technological change and the functioning of society at large. **In Chapter 1 on "Governance and policy action for climate resilient development"** the OPC sets out its recommendations on how to create an enabling environment for climate resilient development in a turbulent world in Luxembourg and beyond.

Luxembourg's financial centre represents both a risk and an opportunity for Luxembourg when it comes to climate action. Without structural change and fundamental reorientation to finance for sustainable development, and in particular climate change mitigation and adaptation, the main pillar of Luxembourg's economy remains vulnerable to climate change risks: investment in fossil fuels and other stranded assets are not sustainable in the long or even medium term and jeopardise future economic stability.

The size of the Luxembourg finance sector represents a risk to the Luxembourg economy if this reorientation does not take place. But the size of the finance sector also represents an opportunity for Luxembourg to have a significant impact on climate action both nationally and abroad. The OPC invites the new Government to consider this opportunity for Luxembourg, since only if the finance sector is truly sustainable can Luxembourg prosper.

In Chapter 2 on "Finance for climate resilience", the OPC outlines recommendations for the finance sector, emphasizing that a re-orientation of the finance sector is necessary both for the health of the Luxembourg economy and for the health of the planet. It is through the strength of its finance sector that Luxembourg can effect global change.

Concrete Actions for the new Government for the 2023-28 legislative period

Based on its analysis, the OPC makes the following recommendations to the Government, and proposes concrete, evidence-based actions that are informed by the latest science, to be included in the coalition agreement and the Government's plan during the 2023-28 legislative period. A more detailed explanation and reasoning behind each of the recommendations can be found in the main report.



Governance and Policy Actions

Goal 1. Better structures and procedures for linking policy development and implementation across different policy areas, administrative levels and stakeholder groups

Climate resilient development gives equal weight to cutting carbon emissions for mitigation, and ensuring preparedness for crises for adaptation to climate change. This will require improving existing, and establishing new structures and procedures for better connecting policy development and implementation across different policy areas, administrative levels and stakeholder groups. The goal is a greater number of more effective collaborations between actors across different governance levels that are fully focused on empowering local actors to implement place-appropriate local actions for climate resilient development.

Towards greater policy coherence:

1. Establish the function of a “Climate Envoy” attached directly to the Prime Minister in the State Ministry.

Towards better connections across governance levels:

2. Reinstate the Klimabiergerrot (KBR) with a new remit.
3. Orient the “Klimapakt” and “Naturpakt” towards implementation.

Procedural improvements of existing structures to enhance transparency and predictability:

4. Simplify and make processes more transparent for the Climate and Energy Fund (“Fonds Climat Énergie”) and create a dedicated funding category for creative/seed projects.
5. Create an administration for climate-and meteorology-related data and information.

Policy support for collaborative structures and action:

6. Put in place legal frameworks and subsidy schemes for targeted investments in collectively-used infrastructures and technologies rather than mainly subsidising individual households.
7. Support the creation of cooperative ventures and enterprises aimed at social impacts (Sociétés d’impact sociétal) for greater diversity of economic actors in particular in the food, energy, and water sectors.

Capacity building through an expanded offer of training for civil servants and lifelong learning opportunities for other stakeholders:

8. Provide training on the basics of climate science, climate action and future-oriented systems thinking for Government officials as part of the “tronc commun” training track.
9. Organise regular capacity building workshops for and with stakeholders.
10. Integrate climate science, carbon footprint, and decarbonisation pathways into the school curriculum, including the necessary training for teachers.



Goal 2. Design policies for regenerative, transformative and future-oriented actions for climate resilience

There can be region-specific interference between energy system transitions and water and food security, or environmental health. In integrated approaches, land use, associated ecosystems and social systems are designed to be multifunctional to contribute to ecosystem health AND human health in the face of accelerating climate change.

Adopt routine procedures to eliminate non-sustainable, and to promote future-fit approaches:

11. Expand the sustainability check of new laws ("Nohaltegkeetscheck") to all policies (not just laws), including those relating to climate change mitigation and adaptation, to enable a systemic sustainability and feasibility assessment of measures.

Design policies for place-based experimentation with integrated approaches:

12. Identify and make suitable land accessible for local actors to implement climate actions, including for the regeneration of ecosystems.

13. Enable experimentation, in particular to promote carbon sequestration and ecosystem health.

Empower and engage diverse actors for effecting long-term changes and learning on the ground:

14. Create and encourage new award programmes for climate resilient development in the private sector and for residents.

15. In addition to the Climate and Energy Fund, develop other more diversified sources of income and resources for engagement in long-term adaptation and mitigation.

16. Institute means to enable public service by private individuals, including for climate action.

Goal 3. Improve the evidence base for policy through well-connected monitoring and action-oriented learning

A final set of recommendations aims at improving the evidence and knowledge base for policies and local action through well-networked monitoring, evaluation, and action-based learning.

Monitoring and learning for more effective climate action:

17. Create and support expansion of existing collaborative internet platforms for sharing initiatives and results of accompanying research. This will rely on participatory research approaches that make a combination of expert driven research, official monitoring and citizen science for impact assessments and long-term monitoring of climate actions publicly accessible.

18. Improve indicators to measure and monitor lifecycle GHG emissions across all sectors, biodiversity impacts, ecosystem services and associated payment for ecosystem services schemes, and wellbeing.

19. Establish an Institute for Climate Resilient Development in Luxembourg to 1) develop capacity building programs, 2) co-design and host internet platforms and networks for climate action and 3) coordinate participatory monitoring and transdisciplinary action research.

Finance for Climate Resilience

Goal 1. Implement a strategy for the entire financial centre

The current sustainability strategy of Luxembourg's financial centre lacks concrete, integrative actions, as well as credibility due to lack of enforcement. The OPC recommends adopting a proactive strategy that directs finance to the implementation of effective mitigation and adaptation measures, that is critical of and aims to go beyond Environmental, social and corporate governance (ESG) criteria.

20. Develop and implement an update to the sustainable finance strategy that addresses all parts of the financial centre, prevents greenwashing, and greatly speeds up the transition to net zero.

21. Introduce the sustainability strategy for Luxembourg's entire financial centre, including disclosure of domestic and foreign, direct and indirect carbon footprints.

Goal 2. Foster capacity building and dialogue

Throughout Luxembourg's financial centre there are gaps in the capacity, capability, and expertise to adequately address and take into account the climate and sustainability dimensions. Next to education and training, a campaign to foster dialogue across different sectors and stakeholder groups would help increase capacity and prevent silo-thinking.

22. Develop capacity and capability building in the financial sector on climate and environmental challenges their interconnected scientific, technical and socio-economic dimensions, and their relation to alternative financing approaches (going beyond ESG).

23. Launch a comprehensive campaign to foster dialogue across different sectors and stakeholder groups in Luxembourg to agree on a common understanding of sustainability and to prevent piecemeal or silo-thinking.

Goal 3. Develop climate-change related risk standards

Continue the pioneering work started for system relevant banks and develop new climate-change related risk standards (transition risks, physical risks, and economic risks) for all commercial banks in Luxembourg. These new standards help identify and reduce climate-related – and thus economic – risks and contribute to making commercial banks more climate-resilient.

24. Promote sustainable banking through highest-quality risk-standard formulation and enforcement for all banks.

25. Continue following the sustainable banking pathway and encourage all stakeholders to buy in.

26. Set up a science-based, open access spatial data and analysis infrastructure to support all Luxembourg based financial institutions to monitor climate-related risks.

Goal 4. Make “finance made in Luxembourg” a brand for true sustainable finance and banking

Luxembourg should grasp the opportunity to become an international leader for true sustainable finance (beyond the EU taxonomy). Its financial centre must bundle its long-standing, unique financial expertise to innovate.

27. Further support the innovative structuring of blended climate-finance abroad and at home.

28. Monitor investments of Luxembourg's pension fund (FDC) in corporations' projects and activities for accountability.

29. Create transparent and credible ways to achieve accountability.

30. Invest in Luxembourg's and the world's just transition and apply the same sustainability principles.

31. Align lobbying and advocacy towards achieving net-zero.



1 Main principles for a rapid and just transformation towards a sustainable and decarbonised society



In its 2022 annual report, the OPC put forth its main principles for a rapid and just transformation of Luxembourg to a sustainable and decarbonised society. As the new Government forges a coalition agreement and plans for the 2023-28 legislative period, the OPC urges adherence to these main principles (Figure 1.1).

transformation towards a sustainable and low-carbon society

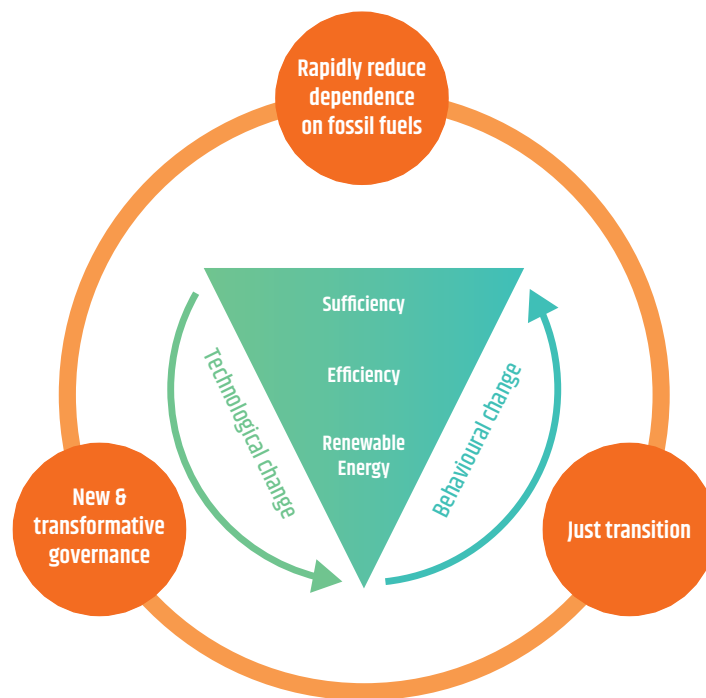


Figure 1.1: Main principles for a transformation to a sustainable and decarbonised society

Sectoral recommendations:

Buildings



- Reduce ambient temperature in homes and offices
- Reduce floor area per person
- Promote resilient buildings
- Require landlords to invest in renovations of leased homes or apartments
- Ban fossil heating systems

Transport



- Land use and urban planning to reduce space for cars
- Develop plans for a 15-minute city
- Promote working from home
- Incentivise the modal shift from a car-centric to a shared, soft mobility system
- Increase share of electric vehicles (EV) and ban fossil fuel vehicles

Energy Systems



- Increase the capacity of renewable energy production and thereby decrease the dependency on imports from foreign markets
- Continue and strengthen the measures in place aiming for a reduction of final energy demand
- Stop direct/indirect subsidies to fossil energy
- Increase the share of renewable power production

Food, Agriculture and Forestry



- 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
- Promote carbon sequestration in healthy and resilient forests
- Promote carbon sequestration on agricultural land in woody structures and soil
- Promote ecosystem restoration, and planting trees in urbanised areas
- Reduce net land take from about 0.5 ha per day to 0 ha per year



2

Governance and policy actions for climate-resilient development

Concept by A. König and C. Dupont with contributions from all members.

Rapidly reducing greenhouse gas emissions to curb climate change is necessary and urgent. However, for society to cope with all likely impacts of climate change, cutting emissions is far from sufficient: Sustainable economic and social development and improved human health are inseparable from the healthy and diverse ecosystems they are embedded in. We therefore need to build more capacity, provide resources, and empower actors, especially local, to implement actions to regenerate and repair our ecological systems. This is a fundamental requirement for a climate resilient development.

Climate Resilient Development is defined as processes of greenhouse gas emission mitigation and adaptation to likely impacts climate change in a way that reverses environmental degradation. Such development is congruent with the pursuit of the United Nations Sustainable Development Goals.² More concretely, this calls for integrated action that considers clean energy generation, healthy diets from sustainable food systems, appropriate urban planning and transport, and a robust social welfare system, for just transitions.³ The development of new integrated solutions and ecological innovation is thus required in production and infrastructures, as well as in spatial and urban planning and in thinking about land use and land cover change.⁴

In this chapter, the OPC provides recommendations to the Luxembourg Government to enable such integrated action. Integrated approaches and action identify and avoid any risks that sectoral climate change adaptation measures may result in other negative environmental impacts.

Governance processes that are organised and interconnected across levels of governance and spatial scales focus on creating the necessary openness for experimentation towards sustainability at the local level, and on engaging a critical mass of actors in action and implementation. This requires the dismantling of possible regulatory restrictions that hinder action.

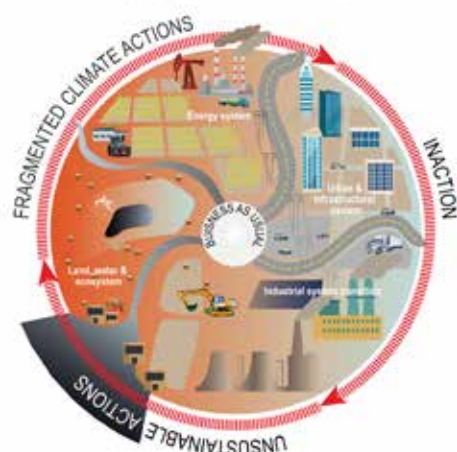
It also requires active encouragement of local variance and differentiation in approaches. Furthermore, if there is an increased burden on the local level and communities to act, government should ensure that they have easy access to necessary supporting means: the time, resources, and capacity to take action, combined with the reduction of administrative burdens and restrictions.

Government should support the development of fast, light, and effective ways of documenting diverse initiatives, tracking and evaluating results, and disseminating successes and failures for networked wider learning. This approach to governance creates room for new possibilities. It structures and accommodates reflection and evaluation of actions from plural perspectives. It highlights that flexibility is needed for continued and rapid adaptation of goals, social structures, and practices considering changing circumstances in a rapidly changing world. A future-oriented and comprehensive discussion of current institutional limitations and procedural requirements for adaptive and transformative governance should therefore 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.

This chapter of the OPC report presents three goals and associated concrete policy actions for the new government that we consider to be central pillars for climate resilient development in Luxembourg. The OPC also invites the government to explore the possibility to position Luxembourg as a Living Lab for climate resilient development that acts as a pioneer for ecological invocation in the EU and beyond. With its short paths from local actors to national government, its multilingual culture, and its high-level of influence in the European Union institutions and the Organisation for Economic Cooperation and Development (OECD) that reaches far beyond what its small size would suggest, Luxembourg seems well positioned to play such a pivotal role.

Transformative actions and system transitions

(a) Societal choices that generate fragmented climate action or inaction and unsustainable development perpetuate business as usual development



(b) Societal choices that support CRD involve transformative actions that drive five systems transitions



Figure 2.1 From fragmented to transformative climate actions.⁵

Goal 1. Better structures and procedures for connecting policy development and implementation across different policy sectors, governance levels, and actor groups

Climate resilient development will require improving existing and establishing new structures and procedures for better connecting policy development and implementation across different policy sectors, governance levels, and actor groups. The goal is a greater number of more effective collaborations between actors across different governance levels that is fully focused on empowering local actors to implement place-appropriate local actions for climate resilient development.

Government's priority should be to **empower locally engaged actors to implement locally well-adapted actions** by securing their access to suitable spaces and resources. Place-based actions shall be carried out by individual citizens and organisational actors, including corporate and municipal actors. Policies should be checked to ensure they avoid imposing constraints to designing and implementing locally adapted actions. Carefully designed policies will offer 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.

Capacity building in actors across all governance levels is required for navigating complex, rich, and, at times, contradictory information and knowledge and stakeholder interest landscapes. The government needs to institute biophysical, social and virtual structures and processes that support diverse groups to engage in climate action. Building confidence and understanding, also in times of setbacks, about when to persevere and when to change course in view of lessons learnt is a key skill that we all need to further develop.

Actions:

Towards greater policy coherence:

1. Establish the function of a "Climate Envoy" attached directly to the Prime Minister in the State Ministry. This Envoy and their team are in charge of mainstreaming climate resilient development across all Ministries and mediating between ministries in case of conflicting interests. They should control, and if necessary, enforce, that all decisions taken are in line with ambitious climate policy. This position should include tasks such as running scenario workshops and developing visions for climate resilient development, a "contradiction mapping" across policy sectors to identify sets of incongruent policies and barriers to necessary transformation processes, and proposing ways forward to avoid incoherent policy and to support climate action.

had not engaged on these topics. There should be a clear commitment from government detailing how proposals are taken up. With longer remits, cross-connections between climate policy structures, such as committees, will be easier to achieve.

3. Orient the Climate Pact and Nature Pact towards implementation. The Climate and Nature Pacts are unique instruments that hold immense promise to better connect endeavours on the national and municipal governance levels. Arguably, several actors on the ground highlight that, at present, many resources and capacities flow into advisory structures and accounting regimes, and less into actual implementation. Measures funded under the Climate Pact and Nature Pact should be focused on implementation – all the while keeping reserves for financial support of creative proposals from local actors under these instruments. Learning across implementation actions is key (see Goal 3). In addition, diversification and locally adapted nature-based approaches are required. This requirement is most notable in the food and water systems that rely on ecosystem services. Permitting local variance and experimentation in approaches will foster resilience.

Towards better connections across governance levels:

2. Reinstate the KBR with a new remit. The new, not time limited, KBR should have an expanded remit to make proactive policy suggestions for climate resilient development, and to point out policy barriers to concrete transformation processes. The call for candidates and selection process could be revisited to ensure it is inclusive to engage participants who

Procedural improvements of existing structures to enhance transparency and predictability.

4. Simplify and make processes more transparent for the Climate and Energy Fund (Fonds Climat Énergie) and create a dedicated funding category for creative/seed projects. Processes and structures to access the fund should be simplified and clarified, and be more transparent, following criteria of good governance, whilst the fund should be kept open, flexible, and effective. This could be achieved by establishing a formal mixed jury with representatives of different sectors of society, and with well-defined timelines for evaluation of proposals and communication of results. The scope should be further defined in collaboration with the Platform for Climate Action, the KBR, the OPC, and other relevant actors.

The dedicated funding category for creative/seed projects should promote projects that face policy and regulatory barriers to climate action.

5. Create an administration for climate- and meteorology-related data and information. In order to help the Luxembourgish society make choices related to climate change based on best available science, the OPC recommends creating an administration for climate and meteorological related information. This entity will collect, or relate to, relevant sources of data and information about climate change, on both mitigation and adaptation. Its mission includes representation to the World Meteorological Organization (WMO) and the IPCC. As such, the new entity would transmit and translate information, both physical and socio-economic, from the global and regional level, such as from the IPCC, the WMO, the European External Action Service (EEAS) and EUROSTAT (see also goal 3). The administrative body would serve as a **national meteorological service**⁶ as defined by WMO, including an efficient multi-hazard warning system for the population in case of weather-related hazard. To this effect it would regroup the resources of the departments of meteorology both from Air Navigation Administration (ANA) and Administration of Technical Agricultural Services (ASTA). The **provision of climate services**⁷ currently does not exist in Luxembourg and would be created by the same entity to provide relevant decision aides to end users.

Policy support for collaborative structures and action:

Reward systems and tax incentives should favour concerted action and collaboration (e.g., cooperatives) as opposed to individual action by those who can afford it in ways that often promote inequity.

6. Put in place legal frameworks and subsidy schemes for targeted investments in collectively-used infrastructures and technologies rather than mainly subsidising individual households. Examples include EV sharing schemes or district heat pumps instead of individual EVs or heat pumps for individual households (see also OPC statement on the PNEC). Such initiatives will be most effective if they follow the general principles outlined by the OPC: sufficiency, efficiency, and renewable energy (see preface).

7. Support the creation of cooperative ventures and enterprises aimed at social impacts (Sociétés d'impact societal) for greater diversity of economic actors, in particular in the food, energy, and water sectors. For example, it can be difficult to align shareholder ventures goals with the urgent and ex-istential need to regenerate the basis for life's existence on earth (healthy and climate change resilient ecosystems, fertile topsoil and water). Other forms of enterprises with other legal statutes such as cooperatives, or Sociétés d'Impact Societal or equivalents are often more reconcilable with regenerative initiatives, especially in the food sector, and energy sector.

Capacity building initiatives through an expanded offer of training for civil servants and lifelong learning opportunities for other stakeholders:

8. Provide training on the basics of climate science, climate action and future-oriented systems thinking for government officials as part of the "tronc commun" training track. By integrating this kind of training into the "tronc commun" training track, all government officials are targeted, which is necessary, as climate change affects all sectors and actors. Only with widespread knowledge of the challenges and opportunities, can government move forward with designing and implementing the transition to net zero.

9. Organise regular capacity building workshops for and with stakeholders. Just like government officials need training on the basics of climate science and climate action, so too do industry and other stakeholders, about implementation of upcoming EU or national regulations.

10. Integrate climate science, carbon footprint, and decarbonisation pathways into the school curriculum, including the necessary training for teachers (see also OPC statement on the PNEC). Students need to be given the tools to navigate a world in which climate change is happening and ambitious climate action is necessary to prevent the worst impacts. To date, education on carbon footprint and decarbonisation pathways is not integrated into the curriculum. Only some teachers and schools offer such education outside of the main curriculum, which does not do justice to the importance of the topic.

Goal 2. Design policies regenerative, transformative and future-oriented actions for climate resilience

There can be region-specific interference between energy system transitions and water and food security, and environmental health.⁸ This interference, as well as the increasing pressure on land and increasing seasonal scarcity of water resources, in particular in small countries such as Luxembourg, requires *integrated approaches*. In integrated approaches, land use, associated ecosystems and social systems are designed to be *multifunctional to contribute to ecosystem health AND human health* in the face of accelerating climate change.

This can often be achieved with nature-based approaches in urban and agricultural settings for improving the micro-climate and water retention, reduce air pollution, maximizing biodiversity and allowing for local food production in urban gardens, but also aiming to replace manufactured chemicals with place-adapted biological solutions. Integrated solutions, that are often nature-based, can help to achieve mitigation of climate changes as well as adaptation and progress towards climate-resilient development and a sustainable society.⁹

Policies are needed to attribute appropriate means for local actors to engender lasting changes over time. Developing and implementing integrated approaches and solutions often requires the capacity to hold seemingly contradictory perspectives in mind and use them to creatively reframe our current thinking and doing. We must confront our predicament honestly and explicitly as a growth-oriented civilisation that exceeds the limits of the planetary bio-physical carrying capacity. Future-fitness should routinely be checked with scenario screening.

Actions:

Adopt routine procedures to eliminate non-sustainable, and promote future-fit approaches

11. Expand the sustainability check of new laws (Nohaltegekeetscheck) to all policies (not just laws), including those relating to climate change mitigation and adaptation, to enable a systemic sustainability and feasibility assessment of measures (see also OPC recommendation on PNEC). The Climate envoy could audit these assessments that can be along the lines of the Nohaltegekeetscheck. In general, this requires procedures for the identification of limitations, risks, trade-offs, and potential barriers to implementation.

Design policies for place-based experimentation with integrated approaches

12. Identify and make suitable land accessible for local actors to implement climate actions, including for the regeneration of ecosystems. Examples of existing platforms where land for climate action can be advertised by private and public owners include the platforms BiBe and Sustain Lux. Examples of promising approaches to foster place-based climate action include the Greenbelt project financed by the Department for Spatial Planning (DATeR).



13. Enable experimentation, in particular to promote carbon sequestration and ecosystem health.

Some agroecological practices and agroforestry – of paramount importance for climate resilient development of our food system and access to nutritious food during crises – require regulatory constraints to be removed to be implemented on a larger scale. For example, farmers face obstacles in planting hedgerows or agroforestry on their land, as they may count as nature protection areas after a certain time and limit what a farmer can do with their land in the future. To enable experimentation, the government could consider developing a cadastre and FLIK category of land, on which exemptions from specific rules can be applied for, e.g., the application of biotope protection in cases of settling of endangered species. This would be conditional based on impact assessment, monitoring, and public sharing of the results of experiments (see Goal 3).

Empower and engage diverse actors for effecting long-term changes and learning on the ground.

14. Create and encourage new award programmes for climate resilient development in the private sector and for residents, such as the Inspiring More Sustainability (IMS) Sustainability awards. Cross-sectoral awards and prizes for individuals and groups aiming to make lasting changes should be grouped and made accessible on a single Luxembourg Climate Resilience Award platform.

15. In addition to the Climate and Energy Fund, develop other more diversified sources of income and resources for engagement in long-term adaptation and mitigation, making corporate funds, EU funding, philanthropic funding, and crowd-sourced funds for climate resilience accessible to all. A public web-platform “Resources for climate resilience” where ministerial, corporate, and private sponsors can enter offers for resources, spaces/surfaces and time and expertise could be developed.

16. Institute means to make public service by private individuals possible, including for climate action. Consider instituting means to allow individual citizens engaging in climate mitigation, adaptation, and climate resilience. This topic will be subject of a future report of the OPC.



Goal 3. Improve the evidence base for policies through well-networked monitoring and action-based learning

Distributed and networked learning will make a system more resilient than just promoting specific actions designed by sectoral experts. Furthermore, whilst spending of public and private funds requires some accountability, tightly knit top-down command control approaches reduce society's flexibility to respond to rapid changes. More open approaches to accounting and impact assessment are available in our networked world. Such a new and improved approach to assembling an evidence and knowledge base for policies, spatial planning and implementation actions at the same time can be tied to more distributed impact assessment, as well as monitoring and evaluation approaches. Such a system would rely on complementing official sets of data and official statistics with co-created data with open data from remote sensing, citizen science tools and shared web platforms. This means reconfiguring the science-policy-practice interface for co-creating publicly accessible evidence for policies and practice (e.g., allowing (dis-)aggregation of data sets and representations across national and local levels and spatial scales, where possible).

For the purpose of impact assessment, monitoring and evaluation over time of diverse climate actions, hybrid human-machine systems should be consciously designed such that human reason derived from participatory deliberation in pluralist and well-networked societies should stay on top, and advice from machines and models is just consulted, discussed and evaluated from diverse perspectives - on tap.

Capacity building will be required to analyse, interpret and use such data from more diverse data landscapes.

Actions:

Monitoring and learning for more effective climate action

17. Create and support expansion of existing collaborative internet platforms for sharing initiatives and results of accompanying research. This will rely on participatory research approaches that make a combination of expert driven research, official monitoring and citizen science for impact assessments and long-term monitoring of climate actions publicly accessible. Promising existing elements that can be included in such a system are virtual networks and platforms, such as the geoportail which can provide open access spatial data in ever higher resolution, the [SustainLux](#) and the [BiBe Platform](#), as well as first citizen science toolsets for environmental monitoring, such as LIST's Algal Bloom tool, the University's Water Quality Assessment Tool, and the LISER Observatoire. The development of Digital Twin Luxembourg could integrate near-real-time, nationwide information for planning purposes and scenario building for government/administrations and transparent data availability for citizens to reach the climate objectives. Co-designing a national platform should be preceded by a strategic analysis of relevant existing elements, based on interviews with researchers, a survey, and participatory co-design workshops. Interconnected digital web platforms should be developed as part of a comprehensive strategy for societal engagement and school participation in environmental monitoring and sense making and empowerment of local actors to engage in action for climate resilient development (see also Greenbelt workshop report: https://bibe.cell.lu/de/initiative/der_gruene_guertel). These platforms should be associated with a facility offering a virtual landscape and decision theatre and associated tools for participatory planning workshops (www.macauley.ac.uk/landscapes).

18. Improve indicators to measure and monitor lifecycle GHG emissions across all sectors, biodiversity impacts, ecosystem services and associated payment for ecosystem services schemes, and wellbeing. The roadmap prepared for the construction sector (Feuille de route bas carbone) is a seminal example of Life Cycle Analysis (LCA) indicators to assess and measure the broader sustainability impacts of decarbonisation trajectories, that could be replicated to other economic sectors. The same approach and indicators should be applied transversally to monitor the consumption footprint at a national level and thereby address the indirect impacts and possible rebound effects of transformative scenarios (reducing carbon emissions shall not create additional harm on other environmental impact categories at global level). Data will be gathered from diverse traditional sources like national statistics, PIB Bien-être, PNEC measures, consumption-based footprint accounting but also from citizen participation, via for example serious games and dedicated applications. **Science based indicators should be considered to monitor investments flows in the real economy, building on the requirements and recommendations of the EU taxonomy, Corporate Sustainability Reporting Directive (CSRD) and Sustainable Finance Disclosure Regulation (SFDR) regulations.**

Forestry and climate funds are good starting initiatives in this direction. It is important to redirect a bigger portion of public and private investments to support impact-driven and climate-oriented activities instead of towards speculative, business as usual instruments. Monitoring of those financial flows and transparency is more than ever essential to sustain the other transformative measures. **The resulting set of ecological, social, and economic indicators could be embedded in a coherent theory of change that could facilitate and steer transformation in society towards the climate goals.** The theory of change should embrace all the economic sectors to avoid suboptimal solutions and shift of pollution from one sector to another.

19. Establish an Institute for Climate Resilient Development in Luxembourg to 1) develop capacity building programs, 2) co-design and host internet platforms and networks for climate action and 3) coordinate participatory monitoring and transdisciplinary action research. In the detail the institute would:

- ▶ Develop and coordinate capacity building programmes (see Goal 2).
- ▶ Co-design and host internet platforms and networks on climate action and monitoring in the context of highest resolution open access spatial data. It could also host the Klimabiergerrot.
- ▶ Finally, coordinate the transdisciplinary participatory research on impact assessment and monitoring of such initiatives, with regular analysis and participatory evaluations of results across time and space, sectors and governance levels. It should offer a participatory planning and 3D modelling facility a decision theatre. This role cannot be fulfilled by any of the existing research organisations or public administrations as the role is transversal and relies on a truly collaborative and networked approach.

In sum this institute, which could collaborate closely with the Klima Agence and structures related to the Nature Pact and the Klima Biergerrot should serve as a LIVING LAB. The mission of the Institute is to support sustainability and climate action by local actors by co-ordinating the co-creation of monitoring programmes and a suitable evidence base, through transformative action research with a focus on transformative governance. The Institute would draw on work and collaboratively with existing relevant research efforts at Uni.lu and Lis and experts involved in producing official data and statistics, but primarily support local actors in their initiatives.

The institute would have a mission of **transformative governance** and would therefore collaborate closely ministerial departments and public administrations, the Klima Agence and municipal and local stakeholders, including those related to implementation of the Climate and Nature Pact and the Klima Biergerrot. For this purpose, it would need a strong **policy analysis and outreach team.**

For its mission relating to transdisciplinary and transformative sustainability and climate research to inform climate action at the policy level and the local level, the institute would draw on existing relevant disciplinary research efforts at the University of Luxembourg and Lis and experts involved in producing official data and statistics.

A **team** of 10-15 permanent researchers would be required for the coordination of citizen science efforts and their accessible representation and integration with expert and official data in transdisciplinary syntheses and analysis and evaluation of very diverse data landscapes emerging from systemic monitoring of social, economic and ecological impacts of climate action. Such evaluation work requires experience and excellent relations over time with national experts in diverse organisations and is thus not possible with short-term contracts. The Institute would play a crucial role in building bridges between disciplinary research groups at the Lis and the University of Luxembourg. This would be necessary to tackle the complexity and relational nature of the transformative sustainability transition. The institute would not need own research staff **that is solely dedicated to** fundamental or disciplined research.

The capacity building team could partner with the German "Transformation for Environment and Sustainability" (TES Academy), which falls within the scope of Germany's Umweltbundesamt, but also with the EU climate coach programme and implementation in Luxembourg led by the Centre for Ecological Learning Luxembourg and draw on the Certificate in Sustainability and Social Innovation at the University of Luxembourg. It could also establish the planned agroforestry academy in partnership with local actors with relevant expertise.

<https://www.umweltbundesamt.de/en/the-uba/international-academy->

Funding: The Institute could rely on blended finance, with a 10-year envelope provided by the state, complemented with funds from the financial sector and suitable funding instruments for transdisciplinary public climate related research including European Research Council (ERC) Synergy and the large Horizon Europe calls. Through its operation and projects, the Institute could play an important monitoring role on climate resilient development.

Outlook

In sum, climate-resilient development in a volatile, uncertain, complex world that is full of ambiguities requires new structures and practices in governance. How can the government help and support society's efforts to curb climate change? How can the government help individuals and organisations to collaborate across diverse sectors in order to become better prepared for and respond to impacts of changing climate, e.g., from extreme weather events or accelerated ecosystem degradation and biodiversity loss?

A Living Lab/ Institute for climate resilient development that promotes practices for a more decentralised transformative governance is an essential tool for innovation across these three domains. As set forth in this chapter, the OPC highlights the importance of transformative governance as an enabler of climate action across all sectors and all actors.



3 Finance for climate resilience

Background and methodology

Finance is Luxembourg's most important industry. As a strategic sector, it has benefitted from privileges and prioritisation of its key stakeholders¹⁰. Luxembourg's financial industry generates over 30% of its GDP and 20% of direct tax revenues annually¹¹; its indirect employment and income-generating effects are much higher (some estimates suggest up to 80% of its GDP).

Finance is indispensable for the world's decarbonisation transformation. However, there are differences between financing decarbonisation projects and creating financial products/instruments that primarily serve speculation and wealth shielding. Luxembourg hosts an important financial centre. It provides means to both, but it prioritises the latter.

This report assesses climate-related (green) financing activity from a predominantly structural perspective. It does not recalculate the share of Luxembourg's sustainable financial products according to the ESG ratings. Rather, the OPC's assessment relates to the broader aim of the current EU Taxonomy¹² and the Taxonomy's forward-looking aim "towards completing the EU sustainable finance framework"¹³. Against this broader aim, the OPC assesses the progress of Luxembourg's aspiration to be(come) a frontrunning/leading centre for climate and sustainable finance. It does so on the example of select financial industries with different characteristics.

Our economies have changed and reorganised continuously over the past decades. Essential aspects of this reorganisation are known to be subject to "financialisation"^{14,15}. It has affected the financial industry itself, and the relationship between the finance and the real economy. The finance industry has grown significantly faster than the real economy, which also explains the growing significance of the financial industry as an income generator for Luxembourg itself. The OPC's evaluation of the financial industry for climate resilience starts at this point.

The continuous growth of Luxembourg's financial industry and its global recognition as an indispensable financial centre goes hand in hand with a broader shift in capitalism, from industrial to financial capitalism, with financialisation as a guiding motive. Importantly, this shift entails a growing disconnect between returns on wage labour and returns on capital. This disconnect has led to a growing overall concentration in wealth (not value) creation¹⁶ in and via places like Luxembourg. Overall socio-spatial inequality has risen.

This disconnect further echoes a decoupling between the physical production of the products through labour, and the "assets" managed and administered by, e.g., Luxembourg's cross-border asset management industry. The previous decades of loose monetary policy ("cheap money") have also helped to synthetically inflate asset prices. Together, these factors have further strengthened the legacy and recent prosperity of Luxembourg's financial industry.

Luxembourg's past legacy, however, bears an immediate responsibility for a just net zero-future.

There are many ways to analyse Luxembourg's financial centre and its activities. The OPC applies an analytical approach to identify the production systems of finance, including their links and structures. It is a product(ion)-based approach. The structure of (global) finance matters; it defines the financial industry's degree of (achievable) sustainability.

Luxembourg is a facilitating, highly specialised "production site" for global finance (originating in the Euromarkets). Its financial centre is embedded in a fine-tuned, well-balanced division of labour between other onshore and offshore financial centres. Luxembourg depends on foreign financial interest and strategic investments. Just as for Luxembourg's economy at large, the guiding principle for the financial industry has been *economic growth*.

Yet Luxembourg's often-lauded financial ecosystem is essentially an enabling "switchboard" for global capital, via the design of enabling financial products and services. The financial centre largely lives of a lucrative fee-based business model.

As such, Luxembourg's financial centre bears responsibility to work out and address its entire carbon footprint. This corresponds with the approach of production-based emission calculations¹⁷.

The OPC recognises that there are numerous studies that illustrate the success of “green finance”. The OPC wishes neither to replicate these studies nor to reassess their results. Rather, this OPC report primarily uses extensive document analyses, and empirical evidence from previous, yearlong academic studies to examine the organisational structures of different financial industries home to Luxembourg. In its most basic guise, we link the organisation of (global) finance with the reorganisation of transforming (regional) economies in need of long-term financing and investment; we then identify gaps with regard to climate and sustainable finance “made in Luxembourg”.

The OPC assesses the progress of Luxembourg's financial industry in achieving *net zero*, i.e., decarbonising its economy by 55% until 2030, and fully latest by 2050. It acknowledges that green finance stresses climate-related financing and investments, but it also stresses the *inseparability* between ecological and human/social systems, which is more adequately captured by the term *sustainable finance*. In fact, net zero requires “regenerative action for ecosystems” (see chapter 1).

Importantly, Luxembourg's financial industry is *no monolith*. It comprises a range of diverse financial industries, institutions, and functions, including banks, funds, insurance, private equity, wealth and supporting services¹⁸, to name but a very few. This variety begs analytical differentiation. The OPC has exemplarily chosen three subindustries for its climate-finance analysis.

Each financial industry has its own financial “production systems and supply chains” (or: financial eco-systems). They respond to different markets, supply chains, clients, geographical reach, and partially differently to the same regulations. Often, these ecosystems overlap in Luxembourg's financial centre, which creates new space for innovation in finance, and often for finance itself.

However, each financial sub-industry is not only affected differently by climate change; they themselves cause direct and indirect GHG emissions in different ways and to varying degrees. This principle is known as double materiality. Because of the complexity of most financial vehicles and instruments designed and offered in Luxembourg, it is close to impossible to identify GHG emissions of the underlying financing activity that are linked to complex financial products. The creation of complexity and opacity has been deliberately pursued (sometimes with unintended results) for decades.

As outlined by STATEC¹⁹, the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development are guiding Luxembourg's *National Plan for Sustainable Development* towards its transition to sustainable development. These 17 SDGs provide the basis for Luxembourg's 2030 Agenda and aim to end all forms of poverty, combat inequality and tackle climate change, and ensure that no one is left behind. If Luxembourg's financial industries/centre are serious about pursuing a credible and ambitious transition, its concrete actions and measures must be assessed against the principles outlined in its own *National Plan for Sustainable Development*.

The organisation of this chapter is different from the previous chapter. It owes its logic to the diversity of “finance made in Luxembourg” and its different exposure to (creating) climate resilience. The chapter starts by assessing Luxembourg's sustainable finance strategy. It moves on to evaluate three key parts of its financial industry in particular:

- ▲ **Nationally operating commercial (retail) banks.**
- ▲ **Public finance blended with private finance, often embedded in multi-lateral financial agreements and strategies within the frame of development aid.**
- ▲ **Global finance, which Luxembourg's key income generating part of the industry with its origins in the Eurodollar markets of the 1950s.**



Four proposals: Finance for climate resilience

Luxemburg has the opportunity to become a credible financial centre and global leader in green and sustainable finance. Its credibility, however, depends on a successfully decarbonisation of its entire financial industry: Not only its national industry, but first and foremost its global market.

After decades of co-designing ever more complex vehicles, from which it has disproportionately benefited and still benefits, it is challenging to disentangle assets (pooled in complex financial vehicles, designed to shield wealth, etc.) in order to identify and address/reduce GHG emissions “hidden” in complex financial vehicles and structures.

Vincenzo Giunta, president of the Luxembourg Financial Markets Association (LFMA), recently argued that to “generation Z (...) the financial industry is uninteresting, unappealing or (they) simply don't trust the sector”²⁰. The OPC argues that in making “finance made in Luxembourg” transparent and climate-and-society-friendly, it will attract the much needed, motivated, and educated young talent again.

All this represents an opportunity to increase the credibility of Luxembourg's financial centre to be serious in reaching net zero and unlocking climate-finance potentials to foster and facilitate decarbonisation, both in Luxembourg and the world. Such undertaking is strongly encouraged and backed-up by a “roadmap to prevent net zero from being undermined by false claims, ambiguity and “greenwash”²¹.

Overall, a strategy includes identifiable and measurable goals and priorities, concrete actions to achieve and implement the goals, and resources and responsibilities to execute the actions. These are expectations linked to a *global*, equitable transition to a sustainable future. As such, key to a “leading green financial centre”²² is not only an adequate regulatory environment and the ability to develop green financial products, but also the *full disclosure of carbon*.

Surprisingly, however, Luxembourg's financial centre lacks a coherent strategy. Instead, several strategies exist in parallel. They all address only smaller parts of the financial system:

- ▲ Luxembourg Sustainable Finance Strategy (February 2021)
- ▲ Grand Duchy of Luxembourg International Climate Finance Strategy 2021 – 2025 (July 2021)
- ▲ Inclusive and Innovative Finance Strategy (2021, Luxembourg Development Cooperation)

The International Climate Finance Strategy and the Inclusive and Innovative Finance Strategy do not address the financial sector and rather put forth the government's strategy in financing climate or microfinance projects

abroad, as part of the government's international commitments, such as to the United Nations Framework Convention on Climate Change (UNFCCC) or the Green Climate Fund. These two strategies stand separate from the Luxembourg Sustainable Finance Strategy, which seeks to address how the Luxembourg financial sector could be made more sustainable.

In this spirit, four concrete proposals invite the government to take immediate action towards net zero:

Goal 1. Implement a strategy for the entire financial centre.

The current sustainability strategy of Luxembourg's financial centre lacks concrete, integrative actions, as well as credibility due to lack of enforcement. The OPC recommends adopting a proactive strategy that directs finance to the implementation of effective mitigation and adaptation measures that is critical of and aims to go beyond ESG criteria.

Goal 2. Foster capacity building and dialogue.

Luxembourg's financial centre has gaps in the capacity, capability, and expertise to adequately address and take into account the climate and sustainability dimensions. Next to education and training, a campaign to foster dialogue across different sectors and stakeholder groups would help increase capacity and prevent silo-thinking.

Goal 3. Develop climate-change related risk standards.

Continue the pioneering work started for system-relevant banks and develop new climate-change related risk standards (transition risks, physical risks, and economic risks) for all commercial banks in Luxembourg. These new standards help identify and reduce climate-related – and thus economic – risks and contribute to making commercial banks more climate-resilient.

Goal 4. Make “finance made in Luxembourg” a brand for true sustainable finance and banking.

Luxembourg should grasp the opportunity to become an international leader for true sustainable finance (beyond the EU taxonomy). Its financial centre must bundle its long-standing, unique financial expertise to innovate, e.g., to reduce spatial and social inequalities and dependency.

A strategy for sustainable finance: Creating a credible benchmark

In 2021, Luxembourg implemented its first Sustainable Finance Strategy¹. It represented an important and laudable step on its way towards fulfilling its responsibilities from signing up to “the Agenda 2030 SDGs and the Paris Agreement temperature goals” (Minister Carole Dieschborg)². However, so far, the strategy has been more aspirational than concrete and credible.

Climate change is a threat multiplier; the consequences of climate change are severe and far-reaching. Thus, the High-Level Expert Group on the Net Zero Emissions Commitments of Non-State Entities is uncompromising with regards to net zero greenwashing³:

- ▲ Actors cannot claim to be “net zero” while continuing to build or invest in new fossil fuel supply or any kind of environmentally destructive activities.
- ▲ Actors cannot also participate or have their partners participate in lobbying activities against climate change or just report on one part of their business's assets while hiding the rest⁴.

Table 3.1 lists the five principles, which have guided the OPC in its assessment towards ambition and credibility of Luxembourg's sustainable finance strategy.

- 1. Ambition** which delivers significant near— and medium —term emissions reductions on a path to global net zero by 2050
- 2. Demonstrated integrity** by aligning commitments with actions and investments
- 3. Radical transparency** in sharing relevant, non-competitive, comparable data on plans and progress
- 4. Established credibility** through plans based in science and third-party accountability
- 5. Demonstrable commitment** to both equity and justice in all actions

Table 3.1: Five principles to guide the setting and attaining of net zero targets⁵.

It is evident that Luxembourg has made enormous efforts concerning sustainable finance dedicated to financing green and sustainable projects⁶. This includes green bonds, ESG compliant and sustainable investment funds, and also microfinance institutions with financing sustainable projects at home and abroad. Further, Luxembourg prides itself in being a “leader in responsible and impact funds”⁷. It has established a range of initiatives, technical platforms, and partnerships that provide a substantial underbelly for and give credibility to the ambition of its sustainable finance strategy⁸.

Overall, the OPC recognises the efforts of Luxembourg” financial actors in addressing principles 1 and 2 (Table 3.1). It encourages further progress, in particular in the realm of global finance.

However, the OPC assesses the sustainable finance strategy to be insufficient and incoherent in terms of both its goals and how to transform alle financial industries into a force to help decarbonise economies/ societies at home and abroad as suggested by principles 4 and 5.

An overall remaining challenge faced by Luxembourg's financial centre is to increase its transparency as stated in principle 3.

Essentially, the task is about defining, implementing, and enforcing a credible strategy rather than a “strategic” strategy. If Luxembourg is serious about its decarbonisation pledge, and about its leadership role as a sustainable financial centre to service a just and rapid transformation to net zero, this commitment must be made by all state- and non-state actors. Luxembourg's global financial centre needs to be reflective of its fair share of the needed global climate mitigation and adaptation. In fact, its strategy (and implementation, monitoring, and enforcement for that matter) must achieve “buy-in from key public, private and civil society stakeholders”⁹. More consistently, **“sustainable development requires changes in the deployment and relative value of financial assets and in their relationship to the creation, stewardship, and production of real wealth. A sustainable financial system is, therefore, one that creates, values, and transacts financial assets, in ways that shape real wealth to serve the long-term needs of an inclusive, environmentally sustainable economy”¹⁰.**

This points to the:

- ▲ recognition of re-connecting the “abstract” assets (managed/administered in Luxembourg) with their physical foundations produced in other parts of the world. Such reconnect allows for the identification of the carbon footprints in both the physical value chains and the investment and financing activities of complex financial vehicles (consumption-based emission measures);
- ▲ decarbonisation of the financial industry's infrastructure and production system itself. This includes office buildings, business travels, data centres, and other GHG emission-inducing activity (principle of double materiality);
- ▲ the inseparability from addressing inequality-drivers in complex investment fund vehicles, such as base erosion and profit shifting principles, which squarely contradict the SDGs.

Failing to buy in increases the risk to actively invite greenwashing to Luxembourg, and to provide ample scope for individual interpretation of sustainability.

This leaves profound challenges for response from all Luxembourg's financial stakeholders:

- ▲ Luxembourg's narrated “green” ambition lacks realisation/materialisation even five years after publishing the roadmap. The formulation, implementation, and enforcement of a comprehensive, ambitious, and credible sustainable finance strategy should be a task of highest priority.
- ▲ This relates to the second key task: Identify commonly shared ground as to what sustainability means for all financial stakeholders. This should not be the smallest denominator, if ambition applies, to make future action credible, transparent, enforceable, and measurable. At stake is nothing short of what Luxembourg is willing to invest now and in the future, to be(come) a true sustainable financial centre, including its own carbon disclosure.
- ▲ A credible sustainable finance strategy can only be implemented with adequate knowledge of the scientific, technical, and socioeconomic dimensions of sustainable finance, that is with true sustainable finance expertise across the entire financial sector. There is a need for capacity and capability building and dialogue.

Recommendations

20. Develop and implement an update to the sustainable finance strategy that addresses all parts of the financial centre, prevents greenwashing, and greatly speeds up the transition to net zero.
21. Introduce the sustainability strategy for Luxembourg's entire financial centre, including disclosure of domestic and foreign, direct and indirect carbon footprints.
22. Develop capacity and capability building in the financial sector on climate and environmental challenges their interconnected scientific, technical and socio-economic dimensions, and their relation to alternative financing approaches (going beyond ESG).
23. Launch a comprehensive campaign to foster dialogue across different sectors and stakeholder groups in Luxembourg to agree on a common understanding of sustainability and to prevent piecemeal and silo-thinking.

Transitioning to sustainable banking: commercial banks

Commercial (retail) banks accept deposits and provide loans to retail and business clients (e.g., mortgage financing). This happens largely within Luxembourg's administrative borders. Luxembourg's most prominent example of this type of financial institution is Spuerkeess (Banque et Caisse d'épargne de l'Etat, SPK), a commercial bank wholly owned by the government of Luxembourg²⁷. As such, SPK is expected to take on a leadership role in Luxembourg's climate finance and sustainable transition moment.

Luxembourg's national market is small compared to its neighbouring markets France and Germany; its small economy lacks diversification. Therefore, banks' climate-related risk exposure in Luxembourg is high: Loans from a relatively small number of lenders to small, specific groups of clients (e.g., residential mortgage loans) and/or in specific locations (e.g., loans for hotels, logistics, agriculture) can represent significant climate-related and thus accumulated economic risks for both the banks and the economy at large.

Examples include the flooded tourism areas of the Müllerthal, 2018, and the severe housing damages after a tornado in 2019 hit parts of the municipalities Pétange, Rodange, Linger and Bascharage. Banks need to understand their own climate related clusterrisks better. These risks can increase the financing banks' credit default risks and asset devaluation. Disclosure of their green and brown loans in a credible (not strategic) way is indispensable, also with view on the stability of Luxembourg's national economy.

For example, SPK has introduced a Net-Zero climate target report (see Text box 3.1), via which it has entered an ambitious transformation path towards truly sustainable banking. It has also set the benchmark for sustainable banking and finance in Luxembourg.

“We were Luxembourg's first bank to commit to the Net-Zero Banking Alliance (...), thus (...) further accelerating the transition towards a sustainable economy.

Spuerkeess supports the Paris Agreement Goals and our ambition is to become net zero by 2050 by:

- ▲ aligning all our portfolios with the Paris Agreement goals,
- ▲ supporting our customers in the green transition,
- ▲ reducing our ecological and environmental impact,
- ▲ integrating climate risks in our risk management framework.

As climate constitutes a core pillar in our business strategy, the challenge consists now in helping our clients and stakeholders in their transition towards a more sustainable economy.

Text box 3.1: Net-Zero: climate target report and ambition of SPK²⁸.

Overall, the OPC recognises that SPK has taken important first steps towards net zero but urges it to continue taking ambitious action.

SPK's own clear strategy and its components to reach net zero is important for becoming a sustainable bank performing truly sustainable banking, and for understanding and therefore addressing climate-related risks in its balance sheet as a system-relevant bank. The risk analysis builds on a comprehensive, ambitious (but still largely aspirational) approach and includes new calculation approaches and measurement standards of SPK's and its clients' GHG emissions.

SPK applies the Global GHG Accounting and Reporting Standard from PCAF (Partnership for Carbon Accounting Financials) to its lending an investment activities, including its clients'/issuers' scope 1, 2, and 3 emissions "where relevant and appropriate reliable data exists" (Source: Spuerkeess (2023:15). In 2022, Spuerkeess took into account the scope 3 (indirect) GHG emissions for oil, gas and mining activities, and in 2023, Spuerkeess expanded the coverage to include scope 3 emissions for five additional sectors (transportation, construction, buildings, materials, and industrial activities)²⁸.

All these measures also help to develop new standards that are nationally recognised and can be applied by all financial institutions in Luxembourg and possibly even beyond.



According to the High-Level Expert Group on the Net Zero Emissions Commitments of Non-State Entities²², a financial institution

“should be considered and recognised as net zero or to ‘have achieved its net zero pledge’ when:

- ▲ its pledge, targets, and pathway to net zero are generated using a *robust methodology* consistent with limiting warming to 1.5°C with no or limited overshoot verified by a third party (for example, Science Based Target Initiative (SBTi), Partnership for Carbon Accounting Financials (PCAF), Paris Agreement Capital Transition Assessment (PACTA), Tax and price index (TPI), International Organization for Standardization (ISO), among others); and
- ▲ it has achieved its long term net zero target with any residual emissions neutralised by permanent greenhouse gas removals according to reports verified by a credible, independent third party based on publicly available data.”

The OPC welcomes SPK's several initiatives under the umbrella of its new Net-Zero climate target report (Text box 3.1 and Figure 2.1), and especially its robust methodology. It sets credible, robust, and impactful targets to cover all GHG emission types and scopes in line with achieving the objectives of the Paris Agreement (see e.g., the *Guidelines for Climate Target Setting for Banks*²⁶).

Yet, huge tasks are still ahead: Complete the climate-risk methodology and connect its different parts, stress test it for its loan portfolio, and apply it on investment portfolios.

Recommendations

- 24.** Promote sustainable banking through highest-quality risk-standard formulation and enforcement for all banks.
- 25.** Continue following the sustainable banking pathway and encourage all stakeholders to buy-in.
- 26.** Set up a science-based, open access spatial data and analysis infrastructure to support all Luxembourg-based financial institutions to monitor climate-related risks (see also point 19., a service offered by the Living Lab for climate resilience).

International climate finance

A second important climate-finance pillar is public private blended finance. This includes in particular Luxembourg-based top-notch expertise in structuring state-of-the-art international and/or multilateral climate finance. In Luxembourg, this overlaps with both its overseas development aid (ODA) and nation branding.

Luxembourg's inclusive finance initiative aims to support partner countries in creating an enabling environment for developing innovative financing mechanisms. These efforts are oriented through Luxembourg's traversing strategy for innovative and inclusive finance in development cooperation, adopted in 2021.

Luxembourg's International Climate Finance supports developing countries for the financing and technical implementation of climate mitigation and adaptation projects. It is a key strategic framing, on which the state-driven blended finance strategy rests. Yet,

“to achieve net zero globally, while also ensuring a just transition and sustainable development (...) financial institutions and multinational corporations (...) (need) to consistently take more risk and set targets to greatly scale their investments in the clean energy transition.”²²

Several further initiatives have put Luxembourg in the international spotlight. Among them is the Luxembourg-EIB Climate Finance Platform, co-launched by Luxembourg and the European Investment Bank, to derisk low carbon and resilient investments in climate action projects in EU partner regions around the world for private finance²⁹.

A “switchboard” economy for global capital

Another successful flagship project is the Luxembourg Green Exchange (LGX) to develop, facilitate and trade sustainable financial products, including green, social, and sustainable securities:

- ✓ In March 2018, more than USD 1 billion was raised for Planet Emerging Green One, a fund that will buy labelled green bonds issued by emerging market banks²⁶.
- ✓ 3 billion EUR green bonds emitted by the Industrial and Commercial Bank of China (ICBC) on 2 December 2021.

A gloomier picture arises with regard to Luxembourg's *Fonds de Compensation Commun au Régime Général de Pension* (FDC), managed by external asset managers. The FDC acknowledges its responsibility towards sustainable investing and portfolio building, but it has started poorly and still a far way to go (see Sustainable Investor Factsheet³⁰):

- ▲ It has a comparably small share of truly sustainable investments,
- ▲ its “light-touch” Scope 1 (rather than the more ambitious and more common Scope 3) carbon measure applied to its managed assets, and
- ▲ sustainability at only two of its direct investment levels, that is, timber and real estate³⁰.

These are only examples of its insufficient, unambitious climate-related investments. The climate-finance performance of the FDC needs further observation, scrutiny, and in-depth analysis. This brief first general assessment suggests, however, that the FDC's sustainability and climate-finance strategy, including its carbon disclosure, is rather aspirational than credible, especially when assessed against the government's own *National Plan for Sustainable Development*.

Recommendations

27. Further support the innovative structuring of blended climate-finance abroad and at home.
28. Monitor investments of Luxembourg's pension fund (FDC) in corporations' projects and activities for accountability.

Overall, Luxembourg's green/sustainable finance strategy is mainly directed at its financial industries at home. So far, it has left unaddressed Luxembourg's role as a facilitating “switchboard” economy for global capital itself.

This section sketches the structural mismatch between ambition and reality. This structural approach helps to understand where climate financing takes place, how resilient it can be (come), and where to intervene.

Over the past decades, global finance has turned into a full-fledged industry of global reach. This is different to what economic textbooks usually refer. Luxembourg and other financial centres are deep rooting, facilitating “production centres” for global capital invested in assets like securities (bonds, shares) and their multiple derivatives, via all kinds of complex fund and special purpose vehicles. Further, agendas have helped morph finance into an autonomous realm, whose logic increasingly permeates and dominates all areas of our social and ecological life – known as financialisation.

This includes a responsabilisation of individuals, households, and the state. Individuals are, for example, increasingly responsible for their own pensions; they are encouraged to invest in “assets”. Large-scale securitization activities in Luxembourg and elsewhere help separate the asset-value from the value of the underlying physical good, and “qualifies” it as an investable, tradable asset (security). For Luxembourg (and other financial centres with fee-generating similar business models), such (para)financial activities are highly lucrative.

Hence, the links have largely been lost between the “asset” under management (AuM) that generates profit in (and for) Luxembourg, and the workers' physical labour in the physical production, including extractivism (sometimes even labelled “green”), degrading entire local communities' welfare, and workers' human rights. Problematically, such decoupling not only violates the SDGs and the EU Green Deal's equality principles. Decoupling, but also the synthetic creation of complexity of financial investment vehicles “made in Luxembourg”, makes it almost impossible to unpack them and identify (i) the climate risks from (exploitative) investments, and (ii) the impact of the financial activities on the climate themselves, according to the principle of double materiality.

It infringes the principles of true sustainable finance to foster the creation, stewardship, and production of real wealth.

Outlook: Having the cake and eating it too?

Luxembourg's dependency on decisions taken by foreign financial institutions defines its financial centre. An important instrument to attract foreign financial and economic activity are the SOPARFI (Société de PARTICIPATIONS FINANCIÈRES) holding companies:

- ▲ SOPARFIs benefit from corporate tax exemptions on dividends, capital gains and net wealth on qualifying participations, and from full access to Luxembourg's extensive double tax treaty network and EU Directives.
- ▲ Luxembourg benefits when transferring a company's registered office to Luxembourg, and when anonymous letterbox companies take over company shares in Luxembourg-based companies, which then, for example, buy real estate in Europe. According to the European Commission, Luxembourg has only patchily implemented the Anti-Tax Avoidance Package, negotiated in 2016³¹. It has interpreted the exemptions provided for in the law rather generously and also extended them to financial companies that are actually covered by the Anti-Tax Avoidance Directive (ATAD³²).

The year 2021 was a record year for banks in Luxembourg after 2016. The 124 banks made a profit of more than 4bn EUR, an increase of 30% compared to 2020 (see CSSF, 2022). Other impressive performance figures are listed elsewhere³³ and provide a snapshot over the sheer size of the global financial industry that is fostered and facilitated by Luxembourg's financial centre.

Fears are that this legacyladen business model is unsustainable and will backfire. Once a politically desired opportunity, it has since created an opaque and largely impenetrable financial centre. Full carbon disclosure is nearly impossible; for example, but not only, in vehicles that conceal owners and beneficiaries. The problem of opacity is structural. Opacity is a legacy difficult to disengage from in times of sustainability imperatives and net zero pledges. Large parts of Luxembourg's particular finance-based "growth-model" has little to do with a just, integrative approach to decarbonisation and sustainability transition.

Recommendations

29. Create transparent and credible ways to achieve accountability.
30. Invest in Luxembourg's and the world's just transition and apply the same sustainability principles as to other industries, e.g. double materiality and production- based ...
31. Align lobbying and advocacy towards achieving net zero.

Environmental and climate protection have recently been enshrined in Luxembourg's constitution. It has set path to be(come) an ambitious green/sustainable financial centre to help reach net zero until 2050. Despite important first steps in the right direction and first successes, reality does not live up to its ambition. It remains to be decided whether Luxembourg's financial centre will implement and follow a credible strategy, or a "strategic" strategy.

The report has identified structural gaps and mismatches that might prevent Luxembourg from achieving its 2050 net zero pledge, if not addressed. Having the cake and eating it is not a credible business model anymore. Not least within its climate policies, Luxembourg needs to name the elephant in the room, and openly discuss the future of its financial centre in a transparent way.

National financial activity is on a promising way to net zero but has still a long way to go. The example of SPK shows that credible initiatives for green and sustainable financing are taking shape.

In accordance with Chapter 1, Luxembourg might want to grab the opportunity to rethink how to better finance cooperative ventures and enterprises aimed at social impacts (Sociétés d'impact societal) and regenerative initiatives, e.g., in the food and energy sectors. Similarly, larger public/private investments to support impact-driven and climate-oriented activities would help implement transformative measures across Luxembourg's economy. Directed investments would also benefit the overcoming of siloed measures implemented by single ministries, and instead help to embrace holistic, integrative solutions.

Luxembourg's international climate finance for countries in the global South illustrates the value of its financial and legal knowledge hub. It has mounted in successful cooperation with multilateral lenders and innovative instruments that can allocate patient capital to climate-mitigating and adapting projects and create positive impacts on the ground.

If Luxembourg was serious about applying its own climate policies to the pension fund, the investment portfolio of its FDC requires attention and an overhaul. In order to maintain credibility, it is important to be transparent about the criteria of the FDC's investment principles, as well as a time plan to implement these principles.

The OPC's assessment of Luxembourg's role as a key facilitator for global capital is ambiguous regarding its focus on climate-finance. How global finance is organised and structured matters on the ground. Global finance for climate resilience "made in Luxembourg" is a huge business opportunity. To elevate this opportunity, the opacity of the financial centre requires addressing. Only then can be the principles of double materiality and product-based emission calculations be implemented, monitored, and enforced.

The OPC recommends the following actions:

- ▲ Constitute a strategy, which lays out a roadmap for reducing GHG emissions and strengthening climate resilience across Luxembourg's global finance community. This includes principles of scope 1, 2, and 3 GHG emissions accounting and double materiality for all financial industries themselves.
- ▲ Assess existing conditions, including baseline emissions, regular GHG inventories, a long-term emissions trajectory, accountability measures, climate risks and socioeconomic priorities for all (para)financial industries in Luxembourg.

- ▲ Develop a detailed overview of the strategies and actions that all financial industries will pursue for achieving reductions in GHG emissions and improvements in climate resilience over time.
- ▲ Lobby for positive climate action, and do not lobby against it. All financial institutions should have a policy of not investing in or financing businesses linked to new fossil infrastructures or deforestation and other ecologically degrading activities. This includes the design of innovative financial products, and scrutinising carbon disclosure for all financial and (para)financial activity domiciled and administered in Luxembourg.
- ▲ Be transparent, credible, and make information on progress (and challenges) available. Net zero initiatives and alliances must adopt best practice governance and processes for developing criteria and establishing accountability.
- ▲ Address these legacies to make "Finance made in Luxembourg" credible for climate and sustainable finance, and to hold it accountable.





4

Conclusion



Members of the OPC



Enrico Benetto

“In joining the OPC, I am motivated to share my experience in quantitative assessment of the environmental impacts generated by human activities and technologies, to contribute to the evaluation of climate policies and the definition of improvement recommendations. In particular, I intend to focus on the quantitative assessment of the positive and negative effects of carbon emissions, of policies on socio-technical systems, on industry and vice versa, so to consider the causal relationships between policy actions and expected benefits in relation to climate targets in the analysis. Considering the possible side effects of climate policies, e.g., on environmental impact categories other than climate change (e.g., biodiversity) as well as on social aspects is also very central in my contribution to the OPC.”

Enrico's core research interest is in developing science-based methods and indicators to orient sustainable decarbonisation pathways towards climate targets. He has over 25 years of experience in RDI institutions in the field of sustainability assessment and in providing assistance with decision-making for industry and public policy. On the academic side, he has co-authored 120+ peer reviewed scientific papers, 150+ scientific conference proceedings, 18 chapters in volumes with ISBN and edited one open access book which has been accessed 1M+ times. On the impact side, he has worked in 30+ European research projects and 25+ collaborative research partnerships with SMEs, policy makers and large industries. With the aim of broadly contributing to enhance the consideration of sustainability in society, he has contributed to develop research and strategic partnerships with national Ministries and international institutions (e.g., World Alliance for Efficient Solutions of Bertrand Piccard). He has been nominated member of the European Platform for Sustainable Finance 2023/2024 and he is serving as advisor in several Boards for public institutions and private companies.




Sabine Dörry

“Climate change is affecting and will continue to affect living conditions in Luxembourg. My motivation and ambition for the OPC is to provide information on the complexities, especially in relation to climate and sustainable finance, and make scientific knowledge accessible. By actively addressing the roots and causes of climate change, I also see many opportunities for Luxembourg's sustainable future, its society, its environment, and its economy.”

Sabine Dörry is an economic and financial geographer. She is a senior researcher working at the Luxembourg Institute of Socio-Economic Research (LISER) and a founding and board member of the FIN-GEO Network, the Global Network on Financial Geography. Building on previous research positions at and academic visits to the universities of Frankfurt am Main, Oxford, Amsterdam, and Singapore, her current work focuses on the financial industry, and its organization in and influence on leading financial centres. Sabine is interested in developing alternative ways to analyse the global financial system. This includes how shifts towards “sustainable” finance and increasing technologization affect financial activities, (re)designing financial institutions, and (re)building regional economies.

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Claire Dupont

“Responding effectively and fairly to climate change is a daunting task: Nothing less than the transformation of our underlying societal, cultural, and technological systems along with fair individual efforts will do. Everyone has a role to play.”

Claire Dupont is political scientist, whose research focuses on EU and international climate and energy politics, policy, and governance. She currently works as associate professor of European and international governance at Ghent University, Belgium. She also serves as the Vice-Chair of the Scientific Committee of the European Environment Agency. Originally from Ireland, Claire moved to Brussels, Belgium, in 2008, to pursue her PhD at the Vrije Universiteit Brussels, in which she assessed the integration of EU climate and energy policy frameworks.

“Clearly, our knowledge systems also need to change to contribute to the necessary transformation, including by becoming more engaged and embedded in policy and societal processes. I am honoured to have the opportunity to play a role in these efforts through the work of the OPC.”

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Andrew Ferrone

“The solution to global climate change has to be addressed as a global effort, however in practice every single action counts. These need to include incremental efforts, based on fossil-free technologies, as well as behavioural changes. At the same time, further fundamental societal changes and lifestyles changes must occur in order to achieve a full decarbonisation of society, in conjunction with all of the Sustainable Development Goals.”

Andrew Ferrone is a physical climate scientist by training and works mainly at the climate science policy interface. He is currently the Head of the meteorological service at the Administration of Technical Agricultural Services (ASTA) in Luxembourg. He is also the Permanent Representative to the World Meteorological Organisation (WMO), the head of the Luxembourgish delegation to the Intergovernmental on Climate change (IPCC) and coordinates the team of negotiators for the European Union on Science issues under the United Nations Convention on Climate Change (UNFCCC). Andrew completed his PhD at the Université catholique de Louvain, on the topic of aviation and climate change in Europe: from regional climate modelling to policy-options.

“The societal changes that are necessary can only happen if we take collective decisions based on the best available science. To do so it is important to bridge the gap between the scientific community and the decisions makers as well as the general public. The OPC should play a key role in this endeavour in Luxembourg, and I am honoured to have the opportunity to be part of this work.”

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Ariane König

“Let's work for healthy ecosystems, social systems, and lifestyles!”

Ariane König is a Research Scientist at the University of Luxembourg, where she and her team are engaged in research projects to facilitate and learn from social processes with experts and stakeholders to address complex sustainability challenges. The research focus is on food and water and land-use systems as well as the tight interplay between the two. We seek to understand how developments and transformations within the spheres of society, technology, ecology, and the personal sphere are interdependent, and which might be prominent leverage points for deliberate transformations for a more sustainable society. König also built and coordinates an innovative study programme in “Sustainability and Social Innovation” that is open to students and professionals. In addition to be a member of the Observatoire, König is also a member of the European Statistical Advisory Committee and has completed two terms as a member of the national Conseil Supérieur pour un Développement Durable. König obtained her Bachelor and Ph.D. at the University of Cambridge, Emmanuel College, and first worked on risk regulation for a leading multinational life science corporation. Thereafter she joined the universities of Harvard and Oxford, where she conducted research and taught post-graduate and executive training courses on governance of new technologies and risk, with a focus on sustainable agricultural food production. She has also worked as an independent scientific consultant for the OECD, the European Commission, and EU research consortia. She has over 50 publications, her most recent book “Sustainability Science: Key Issues” was published by Routledge in 2018.

“Sustainability requires transforming how we think of and relate to ourselves, other people, and the environment we live and work in. That's not easy given our social system and infrastructures produce patterns of thought and behaviour that are hard to escape. The courses, study programme, and research projects I have built since 2010 serve to equip agents of change, such that we can better recognise leverage points for local and systemic change and evaluate and learn from these changes in a networked manner. This can involve citizen science, scenario work and other means. With my research team, and personally, I work to improve how we engage with and regenerate healthy water, soil, and biodiversity, in Luxembourg and beyond. In my organic garden I am proud to host countless lizards, diverse mice, a slowworm, and a rare smooth snake, who seem to seem to enjoy the many insects and packaging- and logistics-free vegetables and fruit there as much as my family and I do”



Mirjam Kosch

“In 2050, I will be 65 years old and looking forward to my retirement. In the same year, at the latest, we must achieve net zero greenhouse gas emissions to limit global warming. It is my professional goal to be able to say at my retirement: The world has managed to stop global warming - and I have contributed to it!”

Mirjam Kosch is an enthusiastic environmental scientist and completed her doctorate in economics at ETH Zurich on climate policy in the electricity sector. As part of her doctoral thesis, she empirically analysed the impact of renewable energy subsidies and carbon pricing. Currently, she is working at the Potsdam-Institute for Climate Impact Research on the impact of fuel and carbon prices on electricity prices as well as on the expansion of the European emissions trading system and its interplay with different policy instruments. As a modern climate economist, she is convinced that carbon pricing should be a central instrument of climate policies but needs to be complemented by a broad policy mix.

“Ever since my Bachelor studies I have been fascinated by the science-policy interface. Only when both sides actively engage in the dialogue between scientists and policy makers, can we really make a difference. Small countries where people know each other, like Luxembourg or my native country Switzerland, can lead the way as pioneers in this field. I am thus very happy to be part of the OPC and hope to make a contribution to mutual understanding between the two worlds.”

 <http://www.linkedin.com/in/mirjam-kosch-abab7512a/>



Jean-Pascal van Ypersele

“I turned 65 years old in 2022, and I want to pass on what I have learned throughout my career as a climate scientist, without embellishing reality or making it sound all doom and gloom. In the institutions and groups where I have the chance to be active, including the OPC, I will continue to advocate for respect for the environment and all forms of life, human rights, equality of women and men, truth, justice, science, listening, empathy, diversity, and inclusiveness.

I would like to put my energy and time at the service of having the IPCC's conclusions seriously taken into account by political decision-makers, economic actors, the education sector, and citizens. In doing so, I wish to remind people that there are many solutions to the various challenges facing humanity, and to support young people who want to build a better world.”

Jean-Pascal van Ypersele is full professor of climatology and sustainable development sciences at UCLouvain (Université catholique de Louvain, Belgium) and member of the Académie royale de Belgique. A physicist and climate modeller who worked at NCAR (National Center for Atmospheric Research, USA), he has jointly published many papers with natural and social scientists on climate change and sustainable development at global and regional scales, and this for forty years. He has been extensively involved in the IPCC since 1995 and was IPCC ViceChair from 2008 to 2015. He co-authored the first quadrennial UN Global Sustainable Development Report (2019) and was a member of the EU Mission Board on Adaptation to Climate Change, including Societal Transformation (2019-2021). He has participated in most UN conferences on climate issues since 1979, including almost all COPs. He regularly briefs Heads of States and Governments and is occasionally consulted by Greta Thunberg

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Highlights of the OPC statement on the draft PNEC update

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 recognises 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-Bürgerrot (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. To allow for adequate participation of all stakeholders, this duration would have to be significantly extended.



List of endnotes

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Acronyms

ANA	Air Navigation Administration
ARG	6th Assessment Report
AuM	“Asset” under management
ASTA	.....	Administration of Technical Agricultural Services
ATAD	.....	Anti Tax Avoidance Package
COP	.....	Conference of the Parties
CSRD	.....	Corporate Sustainability Reporting Directive
EEAS	.....	European External Action Service
EV	.....	Electric vehicle
ERC	.....	European Research Council
ESG	.....	Environmental, social and corporate governance
FDC	.....	Fonds de compensation
GHG	.....	Greenhouse Gas
ICBC	.....	Industrial and Commercial Bank of China
IMS	.....	Inspiring More Sustainability
IPCC	.....	Intergovernmental Panel on Climate Change
ISO	.....	International Organization for Standardization
KBR	.....	Klimabiergerrot
LCA	.....	Life Cycle Analysis
LGX	.....	Luxembourg Green Exchange
LFMA	.....	Luxembourg Financial Markets Association
LISER	.....	Luxembourg Institute of Socio- Economic Research
NCAR	.....	National Center for Atmospheric Research
ODA	.....	Overseas Development Aid
OECD	.....	Organisation for Economic Co-operation and Development

- OPC** Observatoire de la Politique Climatique (Climate Policy Observatory)
- PCAF** Partnership for Carbon Accounting Financials
- PACTA** Paris Agreement Capital Transition Assessment
- PNEC** Plan national intégré en matière d'énergie et de climat
- SBTI** Science Based Target Initiative
- SFDR** Sustainable Finance Disclosure Regulation
- SOPARFI** Société des Participations Financières
- SPK** (Banque et Caisse d'épargne de l'Etat) Spuerkees
- TES** Transformation for Environment and Sustainability
- TPI** Tax and price index
- UNFCCC** United Nations Framework Convention on Climate Change
- UNEP** United Nations Environment Programme
- WMO** World Meteorological Organization





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