

A spatial vision for the long term in Luxembourg

*Fir eng kohärent
Entwécklung vum Land*

“The purpose of the Fondation IDEA asbl is to promote and drive meaningful public debate with constructive proposals to respond to far-reaching, socio-economic challenges.

It’s goal is to conceive a sustainable future for Luxembourg within the framework of a global approach based on the three pillars of its action: identifying the major challenges, generating new insights and ideas, and driving and participating in the public debate.”

This study has been prepared by the operating team of IDEA together with the geographer Romain Diederich.

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INTRODUCTION

Over the last thirty years, Luxembourg's GDP has grown by a factor of 2.6, close to 290,000 jobs have been created (growth of 2.5 times), the number of cross-border workers has risen by 170,000 (a 6-fold increase), and its population has grown by close to 250,000 people (+65%). 495,000 new residents have migrated here and 291,000 have left the country. Population projections available thirty years ago forecast that the Grand Duchy of Luxembourg would be home to 404,000 inhabitants by 2011 – the actual figure was 108,000 higher. Projections available twenty years ago foresaw Luxembourg with a population of 520,000 by 2020 – again, this figure was 106,000 short.

It may be a useful exercise to cast our minds back to the end of the 1980s and imagine how public opinion would have reacted to anyone making such socio-economic projections, in order to understand how difficult and even dangerous a task it is to try and predict such phenomenon over the space of just over a single generation. Would it have been possible to determine (and state publicly) that the country was capable of handling such vertiginous growth?

Strong interplay between Luxembourg's economic and spatial models

This growth ushered in a period of economic well-being and has had a profound impact on many of Luxembourg's societal, spatial and environmental characteristics. Bottlenecks caused by the spatial planning model are gradually making themselves felt and pose a threat to the country's economic, social and ecological prosperity. These impacts can be seen in the price of real estate, the housing shortage, saturation of the transport network, pollution, living standards, and the attraction of the region. Economic and population growth, although underestimated, has, to some extent, been made possible over the last thirty years by an economic and spatial model that benefited from a number of characteristics, some of which have evolved significantly in recent years. Here we refer primarily to the availability of land and housing, oversized infrastructure, plentiful labour just across the border, and less demanding environmental targets.

However, before we conclude that the framework for the consideration of Luxembourg's future lies in an automatic trade-off between economic and population growth on the one hand, and the preservation of a sustainable spatial model on the other, it is key to analyse the interaction between these two spheres, which are particularly closely entwined in the case of Luxembourg. Before we tackle the future, we must investigate spatial developments in the distant and more recent past in order to understand our starting point (Chapter 1).

In public debate, the many negative impacts of the country's economic and population expansion are regularly blamed solely on the extent of the growth; however, we should not underestimate the role that the difficulty in implementing spatial planning strategies has played in proliferating the undesirable consequences of growth. It is reasonable

to assume that the source of spatial development issues can be found in a combination of factors, which certainly include strong growth, alongside a lack of anticipation (chronic underestimation in economic and population forecasts) and problems implementing spatial planning decisions on the ground, despite the fact that spatial planning strategies have for a very long time anticipated the complications caused by poorly organised spatial development.

A spatial vision for 2050 is a necessity

In the coming decades, spatial planning strategies (in the broadest sense) and their implementation will play an increasingly crucial role in making Luxembourg's socio-economic growth possible and sustainable. The need to envisage a long-term spatial vision for Luxembourg should also be considered a tool in its own right for promoting the country's economic growth strategy. This is the purpose of this study, which is based on original multi-disciplinary research. We have a dual objective: to raise awareness among those responsible for spatial planning, of the potential requirements of Luxembourg's economic model; and to highlight the ever increasing restrictions that spatial planning will place on Luxembourg's economy for economic decision-makers.

The choice of a “go with the flow” scenario for economic and population growth as the assumption underlying our spatial vision

Without changes to the spatial development model (urban structure, urbanisation methods, mobility infrastructure and habits, cross-border spatial planning), an extrapolation of observed economic and population growth over the next thirty years would result in undesirable societal and environmental consequences, and a risk of spatial gridlock that would make any assumption of sustained growth effectively null and void.

Despite this assertion, we have chosen to prepare this spatial vision using a simulation of economic and population growth based on a “go with the flow” scenario, which culminates in a population of 1.092 million inhabitants and over 900,000 jobs in 2050 (Chapter 2). This approach has been taken primarily in acknowledgement of the role potentially played by chronic underestimation in previous economic and population projections in the difficult task of anticipating and steering an appropriate spatial development strategy. It is backed up by our intuition that it is not realistic to assume that the authorities can steer economic and population growth on a more modest trajectory. In addition, if spatial planning policies are based on a scenario of weak economic and population growth and this does not turn out to be the case, the negative impacts of growth on the region and society could be far worse.

Using this “go with the flow” scenario as the basis for economic and population growth does not mean that this is the desired scenario. This is particularly the case on the economic front, where it would be preferable to focus on greater gains in apparent productivity (from labour) than we have seen in recent decades, thus moving towards growth that is less intensive in terms of additional (human) resources.

A coherent spatial development scenario for the country

Based on the results of the simulation for economic and population growth – which can of course be considered maximal – it is possible to test the capacity of the region to achieve the projected growth, whilst still respecting certain assumptions such as an urban structure that allows for the tenets of so-called “concentrated de-concentration” or “organised and harmonious spatial development” proposed by various spatial planning strategies, as well as the urban structure included in Luxembourg’s 2023 national programme for spatial planning (*programme directeur d’aménagement du territoire*, hereinafter “the 2023 PDAT”). These detailed analyses are essential to the preparation of a spatial development scenario (Chapter 3) that highlights the areas for development and the areas for preservation, and offers new approaches to urbanisation, the roll-out of transport and mobility networks and cross-border solutions, in order to achieve cohesive growth for the country over the next thirty years.

The vision presented therefore requires considerable changes to the way in which economic and population growth is organised across the territory and at a cross-border level. A “go with the flow” scenario for economic and population growth does not mean a scenario for the future that is based on unchanged policies. Unless changes are made to the interaction of certain aspects of growth and spatial development, the very acceptability of growth will be called into question.

A vision that is both ambitious and realistic

The proposals set out in this vision are guided by the need for balance between, on the one hand, realism regarding the ability to put them into practice with society’s acceptance (in contrast to an approach of excessive future optimism which would certainly make it easier to achieve this balance between theoretical constraints), and on the other, the urgent requirement for a profound evolution in Luxembourg’s spatial development model, which implies ambitious measures to deal with the new constraints (in contrast to a static approach).

This new approach may require the introduction of new legal and governance tools, and reforms that will require debate (Chapter 4). More generally speaking, raising awareness of the issues related to spatial planning is a prerequisite for a calm debate on the future of the country. This long-term spatial vision for Luxembourg has chosen an original stance and aims, upon publication, to drive public debate, informed by several strategic and complementary initiatives (in particular, the PDAT project, the Luxembourg in Transition consultation, and research by the future studies unit Luxembourg Stratégie). It will also require open and widespread debate and represents a starting point for other studies to consider the economic, social and spatial future of Luxembourg.

CHAPTER 1

The current state of affairs: Luxembourg's spatial development

Whilst the country experienced its most profound regional upheavals during the Industrial Revolution, Luxembourg's more recent economic history, based on successful redevelopment, is a useful prism for analysing the drivers of the Luxembourg spatial model.

Economic growth in the period since the Industrial Revolution in Luxembourg has generated substantial numbers of new jobs, new inhabitants and new cross-border workers, and this trend has accelerated during the course of the last decade.

With the exception of population forecasts made in 1974 (at the height of the steel crisis), all projections for population growth since the 1950s have been underestimated – and often to a considerable extent – mainly due to a propensity to underestimate both net immigration (as a result of forecasts for economic growth and employment being too low) and life expectancy.

Whilst the extent of the growth seems to have outstripped all planning strategies, it is clear that its regional manifestations offer a picture of minimal cohesion as regards spatial development. It is characterised by a failure to implement the strategy of concentrated de-concentration, rampant peri-urbanisation and rurbanisation, a worrying spatial sprawl and inadequate functional diversity, in Luxembourg and its neighbouring regions alike.

Despite political stimuli to accelerate planning procedures and implementation, the speed with which most government and municipal infrastructure has been established remains inadequate given the momentum of the growth, and the same is true for privately funded infrastructure such as housing.

The economic, social and spatial growth of the country is based largely on a region that expands beyond its borders and forms a cross-border metropolis, further complicating the ability to steer spatial planning in practice.

Soil artificialisation and the fragmentation of ecological networks and landscapes – the main drivers of a decline in biodiversity – have been particularly significant in recent decades and the country's carbon footprint remains an issue.

CHAPTER 2

A scenario for economic and population growth through to 2050

This study puts forward an original scenario for economic and population growth through to 2050.

The main parameters and outcomes of the “go with the flow” scenario are: GDP growth of 2.8% per annum, an annual rise in apparent labour productivity of 0.5%, a stable balance between new immigrants (45% of requirements) and new cross-border workers (55%) in the provision of foreign labour, continued life expectancy gains, and a stable birth rate. These assumptions result in a population of 1,092,456 and 955,000 jobs (452,000 residents + 503,000 cross-border workers) in 2050.

Two alternative scenarios are tested: a decline in Luxembourg’s relative level of wealth to that seen prior to its take-off as a financial center (scenario A); and an acceleration in gains in apparent labour productivity (scenario B).

	GDP	Productivity	Employment	Population	Jobs	Cross-border workers
	change	change	change	number	number	number
	2022-2050	2022-2050	2022-2050	2050	2050	2050
Go with the flow	2.8%	0.5%	2.3%	1,092,456	955,092	503,329
Scenario A	0.4%	0.4%	-0.1%	768,591	489,795	212,207
Scenario B	2.8%	1.5%	1.2%	948,457	714,827	341,911

Sources: STATEC and calculations by the authors

The STATEC scenario used in the 2023 PDAT gives an outcome close to the “go with the flow” scenario for population (1,007,000 inhabitants) but a far lower figure for employment (770,000), primarily due to a more optimistic assumption on apparent labour productivity.

There is no guarantee that the “go with the flow” scenario will prove realistic given a wide variety of megatrends, disruptions and unknown factors. Furthermore, this scenario is maximal in certain respects in that it is based on the assumption of the prolongation of a period of very strong economic growth. However, this type of simulation is necessary to test the assumptions for spatial development and their potential limits.

CHAPTER 3

Scenario for spatial development based on a “go with the flow” assumption for growth

With the “go with the flow” scenario for economic and population growth, the spatial development capacities of Luxembourg will be stretched to close to their limits, particularly if the split of population growth and employment follows the same pattern as in the past.

The assumptions for the split of the growth (urban framework) put forward in the 2023 PDAT appear extremely ambitious when set against the outcomes for population growth based on the “go with the flow” scenario used in this study. The projected population density of the Luxembourg agglomeration and the agglomeration in the south of the country will be difficult to support without profound changes. A very clear gap is also apparent in the level of projected growth in the number of jobs in the scenario used by the PDAT and that used in this study.

It will be essential for the country’s spatial development model to evolve, in order to ensure sustained and cohesive growth for the country in the coming decades.

Chapter 3.1 Areas for development and areas for protection in accordance with a cohesive model based on an enhanced and (de)concentrated urban framework

In order to make the projected population and economic growth sustainable, it will be essential to maximise the potential of all of the priority municipalities that will be required to absorb a larger share of the population growth; this implies far-reaching changes on the planning front.

In particular, the three Luxembourg Agglos will have to implement major changes in the next 30 years. AggloLUX will require expansion (in particular, up to Mersch in the north) and increased housing density to accommodate around 380,000 habitants (versus 211,000 today). AggloSUD will also require significant development (higher housing density and targeted expansion) around its major poles (and of its cross-border potential) and could be required to accommodate around 150,000 additional inhabitants. AggloNORD could be required to move towards 50,000 inhabitants (26,000 today), relying on the urban continuum available through to Colmar-Berg. Some less central municipalities within the three agglomerations will have to accelerate their development (in particular, Niederanven, Contern, Leudelange, Mamer, Mondercange, Sanem, Kaerjeng, Erpeldange and Bettendorf).

Luxembourg’s designated rural *centres de développement and d’attraction* (CDA) and other priority municipalities will require substantial development (Wiltz, Steinfort, Junglinster, Rédange and Mondorf). Efforts to raise housing density will require a cohesive approach and construction zones will need updating. In these CDA,

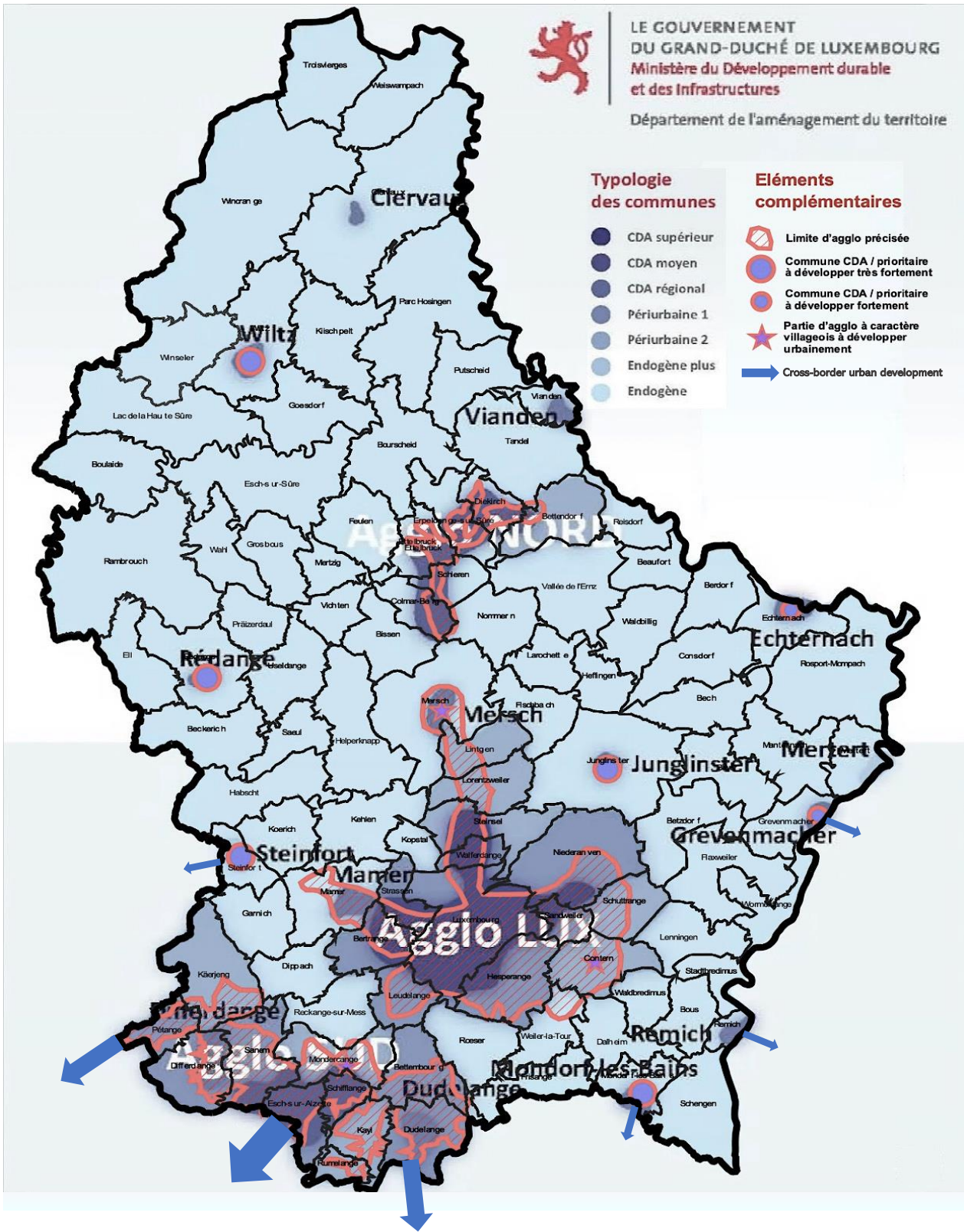
as in the Agglos, new urban hubs will have to be created, which could result in some villages on the inner periphery of the centres becoming small towns.

The urbanisation of rural sectors must be restricted in order to avoid peri-urbanisation and its negative consequences (soil artificialisation, remoteness from economic hubs, damage to traditional village groups, etc.). Some municipalities will have to reduce their development land in favour of priority areas.

The potential for cross-border development in the region will be the key to creating a cohesive and sustainable spatial model. In particular, enhanced urbanisation in the three cross-border agglomerations must be designed in conjunction with the adjacent regions: the region of Esch-sur-Alzette out to Dudelange and Bettembourg, the region around the European Development Pole out to Arlon, Steinfort and Virton, and the region around Trier out to Grevenmacher and Saarburg. Intensified cooperation with the northern part of the Lorraine corridor (Thionville-Metz) will also be necessary, as will spatial visions on a more modest scale for the poles of Schengen-Merzig-Sierck-les-Bains, Echternach-Bitbourg, Wiltz-Bastogne and Rédange-Attert.

Areas subject to environmental protection measures must be safeguarded from this urbanisation. The capacity of the model for spatial development to become more sustainable in environmental terms should not be reduced to a simple calculation of the percentage of soil artificialisation, particularly within a context of population growth where strengthening the country's urban poles will make a specific contribution to rendering the model more sustainable. Major efforts will be required to ensure that green spaces (forests, agricultural and natural areas) are developed and used in a way that shows greater respect for biodiversity. The quality of urban planning must also undergo major changes in order to ensure that living standards are maintained and harmful environmental impacts reduced. Lastly, it would be more consistent to define certain targets for environmental protection and climate change adaptation at the level of the cross-border functional area – failing this, the negative externalities of Luxembourg's growth could be exported into adjacent regions to an even greater extent (see Chapter 3.4).

**Full and complete spatial development model based on scenario 3 – “organised and harmonious spatial development” of 2016 and related classification of the municipalities
“Enhanced urban framework and (de)concentrated”**



Source: Luxembourg's spatial planning department (Département de l'aménagement du territoire); document enriched with the outcomes of the future analysis

Chapter 3.2. Urban developments

The way in which urban units are developed will also require major changes during the coming three decades. The country's three main urban poles must become larger, attractive, more densely populated and more sustainable agglomerations. The development of a growing number of small towns will also require rethinking. At the same time, living standards and the environment must be protected.

The Luxembourg in Transition consultation that combines strategic proposals for spatial planning for the country and its cross-border areas represents an important reference point for urban development. In particular, the proposals for the transformation of certain areas of monofunctional activity into true mixed-use neighbourhoods, and for increasing diversity and (population density) in areas that have already been urbanised warrants particular attention. However, some of the proposals will require significant lifestyle changes and consultation with citizens will be necessary.

In light of changes in the retail sector and in working habits, new urban centralities will have to be designed, with greater emphasis on spaces for social gathering than on traditional shops in some places.

However, it will be important to pay close attention to all of the resources (financial, property, etc.) these changes will necessitate and to ensure that the need for social diversity is considered alongside functional diversity. New economic models must be designed to make these changes accessible to residents.

Chapter 3.3. Transportation and mobility: roll-outs must keep pace with projected growth

The spatial vision for sustained and cohesive growth through to 2050 means we must consider major upgrades to the mobility system within Luxembourg and its cross-border working areas. The future development of transport and mobility will have a high spatial and functional impact; it is crucial within the context of a small country that needs to organise itself to accommodate an additional 460,000 inhabitants and close to 470,000 workers (more than half of whom will be cross-border workers) whilst significantly ramping up its urban fabric.

Journeys, and specifically journeys from home to work and home to school, will have to shift to far greater reliance on car sharing, soft mobility and public transport.

The road network will continue to play a major role in the future. It must be transformed to accommodate the development of shared and connected mobility, and certain road improvement projects will have to be expanded and upgraded.

The railway network must be capable of expanding its transport capacity and will require certain strategic modifications with new connections to bypass Luxembourg's central station. The extension of the tram network (and of bus rapid transit systems) must continue. Meanwhile buses will increasingly be used for daily mobility

requirements, in addition to the development of the tram and rail network.

New means of transportation (at least for Luxembourg) could be very useful in the coming decades. In particular, the increase in population density in the two main agglomerations could require the use of elevated tram lines and urban cable cars in response to saturated capacities on the ground.

Major infrastructure developments are required to encourage soft mobility (walking, cycling) and the use of bike-car hybrids, and to enhance their safety.

Forecast change in overall share (%)

	Car	Public transport	Active mobility
2017 (%)	69	17	14
Estimated 2050 (%)	45	30	25
Change (percentage points)	-24	+13	+11

Based on the simulations, if all of the plans proposed in this vision are realised and there is sufficient progress on spatial planning, in particular regarding centres of employment, the “go with the flow” projections for mobility requirements could be accommodated; this is providing that the modal shift to car sharing is achieved and that homeworking expands considerably (assumption of homeworking for an average of 18% of all working days across the economy as a whole). This would require a very significant decline in solo driving.

Chapter 3.4. Cross-border developments

The cross-border functional area of Luxembourg is facing major challenges, partly due to Luxembourg’s sustained economic growth, and a cohesive approach is needed to develop its long-term spatial organisation. With the “go with the flow” scenario, the cross-border spatial model appears unsustainable over the long term, unless there are changes to the way it works. This speaks in favour of the establishment of a regional project, in conjunction with the bordering countries and regions. Such a project must focus on a more balanced approach to regional development based on co-development. This would strengthen the attraction of the cross-border city, enhance mobility between its various sections, and improve its overall cohesion.

The “go with the flow” scenario for population growth forecasts 292,000 additional cross-border workers in 30 years, which represents, ceteris paribus, an increase of 613,200 inhabitants living in a household where at least one person is a cross-border worker. This rise will require a strengthening urban capacities and of the attraction of cross-border regions in order to draw in new inhabitants.

This will make the development of a cross-border urban framework, such as the one outlined in Chapter 3.1, essential. The spatial vision could also draw on the development of economic business poles

relying, in particular, on cross-border business parks. The transport framework must also be established at this regional level in order to promote co-investment, or indeed co-management, and to achieve the desired modal shift.

It may also be useful to set environmental objectives (specifically 2050 net-zero carbon emissions and net-zero soil artificialisation targets) at the level of the cross-border functional area, as the achievement of such targets at a regional level represents a more logical approach given the physical reality of the phenomena which do not respect country borders.

CHAPTER 4

New tools for spatial planning policies are required

The concrete achievement of the spatial vision proposed in this study will require the resolution of a number of recurring spatial planning issues in Luxembourg. These include, first and foremost, the absence of a cross-sector approach to spatial planning, meaning that national and local planning initiatives are badly coordinated or even incompatible, the difficulty of gaining access to available space, the numerous constraints holding back urbanisation in appropriate areas, and the difficulty of achieving cohesive development in the cross-border region surrounding the country.

We therefore have a number of proposals to achieve five major objectives which represent a cohesive whole, whose ultimate aim is to render Luxembourg's spatial organisation compatible with the country's high growth rate. Various policy levers, which would be binding to a greater or lesser degree, could be established, as standards or incentives, to help to achieve these objectives, and these require urgent consideration.

Given that certain proposals may have an impact on other socio-economic aspects of the Luxembourg model, the suggestions put forward in this spatial vision will require an open and transparent debate.

Objective 1: To ensure that the key aspects of national spatial development policy are better reflected across the whole of the region

- To reform the current method of municipal financing to promote mergers and cooperation between municipalities;
- To create public bodies for town planning and spatial development which could take the form of inter-municipality bodies;
- To grant a central role to spatial planning within the national government and to consider the option of inscribing the role of spatial planning in the Luxembourg Constitution;
- To screen municipal investments based on spatial planning criteria when allocating national funding to such projects; To draw up a detailed inventory of capital transfers from central government to the municipalities as part of a new working group;
- To establish financing for promoting spatial projects, drawing inspiration from the Swiss policy on agglomerations;
- To establish a special new fund to finance pilot schemes on urban planning, landscapes and architecture under the framework of 2023 PDAT.

Objective 2: To ensure that the land required is made available

- To convince owners to utilise their land;
- To use the tools provided to link the classification of land in development zones to actual use and to reconstitute the plots within a project in the event of any blockage;
- To create a compensation fund for capital losses caused by a change in land use classification as a result of spatial planning measures, and to fund this by taxation on capital gains;
- To adjust the taxation of land in order to ensure that land is freed up, and to monitor the effects of the reform announced in October 2022, recalibrating the reforms where necessary;
- To consider tax incentives to encourage investment in the construction of housing;
- To study the option of adapting Luxembourg's Constitution.

Objective 3: To promote optimal use of existing areas and encourage urban diversity

- To design a tool for the transfer of urbanisation rights in order to channel development into appropriate areas;
- To ensure that municipalities, central government and public-sector property developers have greater incentives to upgrade the development land in their ownership;
- To reassess all of the incentives for municipalities to provide social housing;
- To rapidly implement, regularly reassess and, where necessary, adjust taxation applicable to empty housing;
- To facilitate legal proceedings wherever possible;
- To make better use of the Luxembourg land use plan (POS);
- To design a system to guarantee a minimum proportion of constructed surfaces for the development of activities promoting the functional diversity of neighbourhoods.

Objective 4: To establish a sustainable mobility policy that is compatible with the projected growth path

- To use tax incentives to promote sustainable mobility;
- To consider whether a form of road tax is appropriate and establish parking policies in line with urbanisation targets;
- To accelerate procedures concerning infrastructure projects for multi-modal mobility and to provide adequate funding for the government bodies and companies responsible for realising the necessary mobility projects.

Objective 5: To promote cross-border cooperation, specifically via new tools

- To promote more balanced economic development;
- To pass bilateral agreements for cross-border spatial projects, with local authorities heavily involved;
- To make use of some of the provisions of the European Cross-Border Mechanism establishing points of contact in the event of obstacles;
- To set up new funds dedicated to cross-border cooperation;
- To encourage municipalities in cross-border regions to establish cooperative groups;
- To develop the legal and tax framework for cross-border homeworking;
- To promote experimentation.