

P D D A T

✓ **Master Programme
for spatiale planning**
Summary

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P D A T



S O B C

Master Programme
for spatial planning
Summary



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

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1 THE MASTER PROGRAMME FOR SPATIAL PLANNING (PDAT)

INSTRUMENT...

The Master Programme for Spatial Planning (Programme directeur d'aménagement du territoire - PDAT) is one of the main instruments of spatial planning policy in the Grand Duchy of Luxembourg and provides a framework for its territorial development.

Its role is to provide concrete strategic guidelines to support the actors involved in spatial planning and to coordinate any cross-cutting and intersectoral action between the governmental and municipal authorities that has an impact on Luxembourg's territory. The PDAT aims to improve the quality of life through the coherent, structured and sustainable development of the country.

...AMBITIONS...

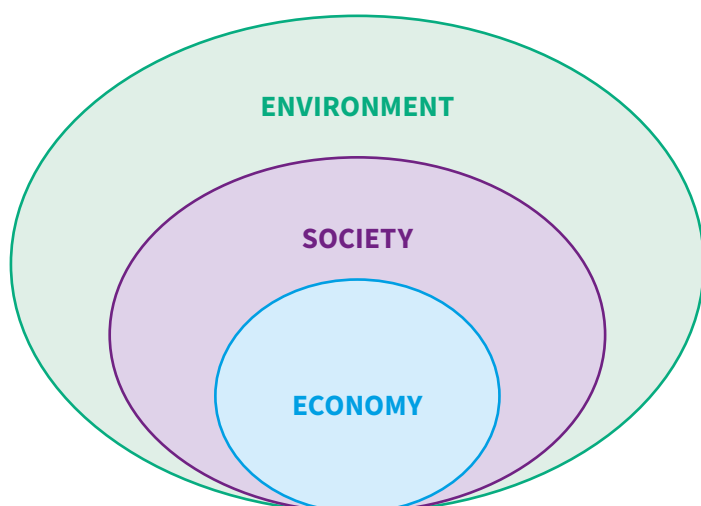
The stated aim is to prepare the territory for future developments, which may be large or small – and in some cases unpredictable – by establishing a territorial strategy able to respond to economic and demographic changes as well as combines protection and development of the territory. This territorial strategy was adopted by the Government and is backed by the municipalities.

Considering that spatial planning policy has no direct influence on the evolution of the number of inhabitants and jobs, it should be noted that the objectives and strategy of the PDAT are based on scenarios drawn up by STATEC (the Grand Duchy of Luxembourg's national institute for statistics and economic studies). Starting from the premise that the country's economic and social policy will remain unchanged, these scenarios estimate an increase of 10,000 to 13,000 inhabitants and an increase of 6,300 to 10,000 jobs per year until 2060.

The key issue is to determine how to distribute this development over the territory in an equitable and balanced way, while ensuring the preservation of resources.

It is against this backdrop that the PDAT sets out four political objectives and a forward-looking territorial strategy that combines environmental protection with the concentration of development in the most appropriate locations.

While this strategy should enable a sustainable response to forecast development, it remains just as effective if the socio-economic development turns out to be less significant.



**NO ECONOMY
WITHOUT SOCIETY,
NO SOCIETY WITHOUT
THE ENVIRONMENT**

The different areas are considered in their interrelation and interdependence.

...PHASED IMPLEMENTATION...

The PDAT sets out two timeframes for implementing its objectives and strategy. The challenge is to usher in a new era today, while incorporating elements from the past and present. In fact, some of the programmes and plans drawn up beforehand or currently being implemented, are already guiding the development of the coming years.

Timeframe I: 2023-2035

Transition phase: initiating the reversal of current trends and prompting a paradigm shift

The first phase, corresponding to the short and medium term from 2023 to 2035, should act as a transition phase and create the conditions to reverse development trends and approaches that are not in line with the objectives and strategies of the PDAT

Timeframe II: 2035-2050

Corroborating the paradigm shift

During the second phase, from 2035 to 2050, the trends in question will be gradually reversed by creating new instruments. These are first and foremost of a legislative or regulatory nature and should come into effect by 2050 at the latest.

...FOLLOW-UP

The implementation of the PDAT will undergo careful monitoring to ensure that the execution of the proposed objectives, strategies and instruments does not in fact impede the country's future development. This monitoring will make it possible, where necessary, to identify development trends and subsequently adapt territorial strategies to new circumstances.

2 CHALLENGES, OBJECTIVES AND STRATEGIES OF THE PDAT

2.1 Present and future challenges

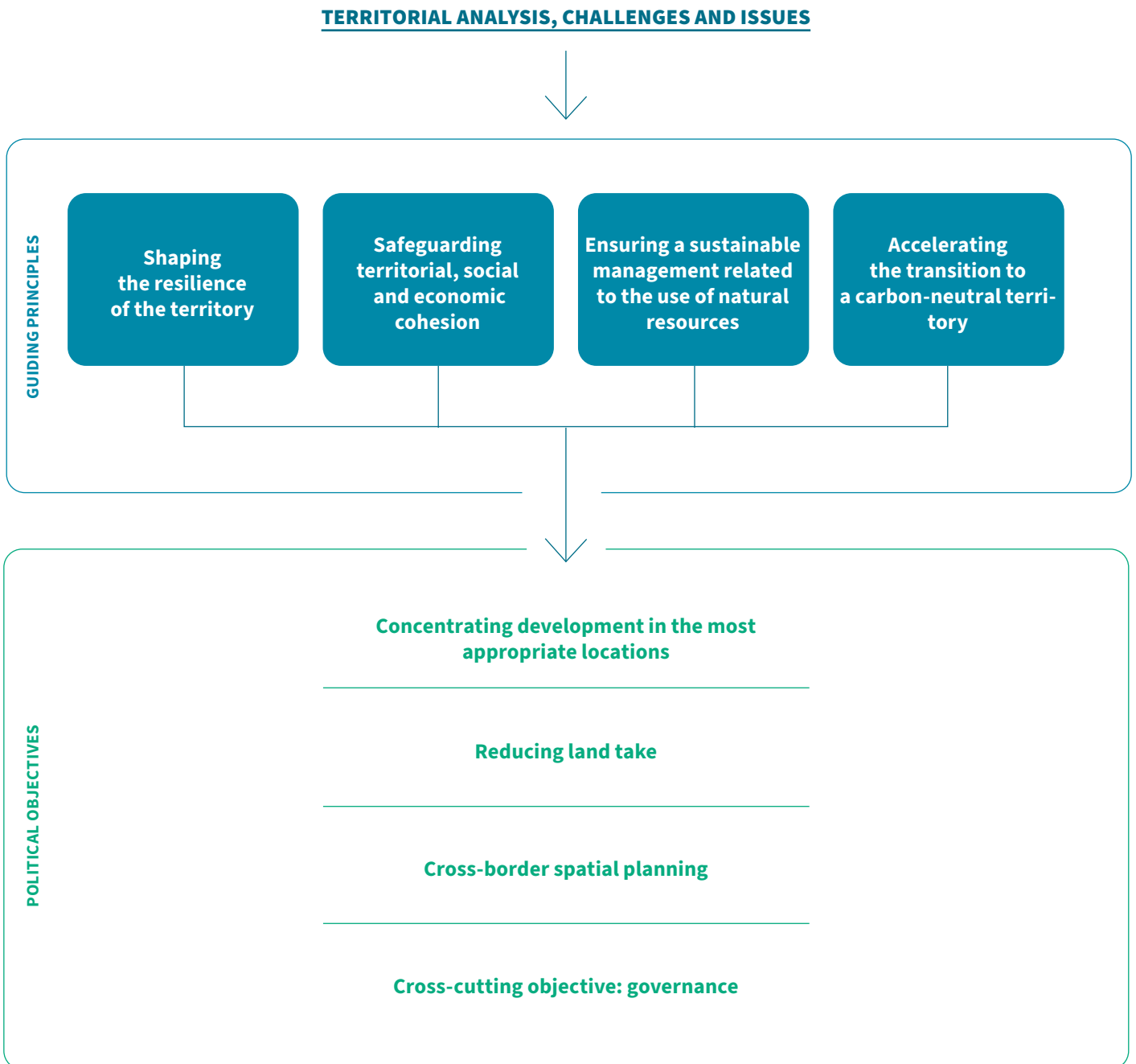
The PDAT is based on wide-ranging territorial analysis, whose main challenges and issues can be summarised as follows:

- A series of climate, health (linked to Covid-19) and geopolitical crises;
- Demographic dynamism linked to employment growth: between 2003 and 2023, the population grew by +212.509 inhabitants.
- Robust and geographically dispersed job creation, benefiting municipalities with endogenous development: between 2002 and 2021, almost 200,000 new jobs were created;
- Cross-border areas for living, working and spending leisure time: around 60% of new jobs are filled by cross-border commuters;
- The cost of housing is a threat to social cohesion and could negatively affect the country's attractiveness: between 2005 and 2021, the average selling price increased by a factor of 1.5 for houses and by a factor of 3 for apartments;
- Mobility on saturated roads is becoming increasingly complicated: in 2019, 45% of residents spent more than 30 minutes travelling in one direction, and a third even more than 40 minutes;
- The living conditions are generally good, but there is a serious risk of a socio-spatial divide;
- An urban system of central places, which is partly challenged by emerging centralities;
- A damaged natural environment with, above all, a loss of biodiversity.

Over the last twenty years, territorial development has thus been largely driven by a dynamic economy, at the cost of urban sprawl in rural areas. But whereas twenty years ago, this urban sprawl mainly affected the municipalities around the capital and followed the main road axes, it now affects the whole of the country and extends far into neighbouring border regions.

2.2 The political objectives of the PDAT

In the context of the missions entrusted to spatial planning by the law of 17 April 2018 and taking into account the challenges and issues that were identified, the PDAT defines three political objectives and one cross-cutting objective. Their definition was shaped by four guiding principles designed whose aim is to further the ecological transition of the Luxembourg territory.



Political objective 1: Concentrating development in the most appropriate locations

Why concentrate development in the most appropriate locations?

It is a considerable challenge to anticipate future developments, measure their possible impacts, identify the respective needs and take the best political, financial and infrastructure-related decisions to ensure the sustainable and high-quality development of the territory. From a spatial planning perspective, the aim is to prepare the territory to be able to cater for future developments by defining an appropriate and geographically concentrated location for all the functions that are essential to everyday life.

These include:

- Facilitating access to public services and facilities;
- Reducing mobility needs and facilitating the use of sustainable means of transport;
- Planning for future requirements in terms of public facilities and infrastructure;
- Pursuing a forward-looking public policy that provides a degree of certainty in relation to land use planning and land management;
- Limiting harmful impacts on the environment and landscapes.

Knowing today where tomorrow's development will take place can enable the various policymakers to plan ahead in terms of infrastructure and be more efficient financially.

How can this objective be achieved?

The PDAT defines an urban system based on Central Places (CDA) and a typology of territories

The objective of concentrating development in the most appropriate locations is articulated through a polycentric territorial development framework, identifying three urban agglomerations, a system of Central Places (CDAs) slightly modified compared to the 2003 version and municipalities with endogenous development.

The PDAT defines the geographic distribution of the population and jobs in line with the urban system

The population and employment growth forecast by STATEC is geographically distributed on the basis of the five categories of municipalities as defined by the urban system:

Urban system	Absorption of the country's population growth in %	Absorption of the country's employment growth in %
Agglo-Centre	36,40 %	52,30 %
Southern Region	33,70 %	23,50 %
Nordstad	4,80 %	4,10 %
Regional Central Places outside of urban agglomerations	11,30 %	10,10 %
Municipalities with endogenous development	13,70 %	9,90 %

This forward-looking structural data on the distribution of the population and jobs among the different categories of municipalities is essential for the planning carried out by the various municipal, inter-municipal and national sector policies with a territorial impact. This data makes it possible to anticipate future needs, particularly in terms of public facilities and services (hospitals, secondary schools, etc.) as well as infrastructure (water supply, wastewater disposal, energy, etc.), but above all to place them geographically.

This proactive approach to territorial development as well as a strengthened coordination across sector policies should make it possible to pursue a forward-looking policy in relation to geographic placement and the associated acquisition of land.

Policy objective 2: Reduce the amount of artificial land cover

What is land artificialisation?

Land take is the process by which soil is removed from its natural, agricultural or forested state. It is measured using land use data. Artificial land refers to built-up land for residential use (buildings, houses) or commercial use (offices, factories, etc.), paved or stabilised surfaces (roads, railways, car parks, roundabouts, etc.) and land that is not built-up but has been heavily shaped by human activity (building sites, quarries, mines, landfill sites, etc.). This category also includes artificial "green" areas (urban parks and gardens, sports and leisure facilities, etc.).

Why reduce land take?

The political objective of reducing land take has to be considered in the broader context of a growing awareness of the need to protect soil – as a non-renewable and non-expandable natural resource – from degradation, pollution and removal.

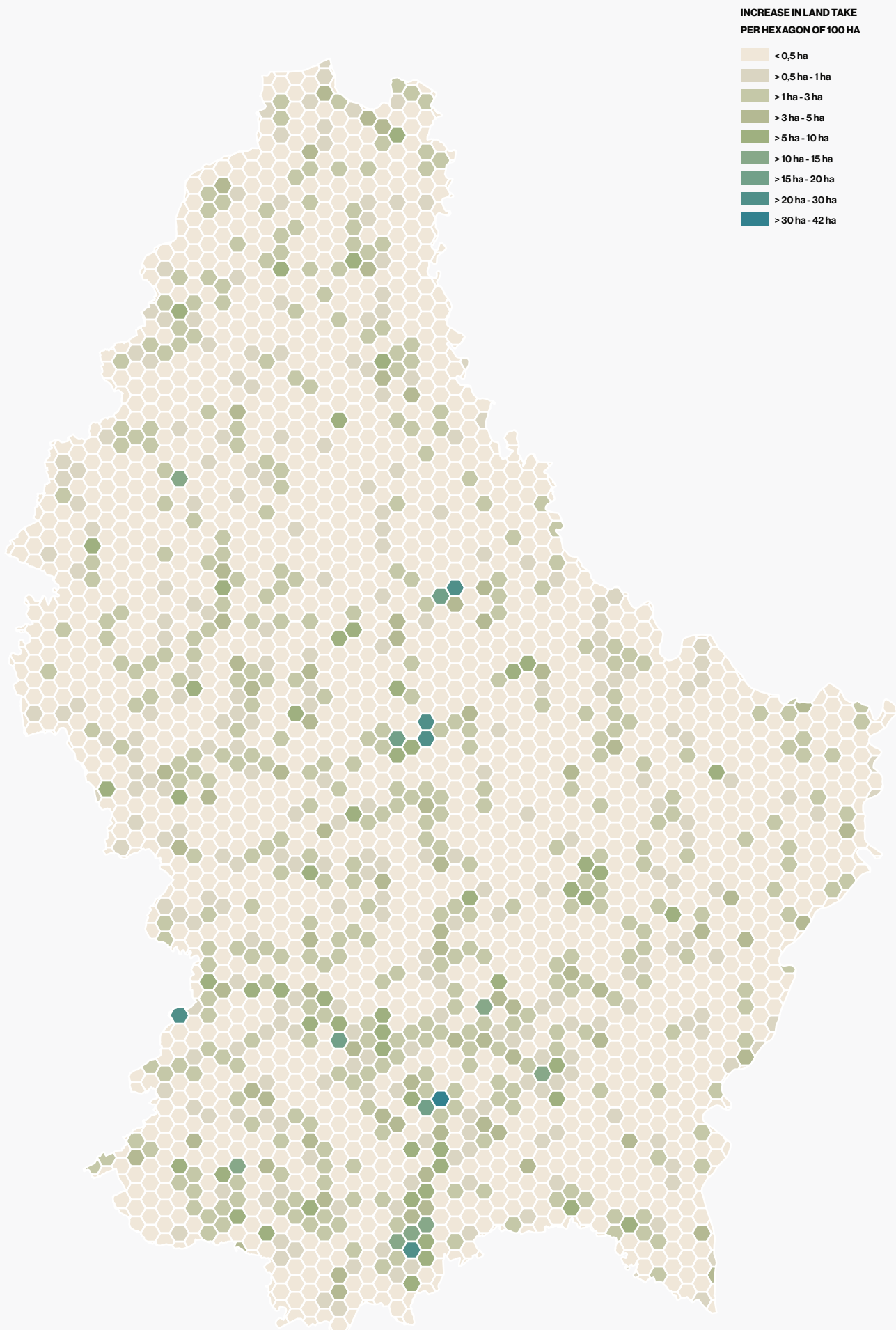
Reducing land take makes it possible to:

- reduce the effects of climate change;
- preserve agricultural and forest areas;
- reduce the risk of flooding;
- preserve biodiversity;
- preserve surfaces capable of sequestering large quantities of CO₂ ;
- reduce urban sprawl.

What are the targets for reducing land take?

Between 2007 and 2018, land take in Luxembourg averaged 0.46 hectares per day. Taking into account the projects and plans that have been approved or are in the process of being implemented, including the Sectoral Master Plans, the PDAT proposes to gradually reduce land take to an average of 0.25 hectares per day by 2035, and then to aim for no net land take from 2050 onwards.

LAND TAKE DYNAMICS 2007-2018



How can the objective of reducing land take be achieved?

The PDAT defines a new spatial planning culture

It is not the PDAT's aim to impede the country's development, but rather to gradually reduce the impact of this development on the limited resource that is land. A new culture of spatial planning, based on urban regeneration, multifunctionality and efficient resource management, will make it possible to maintain the territory's capacity to accommodate this development.

The PDAT sets a theoretical limit for land take

The targets for reducing land take can only be achieved through a gradual reduction in the amount of land consumed by urban development compared with the current level. On a national scale, the PDAT proposes a linear degressive scenario corresponding to a gradual reduction of around 7 ha (rounded value) per year. This means going from 180 ha in 2022 to 90 ha in 2035, and arrive at 0 ha from 2050 onwards, with the definition of a theoretical limit for net land take in each municipality.

Table - Theoretical limits for land take by action area (cf. map p. 45)

Action areas	Theoretical limit for land take		Total theoretical limit for land take
	in ha period 2023-2035	in ha period 2036-2050	in ha period 2023-2050
ÉISLEK	149.2	53.5	202.7
<i>Éislek + Tandel</i>	5.6	2.0	7.6
Agglo-Centre	565.9	203.1	769.1
<i>Agglo-Centre + Dippach</i>	12.7	4.6	17.2
<i>Agglo-Centre + Reckange-sur-Mess</i>	7.9	2.8	10.7
<i>Agglo-Centre + Roeser urban complex</i>	23.6	8.5	32.1
Nordstad	109.0	39.1	148.1
<i>Nordstad + Tandel</i>	5.6	2.0	7.6
Southern Region	344.8	123.8	468.6
<i>Southern Region + Dippach</i>	12.7	4.6	17.2
<i>Southern Region + Reckange-sur-Mess</i>	7.9	2.8	10.7
<i>Southern Region + Roeser</i>	23.6	8.5	32.1
Jonglënster an Ëmland	30.2	10.8	41.0
Mëllerdall	79.4	28.5	107.9
<i>Mëllerdall + Larochette</i>	5.8	2.1	7.8
Miersch an Ëmland	84.8	30.4	115.2
<i>Miersch an Ëmland + Larochette</i>	5.8	2.1	7.8
<i>Miersch an Ëmland + Saeul</i>	2.1	0.8	2.9
Musel an Ëmland	193.6	69.5	263.1
Réiden an Ëmland	63.8	22.9	86.7
<i>Réiden an Ëmland + Saeul</i>	2.1	0.8	2.9
Stengefort an Ëmland	76.7	27.5	104.2

Note : The totals per action area do not include limits for municipalities that may potentially belong to two separate action areas

The joint and multi-annual management of development potentials on an inter-municipal and regional scale

In practice, the quantitative allocation of theoretical limits for net land take could be defined on an inter-municipal or even regional scale, and be staggered over time. In this way, several municipalities could draw up joint territorial strategies and allocate this theoretical limit on an inter-municipal scale.

National and regional management of economic development

Here it is important to mention the particular case of economic activity zones (industrial and business parks), since the reduction of land take should not jeopardise economic development and diversification. Due to their noise, odour and other emissions, not all economic (industrial or business) activities are compatible with other functions, such as housing.

Although the principles of densification and the efficient use of land should also apply to existing and future economic activity zones, it is important to set aside areas for these activities with limited multifunctionality. In this context, the PSZAE, which defines all national and regional economic activity zones, plays a key role.

Political objective 3: Cross-border spatial planning

Why cross-border spatial planning?

The space where people live, work and spend their leisure time is largely cross-border. In addition to an economy that spills over into the neighbouring border territories and thus creates an interdependence between the country and its (cross-border) functional region, the issues linked with the ecological transition of the territory and linked with global warming cannot be tackled by the Grand Duchy alone.

What is the objective of cross-border spatial planning?

The objectives defined by the PDAT at national level concerning the concentration of development in the most appropriate locations, with the resulting protection of resources, must be applied at the level of the cross-border functional region. Therefore, planning in this region must be functionally integrated, thereby combining social, economic and environmental interests.

How can cross-border spatial planning be implemented?

The PDAT recalls for, among other things, the development of territorial strategies for the wider cross-border functional region and local cross-border functional areas. This includes the introduction of a systematic consultation of neighbouring territories within the framework of the respective planning documents. In addition to spatial planning as such, the cross-border management of land and resources should also be envisaged.



Cross-cutting objective: Governance

The PDAT defines a cross-cutting objective concerning the governance required to implement spatial planning policy in general and the objectives and strategies of the PDAT in particular.

Horizontal and vertical governance

The coordination function of spatial planning is carried out in parallel at two different levels:

- horizontally, it must aim to integrate the various sector policies and
- vertically, it must provide a link between the national and local levels of intervention.

Governance at the level of catchment areas and cross-border functional areas

The PDAT calls for the definition of a suitable scale for analysis and planning that takes into account the shared landscapes and resources at the level of catchment areas and cross-border functional areas.

Governance in reference to citizen participation

The PDAT calls for the introduction of participatory methods and tools in order to encourage co-creation and the support of citizens for political decision-making.

Governance in reference to territorial observation - Foundation for a joint approach to forward-looking strategies

The PDAT calls for the introduction of cross-sectoral coordination in terms of territorial observation, as well as enhanced cooperation with the municipalities in order to jointly define forward-looking territorial development scenarios and guide political decision-making.

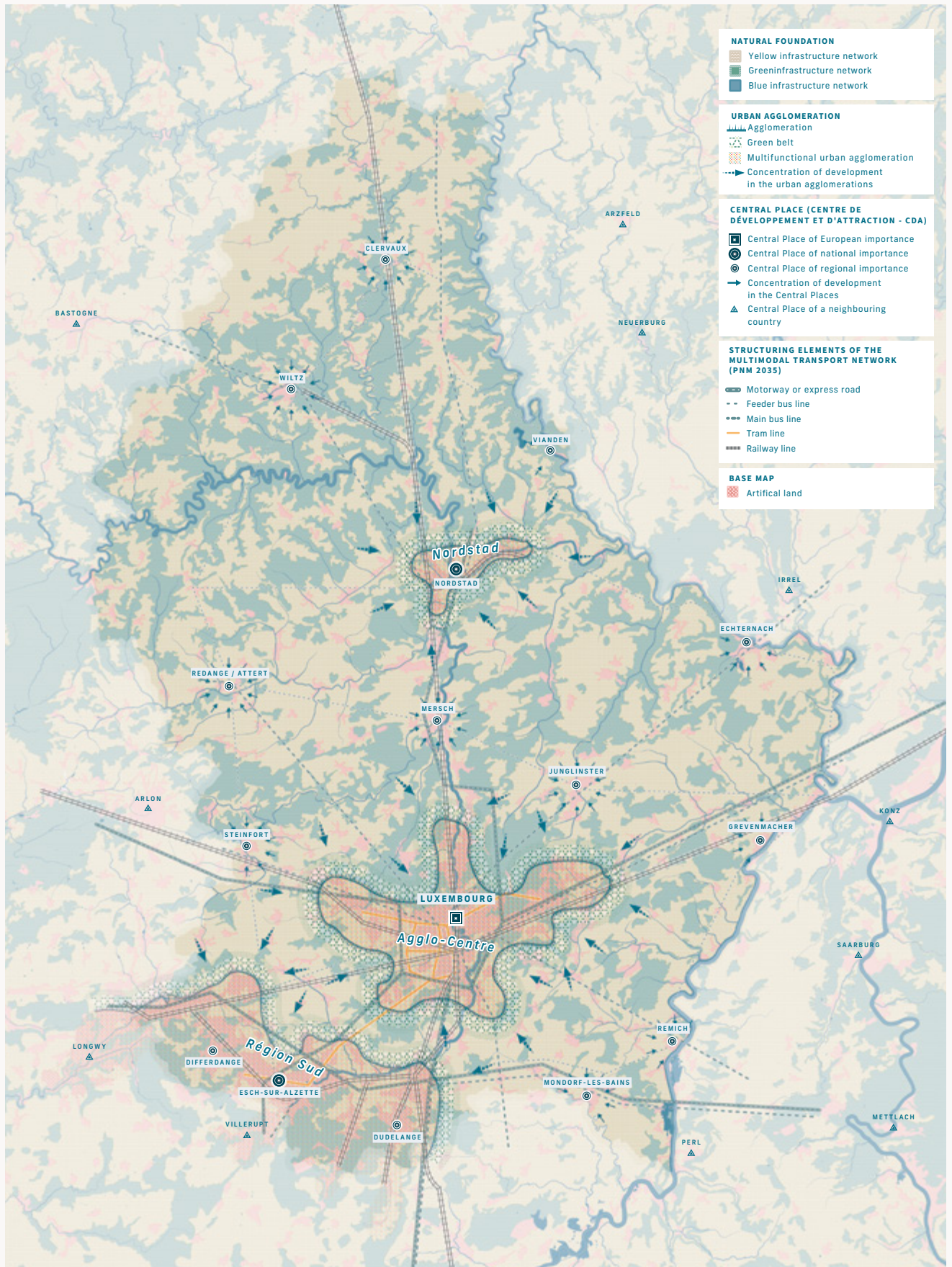
3 STRATEGIES FOR IMPLEMENTING THE PDAT'S POLICY OBJECTIVES

On the basis of the policy objectives adopted, the PDAT defines a territorial development strategy at two levels:

- a national and regional strategy
- a cross-border territorial strategy.

3.1 National territorial strategy

The proposed national territorial strategy takes as its starting point the preservation and protection of the (natural and technical) networks that are essential to maintaining the optimal conditions which allow for the functioning of the territory. Once the related spaces have been mapped, the aim is to concentrate the urban system of Central Places and their catchment areas in the most appropriate locations. Combined and considered in relation to transport flows, these different objectives produce a Leitbild for the development of the national territory by 2050.



3.1.1 The close integration of infrastructure networks for a resilient territory

For a territory to be resilient, it must have the capacity to prepare for various shocks – slow and gradual or violent and unexpected – caused by climate change or any other type of crisis, while implementing the necessary actions that will enable it to:

- at worst, mitigate or absorb the different kinds of impacts of these shocks, and
- at best, prevent the emergence of these shocks.

A territory's resilience can also be measured by its ability to recover from the shocks it has suffered, while at the same time managing to organise itself differently, adapting to change by evolving to take into account their impacts.

The PDAT aims to strengthen the anticipatory and forward-looking role of spatial planning, which provides guidance relating to government initiatives with a territorial impact. In this sense, spatial planning policy ensures that a coherent and evidence-based approach to the management of the land required for the (natural and technical) infrastructure networks, which are essential to maintaining the optimal conditions that allow for the functioning of the territory, is adopted.

Two types of infrastructure networks can be distinguished: natural infrastructure networks (blue, green and yellow) and technical infrastructure networks, both of which are necessary for enhancing resilience.

A natural foundation preserved by reducing land take

Three types of natural infrastructure networks are defined according to their function:

- the blue infrastructure network (hydrological system),
- the green infrastructure network (forests, meadows and pastures) and
- the yellow infrastructure network (surface areas dedicated to agriculture) and

They provide the essential natural foundation for physical life, comprising all bodies of water (groundwater and surface water), all interconnected areas of high biological value and all food production areas.

The PDAT calls for...

drawing up a map of the natural foundation up to 2035 together with the ministries, departments and agencies concerned.

The aim of this mapping is to identify the land needed for the interconnected blue, green and yellow infrastructure networks and the potential for multifunctionality, which is one of the key elements of the new approach to land use planning: food production and protection of ecosystems, agriculture combined with the production of renewable energy and carbon sequestration, and so on. Initially drawn up at a national scale, this mapping could then be refined at a regional or local scale and extended to the scale of the cross-border functional region.

Technical infrastructure networks are the essential foundation of society and the economy

At the same time as mapping the natural infrastructure networks, the various technical infrastructure networks which are essential to maintaining the optimal conditions that allow for the functioning of society and the economy need to be mapped and protected. Territories are dependent on technical infrastructure networks for their development:

- Water supply and wastewater disposal;
- Energy supply;
- System for collecting, reusing and recycling materials and waste;
- Infrastructure for active mobility modes and the public transport networks;
- Telecommunications networks.

The PDAT calls for...

In order to organise the resilience of territories, and in particular that of cities where the majority of the population is concentrated, it is essential to anticipate the negative impacts of natural disasters on technical infrastructure networks and plan joint strategies for these networks, which are currently the subject of individual sector policies.

3.1.2 An urban system of central places to concentrate development in the most appropriate locations

On a national scale, the urban system, made up of central places of various sizes and sustainable mobility links, is superimposed on the three blue, green and yellow infrastructure networks with the overall aim of optimising the use of land as a resource and ensuring sustainable access to the services available to the population. This instrument thus makes it possible to meet the objective of concentrating development in the most appropriate locations.

To ensure that major public infrastructure and facilities are located in the right places and are accessible by public transport and active modes of mobility, it is up to the relevant ministries and agencies to ensure that their location is coordinated.

The urban system of central places

The urban system concentrates development in central places, which can provide their catchment areas with an appropriate range of services.

The urban system of central places defined by the PDAT is based on the principle of polycentric territorial development. As such, Central Places manifest a high degree of centrality and bring together the entirety of urban activities at various scales. Consequently, the urban system includes Central Places of European and national importance with their respective urban agglomerations, as well as Central Places of regional importance that gather the critical mass to guarantee an adequate offer of services for their catchment areas in the long term. Beyond the national territory, the Central Places of the cross-border functional region must also be taken into account in view of a coordinated and coherent territorial development across borders.

The various Central Places are linked by sustainable transport networks, including railway lines and main roads where buses and bicycles can circulate on dedicated lanes.





The National Mobility Plan 2035 (PNM 2035) is based on the PDAT's political objectives and urban system of central places.

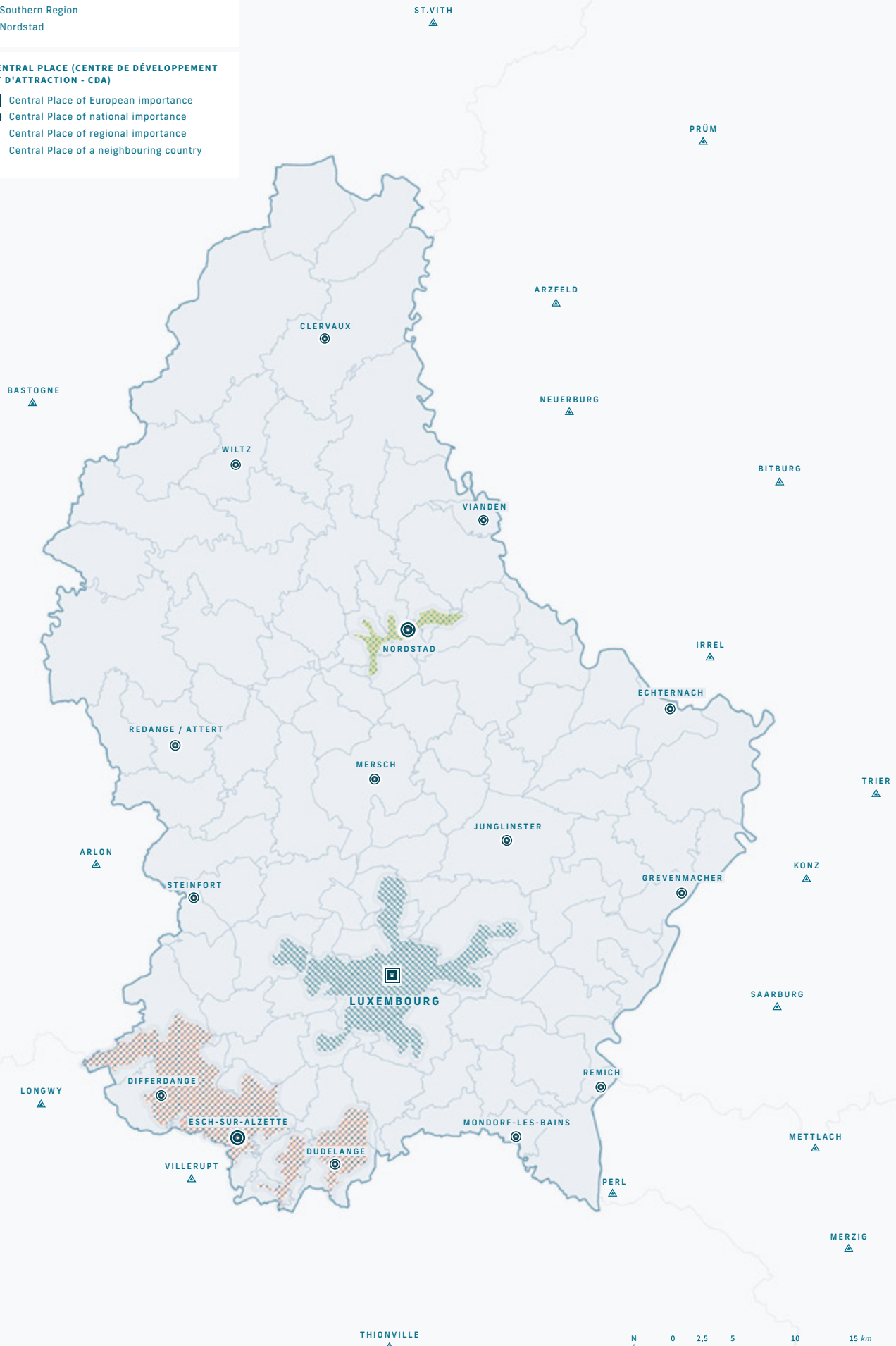
CENTRAL PLACES (CDA)

URBAN AGGLOMERATION

-  Agglo-Centre
-  Southern Region
-  Nordstad

CENTRAL PLACE (CENTRE DE DÉVELOPPEMENT ET D'ATTRACTION - CDA)

-  Central Place of European importance
-  Central Place of national importance
-  Central Place of regional importance
-  Central Place of a neighbouring country



CENTRAL PLACES (CDA)

Definition of a Central Place (CDA)

A Central Place (Centre de développement et d'attraction - CDA) is a locality or contiguous group of localities with a high degree of centrality and accessibility. The main role of a Central Place is to guarantee the provision of basic services for its catchment area (Daseinsvorsorge). To fulfil this function, the level of facilities and services, both public and private, must be high, hence the importance of its critical mass.

Among the facilities, services and infrastructure that were taken into consideration, the following deserve particular mention: services of general interest, educational facilities and infrastructure (primary schools, secondary schools, institutions of higher education, etc.) and recreational facilities (cultural centres, sports centres, theatres, cinemas, etc.), health services (hospitals, medical practices, pharmacies, etc.), transport services (means of transport, network of roads and paths, service capacity and quality) and the ultra-high-speed broadband network, as well as local shops and convenience stores.

The urban system is a guiding instrument for spatial planning at the national and municipal levels and for the allocation of various public subsidies.

- The CDA of European importance: City of Luxembourg
- CDAs of national importance: Esch-sur-Alzette and Nordstad (Ettelbruck - Erpeldange-sur-Sûre - Diekirch)
- CDAs of regional importance: Clervaux, Differdange, Dudelange, Echternach, Grevenmacher, Junglinster, Mersch, Mondorf-les-Bains, Redange-sur-Attert, Remich, Steinfort, Vianden and Wiltz

Typology of territories

In order to guide territorial development at the national level, the PDAT defines two types of territories based on their specific challenges:

- **Urban agglomerations**: areas that are primarily destined for the development of housing, economic activities and public facilities, concentrating a significant proportion of the country's growth potential for population and jobs. An urban agglomeration does not necessarily follow municipal boundaries and must gradually be "constructed" on the basis of structured inter-municipal cooperation, in particular through conventions of territorial cooperation between the State and municipalities.
- **Municipalities with endogenous development**: endogenous development (Eigenentwicklung) refers to the development of a municipality in relation to the needs of its own population. The shared feature of the so-called municipalities with endogenous development is their location within the catchment area of one or even several Central Places. Faced with often similar prospects and potential, it is in the common interest of these municipalities to plan their future together with their neighbours, particularly the Central Places.

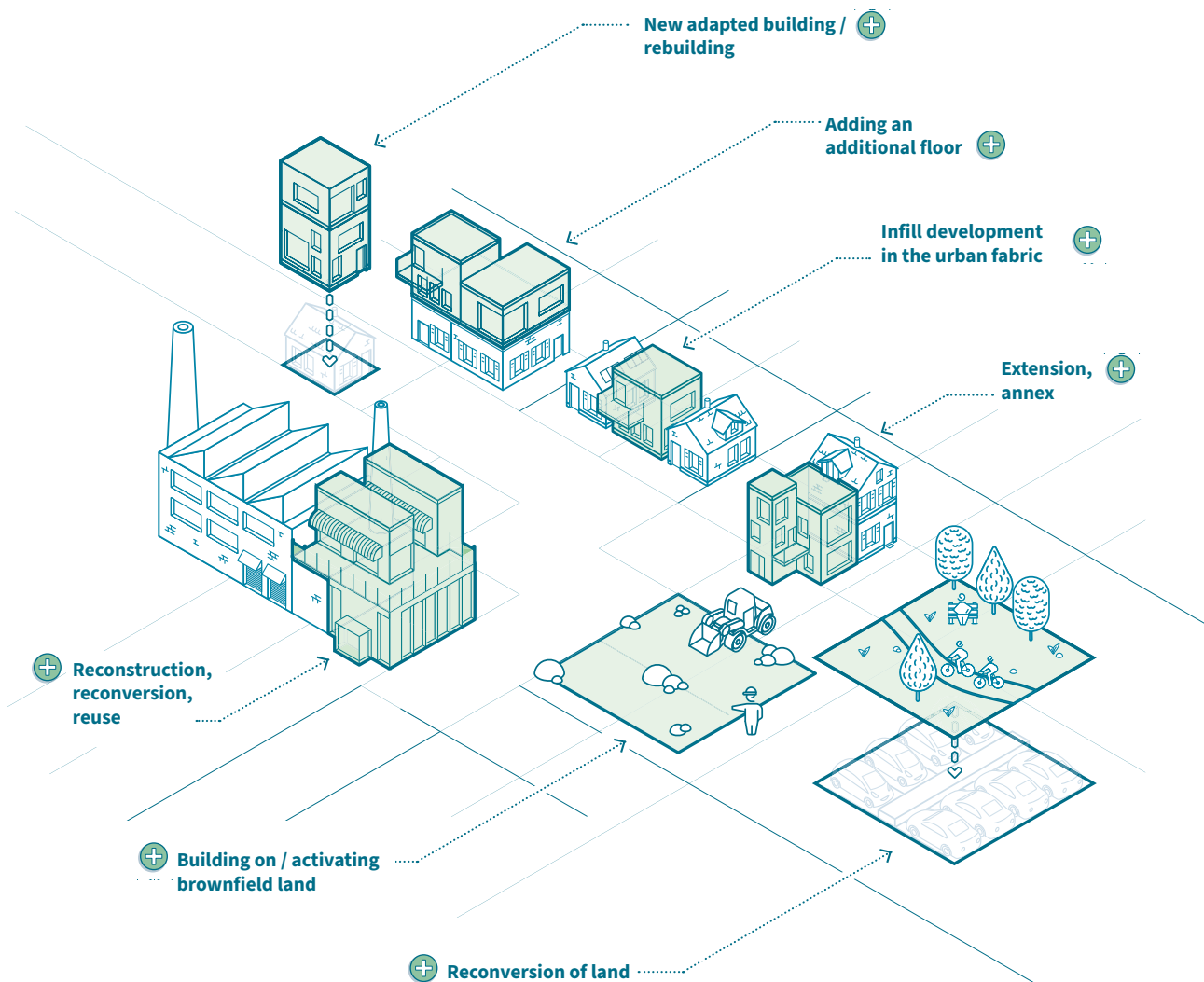
3.1.3 A new culture of territorial planning

The twofold objective of gradually reducing land take and concentrating development in the most appropriate locations means that we need to start monitoring the territorial impact of every public decision now.

It is not the PDAT's aim to prohibit to build on undeveloped land or to make it impossible to develop new urban areas, but rather to plan differently and to develop a new culture of urban development and spatial planning. In this context, the PDAT proposes a series of measures designed to meet this challenge.

Urban regeneration

Particularly in urban agglomerations, where underused areas need to be converted and a greater mix of functions needs to be developed, the regeneration of the urban fabric is an important line of action. Bringing functions closer together will inevitably increase the concentration of flows of people and goods. Urban regeneration also makes it possible to respond to the housing crisis by offering more housing in appropriate locations with a high degree of public transport accessibility.

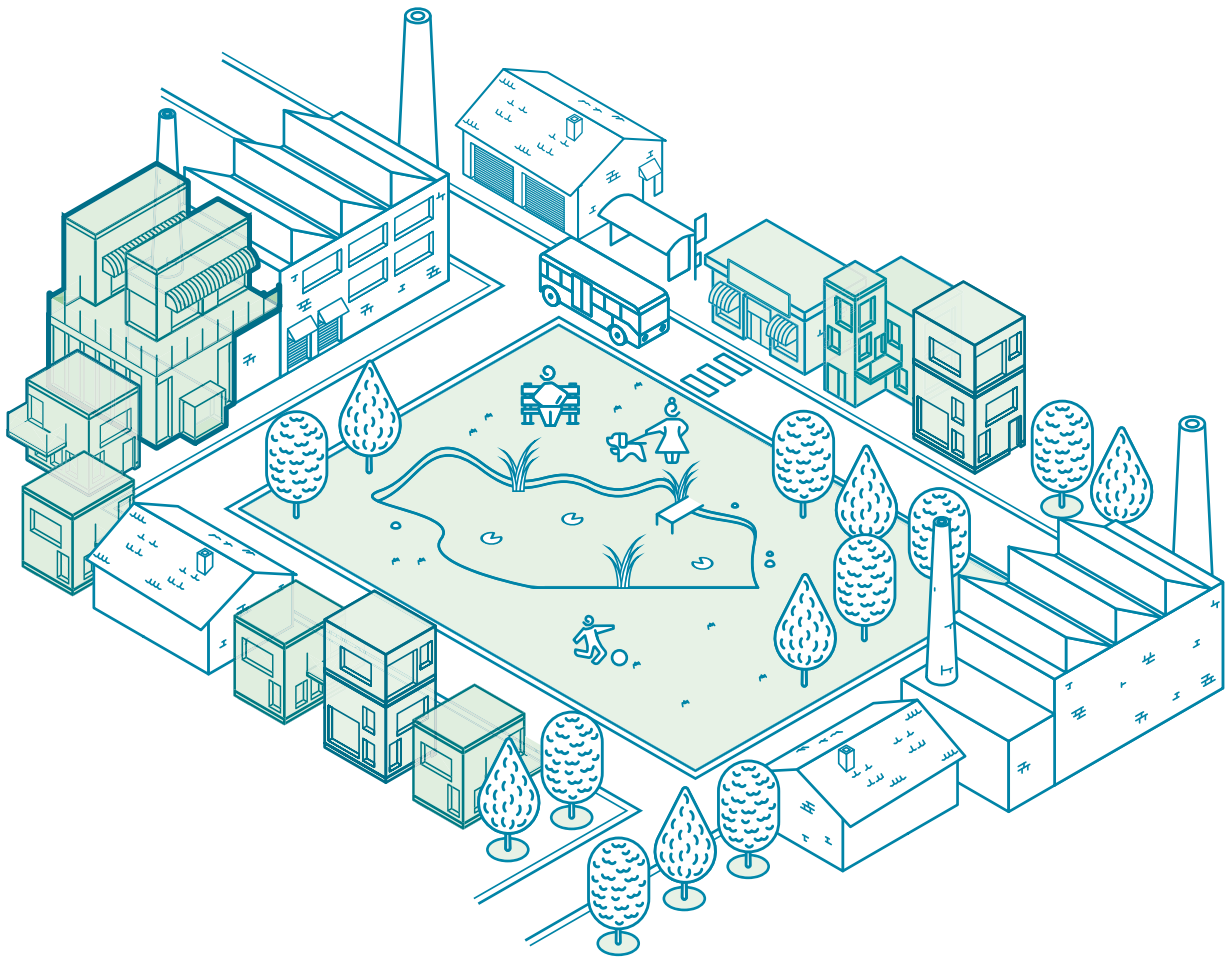


Multifunctionality

Multifunctionality involves combining several functions in the same place, or even within the same building, and can therefore be considered on two levels.

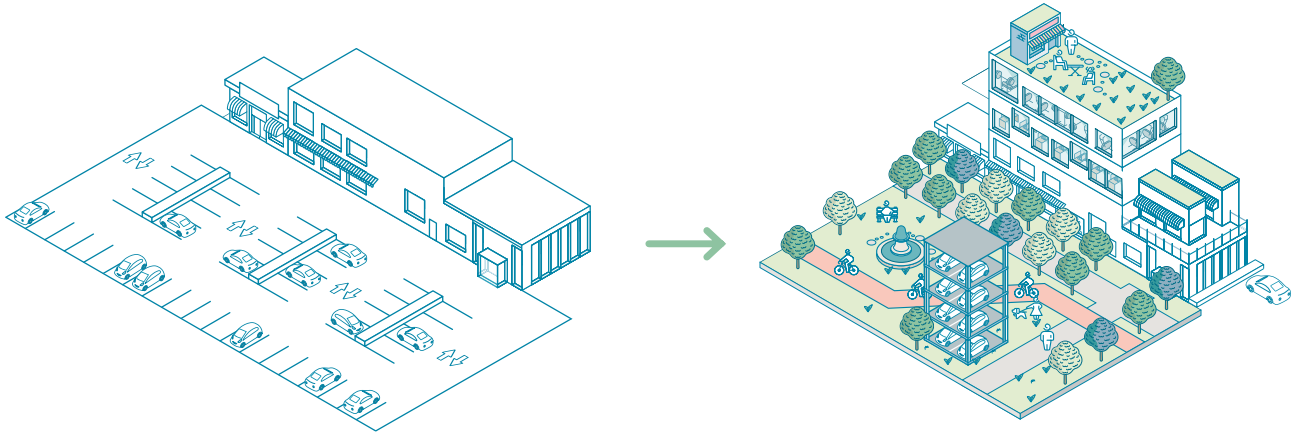
At the level of land use, it is opposed to a territorial division into different monofunctional areas (commercial areas, residential areas, etc.) which encourages urban sprawl and, as a result, depletes town-centres or city-centres and makes individual transport the norm for all journeys (work, education, shopping, etc.). Multifunctionality can be achieved by combining housing and office space at neighbourhood level, for example, or by providing communal places and small shops in residential areas. Multifunctionality can also mean combining the use of agricultural land with the production of renewable energy.

At the level of the individual building, the principle is the same: Multifunctionality can be achieved by combining several uses within the same building (secondary school and housing, using a rooftop as a garden or for renewable energy production, etc.).



The potential of brownfield land

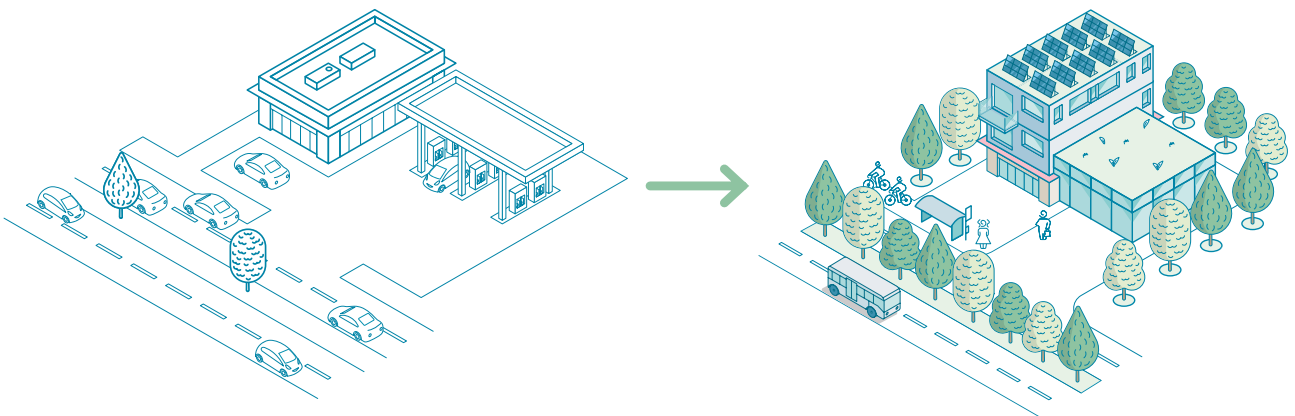
Luxembourg has 611 hectares of brownfield land that could be reused. The redevelopment of this land, in addition to the land already developed and in need of restructuring, offers genuine potential for the creation of housing, office space, shops or public facilities. Every hectare of existing brownfield land to be reused is synonymous with soil conservation and therefore a reduction in land take.



The potential for developing multifunctional areas around train stations

As part of the objective of gradually reducing land take, the choice of land to be developed should be made from the inside out, taking into account accessibility by public transport, particularly by rail:

- **Land take:** In terms of developed areas and future development areas, priority should be given to densifying and regenerating areas with built-up or artificial land, while undeveloped areas (agricultural and natural land) should be analysed to ensure that they continue to have a positive impact on the microclimate and quality of life in the neighbourhood.
- **Accessibility:** densification should take place in the vicinity of train stations as a matter of priority, well before considering building land with a low degree of public transport accessibility.
- **Contiguity:** areas adjacent to developed areas that have not yet been developed must be maintained as they are, unless there is a proven need at the scale of the functional area.

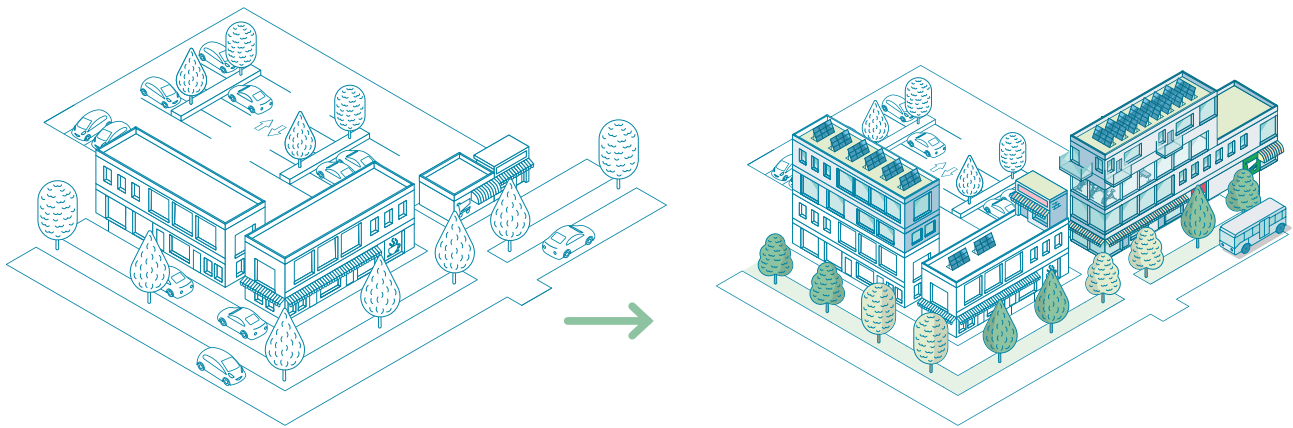


The potential of spaces freed up by adapted mobility

Parking spaces and their regulation play an important role in people's daily choice concerning the means of transport. It is therefore necessary to reassess the use of spaces dedicated to parking motorised vehicles and consider a more efficient use of these areas.

Grouping parking spaces together in scalable, multifunctional buildings would also free up land in the public space. This land would then be available for other uses.

This approach also creates new opportunities for the construction of housing or the creation of office, commercial or manufacturing space.



Complex operations

The zero-carbon city - compact, green and mixed - requires complex operations based on cross-financing and multiple actors. To achieve this, it is essential to increase the skills, compared with the current traditional planning approach, of the actors involved. This ensures the creation of optimal living and working conditions in the city.

An active land policy

This far-reaching change in planning methods leads to the identification of strategic sites and an active land policy for the public acquisition of specific plots of land. This can allow municipalities to set up development projects and co-design the new neighbourhoods.

The principle of reversibility

Foresight studies highlight the need to plan for the reversibility of part of the building stock. It is therefore recommended that the central buildings should remain functionally neutral, the ground floors should be designed in a multi-programmatic way and car parks should be primarily built as silos in line with the principles of evolutionary architecture.

The principle of compensation

The objective of gradually moving towards no net land take by 2050 does not mean that no new land can be developed. If this were the case, an equivalent area would have to be de-sealed and renatured. This mechanism should, however, be applied sparingly, as de-sealing is a costly process and renaturing is a long-term process, with soil taking a long time to return to its natural quality.

3.2 Cross-border territorial strategy

3.2.1 The Greater Region Territorial Development Perspective (SDTGR)

Drawn up jointly by the various political and administrative players in the Grande Région, the Greater Region Territorial Development Perspective (Schéma de développement territorial de la Grande Région – SDTGR) has made it possible to jointly draw up a list of the challenges related to territorial development in the Greater Region and identify concrete solutions and pathways to meet these challenges.

The SDTGR identifies three levels of cooperation for which the intensity of cooperation inevitably varies according to the themes and underlying rationale of the cooperation areas, the interests of the actors and their political will, as well as the problems posed:

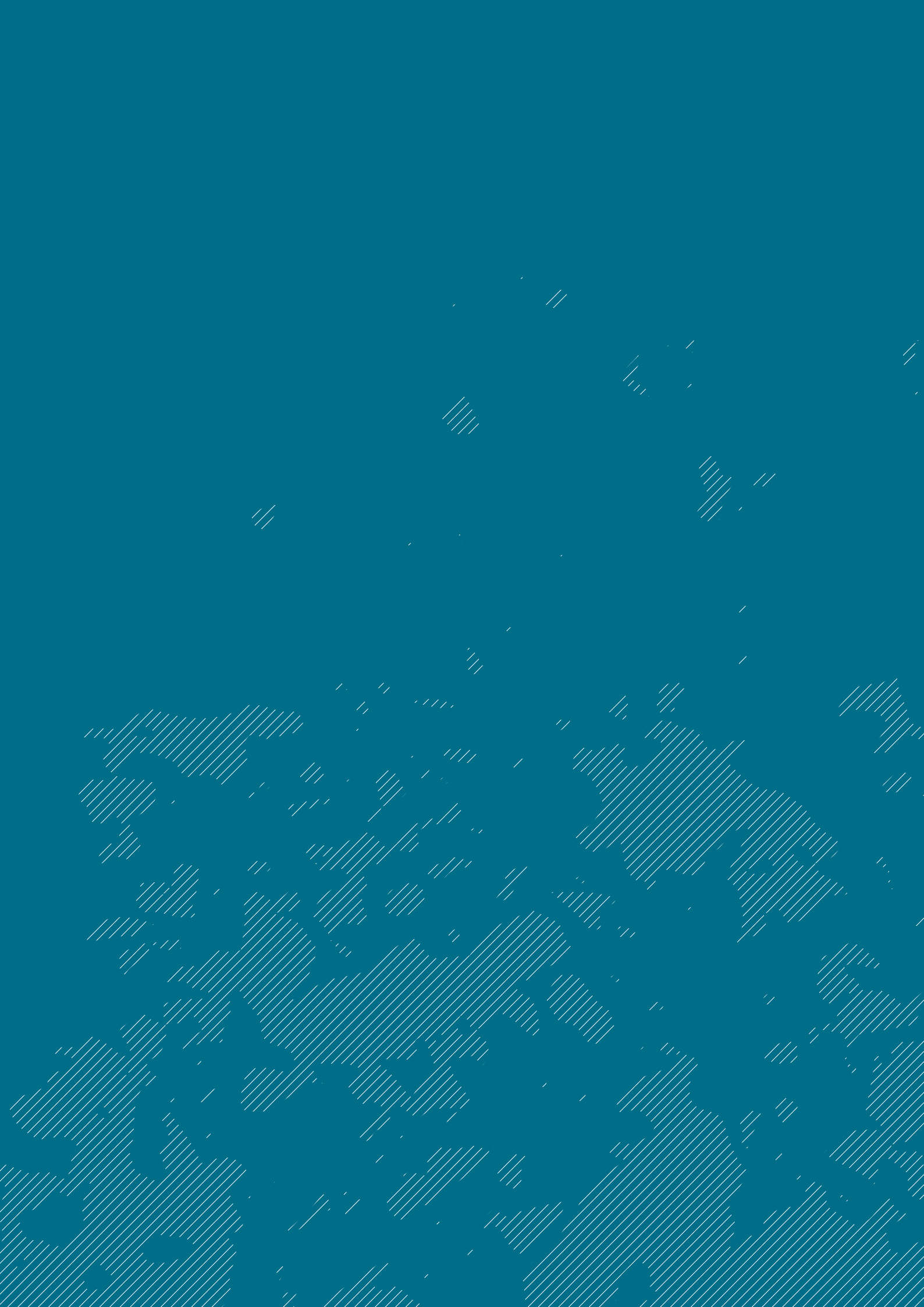
- 1) Level of cooperation of the Greater Region as a whole,
- 2) Level of the cross-border polycentric metropolitan region (CBPMR) or cross-border functional region around the Grand Duchy of Luxembourg,
- 3) Local border areas or cross-border functional zones.

Each of the four strategic axes making up the SDTGR strategy is broken down into actions and ideas for cross-border projects at the three levels of cooperation.

- 1) Anticipating, supporting and guiding transitions to take action concerning resource management,
- 2) Improving services and promoting the balanced geographic location of activities for the benefit of the population,
- 3) Developing zero-carbon, resilient rural as well as urban areas,
- 4) Working together to develop projects and structures in the territory, with greater citizen involvement.

The PDAT calls for...

As the SDTGR is not binding, it is important to transpose its objectives, actions



3.2.2 The cross-border functional region

The Luxembourg cross-border functional region constitutes a functional space and a catchment area of approximately 12,000 km², with approximately 2 million inhabitants in 2021 and a significant number of people working in Luxembourg (216,490 cross-border commuters in 2022). Although the SDTGR acknowledges the existence of this scale of co-operation, at this stage there is no strategy or governance specific to this space, which would involve local stakeholders and citizens through a consultation process rooted in political reality.

The PDAT calls for...

the development of a cross-border territorial vision for this cross-border functional region, while the scope of cooperation remains to be defined with the cross-border partners.

THE CROSS-BORDER FUNCTIONAL REGION AROUND LUXEMBOURG

— National/regional border
 - - - German-speaking community of Belgium (East Belgium)



Territorial units:
 Saarland and Wallonia: municipalities
 Rhineland-Palatinate: municipal associations
 Grand Est: EPCI

© GeoBasis-DE / BKG 2017,
 IGN France 2017, NGI-Belgium 2017,
 ACT Luxembourg 2017, LISER 2017,
 Region Grand Est 2017,
 Harmonisation: SIG-GR



4 STRATEGIES ADAPTED TO DIFFERENT REGIONS

Achieving the first two objectives of the PDAT, i.e. concentrating development in the most appropriate locations and reducing land take, means taking into account the specific characteristics of different types of areas. This means, for instance, distinguishing between the urban, peri-urban and rural areas. Therefore, it is paramount to define individual territorial development strategies for these three types of areas, considering their respective characteristics and potentials. This, in turn, will ensure a place-based improvement in the quality of life.

4.1 A territorial strategy to strengthen rural areas

In relative terms, the predominantly rural municipalities have seen very high rates of growth, while the Central Places have seen proportionately lower growth.

The direct consequence is diffuse growth, leading to:

- an increased need for travel, mainly by means of motorised individual transport, and consequently greater difficulty in organising the public transport networks efficiently due to the dispersal of housing in peri-urban areas;
- an increase in land take and soil sealing, whereby predominantly rural municipalities are among those that have seen the highest relative growth in built-up or artificial land, with a negative impact on biodiversity, the water cycle, agriculture and the fragmentation of landscapes;
- a lack of critical mass to maintain local services;
- a trend towards uniformity in the living environment: the banal standardisation of new buildings is leading to the disappearance of the specific features and thus identity of these rural areas.

Rurality is an issue to be tackled for a better future, and there are many avenues to be explored

Controlling urban development in rural areas is therefore one of the major challenges. To this end, a strategy for rural areas, in addition to those defined for urban and peri-urban areas, is foreseen, with the following objectives:

- Maintaining the attractiveness of municipalities with endogenous development in terms of quality of life due to a supply of multi-generational housing, access to public services, access to education and healthcare, and the enhancement of the built as well as landscape heritage;
- Strengthening the local economy through the development of specific activities that are adapted to the rural context of these municipalities.

The PDAT calls upon municipalities with an endogenous development, in line with urban municipalities, to make a positive contribution, as major players, to the implementation of the overall territorial development strategy of Luxembourg. The strategic guidelines of the PDAT for rural areas take into account their diversity, but also their specific local characteristics. While some regions are more concerned with the transition in agriculture and food production, others are more concerned with forest health or soil quality, and still others are more concerned with the protection of water resources, landscapes and natural environments.

4.2 A territorial strategy enabling urban areas to safeguard their quality of life

The major issues and challenges facing predominantly urban areas can be grouped under five headings:

- 1) Better preparing urban and peri-urban areas for the effects of climate change by preserving, restoring and improving the inter- and intra-urban green and blue infrastructure networks;
- 2) Redeveloping monofunctional areas, vast built-up and artificial areas as well as industrial brownfields, and giving priority to urban redevelopment in order to reduce pressure on undeveloped land and natural green areas, and thus achieve the objective of reducing land take;
- 3) Strengthening public transport and promoting active mobility;
- 4) Reconsidering the urban organisation by emphasising the complementarities and the mix of functions in order to reduce the need for travel;
- 5) Defining the right balance between the protection and the use of green spaces, particularly for leisure activities.

organisation by emphasising the complementarities and the mix of functions in order to reduce the need for travel.

For urban areas in particular, the PDAT focuses on three components: the role of public space, the importance of nature in the city as well as quiet areas, and the space provided for physical activity and sports.

The role of public space at the scale of cities and urban agglomerations

Public spaces must have or display a number of qualities:

- A physical continuity, both comfortable and safe, from the town-city or city-centre to the surrounding countryside;
- A high-quality design and development in order to reduce the effects of urban heat islands;
- An urban greening strategy in order to contribute to the objectives of canopy cover, blue infrastructure, ecological networks and living architecture;
- Accessibility to services via public transport (bus, tram and train) and active mobility (walking, cycling).

Welcoming nature to the city

The PDAT calls for four work streams:

- 1) Creating and/or conserving green belts around the urban agglomerations to offer citizens direct access to nature without having to resort to the car.
- 2) Reintroducing nature and water into cities by creating green and blue corridors to ensure the continuity of ecological networks, as well as quiet areas (compared with the general urban noise level).
- 3) Promoting nature-related experiences in a wide variety of forms, both in green belts as well as in parks and other urban public spaces, and the practice of being allowed to pick fruit from trees in public orchards ("Gielt Band") to raise awareness of the nurturing role of local nature.
- 4) Integrating cooling solutions into urban planning: the intensification of uses of urban spaces requires a connection with a network of green spaces that allow air to circulate and neighbourhoods to cool down.

Recognising the importance of "quiet areas"

Noise pollution has a harmful impact on public health. By mapping "quiet areas" throughout the city, residents can easily find places where they can recharge their batteries away from noise. It is, therefore, important to develop the accessibility of these quiet areas, particularly from the cities, where noise pollution is a bigger issue. In addition, a legal framework for quiet areas could be established.

Encouraging physical activity and sports in urban areas

The PDAT calls for making cities and neighbourhoods more inclusive and liveable by preserving places dedicated to physical activity and sports. In addition to traditional sports infrastructure and roads reserved for active mobility, urban spaces should be designed according to the principle of "active design": cities and neighbourhoods should be designed in such a way that people are encouraged to actively and spontaneously use their urban environment, either individually or collectively, in the framework of a physical or sporting activity.

The aim is to provide places (squares, plots, fields, lanes and crossroads) that are easily accessible, preferably multifunctional, and freely usable by everyone, with no restrictions on physical condition or time of day, with or without furniture or equipment dedicated to physical activities.

4.3 A territorial strategy allowing peri-urban areas reinvent themselves

Between densely urbanised agglomerations and villages, many areas have developed over the last few decades through a succession of monofunctional operations putting emphasis on accessibility by car: these are peri-urban areas, with varying degrees of intensity based on accessibility.

Peri-urban areas face the same challenges with regards to the ecological transition and will have to evolve rapidly. The road to a zero-carbon society involves reducing the land consumption caused by current urbanisation patterns based on the continued growth in the number of car journeys and the persistence of lifestyles associated with single-family detached homes. It is important to curb these types of development, which run counter to the objective of reducing land take, while anticipating changes in areas that have already been developed.

The PDAT calls for...

- Identifying, within these peri-urban areas, the large natural infrastructure networks (blue, green and yellow) facing strong pressure in order to preserve them.
- Encouraging more mixed-use development to create other types of residential areas (such as commercial areas transformed into neighbourhoods), especially in places with a good public transport connection in the future.
- Implementing pilot projects that meet the objectives and strategies of the Master Programme.

5 INSTRUMENTS FOR THE IMPLEMENTATION OF THE PDAT

Spatial planning currently has a series of legal, regulatory and other instruments at its disposal to implement the objectives of the PDAT. A brief overview of these instruments reveals several shortcomings in their application, which makes changes in the legislative framework necessary.

In the phase following the approval and publication of the PDAT, new instruments will need to be developed and existing instruments will need to be refined, in close cooperation with the various players involved. This evolution of the legislative framework will involve:

- adapting current legislation,
- drafting new legislation,
- developing new forms of cooperation.

5.1 The main existing instruments and their necessary evolution

A number of legislative changes could be made to ensure that the PDAT, its objectives and, in particular, the urban fabric are truly effective.

To this end, the PDAT identifies courses of action for the development of the following instruments:

- Master Programme for Spatial Planning (Programme directeur d'aménagement du territoire - PDAT)
- Special Zoning Plan (Plan d'occupation du sol - POS)
- General Development Plan (Plan d'aménagement general - PAG)
- Convention of territorial cooperation between the State and municipalities
- Nature park
- Territorial observation and foresight
- Raum*
- National Information Unit for Urban Policy (CIPU)
- Higher Council for Spatial Planning
- Forms of cross-border governance adapted to the specific characteristics of territories
- European funds as financial leverage for the implementation of the PDAT

5.2 Potential new instruments, adaptations of existing instruments and concepts for implementing political objectives

The PDAT also presents courses of action and new instruments for implementing the three political objectives.

To **concentrate development in the most appropriate locations**, the PDAT calls for:

- More efficient use of the existing urban stock;
- Mixed functions and the application of the concept of the “15-Minute-City”;
- Promoting the development of local shops and revitalising town-centres and city-centres;
- Implementing an efficient land policy based on identifying and acquiring strategic plots of land;
- Setting up coworking spaces in municipalities that already have a certain level of centrality (in terms of facilities and in line with the urban system), while favouring Central Places that offer a high degree of public transport accessibility and sites close to stations or hubs that need to be densified.

To **reduce land take**, the PDAT calls for:

- Limiting the development potential of a municipality to twelve years;
- The instrument of "Transferable Development Rights" (TDR), which, by transferring development rights from an undeveloped plot of land to one that meets sustainability criteria in line with the public interest, makes it possible to direct urban development "inwards" from the built-up area, in a concentric and coherent manner;
- Support for experimentation and pilot projects by means of a Special Fund for Territorial Development (Raumentwicklungsfonds), given that the objectives of the PDAT require decisions and actions that depart from the usual development methods and thus exact testing, monitoring and counteracting.

To **implement cross-border spatial planning**, the PDAT calls for:

- Instruments to overcome the legal and administrative obstacles to cross-border cooperation;
- A systematic cross-border consultation.

To **strengthen horizontal and vertical governance**, the PDAT calls for:

- Promoting and anchoring citizen participation in political decision-making;
- Involving other audiences (e.g. developers);
- Improving communication and support for stakeholders (by providing information and raising awareness among the general public and local stakeholders, or even by setting up an advisory and training structure).

Financial measures that could be an important lever for action to strengthen the role and potential impact of spatial planning at national level: :

- A compensation fund financed by the capital gains resulting from the "upzoning" of certain plots of land (as a possible response to a request for financial compensation regarding the "downzoning" of other plots of land);
- The policy concerning subsidies/funding/financial support /financial participation of the State adapted in line with the objectives of the PDAT, including in particular the urban system of Central Places.

5.3 Towards amending the Constitution of Luxembourg?

Although spatial planning is not referenced in the Constitution of Luxembourg, the objectives and principles of the PDAT are of such importance for the interests of future generations that an amendment of the Constitution in this regard should be considered, sooner or later, in order to include the essential principles of resilient and zero-carbon spatial planning, which is already the case in other European countries.



6 THE PDAT EXTENDED TO NATIONAL AND CROSS-BORDER ACTION AREAS

The PDAT's approach aims to put the objectives into practice and to implement the general strategies, as defined in the previous section, at different territorial scales:

- The national action areas
- The cross-border action areas

6.1 National action areas

The PDAT identifies action areas corresponding to functional territories, which incorporate at least one Central Place.

The identification and delimitation of an action area have been carried out by taking into account the shared characteristics, functional links and municipal borders existing within it, but above all on the basis of a coherent and comprehensive vision specifically linked to it.

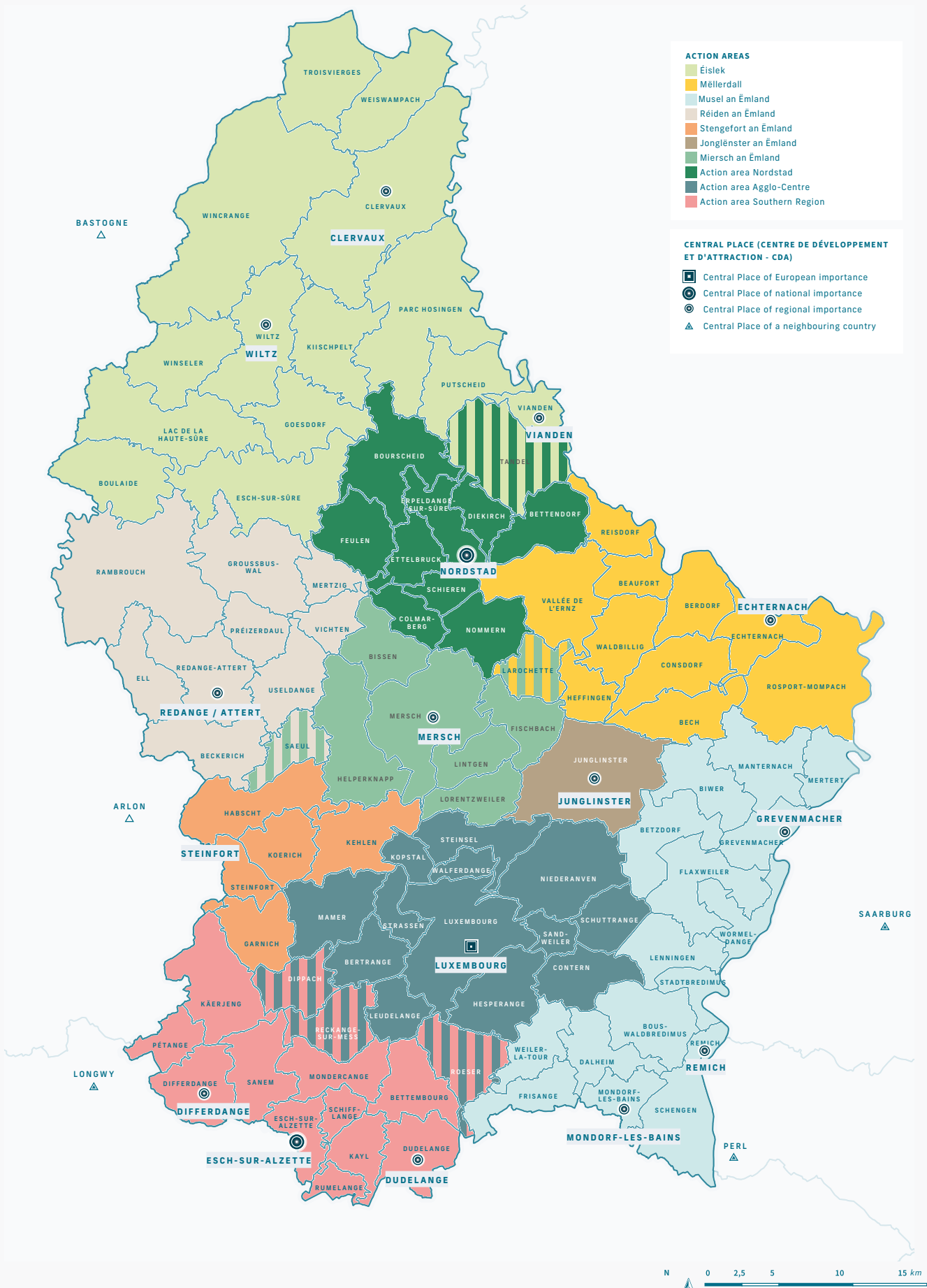
For municipalities that straddle two action areas and for which it is not possible to clearly delimit the functional links, it was decided to assign them to the two action areas concerned. In fact, the notion or definition of an "action area " should not be interpreted as a strict delimitation. A more precise delimitation will have to be determined as part of the discussions to be held with the municipalities and stakeholders concerned.

The PDAT calls for...

defining a shared territorial strategy at the inter-municipal or even, when required, cross-border scale, which transposes and refines the objectives and strategy of the PDAT.

As part of the drafting process of the current PDAT, territorial visions were drawn up, in the context of the Conventions of territorial cooperation between the State and municipalities, for the three urban agglomerations that form part of some of the identified action areas: the Nordstad, the Agglo-Centre and the Southern Region. In addition, the development of a territorial vision for the Canton of Redange was also initiated.

NATIONAL ACTION AREAS



6.2 Cross-border action areas

In line with the political objective concerning cross-border spatial planning, the PDAT calls for defining cross-border action areas.

The European funds and programmes, as part of Cohesion Policy, are an important lever for initiating and developing cross-border cooperation in these areas. As part of the 2021-2027 programming period, the Interreg VI Grande Région territorial cooperation programme provides support for the implementation of integrated territorial development strategies for cross-border functional areas (named “functional zones” in the Interreg programme), which also correspond to the scale of cooperation of “territories in proximity of a border” adopted in the Greater Region Territorial Development Strategy (SDTGR) and the cross-border action areas of the PDAT. This financial support planned for the time period 2022-2028 amounts to around € 47 million from the European Regional Development Fund (ERDF).

These cross-border action areas have been defined in accordance with the political objectives, strategy and action areas of the PDAT, while taking account of the institutional approach resulting from structured cross-border cooperation within the Grande Région.

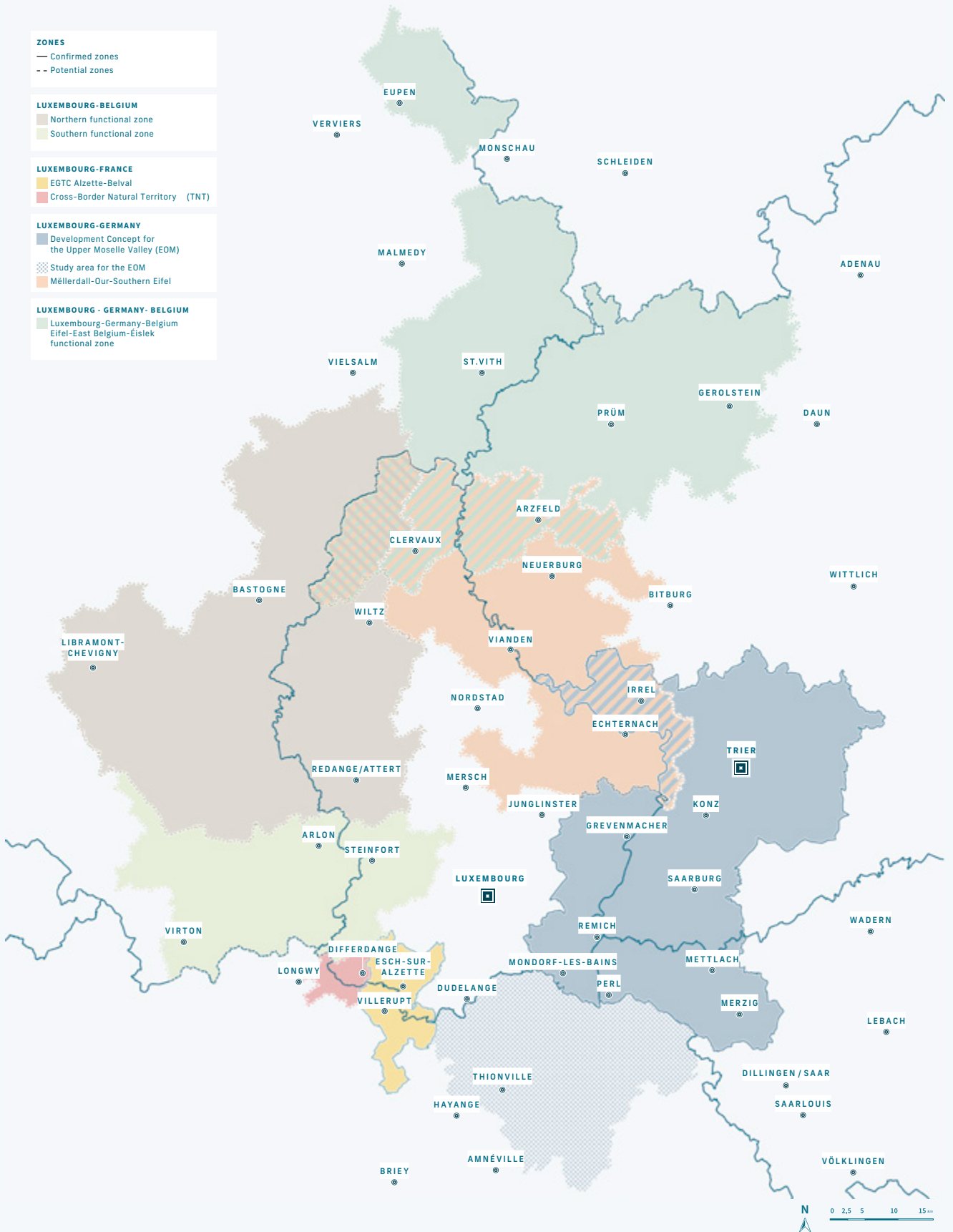
For the functional zones “EGTC Alzette Belval” and “Development Concept for the Upper Moselle Valley” (Entwicklungskonzept Oberes Moseltal - EOM), a type of structured cross-border cooperation has existed for several years. These two areas are, therefore, more advanced in terms of their territorial development strategy and the governance in place.

The PDAT calls for...

using the opportunity offered by the Interreg VI A Grande Région programme to set up structured cross-border cooperation for all of the country's border regions. The aim is first to define strategies for a coherent territorial development before moving on to an operational stage with the implementation of joint projects supported by European funding. In this context, it is important to emphasise the responsibility of Luxembourg, which must also support border territories in the implementation of cross-border projects.

CROSS-BORDER FUNCTIONAL ZONES OF LUXEMBOURG

ZONES	
—	Confirmed zones
- -	Potential zones
LUXEMBOURG-BELGIUM	
■	Northern functional zone
■	Southern functional zone
LUXEMBOURG-FRANCE	
■	EGTC Alzette-Beival
■	Cross-Border Natural Territory (TNT)
LUXEMBOURG-GERMANY	
■	Development Concept for the Upper Moselle Valley (EOM)
■	Study area for the EOM
■	Möllerdall-Our-Southern Eifel
LUXEMBOURG - GERMANY - BELGIUM	
■	Luxembourg-Germany-Belgium Eifel-East Belgium-Eislek functional zone



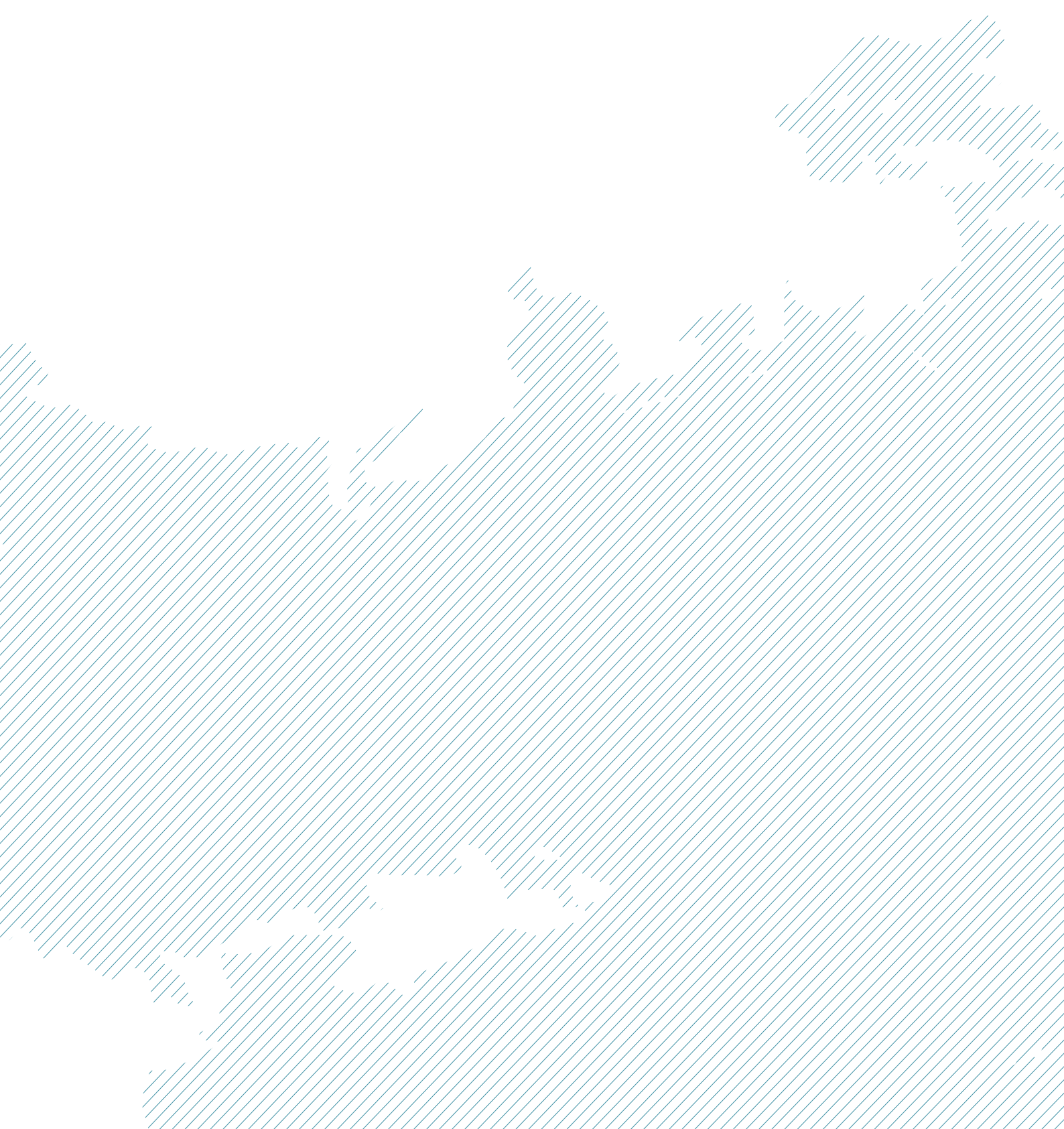
CONCLUSION

As a forward-looking, proactive and ambitious vision, the PDAT provides a territorial response to the many challenges facing Luxembourg's territory and society, such as global warming, the energy crisis, the degradation of biodiversity, the depletion of natural resources, and sustained demographic as well as economic development. This means adapting and rethinking spatial planning in order to enable and support the country's ecological and territorial transition.

The drafting of the PDAT, coordinated by the Department of Spatial Planning with an inter-ministerial working group bringing together all the Government's sector policies with a territorial impact, was a long process of learning and questioning, which eventually resulted in an ambitious but realistic document whose implementation will depend not only on the Government but on each and every one of us. The involvement of municipalities and citizens, as well as scientific experts from various disciplines and practitioners, in the drafting process of the PDAT – notably through the International Consultation “Luxembourg in Transition” – makes it a comprehensive document indicating the path to a more sustainable future from a territorial point of view.

The transposition of the objectives and strategies of the PDAT into territorial policies will have to be carried out in close cooperation with sector policies, but above all with the municipalities, which are the main allies in terms of spatial planning. In addition to the development of various new instruments, the PDAT's implementation will also be achieved through concrete projects.





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LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

