



# **Luxembourg 2050 — A Guide on Repairing Commercial Zones — Report Phase 3**

**University of Luxembourg (UL)  
Luxembourg Institute of Science and Technology (LIST)  
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Institute for Organic Agriculture Luxembourg (IBLA)  
Office for Landscape Morphology (OLM)**

# — Colophon

This report summarises the collaborative work of University of Luxembourg (UL), Luxembourg Institute of Science and Technology (LIST), Centre for Ecological Learning Luxembourg (CELL), Institute for Organic Agriculture Luxembourg (IBLA), Office for Landscape Morphology (OLM) and encompasses the teams' contribution to the International Urban-Architectural and Landscape Consultation “Luxembourg in Transition. Spatial Visions for the Zero-Carbon and Resilient Future of the Luxembourg Functional Region,” initiated by the Ministère de l’Energie et de l’Aménagement du territoire / Département de l’Aménagement du territoire (DATer).

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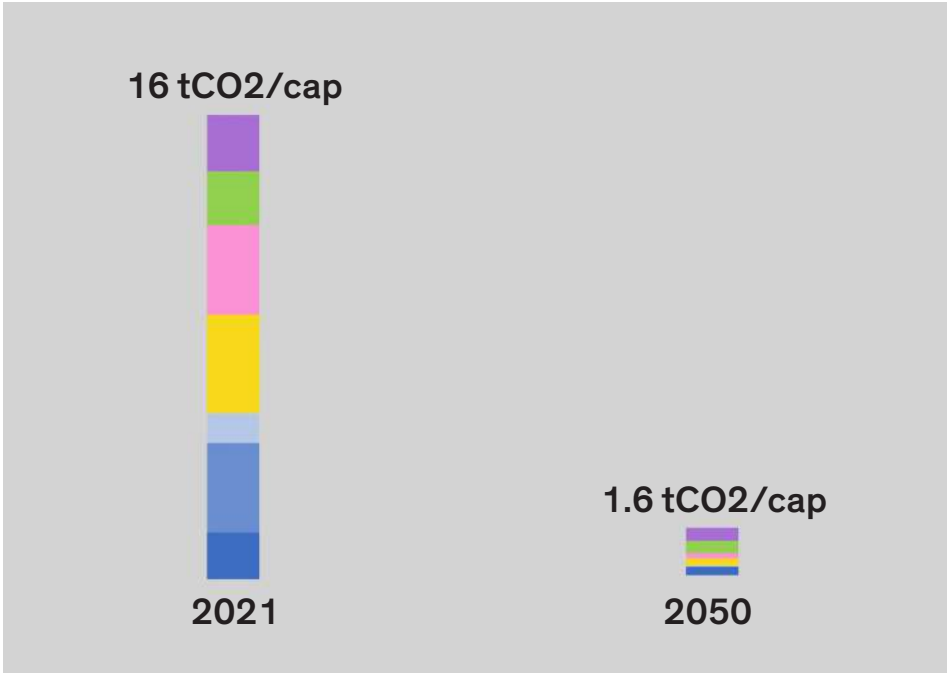
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# — Introduction: Archipelago 1.6TCO2

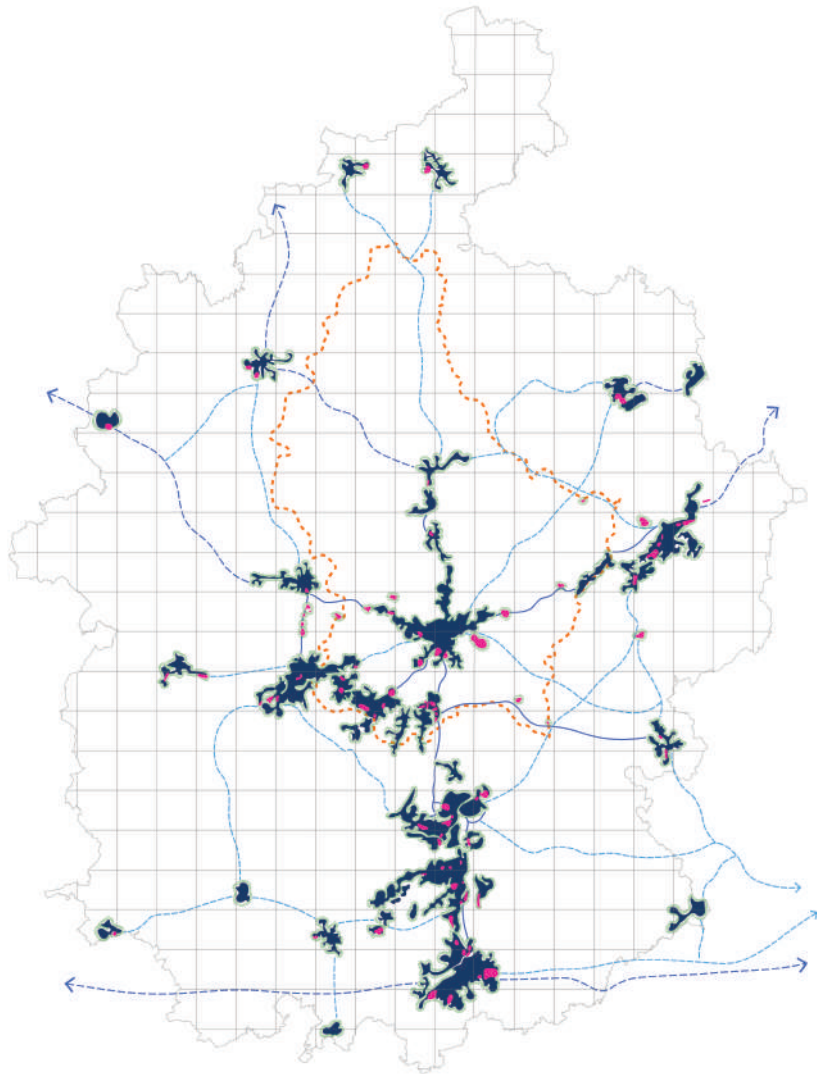
Our second report for the international call for tender "Luxembourg in Transition. Spatial Visions for the Zero-Carbon and Resilient Future of the Luxembourg Functional Region" ended with a spatial planning model for the socio-ecological transition of the functional space of Luxembourg: the archipelago 1.6TCO2. This guiding vision embodies the synthesis of the research and planning work of the first two phases, which demonstrated that the transition into a sustainable era through the necessary decarbonisation could not only be feasible but also desirable. It further interrogated how the functional space of Luxembourg can be better prepared regarding the forthcoming impacts of climate change. It has, by now, become evident that the task is colossal: to meet the Paris Agreement targets, greenhouse gases will have to be reduced in the next 30 years by a staggering 90% in a territory that has the highest per capita carbon footprint in Europe and which—according to climatologists—will suffer more than Rome or London.



Techno-fix

Two different narratives have emerged in the Western world as to how to deal with this challenge: the first and most prominent narrative foregrounds the agency of technological innovation and development as crucial to energy transition. The techno-fix framing is fuelled by hopes that technological advances will continue to generate economic growth, while decoupling it from environmental

impacts. Renewable energy would satisfy the enormous demands caused by digitalization, the electrification of mobility, and the building sector. At the same time, smart technologies promise to recycle materials, tie energy loops, and sequester greenhouse gases. This narrative holds large appeal as a political status quo: neither the underlying economic system of extraction, distribution, and mass consumption would have to meaningfully change, nor consumer lifestyles and the way in which societies are governed. This appeal is particularly strong in Luxembourg. Hence, the citizens' committee accompanying this programme has always expressed collective doubt when it comes to changing the mentality of the inhabitants of a country that seems to be characterised by individualism, consumerism, regular airplane trips, and a particular affection for automobility, even more so than other Western countries.



Less is more

According to our metrics, the alternative narrative, which is not per se opposed to technological developments, is more appropriate regarding the urgency of climate change and more realistic when it comes to the goals of the Paris Agreement. At the same time, it is more demanding for all actors of the territory as it seeks to get along with less: less growth, less energy, less mobility, less land, fewer cars, fewer material resources—while, instead, proceeding into a repair culture dealing with what is already there. Thus, we showed in the second report to what extent the Miesian slogan “Less is More” can be reinterpreted and transferred to other areas—that “less” ultimately means “more” for people and the environment, that this apparently less promising narrative also promises more quality of life: more time and creativity, more health, and more biodiversity.

No (net) land take

In this respect, a consensus has emerged among the remaining teams as to how to deal with the land. All teams are striving to initiate the No (net) land take envisaged by the European Union for 2050 with immediate effect. As a matter of fact, every day in Luxembourg, an area equivalent to a football field is being sealed. When we started to work on this programme—and already had the motorway A4 in mind as a special typology to explore—there was still natural soil where, by now a gigantic event centre around the automobile is currently being developed on 53 hectare by the Giorgetti real estate group: with sales areas for Ferrari, McLaren, and Rolls Royce, as well as a new hotel, restaurants, and an indoor go-kart track. This project was authorised a long time ago, so it was not possible to stop it anymore.

What kind of inner development?

There are two different approaches as to how new housing units could be produced alternatively to the sprawling of the urban into the landscape: the new mainstream approach strives for the inner development of buildable areas. The two recent investigations recently published by the Ministries for Housing and Spatial Development, in collaboration with the Luxembourg Institute for Socio-Economic Research, have found that there is actually more land available within the cities and towns for development than previously assumed.<sup>1</sup> Thus, 140,000 (instead of the 50 to 80,000 previously assumed) housing units could be produced through inner development without further urbanising the countryside.



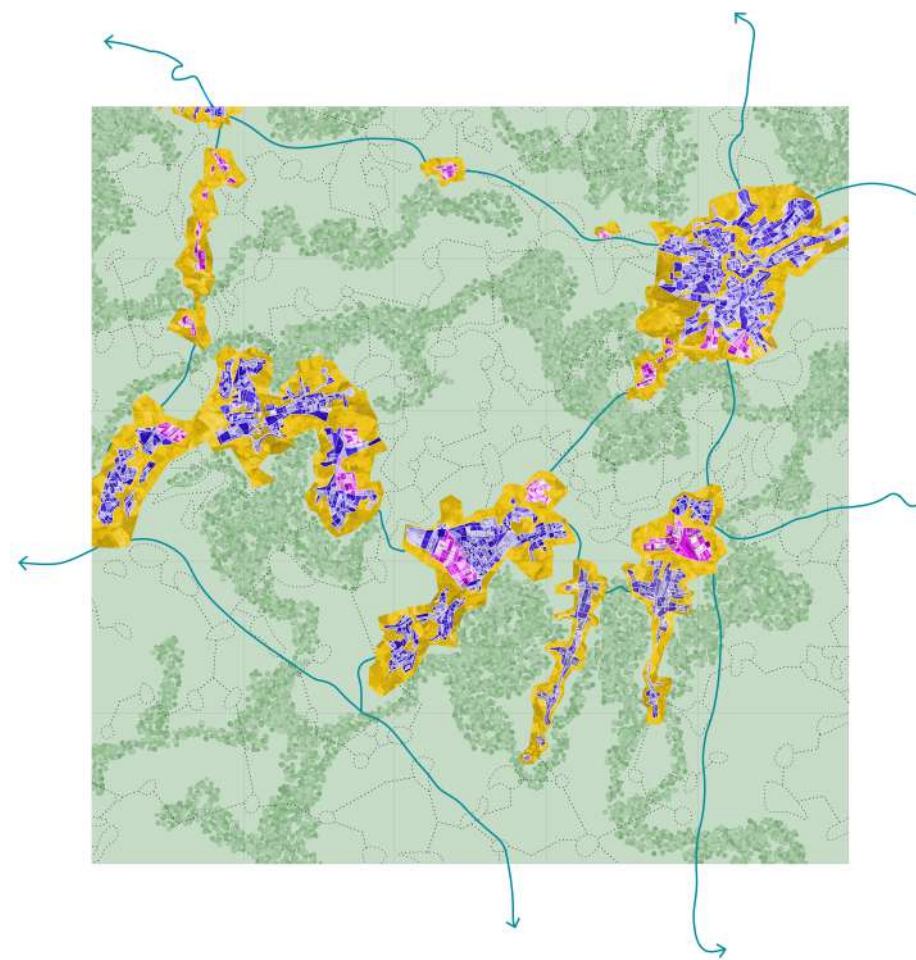
However, land reform measures are far from sufficient to mobilise this mainly private land. In addition, the vast majority of these sites is located in smaller municipalities rather than in urban centres. But it is precisely these smaller municipalities that should not continue to grow demographically, but rather the main agglomerations, i.e. in our model the nodes of the polycentric system. But the main argument against further development of empty and buildable lots in cities and towns lies in their importance for the resilience of these places. Every square metre of natural land acts as a carbon sink, every open space in towns and villages should be preserved, activated with different uses—like urban forests, vegetable gardens with hedges, sports facilities, parks and the like—and should be protected as urban sponges. Nevertheless, the question remains where to put the necessary affordable housing units and their complementary social infrastructures?



#### Post-fossil development

We have shown in the second report that our alternative proposal to the classical inner urban development consists in a transformation of the spaces of the fossil age, such as garages, car parks, shopping centres, industrial parks, commercial zones, urban motorways, arterial roads, and even completely banal buildings that could be partly overbuilt. Our bet in this programme was to prove that we have enough sealed land and space for further development if we succeed in introducing sufficiency in individual transport. Fewer cars open up a lot of manoeuvres in spatial planning. While we simulated possible developments on fossil surfaces in the second phase, we will now expand this approach in the context of commercial

zones, which, in addition to purely industrial estates, represent the greatest challenge when it comes to decarbonisation and resilience. And as with cities, the question is rather how to transform existing commercial zones than to develop a sustainable design for new zones.



#### A case study: Foetz

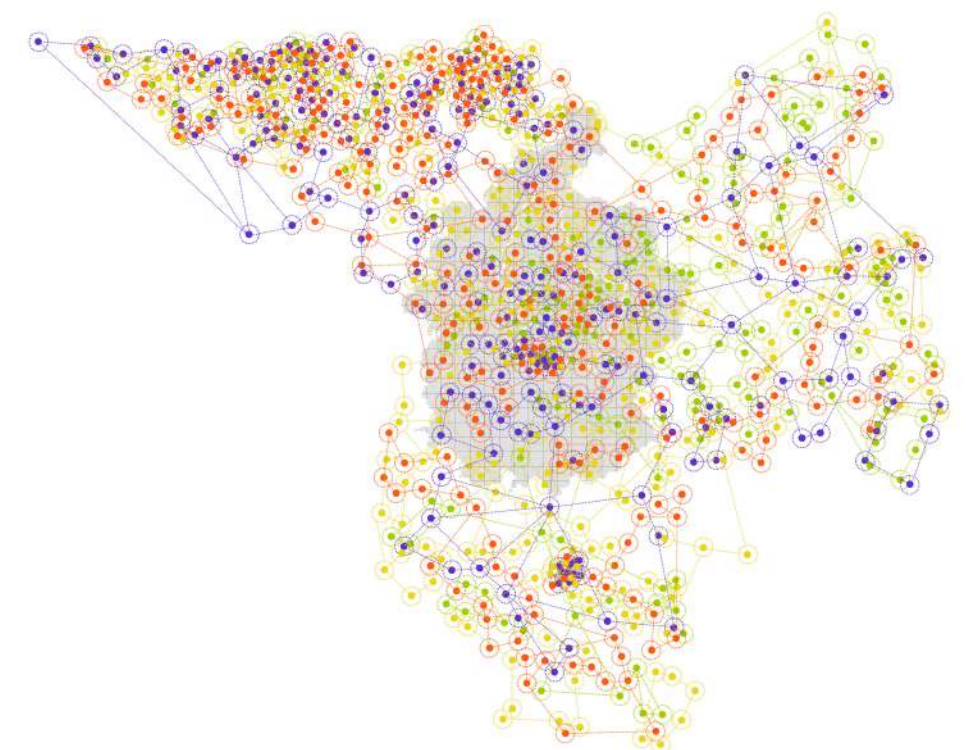
The guide for this transformation is divided into four chapters: how commercial areas can become car-free, how the space thus available can be used productively, with which activities commercial areas can be occupied, and by which actors, and finally how those spaces can be renaturalised. Each of these chapters follows the same structure: A generic manual for all commercial zones is followed by a demonstration of how these generic strategies can be contextualised and translated in the actual place: the commercial zone of Foetz.

We chose Foetz as a demonstration area, because it is virtually the mother of all commercial zones in Luxembourg. Created in the context of the construction of the motorway A4 in the 1970s, it

now covers with more than 100 companies an area larger than the historic centre of Luxembourg. Foetz is an island of unsustainable consumerism by car surrounded by a partly contaminated, partly unproductive landscape with which it engages no relationship. The goal is now to develop it into a decarbonised and resilient, highly mixed and porous urban island within the 1.6TCO2 archipelago: one that is sustainably connected to the other city islands and enters into a productive interaction with the landscape surrounding it.

Therefore, in the second part of this report, we zoom out from Foetz to show how the surrounding, today highly fragmented, partly contaminated landscape needs to be repaired in order to become more resilient. And how, complementary to our offer to concentrate demographic growth in Foetz, urban sprawl can be stopped.

Finally, in the third part, we outline how the transition of a place can be approached and accepted by citizens if we agree that such a site should not be developed anymore by a classic top-down planning. But how can a place be transformed by actors who are not yet there? However, even with innovative co-planning and participation methods, one thing is crystal clear for the future development: without political will, disruptive developments like the one we propose or others necessary to meet the targets of the Paris Agreement, will not be possible.









01 —

# REPAIRING COMMERCIAL ZONES



### Ecological disruption

Commercial zones are legacies of the functionalist planning paradigm and products of the mass consumer society. Functionalist urban planning intended to get the originally dirty production and later the sites of mass consumption out of the cities and bundle them in newly developed zones suitable for cars. The choice of location for commercial zones did not follow a specific spatial planning strategy, but rather the logic of heavy infrastructure networks and whether land could be obtained cheaply. If you superimpose Luxemburgish commercial zones on historic maps, you can see the ecological ignorance with which forests were destroyed, bulldozed, and fields tarred at the time, just as the construction of the motorways and roads serving these zones fragmented the habitats of both flora and fauna.





### Relational sites

While these monofunctional zones draw their consumers from the region, the products originate from complex networks that are usually globally exploited, from the extraction of raw materials to processing and distribution. In other words, consumer goods usually travel enormous distances by ships, planes, and trucks before they are consumed by people in commercial zones who go there by car, or before these goods travel to other sales locations. As a result, commercial zones are always connected to a network of motorways that links them to major logistics networks, while most of the land on commercial zones is used for parking. Similarly, most of the companies in commercial zones are embedded in global networks, which means that not only goods circulate globally, but also the capital. At the same time, commercial zones are not a particularly lucrative business for their municipalities, generating only a small amount of tax revenue. They also contributed significantly to the decline of the often historic shopping districts within the towns and cities of the nearby municipalities. While the large chains of restaurants and retailers of commercial zones continue to enjoy great popularity, the shops in their core towns are largely dying out. Many municipalities and ministries recognise the problem and are trying to counteract it: by soft mixing with office space or equipping the buildings with renewable energies—or in the core cities by desperate actions such as citizen surveys, new urban furnishings or buying up ground floors. But both the problems and the potentials of commercial zones are too big and the ecological crisis is too urgent for cosmetic measures to suffice. Thus, the call for tender “Luxembourg in Transition” gives us the opportunity to realistically play out a more far-reaching transformation of these “non-places”.





### Infusion of the urban in commercial zones

As a start, it seems important to emphasise that the deconstruction of commercial zones is not our desired goal. Labour and production will remain the most elementary components of our society, even if it will no longer aim at absolute growth. However, both categories are undergoing profound change. Production is to a large extent no longer noisy and dirty and thus compatible with urban life. Many cities are again trying, like at the beginning of industrialisation, to bring production back into the cities (cf. the trendy slogan of the "productive city"); either in larger structures that develop on sites of obsolete economies, or in smaller structures, cf. the so called "Kreuzberger Mischung"—a typology that was also very common in Luxembourg: with housing on the street and a workshop in the backyard. In both cases, the aim is again to spatially combine housing and production, regardless of whether the production is purely artisanal or digital. Now this report is not arguing for the return of commercial functions into the city, but rather about the infusion of urban structures into commercial zones. On the one hand, this is due to the unresolved question of land in urban areas that makes the return of commerce into cities in Luxembourg quite unrealistic. On the other hand, it is simply due to the fact that the commercial zones exist—and represent, with their scope, a huge potential.





### Socio-economic transformation

As we have outlined before, a basic condition for making these areas usable is the continuous withdrawal of the automobile from the site. In the commercial zone of Foetz alone, there are no less than 6,200 parking spaces that could be developed without sealing a single square metre of natural soil—for not less than 10,000 inhabitants. The possible conversion of commercial zones, like other relics of the fossil age, gives us the central argument, in addition to resource depletion and a gain in quality of life, for not simply electrifying mobility, but for effectively driving it down and thus making available a huge reservoir of land. By bringing housing and social infrastructures into commercial areas alongside office space and thus gradually transforming them into mixed-use neighbourhoods, we will solve two problems at once: on the one hand, we shorten the distances between living and working—due to their size, commercial areas have the potential of a 15-minute city. On the other hand, an urban milieu accelerates the economic transformation. The strategy of the Ministry of Economy consists of boosting creative clusters like Technoport, be it in the field of digital or craft production. However, their actors are less and less content with driving long distances to work and having lunch at Pizza Hut, McDonald's, or Burger King. They are more and more in search of liveable environments that are as urban as possible.





However, these pioneers should not "gentrify" commercial areas in the same way as creative industries have done in the cities, but rather push a development towards a functionally and socially mixed neighbourhood. Therefore, more diversified, sustainable economies as well as affordable housing for all income levels are also needed. This is our reason for having focused on repair and wood processing. Starting from the Technoport, Foetz could develop into a repair district and wood cluster for which there is and will be a great need in the region. Further, we have developed mechanisms for how affordable housing can be developed without the public sector making large investments.

The various discussions with local stakeholders have shown that both approaches are realistic. While the public sector does not seem ready for a strong mix of commercial areas, companies, land owners and investors are already looking at this vision. This third report is now a guide as to how these monofunctional areas can be strategically and successively developed into mixed-use neighbourhoods—not by private developers, but by citizens in co-design for the common good—where housing, manufacturing, digital work, and leisure intertwine.



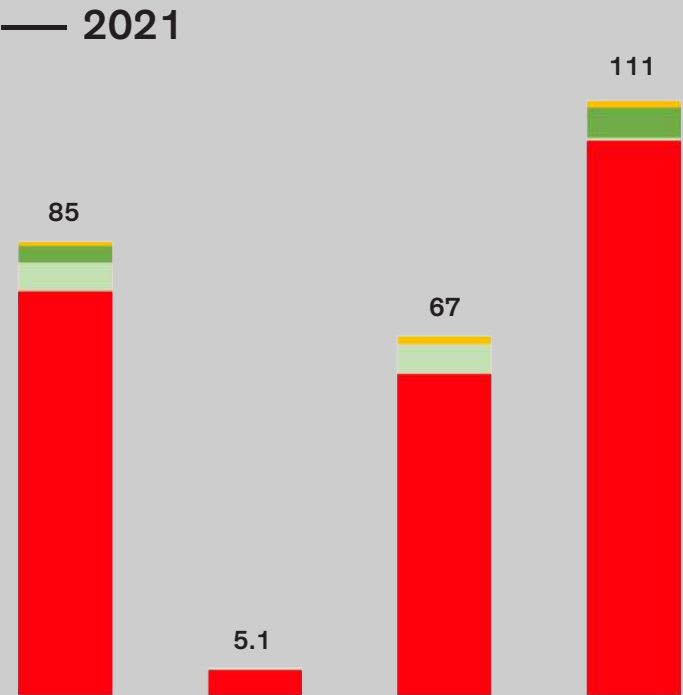


# — Foetz CO2

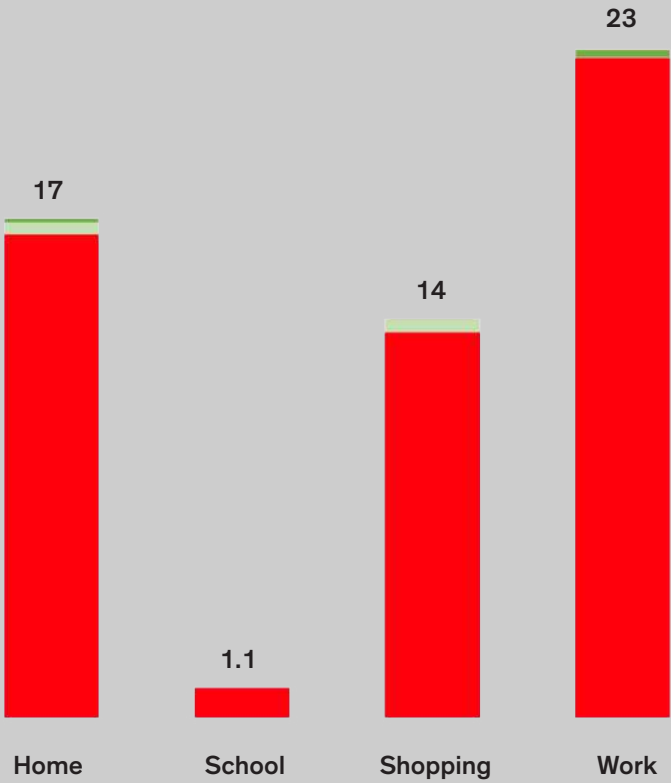
Over a typical working day, the area of Foetz (Bergem and Mondercange) welcomes a grand total of about 23,000 persons—of which 8400 come for shopping, 6,900 for work (half of which from abroad), while the rest either live or go to school in the area, based on data from the 2017 LuxMobil survey. The overwhelming majority (19,000 people per weekday) come by car, as the proximity to the A4 and A13 makes car trips to Foetz natural and expected, reinforced by the 6,200 free parking spots on the site.

A shift in the composition of people in Foetz on a given day along with a shift in mode of transportation combine to reduce person-km for travel to Foetz from 268 to 145 thousand pkm/day and GHG emissions from travel to Foetz from 55 to 5.6 t CO2eq per day in 2040. By 2040, 10,000 people will be living in Foetz and working elsewhere or in Foetz (at their place of work, at home, or in co-working spaces). With the increase in residents, commerce in Foetz will also change. People living elsewhere will be less likely to drive to Foetz for their everyday shopping, opting instead to shop locally close to their home or place of work by walking or biking. This shift will revive the shopping district of Esch-sur-Alzette, reversing a downward trend that began when big box stores came to Foetz and later to Belval, and drew local shoppers away from Esch-sur-Alzette.

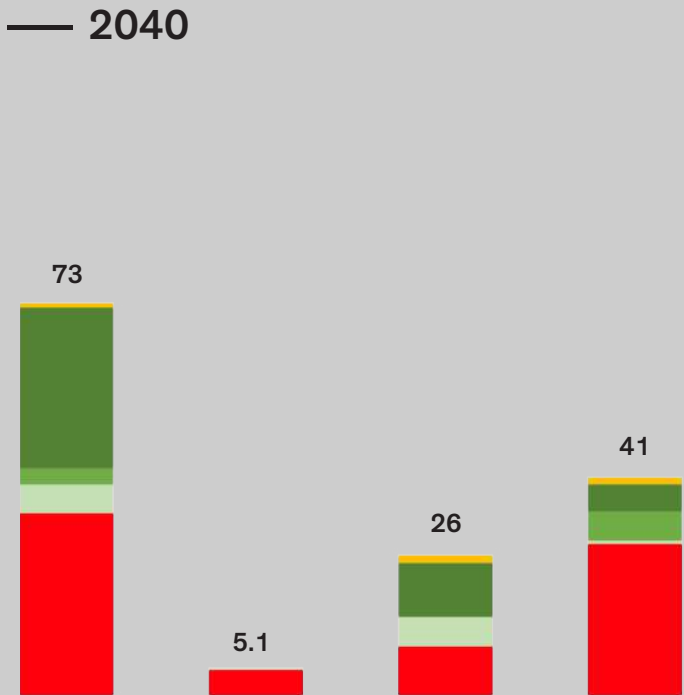
- Car
- Bus
- Train
- Tram
- Bike/walk



Distance travelled to Foetz (pkm/day)  
2021: 268 thousand pkm/day



GHG emissions for travel to Foetz (t CO2eq/day)  
2021: 55 t CO2eq/day



2040: 145 thousand pkm/day



2040: 5.6 t CO2eq/day



## — A. How to make a commercial zone car free

The first path of the transformation of commercial zones consists in the continuous withdrawal of the automobile from the site. Therefore, the zone must first be connected to an efficient public transport system. We know from history that the connection to a tramway—which is planned in Foetz for the late 2020s—substantially changes the environment of the stops. At the same time, infrastructure for e-car sharing and a generous cycling and pedestrian system must be realised that also connects the area to the region for individual mobility. Finally, the road system, which is today almost exclusively used by cars and trucks, should be transformed into public spaces that make it more difficult for cars to get around, but offer people high amenity qualities. This will lay the ground for a mixed-use urban neighbourhood.

Manual

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1

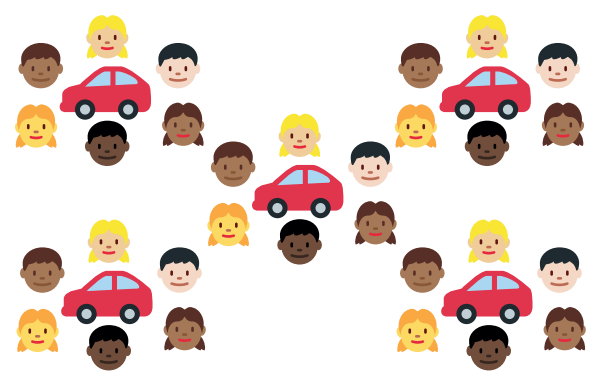
Connect to the public transportation system



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2

Introduce infrastructure for e-car sharing



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3

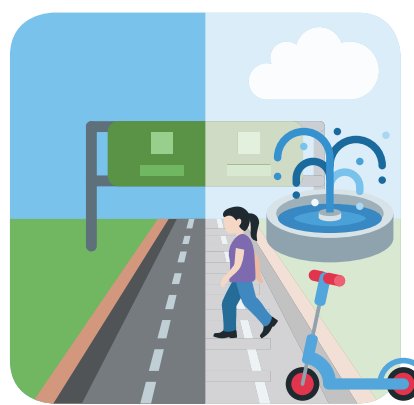
Develop soft infrastructures



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4

Transform road-network into public space



# Problems and Potentials

Noise Pollution



60,000 vehicles/day

Located between two highways, Foetz today suffers from the noise and air pollution of road traffic, averaging 60,000 vehicles per day on the A4. The stretch of A4 highway alongside Foetz is congested during morning and evening rush hour. This makes living in Foetz difficult today. Reducing traffic would lead to measurable improvements in air quality. During the lockdown month of April 2020, NO2 concentrations in Luxembourg declined by 30%.



Sealed Land

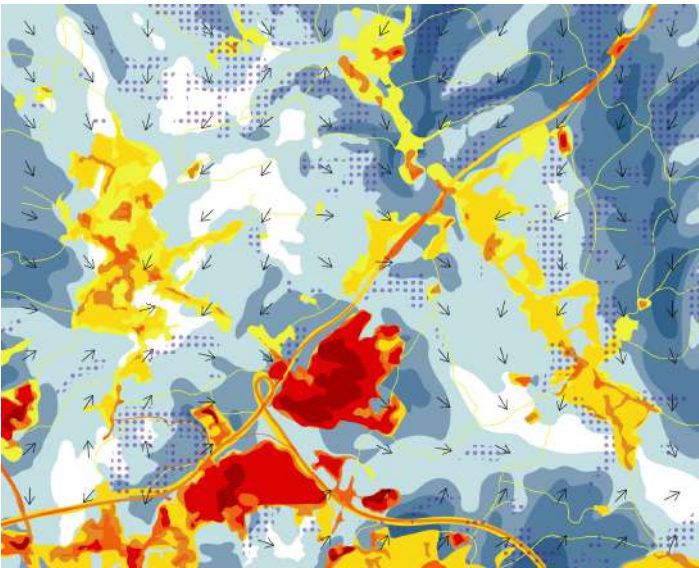


82 hectare sealed

Whenever land is sealed with impermeable, artificial materials, we reduce biodiversity and almost permanently eliminate the ability of the soil to act as a carbon sink. Soil provides other important ecosystem services, such as flood regulation and water purification. Every day an area equivalent to the size of a football pitch is sealed in Luxembourg.

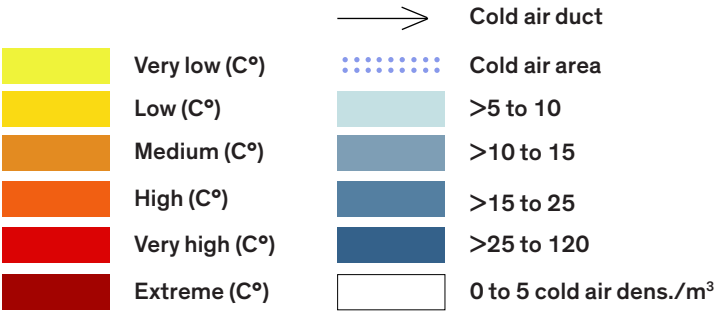


Heat Island



~5°C temperature difference

Built-up areas trap heat and increase the ambient air temperature compared to the surrounding area. Preserving and creating cold air corridors is important as climate change will bring longer stretches of hot and dry spells. Unsealing land and creating green spaces along natural ventilation corridors, smaller cool spots, and blue infrastructure are other measures we take to reduce the ambient air temperature.



Degree of Imperviousness



574 million liter stormwater runoff

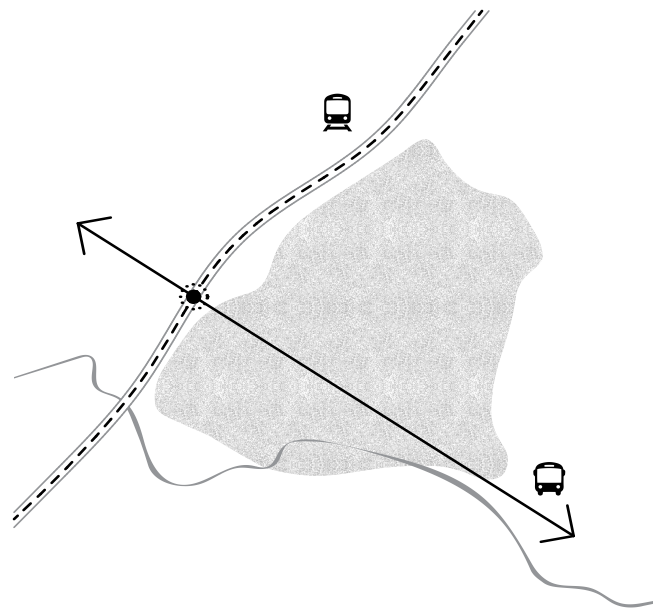
Rainfall on impervious surfaces quickly generates large amounts of stormwater runoff that harms water ecosystems, since the intense water flow leads to erosion and can wash away river habitats. Urbanisation and increased soil sealing also contribute to flooding downstream, such as when Bettembourg flooded in July 2021.





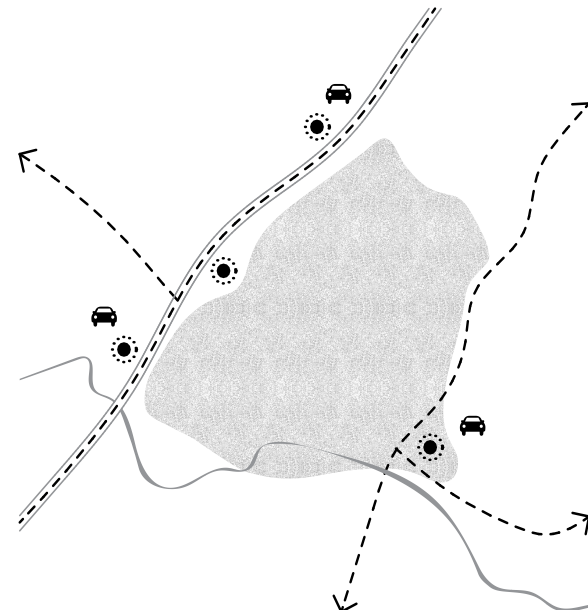
# — Strategies

## Introduce tram and e-bus system



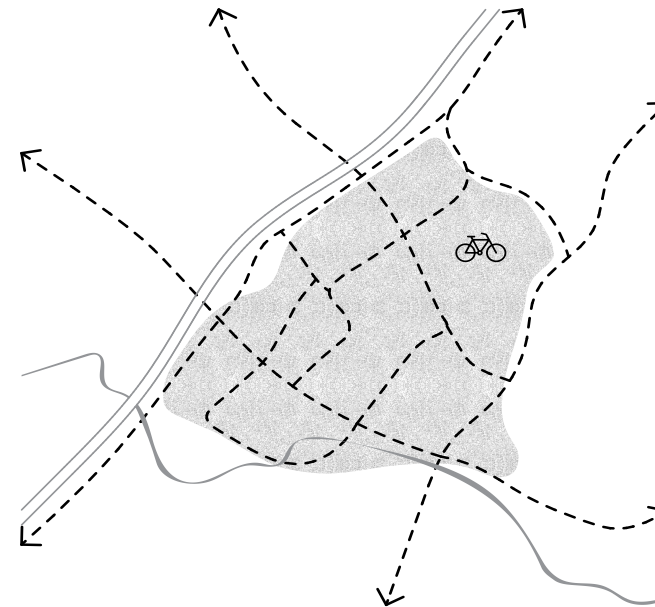
The new tram line, which will connect Esch-sur-Alzette with Luxembourg-City, is also scheduled to stop in Foetz in the late 2020s. Transversally, the e-bus system will be expanded to connect Foetz with Mondercange, Schifflange, Bergem, and other towns and villages. E-buses will have their own lane on the avenue to become more efficient.

## Introduce e-car sharing



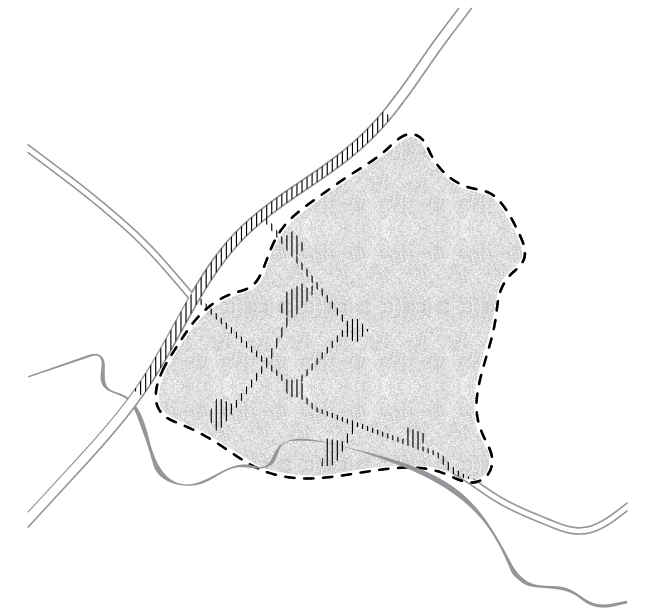
Demountable structures will be built at strategic locations that can accommodate and concentrate all cars on site. Even though all buildings in Foetz can easily be reached on foot from there, these structures will also accommodate sharing bicycles. The structures are designed and constructed in such a way that—when there will be fewer and fewer cars—they can accommodate other functions.

## Introduce bike lanes



A fine-grained bicycle system will be built on existing roads, thus limiting automobile traffic. The bicycle system will be linked to a regional soft mobility network that, as an alternative to the public transport system and the automobile, will allow people to cycle easily to Esch-sur-Alzette in less than 15 minutes (4.5 km) and to Luxembourg-City in less than 45 minutes (15 km).

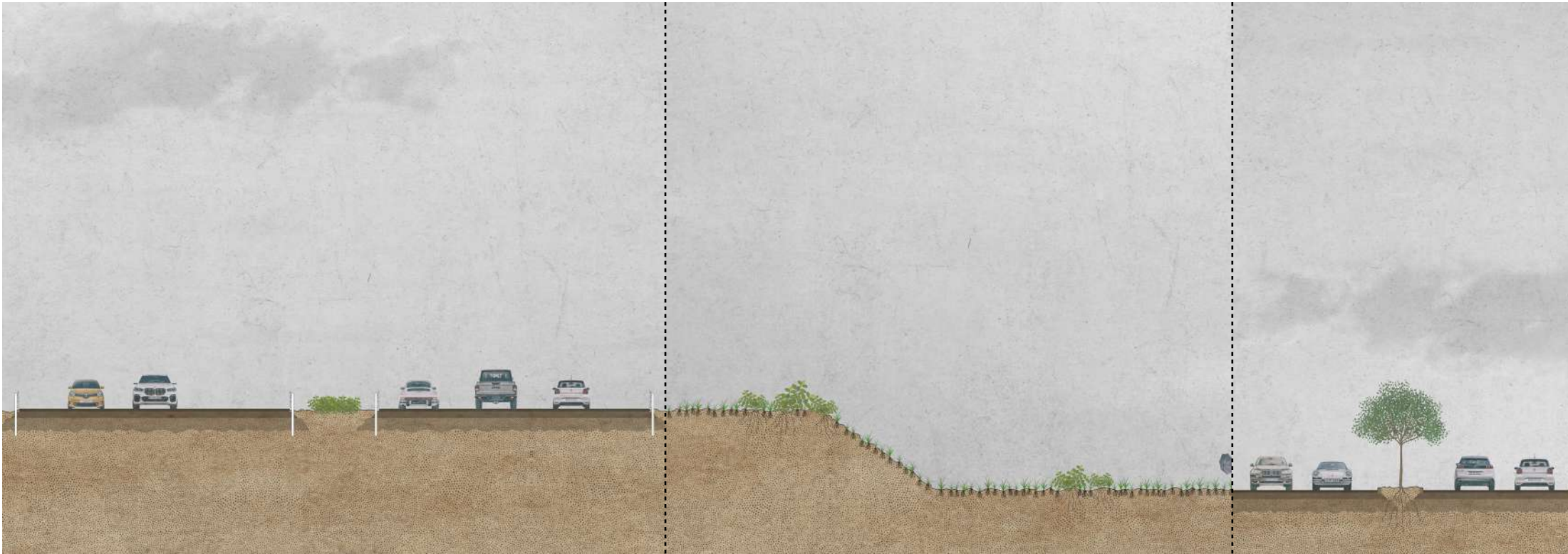
## Introduce urban avenue and public space



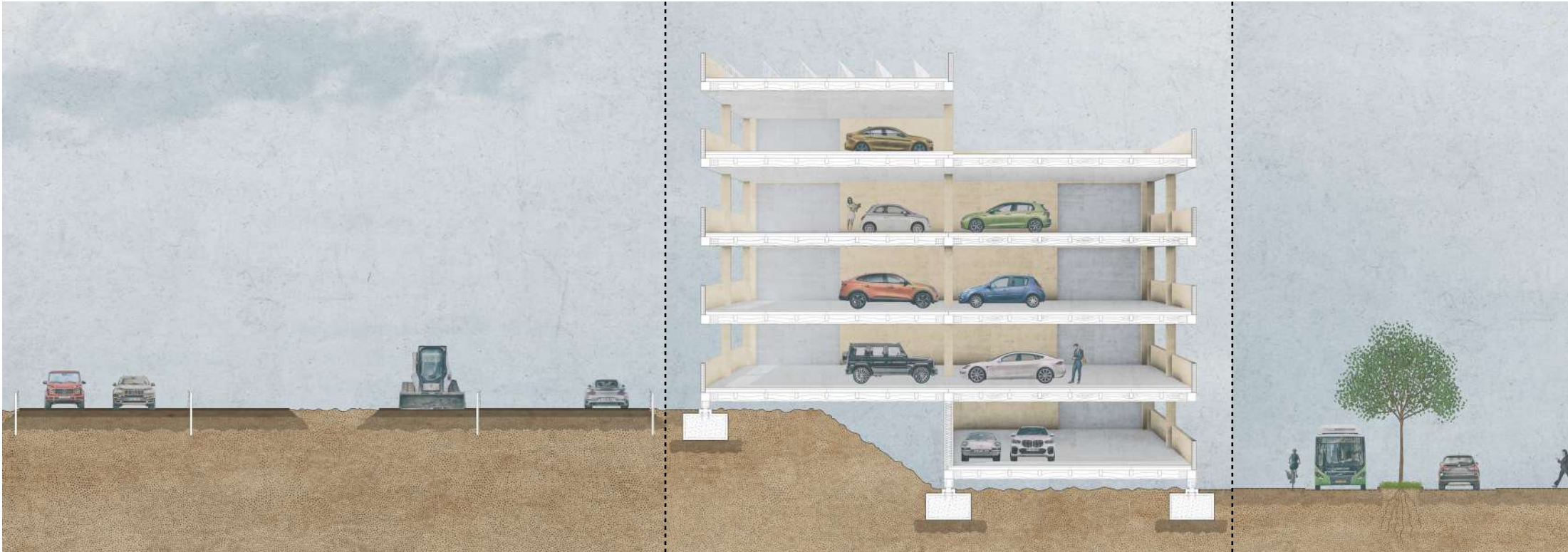
The public space that today is exclusively used by cars will be transformed into a system of shared space and squares with a quality of stay for people. The new shared spaces are conceived in order to serve as a retention basin in case of heavy rain. At the same time, the motorway will be transformed into an urban avenue, giving the tramway the urban space it deserves.

# Transition

2021



2025



The first step of the transformation of the highway will be the introduction of one lane for e-busses and a second one for high occupancy vehicles (HOV). The speed will be limited to 50 km/h. Next to the road a series of reusable and dismountable structures will be built that will concentrate the parked cars of the site and introduce a multimodal sharing car and bike system.<sup>2</sup>

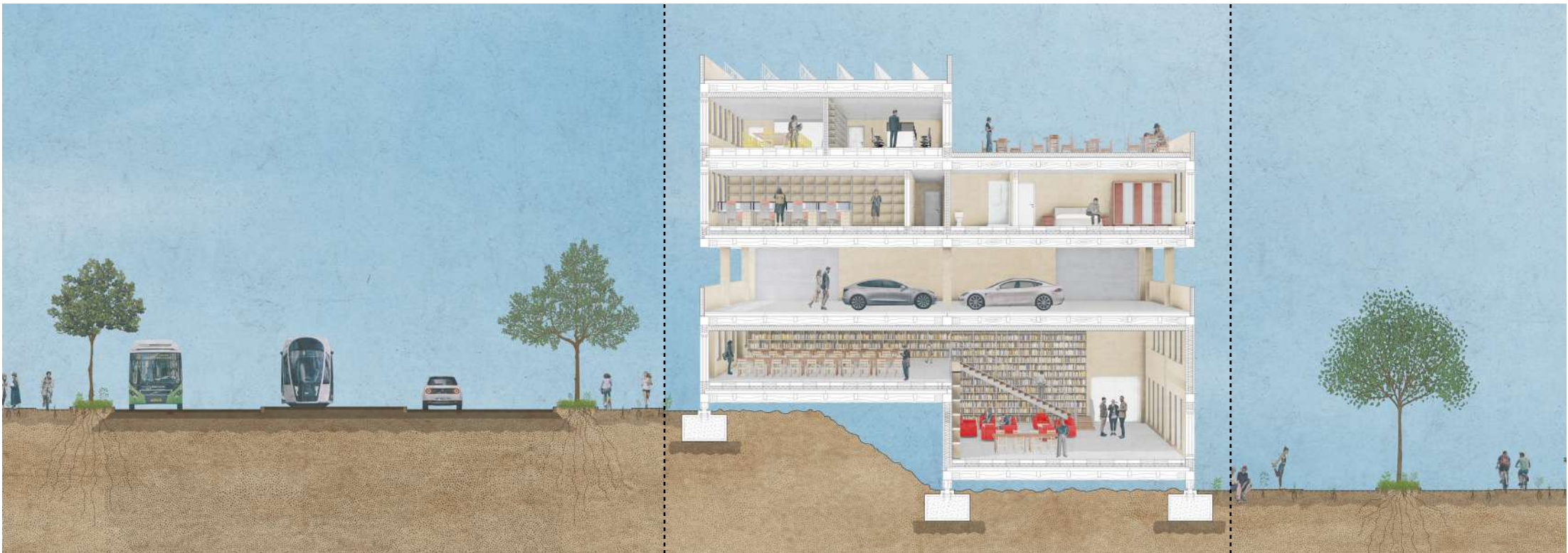


# — Transition

— 2030



— 2035



When the tram arrives on the site and the number of cars is significantly reduced, the structure—which is designed and constructed for this multiuse—will be able to host instead of cars other activities such as public amenities, working facilities and even housing. What was before a highway will become an urban avenue, buildings with commercial and public activities, and a speed limit for cars at 30 km/h. People will be able to transverse the avenue which will reconnect Foetz village to the new neighbourhood.



## — From roundabout to shared public space



The roundabout of the commercial zone will become a public space shared by pedestrians, bikes, and e-busses which will connect the new neighbourhood of Foetz at the regional scale, with Mondercange on the west and Bergem and Schiffflange on the east and south. This space located in the southern part of Foetz will be resolutely urban, with vivid ground-floor activities. The asphalt will be replaced by a porous pavement which will allow the soil to absorb the rain. The urban density of the neighbourhood will remove the development pressure on Mondercange and its surrounding towns and villages, which will allow them to remain more rural.



## — B. How to use the newly available surfaces

The second path of the transformation of commercial zones consists in making use of the space gained by successively removing the automobile from the zone. In the commercial zone of Foetz, for example, there are no less than 6,200 parking spaces, some of which can be used as a basis for new buildings. At the same time, a few existing buildings have the potential to be overbuilt. Both densification measures—the overbuilding of parking spaces and buildings—do not cause any soil sealing. In addition, all roof areas will be equipped with photovoltaics and/or green roofs. Finally, the conversion of the motorway into an urban avenue opens up the possibility of generating new floor space. In the end, there must be a positive balance in the renaturation of the areas. In Foetz, for example, 511,200 m<sup>2</sup> new gross floorspace could be created for roughly 10,000 new inhabitants.



Manual

—

1

Make use of roofs



—

2

Build on parking areas



—

3

Transform main road into urban avenue



—

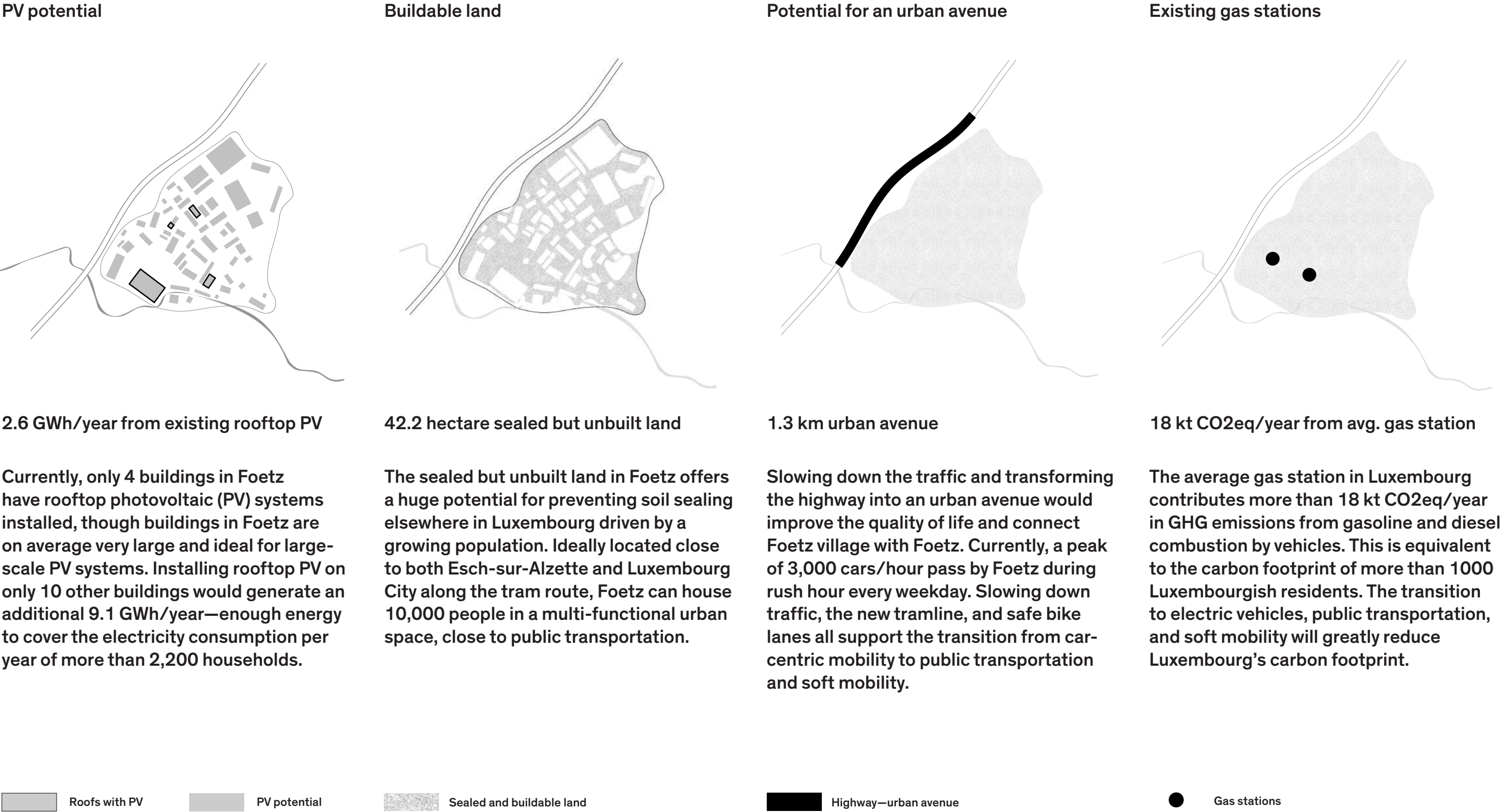
4

Re-use garages, gas stations and drive-ins





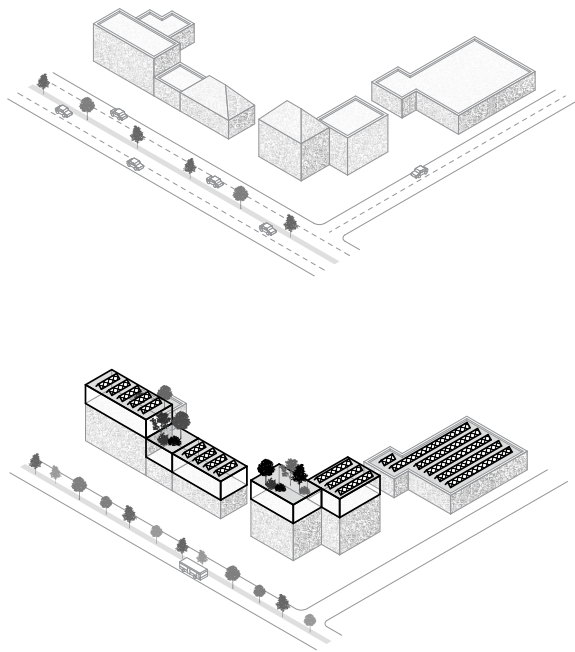
# — Problems and Potentials





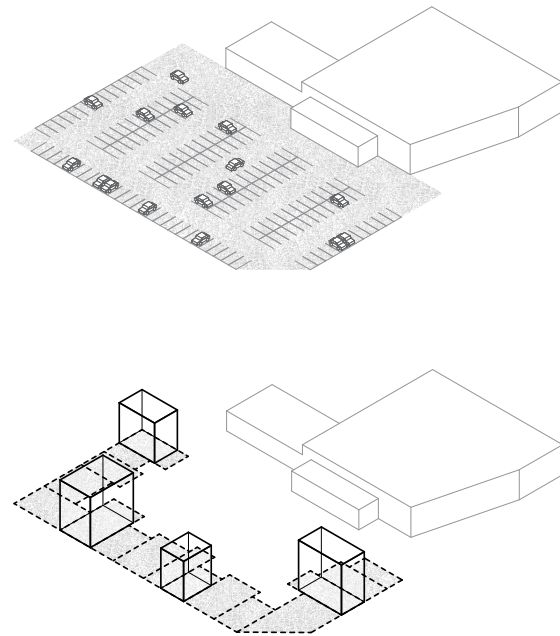
# — Strategies

## Overbuilding



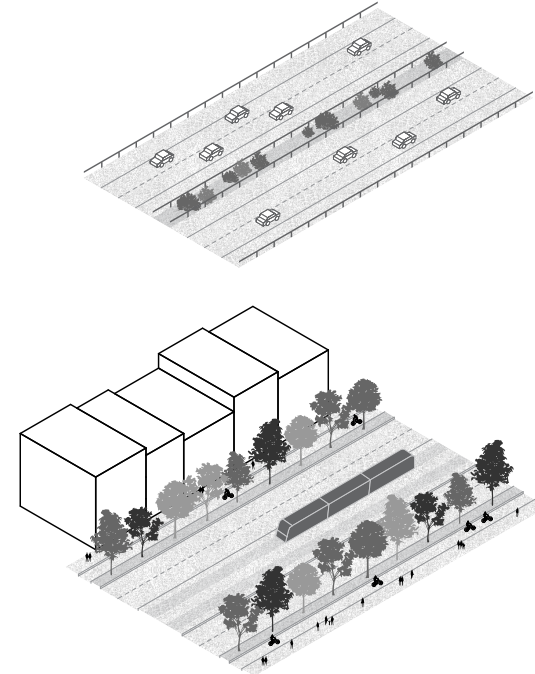
There are not as many buildings suitable for overbuilding in commercial zones as in the city, but nevertheless a few are suitable for this kind of densification. This will also be the opportunity to re-equip the roofs with PV and greenery. The roofs of the lightweight buildings will be systematically equipped with PV.

## Potential building land



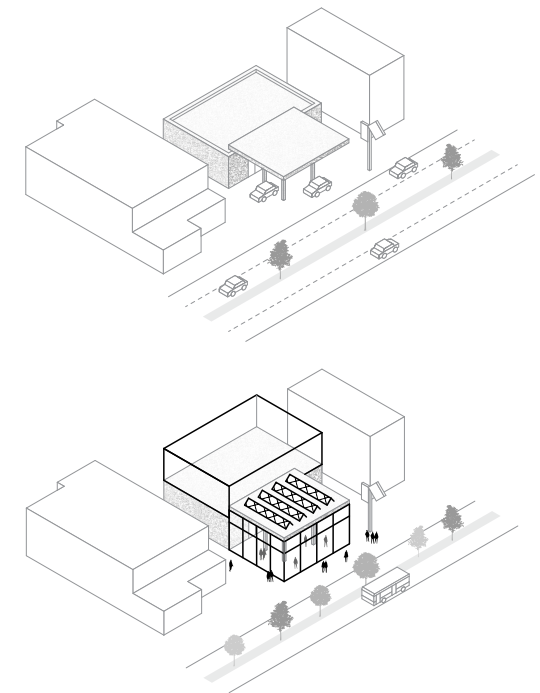
The parking spaces that have become disposable will be divided into unbuildable areas and small-grained building plots, basically on the periphery of these parking spaces oriented towards the street. This usually results in perimeter blocks—a classic typology of urban repair.

## Urban avenue



The motorway will be transformed into an avenue: in each direction one lane for cars, one lane for e-buses and taxis, and one lane for the tram. The narrowing of the road means that buildings are partially built on the paved surface, which gives the avenue its urban space and ties it into the neighborhood.

## Gas stations

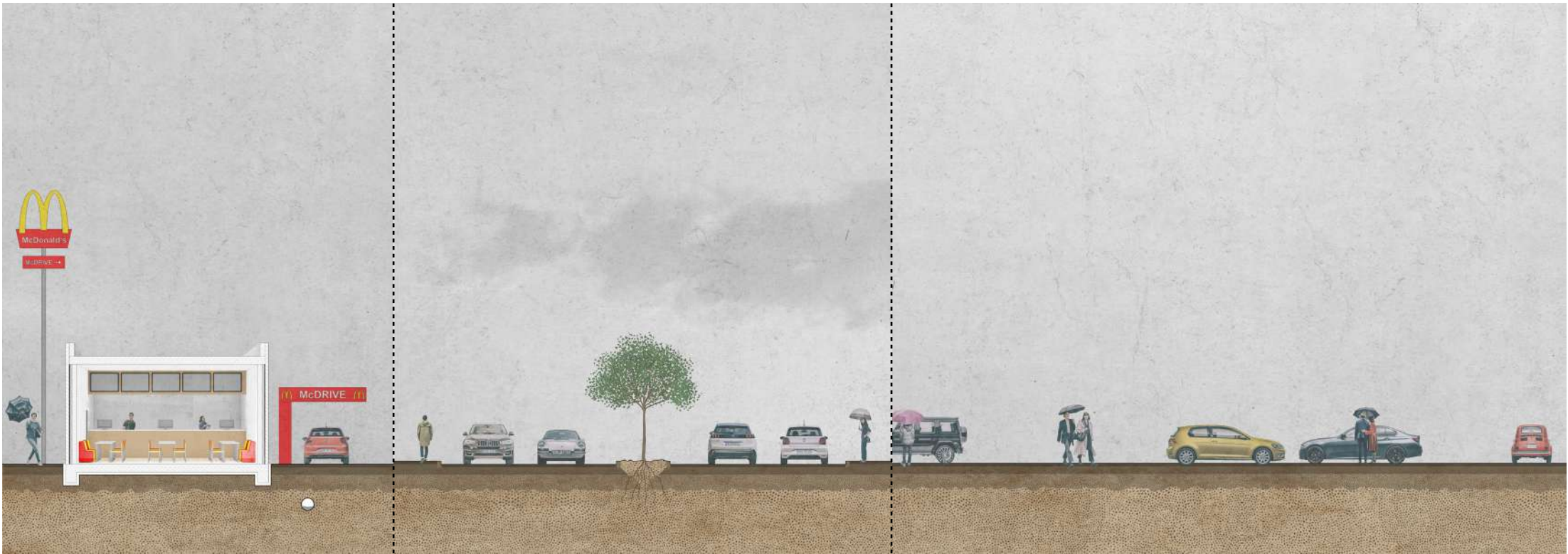


One particular fossil typology that will become “available” due to the mobility transition is petrol stations. Their conversion into functions, such as co-working spaces or coffee houses, will mainly have a symbolic appeal.



# — Transition

— 2021



— 2035



With the removal of the car from the site, the periphery of the parking areas can be developed with new buildings. At the same time, a few existing buildings can be overbuilt. Both densifications will generate an important gross floor area and allow to systematically equip the roofs with PV and/or greenery.



## — From A4 motorway to urban avenue



The most used highway in the country will be placed on the level of the natural soil and transformed into an urban avenue and thus be included in the new urban island. Cars will still go through the site as will the tram, but the priority is given to pedestrians and bikes which will be able to traverse the avenue at several locations. The density of the surrounding buildings will give the necessary critical mass for active ground floor activities, whether they are commercial or more public.



## — From parking areas to urban neighbourhoods



The huge parking areas will be overbuilt by small grained buildings which together will form mixed-use neighbourhoods with common, renaturalised courtyards. The public space will be conceived like a basin, capable of retaining the water in case of heavy rains.



## — C. How to bring in new activities

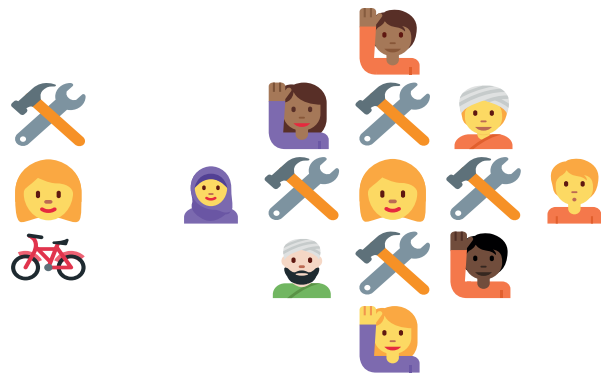
The third path of the transformation of commercial zones consists in revitalising and diversifying the site by carefully balancing the different uses. A transition hub in a central location will stimulate people to organise themselves in cooperative or private-law building communities. Through building rights, the small-parcelled former car park areas will be allocated to the communities and to public housing companies at a fair rent. Work and production must remain an essential part of the neighbourhood, including smaller-grained co-working spaces, workshops, medical and care practices, as well as retail and food shops integrated into the bottom floors of buildings and neighbourhoods and larger-grained spaces for production, processing, training, and markets. Complementary kindergartens and schools and sports facilities have to be carefully placed in between the neighbourhoods and the surrounding landscape.



## — Manual

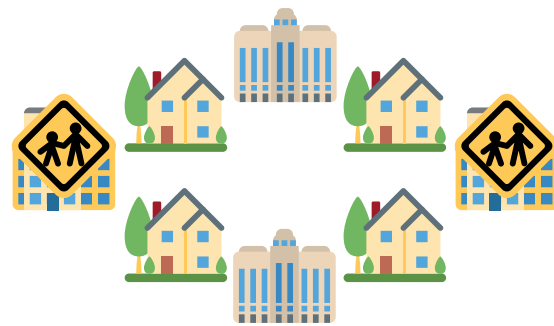
1

## Establish a transition lab



2

## Bring new activities to the site



3

## Diversify new activities



4

## Make existing structures carbon-free and repairable





# Problems and Potentials

## Transitory population



2,700 workers from France

About 40% of the people who work in Foetz come from France, traveling on average about 30km one-way. The transformation of Foetz will allow workers to come more easily using public transportation, as well as provide housing on-site, thus significantly reducing the CO2 emissions currently associated with this commercial zone.

## Mono-functionality



2 daycares in Foetz

The Foetz area is extremely monofunctional, with 500 residents located in Foetz village, and all buildings in Foetz dedicated to commerce or industry, aside from only two buildings dedicated to social infrastructure in the form of daycares. Transforming Foetz will enable us to use space and existing sealed surfaces more wisely, and move away from monofunctional sites of commercialism dependent entirely on transport by car.

## Globalisation



35 out of 123 companies are local

Most local companies are integrated into global networks, both in terms of their products and their capital, which cause high mobility costs and thus high CO2 emissions, while hardly exerting positive effects on the locality and the region. But there are now some pioneers: locally operating companies with sustainable business models which need to be strengthened.

## Economy on the site



8 big-box stores, 15 car-related stores

The large retailing stores risk to become obsolete due to the changing retailing concepts, inefficient land-use and low quality of the buildings. At the same time, 'stable' activities are expected to adapt to new sustainability imperatives by changing their product portfolio and/or adapting product design and production processes. 'Promising' activities refer to those that show less dependency on production infrastructure or have already changed their trajectory towards sustainability.

8300 people/day shopping in Foetz  
6900 people working in Foetz  
500 people living in Foetz village





# — Strategies

## Transition lab



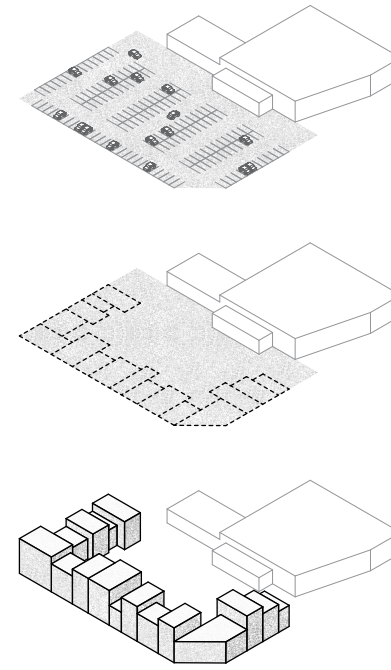
A Transition lab is set up at a strategic location in Foetz. It will stimulate people to engage and organise in cooperative or co-housing communities which will be the main actors of the transition. Thus, the transition lab creates the dynamic for the transformation of a monofunctional commercial zone in a socially and functionally diversified neighborhood (see in more detail in chapter 3).

## Diversification of uses



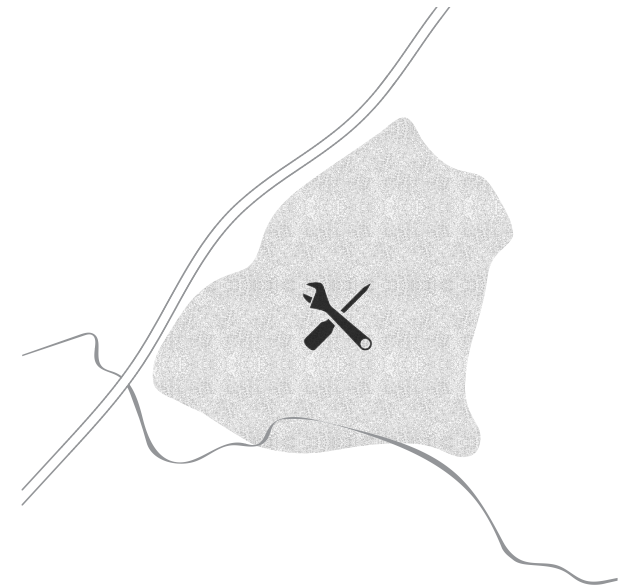
In addition to different types of labour (office work, handicrafts, digital fabrication, etc.) and commerce (food, products, services), the goal is to bring housing onto the site in order to reconnect spatially the most basic functions of life. In addition to these functions, social infrastructures are needed and strategically placed: Kindergartens in the middle of the perimeter blocks, schools connected to the Green Belt and care facilities oriented towards the public space.

## Land lease as a diversification tool



Elementary to the success of the transformation of the commercial zone is that citizens are given the opportunity to shape their living space in communities. For example, the relatively small plots of land are allocated via leasehold rights to these communities and, complementarily, to public housing companies at a fair ground rent. The housing ratio should be fixed at 40 % of cooperatives/co-housing, 40 % of social housing, and 20 % of private developments.

## What if Foetz became a repair district?

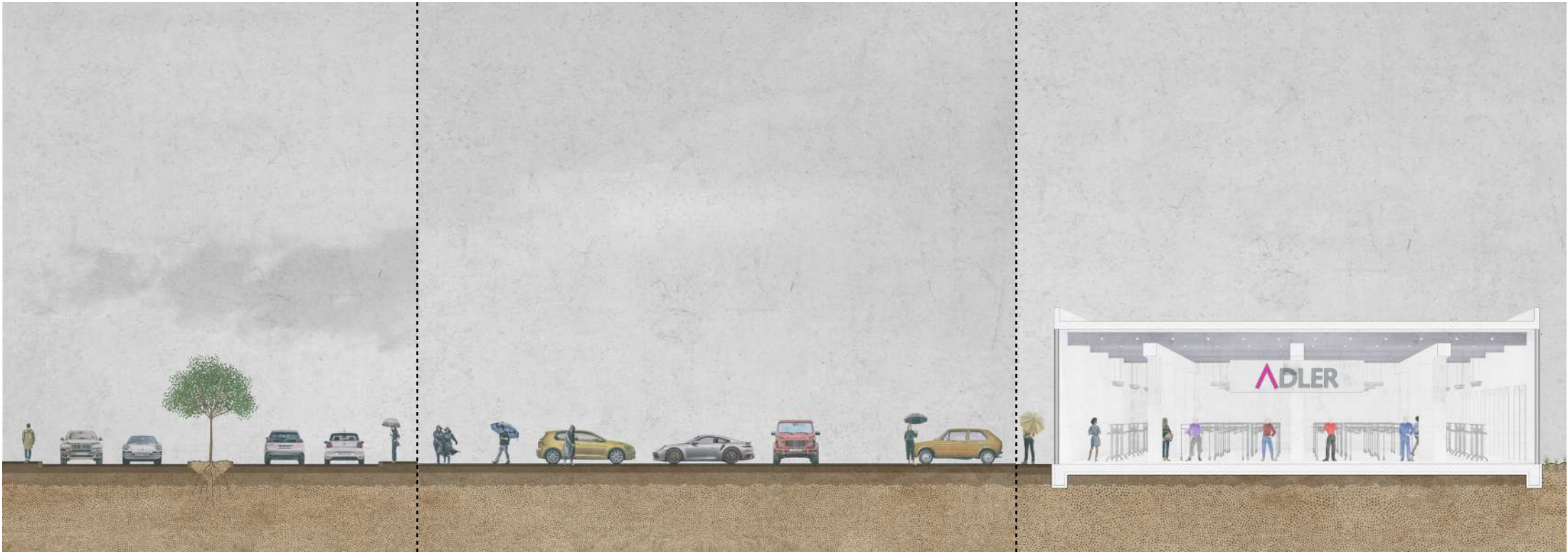


The economy must also undergo a substantial transformation as it is mostly not sustainable today. Each commercial entity must find its own economic theme and scale. Foetz, which is a rather big commercial zone today, could become a Repair District and Wood Cluster, both including education/training and production/craft (see in more detail in chapter 3).

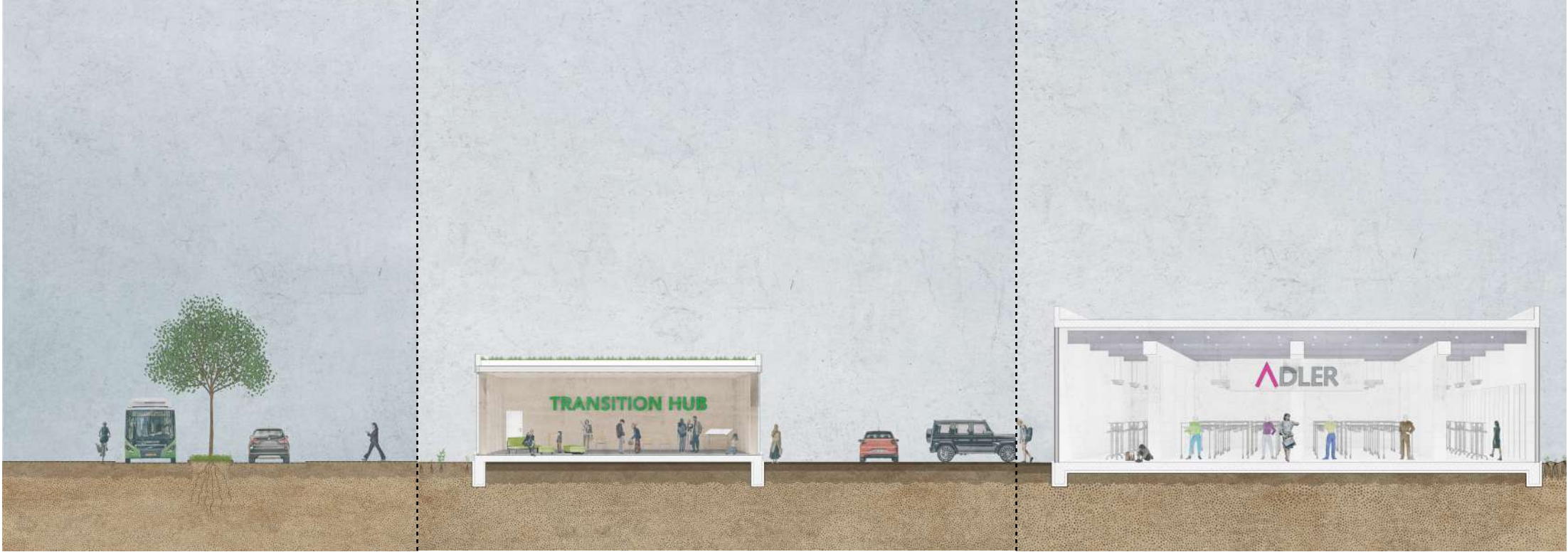


# — Transition

— 2021



— 2025



The cars on the parking lots will disappear by 2025, and the street will become a shared space. On the former parking spaces, a transition lab will be built which will dynamise the transformation of the commercial zone.



# Transition

2030



2035



Mixed-use buildings will be built on the periphery of the parking areas and form together a new neighbourhood. The transition lab is not needed anymore and will turn into a convivial space for the neighbourhood. Regarding the emergence of small grained commerce, there is no demand anymore for the mass production of the big retail structure, which will here turn into a public amenity such as a kindergarten or a primary school.



## — From shopping malls to co-working spaces



The goal is to substantially develop and transform the site without almost any deconstruction. The large hangars on the site, whose activity will become obsolete, will host new hybrid functions such as co-working spaces, repair shops, crafts-workshops for a wide range of labour. The clustering of different activities will create synergies and enhance the identity of the neighbourhood. If before these hangars were located in the centre of parking spaces, they are now in the heart of perimeter blocks and thus surrounded by different free spaces and housing—a reinterpretation of the *Kreuzberger Mischung*, combining housing (between the street and the courtyard) and working (in the backyard).



## — D. How to bring in nature and biodiversity

The fourth path of the transformation of commercial zones consists in the successive renaturation of the area. A landscape belt with different natural typologies will be created around the area, penetrating the site where possible. At the same time, the sealed areas between the buildings will be renaturalised and laid out according to the development with playgrounds, community gardens, trees, and parks. While the neighbourhood will not become self-sufficient in total food production, it will become almost self-sufficient in vegetable production. The residents' desire for more cultivation in the vicinity will be met through community gardens, solidarity farming, open farms, and similar participatory cultivation typologies. A key development will be to adapt the areas that were previously artificially carved into the landscape to the natural streams—especially when it comes to wind and water.



Manual

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1

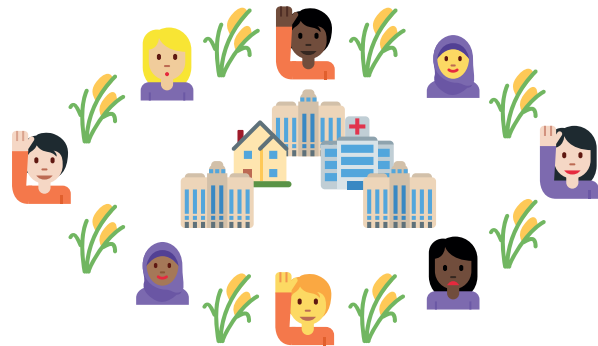
Unseal the land between buildings



—

2

Introduce green belt with community gardens, allotment gardens and solidarity agriculture



—

3

Make the city greener



—

4

Introduce water basins and water retention systems





# Problems and Potentials

## Unsealing land potential



32 hectare = 1/3 of the whole site

The multiple benefits of unsealing land include reducing stormwater runoff and ambient air temperatures in urban areas, increasing biodiversity and carbon uptake. Green spaces in urban areas improve residents' quality of life. Newly created green spaces can be planted with different vegetation to produce food or wood, maximize carbon uptake or water retention, and/or provide habitat for small mammals, birds, reptiles, and invertebrates.

Sealed land

## Productive agriculture



0 hectare land for food production

Foetz was constructed on land that was originally used for agriculture and partly woods. It has grown into a 100 hectare site that is almost completely sealed, and almost none of the land within the site is used to grow food or provide ecosystem services. Foetz is surrounded mainly by conventional agriculture.

Arable land

Grassland

## Trees

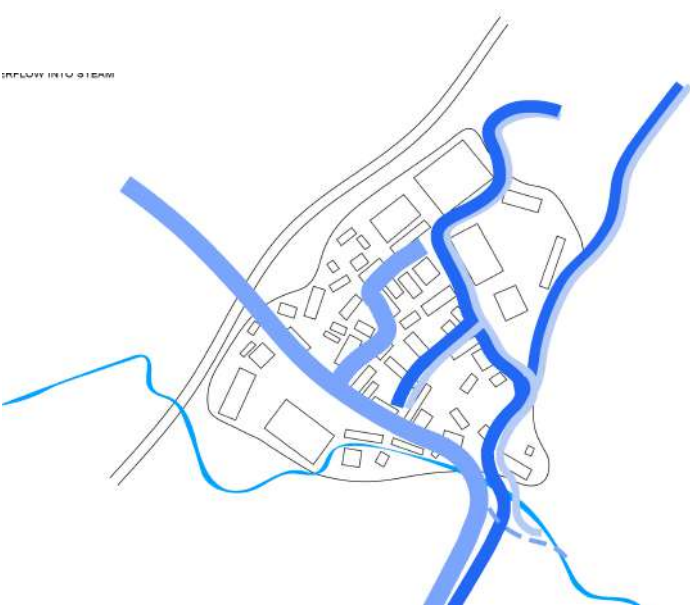


<10% green areas in Foetz

Foetz from above appears black and grey with only minimal foliage interspersed across parking lots, driveways, and roads. The lack of tree cover means that Foetz heats up on sunny days and that rainfall is not retained on-site. Scattered, individual trees on vast sealed parking surfaces provide little support of biodiversity.

Trees

## Water system



>50% combined sewer system

More extreme rainfall events due to climate change mean that combined sewer systems, as exists in the Southwestern part of Foetz, become overwhelmed and are forced to divert untreated wastewater directly into rivers. The Kiemelbaach is the most polluted watercourse of Luxembourg, mainly due to pollution coming from an old landfill across the A4. Separate sewer systems prevent further pollution of the Kiemelbaach.

Separate sewer (rainwater)  
Combined sewer  
Separate sewer (wastewater)  
Untreated wastewater overflow into stream



## — Strategies

Porosity



Although many new gross floor areas are produced, a lot of sealed surface remains between the buildings that can be renaturalised. Even previously tarred streets are transformed into paved but water-permeable surfaces. Thus, the previous heat island of Foetz is transformed into a porous neighbourhood where water can percolate and biodiversity is established in the urban space.

Green belt



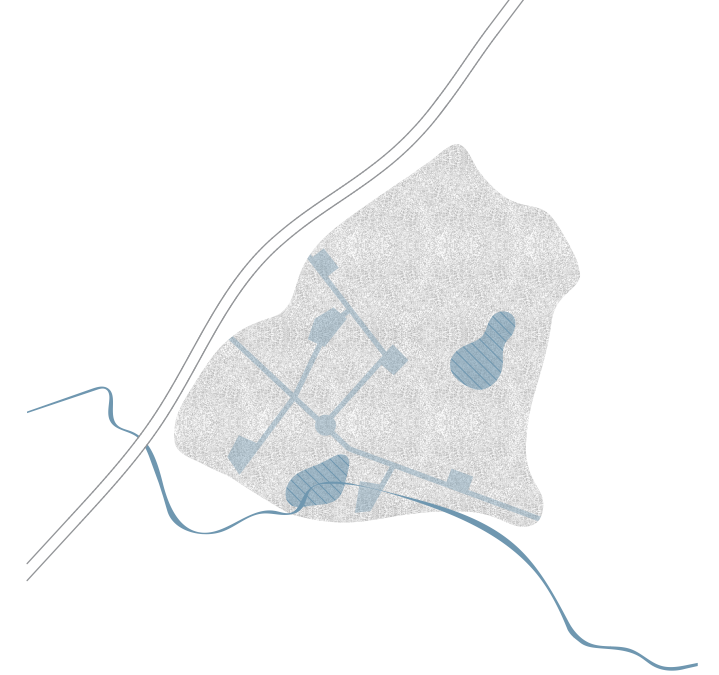
A landscape belt will be created around the area, penetrating into it where possible. The belt will accommodate the different open space typologies: Community gardens, allotments, playgrounds and sports fields, and many trees. But it not only has the function of a recreational area and as a space for biodiversity, as a *zone non aedificandi* it also limits the horizontal expansion of the area.

Forestation



Trees in urban areas are important for climate change adaptation, as they provide shade and help cool cities down at night. They also act as a carbon sink and provide habitat for birds and small mammals. A tree network across Foetz would provide important ecosystem services. The forested green belt around Foetz connects with the forest network of the surrounding landscape, creating ecocorridors for animal movement.

Green infrastructure water system

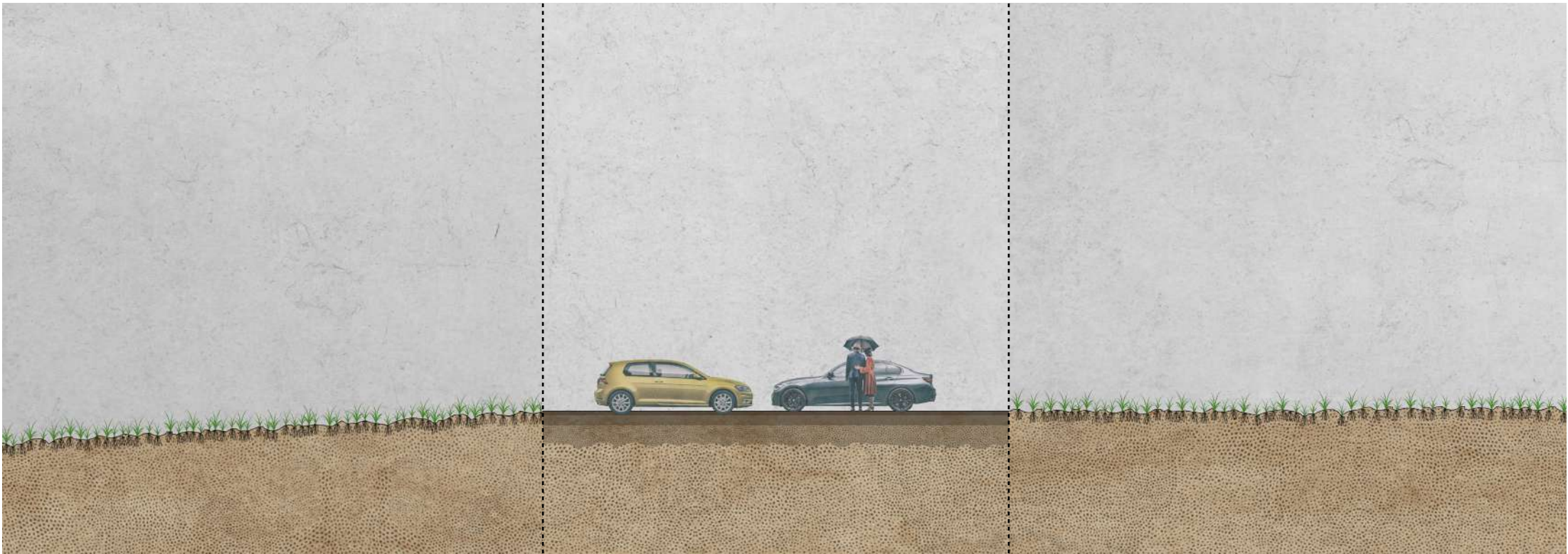


Green stormwater infrastructure relies on plants and natural systems to manage stormwater and increase climate resilience. It includes biofiltration swales, trees, and permeable pavements that reduce the volume and flow of water into pipelines and also filter pollutants. This is particularly important, since Foetz will transition to a fully separated stormwater management, in which rainwater treated in this way can flow directly into the Kiemelbaach.



# — Transition

— 2021



— 2025



The landscape around Foetz will be diversified to the same extent as the built structure. First, a green belt will be laid around Foetz, which will contain a rich tree population, playgrounds and sports facilities, as well as community and allotment gardens. At the same time, the courtyards of the new neighbourhoods will be renaturalised and equipped with open spaces at the scale of the neighbourhoods. Thus, the renaturalisation of Foetz will not only play the role of ecological resilience but also of social resilience. There will be no end to the development: the planting takes place as quickly as possible and, with regular maintenance, continues to grow, as does the resulting biodiversity.



## — From wasteland to a productive landscape belt



The view of the landscape belt shows a rich landscape that will be used in different ways: for growing vegetables and fruits, for playing and doing sports, for ecological learning, or just for lingering. Where the Cora hypermarket used to be, regional cultivation is now processed and sold. These rich open spaces will become the public spaces of the 21st century, where people meet and engage in activities together, debate or just enjoy the clean air and rich biodiversity.



# — Foetz: 2021

Building footprint (m²)  
Existing: 239,200  
New: 0  
Total: 239,200

Floor space (m²)  
Existing: 358,900  
New: 0  
Total: 358,900

Parking spaces  
New modifiable structures: 0

Green space (total, m²): 10,600

The repair of the commercial zone will be undertaken in three main steps until 2035 (we think that the transition should be targeted before 2050 whenever possible).





# — Foetz: 2025

Building footprint (m²)  
Existing: 239,200  
New: 16,700  
Total: 255,900

Floor space (m²)  
Existing: 358,900  
New: 99,900  
Total: 458,800

Parking spaces  
New modifiable structures: 3,800

Green space (total, m²): 10,600

The transition will start with a reduction of car traffic in the zone due to an increased offer in terms of public transport, a concentration of cars in parking structures located at the edges of the site, and the introduction of a qualitative public space which runs through the site in the south (represented here in ochre). The Kiemelbaach to the south has been renatured with forested buffers to absorb rainwater and prevent flooding.





# — Foetz: 2030

Building footprint (m²)  
Existing: 239,200  
New: 80,900  
Total: 320,100

Floor space (m²):  
Existing: 358,900  
New: 388,800  
Total: 747,700

Parking spaces  
New modifiable structures: 2,500

Green space (total, m²): 12,300

Until 2030, when the tram will have reached Foetz and connected the site with the two main cities of the country, Luxembourg-City and Esch-sur-Alzette, the first mixed-use buildings will be built on the periphery of the parking spaces whose centers will be unsealed, whose centres will be unsealed. Simultaneously, the green belt will be created and will penetrate the site.





# — Foetz: 2035

Building footprint (m²)  
Existing: 239,200  
New: 108,100  
Total: 347,300

Floor space (m²)  
Existing: 358,900  
New: 511,200  
Total: 870,100

Parking spaces  
New modifiable structures: 840

Green space (total, m²): 47,000

By 2035, the northern section of the area will be developed. This will spatially close the Avenue and repair the remaining urban fragments. As people hardly own cars anymore, but share them, the main part of the car parks will be converted into offices, public facilities and apartments—a conversion that has already been foreseen in the design. In general, everything that is built will be reversible, repairable, reusable, extensible, and if necessary demountable and recyclable. Thus, 2035 will not be the end point of a development that puts Foetz in a static state, but the end of the transition to a process of constant repair and inner development.



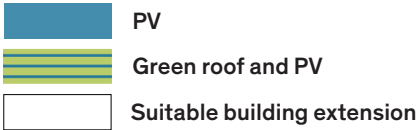


# — Activation of Rooftops

Existing: 198 GWh/year  
New: 88 GWh/year  
Total: 286 GWh/year

Carbon uptake in 2035 (t CO2eq/year)  
Green roofs on new buildings: 54  
Green spaces between buildings: 844

Foetz represents a large, untapped potential in the use of rooftops. In 2021, only 4 buildings had rooftop PV installed, generating about 2.6 GWh of renewable electricity per year. By installing PV on existing buildings and combined green roof and PV systems on new buildings, we increase production to 286 GWh, assuming a 65% usable rooftop area, panels on stands with 14% efficiency and production of 1275 kWh/m<sup>2</sup>. Rooftop PV would more than cover the annual electricity demand of the 10,000 residents of Foetz as well as Foetz’s commercial and production activities. Intermittency in electricity production would need to be counteracted by grid-scale batteries or batteries from Foetz’s electric vehicle fleet or by electricity from the grid. The carbon sequestration of green roofs is quite minimal - their main function is to regulate stormwater, provide habitat for biodiversity, and cool down buildings.









02 —

# REPAIRING LANDSCAPES



### Protecting and enhancing the green landscape


While the first part of the report described the transformation of Foetz, in this second part we elaborate on our vision of the landscape around Foetz and how the two scales interconnect.

Small towns and villages continue to sprawl in the landscape and threaten the green and agricultural belt that separates Esch-sur-Alzette from Luxembourg City. The set of yellow cranes to the left of the A4 shows, for example, the construction of “Motor City” by the Giorgetti real estate group on a 53 hectare site. The landscape around Foetz is also marked by soil and water pollution: A former landfill site causes pollution in the Kiemelbaach that runs South of Foetz.

In the future, Foetz should be connected with the surrounding landscape and people through a multifunctional green network that improves biodiversity, provides ecosystem services, and functions as a pedestrian and bike path network to allow people to move around an area that is currently disconnected and accessible only by car. People living in neighboring Mondercange today opt to go shopping in Foetz driving the 2km by car, since the roads are too narrow and dangerous to allow for biking. While the A4 and tram connects the center and South of Luxembourg, a series of eco-bridges, particularly at the height of the Kockelscheuer forest would connect the landscape on an East-West axis and allow for wildlife passage in a growing network of forests and eco-corridors. Instead of widening the 16km stretch of A4 to accommodate the tram, we maintain the existing width, allocating two lanes to the tram and a bike path. These measures would support the transition from a car-centric mobility to public transportation and soft mobility.





An aerial photograph showing a large industrial and commercial complex. In the foreground, there are several large industrial buildings with flat roofs, some with solar panels. To the right, there is a large parking lot filled with cars and a few commercial buildings, including one with a 'Burger King' sign. A dashed white line runs across the middle of the image, separating the industrial area from the commercial area. In the background, there are green fields and a town. The Cattenom Nuclear Power Plant is visible in the far distance, with smoke rising from its cooling towers.

From a sealed, artificial island to a Sponge City  
Today, wastewater in most of Foetz is disposed conventionally, as wastewater and rainwater are collected together in a combined sewer system and carried via pipelines to the wastewater treatment plant in Schiffflange. This strategy leads to the following problems: (a) discharge of (diluted) wastewater (ca. 30 – 40 times per year) during heavy rainfall events into waterbodies (e.g. Kiemelbaach), leading to pollution with nutrients and pharmaceutical residues; (b) risk of flooding events; (c) only little infiltration of rainwater, leading to decrease of groundwater, all of which are exacerbated by climate change.

In future, a variety of Sponge-City concepts with sustainable water and wastewater management practices should be realized. These consist of: (a) separation of wastewater fractions in larger buildings: greywater (wastewater from non-toilet plumbing systems) should be treated after collection in nature-based constructed wetlands. Treated greywater can be used for irrigation of green spaces or for toilet flushing; (b) cross-linked open green spaces that are able to retain rainwater, increase infiltration and boost biodiversity; (c) green roofs that can retain rainwater, filter it, and help reduce flooding downstream; (d) porous design of roads, pavement and parking spaces allow rainwater to be absorbed, drained and lead to recharge of groundwater.

The benefits of implementing sponge city concepts include a load reduction of the existing wastewater treatment plant, a decrease of problematic pollutants in receiving waters, a reduction of flooding risks, enriched biodiversity, and more and cleaner groundwater.



### Renaturation of rivers and extensive agriculture

The Kiemelbaach is the most polluted watercourse in Luxembourg. It flows past a former landfill, where it takes on polluted stormwater that has trickled through the landfill, then alongside the southern edge of Foetz. Here it takes on stormwater runoff (including any pollutants on the parking lots and roads) from the separate sewer system in the upper part of Foetz. The lower part of Foetz has a combined system, which is forced to divert untreated wastewater into the Kiemelbaach during heavy rain events.

This photo shows the eastern part of the Kiemelbaach as it enters the Dumontshaff Nature Reserve, including the more recent extension towards Foetz. The nature reserve is the result of a watercourse renaturation project initiated by the Schiffflange Commune in 2005. Restoration of the original, meandering path of the river has reduced the peak waterflow downriver by 10%. Extensive, in contrast to intensive, agriculture is practiced alongside the river on 42 ha with specially adapted river buffalo and Galloway cattle. The new forest and vegetation capture 227 t CO<sub>2</sub>eq per year. Renaturation has increased biodiversity: 16 species of migratory birds that had not been seen by the Alzette over the past 50-60 years, now regularly visit the nature reserve.







Renaturation of riverbeds in partnership with farmers practicing extensive agriculture is our vision for the Luxembourgish landscape. It comes with several benefits, including reducing the risk of and damage from floods, and increasing biodiversity and carbon uptake. In light of climate change, flood water management takes on a particularly important role as an adaptation strategy. Combined with large-scale unsealing of Foetz and the conversion of rooftops to green roofs, stormwater from the Foetz site will be greatly reduced. These measures reduce the risk of damaging floods downstream, such as occurred in Bettembourg during the July 2021 flood event.



# — Problems and Potentials

## Infrastructural fragmentation

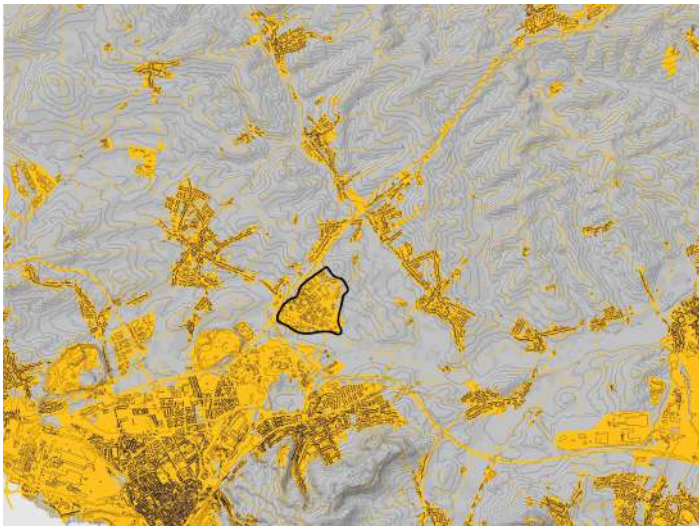


1200 wildlife-vehicle accidents/year in LU

Highways cause habitat loss directly in proportion to the highway area sealed and beyond, as some wildlife avoid roads. Highways also cause habitat fragmentation by preventing wildlife movement from one section to another, as for example the A4 cuts through the large Kockelscheuer forest. Highways also go hand-in-hand with monofunctional use of space, as the greater distances between different spaces and thus different functions are most easily covered by car.

A4 Highway

## Sealed land



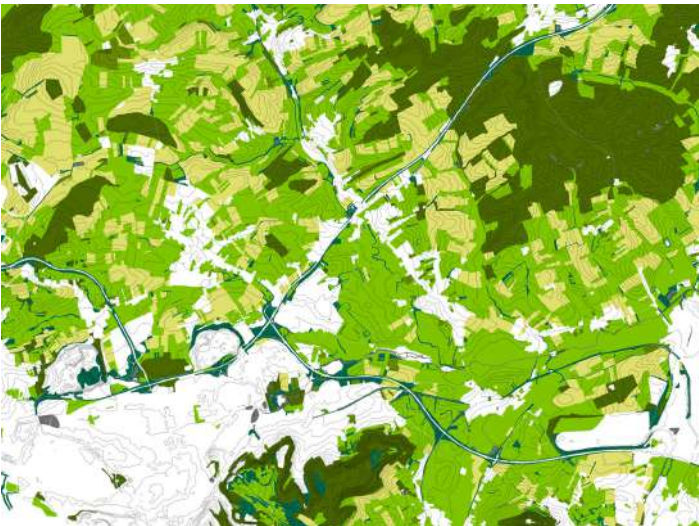
Sealing rate of 0.53 hectare/day

Unchecked growth in towns is unsustainable, since it seals land that would otherwise serve as a carbon sink and since the dispersed population does not provide the density required by an efficient public transportation system. This trend calls for the development of new landscape design systems that will control the growing sprawl and focus growth within the existing urban cores.

Sealed land

Unsealed land

## Productive and unproductive land



5% organic agriculture in Luxembourg

Foetz sits atop a productive agricultural belt separating Esch-sur-Alzette in the South from the Kockelscheuer forest and Luxembourg City in the North. While conventional agricultural practices and continued soil sealing threaten the sustained productivity or biocapacity of the land, there remains a great potential to halt and reverse the trend by shifting to agro-ecological food production, unsealing artificial surfaces, and creating a network of green eco-corridors.

Arable land

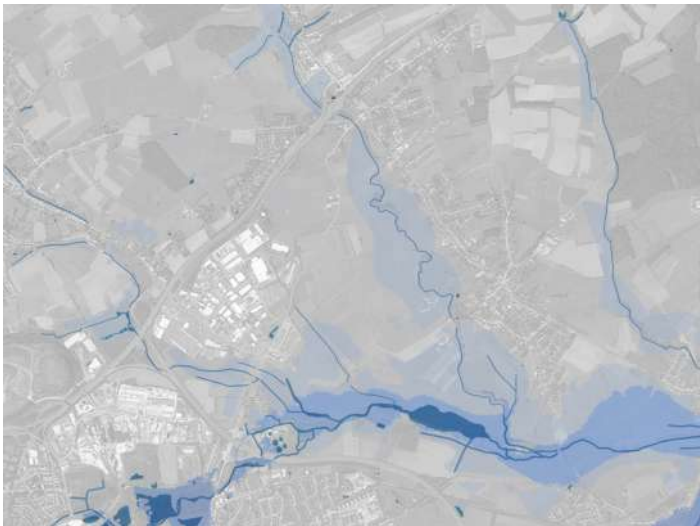
Grassland

Fruit trees

Orchard

Forest

## Flooding potential



Floods up to 9 times more likely due to climate change

The flooding in Luxembourg in July 2021 was 1.2 to 9 times more likely to have occurred due to climate change to date (1.2°C increase in global average surface temperatures since the pre-industrial period). As climate change will likely worsen before mitigation efforts can reduce greenhouse gas concentrations in the atmosphere, the risk of flooding in Luxembourg, particularly during the winter months, will increase.

Flooding areas

Wetlands



The collage of development plans in the landscape shows how far the small towns and villages continue to grow and to what extent this growth is still zoned. For resilience of the landscape and decarbonisation of the region, an urgent paradigm shift in spatial planning is needed: the small towns and villages should no longer grow at all and the cities should only grow on available sealed land. In the process, the classic zoning should be stopped and a radical intermixing of living, working, production, commerce and leisure should be made possible. The map would have to be given a single mixed colour that no longer differentiates functions (except for noisy industrial production) and that morphologically follows the following plan: the natural streams of the territory.

- Residential area 1
- Residential area 2
- Urban mixed-use area
- Village mixed area
- Rural mixed are
- Public buildings and facilities area





Use the existing to anticipate the changes of tomorrow

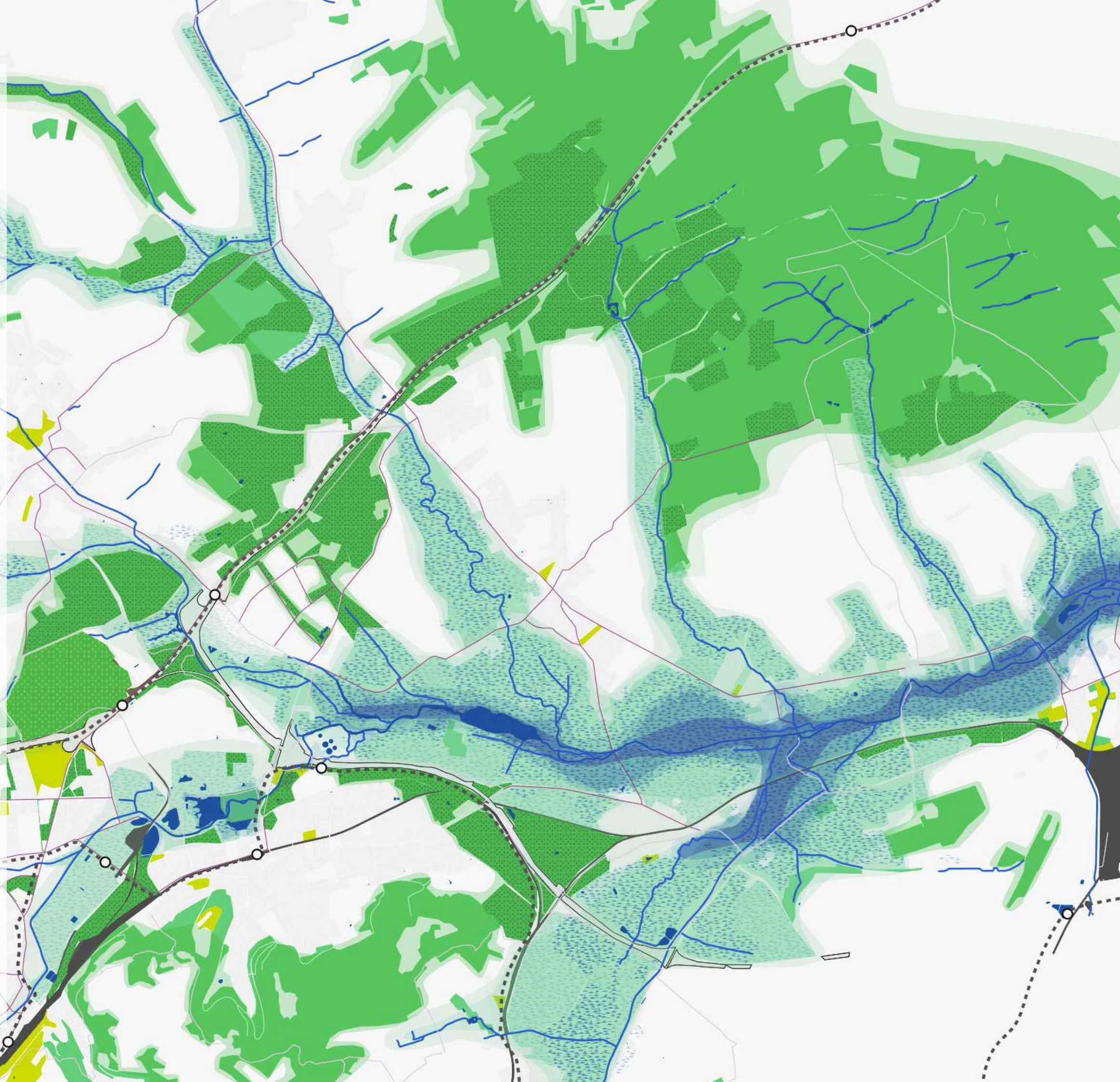
From the existing woodlands and forests, we create a large-scale forest infrastructure that supports many possibilities for: (1) the creation of large pedestrian and cycling continuities; (2) the development of biodiversity and air cooling; (3) soil decontamination by the root system; (4) the production of wood for the construction of buildings; (5) the production of fruit through large orchards; (6) the ability to reconnect parts of the territory that are currently cut off by road or rail infrastructures by creating ecoducts.

First, we create a system of forest parks that connects existing woodlands and brings together many actors of the territory to maintain it. It also has the role of providing clear and visible boundaries to urban expansion and qualifying poorly-programmed spaces between road and rail infrastructure.

Second, we give watercourses the necessary space for future floods, slow down the water as much as possible, desilt the soils, and associate them with forestation able to support these events. The map shows the flood expansion zones that make up this landscape, which can be agricultural most of the time but which sometimes accept these floods.

Third, we make multifunctional use of land, such as through agro-forestry, agrivoltaics installed on 5% of cropland, and the incorporation of a bike and pedestrian network into the larger green infrastructure connecting and traversing the urban and rural elements of the landscape.

-  Tramway network
-  Stream network
-  Renaturation: riverside vegetation
-  Renaturation: wetland (flooding area)
-  Urban areas
-  Urban green areas
-  Pollution removal by vegetation
-  Forestry — project
-  Existing forest
-  Existing bike path
-  Bike path — project



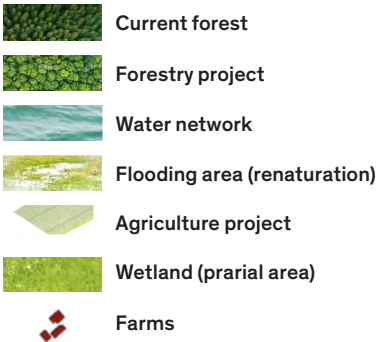


A greener and more productive Foetz

On the scale of Foetz, the principle is to create physical and visual relations between the urban framework and the landscape framework, which includes the forest, the hydraulic and the agricultural system. We propose a porous, deep, and permeable system to give future users a healthier and more enjoyable life.

Unsealing land in Foetz will perhaps be the most visually striking change to Foetz, next to the shift to using the land for residential purposes. Sealed land that is used inefficiently, e.g. mostly vacant parking lots or unnecessarily wide streets, are inherently unproductive. Trees and shrubs in urban green spaces reduce thermal stress during the day and night and also improve air quality by filtering air pollutants. Green roofs play their part in cooling, reducing stormwater runoff and sequestering carbon. The unsealed land will also be used for vegetable and herb production in urban, community, and allotment gardens scattered throughout Foetz and concentrated in the inner courtyards of the new residential blocks. Fruit trees will be planted in the green corridor separating the more industrial northern part of Foetz from the more residential southern part. The green corridor also creates a cold-air corridor across Foetz and aligns with existing flow patterns.

A much greener Foetz will not only supply the residents with a steady stream of fruit and vegetable production, but also provide important ecosystem services and contribute positively to people's quality of life. In contrast to the usual centring of built objects in architectural and planning practice, this project takes landscape as its central element, both in terms of revisiting its productivity and biodiversity, but also as a tool for blocking urban sprawl, thus redirecting growth towards inner urban densification.





# — Planting Calendar

In future, 13.5 hectare newly unsealed or transformed areas within Foetz will be available for vegetable cultivation. Using organic production methods, about 870 dt of vegetables would be produced over a year, which amounts to 87 kg per person for the 10,000 people living in Foetz. This corresponds to about 80% of the average vegetable consumption per person in Germany over a year – meaning that during the most productive, seasonal months, the yields represent about 100% of local consumption needs.

The planting calendar (based on data provided by Frank Adams and supplemented with empirical data from Claude Petit of Krautgaart, Pit Reichert of TERRA and Marc Thiel of SIAS) documents the different cultures that producers are already growing today throughout Luxembourg. Additionally, numerous popular and less known vegetables are currently successfully being experimented with in Luxembourg: pak choi, aubergines, radicchio, peppers, spring onions, chives, dill, coriander, broccoli, cauliflower, artichoke, parsnips, black salsify, garlic, and rucola, among many others.

The organic vegetable production would benefit from compost produced at the Minett Kompost facility, located almost adjacent to Foetz about 500m to the southeast. Any organic waste resulting from production and consumption of these vegetables in Foetz would be returned to Minett Kompost to complete the cycle.

Fruit trees in the 2.5 hectare green corridor crossing through Foetz would produce 5 kg per person per year of apples, cherries, pears, mirabelles, quince, reine-claude or plums. Together with 1.4 hectare for herbs and edible wildflowers, a local, healthy food production can be achieved, while optimising biodiversity and soil health through sustainable crop rotation in and around Foetz.

Vegetable	Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yield (dt/ha)	Production (dt)
Beetroot	F	S				P				H		S		250	8.5
Brussels sprout	F	H					P					H		150	5.5
Cabbage (spring)	F				P		H							780	57.6
Cabbage (fall)	F					P				H					
Carrot	GH			P		H									91.3
Carrot	F				P		H							900	
Carrot (storage)	F	S			P		H					S			
Celeriac	F	S					P			H		S		400	14.8
Celery	F						P			H				300	11.1
Chard	F					P	H							570	57.8
Chard	GH			H2 P1		H1				P2					
Corn salad	F								P			H		80	19.5
Corn salad	GH	H										P	H		
Cucumber	GH					P		H						1125	76.1
Endive / chicory	F								P		H			487	49.4
Endive / chicory	GH		H							P					
Fennel	GH				P		H							300	30.4
Fennel	F					P		H							
Green bean (bush)	F					P	H							200	16.2
Green bean (pole)	GH				P		H							200	20.3
Green bean (pole)	F					P	H								
Kale	F	H					P				H			500	18.5
Kohlrabi	GH		P		H									195	19.8
Kohlrabi	F					P	P / H								
Leek	F	H				P				H				300	11.1
Lettuce (butterhead)	GH		P		H									250	25.4
Lettuce (butterhead)	F					P	P / H								
Onion (seed)	F					P	H			S				450	15.2
Onion (set)	F			P			H			S					
Parsley	GH 1			H							P				21.9
Parsley	GH 2		P		H									270	
Parsley	F				P		H								
Pea	F				P		H							150	12.2
Pumpkin	F	S					P				H	S		360	26.6
Radish	GH		P		H									300	73.1
Radish	F			P		H									
Radish (winter)	F								P		H		S	500	50.7
Spinat	GH		H								P				5.1
Spinat	F 1			P		H								150	
Spinat	F 2				H				P						
Sweet corn	F					P			H					160	5.9
Tomato	GH					P		H						1000	73.8
Turnip (may)	F			P			H							350	35.5
Turnip (fall)	F							P		H					
Zucchini	F					P	H							400	14.8
Total															868

F

Field

GH

Greenhouse or foil tunnel

P

Planting (seeds)

P

Planting (seedlings)

H

Harvest

S

Storage



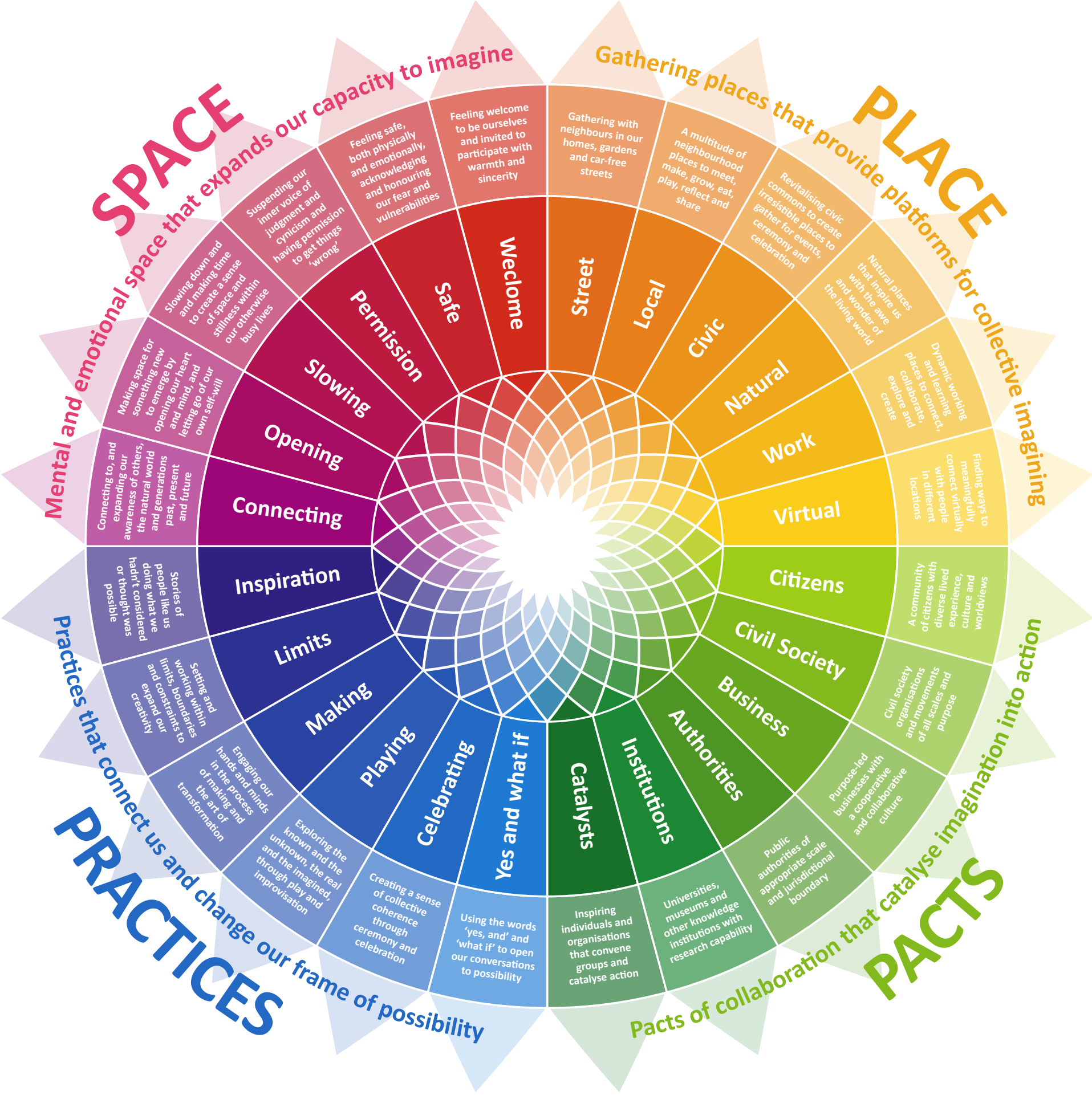
03 —

# CATALYSING TRANSITION



RE-design Foetz by imagination

Limiting global warming to 1.5°C requires rapid, far-reaching and unprecedented changes in all sectors of society. According to Rob Hopkins, co-founder of the Transition movement, the climate emergency calls for rekindling collective capacities of imagination, design and action along four main components: space, place, practices and pacts. The Sundial diagram designed by Rob Shorter condenses the pioneering experiences of thousands of transition initiatives into a participatory tool for catalysing and accelerating local and larger-scale transitions. In the following subchapters we will touch upon the critical importance of each component and how they can be applied to transforming commercial zones. To make a commercial zone such as Foetz future proof, technological innovation will not suffice. Our team investigated what it takes to catalyse transition imagination in a zone that has no inhabitants and lacks strategies and tools to cope with climate mitigation and resilience challenges.





#### A. Spaces of imagination

The right kind of mental, emotional and relational space activates and expands our ability to imagine a desirable and achievable future that is different from both business-as-usual or science fiction. Space is a framework in which collective intelligence generates the models of society we need to address the mutually reinforcing societal challenges (climate, resources, cohesion, pandemic, to name just a few). Examples of spaces from CELL's experience that foster collective intelligence are climate assemblies, Transition Days, many forms of citizen meetings at local level (DIY workshops, open forums, world cafés etc.), as well as permaculture trainings. In the following we will show how artistic performances and games that we prototyped in Foetz can complement the approaches for activating the imagination of citizens and other stakeholders.

**How could artistic performances and games that we prototyped in Foetz complement the approaches for activating the imagination of citizens and other stakeholders?**



### The Urban psychoanalysis

The 'National Agency for Urban Psychoanalysis' based in France is a multi-disciplinary team that developed in 2007 an original method that consists of putting 'cities on the couch,' detecting urban neuroses and proposing appropriate therapeutic solutions. Urban psychoanalysis is an investigation of the 'unconsciousness' at the origin of the urban development of a city or a district within a city. Urban psychoanalysis uncovers hidden imaginaries underneath urban developments by means of artistic performance, associative thinking and symbolic representation, potentially opening up new options for urban regeneration. The ANPU protocol stipulates that it begins its mission with a 'couch operation' (French 'opération divan'), during which inhabitants are asked to describe their city, using a questionnaire with poetic language. In parallel, the ANPU agency meets resource persons who help them better understand the city. A synthesis is drawn up, intentionally parodying both the language of psychoanalysis and that of urban planning.

For imagining Foetz 2049, on Friday, 12 November, and Saturday, 13 November 2021, CELL and the University of Luxembourg invited citizens to share their vision of the commercial zone. What is the perception of the citizens of this area today? How do they sense it will evolve in the future? How can this area be developed while respecting its natural, economic and social boundaries? The users of the area have been invited to share their visions for the commercial zone in 2049, and a sample of responses are shared on the following pages.





What if the Foetz shopping area was a fruit?

A pumpkin was often been mentioned because of its large size, as has a cluster of grapes, because the shopping area is made up of numerous signs linked together by a sort of stem and branches formed by the traffic lanes. The same idea can be found with the cauliflower because this vegetable is composed of many small parts, or via the pomegranate and all its seeds. The availability of the shopping area was mentioned many times, for example via apples because they are available all year round, or via lettuce, which is generally tasteless, as one interviewee said, but which has the advantage of growing very quickly and always being on the shelves.

What if the Foetz shopping area was an animal?

Here too, the impressive size of the shopping area was evoked, for example, through the figure of an elephant, a hippopotamus, a giraffe that is always growing, but also a mammoth that is always hungry. The predatory dimension of the area also came up several times through, for example, a tiger that would be very dangerous for small shops, a wolf, a jackal and even an octopus in its tentacular dimension capable of attracting all the consumers who pass through the area, as can also be the case with the snake (note the snake), which was mentioned, no doubt in connection with the advertising messages that are very present on the site. That said, many people agreed that the shopping area was like a cash cow. Other pejorative images appeared, such as a rat living in a hole or a hedgehog crushed by cars, as opposed to an easy-going and friendly dog mentioned by an older lady who considers the shopping area above all a place to meet and socialise.

What if the Foetz shopping area could be summed up in a movie title?

*Titanic* has often come up in the conversations, because for many the Foetz shopping area is far too big, oversized and will end up sinking in circumstances that have yet to be determined. In the same vein, *Mad Max VI* is also positioned in a futuristic vision of the place, whereas with *Les Misérables*, *The Grand Illusion*, *Le bonheur des dames*, *L'arnaque*, *The Good, the Bad and the Ugly*, *Santa Claus Is a Stinker* or *The Truman Show*, the place is once again approached in a slightly pejorative way, unlike *Merlin the Wizard*, *Sleeping Beauty* or *Snow White and the Seven Dwarfs*, which are more concerned with the marvellous dimension of our case study.

Many people agreed that the shopping area was like a 'cash cow.' Titanic often come up in the conversations, because for many the Foetz shopping area is far too big, oversized and will end up sinking in circumstances that have yet to be determined.



What if the Foetz shopping area had a father and a mother?

We were told that the Foetz shopping area was born of the marriage between agricultural land and the logic of the market, of the marriage between Esch-sur-Alzette and Schifflange, of the marriage between the baby boom and a cash register, of the marriage between a steak deity and the striatum (\*), and of the marriage between a small grocery shop and an electronics shop that would be proud to have seen their child grow up and become so successful. We have heard rumours of a zone born of a marriage between the economist Milton Freedmann and the architect Le Corbusier and/or the marriage between Luxembourg and the border, or perhaps the Foetz zone was simply born of the somewhat problematic marriage between the USA and China, or else between lack of imagination and bad taste.

(\*) The striatum is the inner part of the brain that regulates motivation and impulses. It is probably the most important brain area in decision making and also plays a key role in addiction.

What if the Foetz shopping area was offered a present for its birthday?

A trip to Dubai was almost unanimous because this city is universally recognised as a paradise of consumerism at its most pathogenic, while other people advised the Foetz shopping area to take a trip to Disneyland instead, to recharge its batteries of wonder. Otherwise, the participants of this couch operation have offered to join forces to offer the Foetz shopping area a common gift, but they are still hesitating between a yoga session, a classical music festival, a bag of fresh cocaine, a four-storey car park with a helicopter pad on the roof, noise-cancelling headphones, a hectare of farmland, an inflatable swimming pool with a slide, a fairy costume, pyjamas, an electric scooter to avoid traffic jams or a new haircut from Ryan-Hair.

What if the Foetz shopping area was a music or song?

Spontaneously, many interviewees mentioned heavy metal (the song Highway to Hell for example) as if the shopping area was experienced as a harsh, somewhat violent place, while other regulars seemed to appreciate the warmth of the place more with songs like Still Living you (The Scorpions), Born in the USA (Bruce Springsteen), We are the champions (Queen), Aux Champs Elysées (Jo Dassin), On ira tous au paradis (idem) or simply Petit Papa Noël (with a preference for the unforgettable version by Tino Rossi). In a more critical register with regard to our case study, let's remember Lost in the Supermaket (The Clash), Beds are burning (Midnigh Oil) and more generally elevator music that would fit well with a place above all intended to put us to sleep and hypnotise us to extort as much money as possible, an employee of the zone confided to us on condition of anonymity.

**A trip to Dubai as a present to the city received almost unanimous approval, because this city is universally recognised as a paradise of consumerism at its most pathogenic state.**



The urban psychoanalysis performance in two locations in Foetz showed how challenging it is to invite random users of this functional space to take a few minutes off from their respective occupation or trajectory. Those that followed the invitation offered themselves an unusual experience by responding to the poetic questions and the request to draw how they imagine Foetz in 2049.

Many verbal responses reflect heavy, strong if not aggressive characteristics of the current state of affairs, reason enough to think about how to make the area more inviting. But a few almost opposite views were expressed. A person working in one of the shops, for instance, insisted that the shopping centre is really very friendly and calm. All depends on the reference, in this case other even still bigger shopping centres, whereas the vantage point of an environmental activist leads to foregrounding other aspects. The artistic approach of urban psychoanalysis does not require finding coherence, nor a middle ground or a statistical average as a scientific approach would do.

Paradigmatic differences show up even more clearly in the drawings of the future of Foetz. Mixing functions (1), growing vertically (2), and new modes of transportation (3) show complementary options for gradual development other than business-as-usual. These options happen to be important ingredients of the transformative vision of our team. But some respondents came up with outright disruptive images of physical destruction, economic decline or technological leap, reminding us that such a commercial zone as a whole might well become obsolete (4). Some of the spontaneous artists managed to represent the principle of porosity in which nature and human settlement flow into each other (5). This principle has been a starting point for the research of our team<sup>3</sup>, becoming reinforced here by the imagination of site users.

#### Foetz mi-cité

Ici, on se retrouverait à l'opposé même du principe du zonage avec une nouvelle configuration qui formerait une zone ou mieux encore, une couche d'zone qui intégrerait tous les ingrédients et temporalités du vivant. Nous, les arbres, nous, les animaux, nous y achèterions, nous y vivrions, nous y mourrions, pour former la mi-cité — mais avec son autre moitié.





### Foetz fractale

La dimension fractal de la zone commercial pourrait nous inspirer, à la manière du flocon de neige ou de l'architecture d'un chou-fleur, un principe de développement urbain à mi-chemin entre la surdensification de la ville centre et l'étalement urbain incontrôlé. Mais saura-t-on penser comme un chou-fleur en 2049?

### Foetz hauteur

Et si nous transformions cette zone clairsemée de financiers aux amandes en empilement de pan-cakes ? Plutôt que de continuer à s'étaler horizontalement, la zone commerciale s'élancerait vers le haut, via des superstructures à la Yona Friedman qui viendraient anjamber les boîtes de la zone pour s'élever vers le ciel, à la manière de tours Eiffel habitées, tels des villages vernaculaires verti-caux.

### Foetz transports

Durant l'opération divan, on nous a beaucoup dit que la zone commerciale serait née du mariage de la voiture avec le commerce. Aura-t-elle réussi, en 2049, à s'émanciper du modèle parental et découvrir son identité profonde ? Quel type de THC (Transports Hors du Commun) lui permettra alors s'épanouir pleinement?

### Foetz deuil

Ce nuage de fumée en forme de champignon nucléaire augure peut-être de la fin prochaine de la consommation de masse. Les caddys livreurs et les achats connectés pourraient bien avoir raison de cette pratique anthropologique si particulière quand on y repense. Allons-nous assumer le deuil des zones commerciales plutôt de vouloir les sauver à tout prix ? Irons-nous jusqu'à l'acharnement thérapeutique?





### Games, participation and planning for ecological transitions

The integration of games to support participatory planning processes and lead to spaces of imagination is not a new phenomenon. From both the fields of academia and practice, the literature provides a large diversity of games. There are examples of board games, location-based games, gamified augmented reality applications and new and emerging virtual reality games. Such games are used to raise awareness of particular planning issues, simulate discussion on planning processes and develop scenarios or elicit public perceptions on planning applications.

Despite their viability, game-based approaches are rarely formally integrated into the planning process and often remain the responsibility of academics or consultants to design and administer in an ad hoc fashion for different projects. For true participation in planning of ecological transitions in Luxembourg, we need to go beyond simple notions of information and consultation. It is no longer sufficient to present citizens and stakeholders with plans at various stages in the process and ask them to review and comment on the ideas developed by others in the planning process. To improve the socio-economic and environmental determinants of our neighbourhoods and to reach carbon zero by 2050, local issues need to be diagnosed by local communities comprising both residents and those that work in that place. Such communities of citizens are better able to reflect the everyday lived experience and reveal true observations and share local knowledge and reflections on their needs.

Therefore, we need a more inclusive and co-creative approach that integrates participatory planning and what better way is there than one that is social, playful and encourages dialogue and exchange? The involvement of local residents and workers in the creation of plans will support ownership in how they are implemented and lead to reimagined spaces better serving the local population. This is because participatory planning leads to democratic governance. It also encourages the development of place attachment and enhances sense of belonging because citizens feel a connection





to the plans that better represent their needs. Participatory approaches have considerable potential to transform our villages, towns and cities so they are connected to the human scale.

In this context games—digital, hybrid or physical—offer a tangible solution within participatory planning. Their inherent sociability and playfulness can be maximised to support the exploration of complex multidimensional and multi-scalar issues whilst simultaneously stimulating the imagination and encouraging cross-cultural dialogues. The result is collaboration and consensus-building and the creation of spaces of imagination and reimagination.

**For true participation in planning of ecological transitions in Luxembourg, we need to go beyond simple notions of information and consultation. It is no longer sufficient to present citizens and stakeholders with plans and ask them to comment on the ideas developed by others in the planning process.**



An introduction to “Carbonopolis”: a game to support dialogue building on sustainable planning initiatives

Carbonopolis: Letz bring it down! is a prototype board game, designed by Catherine Jones and Tom Becker of the University of Luxembourg. Its goal is to stimulate awareness and encourage exchange on six topics related to climate change issues in Luxembourg. By playing the game, participants have the opportunity to explore and discuss carbon reduction planning initiatives that could be implemented. We use a blend of game play inspired by the traditional 'shoots and ladders' boardgame together with different types of event playing cards. Groups of 2 to 5 players alongside a game-master and game observer then interact with different forms of game content. There are three types of playing cards all of which draw upon content from the 6 themes of urban heat islands, extreme weather and flooding events, quality of life, mobility, housing and construction and food and agriculture.

Players start with 8 carbon tokens, and the aim is to lose as many as possible during the play session. A role of the dice determines their moves and different icons on the game board indicate which playing card they must select. Footprints on the game board require participants to answer a yellow multiple-choice question that draws upon factual statistics in relation to CO2 emissions from National and European reports to challenge players on their knowledge. We designed a range of questions some of which are obvious to answer whilst some are more challenging. If correctly answered, players lose a carbon token. The green planning Initiative cards are drawn when a player lands on the leaf at the base of the magic tree. Players read aloud the short description and discover 4 different planning initiatives that would ameliorate the issue under the spotlight and lead to a reduction in CO2. They have to discuss which initiative they would prioritise for their neighbourhood and why. If they successfully engage in a discussion, they lose 3 carbon tokens and climb the magic tree. If the player lands at the top of the slide of doom, unfortunately they have encountered a crisis (which can be local, national, regional or beyond)—they must take a red crisis card. They read about issues that result for inaction and failure to implement carbon reduction policies. They are asked about what could have been done but it is too late and unfortunately, they must slide backwards and gain two tokens. The winner of the game is the player with the fewest carbon tokens once the first player crosses the finish line.





### Carbonopolis: the player experience

The game was playtested in 4 sessions over three weeks. Each session took place in a different spatial setting and at different times of day. To date, the game has been played by 20 participants of which there were 8 female players and 12 male players. The length of play varied from 25 minutes to an hour—determined by the roll of the die and the type of card that was landed on. The depth of discussion was stimulated more naturally and comfortably when players were in a space designed as social setting. Dialogue between players in the classroom and the bar naturally encouraged exchange between people—both places where sociability is a norm.

The inherent multicultural nature of Luxembourg's resident population was also reflected in the game where players' heritage varied from Luxembourgish, French, Chinese, Iranian and more. In the setting of the bar where participants were most at ease, we observed a number of multicultural exchanges of ideas around different types of planning policy initiatives and their challenges. This led to rich discussions on the different types of planning artefacts, policies and the social and physical environments where the game supported spaces of imagination and participants reacted, elaborated and contemplated upon what could and should be implemented in a Luxembourg setting.

To evaluate the game, players were given a set of post-it notes for different themes together with a deck of cards with descriptive words (positive and negative) to summarise their perception of the game. For each theme players were given four cards from the deck of descriptive words and were asked to select the one that most closely represented their sentiment. If none of their cards matched their feeling, there was one blank card per theme that they could negotiate with the other players to use.

Another game developed recently by CELL and is yet to be tested in Foetz is the transition game URBO. The participants of this role-play game are asked to transform their city by creating on food, consumption, mobility and energy projects.





#### B. Practices of co-creation

Practices change our frame of possibilities: It's what we can do together, breaking down societal norms to open up a greater sense of what is possible. Practices are inviting us into Transition in action, where things begin to move through new forms of cooperation. Examples of practices from the Transition movement are numerous, such as energy cooperatives, community supported agriculture, community gardens and repair cafés. Unfortunately, Luxembourg has not been able to show any successful co-operative housing project so far—due to political failure.

**Luxembourg has not been able to show any successful co-operative housing project so far due to political failure.**



## Wood hub

Wood metrics for Luxembourg: Did you know 11,000 jobs are associated with the wood industry, more than half of which are in the construction sector and with 1,500 companies directly or indirectly involved? The forest cover represents 92,000 ha, i.e. 36% of Luxembourg's territory. 54% of forests are privately owned. Every year 500,000 m<sup>3</sup> of wood is harvested in Luxembourg (3% of total volume Greater Region), from which (1) 25% are timber = high quality wood > construction and fine woodwork; (2) 50% are industrial wood = of lower quality > chipped and reprocessed into chipboard/fibreboard or as paper pulp in large wood processing units; and 25% are energy wood = not very well processed and is burnt directly.

Our team conducted a number of interviews\* to proof-check the idea of developing a wood hub in the commercial and artisanal zone of Foetz. We asked them about potentials to increase regional markets, reuse construction wood from deconstructions sites, use timber to upgrade existing buildings and to what extent a centralise wood hub would make sense. According to our interlocutors there is a trend of an increasing market share of timber in the construction sector. However, it is difficult to match regional wood supply and regional demand.

The Challenges in the wood sector are: (1) not enough softwood available in the region for construction, little use and/or no processing means for available hardwood, (2) not enough carpenters nor structural engineers specialised in wood construction, (3) not enough sawmills nor storage facilities for drying or for reusing wood, (4) climate change having strong impact on wood quality (mostly on softwood), (5) the regional label 'Holz vun hei' being in early prototype phase only, (6) there is a big challenge to make innovative projects such as LEKO in Foetz economically viable, and (7) outdated regulatory constraints (fire safety etc.).

Is there a chance to encourage modular or reusable wood construction as a standard? Generally speaking, wood construction is very flexible by default and in the same time wood buildings can have a very long life cycle which is a huge advantage. But re-use of wood in construction will likely remain a niche market. It is still easier to recycle or burn construction wood. A major problem identified is that pre-production of bigger modules requires big facilities that are lacking.

**According to our interlocutors there is a trend of an increasing market share of timber in the construction sector. However, it is difficult to match regional wood supply and regional demand.**



The potential for adding wood construction floors on existing buildings has always existed, but so far as niche practice. There are some pilot projects for adding more than one floor. In principle, there is huge potential. However, the communal PAGs and *règlement des bâtisses* often prevent exploiting this potential. They would need to be changed.

A centralised wood hub sounds interesting but under certain conditions. A central storage hub for construction wood makes sense for some players, in particular if connected to decentral storage accessible for all through a virtual library. For some players a production hub shared with others makes sense, with the idea to line up several companies along the production chain in the same place. For other players, this is not relevant or unrealistic. A "Wood Campus" could synergize training & education needs in the sector. These three main ideas resulting from the interviews could be combined at Foetz. For the construction sector the vast majority of clients are based in the South of Luxembourg. The A4 next to Foetz offers a good opportunity for transportation.

Other considerations to take into account: (1) The majority of the deciduous high forests (and thus probably also the valuable timber reserves) are located in the Gutland region and owned by the public sector. (2) Subsidies drive demand but public funding needs to be allocated much less bureaucratically and faster. (3) Standards and regulations for wood construction need to be updated, could be inspired by up-to-date regulations already applied in other countries rather than going through long home-grown regulatory processes. (4) The Woodcluster does important work that needs to continue.

**The communal PAGs and *règlement des bâtisses* often prevent exploiting the potential (for adding wood construction floors on existing buildings). A 'Wood Campus' could synergize training and education needs in the sector.**



Setting up a wood hub (Holzhaff) in Foetz: As there is a need to build up regional infrastructure to use hardwood from forests in the region a regional multipurpose wood hub makes sense if a number of conditions are fulfilled: (1) Political will and therefore investment aids are essential, such as public funding and public construction contracts to kick start a demand and create volume (and lower costs). (2) This initiative needs to strengthen and not weaken the network, therefore strong cooperation with existing structures such as existing sawmills, timber suppliers and wood hubs of the Greater Region. (3) In parallel a decentralised network of smaller wood hubs that would include first processing and storage closer to wood production sites (the forests) is essential. (4) Last but not least physical wood hubs could fully develop their potential if they are run together with a virtual wood hub, with a complete database of fresh wood and used wood from deconstruction (material bank) and with a matchmaker function for wood producers and buyers. This combines several scenarios drafted in a study by the Luxembourg Nature and Forest Agency in 2018.

Next steps to develop a wood hub in Foetz: (1) 2022-2025: building up a virtual wood hub with material bank; (2) 2025-2030: acquire at least 5 hectare for the physical wood hub in Foetz, including sawmill and storage capacity; attract wood processing companies and set up training facilities. In parallel develop first processing and storage hubs closer to wood production sites (North and Centre of Luxembourg); (3) 2030-2040: wood hub fully operational with all processing steps for construction and furniture business (except the first processing, which still should be done close to the forest).

List of interview partners: (1) Philippe Genot, Chief Engineer, Schroeder & Associés and former head of the Woodcluster; (2) Stephan Hain, Architekt at hainarchitektur; (3) Patrick Losch, President of the Foundation Hëllef fir d'Natur and member of the board of directors of the Lëtzebuerger Privatbësch; (4) Christian Nilles, Director General at Prefalux; (5) Dirk Plattes, Managing Director at Rollingertec; (6) Mark Weber, Managing Director at Steffen Holzbau; and (7) Frank Wolter, Director at the Nature and Forestry Administration - Ministry of the Environment, Climate and Sustainable Development.

**This initiative needs to strengthen and not weaken the network and strong cooperation with existing structures. Physical wood hubs could fully develop their potential if they are run together with a virtual wood hub.**



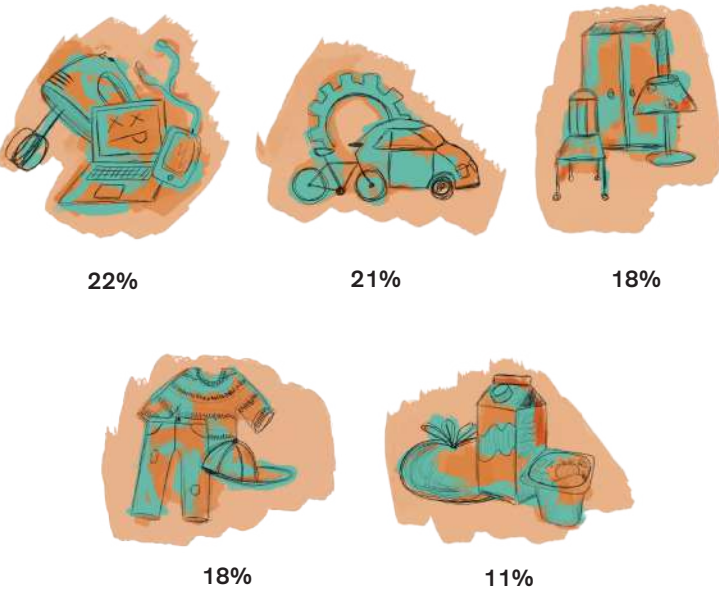
Beyond repair

Let's imagine that in the coming years Foetz would host a centre of excellence on RE (re-use, re-pair, re-manufacture etc.) and that the "repair everything" approach would become an appropriate response to "peak everything".

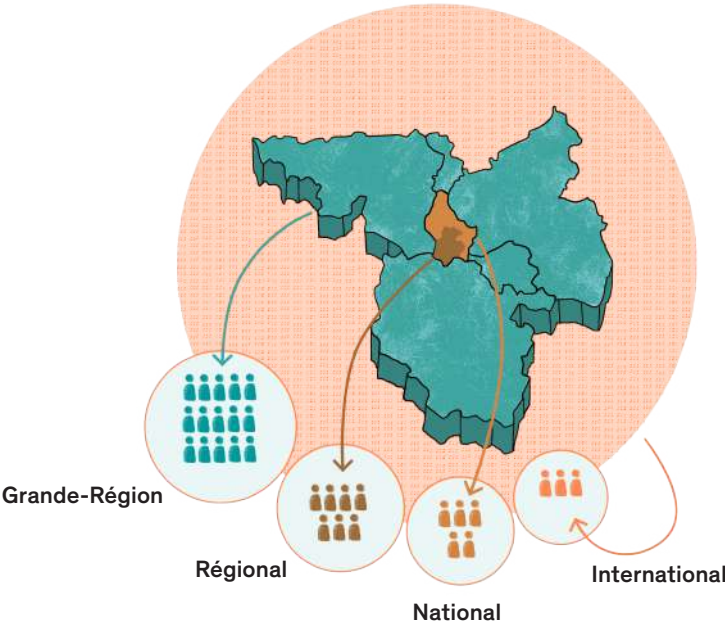
Our team interviewed a number of stakeholders from civil society, public sector (ministries and local authorities), private sector and research & education. We questioned them about the geographical range (from local to international), the thematic diversity (electronics, mechanics, furniture, textile and food), the objectives (from business creation to awareness raising) and the approach to focus on (repair, reuse, recycle, remanufacture, refurbish, repurpose, share). A vast majority expressed a clear position to develop a multipurpose, multi-actor centre based on a holistic approach.

According to respondents the project would have a Greater Region outreach and need to get on board a vast range of stakeholders: (1) State and municipalities to provide legal and financial support including on tax regulations and access to land/buildings, (2) professional schools and researchers to build capacity and investigate further concepts, (3) a colourful palette of enterprises from innovative start-up to medium size industry, from already present to completely new actors, from commercial businesses to handicraft enterprise, and last but not least (4) a quite heterogeneous scene of associative actors in solidarity economy, citizen based transition and repairers/makers movement. Challenges are clearly know-how, logistics and access to land/buildings, business models and funding, legal constraints and slow adaptation of spatial planning, but these challenges can obviously be turned into opportunities if there is ambition and political will. The ideas emerging at the co-creation workshop BEYOND REPAIR early December at Facilitec in Esch gave indications about innovative approaches that could be used, including creating mixed use zones (housing, small industry, commercial activities, research and development etc.). The combination of the whole 'RE loop' would boost collective intelligence and emerging business models and be a chance for local communities to increase local quality of life by being pioneers and part of the development of the new Foetz city. A final note about this process goes beyond the Luxembourg in Transition study and the Foetz zone: there seems to be a strong tendency to consider the 'RE stakeholders' and the experiences they develop as a vast and emerging ecosystem on different scales and geographical implantations. All stakeholders who took part in the process showed interest to stay in the loop of further exchanges.

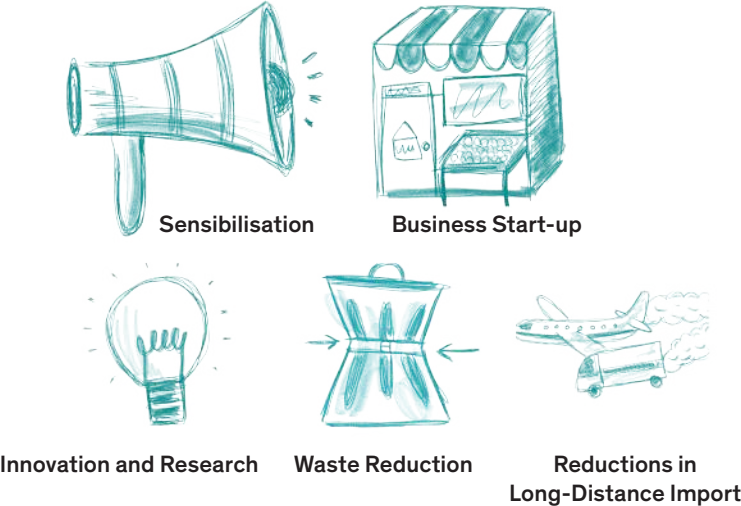
Thematic diversity



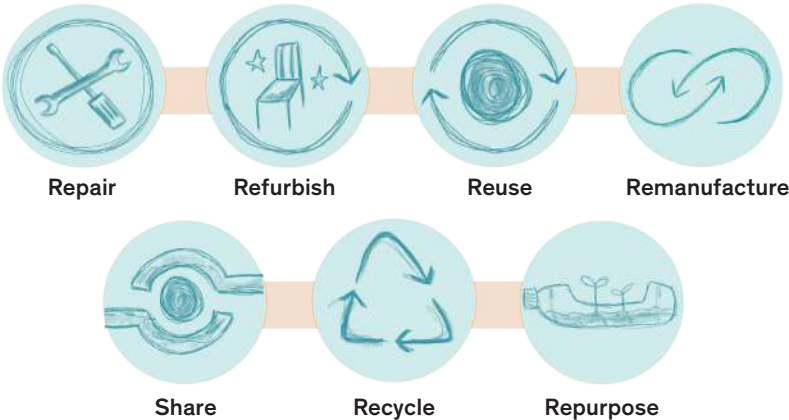
Geographical range



Objectives



Approaches





Concept showcase: By RE we mean the whole sequence of steps like repair—reuse—recycle—remanufacture—refurbish—repurpose—share. A Repair Café is a place where people gather to work on repairing objects of everyday life such as electrical and mechanical devices, computers, bicycles, clothing, and other items. Repair Cafés are typically held at community locations with the help of volunteers. A Fab Lab is a Fabrication Laboratory—a small-scale workshop offering (personal) digital fabrication. Likely inspirations are La REcyclerie (Paris), Cité Fertile (Pantin, France), BLIIIDA (Metz), Low-tech Lab (Concarneau, France), BlueCity (Rotterdam), De Ceuvel (Amsterdam), Stilbruch (Hamburg), ReTuna Återbruksgalleria (Eskilstuna, Sweden), Restart Project (EU), Facilitec (Esch), Äerdschëff (Redange), BENU Village (Esch), Repair Café (Luxembourg).

Next steps to develop a RE Centre in Foetz: (1) 2022-2028: overall concept, funding, land acquisition and pilot tests, including a maker's spaces with Repair Café and FabLab, a start-up space and manufacture space. (2) 2028-2035: with the arrival of the tram and first housing projects, citizen-based spaces are created next door to the Transition Lab. In parallel further spaces are acquired for mixed crafting, small industry, housing, co-working, circular kitchen and 2nd hand retail activities. (3) 2035-2040: the space is established to showcase a circular community center for the Greater Region and also serves as capacity building centre.

Participants in the process (present and/or online poll) and interested to stay tuned: +Impakt, Benu, Centre Formida, Chambre des Métiers, Commune d'Esch, Commune de Sanem, Commune de Schifflange, DKollektiv, Ecotransfaire, Ecotrel, Umweltberodung Lëtzebuerg, IMS, Luxinnovation, Lycée technique des Arts et Métiers, Ministère de l'Économie, Ministère de l'Énergie et de l'Aménagement du territoire, Ministère de l'Environnement, du Climat et du Développement durable, ProSud, Repair Café Lëtzebuerg, Repair Together (B), Sivec, SuperDrecksKëscht, Technoport, Transition Minett Facilitec, University of Luxembourg.

**Challenges include know-how, logistics and access to land/buildings, business models and funding, legal constraints and slow adaptation of spatial planning. However, they could be turned into opportunities if there is an ambition and a political will.**



### C. Places for transitioning

Places provide platforms for the collective imagination: those that you leave with a sense that the future may have changed, even by a little. They can be ephemeral, such as those created during citizen meetings, festivals and co-construction forums, but also more stable places that serve as landmarks for people who want to engage in Transition (like Maison de la Transition and Facilitec for a citizen's circular economy, the Äerdschëff as a place for systemic learning in Redange, community gardens all over the country, etc.).

**Places for transitioning can be ephemeral, such as those created during citizen meetings, festivals and co-construction forums, but also more stable places that serve as landmarks for people who want to engage in transition on a long-term basis.**



## Transition lab

The stepwise transformation of the highly monofunctional and carbon-intensive commercial zone of Foetz into a vibrant car-free mixed-use neighbourhood has a chance to succeed only if the collective intelligence and creativity of all stakeholder groups across sectors is mobilised over a substantial transition period.

As the main strategy for driving the transformation forward in genuinely participatory ways, at eye level between all stakeholders, we suggest the creation of a local Transition Lab. This Lab is an open platform of collaboration, a place for exchange and experimentation, an incubator of concrete local transition projects and a shared facility at the centre of Foetz. The Transition Lab is a new Third Space with a specific mission, networked and synergized with other Third Spaces in the South like the already mentioned Transition House and Facilitec in Esch, created bottom up within the Transition network of CELL, or closely related ones such as Atelier D of DKollektiv in Dudelange, FerroForum in Esch-Schifflange or Bâtiment4 in Esch. Derived from the recent creation of Facilitec, the following steps<sup>4</sup> can also inspire the development of the Transition Lab Foetz: (1) Build a core group of people with a shared vision; (2) Define the needs; (3) Mobilise the community; (4) Find a place / building; (5) Organise the community (with a charter and an internal governance system); (6) Renovate the place to meet the pre-identified uses; (7) Establish itself in the local landscape and build a network; (8) Create a structure (association, cooperative, etc.) with a multi-trade and entrepreneurial incubator; (9) Attract project leaders; (10) Share your experience with other transition communities.

In terms of physical Place, the Transition Lab could be kick-started right away simply by means of a container on a parking lot.<sup>5</sup> A planning phase further down the line, an empty industrial building in the area could be transformed into a prototype of topping it up through wood construction thus offering meeting and office spaces for transition projects. The further vision is to evolve a central building complex into a fully-fledged community and cultural centre. As the transformation of the commercial zone progresses and the green neighbourhoods emerge through numerous transition projects, the Transition Lab will increasingly morph physically and functionally into the permanent community centre of Foetz.

**A Transition Lab is an open platform of collaboration, a place for exchange and experimentation, an incubator of concrete local transition projects and a shared facility at the centre of Foetz.**



Once the Transition Lab starts taking its full shape, its purpose is to advance 6 synergistic layers of activity, as well as cross-cutting capacity building, support and networking activities:

First, the baseline activity on which all other layers depend is mapping and activating stakeholders across sectors (citizens, civil society initiatives, businesses, municipalities, educational and research institutions) that are ready to become actively involved in the transition of Foetz. The mapping includes the Places that can be repurposed and reused differently. This could be achieved with the help of the digital tools of BIBE,<sup>6</sup> a project on digital participation for place-based transition, run by CELL and already supported by the Luxembourg Ministry of Energy and Spatial Planning. The collective imagination and action capacity is going to be activated through participatory approaches like those described previously under Spaces and Practices.

Second, collaborative transition projects emerge from facilitated conversations among stakeholders. New digitally supported methods of participatory urban design from early design phases onward are becoming available, such as the Vienna-based Urban Menus or MUST (Managing Urban Spaces Together) developed by Elie Daher from LIST. They will help specify the regeneration and transformation of perimeter blocks in Foetz according to the expectations and needs of the future inhabitants and users. Pilot events and projects for economic transformation through circular and re-regionalised supply chains need to be prioritized from early on, e.g. through repair cafés or a maker space. Depending on each project, the highest value leverage point needs to be detected, first of all, on a gliding geographical scale, from single plot/building to perimeter block to the whole zone of Foetz, the landscape around Foetz, the involved municipalities taken together as a whole, if not the cross-border corridor.

Third, once the number of projects increases, it makes sense to group them together in long-term transition programmes, such as 15-minute mobility, local food and biodiversity, wood hub, repair district, (co)housing and urban commons. The progress of these programmes needs to be monitored, evaluated and if necessary readjusted, according to the decarbonisation, resilience and well-being metrics our team has proposed. Besides quantitative assessment, ideally evolved into a citizen science approach, qualitative participatory methodologies shall be used for enhancing the reflective and adaptive capacity of the Lab and of the community (e.g. the holistic approaches of the Reflexive Monitoring in Action methods or the Participatory monitoring, evaluation, reflection and learning for community-based adaptation to climate change).

**The baseline activity on which all other layers depend is mapping and activating stakeholders across sectors—citizens, civil society initiatives, businesses, municipalities, educational and research institutions—that are ready to become actively involved in the transition of Foetz.**



Fourth, the more activities the Transition Lab hosts and facilitates, the more important becomes a transparent participatory governance and organisational development of the Lab itself, including a fair model for resourcing those activities when working with a mix of volunteers and professionals. “Sociocracy 3.0” provides time-tested principles and patterns for scaling collaborations in agile, boundary-crossing ways that need to transcend the traditional governance arrangements.

Fifth, currently, there are practically no public spaces in Foetz. For attractive neighbourhoods to emerge it is imperative to create parks, squares, community gardens, a maker space, a community centre, as urban commons. The pioneering example of Bologna where the governance of urban commons (LABoratory for the GOVernance of the City as a Commons) is entrusted to empowered citizens has already been emulated by many other cities. This could also be the model for development and stewardship of Foetz’ future public spaces.

Sixth, the holistic vision for the transformation of Foetz laid out in this report provides a credible story and framework. But only the local stakeholders can adjust it to constraints and opportunities arising over time, only they can shape and decide on the implementation strategy together, hopefully strongly supported by national and international Pacts, frameworks and research programmes.<sup>5</sup> The Transition Lab will host and facilitate the continuous process of specifying and adjusting the vision and the strategy for the wholesale local transition.

Each layer of activity is necessary for a zero-carbon and resilient transformation of a “fossil-age heritage site” like Foetz to advance in open and transparent ways that empower the participation of any interested stakeholders from any sector. Such a participatory transition is new to most stakeholders that are going to become involved. Various capacity building and support measures are therefore crucial, including: (1) professionalisation of transition catalyst and facilitation roles; (2) curation and sharing of participation tools, methods and inspiring case studies; (3) open access to relevant data; (4) participatory action research; (5) prototyping innovative transition governance and resource models; (6) regional networking (e.g. among Third Spaces in the South) and international networking (e.g. by becoming a member of the European Climate-KIC (Knowledge and Innovation Community)).

**Only the local stakeholders can adjust the holistic vision for the transformation of Foetz laid out in this report. Only they can decide on the implementation strategy together, supported by national and international Pacts, frameworks and research programmes.**



#### D. Transition pacts

Pacts do catalyse imagination into action and are the result of collaborative and cooperative relationships cultivated between public authorities and citizens, as well as other actors (local associations, schools, local businesses etc.). The 'Pacte climat' is an excellent example of how pacts can be developed nationally between State and municipalities and locally between municipalities and their citizens. However, as commercial zones like Foetz seem to fall off the radar of local climate action, wouldn't it be time to initiate a specific kind of pact for activity zones and the commerces and industries they host?

**As commercial zones like Foetz seem to fall off the radar of local climate action, wouldn't it be time to initiate a specific kind of pact for activity zones and the commerces and industries they host?**



### Transition pacts

Pacts are orienting frameworks that guide collective action and respective resource allocation in transparent ways. Pacts concluded at different levels, international/European (e.g. Sustainable Development Goals, Paris Agreement), cross-border/national and local, need to cohere and synergize with each other.

The ‘Pacte climat 2.0’ is a good example of how a pact can be developed nationally between the State and the municipalities and actualized locally in each municipality with its citizens. Presently on a municipal level as well as on the national level, the presence of several pacts—all of them somehow involving citizens and somehow contributing to territorial resilience—is challenging for those in charge of implementing them: Pacte climat 2.0, Pacte logement 2.0, Pacte nature 1.0, Pacte du Vivre Ensemble etc. Putting into place all these pacts and plans is challenging but possible for municipalities under the condition that there is knowledge transfer and coherence between municipal departments and even between municipalities within a region.

Other concrete examples of local pacts from Transition experiences in Luxembourg: (1) Pacts can be developed at citizens' forums, as in Dudelange Neischmelz where the municipality wanted to allow its citizens to take temporary possession of the premises, long before the arrival of cranes and bulldozers; (2) The results of a citizen workshop in Sanem in 2015 set the stage for a number of initiatives that brought together local businesses, citizen and municipal administrations and produced a fresco, which was exhibited in the municipal hall for a number of years; (3) Signed contracts between local Transition groups and municipalities allow long term planning and funding of a number of projects cited above, such as between the city of Esch-sur-Alzette and Transition Minett asbl. or between the city of Wiltz and Transition Nord asbl.

In other European countries, there are inspiring examples that show how local Pacts can be developed in people-public-private partnerships with a strong vision and a long-term ambition, e.g. (1) the Amsterdam Doughnut Coalition that evolves a Doughnut Economy framework and methodology at the city level, generating a quickly increasing number of public events and collaborative urban development projects; (2) the Bologna Collaborative City, a pioneering framework for the governance and development of urban commons like green spaces by citizens rather than services of the local administration; (3) the Bornholm Bright Green Island targets that are about to make this Danish island one of the first zero emission societies already by 2035. These examples show that urban and regional planning and development aiming at decarbonisation and resilience can and must go far beyond one-off ‘post-it’ workshops with a few citizens. The level of participation can be advanced from information through consultation to shared decision-making and stewardship.

**Urban and regional planning aiming at decarbonisation and resilience can and must go far beyond one-off ‘post-it’ workshops with a few citizens. The level of participation can be advanced from information through consultation to shared decision-making and stewardship.**







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# Endnotes

1  
Ministère de l’Energie et de l’Aménagement du Terri-  
toire, Ministère du Logement, Raum+. Zwischenbericht  
Siedlungsflächenreserven in Luxemburg 2020/2021,  
published in November 2021. [https://logement.  
public.lu/dam-assets/documents/publications/ob-  
servatoire/DATer-Raumplus-Zwischenbericht-Sied-  
lungsflächenreserven-in-Luxemburg-20202021.pdf](https://logement.<br/>public.lu/dam-assets/documents/publications/ob-<br/>servatoire/DATer-Raumplus-Zwischenbericht-Sied-<br/>lungsflächenreserven-in-Luxemburg-20202021.pdf).  
Ministry for Housing/Observatoire de l’Habitat, Lux-  
embourg Institute for Socio-Economic Research, La  
Note 28, Novembre 2021. [https://logement.public.lu/  
dam-assets/documents/publications/observatoire/  
note-28.pdf](https://logement.public.lu/<br/>dam-assets/documents/publications/observatoire/<br/>note-28.pdf)

2  
The demountable structure, designed by Marielle Fer-  
reira Silva and Florian Hertweck, directed by Prof. Dr.  
Daniele Waldmann, has been developed in the frame-  
work of ECON4SD and financed by the EU and the  
Luxembourg Research Fund (FNR).

3  
For more information see our first report *Luxembourg  
2050—Prospects for a Regenerative City—Landscape*.

4  
See [https://facilitec.lu/comment-mettre-en-place-  
un-tiers-lieu](https://facilitec.lu/comment-mettre-en-place-<br/>un-tiers-lieu).

5  
See the Utopia toolbox as an example [http://www.  
utopiatoolbox.org/utopia-toolbox-container](http://www.<br/>utopiatoolbox.org/utopia-toolbox-container).

6  
For more information see Annex, section on Amplifiers  
in our first report *Luxembourg 2050—Prospects for a  
Regenerative City—Landscape*: 117.



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