




**Explorative scenarios of future urban mobility in Brussels**



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## 1. Introduction

### **What is Remobilise?**

Mobility is fundamental in shaping the spatial structure of society and is deeply embedded in people's everyday lives. Owing to its profound impacts on the environment, society, public budget and the long-term character of investments, mobility policy needs a well-grounded vision of the future.

The Covid-19 pandemic has exposed the vulnerability of the mobility system to external shocks. Cost-efficiency of public transport has plummeted due to falling demand and imposed 'social' distancing measures, and the modal share of private transport, be it either cycling or in private cars, has surged.

Of course, systemic shocks not only relate to pandemics, but also to other key uncertainties such as climate change and energy security. The resilience of transport systems in such crises remains vital to the functioning of other socio-technical (sub)-systems and therefore society as a whole. Another key uncertainty concerns socio-technical evolutions, which profoundly affect the adequacy of investments. For example, knowing that the construction of the Schuman-Josaphat railway tunnel took 25 years, how much should be invested in heavy rail infrastructure in the light of the mainstreaming of teleworking or the advent of automated vehicles?

For the short to medium term, Brussels does not lack visions of what an 'ideal' mobility landscape should look like. The recently adopted Regional Mobility Plan (GoodMove) is based on an extensive citizen and stakeholder consultation process and has formulated core values for mobility (green, social, pleasant, healthy, performant, safe and efficient), and is in turn based on participatory visions that were elaborated for the Regional Plan for Sustainable Development (PRDD/GPDO). These plans present well-developed stakeholder-based 'utopic' visions of a desired future and stipulate possible policy measures to get there, based on a profound diagnosis of the current mobility situation. However, they do not take into account the uncertainty of the future, i.e. the possibility of different scenarios and systemic shocks. Therefore, the question Remobilise seeks to address is: how to pursue the core values that underpin these strategic plans, taking into account deep ecological, economic, technological and societal uncertainties?

Remobilise is a research project of the Mobilise research group of the VUB, financed by Innoviris under grant agreement number 2021-PRB-6. The main objective of this research is to build scenarios, visions and develop a strategy-building tool to help mobility policy making in Brussels to be robust to systemic uncertainties and shocks.

## **What are scenarios?**

Scenarios are an exploration of the future. They answer the question of „what could potentially happen in the future?“. Scenarios can provide alternative “what-if” versions of the future that can be used for strategic decision making. By exploring the future, scenarios can help deal with the intrinsic uncertainty that characterizes our societies.

Within this project, we aimed to explore the possible futures of mobility in Brussels by the year 2050. In the next sections of this document, you will find the methodology that we employed for our scenario building exercise, as well as the resulting scenarios.

Please note that the scenarios are results of a combination of experimental methods, and they are exploratory in nature. They therefore do not reflect certain future developments, and they are not the only possible future developments.

## 2. Methodology

The methodology we employed is based on Tori et al. (forthcoming) and consisted of six steps combining CIB with scenario writing workshops. Steps 1, 3 and 4 are identical to the original CIB method (Weimer-Jehle, 2006). In our combined methodology, all steps but steps 1 and 6 included the participation of experts or stakeholders:

1. *Inventory of drivers*, i.e. the factors that are expected to have an influence on the subject matter (in our case, urban mobility in Brussels) (Weimer-Jehle, 2006). The inventory of drivers was done by members of the project team through desk research. We employed the PESTEL approach to categorize drivers.
2. *Selection of relevant drivers and attribution of variant states*, i.e., the prioritisation of drivers to be taken up in the subsequent scenario building steps (Abou Jaoude et al., 2022). The selection of drivers is needed, as between 5 and 15 drivers are recommended for CIB (Weimer-Jehle, 2006). Our approach used a so-called Delphi questionnaire (Dalkey & Helmer, 1963) among stakeholders to select the relevant drivers through the Welphi software<sup>1</sup>. A Delphi questionnaire is a structured questionnaire over multiple rounds, aimed at finding consensus among experts (Hasson et al., 2000). According to Beiderbeck et al. (2021), between 15 and 20 experts are required for statistical purposes for a Delphi. This step also includes the attribution of 'variant states', i.e., the different directions in which a driver could unfold.
3. *Evaluation of direct effects*, i.e., the assessment of the direct effects of drivers onto one another in a cross-impact matrix. In our study, the evaluation of the impacts was conducted by a panel of researchers with expertise in different domains of urban mobility, logistics, vehicle automation, and energy. Each researcher filled out an individual cross-impact matrix, which were subsequently aggregated. A sensitivity analysis was performed to identify cases of dissensus, for which consensus was found through a panel discussion within the project team.
4. *Scenario analysis*. Here, the algorithm is run to check the cross-impact matrix for internally consistent assumption bundles, using dedicated CIB software<sup>2</sup> (Weimer-Jehle, 2006).
5. *Development of narrative elements and visuals*

We organised two types of creative workshops. The goal of the first type was to translate the raw scenarios into narratives. In each workshop, two scenarios were discussed,

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<sup>1</sup> <https://www.welphi.com>

<sup>2</sup> [https://www.cross-impact.org/english/CIB\\_e\\_ScW.htm](https://www.cross-impact.org/english/CIB_e_ScW.htm)

allowing to focus on the similarities and differences between the scenarios. The workshops were structured around two creative techniques: 1) writing newspaper headlines, and 2) discussing impacts. Through newspaper headlines, a conversation can be sparked around the narrative of the future, focusing on key aspects and concrete elements of the scenario (Kurniawan, 2016).

In the second type of workshop we mapped *personas* to each of the scenarios, i.e., fictional characters representative of archetypes (Cooper, 1999). The personas we used were based on Vallet et al.'s (2020) mobility personas. We also added a persona representing vulnerable population groups based on Vanobberghen et al.'s (2020) analysis. The overview of the personas used can be seen in Table 1.

*Table 1: Overview of personas employed in the scenario building*

	Antoine	Maria-Carmen	Nour	Giovanni
Age	42	60	18	67
Place of residence	Ouder-gem/ Auder-ghem	Brussel-Stad / Bruxelles-Ville	Sint-Gillis / Saint-Gilles	Sint-Joosten-Node / Saint-Josse
Civil status	Married	Widowed	Single	Divorced
Children	3	2	0	3
Occupation	Employee	Unemployed	Student	Retired
Income	High	Low	Low	Low

For the persona workshop, participants were paired to imagine a day in the life of their persona in each scenario, and how they moved around Brussels. Again, the discussion was captured by a *visual harvester*.

## 6. Finalization of scenario narratives and visuals

Using the building stones provided by CIB, the output of the three creative workshops, and the visual rendering of the discussion of the visual harvester, we developed the final scenario narratives. The final scenario visuals were developed by the visual harvester present at the workshops. As a last step, titles we developed a title for each scenario. A

scenario title plays an important role in conveying a distinct theme from the scenario (Ogilvy & Schartz, 2004).

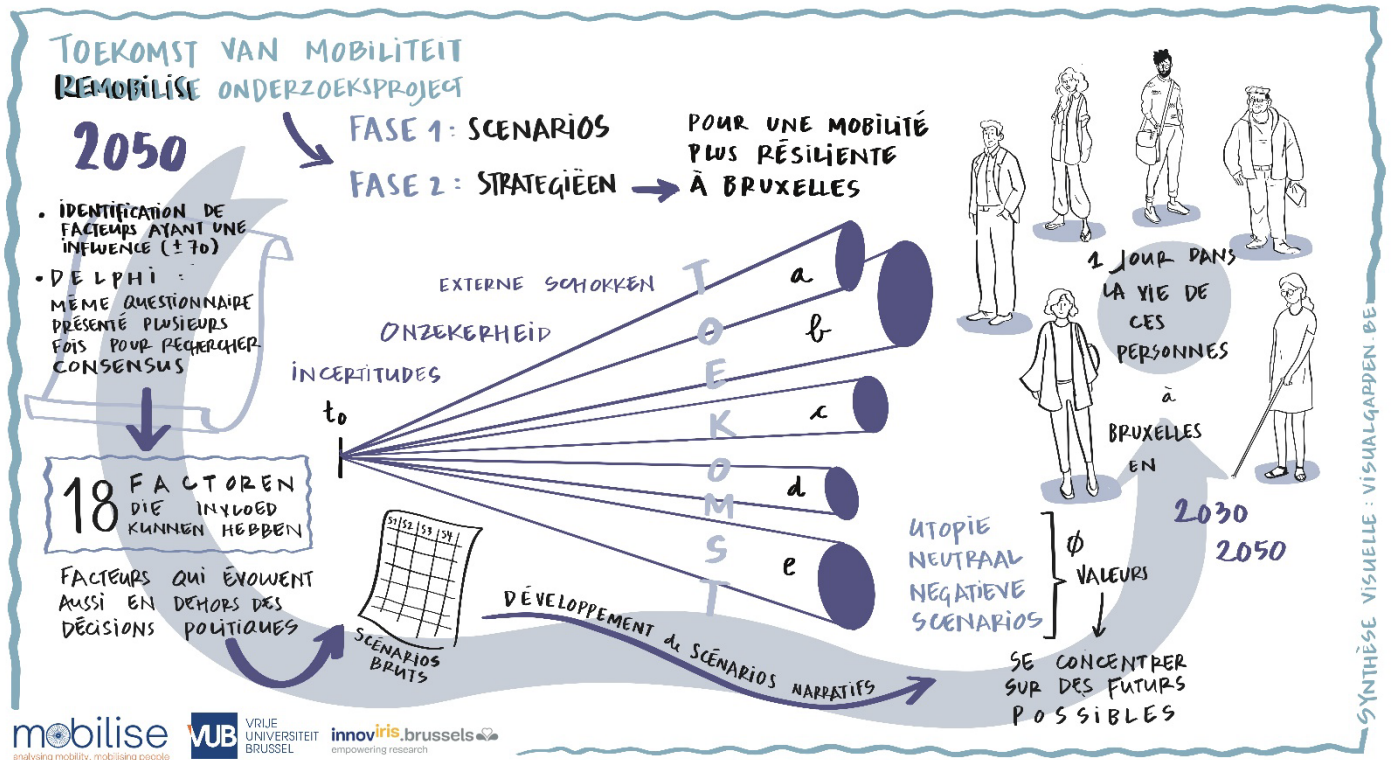
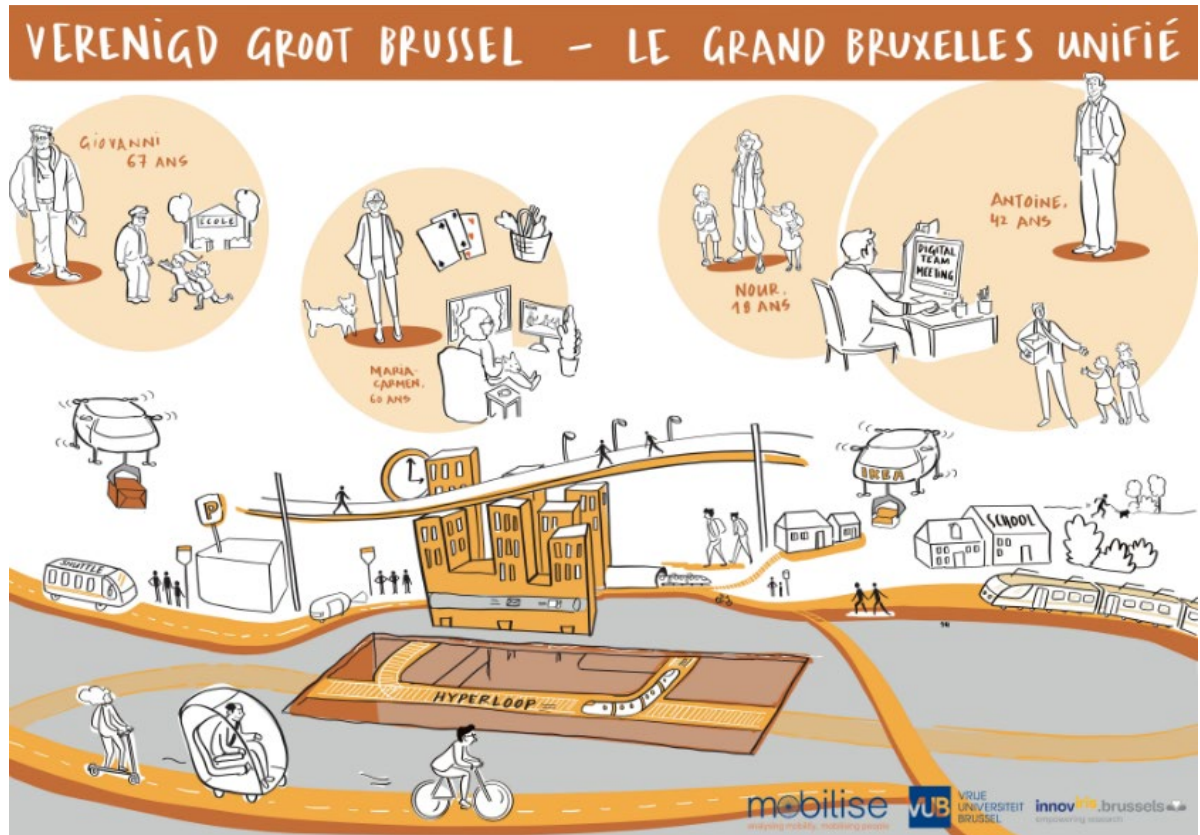


Figure1 Scenario building methodology

### 3. Results- Scenario overview

#### 1. Unified Great Brussels



On this Monday of June in 2050, Antoine has just dropped off his three children in their local co-schooling location in Auderghem, where they follow classes taught online from a central school location. After dropping them off, he walks back to work from home, as he has his digital team meeting every Monday morning. Like other citizens in Brussels, he works from home 85% of the time. As campaigns from the government have highlighted, this leads to a sedentary lifestyle, so at lunch Antoine takes the hyperloop to Waterloo, which is now one of the districts of the metropolitan area. The Unified Capital Region has integrated a lot of the border municipalities and is very densely built, so he has to go to the periphery to find green areas to go for a run. But the mass transit system is very convenient, connecting the inner and outer city in a smooth way. The only problems arise when there is a failure in the system somewhere, as everything is organized centrally from a mobility control centre. Transport and logistics are therefore extremely reliant on the city's centralized data provision.

In the afternoon, he takes a break from work to go pick up his new double bed that was delivered by mega-drone on the roof of one of the neighbouring buildings. He has time to get his work finished, as his children are picked up by Nour on Mondays, their regular babysit. Sometimes, she also accompanies them to their second home outside the city,



although the logistics for that are more complicated. Areas outside the Unified Capital Region are not well connected as all investments are made within the city, so they have to use autonomous vehicles. But with his wife, the three children, and Nour, fitting everyone in the car can be a challenge.

After picking up the children from school and dropping them off, Nour takes the hyperloop back to Saint-Gilles, where she lives. She's glad to have a student subscription for it, as most of her money has to go to her rent, since the inner areas of the city are very expensive. Once she's home, she does some work for school, as she studies at one of the local VUB-campuses in Saint-Gilles. On weekends, if she's not going with Antoine's family to the countryside, she works in one of the luxury campings that accommodates tourists in the central areas. One of her favourites is the Saint-Josse forests, but she also really likes the one in the Madou tunnel. She watches tourists' children while they go out and explore the central areas of the cities, which are extremely popular.

Maria-Carmen does not like the extreme popularity of the central areas. As a long-time resident of the Pentagon for the last 50 years, she has witnessed this tourism boom, but she thinks streets are too crowded, so she does not really go outside much. The only positive aspect is that she has all commodities accessible within a 15-minute radius in the city centre, and pedestrian infrastructures are outstanding. As her adult children live in the periphery, she knows that this is not necessarily the case there, so she very much appreciates being able to walk everywhere. She does avoid some of the major arteries though, as for those you have to reserve your pedestrian walk ahead of time to avoid overcrowding, and she is not tech-savvy at all. That is also why she never has anything delivered, or why she never takes public transit. Her children don't visit her so she's often lonely, but she has a social club for older people that she walks to once a week, which she very much enjoys.

That's where she met Giovanni, who lives in an elderly co-housing in Saint-Josse. He is still co-housing due to the real estate prices, but he does not mind the company of others too much. Contrary to Maria-Carmen, Giovanni likes taking public transport, which he uses to go pick up his grandchildren from their local co-schooling in Beersel. He especially likes that it is not too crowded, since tourists stick to the central areas, and Brussels citizens are commuting infrequently due to teleworking.

## 2. Maxi Freedom



On this Monday of June in 2050, Antoine has just dropped off his three children at school. Even though Auderghem is a small municipality, he has to drive for about an hour with traffic to the other side of it. That's the only school in the municipality that had spots available. There was a school two streets down from their house that had spots, but that school is located in Watermael-Boitsfort, and school choice is tied to the municipality you live in. After dropping off the children, he drives another 30 minutes to work. He works outside of Brussels, as there are more economic opportunities there. He has to cross through different municipalities to reach his office, which is quite a hassle considering all the different traffic regulations the municipalities have. A lot of his colleagues actually commute via air traffic from inside the city, which is currently the fastest option. At lunch, he goes to the gym in an old metro station that was converted, since public transport is not much used anymore nowadays due to security issues.

The kids are picked up from school by Nour, their babysitter. She has just received her car from the government, as she recently turned 18. She was among the last of her friends to turn 18, so she was very impatient about that. It is now easier for her to pick up Antoine's children from school. Previously, as she lives in Saint-Gilles, she took the bus, but that was around 2 hours and five different public transport companies, since

every municipality has their own public transport operator. Now that she has her own car and since the inauguration of the ring road around Etterbeek, it will be much easier for her to get to the school in Auderghem. Sometimes on the weekends she accompanies Antoine's family to their second residence in France. She enjoys that, as they travel by helicopter. It is also quite convenient. As Antoine and his family live in a gated community, there is a local helipad, which is part of the gated community helicopter network. Nour is a first-year student at the VUB, and she lives on the Parvis the Saint-Gilles in a student gated community, which she really enjoys. The only drawback is the distance from the campus, as she does not have money to take a helicopter, and therefore spends quite a lot of time commuting by car.

Maria-Carmen lives in the Pentagon in an apartment building. She has lived there for 50 years, and has witnessed all the changes. She remembers when the city was bustling with tourists. Since the city now has an arid climate, tourists have been visiting more northern destinations, to escape the heat. She also remembers when the streets did not need to be covered to be able to walk outside in the heat. She used to walk a lot, but now she drives as everyone else, since the car has air-conditioning. Streets are also rather unsafe, so she prefers the security of her car. Her car gives her more independence to go and visit her children who live in the periphery, so she likes that. It takes her a lot of time to get there, but she does not work, so she has the time. Once a week, she has a social club with other elderly people, which she also drives to.

That's where she met Giovanni, who lives in Saint-Josse. They have been thinking of moving in together, but moving from one municipality to another is administratively rather difficult, so they have not done so yet. Sometimes she accompanies him when he goes to pick up his grandchildren from school by car, which he received as a present from his children. He used to take public transport a lot, but now shares the same concerns as Maria-Carmen when it comes to safety.

# HEEL BRUSSEL OP 4 WIELEN - BRUXELLES AUTOMOBILISÉE

HEEL BRUSSEL OP 4 WIELEN - BRUXELLES AUTOMOBILISÉE

Giovanni, 67 ANS

BETTER VIGILANCE AND DISCOUNTS

MARIA-CARMEN, 60 ANS

SHORT TERM RENTAL HERE

Uber Kids

TOEGANGSPRIJS OM DE STAD TE BEZOEKEN

VISIT BRUSSELS

STIB HYPERLOOP

DELIVERY

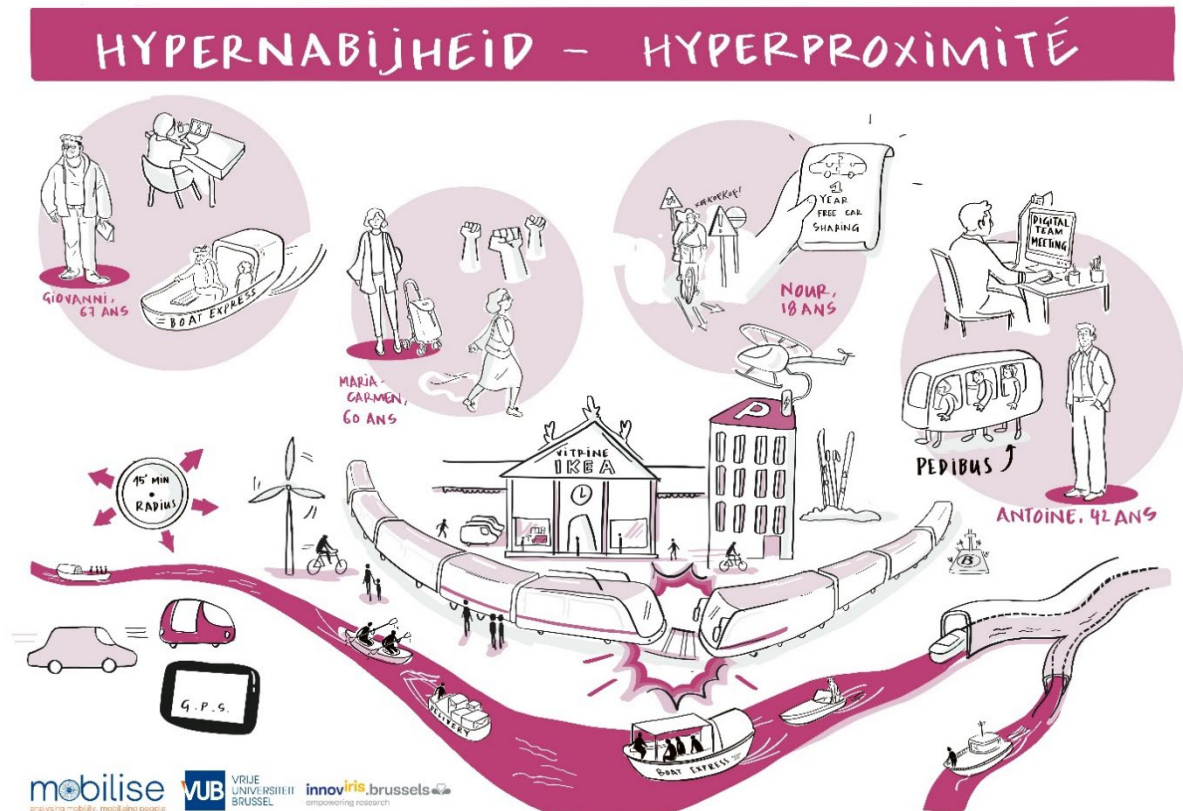
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Nour is a student at the VUB, and she mostly drives to the campus. On weekends, she sometimes works on the new F1-race track that goes from Manneken Pis to the Atomium. To reach the race track, she takes the only reliable public transport there is in the city, which is the hyperloop operated by STIB. As she has to move around the city a lot, she does appreciate all the real-time information she has, be it on traffic, on the hyperloop, or on how crowded the city centre is. She lives in a co-housing in Saint-Gilles. She likes it, but most of the other residents are short-term Airbnb rentals, so there is a lot of turnover.

Maria-Carmen is a long-time resident of the Pentagon for the last 50 years, and she has witnessed the tourism boom of the central areas. She does not like the crowds, so she is excited about the potential of putting a quota on the number of visitors that is currently being discussed in the parliament. She already enjoyed it when the city, back in 2045, introduced an entrance ticket to visit the centre, somewhat reducing the number of tourists. Although her adult children, who live in the periphery, do not visit very often because of it. Her neighbours are mostly people using Airbnb, so she struggles to make lasting social connections. She does not have the money for a car, but she loves using her electric bike to go on errands. Once a week she goes to a social club for elderly people, where she met Giovanni.

Giovanni is retired and lives in Saint-Josse. His main activity is picking up his grandchildren from school, and then bringing them home to his children's place in the periphery. He used to take public transport for this, but due to the rising heat and safety issues, he usually drives. Lately, he has been experimenting with taking the public boat, which he really likes. He is a volunteer in the 'Less Mobile Centre', where he helps other elderly people get around.

#### 4. Hyper-proximity



On this Monday of June in 2050, a pedi-bus has just picked up Antoine's children to go to school. Once a week, he himself is a volunteer on the pedi-bus, accompanying the neighbourhood's children. After his children leave, he starts working, as he works from home 100% of the time. He has never met his colleagues in person outside the virtual office. During lunch, he walks his dog, and goes for a quick errand. He likes that he almost never has to leave Auderghem to do all of his daily activities, since everything is either at home or within a 15-minute radius. After school, his children are picked up by Nour, who comes and drops them off. Nour has just turned 18 and therefore received her one-year car-sharing subscription from the government. She is very excited to be able to drive to pick up Antoine's children, since public transport is not synchronized across municipalities. She does have to be careful, since the different municipalities have different driving regulations, that she will need to get used to.

Nour is a student living in Saint-Gilles. She studies at the VUB, but attends the VUB's local antenna in Saint-Gilles. On the weekends, she sometimes works in the IKEA-branch that has opened in the Bourse building in the pedestrian zone. She likes walking around the bustling pedestrian area, where a lot of local stores have opened up. She has been told that this used to be a tourist hotspot, but she has never known that era.



She sometimes tries to reach IKEA by bike, which she enjoys, but crossing the small ring road can be a dangerous endeavour due to all the varying traffic regulations.

Maria-Carmen, originally from Brazil, lives in the Pentagon and has seen the area change significantly over the past few years. She knew the city when it was very touristy, but tourism is on the decline globally. She does like the reappropriation by citizens and the opening up of local stores. She often goes outside to go on errands, as everything is easily accessible on foot. She does not like to leave her municipality though, because the communal disintegration means that the pedestrian infrastructure is incoherent across municipalities, and public transport does not work at all. She goes outside a lot also partially because her apartment is very small, due to high real estate prices. She attends a social club for older people once a week, and that's where she met Giovanni.

Giovanni lives in Saint-Josse and loves the proximity he enjoys and his neighbourhood. He does have to leave Saint-Josse often, since he visits his grandchildren in Vilvoorde. He likes to do this using the extensive boat system that the city now has, although the lack of communal integration means that there are a lot of accidents. He is thankful he does not have to pick them up from school every day, as they follow education from home. With all the accidents, he's afraid he would often be late. He thought about driving, but he does not like it, and regulations for parking are too complex.

#### 4. Next steps

The next steps of the project will include the development of policy packages that are adequate in responding to possible future developments. Below, you can find the full timeline of the Remobilise project – the policy development falls under the „VISIONS & STRATEGIES“ section. For further information, do not hesitate to visit the project's [website](#).

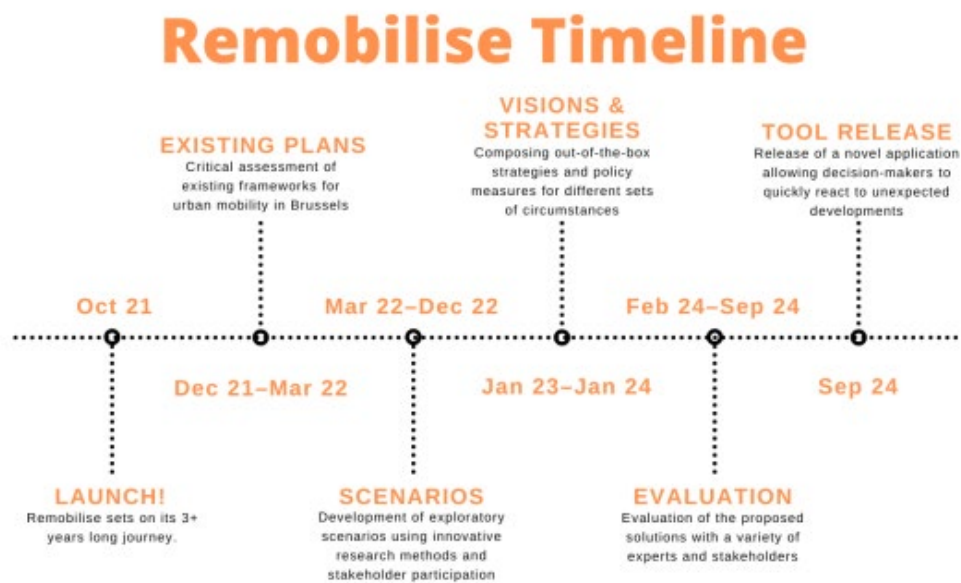


Figure 2 Remobilise timeline



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