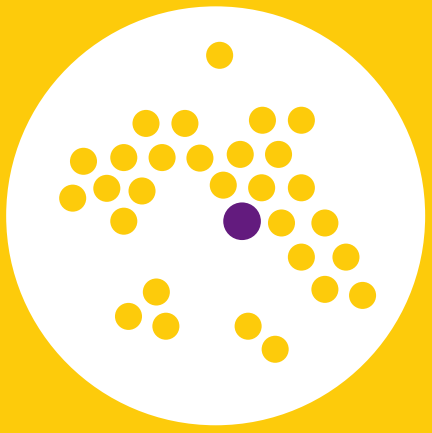
PBL Netherlands Environmental Assessment Agency

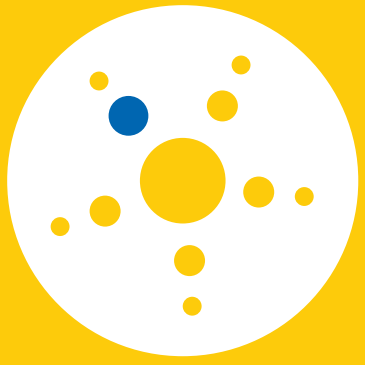
Rehearsing the future

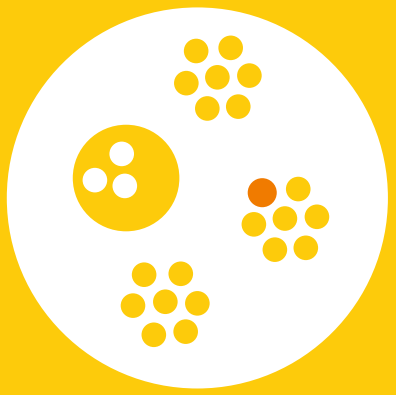
Scenarios for urban development, infrastructure and mobility in the Netherlands in 2049

Greater engagement with scenario planning (...) is called for to enable key actors to 'rehearse the future'
Glenn Lyons

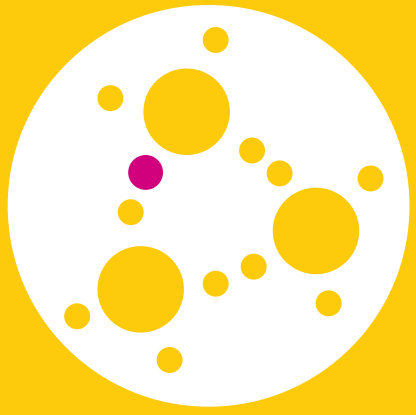


Uncertainty is the root of all progress and all growth
Mark Manson





We need stories, inspiration and perspectives
Henk Ovink



The end result (...) is not an accurate picture of tomorrow, but better decisions about the future
Peter Schwartz

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Foreword

The future cannot be predicted, but it can be explored. Scenarios are an effective tool in doing so. They help you find your way through all the currently unfolding developments and changes as well as those still uncertain. And so, they give insight not only into what is coming our way, but also provide food for thought related to the question of 'Where do I actually want to go'?

In this Spatial Outlook, PBL presents four qualitative scenarios for the future of urban regions in the Netherlands, focusing on the relationship between urban development, infrastructure and mobility. In doing so, we cast an investigative glance towards 2049. The narrative scenarios sketch various conceivable developments in society, technology and the relationships between societal parties. They provide possible images of what such developments could mean for the challenges facing urban regions and how to deal with them.

These scenarios are the result of an intensive process involving many people both inside and especially outside PBL. After all, it is better to make maximum use of the collective knowledge and imagination available in such an exploratory research process. Many thanks go to all those who have contributed to our thinking and have challenged and inspired us.

Professor Hans Mommaas
Director-General PBL Netherlands Environmental Assessment Agency

Introduction

The future is uncertain

The future is cloaked in great uncertainty. Especially in fields such as urban development, infrastructure and mobility, where many complex issues come together. Where is building required in urban regions? What types of dwellings? Where is space available for business activity, to ensure the Netherlands remains competitive? How can regions be kept accessible?

The Netherlands is standing on the eve of a number of far-reaching developments that are difficult to oversee. There is the energy transition, rapid developments in information technology, a changing population composition and shifting administrative relations. These developments lead to new questions. How do virtual reality and augmented reality affect our perception of the urban space? Is the self-driving vehicle an enhanced car or a completely new type of vehicle? What changes may occur when private companies take over the operation of motorways from the government?

'The Netherlands is standing on the eve of a number of far-reaching developments that are difficult to foresee.'

In this study, we call for careful attention for uncertainties that cannot be tamed by providing more data, more advanced statistics or improved models. Policymakers will need to relate to these uncertainties. Their task will become even more complex than it already is, because what we consider important policy issues or how we view urban regions and transport is likely to change in the future. For example, in the past we adapted the city to the needs of the automobile – will we continue to do so for the self-driving car, or do we expect it to adjust to the city? And what changes may occur at the regional level and in traffic systems, if, in the future, it is decided that the main goal of accessibility policies should be inclusiveness or safety?

Using scenarios to explore the future

In the face of uncertainty, well-informed images of future developments are crucial for the formulation of strategic government policies. It is important to consider today's perspectives on problems and solutions in the light of the longer term and to explore possible new challenges, views and policy options. This Spatial Outlook aims to provide solid support for this process.

We visualise the three decades up to 2049 and explore possible future developments, new challenges and beliefs that are important for policies at several levels ranging from municipalities to the national government. For this, we have developed four narrative scenarios: Bubble City, State of Green, Market Place and Our Neighbourhood.

In each scenario, we present both the situation in 2049 and the path towards it. The scenarios aim to help administrators and policymakers to explore the future, to facilitate conversations, and to provide support and inspiration for the strategic phases of the policymaking process.

Workshops: rehearsing the future

The future scenarios outlined in this publication are meant to serve as an incentive, a source of inspiration and a helping hand. We encourage interested parties in the fields of urban development, infrastructure and mobility to get to work with the scenarios themselves. The scenarios can be further developed and adapted with an eye on a specific region; they can be revised to make them apply to a specific policy issue; or they can serve as a source of inspiration for thinking out changes in other policy areas.

Over the course of 2019, PBL Netherlands Environmental Assessment Agency organised a series of workshops to undertake these efforts together with interested parties. We experimented with different workshop formats, different types of issues and variously composed groups of actors. As the designers of the scenarios, we led many of these workshops. Drawing from experience, we will develop some ground rules that governments, market parties, social organisations or civil society groups can use to get to work themselves, or that advisors or process supervisors can use when providing assistance to these groups. The workshops have also benefitted us in learning more about scenario development and the application of scenarios in policy processes.

Reading guide

First, we introduce the four developed scenarios by presenting brief descriptions of what the future might look like in 2049 and short scenario stories on the path from now to 2049. This is followed by a table with a clear overview of the most important characteristics of the four visions of the future. We then present six short examples to offer some guidance to policymakers and other strategic thinkers on how to use the scenarios to reflect on current policy issues. Finally, we briefly discuss the methodology applied in the development of the scenarios.

An in-depth study (PBL, 2019 (in Dutch only)) has been be published along with this report. This study includes the full scenario narratives and a detailed overview of the characteristics of the four futures. We summarise the most important developments that have been integrated into the scenarios, provide more information on the used method and the research process and offer an inventory of all the studied sources.

To supplement both publications, we made a few short, animated films. While the publications are mainly aimed at policymakers, the films introduce the scenarios to a wider audience. Each of the four possible futures is presented in just one minute, along with the question: ‘What future would you like to see?’

Scenarios: terms used

We use several means to present each future. In the next chapters, we first give a description of the situation in 2049 for each scenario, followed by the narrative (the developments that took place from 2019 onwards to 2049). The futures are based on four different world views, each with their own particular dominant values, beliefs and divisions of power in society. We use the term scenario to refer to the combination of description, narrative and world view.

Bubble City

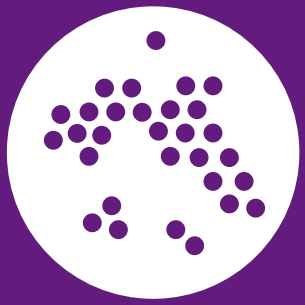
State of Green

Market Place

Our Neighbourhood

Bubble City

Scenario



In Bubble City ...

society is fragmented

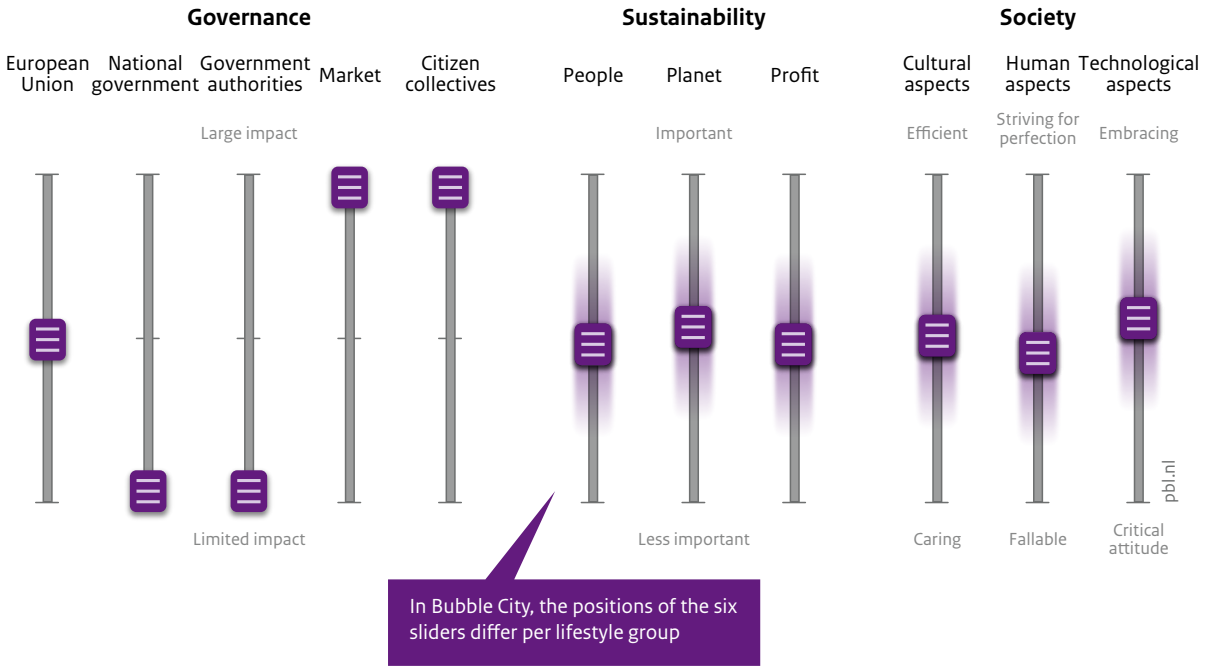
urban network nodes are more important than city centres

digital is more important than physical

technology has a permanent beta status

market and lifestyle collectives dominate

Mixing console setting Bubble City scenario



Source: PBL

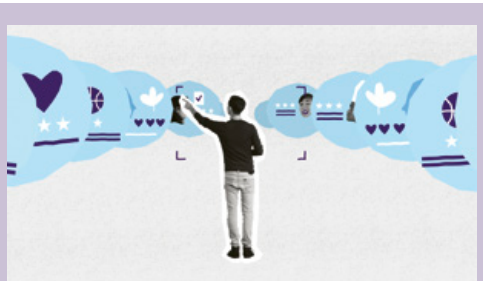
Bubble City: 2049

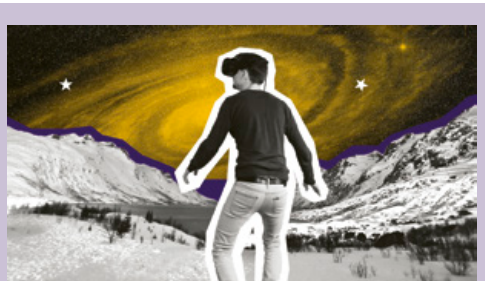
Social fragmentation and digitisation

In Bubble City, Dutch society is made up of tribes: 'bubbles' where individuals gather who feel strongly connected to each other, whether or not temporarily, on issues of lifestyle, interests or opinions. The population breaks down into a plural diversity of collectives, instead of forming a single 'general public'. Bubbles organise themselves mainly digitally, using rapidly developing technology. Due to that high rate of development however, technology does not work flawlessly: software is not fully developed and does not interact optimally with hardware. In this future, the role of digital infrastructure and digital communication rapidly becomes more prominent and takes precedence over the importance of the traditional physical infrastructure. This also means that, with regard to the construction and maintenance of the physical infrastructure, compromises are made in favour of the digital network.

Places and buildings are subject to ever-changing virtual reprogramming

Urban areas are no longer thought about in terms of individual cities with a centre and a periphery, but rather in terms of networks of cities. In this understanding, the geographical location of activities and the physical appearance of places and buildings lose significance. City dwellers make use of locations in the way they present themselves, or reuse them in innovative ways. Many people feel they have only minor connection with places, and some even part with the idea of having a permanent home address. People meet mainly in the digital domain. They also find information online about spaces that are available for activities and there are many quick and convenient ways to rent, lease, or buy those spaces for a certain period of time. Thanks to virtual and augmented reality, flexible use of spaces is possible: time after time, obsolete real estate (such as old office blocks and empty car parks) is brought back to life through flexible digital programming. Given the varying use of space and the diminished importance of ownership, nobody really cares about the public space. As a result, hardly any public funding is dedicated to building and maintaining public spaces.



Less mobility, criss-cross journeys

In Bubble City, people make fewer physical journeys than they do now, due to the expansion of digital possibilities. When they do travel, they often criss-cross the network with not much planning ahead. For each trip, city dwellers choose a suitable combination of transport modes, depending on the lifestyle in their bubble, personal preferences, the day, the time and real-time travel information. Mobility as a Service (MaaS) therefore plays an important role.

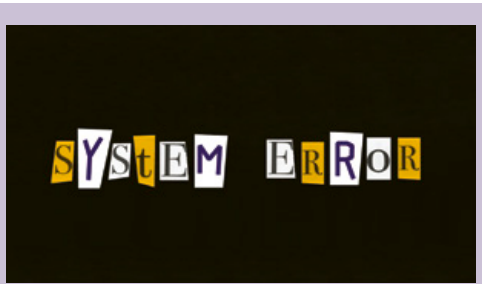
'In this future, the importance of digital infrastructure and digital communication is rapidly increasing.'

Alliances between lifestyle collectives and matching market parties dominate

Both the individual and the collective they belong to (sometimes only temporarily), enjoy a great deal of freedom in Bubble City. Lifestyle collectives enter into varying alliances with matching market parties, and together they are a dominant force in shaping society. The public authorities play a minor role. The national government holds a marginal position. The European Union is the only body with a coordinating function in those areas that the collectives consider important, but are unable to manage separately, such as international rail connections. Territorial government loses relevance: automatically detected digital patterns determine who is allowed to join in conservation (e.g. about spatial development).

Flexible, but messy

Bubble City is a world where citizens can shape their identity the way they please. It is a very flexible world, in which temporariness and virtuality overrun concrete, physical matters. But this comes at a cost: a primitive kind of society emerges. A lot of things do not work properly and it is rather messy. Those who are not proficient in digital technology, or lack the will, are left in the cold.



From the present to Bubble City

South Holland, 2 December 2049

Fragmentation and volatility

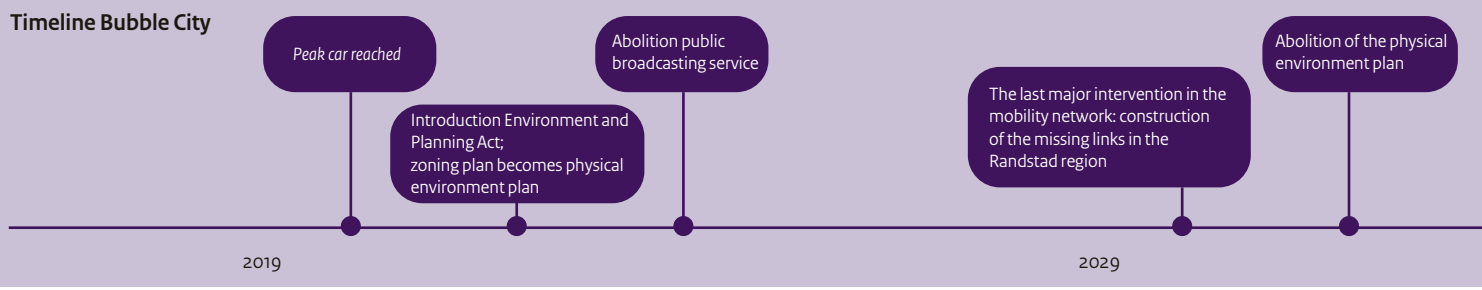
Since the recent introduction of 8G, almost everybody can do whatever they want, wherever they want. This catalyses a series of developments in issues that administrators and policymakers were already struggling with: far-reaching fragmentation and volatility, occurring not only in social life, but also in the field of infrastructure and space.

'Who remembers the V&D department store, Opel, public broadcasting or Facebook?'

Since as far back as the late 2020s the notion of 'the general public' has no longer existed and the mass media, major brands and large platforms have lost much of their relevance. Who remembers the V&D department store, Opel, public broadcasting or Facebook? In recent years, the acceleration in digital communication has served to further strengthen the tendency among members of distinct bubbles to live indifferently to each other. Citizens who share lifestyles are in constant online contact with each other. They use the same apps, receive the same news updates and sign contracts with the same companies in unison. People from different bubbles run into each other less and less often. They have little to share with each other and encounters only take place if they set their digital filters to make that happen.

Many people appreciate the freedom to do as they please. Those who want to attend their business meetings at home can now even use an older, unwieldy avatar without experiencing any glitches. This means that those who couldn't afford to do so in the past, can now also avoid having to get on the motorway. Roads have become quiet; what you see most is the white vans of delivery firms, installers and maintenance people who have to do physical work somewhere. Anyone who has the option of working digitally, but is also looking for company, can find a temporary hotspot in the urban network, sometimes in one location, sometimes in another. In the use of physical space, the keyword is hybrid. The office hubs around stations attract many people, which include not only dockers but also stayers who use sleeping pods that can be plugged in to the frontages of standard dwellings (plug & sleep). Policymakers have felt particularly perplexed by the emergence of the 'backyard shed industry' in the 1970s neighbourhoods. What back then was built as sheds or garages has evolved into a system of brisk manufacturing hubs,

Timeline Bubble City

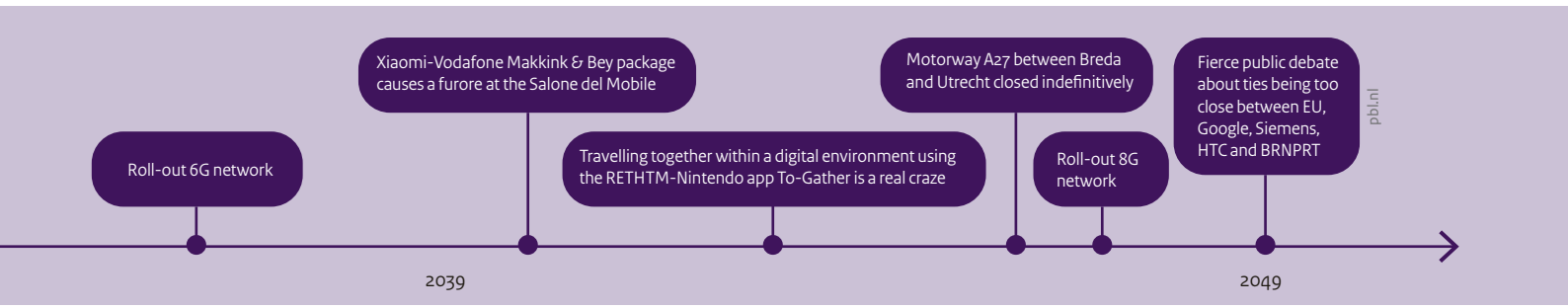


which means that after the practice of carrying out work in cafés and parks, a new generation of third places has gradually arisen. What actually is happening is that, depending on the latest fashion or the time of day, people are at work at what appear to be the most unusual nodes in the urban network. After all, apart from access to their cloud, many people don't really need anything. And for those who do have desires with regard to physical space, some bubbles offer subscriptions for comfortable, lightweight and modular (i.e. portable and linkable) work units, such as the Xiaomi-Vodafone-Makkink & Bey system that was a rage at the 2040 Salone del Mobile in Milan.

The demise of the physical environment plan

The dynamics and fragmentation of society and the hybridisation in the use of space present the Holland-South metropolitan region with new tasks in urban policy. A concrete reason for a review of policy and planning lies in the AR shells. Nowadays, they can be found almost everywhere, but they have proven to be difficult to cover in policy terms. Initially, policymakers were happy with these shells. With the use of augmented reality, they brought all kinds of obsolete property back to life, such as the deserted showrooms along the urban ring roads, empty car parks and deck access flats that were in dire need of renovation. This way, the shells offered a solution to problems around vacancy and degradation. Yet, this also means that they no longer have an established function. You might not be able to tell from the battered cladding on the façade of what was once the Alexandrium Mall, but the interior space that serves as a market hall in the mornings turns into a reading room in the afternoon, a gaming hall in the evening and a dance club at night. Visitors from far around know how to get to this location. The impact of ICT is enormous here. The on-site order of events simply no longer depends on the physical features of the building or the surrounding area; it is all about the digital reality that users temporarily create there. Put in your HoloLenses, put on your haptic suit and you're all set!

'People from different bubbles encounter each other less and less often.'



'Put in your HoloLenses, put on your haptic suit and you're all set!'

This development disconcerted spatial policymakers, urban planners and spatial designers. After the traditional zoning plan was disposed of in the 2022 revision of the Environment and Planning Act, the new physical environment plan was also soon found to have problems in dealing with the sharply increased variability in the use of urban space. The development of virtual and augmented reality technology took place very fast and left its mark, first in Rotterdam and The Hague, and later also in Delft and Dordrecht and, after that, in the area between Schiedam and Schipluiden. Roughly from 2030, it was clear to everyone that physical environment plans could not react to the speed with which locations known as swipe spaces were changing their appearance.

Initially, it was mainly the policymakers at the Ministry of Urban Development who defended the plans as an instrument in the recently created Environment and Planning Act. 'Give it time,' was the argument of the Ministry, 'the instrument offers more flexibility than you think'. However, municipal policymakers observed an increase in the number of problems in actual practice at their local level. The municipal authorities did offer, in the spirit of the Act, a great deal of flexibility to event producers, but this was still inadequate, particularly in areas and buildings where digital frontrunners kept remodelling the use of its space again and again. Changing alliances between ICT companies and users operated at such high speeds that the physical environment plan came to feel more and more like a burden. What some administrators and policymakers initially denounced as illegal digital interventions in physical spaces gradually shifted into tolerance of space hacking – 'squatting 3.0' as long-serving public officials would say – and eventually transformed completely into appreciation for a form of experimentation and innovation that was apparently in great demand. The frontrunners were followed by other alliances between companies and user collectives, which focused on bubbles that were somewhat more conservative but considerably larger. At one point, even three of the four subscriptions issued by ANWB-MAX automobile club included access to AR shells. For spatial policymakers from both the national government and the metropolitan region, that was the sign they should take a step back. The physical environment plan was abolished.

From spatial planning to temporary Foam Committees

There is another reason for this change of heart among administrators, policymakers, planners and law enforcers. And this reason too has everything to do with developments in ICT. As the physical space and the digital sphere were merging in the city, it became more difficult to establish who had authority over what happens at a particular location. Is it the owner who has left a building or a place in disuse for years? Is it the companies with brilliant ideas, or the users rushing in and out of the building? Or maybe the local residents, who sometimes do not reap the benefits but have to put up with the disadvantages of changes to the local programme? Or citizens who live further away, but pass through a place while they are jogging? Or is it still the government? Another consideration is how to bring about interesting combinations of projects, and in retrospect, the old planning system was actually pretty good at that.

In the recent past, various answers have been offered to these questions, and this has brought an underlying problem in spatial planning policy into the open. The territorial dimension of spatial planning suffers severely from ICT innovations. It has become clear that limited-period based programming is better suited to the new times. It is becoming increasingly simple to determine where any person is at any given moment thanks to Track and Trace technology. This, for example, means that, for the purpose of programming and reprogramming places, buildings or routes, it is possible to digitally identify the

'Some people have changed their Foam app settings to automatically reject all plans.'

stakeholders, on a case-by-case basis. These people automatically receive an invitation to take part in discussions and in decision-making.

The first attempts led to the emergence of the Foam Committees, which are now active throughout the entire metropolitan region. For government and policy, it is a matter of searching for a new balance between, on the one hand, the overall physical and digital preconditions in the Environment and Planning Act (without being able to fall back on physical environment plans) and, on the other hand, the highly context-dependent, temporary negotiations in the many Foam Committees. In a society that has been dominated by the public domain for so long, it is proving to be quite a mission to guarantee collective interests among all the dynamics. Which platforms should be used to announce plans for programmes, events, demolitions and projects for new constructions, restructuring and transformation? Which algorithms are to be the basis for determining patterns of residing, behaviour and movement, as well as the corresponding stakeholders? How long does the outcome of negotiations in a Foam Committee apply? And what about citizens who do not stay up to date with their news feeds? It seems that it is not so easy to always be up to date and to take action in time. Some groups have even pulled out; all the notifications were driving them crazy and they have changed their Foam app settings to automatically reject all plans.

Would you like to learn more about the path towards Bubble City in 2049?

This story above is made up of a selection of passages, taken from the full scenario for this future vision and the path towards it. In the full scenario, only available in Dutch, in the in-depth publication (PBL, 2019), you will find out:

- that a small group radically turns its back on the 24/7 online society and goes off-grid;
- why the word rush hour loses its meaning and the A27 motorway between Breda and Utrecht is definitively closed off;
- that, due to poor coordination, self-driving cars are responsible for chaotic scenes;
- how the auction of motorway time slots on the European platform MileMarket gives preference to users of electric cars and hydrogen cars.

State of Green

Scenario

In State of Green ...

there is a top-down green system transition

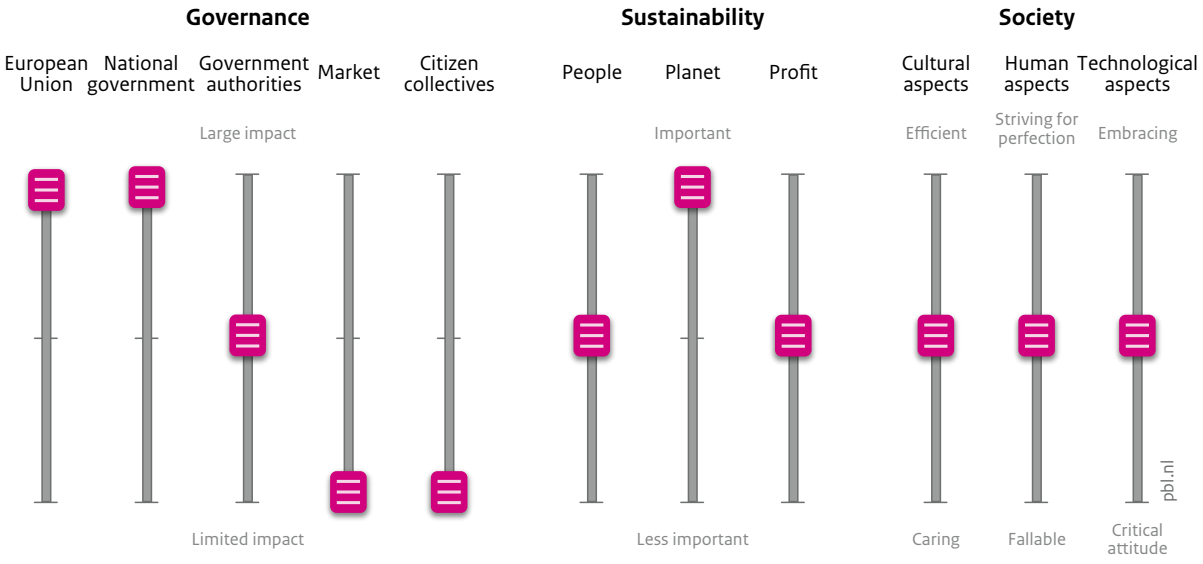
it is all about planet points and 'not owning'

there is less freedom of choice and a better local environment

proximity, development of hubs, walking and cycling are key

technology serves green ambitions

Mixing console setting State of Green scenario



Source: PBL

State of Green: 2049

A top-down system transition towards green and circular

In State of Green, society no longer accepts that well-intentioned citizens and companies try to achieve sustainability goals, while others are bending the rules all the time and keep on polluting. In a top-down approach, the national government, under pressure from society and under order from the courts, takes the lead in a system transition towards a green and circular society and economy. This world is no longer focused on individual property, but on the impact that behaviour has on people, the environment and the climate. The solution is found in sharing and making more efficient use of energy and natural resources. A 'planet points budget' (a non-transferable, non-tradable allowance: gone is gone) ensures a fair distribution of advantages and disadvantages. This society embraces technology only insofar as it upholds green ambitions.

Make use of what is already there, transit-oriented development, experience over ownership

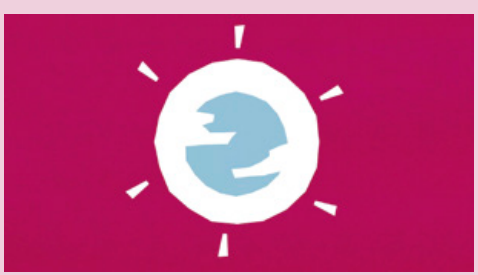
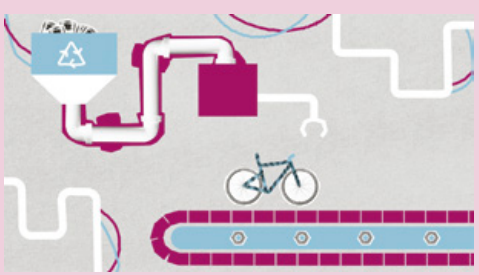
The standpoint of using what is already there promotes optimal use of the existing urban structure: already developed areas are not expanded and existing property is reused. Transit-oriented development – urban development near public transport stops – is the norm, with special emphasis on the areas around smaller stations and halts. Shopping as an activity has been cut back to the level of the absolutely essential. There are more small shopping centres for daily, functional shopping, while the larger complexes no longer revolve around objects, but around experience and culture. The focus on 'green living' produces a further intertwining of the red, green and blue: city, nature and water. In metropolitan environments, for example, investments are made in energy supply, water storage and ecology. Urban densification goes hand in hand with providing sufficient amounts of green space in order to provide a good quality of life, a comfortable local climate and water safety.

'A 'planet points budget' ensures the fair distribution of advantages and disadvantages.'

Walking and cycling are the model to follow

Thanks in part to the planet points system, the physical, and also virtual, proximity between living, working and leisure is at centre stage and, therefore, walking and cycling can be the standard. Everywhere, human-powered travel has priority. Long commutes are no longer acceptable. All trains stop at all stations. Innovations focus mainly on active forms of transport and less on motorised traffic.



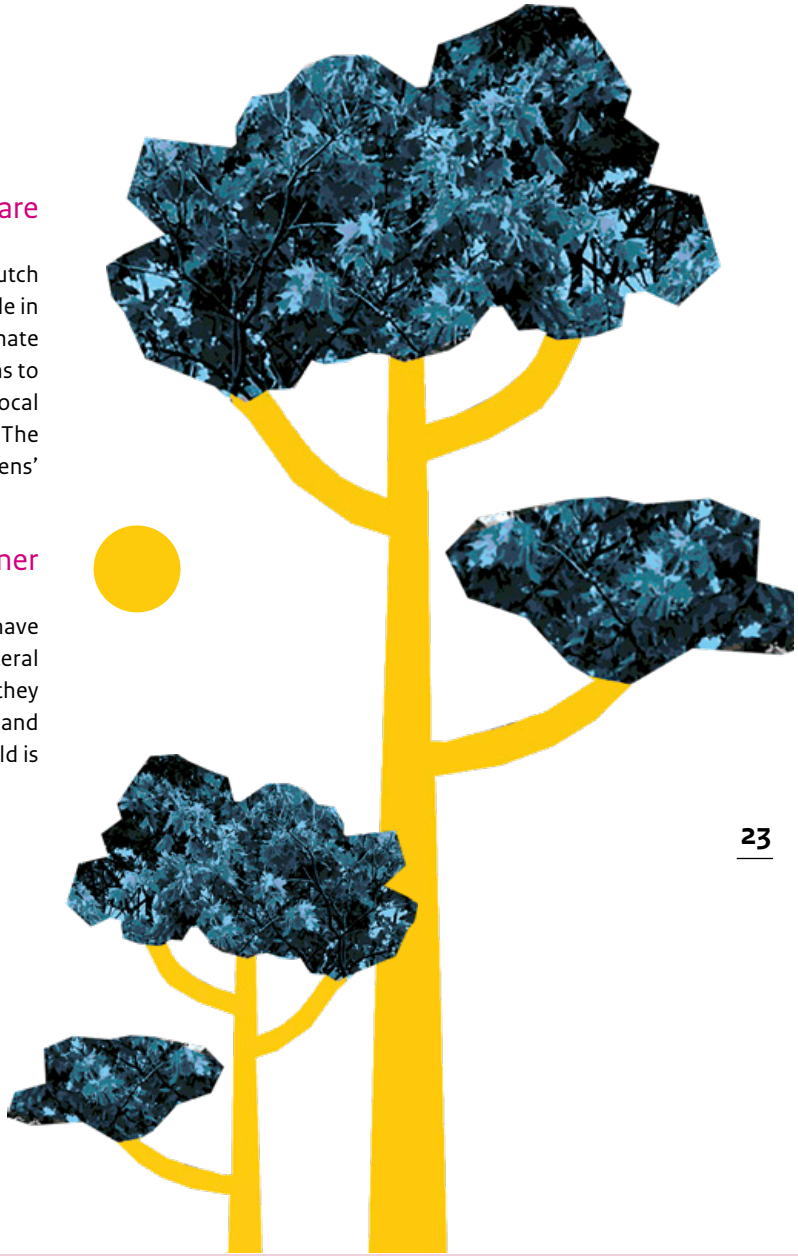



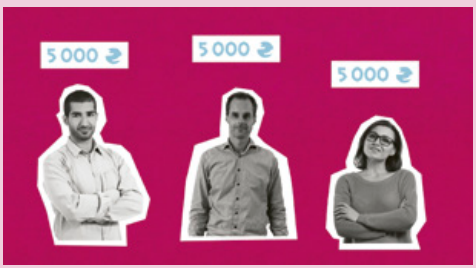
The national government and the EU are the leading authorities

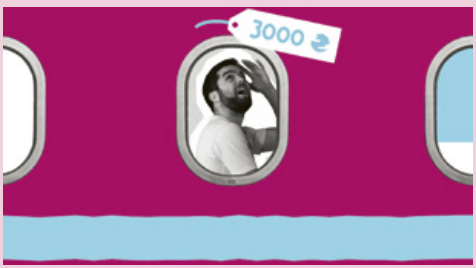
The central authority, comprising both the Dutch national government and the EU, plays a strong role in this world. It enforces the reaching of the Paris climate targets, considering expertise and strict regulations to be of paramount importance. Regional and local authorities carry out more executive functions. The steering role of the market and civic society (citizens' collectives) is limited.

Less freedom of movement, a cleaner physical environment

In State of Green, individual citizens undoubtedly have far fewer options to choose from and, also in a literal sense, less freedom of movement. In exchange, they enjoy a public space that is safe and pleasurable, and live in a cleaner environment. In addition, this world is more straightforward and orderly.







From the present to State of Green

Nijmegen, 3 August 2049

Radical change of course

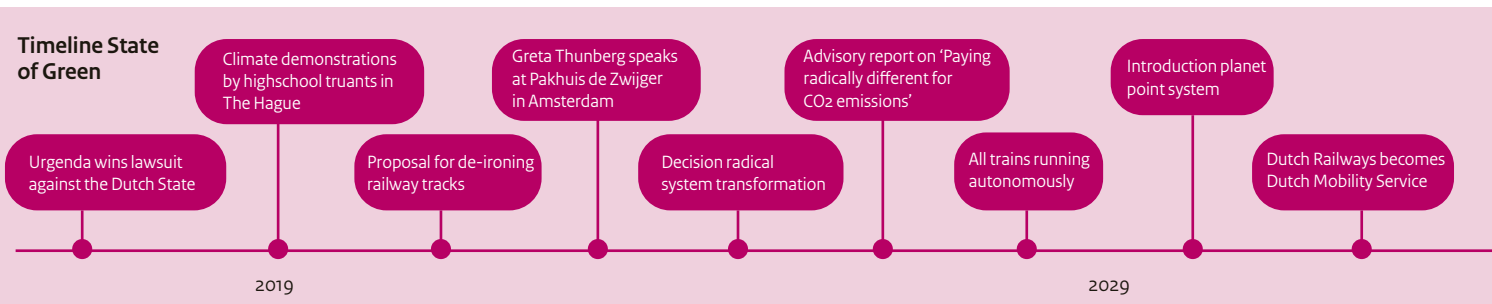
Looking back, it is clear that the seeds lay in the lawsuit that the Urgenda Foundation won against the State of the Netherlands. From that moment on, opposition built up against companies and authorities who were bending the rules or were combining grand words with paucity of action. Adopting rallying cries such as 'Don't lie to me' and 'Deliver on your promises', all kinds of broad-based citizens' groups filed lawsuits against double-dealing businesses, and against the government bodies that did too little to halt their practices. The crushing blow was dealt by the Kinderleven movement. Concerned parents and grandparents joined the younger people who had already been protesting for some time, and together they stood up for the future of their children and unborn children, very much along the lines of the prominent road safety pressure group Stop the Child Murder of the 1970s. Away with air pollution and other threats to the quality of the physical environment. If China can manage to get it done, then here too, it should surely be possible to substitute obsolete, polluting technology with clean alternatives.

The criticism that society voiced against the 'fossil-based' actions of companies and government was sharp. In a debate in Pakhuis de Zwijger, Swedish climate icon Greta Thunberg put it in no unclear terms: 'In the Netherlands, when push comes to shove, the unilateral short-term focus on hard cash and GDP figures wears the crown!' The public at large also gained a clearer view: noble intentions, dots on the horizon, climate agreements, promises of self-regulation in the business world, circular economy ambitions, and calls on citizens to adopt a more sustainable conduct – it was all woefully insufficient. A change of course was needed. Society was crying out for it. In 2024, the national government decided to institute a radical system change aimed at the climate and the environment.

'Opposition grew against companies and authorities who were bending the rules or were combining grand words with a paucity of action.'

Planet points

But how? In addition to the public pressure to develop a serious approach to the problems around the climate, natural resources and air quality, a heated debate was going on about the two-way split in society. Simply resorting to a pricing scheme was not an option: the lower-income groups would be forced to make drastic changes to their lives, while those who caused the bulk of the emissions could, for the greater part, continue to do so. It was a dilemma that held politics in its grip for a long time. The breakthrough came in May 2026 with the official recommendation Paying radically different for CO_2 emissions, issued by



Council for the Climate. It contained a proposal to introduce a separate currency for the consumption of products and services that require excessive amounts of natural resources or that are detrimental to the climate and the environment. Never before had a Council recommendation been embraced so readily. The planet points were born.

The idea was brilliant in all its simplicity: an annual, non-transferable and non-tradable points allowance for every individual, to be spent on environmentally unfriendly behaviour. It did prove quite complicated to work out the details, but the basic principle was clear and, eventually, could count on broad support: there is no difference between the rich and the poor; everyone is allocated the same points budget to compensate for 'wrong' behaviour. It took almost four years to implement the scheme. It was a quite challenging job to organise a transition period, set up the necessary points balance administration and arrange the supervision system to cover issues such as how to deal with consumption abroad. Making the actual payments possible in practice also entailed a lot of work. Companies and shops needed to adapt their systems because they had to operate with two currencies. The kingpin in this whole process was the Planet Points Service. The system came into effect on 1 January 2030.

'Rich or poor, it makes no difference; everyone is allocated the same points budget to compensate for 'wrong' behaviour.'

Of course, there was opposition. The daily newspaper De Telegraaf ran a headline saying 'Big brother is watching you,' and referred to it all as interference and technocracy. Still, in the past smoking used to acceptable and even the United States, after yet another school massacre, had made a turn towards tougher weapons legislation. The focus shifted from 'look what you're giving up' to 'look how much we've gained'. And that's quite a lot: a healthier physical environment, a lower energy bill, attractive city centres and residential areas, and being freed from a bad conscience. A small minority still thinks it is nonsense and tries to dodge the system or undermine it. It is part of the game. As Queen Amalia said in her Speech from the Throne last year: 'The system is a great good, but not a happiness generator'.

Mobility turned upside down

The points scheme also turned the transport system upside down. This was because people started to make different choices. The result: the train is now a real prime product. But there still was a major hurdle along the way. The promise of the self-driving car meant that initially the choice was made to 'de-iron' the railway network. However, the self-driving car turned out to be far more complex than expected, while the autonomous train was a no-brainer. On top of that, due to the high cost in planet points, the demand for private vehicles and individual transport services declined. The Dutch Mobility Service NM (the former

railway company NS) had also already started to offer a wider range of services in the early 2020s; today, you can rent super boards and wave gliders and the like, or take journeys by autonomous pod, e-TukTuk or rikshaw.

The points system also had other effects on mobility. By 2030, for example, nobody wanted to have an old-fashioned fossil-fuel-powered car any more. The trend had already started a few years earlier; in anticipation of the fact that fossil fuel was going to cost valuable planet points, there was a massive sell-off of cars running on diesel and petrol. Who on earth would want to waste planet points on something that can be replaced by a clean alternative? You would opt for a bicycle, which is now more popular than ever. After all, in the planet points system, only walking and cycling will not cost you any points; as a result, the bicycle culture has flourished dramatically. Batelle (resulting from the merger of two typically Dutch bicycle manufacturers) promptly offered a range of bicycle models that took over all kinds of functions from cars and vans. Today, in 2049, we can see in our streets the classic city bikes, every conceivable variation on the cargo bike and the transport bike, tricycles and quadricycles with ample luggage space, trailers in all shapes and sizes, family bikes for two to six people, specially designed e-bikes for the elderly (not faster, but lighter and easier to handle), speedy e-bikes, and lots of other kinds of electric one-, two- and three-wheeled cycles. And, of course, we can see large numbers of pedestrians. Only when absolutely necessary, you use the Your-Ride-Our-Concern app to effortlessly arrange the optimal journey in real time, using all kinds of clean modes of transport and taking into account your points budget. It took a bit of getting used to – exchanging the private vehicle for a set of services – but these days it is really hard for us to understand why we let those space-eaters mess up our physical environment for so long; it's such a relief to see green in the street instead of metal.

'By 2030, nobody wanted to have an old-fashioned fossil-fuel-powered car any more.'

Urban regions at smaller scale and greener

The effect that the planet points system had on cities, villages and regions proved to be even greater than initially foreseen. Restrictive spatial policies, subsidies for inner-city building projects and promotion of transit-oriented development all became practically unnecessary. Houses that were not within walking or cycling distance of facilities, shops and places of work, saw their value fall quickly, most particularly in the outskirts of the city, and developers knew better than to offer new housing in those locations. The points system had the effect of concentrating activities as much as possible within walking and cycling distance from residential areas. Proximity is the ultimate success factor. After decades of rapid expansion, in recent years urban regions have gradually been shrinking. Even before the implementation of the points system, a handful of project developers already anticipated that the future did not lie in doing more of the same, and made the radical choice of considering the regional rail network as the substructure for residential areas, working locations and for taking advantage of existing urban centres. The first project was Groenstad Gelderland, where a string of locations was developed along railway lines, starting in the municipalities of Arnhem, Nijmegen, Ede, Wageningen, Apeldoorn, Zutphen and Deventer. Since then, the Green City concept has become successful in other places too.

'Restrictive spatial policies became practically unnecessary.'

This does not mean that everybody everywhere is living in high-density locations. The view that this is a requirement for green living is rather old-fashioned. The new rules of the game have stimulated the creativity of planners, designers and building contractors to develop districts and neighbourhoods with a minimal impact on the climate and the environment through innovative building technology, abundant

'It is still possible to live in the countryside, but people who prefer this option will need to change their lifestyle.'

green areas, proper water management and local food production. To give an example, Deventer is a compact city with relatively high densities and a high level of facilities, while lower-density residential areas can be found in what is known as grex districts (neighbourhoods built under the 1990s Vinex policy, home to an ageing population) at nodes along the railway line between Arnhem and Nijmegen. It is still possible to live in the countryside, but if that is your preferred option, you will need to change your lifestyle. There are, after all, hardly any facilities in the countryside and simply jumping into the car is no longer an option. People in rural areas are more self-sufficient. For example, they grow their own food and keep generation of waste as low as possible. Then there are the 'outlaws', who live off-the-grid. While this gives freedom, there is no safety net. They are also said to be involved in shady businesses, like the ones that use the notorious Iceland route to offer people a way to illegally jack up the balance on their points budget.

Would you like to learn more about the path towards State of Green in 2049?

This story above is made up of a selection of passages taken from the full scenario for this future vision and the path towards it. In the full scenario (available only in Dutch) in the in-depth publication (PBL, 2019) you will find out:

- that, echoing what had happened in the past in the field of water management, a series of Dutch companies has now been put on the international map thanks to the planet points system;
- what the BLT app means for how we live;
- how 'not owning' has become the standard, with companies like Toolbox, BakeNow, Rent-a-Trampoline and Time-to-Baby;
- that revenues from VAT on air fares and excise duty on kerosene can be invested in an appealing international railway network.

Market Place

Scenario

In Market Place ...

it is all about performance, success and self-sufficiency

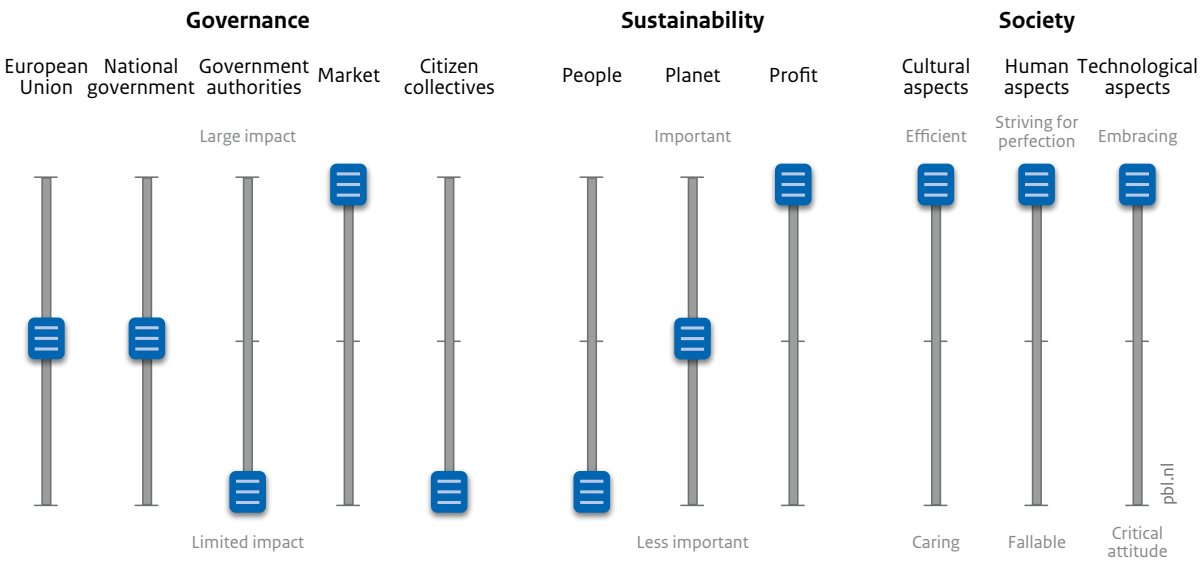
technology serves efficiency

there are stark socio-economic contrasts

people travel a lot, using all possible modes of transport

the government facilitates business activity

Mixing console setting Market Place scenario



Source: PBL

Market Place: 2049

Work hard, play hard, but not within reach for all

In Market Place, the dominant values are performance, success, self-improvement and self-reliance. People work hard, many people earn comfortable wages and enjoy themselves to the full, though this is not the case for everybody. Technological innovation results in increasing efficiency, for example in the form of robotisation in industry, in services, and on the road (self-driving cars).

Contrasts in the city, disparities in accessibility

Urban development is market-driven, which leads to stark contrasts between locations in the region. At one end of the spectrum, we can see business campuses being erected: pleasant, green working environments combined with luxury residential complexes. These campuses are located close to the central business district or at places in the mobility network that are readily accessible by various means of transport. The historic city centres have transformed into musealised residential and pedestrian districts. There is hardly any business activity there and, as for shopping, people prefer going to new-fashioned shopping malls. On the other end of the spectrum are the neighbourhoods that no one really cares about, located in a ring around the city centre. They are dirty and noisy, and the spatial quality is significantly lower. Still further away from the urban centre, suburban residential sites are emerging. They have a character that appeals to sizable groups in society and are also affordable for them. However, a lot of these people do have to face a long daily commute.

CoreNL and WeekendNL

At the level of the nation as a whole, a contrast is arising between the economically active part of the Netherlands, CoreNL, where people earn their salaries, and a quiet part of the country, WeekendNL, where people go to pursue leisure activities. In CoreNL people travel a lot, using all possible modes of transport. The fastest option is the self-driving car, for which dedicated, limited-access toll lanes have been built. In WeekendNL, it is more difficult for investments in infrastructure to materialise. In parts of the country, public transport has been discontinued and several sections of the motorway network have been closed to open up space for the expansion of nature.



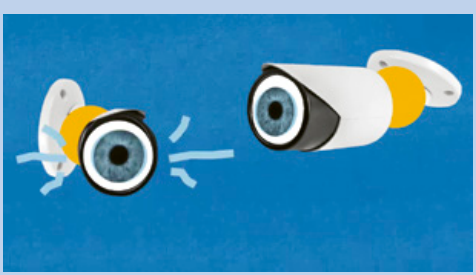

'Almost anything is possible, as long as you can afford it.'

Large corporations are the dominant force, the government facilitates

Large market parties are in the lead in Market Place. The modest role of the government is to guarantee a stable environment so that business activity can thrive, for example by undertaking efforts towards standardisation and risk reduction. In some fields, the business world is taking over tasks traditionally assigned to governments. For example, it is investing in the construction of infrastructure; the costs are won back through a per-kilometre charging scheme and by linking traveller data to the range of services offered. In addition, companies are involved in the planning of residential areas.

Freedom, risk of exclusion

In Market Place, freedom of choice and hedonism are at the forefront. Almost anything is possible, as long as you can afford it. But not everybody can. The relatively high average level of prosperity contrasts with quite substantial socio-economic inequality. Added to this is the poor sense of solidarity. For part of society, exclusion is a lurking danger in the form of, for example, accessibility poverty, which can arise when people have to travel very long distances every day.



From the present to Market Place

New Metropolitan Region Amsterdam, 14 November 2049

Google frees the Netherlands from its onerous burdens

Given today's economic prosperity, it seems rather implausible, but, in the early 2020s, the Confederation of Netherlands Industry and Employers (VNO-NCW) forecasted a bleak future for the country: even the most powerful regions would be missing the boat. Jointly with the New Metropolitan Region Amsterdam (NMRA), the employers' organisation accused the national government of sluggishness in getting the road infrastructure ready for the digital age. Time was running out; other European regions had already authorised level-4 automated vehicles to use the existing road network, and NMRA and other Dutch regions were facing the threat of falling behind their competitors.

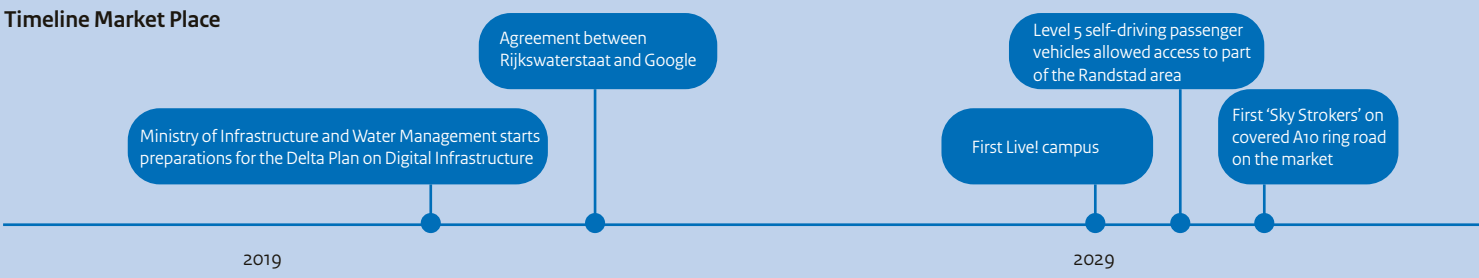
'Now it's the market's turn to make a move.'

The Ministry of Infrastructure and Water Management had already started drawing up the Digital Infrastructure Delta Plan, but preparations were very time-consuming because of the ambition to not only make the road system ready for fully digital routing, but also ensure it would generate energy. The complexity of the process built up even further because, under pressure from public opinion, the Ministry had chosen to make maximum safety the basic condition for the Delta Plan. This required a huge investment in the Dutch road network in the form of a high-quality communication system between all self-driving cars – for which ample room had to be made – and between those cars and the road. In the eyes of NMRA (which accounts for 40% of economic growth in the Netherlands) and VNO-NCW, this took too long. They wanted to be at the leading edge.

The very Prime Minister saved the situation by stating that: 'A next-level infrastructure calls for a next-level government that does not believe it always knows what is best. Let's face the facts, as a government we are always hopelessly lagging behind the boys and girls of Big Tech. Now it's the market's turn to make a move.' As a result, the entire Delta Plan, from consultation and planning to financing and implementation, was put out to tender. The government limited itself to laying down a series of preconditions.

The fact that Google won the tender did not surprise anyone. The company was looking for a territory to experiment with its new revenue model, which was driven by the link between personal data, travel patterns and real estate investments. The agreement was signed in 2025. The national government introduced compulsory location identification for vehicles and a dynamic charging scheme for infra-

Timeline Market Place



structure use, and pledged to set aside a budget for road maintenance through the Infrastructure Fund. Google invested in infrastructure and the communication system for cars, and received an amount per car kilometre driven, which was calculated on the basis of the traffic flow rate. Google also became the owner of the generated data, while taking on the obligation to make the data available to the Ministry of Infrastructure for a fee.

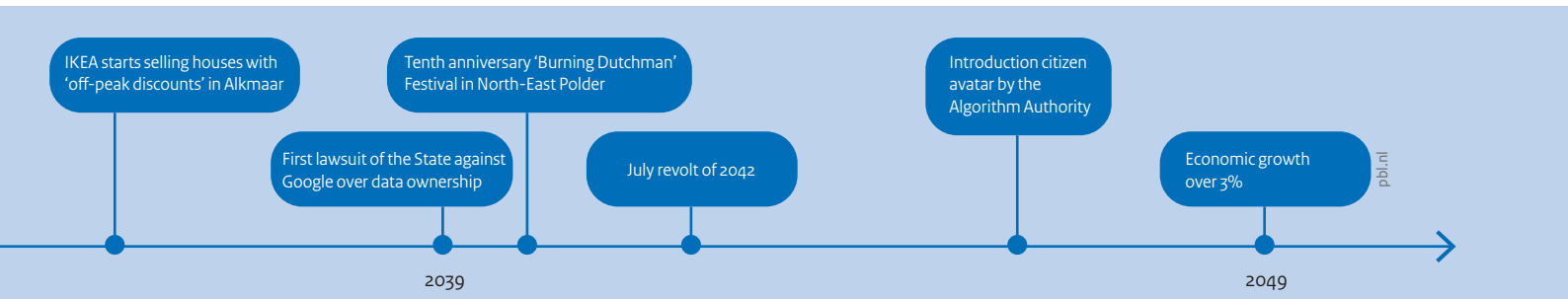
Smart communication technology was rapidly installed on all motorways and major provincial roads in NMRA. Automated driving was permitted on all these roads, and on certain motorways, a virtual lane booking system for self-driving cars was introduced. Those dedicated lanes made it possible to drive at higher speeds, which strongly boosted sales of self-driving cars. Over the 2030s, these exclusive lanes reached further and further into the city, right up to destinations in sought-after neighbourhoods.

Pleasant low-traffic area or rise early?

Throughout the 2020s and 2030s, a development took place in large parts of the area bounded by the A5, A9 and A10 motorways, and in the centres surrounding the metropolitan region. Planners characterised the development as 'the radical sweetening of the city'. Many city neighbourhoods turned into attractive and quiet environments for living and working. They were green and safe, and, since cars could park themselves remotely, they became low-traffic and gained more and more greenery. An Amsterdam professor referred to this shift as 'cargo bike meets Central Business District'. Google successfully zeroed in on this. The marketing efforts for its real estate and mobility services promoted automated mobility not so much in terms of mobility itself, but mainly as an essential element of a more pleasant living and working environment.

'If you're an early riser, then opt for Amsterdam-Beverwijk.'

Nobody living in a good location in NMRA today, is forced to spend time in a car on a daily basis. To reach nearby destinations, many people choose to walk or cycle, aiming to stay fit, while at the same time keeping their health insurance premiums down. The high-speed train and the airplane are available for journeys to urban hotspots further afield. Many people, however, live in less ideal locations and the daily commute to work takes up a lot of their time. This applies especially to the mid- and low-income income groups that live outside the ill-famed 10k perimeter. Referring to the square meter price of housing, the term is now also used to point to other socio-economic developments, such as the 10k school. In the past, this area comprised the first ring around Amsterdam, but the bounds are moving more and more outwards. Those with less to spend will have to resort to the former overspill towns further away from the central city. Housing development



market leader IKEA Project Development offers affordable dwellings in the Amsterdam region in Almere, Lelystad and Purmerend. Anyone who lives there and has to go into the city for work or to visit clients – which is often the case when a task cannot be taken over by a robot – has to get up really early. This is the situation of, for example, those working in the sector of in-person services. It means rising at 5 in the morning and getting back home at 8 in the evening. Their lives are dedicated to delivering services to others and not much time is left for relaxation. This group is being targeted by IKEA, who is selling its latest housing units in Amsterdam-Beverwijk with off-peak discounts on Google Routes included in the price – 'If you're an early riser, then opt for Amsterdam-Beverwijk'. In addition to those discounts, the lowest income groups make use of government-subsidised reduced fares which are only offered for travel at unpopular times, i.e. at night.

The revolt of July 2042

In hindsight, it is not difficult to see that it was the excessive travel times that motivated the July Revolt of 2042. At one point there was hope that the new Metropolitan Metro (The M2, built with the last revenues from the Dutch natural gas reserves) would relieve the road system to an acceptable degree. But many commuters continued to rely on road transport because they live beyond the M2 network. To make matters worse, the traffic models had not counted on the ever-increasing stream of automatic cars driving around in wait mode (the now notorious practice of temp-touring).

The dynamic toll system reacted continuously to the volume of traffic. Since the government had made an agreement with market parties, such as Google, to optimise traffic flow using fully automatic routing on important roads, prices on those roads automatically went up. As a result, in those years there were many roads that people on a low income could not afford to use. Increasingly, they had to resort to the secondary road network. Attempting to reduce travel times, the traffic routing system sent them along ever-smaller roads, which consequently also became congested.

'The Algorithm Authority received a considerable boost, funded in part through the Mobility Fund.'

Critics claimed that NMRA simply did not have enough road capacity to accommodate all the traffic flows. The opposition parties therefore demanded putting an end to the toll system, but the coalition government would have nothing of it. According to the coalition, improvements within the system were possible and doing away with the usage charge would put the accessibility of NMRA at risk. The coalition restated its confidence in Google, which promised to improve traffic flow through the pricing system and the traffic routing system. The government did promise to conduct research into socio-economic inequality with regard to travel time. However, this research was put on hold because Google did not want to provide the necessary data, insisting that the information was not subject to the supply contract and regarding it as a trade secret – which formed the start of a lengthy court case.

In the suburbs and satellite cities, activists took to the streets, in the most literal sense. In July 2042, they organised a protest march on the motorway. It was not dangerous, given all the self-driving cars, but it was disruptive and traffic came to a grinding halt. The march was so successful that it was decided to keep on doing it every week until the government gave in. Faced with this pressure, the government held a meeting with the big players in the tech world. The agreement they reached is now six years old and appears to be a success. The Algorithm Authority received a considerable boost, funded in part through the Mobility Fund. The fully dynamic road pricing scheme was abandoned, so that toll fees could no longer rise

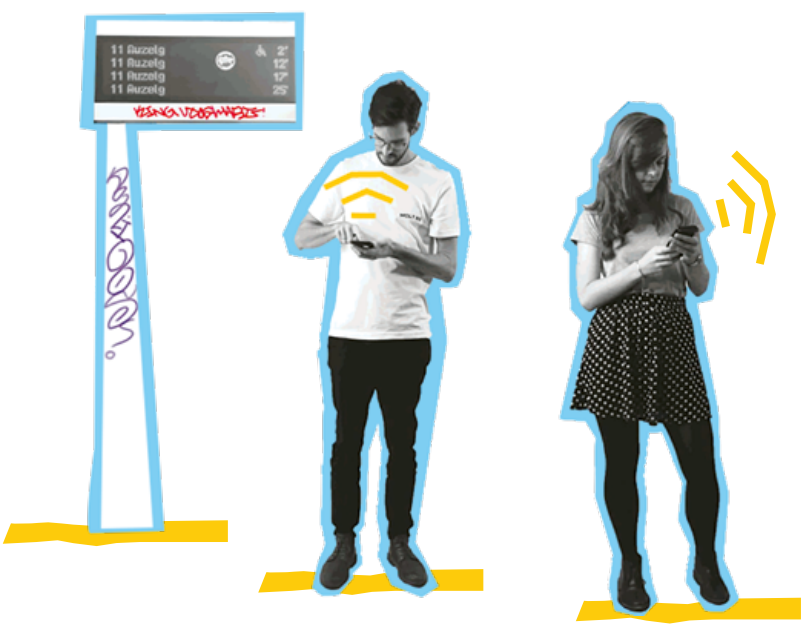
unchecked. In addition, Google reacted by expanding the application of the free-passage system on motorways to a number of specific professions, such as nurses and police officers (also usable outside working hours), as well as talented students. In recent years, this travel pass system has been developed further, attuning it to a broader target group. Employers can purchase passes for their staff and companies are including them in their loyalty programmes. This expansion goes hand in hand with arrangements to differentiate access and priority, using a range of categories from silver and gold to platinum and platinum+.

On the whole, emotions have calmed down. A new balance has been found, which benefits the investment climate. International companies know how to find NMRA. According to the authoritative Asia Global Rating Agency, the Netherlands is still among the top five competitive economies, and the Ministry of Economic Growth asserts that our excellent infrastructure and the high quality of the physical environment are contributing to this.

Would you like to learn more about the path towards Market Place in 2049?

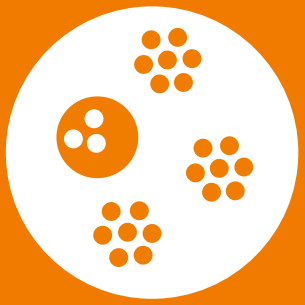
This story above is made up of a selection of passages, taken from the full scenario for this future vision and the path towards it. In the full scenario (available only in Dutch) in the in-depth publication (PBL, 2019), you will find out:

- how the 'sky strokers' were built on the cover structure of the A10 motorway;
- where the Augmented Intelligence Clinic is located;
- why the catchphrase 'Connections make all the difference' left people with a bad taste in their mouths;
- why the development of CoreNL went hand in hand with WeekendNL.



Our Neighbourhood

Scenario



In Our Neighbourhood ...

the neighbourhood is the centre of day-to-day life

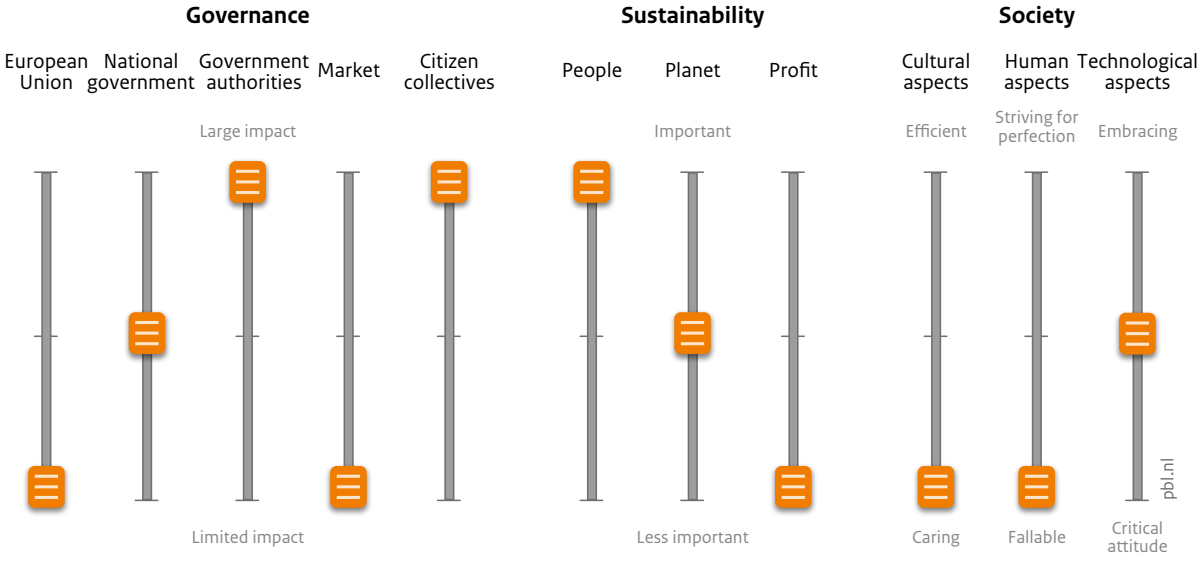
people, first and foremost, are members of a community

active mobility and creating things yourself are the norm

there are major differences between places at local and regional levels

supra-local coordination is complicated

Mixing console setting Our Neighbourhood scenario



Source: PBL

Our Neighbourhood: 2049

Local communities have control over their physical environment

In Our Neighbourhood, it is the local communities, each with their own specific character, who are in charge of affairs. The own district is the centre of day-to-day life and people feel strongly connected to it. The human being takes centre stage: the priority is on care towards good and healthy ways of living together in harmony.

Small-scale living, meeting each other

Existing districts and neighbourhoods develop their own character and new villages arise. Small-scale activities and local or regional products are highly valued. Almost everyone has a garden that is large enough to hold a few fruit trees. As many activities as possible, including work and recreation, are carried out within the neighbourhood. People enjoy meeting each other, and public places, such as streets, squares, community centres and neighbourhood gardens, play an important role, in this respect.

Local buses with a familiar driver

Active travel and making things yourself are more important than travelling fast or getting products from far away. What can be done locally is done locally, so travel largely takes place in and around the own neighbourhood or city. When necessary, people travel with their own car or share a vehicle. There is also organised collective transport, such as the frequently used local buses which have a familiar driver and carry both people and parcels.

'Your own neighbourhood is the centre of day-to-day life.'

Wide differences between neighbourhoods, districts and cities, limited support for supra-regional infrastructure

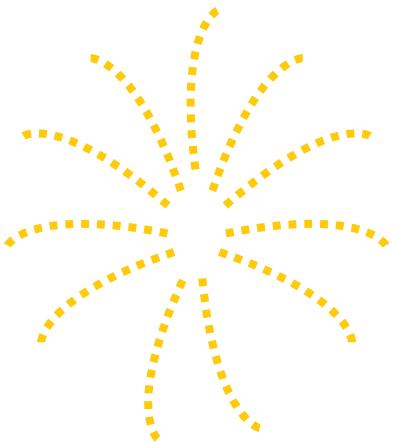
Community spirit predominates in Our Neighbourhood. Local collectives work together with local authorities (and sometimes the market) to organise society. As a result of the focus on the specific nature of places, wide differences arise between neighbourhoods, districts and cities in all sorts of fields, such as energy supply and the transport system. Aspirations vary and not every district is capable of organising itself effectively. In addition, supra-local coordination becomes more complicated. For example, garnering support for central facilities can be problematic. A village mill will surely draw applause, but nuisance to the

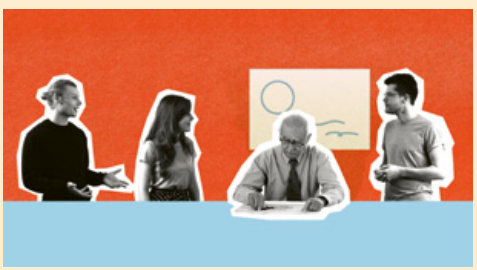



local environment from activities of international companies is not tolerated. Problems also exist in the infrastructure system, such as the issues around the construction of new long-distance links, because local interests prevail over supra-regional interests.

Sense of security, social control, risk of exclusion

In Our Neighbourhood there is a sense of security. The central idea is to achieve small scale familiarity and direct control of the local physical environment. This does mean, however, that there is also a relatively high level of social control. People who do not do well in such a setting may become excluded.





From the present to Our Neighbourhood

Vleuterweide, 4 June 2049

‘Take back control!’

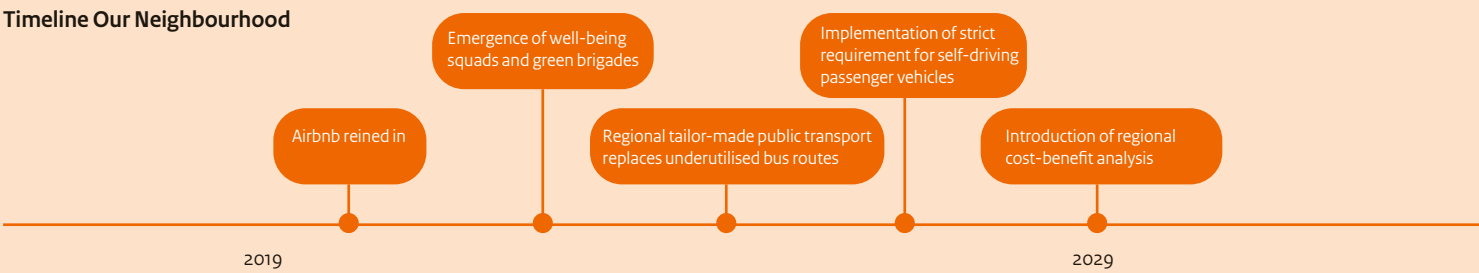
The House of Enterprise in Vleuterweide has had its new 3D printers for several months now. They can be used by every local resident – schoolchildren and amateur producers as well as professional designers. This investment has made a huge dent in the district budget, which means the overhaul of the neighbourhood parks has been put on hold. This caused the indignation of the local dog owners’ association, but the micro-democracy has spoken.

‘Citizens having control over their own physical environment is the result of a long struggle.’

The fact that citizens have control over the design of their own physical environment seems self-explanatory, but it is actually the result of a long struggle. The rise of citizen authority began when citizens reined in the activities of Airbnb in the 2020s. Tourism was approaching the tolerance limit with regard to quality of life; Amsterdam, and later also Delft, ‘s-Hertogenbosch and Maastricht, turned against the disproportionately large numbers of tourists, congesting the city and disrupting the housing market. The tourism industry was deprived of its social licence to operate. A change in the law made it possible to prohibit rentals through Airbnb and similar platforms. This was not the first time that the technology giants had their power curtailed: New York had banned Uber from its territory and the United Kingdom had imposed a tax on online sales via Amazon. The Dutch Airbnb ban, for that matter, sparked protests from Brussels about ‘state aid’, based on the argument that the country would be giving undue preference to national hotels, but the government held its ground: ‘We choose to defend our cities’. Several commentators added the further observation that ‘the European Union is already on the way out, anyway’.

People’s growing involvement in their local environment was part of a broader trend of local and social values taking centre stage after a long period of globalisation and privatisation. People realised that one’s city, district or neighbourhood is more than a place of residence and a place of work: it is the place where you live. At the beginning of this century, commuters had resigned themselves to being stuck in a traffic jam each and every day. They had split their lives between different places and times that were dedicated to work, rest, care and so on. It is not surprising that, compared to today, all these journeys caused many individuals to feel quite uninvolved in their immediate surroundings. But people gradually realised that you can only grow as a person – and prove your added value over robots – if you maintain a proper balance between work, leisure activities and doing things with and for each other.

Timeline Our Neighbourhood



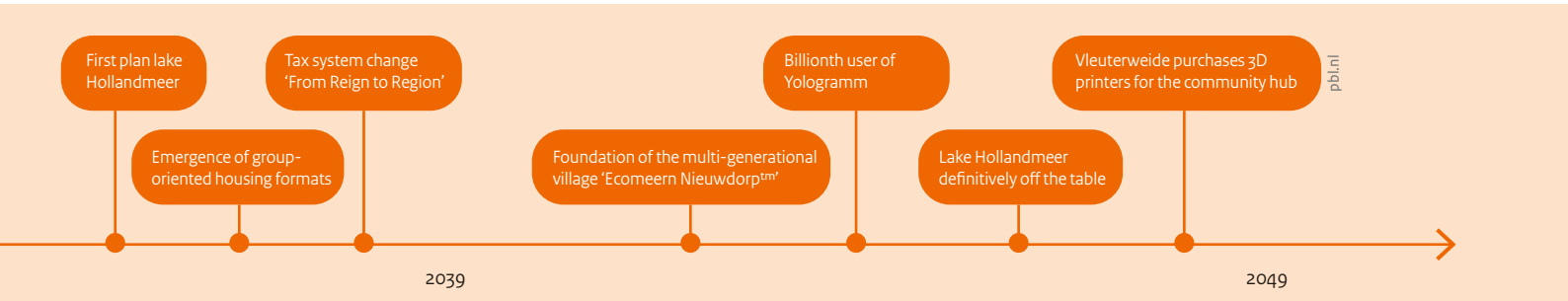
Local collectives were taking the initiative more and more. It led to the appearance of green brigades, well-being squads and cooperatives for care services, credit, energy and food. One notable effort was the way the local population in several regions reorganised public transport in rural areas. During the 2020s, more and more bus lines were closed down due to lack of funding, and those that remained were mostly running without passengers. To ensure a continued provision of transport, collectives in some regions sought collaborations with partners from the business world, an example of which is the successor to the made-to-measure public transport company Bravoflex in Helmond. In other regions, citizens themselves took the wheel, literally and figuratively. Thus, a wide range of regionally operating public transport services came into existence, with as their common denominator a driver who would be a familiar face to most users. This worked magic for passenger confidence regarding reliability and service provision, resulting in high patronage. These initiatives were financially supported with money formerly assigned to the transport companies, but they operated on a non-profit basis.

Technology has to benefit the community

The new reality of citizen involvement is, paradoxically, also due to a development that for quite a long time had been associated with disengagement: digitisation. It is true that digitisation and robotisation were met with scepticism some thirty years ago, but it has become clear that they have produced many valuable outcomes. This may have been due to that very same scepticism. By continuously taking a critical look at what the actual benefits are of innovations, you separate the wheat from the chaff. We can now only laugh at the idea of a digital assistant welcoming you at a hospital reception desk in those days. Did they really believe this would make a patient feel better? The private car is another good example. A broad public debate motivated the national government to formulate all manner of legal conditions before allowing the first self-driving car on the road: the quality of the public space was given right of way over the possibilities of technology, and the commercially based development of automation had to be linked to vehicle-sharing schemes. As a result, automatic driving in the Netherlands has never really gained momentum.

'The driver was a familiar face to most users.'

Technology has contributed to the realisation that the huge amount of travel (e.g. commuting) and hauling (of goods) is a waste of everyone's time and energy. Thanks to technology, you don't have to leave your neighbourhood to attend to your business. Almost every neighbourhood hub now has Yologramm licences, so you can take part in a meeting that is being held anywhere in the world. And we let the robots do what they do best; hardly anyone fancies a return to the heavy, repetitive work of before. And then there's so much that robots can't do: exchange



new ideas and discuss them, take care of each other, have fun, enjoy themselves. At the end of the day, it is precisely those things that we humans are good at: creativity, authenticity and quality.

A vast majority of people agrees that these values can be found primarily in a well-organised, small-scale environment. Consider the concept of village in the city, which first arose in the gentrifying districts of the larger cities in the 2020s, but later acquired its clearest expression in former growth centres and the earliest Vinex neighbourhoods (housing developments built under the 1990s Vinex policy). Several of these developments had, for a long period, been viewed as sources of demographic and economic concern, but step by step the realisation grew that people not only enjoyed living in many of these neighbourhoods, but also very often took the lead in exploring questions in the social and economic field. The image of the dormitory town was becoming more and more out of tune with reality; it turned out that, throughout 2020s and 2030s, many new forms of business activities developed, from services for the sharing economy, offered through private homes, to successful community firms. Some municipalities stimulated the home- and neighbourhood-based economy through the creation of innovative business environments: private-office concepts set in public buildings, or public functions carried out in private buildings. An example of the resulting interactive settings is today's quite common mix of municipal office, flex office, cafeteria, parcel distribution hub and child care centre. These kinds of workplaces successfully fulfil the wishes of the residents, in terms of both location (proximity) and time spending patterns (since they allow activities to be alternated or combined).

Financial autonomy, difficult coordination

The national government has, at all times, vigorously supported the new citizen involvement. When citizen initiatives challenged vested interests in the market and civil society, the government invariably sided with the citizens. The government also devolved powers to municipalities, which in turn further 're-decentralised' responsibilities to citizens' collectives. That was how the outline of our current government model was traced in the 2030s: affairs are handled at the lowest possible level, a level that is often much lower than originally thought possible. Today, for instance, regulations concerning the physical environment are drawn up at that local level. Vleuterweide serves as a good illustration, as it was the first district to win back peace and quiet from motorcyclists who think they can engulf everybody in noise, and it was also the first to ban old electric cars which use 'blood batteries' (produced with raw materials from conflict areas). Those things are simply not allowed into Vleuterweide.

'The image of the dormitory town became increasingly out of tune with reality.'

Over the course of the public debate, the call to take things much further was getting louder and louder. There was a demand for financial autonomy of regions and municipalities in which authority over funding for infrastructure played a key role. Up until the early 2030s, most infrastructure projects had been paid for from the centrally managed Mobility Fund. For its Multiannual Programme for Infrastructure, Spatial Planning and Transport, the government used a social cost-benefit analysis (CBA) to assess the added value of the plans under consideration from a national perspective. That caused aversion in growing numbers of regions, which found it neither relevant nor fair that a benefit in Amsterdam, for example, was weighed against costs suffered in Groningen. How could that help the citizens of Groningen solve their problems? The CBA lost support, was discarded as centralistic and replaced by the current regional variant (regional CBA).

This development eventually led to the late 2030s change in the tax system known as From Reign to Region. The region became the Tax Agency's primary territorial unit and has since then had the authority to both build up funds and decide what to spend the money on. The regions are their own masters within their borders, and it really shows! Over the past decade, major investments have been made in local and regional infrastructures, for instance the upgrade of provincial roads and the construction of separate bus lanes, separate paths for bicycles and e-bikes, and local roads where safety comes first. Investments in the quality of spaces around infrastructures, such as covers over motorways, are also growing substantially.

'Regions govern autonomously, and it really shows!'

When dealing with projects beyond their own particular level, the regions decide together whether a programme will be funded, and whether or not the national government should play a meaningful role in the planning process. This, of course, leaves the execution of such projects in a vulnerable position. Take, for example, the various plans for international rail connections that proved unfeasible, and major motorway maintenance operations which are regularly postponed. To get off the ground, projects like these depend not only on the outcome of the various regional CBAs, but also on the mood in the debates on regional elections, which are always taking place somewhere. In these debates, national-level administrators try to frame interregional projects in terms of solidarity (e.g. with economically weaker regions), but quite often voters are unwilling to contribute to 'megalomaniacal plans' devised for other places. Several large companies are now sending out warnings that the accessibility of the Netherlands is at risk and are arguing in favour of more central control.

Would you like to learn more about the path towards Our Neighbourhood in 2049?

This story above is made up of a selection of passages, taken from the full scenario for this future vision and the path towards it. In the full scenario (available only in Dutch) in the in-depth publication (PBL, 2019), you will find out:

- whether or not lake Hollandmeer has been created;
- the strength of Ecomeern Nieuwdorp[tm];
- how potter zones offer room to the free spirits of society;
- the meaning of debundled deconcentration.

	Bubble City	State of Green
Description	• Society is made up of 'bubbles', groups of individuals who feel strongly connected to each other, temporarily or not, on issues of lifestyle, interests or opinions. • There is a great deal of flexibility. • Digitisation continues at an accelerated pace in many fields.	• System transition towards a green and circular society. • The national government organises the transition in a top-down fashion, in response to increasing pressure from society. • Technological innovation is mainly applied for greening projects.
Space	• Physical locations and the physical appearance of spaces and buildings have very little significance. People do not have strong bonds with places. • The urban fabric is largely the same as it is now, but the classic city centre loses significance. • Places are subject to temporary programming by means of virtual reality and augmented reality. • New dynamics in locations with a lot of ageing property.	• The existing urban structure is used optimally. Proximity is crucial. • *Transit-oriented development:* a string of developments around public transport nodes. • Many green innovations and intertwining of red (urban) and green-blue (nature and water) networks. • Housing projects are designed to avoid creating the need to travel: they come with extra working space. In cities, the neighbourhoods have central spaces for work with good facilities. • Outside urban areas there are fewer facilities and people are more self-sufficient.
Mobility and infrastructure	• Digital connectivity plays an important role. Fewer physical journeys than today. • Mobility is a choice; journeys, often criss-crossing the urban network, are flexible and based on real-time information. All modes, whether combined or not, play a role. New forms of transport are quickly allowed into the system. • *Mobility as a Service* (MaaS) plays an important role. There is a large number of providers of public transport and MaaS services. The system is vulnerable due to its high degree of fragmentation. • Modest levels of maintenance work mainly on interurban and international road connections. • There are self-driving cars, but due to a lack of coordination, communication between vehicles is poor: service providers are not always reliable and service malfunctions occur regularly.	• The need to travel is minimised as much as possible. Essential facilities are distributed over many, mostly smaller scale, centres. • Walking and cycling are the norm, followed by public transport. Innovations take place in these forms of mobility. • Investments are shifted from the road to public transport and rail transport. • Optimal use of the railway network. The emphasis is on serving the regions and being light-weight and accessible. • Flying is far less common. International trains take over some of long-distance journeys. • Self-driving technology is used for tailor-made public transport.
Governance	• The varying alliances between market parties and lifestyle collectives are dominant. • The government plays a minor role; the European Union continues to coordinate several matters, such as main infrastructures (road, rail, water) at the international level.	• The central government plays a major role in which achieving the Paris climate targets is a priority. • The regions take on a more executive role. • The market and civic society play a minor role.
Advantages	• People have the freedom to shape their own identity. • Flexibility makes it possible for people to get customised solutions for their own lives, their urban environment (temporary, digital programming) and their mobility.	• Better quality of the physical environment: public spaces are more pleasant, cleaner and safer. • Society is straightforward and orderly.
Dis-advantages	• A primitive kind of society emerges, in which a lot of things do not work properly and which is rather messy. Long-term spatial planning is difficult. • Those who are not proficient in digital technology, or lack the will, are left in the cold.	• Individual citizens have less freedom of choice and, also in a literal sense, less freedom of movement. • Outside urban regions, there are only very limited facilities; those who live there are left to their own devices.

Market Place	Our Neighbourhood
• Performance and success are the dominant values, and technological development is seen as having to serve that purpose. • A highly individualised society with plenty of room for self-development. • Large companies take the lead in efforts towards progress.	• Local communities, each with their own specific character, are in charge of affairs. • The own neighbourhood is the centre of daily life. • New technology is only embraced if it makes a valuable contribution to the community.
• Market-driven urban development. Property development in economic hotspots. Places become highly specialised: metropolitan centres with many offices, campuses and pleasant residential areas. Other places are lagging behind: poor quality of the physical environment and facilities. • Marked socio-economic differences and disparities in proximity and accessibility. • Sharp contrast between CoreNL (earning a living) and WeekendNL (rest and recreation). • Development in WeekendNL only in a limited number of dispersed locations; its economy is largely focused on recreation and care services.	• Great affinity with specific places. Meeting each other and living together in one's own neighbourhood. • Districts and neighbourhoods cultivate their own character. • Varied pattern of existing residential centres and new villages in green settings around cores formed by medium-sized cities. • The small scale is important. 'Everything' can be found in the district, and what is not available is not missed. • People work from their homes, in the district or in the region.
• Having to travel a lot (e.g. to work) is a sign of poverty, being able to travel a lot (e.g. for recreation) is a sign of wealth. • Walking and cycling are practiced a lot in prosperous campus areas. Public transport exists for those who cannot afford proximity. • Investments in road, rail and stations are only made at top locations and to ensure international connections. Other parts of the network are dismantled. • Privatised roads with pricing schemes. Your purse determines your accessibility options. • Large scale presence of self-driving cars with access to their own dedicated infrastructure. There is a wide variety of providers and subscriptions.	• Travel time and driving speed are less important than quality of the physical environment. The speed limit is standardised to 30 km/h in built-up areas, and 60 km/h on provincial roads. Part of the infrastructure is dismantled to reduce traffic nuisance. • Active travel is more important than travelling fast or far. There is a preference for nearby destinations. • Walking and cycling infrastructure is important. Local and regional road and rail networks are well maintained. National and international connections are not a priority. • Public transport takes the shape of local and regional neighbourhood buses with human drivers. Collective transport is also possible through carpooling. • Self-driving technology plays only a limited role; it is sometimes used for local-level subsystems. It is not very popular and usually slow.
• Market parties take the initiative. • The government has a modest role, but the business world expects standardisation, risk reduction (e.g. through public-private partnerships) and social safety nets. • Large companies are called to account for their public responsibilities and they sometimes comply with the demands.	• Local and regional communities have great powers and control over spatial planning investments. • The national government is far less important than it is now.
• A substantial part of the population is able to attain prosperity. The government continues to protect essential qualities. • People have a great deal of freedom of choice and many options, provided they can afford them.	• A sense of security. A familiar world. • Small-scale approach and empowerment offer citizens the opportunity to have a direct say in their own local physical environment.
• Possibility of social tension as a result of gross socio-economic inequality and limited solidarity. • For a part of society, exclusion lies in wait, for example as a result of accessibility poverty.	• Supra-local coordination is difficult, which means support can be problematic for facilities whose scope lies beyond the local level. • There are major local and regional differences in spatial quality, facilities and transport systems.

Rehearsing the future

Scenario objectives

The four scenarios provide insight into various possible developments, beliefs and tensions. They are not predictions of the future, but make different futures imaginable, comparable and debatable. The scenarios describe both the situation in 2049 and the path that leads there.

The scenarios are not an end in themselves. Rather, in policy processes focused on defining vision documents, formulating strategies and building coalitions, they are a means that can be used to:[1]

- **broaden insights into**
  - important turns of events in the fields of urban development, infrastructure and mobility, and the relationships between them;
  - alternative approaches to existing policy issues;
  - new questions.

- **support communication by**
  - helping to explore the widely varying expectations and wishes of actors in different domains and practices;
  - making those matters debatable;
  - thereby, giving structure to social debates and policy debates.

- **strengthen involvement**
  - of various parties that play a role in debates on urban development, infrastructure and mobility;
  - to actively reflect on existing policy strategies;
  - to inspire them to explore new avenues.

Working with the scenarios

The reflection and exchange of ideas we aim for in this project, can best be brought about when the relevant parties in the fields of urban development, infrastructure and mobility get to work with the scenarios. We call this rehearsing the future. By working with the scenarios, they can ask themselves and each other three questions:

- **What might urban regions, infrastructure and mobility, and the associated technologies, institutions and values look like in different futures?**
- **What do the various scenarios mean for today's challenges and for the choices that are being made, or have to be made, today?**
- **What new challenges and choices are envisioned in the scenarios?**

1 Here, we follow the approach of the two PBL Guidance Documents (Dammers et al. 2013; 2017) on the creation and use of scenarios in strategic policy processes.

In the following sections, we will practice with six topical issues to illustrate how the scenarios can be used to look at matters with a long-term perspective. These illustrations include elements from both the short scenario versions in this report and the more elaborate versions in the in-depth report (PBL, 2019).

Proximity

Many urban regions nowadays opt for compact urban development, often by creating higher densities within existing urban areas: new opportunities for living, working and facilities are located as near as possible to each other. With this approach, present-day planning policy is aimed at benefiting from economic agglomeration effects, such as improved productivity and innovation, and at maintaining the green spaces around the city, limiting the length of journeys and making multimodal access possible (e.g. by public transport as well as by bicycle and car).

The significance and importance of proximity differs substantially across the four scenarios. In the world of Market Place, proximity is very important for the economy, but, since it is hard to achieve, it is also expensive. Those who can afford to, can purchase proximity. The many who cannot, have to resign themselves to long commutes. In State of Green, physical proximity plays an important role in a lifestyle marked by environmental awareness. For city dwellers who do not have to travel far, walking and cycling are attractive options and the car and public transport can be used more selectively. As a result, proximity is a crucial part of the efforts towards achieving the international climate goals and economical use of resources. In Our Neighbourhood, the great importance of proximity is motivated by the local affinity with place and community. While the intended outcome is comparable to that of current policy, the line of reasoning is different.

It is clear that in these three scenarios, physical proximity will continue to play an important role in the future, although justified by widely varying values and goals, which may influence the starting points for policy. Current urban planning policies provide building blocks for spatial arrangement that may also be useful in these scenarios, even though they are, for each case, still incomplete. Things are radically different in Bubble City – the high-tech society where digital technology will eventually dominate the physical world. Technological innovation will lead to a break in planning trends, and as a result, the long-predicted death of distance will become a reality. Activities which today primarily require spatial proximity, such as social and professional encounters, can then increasingly take place in a virtual environment. This means that in spatial planning and mobility policy much less importance can be given to concepts such as concentration, mixed functions and travel time. The urban development pattern that follows from current policy is not in conflict with this notion, but cannot assign it any added value either.

'Those who can afford to, can purchase proximity.'

Housing

The demand for housing is foreseen to be high in the coming decades. Satisfying this demand is not just a matter of building the right number of dwellings, but also involves looking at type, location and who will be building them. Depending on the world view and the corresponding organisation of space, the ways we use our homes in the future differ widely across the scenarios.

'Housing subscriptions enable people to relocate, effortlessly.'

In Bubble City, homes become much more transitory than they are today. Owning a house does not fit in with the flexibility of this society. People have little affinity with locations and quickly change their place of residence, depending on their possibilities and preferences at any given moment. Housing subscriptions provide people with the possibility to effortlessly move to another home: you rent the right to housing, rather than an actual dwelling. Another point is that, compared to the situation today, there are more small houses, because many people live alone. New developments and conversion projects often involve creating light-weight portable homes or units in old, transformed buildings that are given individuality through the use of digital technology. Each bubble has its own preferences and developers align their housing offering to this reality; they are typically small, flexible businesses that focus on specific niches and are able to respond quickly to changing requirements.

In State of Green, sharing your home, using it to fullest advantage, is the most normal thing in the world. It means you use fewer square metres per person and fewer homes are needed in total. In larger housing complexes, residents share many facilities, such as in-home offices, laundry rooms or exercise rooms. Existing buildings form the bulk of what is on offer; any new construction will be erected in between or in the immediate surroundings. Both small and large property developers focus mainly on restructuring and transformation projects. In Market Place, however, the large developers are the ones who run the show and housing cooperatives have disappeared. If you are well-to-do, you'll be living in a spacious home, and have access to a wide range of housing services to maximise your comfort. And your second house in the countryside will make a nice change from the bustle of life in the city. For those with less to spend, there are standardised neighbourhoods or IKEA districts: basic but affordable. Finally, in Our Neighbourhood, people have a very close bond with their home and their neighbourhood. Most people, by far, stay in the same home for a long time. Houses are spacious, resistant to wear and tear, and often good enough for occupation by several generations at the same time. Project development is mostly carried out under private commissioning by corporations, cooperatives or regional developers.

These points reveal the differences among the scenarios with regard to several relevant aspects of the housing market and the corresponding policies. For example, there may be huge disparities in the types of sought-after dwellings. Market Place and Our Neighbourhood are much more focused on home ownership, whereas Bubble City residents see ownership as more of a complication. Housing cooperatives have completely disappeared from Market Place, but Our Neighbourhood is seeing the emergence of many new forms of cooperative development and management. Major developers are especially relevant in Market Place, while in the other scenarios it is the smaller players in the housing market who take care of the larger part of the supply. In State of Green and, to a lesser degree, in Our Neighbourhood, the average household size is much higher than in Market Place and, more particularly, Bubble City, which has an influence on the volume of the housing demand. In Market Place and Bubble City, housing is being coupled more and more to all sorts of personal and virtual housing services, while in State of Green and Our Neighbourhood, shared facilities in or near the home are considered more important.

Smart mobility

The third topical policy issue is smart mobility – the use of information and communication technologies to improve accessibility. The Netherlands aspires to be a pioneer in this field, for instance by providing space for experimentation and ensuring infrastructure and traffic management are ready to deal with innovations such as self-driving cars.

The scenarios reveal that approaches to issues in the field of smart mobility vary widely. In Market Place, businesses and citizens embrace innovative technologies and the government offers them the space for that. As a result, development takes place very fast, but is coupled to newly arising issues related to accessibility, inequality and privacy. For example, who is granted access, and at what times, to lanes dedicated exclusively to self-driving vehicles? And who owns the data collected by these vehicles? In State of Green and Our Neighbourhood, technology is given a more critical reception. There, they expressly raise the question of what new technologies can mean for greening, and for local communities, respectively. For example, in State of Green, reducing travelling time is not a priority, and in Our Neighbourhood, it is imaginable that self-driving cars will be allowed to enter one city but not another. In Bubble City, the level of interest in innovative technology is high, but the absence of standards and coordination leads to a lack of compatibility (self-driving cars do not communicate properly with each other) and poor reliability (it is difficult to predict travel times due to malfunctions and traffic jams).

Accessibility and exclusion

'In all four scenarios, problems occur around access and exclusion, but in each case in a different way.'

A topic that is receiving attention in a growing number of policy areas is inclusiveness, the question of access or exclusion. It has been an issue for a very long time in some domains, such as health care and housing market policies. In those cases, access is even regulated by law. In other domains, inclusiveness has only been on the agenda since more recent times, for example because differences in the degree of access to places or services have gradually become more marked, or because technological developments have gone hand in hand with new challenges. Access to, or exclusion from, a service or a place can depend on several factors, such as an individual's place of residence, spending power, physical or cognitive

skills and mental capability. Because of the rapidly advancing digitisation in the urban environment and the transport system (navigation systems, apps, smart cards, online shopping and services), digital literacy in particular has increasingly become the differentiating factor in the question of whether or not a person has access to a service or a place. This differentiation gives rise to new dilemmas and further effects of division may appear.

In all four scenarios, problems occur around access and exclusion, but in each case in a different way. Our Neighbourhood is a caring society with, in principle, the fewest problems in this area. However, to be part of a community and reap the benefits of 'membership', people need to have a certain level of social skills. Not everyone can or wants to do that. Bubble City, with its diversity and flexibility, has a suitable collective for almost every individual. But given the high-tech nature of communication in these bubbles, it is very important to have digital skills and citizens who lack them are vulnerable here. In Market Place, it is the size of a person's wallet that is decisive: who is able to afford to enjoy all the beauty that this world has to offer and who is not? And in State of Green, citizens have to conform to the system. Those who are unwilling to do so, are living without a safety net and are left to their own devices.

Virtualisation, robotisation and datafication

A development that plays an important role in all four scenarios, but has different consequences in each one, is the shift in emphasis from the physical world to the digital sphere. The shift comes with new tasks. A new set of answers can be given to seemingly simple questions, such as where someone is or which channels they might be reached through. Today's definitions (e.g. in the form of policy categories) and institutions (e.g. regulations) related to urban development and mobility will need to be adapted to concur with that. Key concepts such as physical environment and infrastructure may also need to be redefined.

Bubble City is a world that is only to a small extent spatially rooted. The physical environment will obviously not disappear, but its tendency to merge seamlessly into the digital domain will continue to grow. With the emergence of hybrid, physical-virtual use of space, new questions are raised. Is a virtual-reality environment just as 'real' as a physical space? How does spatial planning deal with the ongoing digital reprogramming of places? Is accessibility becoming less a matter of mobility and more a matter of connectivity? In Market Place, new questions are posed by things such as self-driving cars. Robot cars and other new types of vehicles require space, and space is in short supply. To what degree should new means of transport adapt to the existing physical environment, or should the physical environment be adapted to the requirements these new vehicles impose? Who is in charge of all this, market players or the government? Another matter is that self-driving cars are likely to not just be vehicles, but also itinerant data factories. When a car manufacturer or a provider of mobility services collects data on public or private motorways on the basis of the movements of cars, they generate money for their companies, but can the effort also serve public interests? In State of Green and Our Neighbourhood, platforms, apps and algorithms also have a growing influence on spatial behaviour. In State of Green, the national government uses big data to control citizens' behaviour. Does the end justify the means? In Our Neighbourhood, robotisation might grow into a tricky issue: while an increase in efficiency or safety on the shop floor may be appealing, employment is more important to the community. And another point is whether a driving robot is seen as just as friendly as a waving bus driver?

Governance and financial flows

This sixth and final illustration of how scenarios can enable reflection on current and newly arising issues is related to the institutional aspects of urban policies and mobility policies. Though these have already been touched upon in the previous sections, they are important enough to merit separate discussion. The relationship between urban development, infrastructure and mobility depends in part on who the actors at the helm are and on how investments in each domain are financed (e.g. see PBL, 2014). The scenarios deal with both gradual and fundamental changes to the system, which can contribute to clarifying positions, and exploring existing and new lines of reasoning in today's ongoing debates.

Our Neighbourhood reveals a system which makes a clear choice to have both authority and funding at a decentralised level. This brings advantages for the coordination between urbanisation, infrastructure and improvement of the so-called last mile (e.g. going into the city by car from the motorway). But there are also disadvantages. Plans to build connections at the national level may face strong regional and local opposition in this world, which can result in procedures taking a long time to be completed or plans not even getting off the ground at all due to a lack of support.

Market Place and Bubble City both show how spatial development, infrastructure and mobility can combine in innovative ways under the influence of new technologies. For instance, if real-time online auctions are employed to allocate scarce road space to certain road users, then specifically tailored digital advertising can be displayed along the route. Companies can also develop new revenue models. An example is a project developer who upgrades a property subscription with a time slot for use of a motorway or public transport.

Finally, in State of Green, it is not the business world that takes the lead. The relationship between urban development, infrastructure and mobility is considered to be a national-level issue. The central government is a determining factor in a large part of the choices around local urban development, and also influences how, and how much, people are able to move around. This is backed by the reasoning that this is the only way the international climate goals can be achieved. Apart from that, the system does provide clarity, on the regional scale, for businesses: as the national government establishes a course that is to be followed for a long time, investors and developers know where they stand.

Methodology

Scenarios – exploratory, qualitative, normative, narrative and plausible

Through this Spatial Outlook, we offer tools, in the form of four future scenarios, to administrators and policymakers who are dealing with the inherent complexity and uncertainty in strategic policies in the fields of urban development, infrastructure and mobility in the Netherlands. The use of scenarios is a productive way to embrace and explore uncertainty about the future.[2] Scenarios are not predictions, but rather, an instrument to support strategic policymaking when thinking through possible paths towards the future: the developments that might take place, how opinions on those developments might change, what the options are in anticipation of, or in response to those developments, and what consequences they might have.

During the research that underpins the four scenarios, we made an inventory of existing developments, interpreted them and extrapolated them into the future; we identified new trends and remained perceptive to weak signs of possible breaks in trends. The individual developments were not considered in isolation, but studied in connection with each other. It is, after all, the interaction between developments that shapes the possible effects in the urban region and the infrastructure network.

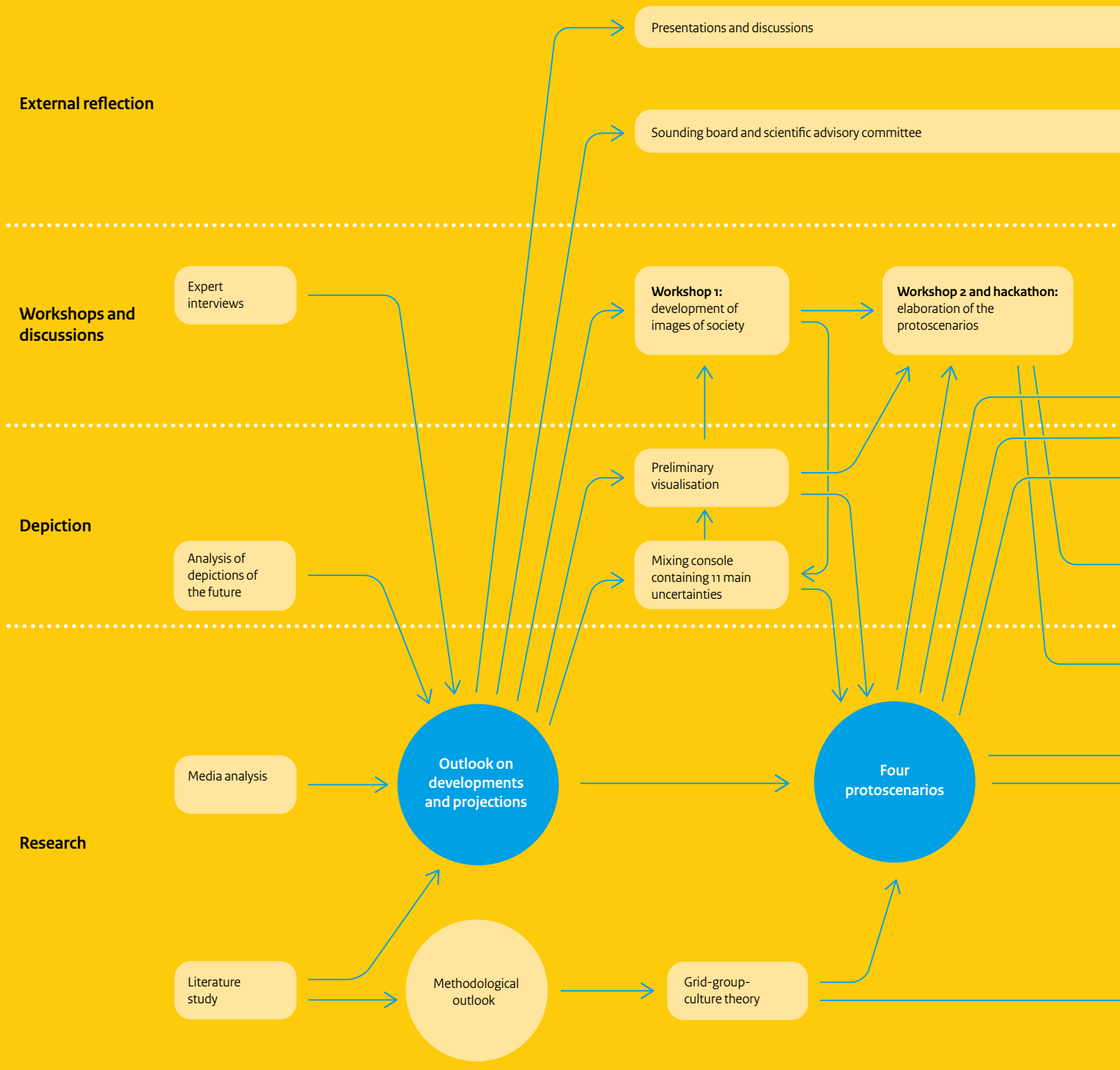
'The use of scenarios is a productive way to embrace and explore uncertainty about the future.'

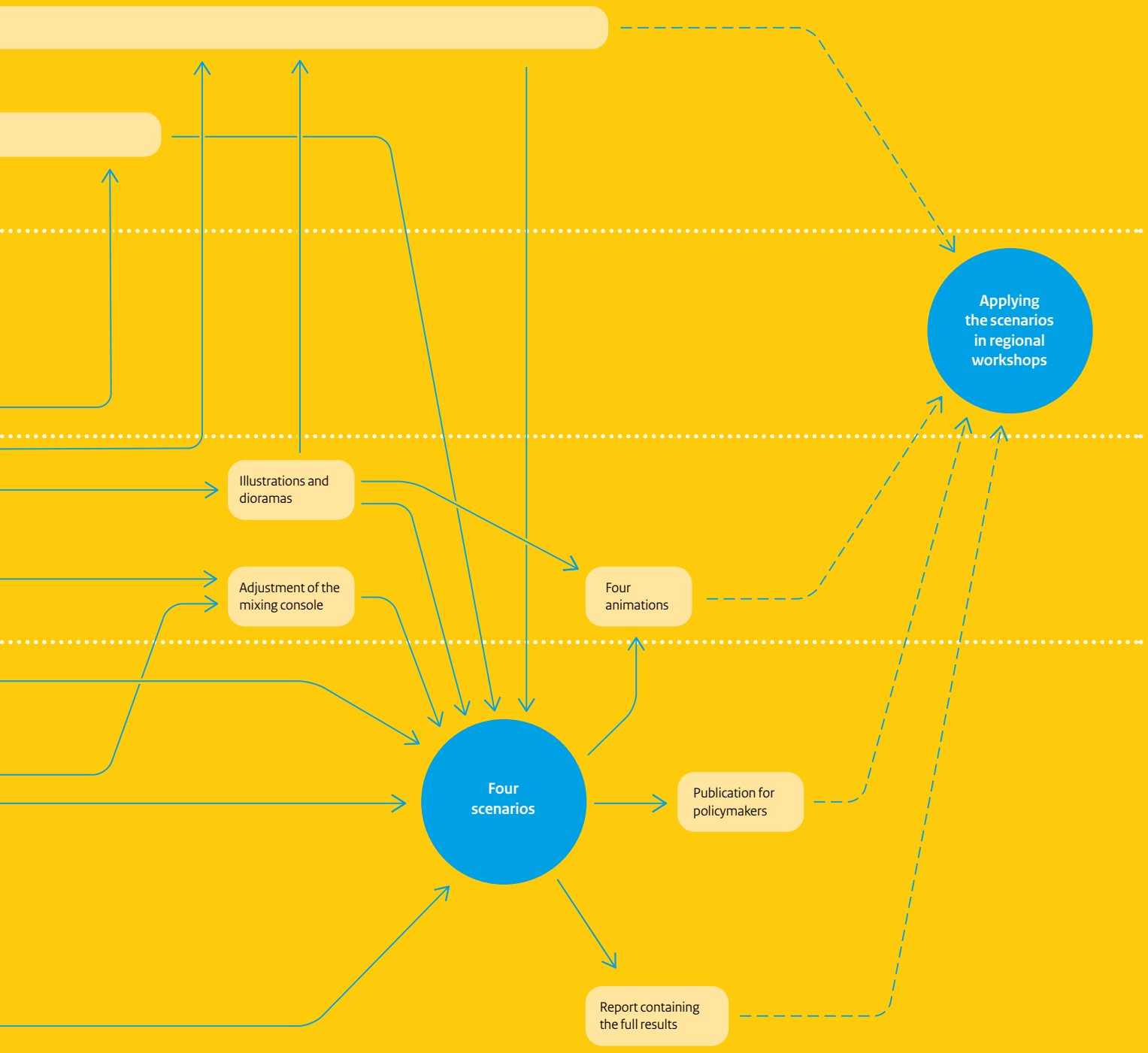
This means our scenarios are exploratory. They offer a long-term exploration of new issues and frameworks for reasoning. They are also qualitative: we cannot express in figures the possible futures that diverge with regard to notions such as the conception of humankind and the principles of governance, or futures that make use of technologies that have no practical application yet today. As the scenarios describe futures which have several core values at the forefront, they are normative: the pertinent actors have widely diverging views and make different choices from each other.[3] We explore those views and choices by giving a description of developments, actions, conflicts and solutions over time. To visualise these dynamics, the scenarios are narrative: stories produce concrete images of changes that we have not thought through yet. They achieve this by presenting specific places, relationships, events, actors, and so on, in connection with each other and by depicting tensions that stimulate thought. The scenarios help various stakeholders to exchange ideas about these things. Finally, the narratives presented here are not random. Each of the futures is plausible: the described developments, with regard to both the physical environment and policies, are interrelated and logically consistent.

2 In the in-depth study (PBL 2019), we provide a more detailed discussion of why we work with scenarios and of the method we used to develop them.

3 It should be noted, by the way, that normative does not mean we are dealing with desired futures. The four scenarios are not models of perfection

Research process




Applying the scenarios in regional workshops
Illustrations and dioramas
Adjustment of the mixing console
Four animations
Four scenarios
Publication for policymakers
Report containing the full results

Research process

The scenario development was based on interviews with experts, a literature review, a media analysis, and discussions and workshops attended by stakeholders. Within an iterative process, these activities were alternated with rounds of processing by the project team, further development of the scenarios in descriptive, narrative and illustrative forms, and report writing (see the process chart).

Interviews with experts, literature review and media analysis

To determine which developments were to be included in our future exploration, we consulted a series of experts to hear about their ideas on possible developments with a profound impact on life in the urban region, the ways people and goods move within the urban region, and the dilemmas that the administration and policies may have to deal with. Additionally, we carried out a literature review and an analysis of media such as newspapers, magazines, websites, social media platforms and advertising films. The aim was to both identify present-day trends and detect signs of changes that scientific and professional journals had not picked up yet.

The material that was gathered in that process formed the input for the first, preliminary design of the scenarios. An outline of the analysed material can be found in Chapter 2 of the in-depth publication (PBL, 2019 (in Dutch only)).

Key uncertainties

We formulated the preliminary concepts, or prototypes, of the scenarios in collaboration with several groups of external experts active in the fields of policy, science, business and society. During the research process, they were involved in two workshops, and following these, the project team processed the results.

Among the results of the first workshop was the insight that the scenarios should not focus that much on making statements about concrete manifestations of urbanisation and mobility, but rather demand attention for a number of fundamental uncertainties that underlie them. This is in agreement with the appeal made in the scientific literature to pay attention to what has been called deep uncertainty, a matter that needs to be dealt with in policies in fields such as the future of mobility (Lyons, 2015; Lyons and Davidson, 2016; Marchau et al., 2010). On the basis of the available material and the input from the first workshop, we subdivided the key uncertainties into three main categories.[4] They form the substructure of four world views, which were then further developed for the purposes of the subject of this study: urban development, infrastructure and mobility. The three categories are in turn subdivided into a total of eleven dimensions, visualised in the form of a mixing console. For each of the four world views, the sliders are set to different positions to visualise their particular sets of societal values.

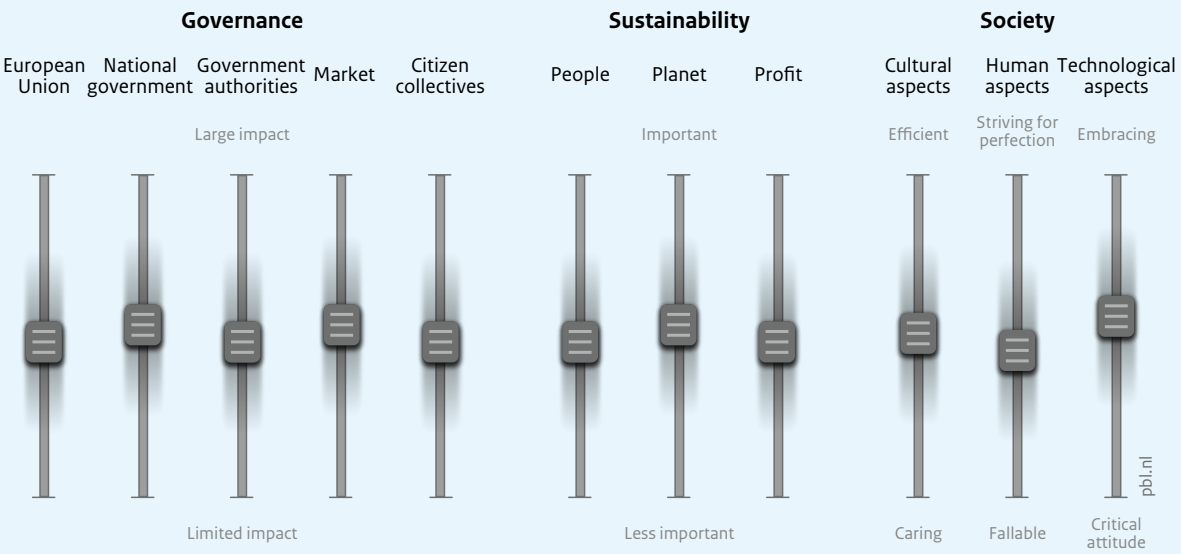
4 We made the deliberate choice not to use the classical coordinate system in the scenario development, because it assumes that it is possible to think through several different futures while considering only two core uncertainties. It is our understanding that the future of urban regions is too complex for such an approach. Moreover, actual practice has revealed that the coordinate system often produces at least one quadrant that proves difficult to further develop into a plausible future vision.

The first set has five sliders related to the question of governance: which actors will have the greatest influence in developments around the city, infrastructure and mobility. Does the European Union have a marked influence, is the national government guiding things, or are regional and local authorities taking the lead? In addition to that, the relationship between the government, the market and citizens may change. What happens if, for example, the role of large companies increases or if civic society starts acquiring more and more significant presence? In the scenarios, different coalitions of actors originate different developments.

The second set has three sliders which have to do with the three basic elements of sustainability: people, planet and profit. The weight of each element can change, and with that, the balance between them changes too. Urban development, infrastructure and mobility will be influenced by shifts of focus between economic growth, ecology (the environment and climate) and social goals, which include the distribution of wealth.

The third set also has three sliders and shows the uncertainty at the level of society, particularly with regard to type of society, cultural frames of human well-being, and attitude towards technology. Will future societies be focused on values such as speed, efficiency and self-reliance, or will more importance be attached to comfort and care? Will humans still have the liberty to be fallible in the future, or will the bar be set so high that they have to strive for perfection? A final uncertainty is how the attitude towards technology might develop: will people unreservedly embrace technical innovations or receive them with a more critical attitude?

Mixing console main uncertainties



Source: PBL

From key uncertainties to four scenarios

At this point, to facilitate the creation of the world views, and the subsequent elaboration of the scenarios, we used the morphological scenario method (Curry, 2012; Rijkens-Klomp, 2016). By setting the sliders on the mixing console to different positions, we laid the basis for a series of differing world views. Each one had to be internally consistent and to achieve this, we used the system of grid-group cultural theory (Douglas, 1970; Thompson et al., 1990). Each world view needs to be credible; that is to say, the positions of the mixing console sliders have to correspond to a conceivable 'inner logic' of the future society in question. Our application of grid-group cultural theory is described in more detail in Chapter 4 of the in-depth publication (PBL, 2019 (in Dutch only)). In short, each world view is structured around a coalition of different 'cultures' – currents in society, each with their own dominant values and behaviours. We chose coalitions that either closely match those that have been present in the Netherlands for some time now, or do justice to newly emerging alliances that we can extrapolate into the future. The mixing console settings we eventually decided on can be seen in this publication on the title pages of the four futures and corresponding narratives.

Bringing the futures to life

The next step was making the four futures imaginable in material terms. For this phase too, we invited a diverse group of external experts, involving them in efforts to enrich, test, adapt and refine the future visions. Over the course of a long, intensive 24-hour workshop, they collaborated with the project team on bringing the visions to life and making the first steps in devising coherent narrative elements. During part of the session, eight younger colleagues thought along with the team: in an exercise known as a hackathon, they explored a number of potentially disruptive development paths, which the four workshop groups could then respond to.

Subsequently, we transformed the results of these sessions into the final four scenarios. The most important characteristics of each future are summed up in the concise table in this publication, and presented in more comprehensive form in Chapter 5 of the in-depth study (PBL, 2019 (in Dutch only)). The latter does not only provide a detailed overview, but is also suitable for additional development of the scenarios, for example with regard to a specific region, or a subject that is not examined in detail here but is worth exploring further.

Writing the narratives

The last step in the research process was writing the narratives. The narrative form offers the opportunity to explore the emergence of widely varying alliances, tensions and conflicts over time. It is precisely these things that can help administrators and policymakers to think through future developments, opinions and alternatives for action. The narratives describe how the four futures unfold over the period 2019 to 2049. Short versions are presented in this publication and the full versions can be read in Chapter 6 of the in-depth study (PBL, 2019 (in Dutch only)).

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Every few years, PBL Netherlands Environmental Assessment Agency publishes a Spatial Outlook report. The subject matter and structure always vary, and the central theme of this edition is the future of urban development, infrastructure and mobility in the Netherlands. The Spatial Outlook 2019 has three parts: this report 'Rehearsing the Future', the in-depth study 'Scenario's voor stedelijke ontwikkeling, infrastructuur en mobiliteit' (in Dutch only), which includes more information about the scenarios and explains the applied methodology; and five short animated films to introduce the scenarios to a wider audience.

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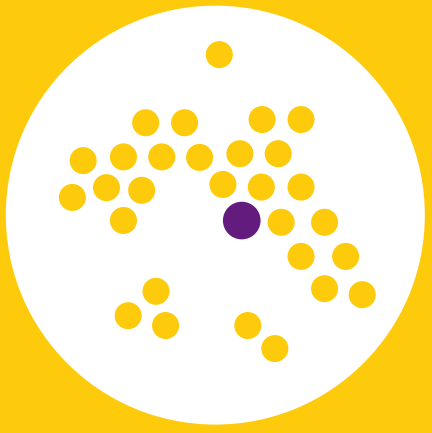
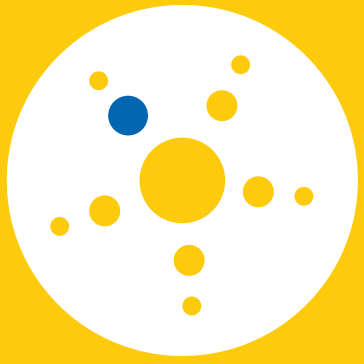
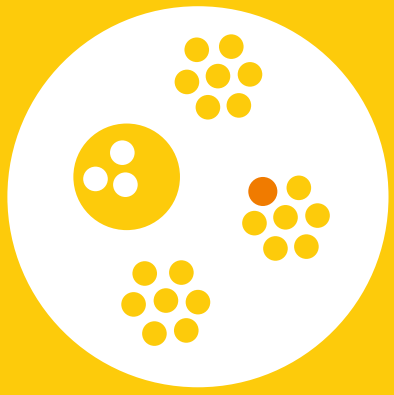
Your thoughts

We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run
Roy Amara

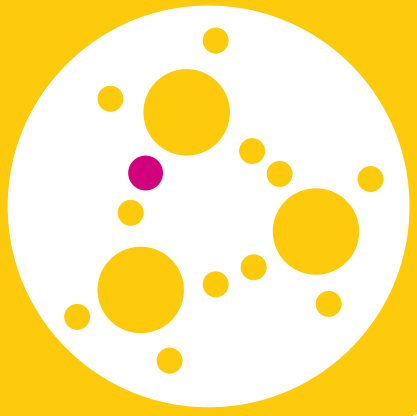




Everyone has a plan until they get punched in the mouth
Mike Tyson



It is the images of the future that shape present decisions
Jens Beckert



The best way to know the future is to create it
Abraham Lincoln en
Peter Drucker

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