



Visions of UNaLab Follower Cities

D6.5 Joint Vision Report

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Extract of pages related to Future Telling

6. FUTURE TELLING

6.1. Future Telling research

The future is unpredictable and elusive. Recent changes in technology, ecology, economics and society have already led to significant changes.

The expectation is that the complexity that people and organisations experience will only increase further in the years ahead. A number of current Drivers for Change will lead to radical changes in the future. For example, new developments in information technology will create opportunities that we cannot imagine today. These will undoubtedly change our lives significantly, including the way we shop, travel, move, communicate and work. Another example is the increasing level of social connectivity, which will drastically affect the relationships between organisations and their strategies. Even today, disruptive developments in many areas are challenging us to redesign our world.

This constant process of change has also become more complex: developments are so rapid that the future is unpredictable, based on our knowledge and models of the past and present. Predictions based on analysis appear pointless. The new complexity is characterised by simultaneous developments with far-reaching effects. We need a new way to visualise the future, with all the opportunities and challenges that it will bring – an approach that is creative, imaginative and research-oriented. Even though we can't predict the future, we can create a range of possible context-related future scenarios. These desired scenarios will direct our decision-making, from short-term actions to long-term consequences.

In the UNaLab project, the Future Telling research method is used to develop possible, context-related future scenarios in a creative, imaginative way. This implies a structured method to map the expertise and ideas of the thought leaders. The process focuses on climate and water resilient cities, in particular using analysis to gain insight into the Drivers for Change for cities in 2050.

6.1.1. Thought leaders

Finding suitable Drivers for Change requires both broad and specialist views. The research involves 8 interviews with thought leaders holding different views on smart and sustainable energy in cities. A broad spectrum of experts with a visionary scope was chosen from knowledge institutes, companies, consultancies and profit or non profit organisations. Their expertise was both general on climate and water resilience, and specific on nature based solutions.

To overcome possible cultural bias, the experts were drawn from all over Europe, and even included thought leaders from the USA. These thought leaders are introduced on the following pages. For the interviews, the requested expertise of the thought leaders was not specifically their

future vision, but their knowledge of important influences in their own fields. The Future Telling method inspired them to use their knowledge to visualise future trends and to describe possible future scenarios in rich stories. In fact, the richness of those stories makes them fertile input for the UNaLab project.

The H2020 project Roadmaps for Energy (R4E) also included Future Telling research. Although the focus of the R4E project was on energy in the urban environment, the interviews also addressed quality of life in cities. Some thought leaders included nature and climate resilience in their future scenarios, these interviews are also included in this research.

The list of Thought Leaders and a short background can be found on the next pages.

6.1.2. Future Telling card set

The Future Telling method uses a set of 52 cards showing general future trends derived from an extensive research project by The Hague University of Applied Sciences. The cards are shown on the previous page. They are used to trigger ideas by the research participants, and to inspire them to tell rich stories about how they think these trends will influence the use of nature based solutions for climate and water resilience in future cities.

6.1.3. Structured interviews

The Future Telling card set is used in the interview. The interviewees are asked to identify relevant future trends and to tell stories about how they imagine these trends could develop.

The card set with a broad collection of general trends helps in the interviews with specialists by making them consider all the relevant directions (social, technological, economic, ecological, political and demographic), and at the same time to consider more distant future scenarios. The trends that are presented on the cards trigger their thinking, and inspires them to give rich descriptions of how they see the future developing in relation to climate and water resilience in cities in 2050.

The interviews contain three main questions:

- Sort the 52 trends on the cards into three categories:
 - Not relevant in the context of climate and water resilience in cities
 - Already relevant now
 - Relevant in the future
- Take the selected cards in the category 'relevant in the future' and pick the 10 cards that in your opinion will have the greatest impact on cities in the context of climate and water resilience. (The interviewees can

also add missing trends which they regard as important.)

- Tell stories about how you imagine these 10 trends will develop and what the future in cities will look like.

6.1.4. Drivers for Change

A limited yet representative number of Drivers for Change are distilled from the large volume of expert material. In this phase, the data from the interviews is analysed by means of clustering, selecting and comparing the quotes by the thought leaders. The clustering is based on both commonalities and contradictions in the statements by the experts on the specific topics.

A Driver for Change needs to address the topic of a cluster, as well as to point in the directions that the future might take. So for each cluster, a short title and a description are given to capture the richness of that cluster. The quotes by the thought leaders serve as an inspiration to paint richer stories of the possible new future scenarios.

The analysis led to five Drivers for Change for the future of climate and water resilient cities in 2050.

6.1.5. Prioritising drivers for change

In the joint ambition workshop the results of the Future Telling research was shared with all cities. The aim was for the cities to better understand the Drivers for Change and to prioritise those that are most relevant in relation to the cities ambition, and therefore are included in the further vision development.

6.2. Thought Leaders

The thought leaders are selected for their expertise and visionary scope. The interviewees work as members of knowledge institutes, companies, consultancies and profit or non-profit organisations. We aim for a mix of expertises, varying from ecological, social, and human oriented to technology oriented.



Jeroen Aerts is director of the Institute for Environmental Studies (IVM), the oldest multidisciplinary environmental research institute in the Netherlands. IVM has a total of 55 Staff and PhD's divided over 3 departments. Within IVM, Jeroen is also head of the department 'Water and Climate Risk'. Jeroen has an established internationally-recognized leading position in the field of water and climate risk management with 12 key publications in Nature, Science and PNAS. He has developed and applied a wide range of assessment and modelling methods to analyse water risk (flood/drought) and climate adaptation at scales from local to global. The methods include: hydrological modeling, insurance, catastrophe modeling, agent based modelling, scenario analysis, pathways, and optimization. On the basis of scientific results in the area of climate and flood risk modelling, Jeroen was awarded by the prestigious NWO-VICI grant (1.5 mln Euros) in 2014.



Michael Lake is the President and CEO of Leading Cities, a global non-profit with operations in 10 countries. Michael establishes and develops relationships with municipal governments, businesses and universities around the world, creating a global network of partner cities dedicated to implementing urban solutions that effectively address the shared challenges facing 21st-century cities.

Leading Cities is a global leader in Smart City solutions, city diplomacy and collaboration advancing sustainability and resilient city strategies and technologies. With its global network of world-class cities, Leading Cities has built bridges to share best practices, urban solutions and lessons learned among city leaders while breaking down barriers within cities by engaging each of the five sectors of the Quintuple-helix (Q-helix): Public, Private, Non-profit, Academia and Citizenry.



Malia Lazu has over two decades of experience establishing grassroots involvement in political advocacy and civic engagement, including a two-year fellowship at MIT. The passion and success of Malia's work has earned her a reputation as one of the most insightful and critical organizers of her generation, and caught the attention of MTV, Showtime, ABC-TV's Chronicle, Fox News, and print publications such as Newsweek, The Boston Globe, and Boston Magazine. In addition to her extensive work advocating for our youth, Malia has managed campaigns for numerous tastemakers including Grammy Award-winner and famed Civil-Rights Activist Harry Belafonte, American novelist Walter Mosley, and Peter Lewis, philanthropist and Democratic Party donor.

Transformative Culture Project harnesses the economic power of creative arts for youth and community development. They imagine a world in which artists and cultural creatives are celebrated and compensated for their role in imagining the future and connecting people to one another. At MIT Malia founded Urban Labs, helping companies activate their cultural competency to attract customers, influence product offering, and attract and retain talent in order to outperform their competitors.



Chris Luebke's interest in the built environment blossomed early, propelling him to pursue a multi-faceted education, beginning with engineering and culminating in a Doctorate in Architecture from ETH in Zurich, a city to which he remains deeply connected. Chris gained valuable experience as the protégé of esteemed Spanish Architect, Santiago Calatrava. But, subsequently he turned to his other love, education, by accepting teaching positions at several prestigious universities. In 1999, Chris joined Arup as the Co-Director for Research and Development. A couple of years later, he formed the Foresight, Innovation and Incubation team, which has evolved to its present form as Foresight + Research + Innovation.

While he refuses to be categorized, Chris views himself as a generalist with a view of being "in league with the future". He has been described as the "Willy Wonka of the built environment, conjuring up dreams of a future where we can cure our ills through faith, physics and forethought".



Riccardo Marini was born in Pistoia, Tuscany, he is aware that this ‘place’ and its culture shaped a lot of who he is. As an architect who would define himself as a modernist, he is acutely aware of the destructive nature of architecture, which does not know where it belongs and who it is there to serve. Over the years he has observed the inability of professionals to actually listen and learn from past mistakes and this drives him to ensure that there is proper meaningful engagement and that people come first. Riccardo loves design and designing but is fascinated by what makes places work. He has come to a simple conclusion that places are a reflection of the culture of the people who created them. He has for many years endeavoured to show that the real value of place is far more profound than monetary value alone, but that the economic indicators which drive a lot of the current decision making can only be achieved and sustained if you create the genuine article: a place that makes people happy.

After working for many years as a senior city officer he worked as a director with Gehl architects in Copenhagen, he founded Marini Urbanismo in 2017.



José-Luis Muñoz-Bonet has a Masters Degree in Industrial Engineering, a Masters of Advanced Studies in Innovation Projects and more than 25 years of professional experience in environment, water and energy management, innovation and international cooperation. He has had executive responsibilities in companies such as IBM and public bodies such as the FCVRE based in Brussels. He is director of Climate KIC Spain, EIT Climate-KIC is a European knowledge and innovation community, working to accelerate the transition to a zero-carbon economy.



Corrado Ragucci is Chief Commissar of Genoa Local Police Department in charge for the Innovation Policies Office where he manages the main analytical programs in theme of Urban Security and Road Safety. During 2017 he was coordinator of the Climate Adaptation Partnership belonging to the Urban Agenda for the EU. Since 2015 he managed the Resilience WG of the Genoa Smart City Association and was in charge for Civil Protection Emergency Management of Genoa Municipality (2012-2015), while since the ‘90 he worked in the special unit of Local Police engaged in the fight against the environmental pollution crimes and Civil Defense. Graduated in Philosophy.



Joaquin Rodriguez, Ph.D specialised in the relations between society and technology; He works as researcher at the Foundation of the Autonomous University of Barcelona, and is also the local coordinator of the Leading Cities Network. Among his publications, the following are of particular significance: Migration und Integration in Europa (Migration and integration in Europe) and Europa, La civilización Ausente (the absent civilization)

He is also member of the ICRAC (International Committee for Robot Arms Control) and member of the Campaign “Stop killer robots”.

His recent work on artificial intelligence and human intelligence are the main triggers to invite him to the Future Telling research.

Thoughtleaders of the Roadmaps for Energy (R4E) project

The following thought leaders interviewed for the R4E project included relevant future scenarios on nature and climate resilience. The relevant quotes from these interviews are also included in the description of the Drivers for Change (printed in *italic*).

- Tracey Burns, OECD, Paris, France
- Mario Cucinella, MC Architects, Bologna, Italy
- Gianfranco Franz, University Ferrara, Italy
- Rudolf Giffinger, Technical University Vienna, Austria
- Pieter van Wesemael, Eindhoven University of Technology, Netherlands
- Stefan Schurig, World Future Council, Hamburg, Germany

For a complete report of the Future Telling research in the R4E project we refer to: www.tue-lighthouse.nl/R4E.html.

We would like to thank all participants for their contribution to the Future Telling research.

6.3. Drivers for Change

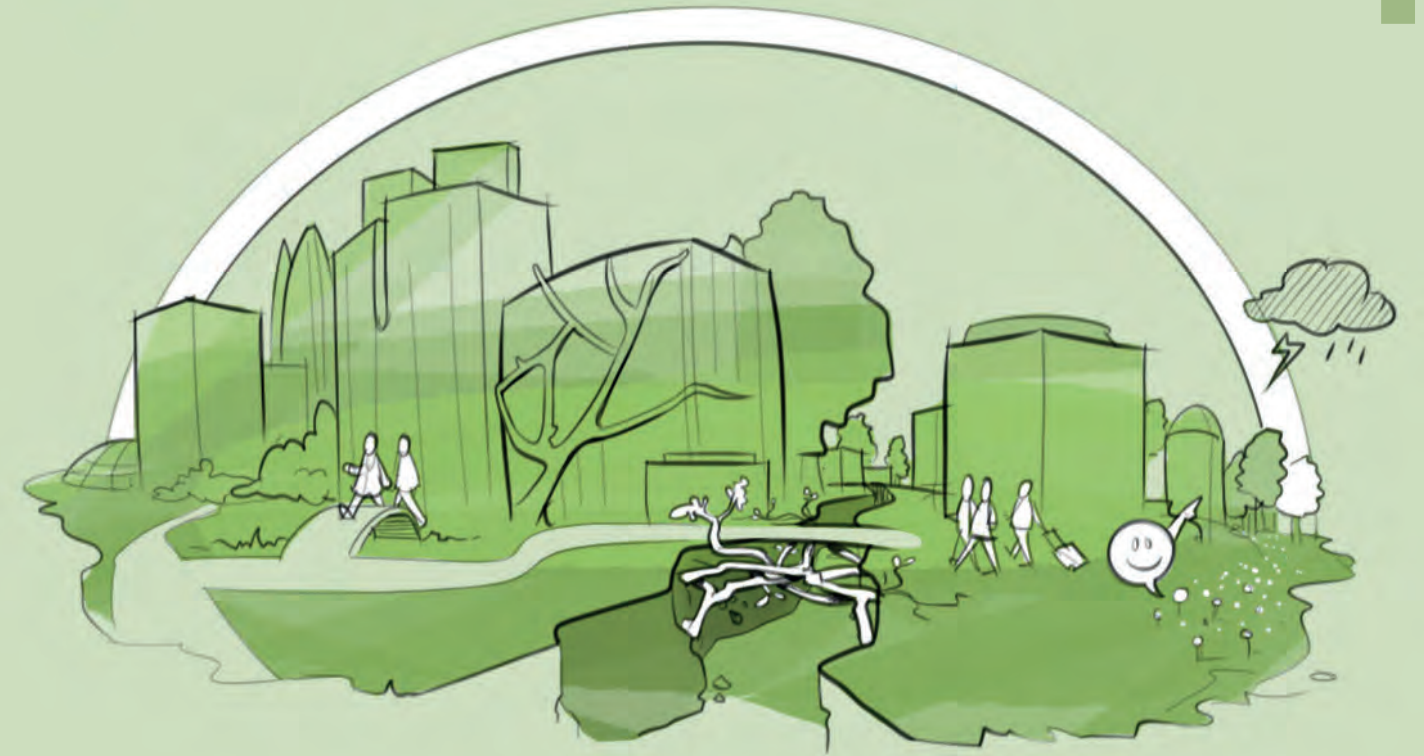
The Future Telling interviews revealed a variety of future scenarios. To achieve water and climate resilience the thought leaders indicate that there are many transitions to be made: in the way decisions are made, in the way people are involved, in the way technology plays a role. A clustering of the quotes showed five recurring themes. We used the quotes related to these themes to describe five drivers for change:

- Cities as living organisms
- Leveraging natural value on micro and macro level
- Reinventing nature in the city
- Synergy in nature and augmented technology
- Tailored use of limited resources

The following pages give descriptions of the Drivers for Change stating the essence of the changes. These are supported by quotes from the thought leaders. The quotes in *italic* are taken from the interviews conducted for the R4E project.

Cities as living organisms

In 2050, cities adjust and transform to adapt themselves to changing conditions - like organisms living in harmony with their surroundings. Like all living organisms, future cities have the ability to recover from the effects and impacts of changes, such as climatic and weather conditions. The people benefit from the resilience of their cities, and they enjoy an environment in which urbanisation and nature go hand in hand. They also contribute to the resilience of the city. They care for nature, and respect its value. The public spaces provide a good atmosphere and help to build social cohesion and inclusion. The city is constantly adjusting, to optimally respond to environmental and social changes.



FT4. The city in the future will be more in harmony with its environment, that is very important. Which means that **cities will have to adjust and transform into a more organism-like organisation than an urban city which is apart from nature**. That is my main vision that cities become part of the living organism. In doing that it is important that gradually cities absorb and also adjust solutions that are also driven by nature.

FT4. In general, I think cities should become greener. More a living creature, so to say. **I see a city as an organism that breathes. And an organism that lives, is more resilient, because it can more easily adapt itself.** If you have a technical, concrete structure, it is robust and strong, but if you break the wall then it collapses. Whereas an organism you can punch it, it can have an impact, but most organisms also have some kind of resilience, so they can recover from, for instance, an impact. **Future cities can also take impact and effects, but they also can recover themselves.** Developments in buildings, energy efficient buildings for example, if the building is greener with plants around it... I mean, plants itself already adjust to temperature changes. So, if you incorporate plants and living organisms in your building, then the whole building also adjusts, right? That is how I view the whole city.

FT4. Urbanisation creates new possibilities. But if I look at the geology book of my son on high school, then urbanisation is always something bad. If we can change that, **if cities can become really nice areas to live in, and not only seeing urbanisation as something bad, something that takes away nature, but maybe replace nature with some other living form, then maybe people become to be more enthusiastic and also will engage in this whole process.** So, it is important to bring also a positive message, also for the generations to come.

FT1. We have people that come from a very privileged background, like me, that fly around the world and deliver solutions that are appropriate in their back garden, which

is where ample people live and there are lots of places where that solution is an actual insult. That is cultural imperialism at best, and it creates in part of the countries real fucked up situations. And that is compounded by this [picks up phone] technology. So, I go anywhere, I was somewhere recently where there was no electricity, in India, but they had mobile phones. And they were looking at Facebook. And I wouldn't want to deny that, but it creates this kind of different philosophies of thinking about your reality. And it creates tension. Not positive tension, but it can be negative tension. And that is because of the fact that we have boundaries and rules and if you come from a poor country you cannot come to my country because you take my jobs, or if your kids ... you now, it's all this craziness that has to do with control and a city is an interesting place. I had an interesting conversation at dinner last night, sitting with someone who is French and who lives in Paris and said: Paris is actually, when I think about it, a horrible place, because it is filled with Parisians. But when I came to live here I realised that Parisians are the minority. The ethnic mix is really brilliant, which makes Paris a good place. And I must say, I agree. I love New York. I spend there any time I can, because, apart from it that it is very expensive, but you walk down the street and you have everybody under the sun and it doesn't matter who you are. And I think **the city of the future has to embrace that notion that public space is for everybody, is an equaliser and it has the right philosophy for us.** Which has an impact on all the environmental conditions: noise, vibrations, pollution, etcetera.

Leveraging natural value at micro and macro level

Driver for Change

2

In 2050, there is a balance between cities and their surrounding natural and rural areas. Cities, especially in Europe, take careful decisions on their maximum size, in relation to affordable limits of natural resources and a high quality of life. At the same time, (technological) solutions enhance life and work in the city's surroundings, making the city an integral part of its landscape, in harmony with agriculture and nature. A holistic view of nature in and around the city ensures that all value and benefits are captured. There is a good understanding of how smaller and larger green and blue areas contribute to the micro and macro climate, and how the two influence and need each other. There is a deep respect for ecosystem services provided outside the city, such as maintaining nature and biodiversity outside the city. This results in more and better jobs for people in rural areas.



FT7. What is really important is water. Production of water supply is one of the key resources of the future. It limits everything. **The growth of the city is limited by it, how many people can live in a city.** Also, to organise it on a global scale. I see a link with solidarity. There are places where there is enough water, even too much water. And there are places where there is not enough water. This is key in the future: to share this key resource for life.

FT7. **When I say solidarity, it means that there are places where there is too much water and they don't put a value on that water, because they have too much. But climate change is changing the regime of water that we had.** For example, scarcity of water and draughts in the south of Europe means more floods in the North and Central Europe. If we have a good system to share the water, there is some scientific evidence that if we keep the humidity in the south, then we can create more water in the south. Because if there is more and more draught in the south, this means that the clouds are generated from evaporation here, but the winds will take it to the north and create showers in the north. It is a combination of effects. If we can have some of the water in the south, to create again the rain here, then we can avoid a flood in the north. But even in the north of Europe, when there is one, two or three weeks no rain, they have also scarcity of water: they are not prepared for that. Also, for the cities this is a big problem – probably it is one of the biggest problems of the future, next to energy.

FT7. For the future of our cities, **we need to reduce the size of our cities. We need also to make more space for nature in the city. But also we need to create opportunities for people who live in rural areas.** The technology now permits that. It is not the way to only have three big cities in a country where you concentrate all your people and all the things. **The problem is that the environmental costs for people in our cities is very, very high. But the problem is that we don't keep enough income for the people that each day take care of nature in the rural areas.** Only we pay for the product that they are selling, but we are not paying for all the good work that they

are doing, to keep CO2 emissions low, or maintain the forest or maintain biodiversity, or even the certification of many things. We don't pay for that. But we want that this continues. There are many things that we need to think about when we design cities.

FT7. In my point of view **there is a size that could be affordable for a city.** I cannot imagine having cities like Mexico-city with 12 million people to be sustainable. And it is not the way that people want to live, they may need to because there is no economical way. But **we need to create opportunities in other areas.** I give an example. My finance manager is coming to our office in Valencia only once a week. But she's working on a farm in the region of Castellón, she has internet and can work from there. Her man is taking care of the farm. These people have a very high level because of technology: they have internet, we are connected. Imagine that you have a much better life on the farm. If you speak to her, the quality of life is much higher. I see the future in such a way. We have good connections, and technology can help us in many ways. Cities can grow, but to an affordable limit.

FT7. **Each city should define the limit, because it depends on many conditions.** In some cases, a city is more of a metropolitan area: the city has maybe half a million inhabitants, but is connected to other cities in the area. It is only an administrative separation. I think in each city they should decide what should be more or less the limit for growing. They need to see the value of the things that they are having within the city or around the city. If you want to grow your city but you have a nice beautiful area, a rural area, that should be the limit. You should not grow on that.

FT7. I see also **a change in the future of the rural areas. We have the technology to keep the people there, but we need to think how we create more income for different activities there.** This is not for all the people, but I do not see that 70% of the people is going to live in the cities: this is too much. I don't think we can afford that. Even in countries as China and India they need to keep people in the rural areas. What

they are doing is not affordable, and the impact on climate affects all of us. Maybe in Europe we are more balanced, but we need to be careful with this.

FT4. This whole transformation of cities into a city that is a living organism, that is more resilient in general to climate change impacts and other impacts, this also may contribute to – perhaps maybe not in the city itself, but maybe in the neighbourhoods – to areas where you have agriculture. Agriculture that provides food to the city. So, I also see that **the division that you have now between cities and agriculture, which is really harsh: this is the country side and this is the city. That will become more integrated. The city is a part of the landscape, as well as that agriculture is part of the landscape. And the two need each other.** Nutrition is important, because food for the people is needed and comes from the land around the city. If you look at The Netherlands, the delta is in terms of economic output, the number 6 in the world of agricultural production. We can definitely feed ourselves. But there must be more of a notion on what kind of food we are producing. Is this the food that we need? And also: that we want to export. If you have a society which is more a green society, or in which people can also explore their own capabilities in terms of building their own house for example, then you will see, also, a change in demand of food. The type of food. You already see that happening, the demand for biological food is growing. I think that that direction will only increase. Which means that there is also another demand, on local products. So that is why I see the development of cities must also include agricultural areas. So it is not only on mass-producing food to feed people anymore, but that you connect the agriculture to the urban environment and create more awareness of people on what sort of food we are producing, what is the quality of the food, this kind of things. Until now, food is too much neglected.

FT1. We are organic forms and we got distracted. I think there are lots of solutions that are actually destructive and create issues for us collectively in the long term. I always say: **if you come up with a solution and it creates ten other problems than it**

is the wrong solution. I know it is mission impossible to meet up to all the requirements, but far too often I see professionals that think they have one problem, and try solving that one problem. They don't really realise that the problem may be a symptom of a series of other issues. You know the political cycle is the problem for this. The financial investment horizons will indicate that you need to get the solution to that problem. So, what I am engaged with as well is that I say with all due respect, you are telling us this, but we need to do some analysis in the most open ways, so that we can then have a conversation on is it this, or is it something over here that you actually control. So, whether it is morals or ethics, I'd like to think that there is people involved in the creation and the looking after the places where we live who take that seriously. And the decisions that we make, as far as possible, are beneficial. But far too often decisions serve narrow focusses. But those **narrow focusses in time will, I think, create systemic problems.** [...] We are incredibly simple organic forms. We have all this fancy stuff, but what really makes us happy or what makes us sad is very similar. You will always get a person who wants to live on a top of a mountain and not talk to anybody, but the vast majority of us like sharing, looking, being in places with other people. But the main difficulties are in the money: I am not appropriately dressed to be here or I am in the wrong place: why the wrong place? It is because we make those boundaries. **Organic solutions are solutions that try to understand the full impact of what they do.** Implicated in all of this is the notion that we have that everything is disposable, which I think is bizarre to say.

FT2. If we look back to the origin of this land, then the possibility that this land could again help trees to grow and to substrate water, that will need another 2000 year to get back to its origin. Knowing that this will take a long time, then this needs to become a concept of human life. There is also a change in the idea that you can just chose and take a land and built up homes of apartments. If we have in mind that **we have to respect the natural aspects of the land and the environment**, because it is also linked to our health. All that is already built must be given new value. Now we think it is possible to build everywhere, but if we keep in mind that land is important than we will limit urban area in restricted areas. We already think that it is possible for people to grow without limits, with exploitations of the land and the environment, but we have to think and tackle the problems, because **we cannot grow without limits.** It will become a big problem in the future, but already now we have to become conscious of the real problem.

FT2. We have to rethink our reproduction system. Also, there will have to be a big change in the concept of what a family is and the growth of families. **If we accept that we cannot make the urban area any bigger, then the value of what we have already built and realised changes.** It could also be possible that we have to have small flats. We have, in the area of families and born babies, already changed the mentality. If we think about 80 years ago, in Italy it was quite common that a family was composed by 12 people. Now big families are not normal any more.

FT4. In my own neighbourhood, for instance, IJburg, which is sort of a living lab. There are experiments with floating houses, there are experiments on energy, for instance now through urban heating. Which was the solution 15 years ago, because it was more efficient in energy use, but now they see **we have to do it differently again.** So, there are huge developments in 10-15 years' time already. So, **maybe the cities can become energy factories, for the agricultural areas.** Energy producers, instead of users.

FT21. *Now coming to a more positive example: I think **the future city will be some kind of a city that has redefined its relationship with its immediate hinterland.** Due to the need of energy and resources the hinterland already sees this as a chance to **re-cultivate its own regions.** Energy will be produced from most surely entirely from renewable energy – by 2050 we will still be needing appliances like solar cells and wind turbines and geothermal facilities – and a big city will not be able to generate its own energy within the city borders. So the hinterland has a particular role to play: it will be*

delivering the city will its energy sources, water and so on.

FT23. **Green infrastructure is very important: the territories need to be connected to the cities. The concept of cities is not anymore about boundaries, it is connected, and cities are much more interrelated. But what is the connection, what is green infrastructure. It is all about making the connection better and look at quality of life.**

FT23. *A social life, a good life is not easy to reach outside Europe. We work a lot in Africa, there it is difficult to have a social life. The point in the eastern metropolis, I do not see a good future in that. In the 90s we dreamt about mega-cities, a lot of architects wrote books about the mega-cities. I think it is a big fail. We left behind millions of people living in poverty. Forget the mega-city. So I think **there are some changes in the vision about cities. And European cities are very good: The quality of space, the quality of cities, the culture, the economy, the social coherence, this is very good.** Of course big cities give opportunities for jobs, for scaling, but European cities are big enough and have still a human scale.*

FT21. *There is no harm in emancipating ourselves from oil companies and from the energy generation companies and become our own energy generators, and so on. But it should **be in balance with our origin: with nature.** There are very different levels to start. If you discuss Lagos, or Beijing, there are certain constitutions that find this interesting. But the people that have been forced to leave their land behind and live in the city, but not having their rights as city dwellers – which is the case in China – for them this question of 'why' is not so important. This **question of happiness** is not so important, because for them it is pure survival. Of course there are certain trends in different areas, which can't be giving a general answer for the city.*

Reinventing nature in the city

Driver for Change

3

In 2050, designing cities for a high quality of life has reached a new level. We revalue our European heritage of designing cities on a human scale, with places that satisfy the wish for both enjoyment and beauty by benefiting fully from their local contexts. For example by providing a hilltop park with an attractive sunset view, or by creating a green riverside boulevard. The overall city planning is based on a holistic vision of a healthy and enjoyable living environments. Here, green spaces serve as ‘lungs’ and ‘air conditioners’, and water as ‘arteries’. Natural solutions are used to offer people comfort - for example with trees providing shade in warm regions, and green areas with ponds to collect rainwater in wet regions. Urban spaces, squares and boulevards are combined with green and water to create pleasant places that are also resilient to extreme weather events. Green areas in each neighbourhood allow recreation in people’s own surroundings, and connected green areas – such as gardens, urban forests and parks – make it easy for pedestrians and cyclists to move around the city. The transformation towards cities that embrace nature is driven by citizens themselves, who want to implement solutions they have enjoyed in other places.



FT1. To me human contact is critical to the shape of our cities in the future. Without that ... being able to see the future love of your life in the street, or going to a bar and just meeting somebody for biological exercise. That are all really important things to us. We still our scream and we think the answers aren’t there, but the answers are in other people’s eyes, I think, and part of that means that **the shape of the city will be actually totally very similar to the shape of a medieval settlement** or of a U-dome. It is not necessarily that we, northern European, will have all the answers, but if you look at any kind of even, just ... maybe after Irony, the way we started to gather, for a variety of different reasons, and share, was all to do with how we develop. And being able to understand that our senses and our feelings are one. We are not massed by either clothing or technology. And that means that the **formal settlements, I think, will not be designed around the mechanics that are developed, but around our scale, the human scale.**

FT1. What the settlements will look like? I don’t think they will look like San Gimignano, or whatever, but I think they will have that kind of physical relationship. **Climate resilience will mean that, because we are cleverer we will position those places for the right reasons.** And one of the things that I find really fascinating is that when I go to ... most places that I go to, I can work out why we as a species call in nature. And I think those triggers will remain the same, like the fact that we don’t want to live under water, unless someone invents something to be able to breath under water but still it will be a bit odd. We will to find **places that satisfy pleasure, beauty,** the things that we ... we used to build – well obviously not in the Netherlands – on a hill top, so that when somebody came to attack you, you could see them from a long distance. But **there is really something nice in sitting on a hill top and looking at a sunset.** So, some of the drivers that are related to **human contact and being human will be relevant.** It is not like ‘because we can’ and ‘this piece of desert will never float’ that we build a city there. It has to be more, more to it.

FT7. Water has to be seen as a key resource of the city, as something that has a very high value. Systems should use the water as much as possible. From rain, to sustainable drainage systems. Not only to deal with floods, but also, we can use the water. **We need to gain back some of the technology and what our ancestors, like the Romans or the Arabs, were doing. They had systems to keep the rain water at home.** Now we think that someone will bring us water, out of nothing. This is key, and it links to nature-based solutions. Because if we want to have nature in the city, we need to have water in the city. When we want a sustainable drainage system, this will change the way we plan the city: **how we use the gardens, how we use the green areas of the city. It is not only for something beautiful, it is also a mission to keep the water and to clean the water in the city. It is a key resource of the ecosystem of the city.**

FT8. I understand that complexity and uncertainty are now an inextricable part of our system. And this **complexity has led to a total lack of responsibility.** For individual citizens, politicians, there is always a way to be not responsible for an action or conclusion, because due to complexity it is easy to camouflage these things. And this exponential growth of complexity is going to lead to a kind of break out of the system. The system cannot achieve these levels of complexity. This will probably lead to a new structure, maybe a sort of anarchical, maybe some sort of **new medievalism.**

FT8. There is this theory about post-humanism and how people grow from humanistic condition into an new condition. [...] So we are already different, and we will be more different, and the big challenge is how we can make sure we will be better. In an ethical and human way. How we make sure that the city we design for the future will be a city where those new people want to live? One of the key points to me, and I am kind of technology deterministic in a way that I analyse reality and changes to understand technological loops, it is really important that we generate technological scenarios that can aggregate especially in moments where 2 tendencies, the **utopian and the dystopian** are so ... and people are so optimistic about a bright future and peaceful, where all

people with different races and religions live together. And there is this other tendency that we will end up in a sort of ‘Mad Max’ scenario. And both of them are possible, for me at least, and this is the challenge of our generation: we have to make so many decisions about [...] how we want people to regain power, to empower themselves, in order to lose these constraints, marked by the frameworks of today that protect the elite and people will have their own decisions and we have to make a strategy, **a city strategy to regain power and go steps further.** This democratic framework of the 19th century, that followed the communal framework of the 18th century, makes no sense anymore and we have to adapt to a technological framework for the 21th century but this makes the transition so incredibly difficult to make conclusions and to distract any patterns towards the future. We have to understand, there is a part of the world that is dying, a new one is arising, but we still cannot imagine how this new world will be.

FT1. I think that the cities we create, or we used to create, we lost our way. Somewhere, probably in the 1920s – 1940s or so, we totally lost our way in the drivers of our cities. They are not **the right drivers that deliver happiness, equality, the things that ultimately, we all know make a better society.** I am doing stuff in America and the growth of gated communities is exponential. That is crazy. [...] Whether it was in Italy, or Holland, people built walls around us because people that were different from you were dangerous and scary. And the level of civilisation we had meant that if I want something you had then I came and took it. We came to an ambient level of security where we don’t need those walls. So, we got rid of the walls. And one of the things I am trying to say to them is: you’re building walls, in a dysfunctional way, because you don’t need to. And the people that market these things, work on fear, which is an incredible driver. And there is this kind of notion ... I had to be careful, because if you think that there is something scary and you don’t, that doesn’t mean your fear is not real. But the answer is: let’s look at this, let’s see what is the trigger of that. And gated communities are the inverse of a good city, I think.

FT4. People are living longer. That reminds me on a very old project, I think already 15 years ago, where I was actually quite surprised, positively surprised, by a project in the Ruhr area in Germany, where a lot of industry has been abandoned, because the old mining industry was decreasing. But already at that time, 15 years ago, they were very much ahead in green cities. They were already investigating how to **re-green the areas**, also with green roofs and that sort of things. But they were also thinking about people living longer. So, how to make sure that elderly people, who are not very mobile, who don't drive a car maybe, how to make sure they can recreate in our cities? And for that we need green areas. And the population in cities will increase, and especially in western Europe the elderly people, living in cities will increase. So, they need **green space to get around and to recreate**.

FT7. Also, it is very important **to connect the city to green areas, with all the territory. In the future of the cities you can walk through gardens, urban forests and other natural environment** without going by car. Outside the city there is green area, and green networks connect with other areas. It is not like green islands in the city, but all connected. E.g. Valencia they decided many years ago not to put a highway in the old river bed of the Turia river. You can imagine that city would be able to grow more when they put a highway. But it was decided to make a big garden in the middle of the city. The city has not grown a lot, but that is OK, that is the limit. At that time, they put the limit of the city just there. I am living 25km from Valencia, but I can go walking or by bicycle through a natural park to my office. This old river bed connects the village all the way to the sea and it is beautiful. The river bed is also linked with other activities, like cultural activities because of the museums and sports activities. In Valencia we have good weather all the year, so people are outside all the year. This is the kind of cities that I see for the future. **Each one should develop with what they have**. I do not believe you can exactly copy the model, but you have to apply the concept on an individual level to make it suitable for the city. With its history, with its climate and also with other things. Using the opportunity they have.

FT7. Climate is going to change, and we already have in some cases radical phenomena, lot of rain, or snow where there was never snow, or a very hot summer in places where it was never so hot. This is very difficult for people. Most of the people, especially older people, suffer a lot from these changes. You can imagine in central Europe where they have houses that are not adapted for this very hot summers. It is very difficult for them. The construction of houses is different. In the south for example they build with cold materials to avoid the heat, e.g. ceramic or concrete. In the north they build with wood and use carpets. But in the summer that does not help when it is hot. For older people the easiest way to cope with heat is to buy an air-conditioning system for the house, but this is not the right way. I live in the south in an old house, more than 100 years old. I have no air-condition in my house but is not needed: it has **the traditional way of maintaining the temperature**. This means that you open the windows early in the morning to leave the fresh air in. Then you close the house and it keeps the temperature. This is very sustainable, and this was normal to design in the past. We want comfort, but this comfort requires a lot: we need to plan it for a long time. We need to adapt our houses, how we orientate them for the sun, for the wind, **where we put houses or not, how big we make the buildings, how we plan the greenery around it**. This is funny, in the past we came from rural areas and our grandparents were part of a very critical system. They had to reuse everything, and they were quite sustainable. They were close to nature, and they eat what they have in different seasons. They did not eat fruits that were grown in South Africa.

FT8. For me it is intimately related to this new complexity. Social initiatives and social movements in general, from feminism movement and ecological movements, etc. have to tend to limit the power of institutions and bring a more equal, more fair society. Which matches more participation, co-creation and a new form of democracy in our

total living. More science labs, more fun-labs, **more places to put ideas into reality and co-create together and to better respond to the necessities of the community. We need to do this with the people much more involved in that. Also erasing the gap between the expert and the others, much more communal**. I do not really believe in a strong role for government in this, I truly believe that government will only be the administration of the common world. I truly believe in a process of where naturalisation of natural resources, like water. They can play a role in legal matters and when people get married, but they cannot interfere with how people want to live their lives. People should be free make their own choices.

FT4. *It depends indeed how you look at the world, at Europe or at the Netherlands. In the Netherlands for a long time the classical opposition between the city and the rural area doesn't exist. It is far more an urbanised region, and urbanised landscape. With the growing awareness of this capital which we inherited, and which is there, for instance I think one of the big, big advantages internationally, globally seen, one of the big values of the Netherlands, is this small scale, fine grained urban landscape with its historical layers, with its functional diversity, it its richness: a qualitative good place. The relaxed quality of life that lots of foreign people see in the Netherlands has a lot to do with **the special quality of the place, which is that it is much more urbanised landscape, fusing all kinds of qualities, not replacing one for another**. That is also why we, in the Netherlands, do not use the term metropolis for the cities, but we go for the notion of the metropolitan region. In its aggregation of functions, in its aggregation of social networks, of economies, it is able to compete with a metropolis, but it has a fundamentally different quality in terms of place and life. In the sense that there is much **more balance between the green and the red, between the old and new, between the big scale and the small scale, etcetera**.*

FT23. *The interesting phenomena of cities is the reaction of nature in cities. You are probably not Catholics, but – if you read Pope Francis papal encyclical, it starts with “the global eco reconciliation”. It is fantastic. Because the ecology has a big consequence in social impact in agriculture and politics. And it is said by the Pope, who would have thought about this? There is not one politician thinking about these things. All the United Nations conferences, like Rio on sustainability had zero impact. Zero Impact. Agreement, zero impact. I think it is very interesting, this global eco reconciliation between the idea of urbanism – building buildings everywhere – and nature. **Now is the time of reconciliation, because people want to live in cities together with nature, and not just buildings**. So maybe smaller cities have now a great opportunity, because agriculture is inside the cities. If you take Bologna, if you go out here, within 10 minutes there are fields of wheat and everything, you can see in Forli fields of fruits. And people are now looking for more **living in the city but with relation to nature**. And you cannot do that in New York. They plant some trees. So there lies an opportunity to optimise the relation between buildings and nature, and that may help with our energy problems and social problems. Maybe it is as simple as that. We should not make it more complicated. It can be this simple. Mostly simple things are still difficult to do.*

FT8. *I believe that by 2050 we are redesigning urban spaces for more peaceful living. I do think that regardless about how we think about national boundaries or local boundaries, regardless about how technology is improving our day to day life and the access to energy and food and etcetera, I think that at the end of the day **humans are animals. That there is something that we deeply need, that is met by green space, that is met by quiet sound and birds dripping, there is this very intangible effect that that kind of peacefulness has on peoples well-being, physical and mental**. This is not even so much in the future, this is already in the thinking of our urban spaces today, it is really understanding this need that people have for green and for active clean places without pollution that they can actually just be at peace and I can imagine that the more*

cities grow, the more people are inhabiting them, that will only increase their ability to just smell the flowers for a little while. And I think that some people might propose technological solutions to that, and maybe that is totally possible, I do not know enough about virtual environments, but – being someone who comes from the country side – the importance of actually the real thing will grow. I mean if we just look at Paris. Paris is a very old city, with very old architecture and infrastructure. And so it does have some very nice parks. But they are either on the edges of the city or in the more affluent parts. And in the poorer parts of the town, it is not only not green, but also dirtier. And all of the proposals that the new mayor are putting forward – and this is an extension from the last 10 years of policies – are about creating pedestrian spaces, lowering vehicle traffic, trying to create new green spaces, to take the pollution out of the air. So right now, in Paris at least, even though it is the most beautiful city in the world, there is really a real policy push to make concrete changes at increase the amount of green space that people have at their disposal. Which honestly, from my perspective, is hugely impressive because it is such a dense city and everybody has an interest and there is so much opposition. For instance when they closed the left river bank there was such an outcry. But they anyway did it and now it is such a success that they are also thinking of doing it also for the other bank. For me, because the left bank worked, even with the major opposition, I really believe that now after the coming election, it will be impossible to open that bank again for traffic. It has had a major impact and people are so happy about it. People come there from all over the city. So for me, I could say that is a small scale, but for a city such as Paris, that actually represents a major change in the landscape. And I do think that once people become used to it, it is impossible to take that away again. It is amazing how that is used and adopted by the people. It is a real success.

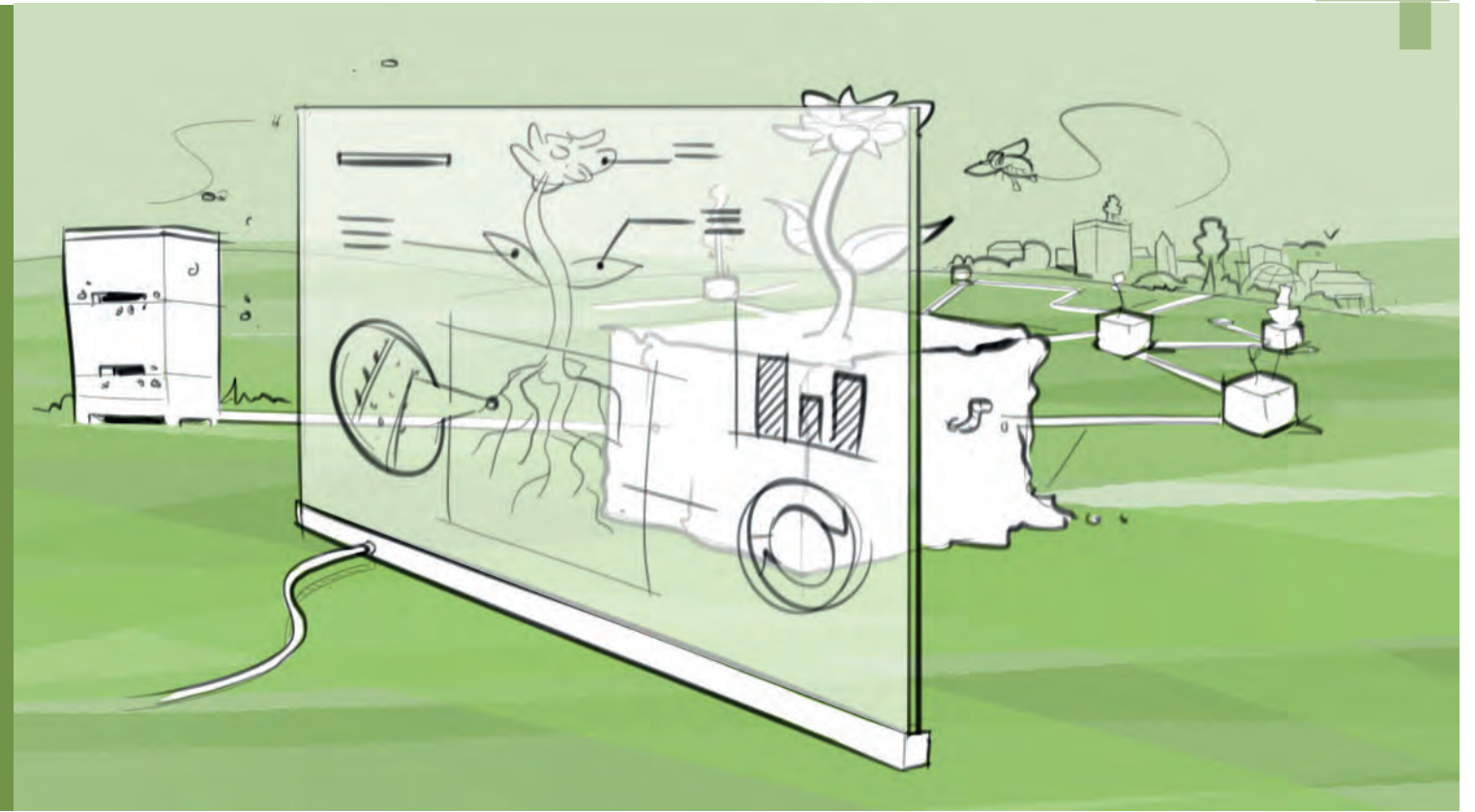
FT1.15. **One aspect that could drive the process is a stronger protection of nature.** *One does not realise that immediately, but e.g. the Canary Islands were lucky that an oil company did not find oil, and only after that decided that they should protect the area. This should be the other way round. E.g. Austria is now against fracking, because it is a risk for the landscape and for the future. If landscape protection in any form becomes more important, it will reduce the potential for the traditional, non-renewable resources and increase the price of it. What we could experience last year when the US started with fracking the oil prices went down and even coal production has become important again. This has hampered the further growth of renewable energy. E.g. Austria embarked on wind energy really heavily. Now the growth is slowing down. Some people claim that it has reduced the diversity of birds. There have been environmental assessments, and hopefully it is not bad for the birds.*

Synergy in nature and augmented technology

Driver for Change

4

In 2050, nature and technology go hand in hand. Technology is used to collect data and monitor nature. This leads to a deep understanding of the factors influencing the health of nature and nature-based solutions. This knowledge allows nature to flourish in and around the city - for example with organic food production augmented by high-tech to optimise resources and make cities self-sufficient. In this way science provides new solutions, together with evidence of the impact of the solutions implemented in the city. Data enables fact-based decision-making and building the overall economic case, including any expected downside risks. In this way technology supports better designs, and helps to gain acceptance of the solutions by citizens. Ethics and morality are safeguarded by ensuring people are always in control, and are free to take their own decisions.



FT5. Even in my lifetime, how short it may be: when I was 16 and you looked inside an automobile engine, you could see everything, you could understand how it worked. Same for an airplane: you could look at it and you kind of understood it. Now if you open up the hood of a car, there is a plastic shield on it so you're not even supposed to look at it. There is a wired plug-in, so the computer tells you. This is profound challenge for society as a whole. People have always lived intimately with the technology of the time. In the medieval days you slept in your clothes, or you had your ploughs right next to you, your animals underneath you. That was the technology of the time. Now I sleep with my phone next to the bed. We do not live more intimately with technology, but **our perception of the volume and the pervasiveness of technology is much more profound in how it is all around us now**: it is our perception of it. I think that is even scarier, because in 2050 we're going to take a pill that is going to tell us what is going in our body. [...] **All the impacts: the question is more about the unintended consequences.** There again, every technology has unintended consequences. From a nature-based solution stand point this is maybe where resilience comes in. The more we understand about nature, how natural solutions work, when we know how trees talk to each other over time, we never knew that, we didn't know that before. **So, as we understand more and more about nature-based solutions you can bring that into the way we design and execute. That is about data and understanding, so to me a lot of the technology is on data gathering and understanding how it flows,** the ebbs and the flows, not only in our bodies, but also in the social interactions and the buildings, the infrastructure, the energy etc. When we understand more, we'll see patterns that are revealed in the same way that we understand nature. Patterns get revealed which were in front of us, but we never saw. Then we can emulate them to our benefit more and more.

FT5. Algae are not going to replace everything, but I do believe that farming practices are going to go through another revolution. **There will be more data-based practice.** Farmers are amazing, they understand their land, but their practices are not

always good for they land, because the repeat what has been done over years and years, because it is easy and they do not want to change. I would like to hope and believe – I believe in farming, I believe in Europe being able to feed itself – support and helping farmers in their transition to more modern, carbon capturing, nitrogen, phosphorous reduction and reduction in artificial fertilizers that are based on carbon, on oil. **We need more intensive food production, but more organically, more naturally, so that we can feed ourselves.** I think this is an area, when looking forward, that cities can play a big role in. In that, I would argue that most cities don't know where their carbohydrates or proteins even come from. So I think we first need to understand where things come from, so that we can support. We have to map the flow of protein, carbohydrates, rice, wheat, and how that is changing. I think we need to understand that better, and we should be encouraging more organic food production. **Organic food production, supported by technology.** We cannot go back to using mules and horses, but we need to feed a lot a people. So we need to push for organic and technology, bringing those two together into intensive organic food production. That is the key. It is to right for the north and right for the south. There is no single solution. We need to be careful with water. Carbon capturing, not carbon spending. When we have some alternative production, such as fake meat or algae, the answer is yes we need to use it. But not to replace: the answer is 'and' looking at what is appropriate, and **augment rather than replace.**

FT7. **Technology is a key element for nature-based solutions.** Not only for water: but for all key resources. For example, we can use technology to optimise the amount of water that we bring to gardens. There has been a very interesting research of the Polytechnic University of Madrid, where they have identified that when you have agriculture with scarcity of water (which is normal in Spain), and you give only the water that is needed – and no more than that – even when there is not a lot of humidity. If you bring water by flooding this is only once every month, then there is a big period of time when there is a draught. The CO2 emissions that brings this kind of agriculture is

lower, than with a lot of humidity. This changes the model. Technology can help in this. In some cases where they have a lot of water they are not taking care about how much water is used, and maybe they use too much. And technology can enable the control of resources. I see a combination of technologies with nature. We can use nature in our buildings and cities, but with technology we can discover new opportunities, that may even be changing through the day. Depending on the level of ventilation you have, or the level of humidity you can change things through e.g. automatic regulation. Linking technology with nature-based solutions will be a key element.

FT3. If we don't come back to facts than we are going to drive ourselves onto a dark pad. I think access to data. If you look at the number of connected devices and the data that is being produced on a daily basis. All of that is value, data is the new oil. I don't think we are ... well just like oil actually. When oil was first started to be used, it was used in very few things. And then it grew over time to be massive. **Right now we use data in a more limited way and as we make the processing of data, the collection of data easier and more economical, it will in fact drive more decision making and those decisions will have a profound effect on the daily lives of individuals.** Cities in particular, primarily because that is going to be the largest repositories of data, largest creators of data and therefore the largest populations who will be effected by the decisions that those data drives.

FT4. How to facilitate this all? This needs another type of government, I think. A governance where citizens have more to say and where the government is a facilitator. I think that is really, really important. Again if you look at my neighbourhood, IJburg, there you have old school housing projects, with housing blocks and the same kind of houses everywhere. And you have another island where people could buy a piece of land and they could do whatever they want. This generated quite nice architecture and also many people who really want to do something about sustainability. The government also took risk in this pilot. And now in the third pilot it will be all about free building. I think

that will be the way to go. To facilitate more that kind of experiments. **Experiments we need, because we need more evidence and more experience and more ideas of becoming more sustainable. Living labs are a good way to do this.** Because people will act, if either they get a financial incentive, or when your neighbour is doing something and you see that it is a success. If you have really credible examples, like for instance a guy that has created a really green house, and you know what it costed 20.000 more in investments than a normal house and he saves on energy bill each year 600 euros, that works. People see it, they see the numbers and then they will do it themselves as well. You need examples.

FT3. Those who actually able to glean knowledge from a huge mishmash of data are going to be invaluable, I think. To the extent that this has an impact to cities, it is **putting individuals, but also organisations and communities, in a position of power.** Depending on the data that they have access to and control and their ability to make use and extract value from that. Whether we are talking about the trash route optimisation or simple things like commute times and how we can better organise and plan those, or ... I don't know there are so many things I don't know which ones to choose ... just even how we get food for instance, **it is a whole different ball game when you add data to the decision-making process.** Data in terms of inventory control for your local grocery, that can order the food you are looking for because it is Wednesday and they know that Wednesday is pasta night, you now that type of thing. But also, data about the food we consume, and choices we make as consumers, like how it is produced and where.

FT5. For me there are three aspects that are fundamental. The first aspect is that citizens have to believe that something is happening. Because if citizens don't believe that something is happening they are not going to want to change, because change is very terrifying and very scary for most people and for some people it is very exciting. That typically depends upon your social position and age. For those that have money, change can be exciting. For those that don't, they are scared for the future. So, especially in the European context, we have to look at what the citizens believe is happening to them. That is part of the story that we're telling them. We have to base it on science, because fortunately even still today – even though it is becoming less so – most European citizens still believe in science and listen to science-based conversations and targets. So, **I think that based on science we can talk about climate change and then the impact that these changes will potentially have on the city.** That leaves the groundwork. And then we can talk about 'so what'. We have to lay out the implications. So, what does this mean? Especially looking at nature-based solutions, nature is survival of the fittest and what does that mean? Or is it an ecosystem, and what does that mean? So, **we have to define clearly and articulate what we are meaning with nature-based systems.** Because when you say it, it creates an image in my mind, and my mind may not be the same than you have. Therefore we have to use examples of what nature-based solutions have been, could be and will be. Then I think **the next critical factor is citizens acceptance of solutions.** And that depends on culture. Europe is a wonderful collection of many, many cultures and subcultures. So, some solutions will be clear and easy in some area, and others not. Up in the North or the South are two different worlds. Therefore, again, we got to be very careful on how we articulate what the solutions are, so they are not immediately out of hand rejected, because it is only good for the southerners or only for the northerners relevant. Because as soon as the citizen feels any modicum of irrelevance they dismiss everything. That comes across everywhere in the world.

FT5. **New ethical and legal dilemmas are going to be really huge.** Especially with autonomous vehicles, drones. What is privacy when I can have a camera reading someone's lips through a window – you can already do this now. It is going to really ethically difficult. What happens when a DNA slice goes wrong: you're actually introducing cancer into somebody's body rather than cure it. It will happen, so it is going

to be really challenging. A software glitch can have major impact. **Nature doesn't tell us anything about that.**

FT5. Robots and intelligent systems are not going to replace nurses etc, but they will be pervasive in society. It is already happening and will continue to happen. Artificial intelligence and machine learning is about pattern recognition. It is about understanding. **The more data we have, we can turn that into knowledge, that we can turn into understanding.** Once we have the understanding, the machine can learn what that is, and begin to tell us what's going on. I think we will see more robots in society. On construction sites, in hospitals, places where we have repetitive tasks, dangerous or difficult tasks. We'll see more robots and more robot assists. It is very interesting in construction where we are already beginning to see digital fabrication coming in. **sometimes it is augmenting what people can do, sometimes it is replacing.** Quality can go up. It is an interesting challenge, opening up new opportunities. I go back and forth between being excited and being terrified.

FT5. Anything that can be automated will be. Anything that is inconvenient will change. We just don't know what yet. E.g. monitoring: already now we are able to monitor moisture, predictive park plans. You can monitor growth, you can use satellite images to assess canopy health. **Technology is already helping us understanding health of nature better. We can get more precise and adapt.** Some plants may not be doing so well, we may need to switch something. We can adapt.

FT7. The issue of information and the ethical issues of technology and of information we have to take care about. The control of the citizens by the public bodies is something that we need to be aware about. If not, we are losing part of our independence, and part of our freedom. In some cases it is good, because we improve security or safety, but in other cases we see that it becomes a very easy way to control everything we are doing in our lives. The technology should have a very strong legal framework that defines what could be done and what couldn't be done. If not, I foresee a reaction of society. Society will say: 'I do not want more control'. So, **it should be a combination of the implementation of new technology and new systems with leaving freedom with people, so that they can take their own decisions on what they want.**

FT4. We just published **research that proofs that re-greening the city lowers the heat islands.** It is less hot. And we all know that the heat in the city is bad for the elderly people, and then more people will die. We know that. So yes, we can proof it. And then you also know that it should pay off: if you plant more trees people will not die and you will have a return on investment. We, as scientist, should provide the evidence, that investing in a tree or in a green garden or a green roof, that it pays off. So you have the experiments to show people examples and create awareness, and we as scientists should put a number on it. That is our role. And now already we know that every Euro you invest in green roof, pays off with three Euros backwards. So, a cost-benefit-rate of 1 to 3, which is quite high. And you can do that for other things as well. For solar panels. About 5 years ago you had a return on investment of 10 or 12 years' time. Now it is only 8 years. And then people can make a decision, that is exactly what we need now.

FT21. *The ecopolis idea comes from the analysis that the origin of the city – the polis – has been very much dependent on the immediate environment, the agricultural goods that have been produced for this little polis. This is why we called it the agropolis, which was the ancient idea of a city. Now when you look at cities, most of them are 100% dependent on the combustion of fossil fuels: in the cars, in the energy, the materials that we use for our buildings – every thing is designed around the combustion of fossil fuels. They create the space for cars, rather than for pedestrians or people – loosing human scale. So we call that the metropolis. In the ecopolis we aim not to go back to the agropolis completely, but **make use of the findings and the technology that we developed in the last 150 years.** There are different sectors: we have the energy sector;*

*the transport sector; the water sector; the food sector; the incorporate energy materials. We try to see this as the basis in which we have to design the different concepts that help to use the resources efficiently, to do this in a rather environmental friendly way. In these different technological sectors it has to be implemented. But in order to achieve the different changes in the sectors, you have process targets, or process fields of action, which is the governance sector and the communications sector: **to tell the story, to explain to people why you have to be involved in the change.** And you have the local economy: if you can't make the economic case, you probably should try again. **Without an economic case you will not have any success with the measure.** On top of that you should reach this idea of the regenerative city, which of course than is a long way to reach. It has to be determined; it has to be measured to get concrete steps to reach this ecopolis. From a certain time on you have to design from this concept.*

Tailored use of limited resources

Driver for Change

5

In 2050, small-scale local manufacturing and services provide a secure supply of products and services tailored to individual needs. Short supply chains can easily be upscaled and downscaled as needed, contributing to resilience.

People actively participate in decision-making on the use of scarce resources and measures to make the city climate-resilient. This results in an awareness of the value of (natural) resources such as water, wind and sun, with people using these wisely. All flows to, from and within the city are monitored to understand the need for these resources and their availability. Circular systems are implemented to ensure zero waste of materials, energy and water. Companies provide expertise and create incentives for people to invest in nature based solutions for climate and water resilience.



FT5. Many trends can have an impact on resilience. The top one: there is more room for small local services. Re-localisation is the biggest challenge for Europe: how do we re-localise supply chains? Jared Diamond talks in his books about the lessons we take out of collapse: **societies fail when supply chains become too long**. Right now, our supply chain, in many situations, are too long. The wonderful thing about Europe is that **we have the capability to reduce our supply chain dependency tremendously**. It is not isolationism, but it is trying to say what we can do in Europe to have more small scale local services that are tailored to the individual needs. That means that we understand those needs. Individuals have needs and wants. The needs have to be satisfied otherwise you have very unhappy citizens. Their wants or desires are the things that if you tickle them they make you happy. So, **we're looking at small scale local services, tailored to wants**. There is a general trend for mass-customisation and personalisation, which is going to be really important.

FT5. With resilience you need redundancy. Optimisation is the process of eliminating redundancy, where **we need redundancy in order to be resilient**. Nature is extremely redundant, extremely resilient because there is so much redundancy in ecosystems. **And this is the other part where local, small scale manufacturing has benefits: you can scale up if something happens, and scale back**.

FT5. We need carbon for food stuff etc., so it is stupid to burn it. We shouldn't be burning it. What is interesting is if water becomes the next 'oil'? This was talked about 20 years ago, and we will talk about it again very soon. Cape Town today is 87 days away of running out of water. When we look at the draught in California, the draughts in Spain, it becomes clear that **we have to deal with water as a hugely important issue towards 2050. Garbage, waste and circular economy force to look at the circularity and resource efficiency within the country, across borders as well as within each city**. This is where mapping the resource demands of the city, to get a data driven, data rich understanding of the resource demands of every city neighbourhood becomes

vital for us to be able to map Europe as whole and understand how it functions. Cities are artificial boundaries, but it is a convenient focal point for dialogue. But citizens, food, resources move in between, so it is a political boundary, not a natural boundary. **The lesson from nature is to focus on the ecosystem. The key is with data we can understand the city and the ecosystem they represent and what the levers are. And then you can see what happens when the system gets disrupted or changed. Then you can actually begin to model it.**

FT3. We are seeing the rapid urbanisation around the world, but we are at a stage right now where urbanisation is helping us identify and see more clearly the challenges, and I think that the real impact of this is that the challenges, well as they say, **necessity is the mother of all invention**. So, I think these challenges will become the necessity that ultimately invent new solutions that drastically change the quality of life. That is the case, not so much because we choose, but because we must. [...] In terms of climate and water. By 2050 I don't think water will yet be the challenge that it can be beyond 2050 in terms of access to usable water. And in climate it is kind of the same thing. I don't think by 2050 we are going to feel the full effect of climate change. So, I think those are going to be a little but ore further off. By that time, they will be more into the fore-front of people's minds than it is today, but it won't be so directly felt. I think it is the direct feeling, like taking a two-hour commute every day which once was 15 minutes, that is going to be the driver of change.

FT3. People are looking for more meaningful contributions to society and spend some time and energy and what not, not just thinking about it, but creating and whatever... that is when we really see tremendous impact in terms of solutions to problems that are felt by the average person. Again, I cannot even start imagining what solutions that could be, the sky is the limit. And I think it will be driven by people who ... we talk a lot about millennials already, who have a sense about them. It will be interesting to see how that transforms itself into action over time, once they are in

positions of power and they can effect change. I'll tie it back to the earlier example of participatory budgeting. 'Leading cities' introduced this concept to Boston, based on what Lisbon had done. Lisbon developed a traditional **participatory budgeting process**. Boston took the idea and created something quite different that they call it the youth budget. So, money is set aside from the budget of the city that is empowering young people to run the process. They run, they design the process, they chose what projects will be implemented. That is an example where on the one city the city recognised the opportunity to engage young people and number 2 it is training young people to think differently. And it is interesting to see what projects they have selected, for instance they selected iPads for students, but they couldn't afford to give every student an ipad, so they had to choose which schools got it. And so, they voted against their own self-interests to advent somebody else. This seed is now planted; these kids will never forget that. It will forever change their vision and understanding of their role in government. That they can **be an active participant, and not just government, but in society**. And that the decisions they make impact others. So that is a start and I have no idea where that might go.

FT4. Companies can also play a big role in this. Companies have research and development departments, but they are also about profit. I can understand that. But companies like insurance companies, they are very much interested in lowering risk, also from climate change. They can also play a big role in awareness. If you look at an insurance for theft, for example, then you see all the campaigns. Put another lock on your door, keep on the light when you go on a holiday. That works. People now know what to do when they go on holidays. But you can do the same for climate extremes, right, so what can you yourself do about climate extremes? Green roofs, or less pavement in your garden. And insurance companies can play a big role in that, because of their expertise in **creating incentives and awareness**. Through campaigns, but also through, if you have a premium and if you have a second lock you get a discount on your premium. You can do

the same in the creation of green spaces in your garden. These kinds of things.

FT1. People who can afford it; will buy organic. Europe is bio. What does that really mean? Everything is biological, unless it is mixed with petrol chemicals. But it is about understanding the importance of the things that we chose to be. I think now it is about the importance of the negative things. It is the weight stuff that is just killing us, but would have that waste stuff still be in the future? That Woody Allen movie ‘The Sleeper’ where you smoke your chocolate and he is having a plea on the concerns of middle class America in the 70s. We will discover that actually something tasting good does something good to your brain. If we do what we are designed to do, and that is walk everywhere, and the shape of the city will facilitate that, then you may be able to eat a bit more of that. Then again, excess in any way, can be harmful. So, but understanding the nutrition content, discovering things that are natural, that are good for us, will help well-being. I would like to think that part of the impact will be that like in Martin Major’s ‘knowing things in hydroponics’, that **the new city will use all the resources that we have**. I like the fact that you walk past a building and there is fantastic fruit which is good because it is full of something that helps prevent cancer, you’ll be able actually to take it and eat it and there is no charge.

FT4. Abundance of energy and clean water exists, so that means that all the things that we need are available in nature. It sounds a little bit vague, but I think it is true. So, we have energy, we have the sun, we have wind, we have the materials in our own area. Some things we may have to import, but **most of the things we need to sustain ourselves is already here**. Especially here in the Netherlands, we have wind, we have sun, we have a lot of agricultural areas, so in fact, everything we need for living is already here. The question is more, **how do we organise it in a way so that we can live happily and sustainable**, right? Sustainable is the key here: we shouldn’t use more than we have. In order to do that we need a two-way approach. We need the recognition by people that this is necessary. This needs an increase in awareness. But the message has, until now, always been a negative message, like the earth is disappearing and this is partly true, but it doesn’t really trigger people. A lot of people think ‘oh my god, the earth, and what can I do about it?’ And that brings me back to local room for local services. If you want to... the most important thing is to **give people the feeling that they can do something themselves**. If individual people have the feeling ‘yes, I can do something myself’, then you can mobilise a lot of people and then things will change. And there the government and also big companies can play a role.

FT6. Today, a real worldwide polluting is around energy. Yes, recycling, we need to do all that, but the very ideas of how we get along, of how we turn lights on, of how we are able to live our everyday lives, is now depending on fossil fuels. For me, going back to natural resources means like, maybe not like worshipping the water and seeing the water as a god, but seeing it as important. This really is why the indigenous people of every land used to see water as a god. As we move our dependency on this one type of energy, the way I see government really playing a role, is again getting out of the way and then getting in the way when it is important. This is like thinking about relationships: whether they are macro, societal relationships, it is about the timing of knowing when to say and do what. [...] So, rather than oppressing indigenous people, we should be learning from them and growing up in Hawaii, the first 6 years in public schools (you know general schools for the poor people), is about being a Hawaiian. So, learning how Hawaii people lived, you learn their stories and their culture. That allows people from Hawaii **to understand their background and secondly how to respect the water and the rain**. So, that is a role for government: education, but also **incentivising to sustainable investment and entrepreneurship**, or work force development. Like: ‘we are going to help you people to create your own place, keeping the river clean and generating energy, and your own future.

FT2. If I imagine the future, I have a line in mind. I can put all these elements on

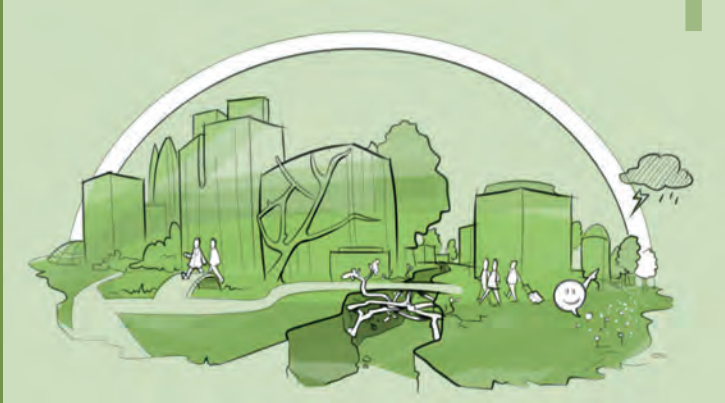
the line, the line will go further, but we also have to imagine that it can be influenced by climate change. The difficulty is to think of how this line can be influenced and if it can be influenced in some way. Because the **climate change is a problem, but also gives opportunities to change**. Also, we have to rethink this line and the elements that compose it, because the impact of climate change can be enormous. The climate change could influence the mentality in a very big way, also according the notion and the concept we have of the environment right now. **Now we have a notion of exploitation of the environment, in 20 years it could be possible that our vision of the environment could totally modify**, due to the climate change problems and the influence on our mentality of the environment. In the next 20 years the heat wave is foreseen as a very big problem and that will have a big impact on our thinking. In the daily lives of people, the outdoor works could be a problem due to heat waves. This kind of problems could influence the cities and the idea and **the realisation that it is not good to consider the environment as a field to exploit and use for our daily lives, but as a field that can mitigate the climate problems**, such as heat waves. No more land to use for building, but land that help citizens in a better environment. So, a total shift in the mentality of the importance and use of land.

FT4. *That is one important aspect and another is urban farming, urban guerrilla, area also examples of **increasing awareness of the possibility to do more local and not depending on the global networks and markets**. Although I think it has a tendency of becoming too romantic. I don’t think it is going to replace completely. You can do much more local, but at the same time you also have the global system. But talking about space: **temporarily, flexibility, trying to achieve a certain amount of autarkic life systems**. It is a mixture. Everything you need for your daily life. From sustainability and energy perspective, that also means that where we now, for instance for garbage or waste water have now very complex and huge, often national and even international. Garbage is transported all over Europe. Probably you will see that it becomes more local, even on a neighbourhood level. Trying to do more local; harvesting energy, but also dealing with re-purifying water and things like that. So I see the **flipping over from central systems to decentralised system, from institutionalised governance to co-creation and bottom up**.*

FT22. *Our buildings will in the future for sure be more intelligent and more green. For instance I live in an ancient house of 200 year old, which was a very bad house for the past generation. Now it is very good, with a **good level of saving resources**, like water and energy. One of the problems is that we need more and more space, and we live in comfortable houses, with many m². And we consume. The problem is that a sustainable city is a very compact city, but our culture is that we expect more comfort, so the growth is going in the other direction. This is everywhere the same in Europe. Because of our incomes, we improve our quality of life, by living in the countryside in the green. The big challenge in Europe is **how to stop this consumer waste**. We cannot enlarge cities anymore. This is a challenge, both in economic measures, since the building sector is one of the most important economic sectors in all of our countries. We have to reshape and rebuild the buildings sector from the structure to the **renewal of systems**.*

Cities as living organisms

In 2050, cities adjust and transform to adapt themselves to changing conditions - like organisms living in harmony with their surroundings. Like all living organisms, future cities have the ability to recover from the effects and impacts of changes, such as climatic and weather conditions. The people benefit from the resilience of their cities, and they enjoy an environment in which urbanisation and nature go hand in hand. They also contribute to the resilience of the city. They care for nature, and respect its value. The public spaces provide a good atmosphere and help to build social cohesion and inclusion. The city is constantly adjusting, to optimally respond to environmental and social changes.



Driver for Change **1**

Leveraging natural value at micro and macro level

In 2050, there is a balance between cities and their surrounding natural and rural areas. Cities, especially in Europe, take careful decisions on their maximum size, in relation to affordable limits of natural resources and a high quality of life. At the same time, (technological) solutions enhance life and work in the city's surroundings, making the city an integral part of its landscape, in harmony with agriculture and nature. A holistic view of nature in and around the city ensures that all value and benefits are captured. There is a good understanding of how smaller and larger green and blue areas contribute to the micro and macro climate, and how the two influence and need each other. There is a deep respect for ecosystem services provided outside the city, such as maintaining nature and biodiversity outside the city. This results in more and better jobs for people in rural areas.



Driver for Change **2**

Reinventing nature in the city

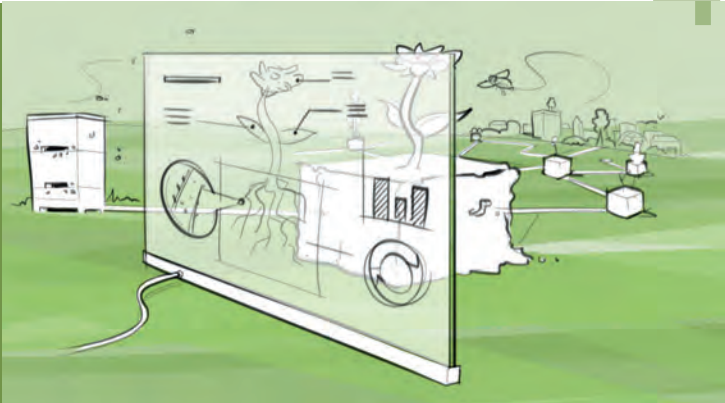
In 2050, designing cities for a high quality of life has reached a new level. We revalue our European heritage of designing cities on a human scale, with places that satisfy the wish for both enjoyment and beauty by benefiting fully from their local contexts. For example by providing a hilltop park with an attractive sunset view, or by creating a green riverside boulevard. The overall city planning is based on a holistic vision of a healthy and enjoyable living environments. Here, green spaces serve as 'lungs' and 'air conditioners', and water as 'arteries'. Natural solutions are used to offer people comfort - for example with trees providing shade in warm regions, and green areas with ponds to collect rainwater in wet regions. Urban spaces, squares and boulevards are combined with green and water to create pleasant places that are also resilient to extreme weather events. Green areas in each neighbourhood allow recreation in people's own surroundings, and connected green areas - such as gardens, urban forests and parks - make it easy for pedestrians and cyclists to move around the city. The transformation towards cities that embrace nature is driven by citizens themselves, who want to implement solutions they have enjoyed in other places.



Driver for Change **3**

Synergy in nature and augmented technology

In 2050, nature and technology go hand in hand. Technology is used to collect data and monitor nature. This leads to a deep understanding of the factors influencing the health of nature and nature-based solutions. This knowledge allows nature to flourish in and around the city - for example with organic food production augmented by high-tech to optimise resources and make cities self-sufficient. In this way science provides new solutions, together with evidence of the impact of the solutions implemented in the city. Data enables fact-based decision-making and building the overall economic case, including any expected downside risks. In this way technology supports better designs, and helps to gain acceptance of the solutions by citizens. Ethics and morality are safeguarded by ensuring people are always in control, and are free to take their own decisions.



Driver for Change **4**

Tailored use of limited resources

In 2050, small-scale local manufacturing and services provide a secure supply of products and services tailored to individual needs. Short supply chains can easily be upscaled and downscaled as needed, contributing to resilience. People actively participate in decision-making on the use of scarce resources and measures to make the city climate-resilient. This results in an awareness of the value of (natural) resources such as water, wind and sun, with people using these wisely. All flows to, from and within the city are monitored to understand the need for these resources and their availability. Circular systems are implemented to ensure zero waste of materials, energy and water. Companies provide expertise and create incentives for people to invest in nature based solutions for climate and water resilience.



Driver for Change **5**

