A new turn in the development of the region? : Future perspectives on the settlement and planning in the Helsinki region

Vaattovaara, Mari

Painotalo Plus Digital Oy
2018-10

Vaattovaara , M & Kortteinen , M 2018 , A new turn in the development of the region? Future perspectives on the settlement and planning in the Helsinki region . julkaisussa A Joutsiniemi , H Linkola , M Puttonen , K Swan & M Vaattovaara (toim) , Confused Suburban Identities : A Case Study of Helsinki Region . USP Studio Publication , Nro 1 , Painotalo Plus Digital Oy , Helsinki , Sivut 237-243 .

http://hdl.handle.net/10138/297099

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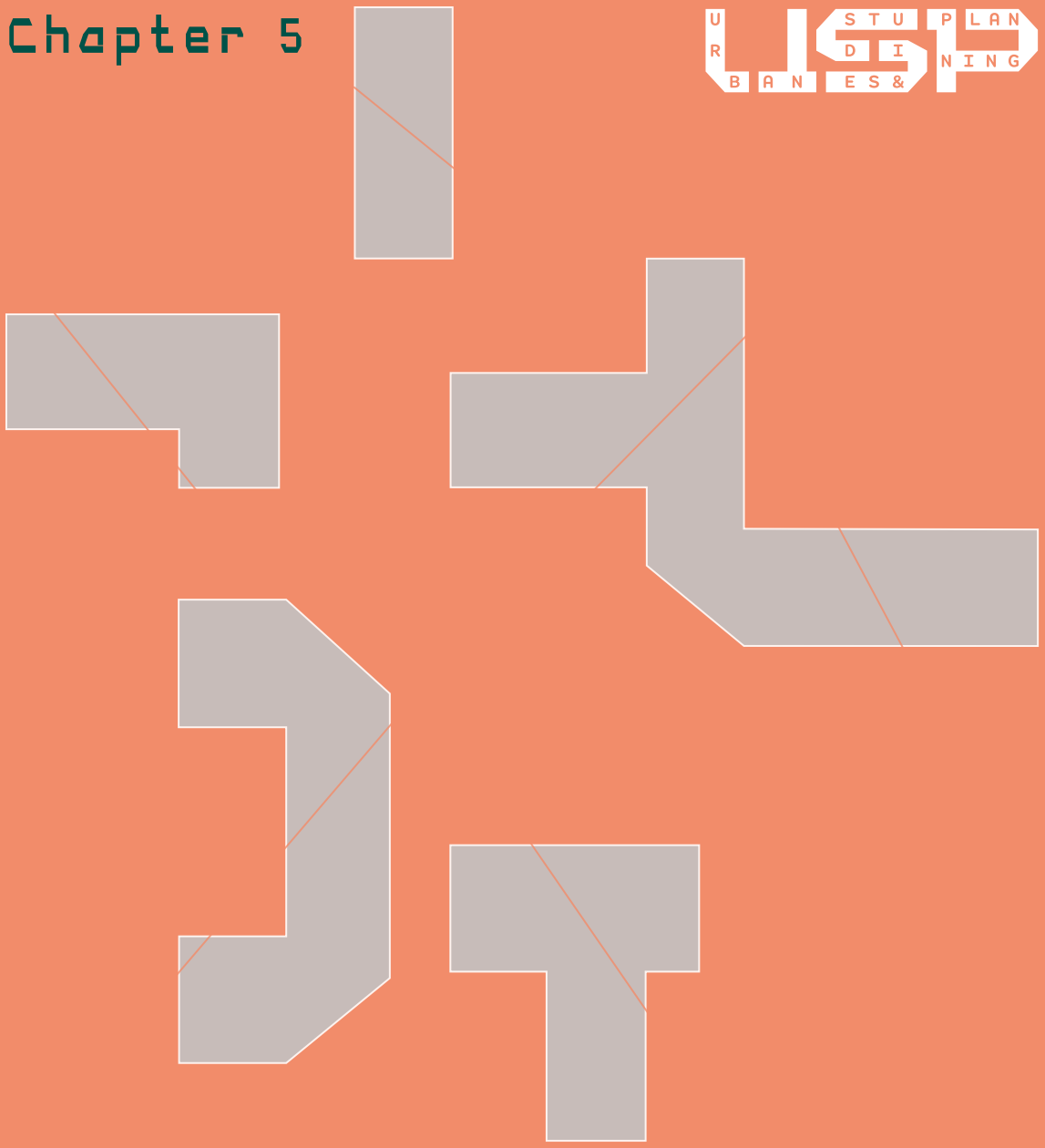
Chapter 5



Sustainable Futures for Hakunila and Sotunki

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Framework

In this chapter, we analyze two areas of Vantaa: Hakunila and Sotunki (Figure 1). We examine their relationship with each other and the threats and opportunities presented by their paradigm. Using this information, we have created scenarios for sustainable futures. These scenarios seek to illustrate how policies, technologies, people, and planning can shape a more sustainable future. To illustrate the context of the scenarios, we have defined the trends that we will focus on. We chose governance and technological/economic factors as drivers of change. The scenarios narrate different paths for sustainability and illustrate diversity of the concept. Scenarios are not necessarily a realistic view of the future, but they can be seen as tools to demonstrate what might happen if different sustainable policies or other measures are used. In fact, the future might have aspects of each of the scenarios. We hope also that these scenarios could inspire the planners' choice of strategies and tools to achieve sustainability. If we are very hopeful, perhaps scenarios could inspire people to think about what they could do personally to push sustainability forward.

Our team consists of people from four professional backgrounds with completely different skill sets and perspectives: real estate, environmental sciences, landscape architecture and design. Never the less, we share an interest in social, environmental and economic sustainability. We are all interested in practical ways to make our ways of life and habitats more resilient in the face of climate change and other environmental challenges. Throughout this topic we address several areas of our interest, such as the densification of agricultural areas, urban permaculture, utilization and retrofitting of existing structures for better environmental performance, environmental behavior change, ecologically-driven decision making, and social cohesion in small neighborhoods. We found that these are interests shared by all of us, and they acted as drivers to develop the project. These areas of interest enable us to challenge the way we plan, from fast production, to the most efficient solutions. One such example is assessing the needs of new structures versus

Figure 1. *Location of Hakunila and Sotunki in Vantaa.*

the re-adaptation of old structures, to enable less resource use.

For research topic purposes, we have decided to work with the areas of Hakunila and Sotunki, within the Vantaa municipality, because of their modes of interaction, their different social paradigms, existing plans touching both areas, the potential of local cooperation, and the history of community interactions. The two areas are significantly different in structure and culture; Hakunila is a green belt high-rise suburb which is densely populated and contains services, while Sotunki is an agrarian landscape with no local services of its own. This gives us the opportunity to consider solutions for both types of neighborhood.

The City of Vantaa has notable environmental goals and contains commercial functions governing consumerism in the capital region, such as logistics companies and Jumbo, the popular shopping center (Laakso 2017). Additionally, Vantaa is projected to grow between 2017 and 2050. This combination means that Vantaa could be a model for the United Nations' Goal for Sustainable Cities and Communities.

This paper consists of six sections. In addition to the purpose of the article, we have presented in this first section the scenario method we used. In the second section we have presented background information about Hakunila and Sotunki and in section 3, the essential concepts which provided inspiration and guidelines for us. In the fourth section we have gathered the essential knowledge in relation to development of these districts as an analysis of strengths, weaknesses, opportunities and threats (SWOT analysis). Section 5 presents the four scenarios and the sixth section provides conclusions of the work.

Method

In order to talk about potential sustainability tools for the region selected, we have described four normative scenarios for Vantaa in 2050. Scenario planning is a tool used to create a fictional image of what the future might look like if a determined set of steps is followed. The purpose of the scenarios is not to predict how the future will look, but rather, the tool allows us to be inspired by the current trends and pinpoint possible future trends and outcomes. It is a tool used by planners to help to make better decisions today.

In the creation of future scenarios, four societal driving forces have been taken in consideration: societal dynamics, economic issues, political issues and technological issues. These forces influence our behavior and the course of action of our society (Wilkinson 1995).

The future is not guaranteed to manifest itself exactly according to these scenario, but the scenarios give a contextual framework for the options and opportunities described. By choosing two axes with extremes at each end, we hoped to present a variety of tools and strategies relevant to any of the middle values of each (Figure 2); a combination of these would be needed for any plausible future. The vertical axis describes the level of government involvement in change-making, as sustainability strategies exist for every value along this spectrum. The horizontal axis describes the involvement of technology and technology-driven economics in adapting to this future and also direction of the economy.

We chose these axes as we believe them to be the most relevant factors for real sustainable development based on our own research. The selection criteria have been based on two current, global trends. One emphasizes the role of technology, innovation and economic green growth, while the other sees declining consumption and low technology alternatives as the best solutions to reach sustainability. Thus, while all the scenarios are located inside the wide and diverse concept of sustainability, they represent opposite views. Therefore, there are no best- or worst-case scenarios. Instead we assumed an atmosphere of hope; none of these predictions are apocalyptic, none involve the extinction of humanity or any group of humanity, and all assume that no one will actively seek their own destruction.

After defining the axes, we brainstormed

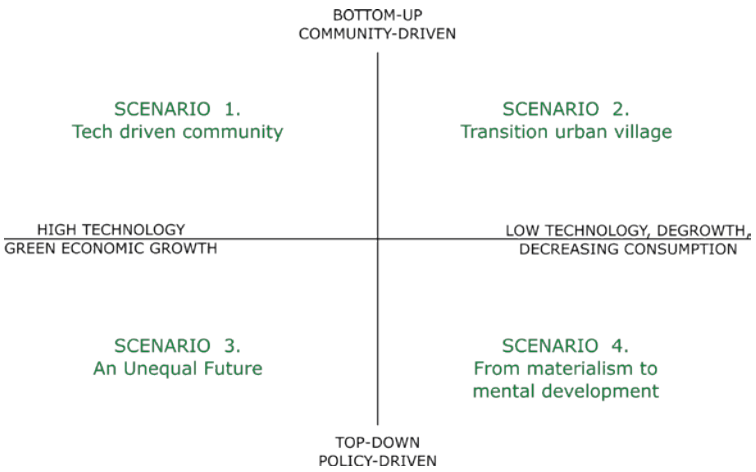


Figure 2. *Scenario axes.*

what those scenarios would look like. We did this together to gather different ideas of sustainability and discussed which factors would be part of the scenarios - things such as communal spaces for co-living, car-free cities, a sharing economy, or low-tech development. We also took into account all ideas that were inspired from previous research on the essential concepts, as well as results from both the Analyses and SWOT analysis sections. The concepts were used as existing trends that could lead to a more sustainable urban structure. Statistical data and literary material, processed in the analysis and results of SWOT analysis, were used to contextualize the solutions illustrated, and to differentiate the area's needs from standard urbanization models.

To tell the story of the four scenarios, we chose different narrative perspectives in the form of four characters whose backgrounds would make them particularly affected by the changes we want to illustrate. The stories are told as one day in the life of each character, including the character's internal monologue and reflections to showcase how things came to be the way they are. For scenario planning, there are several ways to tell the stories, usually technical language is used, using back casting to define the steps required to reach the specific scenario. This is combined with the purpose of developing a strategy that will help reach a set of goals (Schwartz 1991, 258). However, we wanted to use storytelling to get the reader involved, to make it more comprehensive, and to provide the scenario with a face.

While composing the scenarios, we decided to follow some previous assumptions. For instance, we assumed that the climate will change as described in The Baltic Marine Environment Protection Commission's (HELCOM) assessment (Climate change… 2013), in the worst case for each indicator. Over the course of the 21st century, the capital region may warm by four degrees, precipitation might increase by between eight and 24 percent in both summer and winter, and the volume of snow may decrease by 70 percent. Snowmelt will begin earlier in the year, and sediment transport into waterways will decrease according to the decrease in snow volume, both of which bode well for agriculture, if poorly for migratory animals. The sea level may rise by as much as 1.1 meters.

We also assumed that attention will be paid to adapting to these changes as well as

the global changes that climate change will cause-- the disappearance of island nations and low-lying territories, increased occurrence and severity of drought and flood events, food and water insecurity, and the mass migration of people living in places impacted by these. As a place relatively mildly impacted by these problems, Finland may expect to see an influx of people.

Analyses of Hakunila and Sotunki

General Overview

Hakunila is Vantaa's third largest district by land area (Table 1). It is named after the 18th century Håkansböle estate, which existed in the same area. It also contains the old village Nissbacka, now a housing area called Nissas. In the area a manor house still stands, which burned down in 1934, later to be repaired by the city, and later still to become a cultural and recreational space. It now serves as an artist's studio and sculpture garden, and has some historic trees. (Vantaa alueittain… 2016, 258-259).

In the 1970s, the district developed a distinct high-rise suburban character with its own shopping center, library, and church. Most of its residences are rental apartments, with a high proportion of people living alone. In the 1980s and 1990s, the Kaskela neighborhood developed with small houses and the Nissas area developed first with small houses, then with row houses and two-floor apartment buildings. In the south, there are small areas for row houses and single-family houses. Despite the exiatence of bus connections, the area is heavily car-dependent and contains significant car parking areas (Vantaa alueittain… 2016, 259).

Sotunki is the eastern-most district in Vantaa, sharing a border with Sipoo (Table 1). Formerly Översby, it is the oldest village in the Uusimaa region. Stone Age dwellings and burial grounds have been found in the area. The earliest records of Översby village are from the 14th century. Nygård farm houses still stand in the area. (Vantaa alueittain… 2016, 274)

The area is still agricultural, and houses

	Hakunila	Sotunki	Vantaa
Area ($km^{2)}$	3	14	240
Inhabitants in 2015	11,253	652	210,803
Inhabitants / km^2 in 2015	3,618	48	877
Vantaa citizen by birth (%) in 2015	25.6	35.9	27.5
Foreign country citizens (%) in 2015	19.6	2.3	9.4
Graduated (%) in 2015	56.8	72.8	67.6
Proportion of entrepreneurs of all working people (%) in 2015	5.6	14.6	7.0
Unemployment rate (%) in 2015	16.6	4.3	10.3
Average income of over 15-year-olds (e) in 2013	25,434	42,108	31,694
Workplaces in 2013	1,625	88	106,420
Level of self-sufficiency in workplaces (%) in 2015	34	28	106

Table 1. *Basic information of Hakunila and Sotunki (Vantaa alueittain… 2016).*

are single-family owned. Though the district is the largest in land area in Vantaa, it contains only 650 residents, of which 17 percent speak Swedish as their first language. Services and transportation are accordingly sparse; there are some bus connections, but the area is almost entirely car-dependent. Housing is mainly made up of detached houses, constructed over several decades (Vantaa alueittain… 2016, 275).

Ojanko is included in our maps and consideration only with regards to the Kormuniitty area, which is categorized as a "Culturally Significant Landscape area" (Vantaa alueittain… 2016, 253). It borders Hakunila and Sotunki, and encompasses also the Sotunki school and Hakunila sports complex. Land use changes and development plans affecting Sipoo National Park will affect green areas and paths connecting to Ojanko.

We have created maps to illustrate the differences of accessibility to both areas, to compare how easy or difficult it is to access and get around. We compared the accessibility using three factors: car (Figure 3), public transport (Figure 4), and walking (Figure 5), to point out the efficiency or inefficiency of the infrastructure that allows citizens to get around Hakunila and Sotunki. Thus, these maps can illustrate issues that can cause conflicts with the sustainability targets of Vantaa.

Nature

A significant portion of the green areas in Sotunki is part of the Sipoonkorpi National Park, which is protected against development (Vantaa alueittain… 2016, 275). Also present is a national heritage site which covers parts of the border between Sotunki, Ojanko, and Hakunila. A small portion of the heritage site would be affected by the proposed use change for Kormuniitty (nro 002226), therefore attention will be needed to prevent degradation of the site to be developed. Also, some of what is marked in

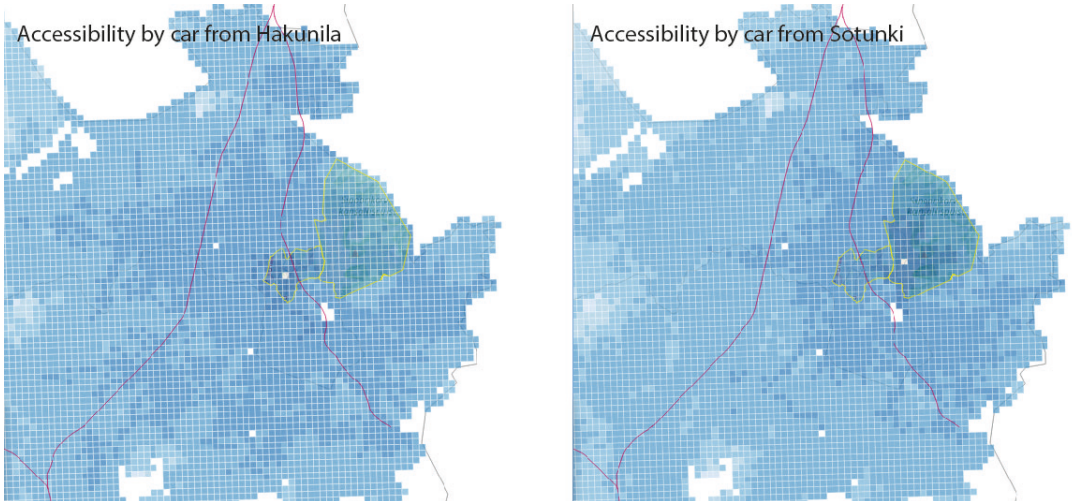


Figure 3. *Accessibility by car from Hakunila center and Sotunki. In the images above, we can see that Hakunila is more accessible by car than Sotunki. This means that it has better infrastructure to get around, and at the same time that Sotunki is somewhat dependent on Hakunila's existing infrastructure. (Data: Toivonen et al. 2015).*

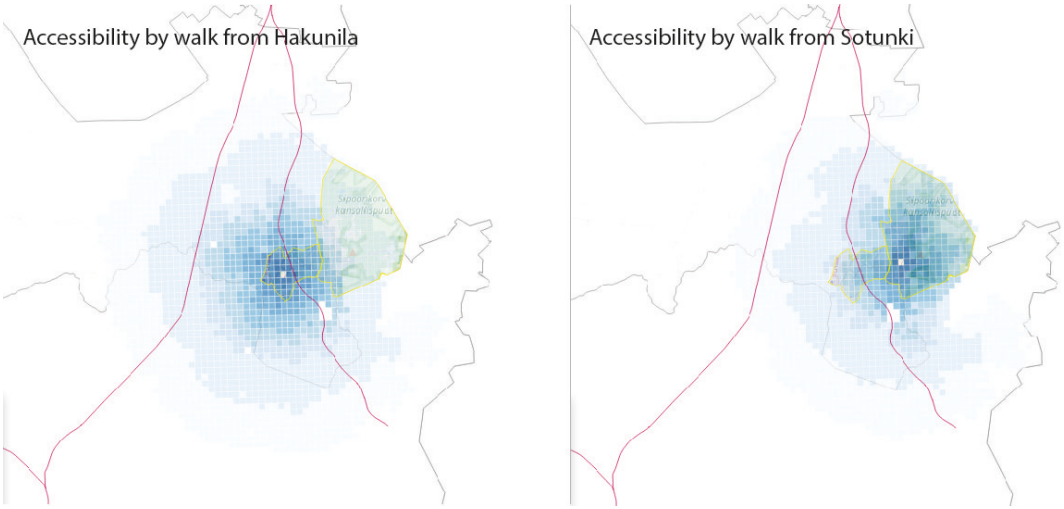


Figure 4. *Accessibility by public transport from Hakunila and Sotunki center. In the images above, it is clear that it is much easier to get around from Hakunila than from Sotunki where the average time just to get out is 10-20 minutes, and from there to the Espoo it can take more than 90 minutes. (Data: Toivonen et al. 2015).*

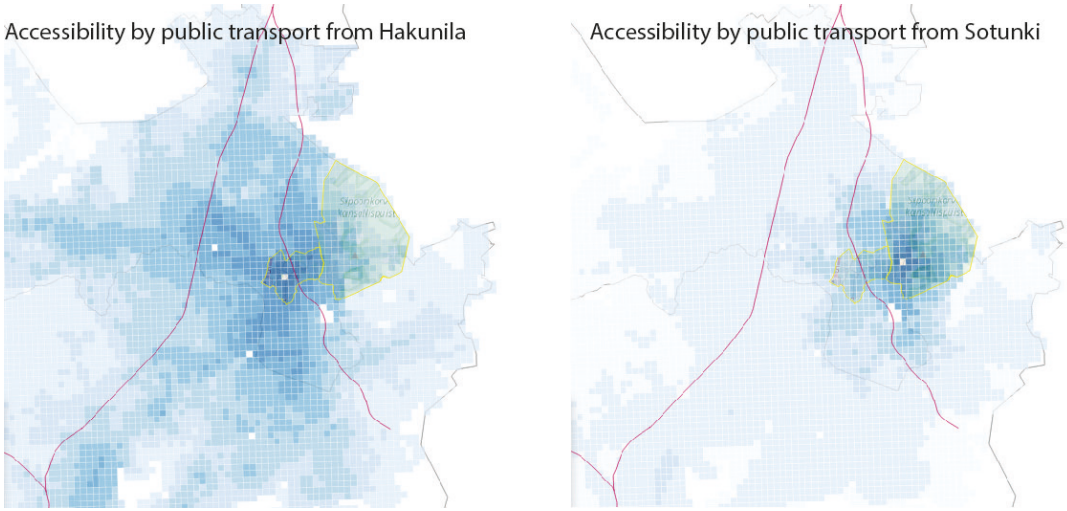


Figure 5. *Accessibility by foot from Hakunila and Sotunki center. In terms of walking distances, both Hakunila and Sotunki are limited in the same way, but we can also see that it takes on average 20 minutes to walk from one's center to the other. (Data: Toivonen et al. 2015).*

publicly-available data as green areas appears to be in agricultural use, which we have considered separately in figure 6.

Green areas in Hakunila include both open and wooded spaces, which appear to serve as a noise buffer from major roads and as set-backs between residences and streets. Open spaces in the built area are underutilized. Forested spaces at the edge of the built-up area host birds, squirrels, and insects.

Figure 7 shows high biodiversity within the conservation areas, which are mostly on the Sotunki side. The natural richness of the area will challenge future development to maintain high biodiversity. On the other hand, almost half (1.2 of 3.0 sq. km) of Hakunila has a very low biodiversity rate because of pavements, artificial surfaces, and buildings. It could also be another challenge to the City plan to increase the quality of nature (City of Vantaa's… 2012, 8).

Climate change is another challenge for future city planning as it affects all environmental elements. The City of Vantaa has realized the importance of climate change adaptation. According to the City of Vantaa's Environment Policy (2012),

> *[O]n a local level, cities and municipalities can, to a significant extent, have a significant impact on cutting greenhouse gas emissions. Thus, cities and municipalities play a major role in implementing climate-change-adaptation*

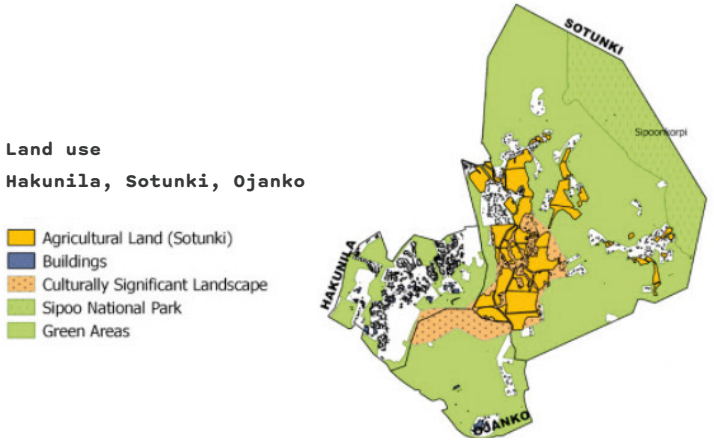


Figure 6. *Land Use and Green Areas (Corine Land… 2012; Luonnonsuojelu- ja… 2017; Natura 2000… 2017).*

Figure 7. *Biodiversity maps with buildings and conservation area outline (Jalkanen 2017).*

measures. [...] The City of Vantaa has set a climate change management group to be in charge of the city's climate work. Different departments' goals and actions to cut greenhouse gases are included in the departments' climate and environmental programs. The city can influence the emissions by integrating and condensing the urban structure. It is also essential to reduce the greenhouse gas emissions caused by energy and electricity consumption.

The statement has already mentioned the tendency of changes in the urban fabric. The clear policies also enable business sectors to plan their goals in the same direction. Climate change issues are also mentioned in sustainable urban development of environmental policy guidelines (City of Vantaa's… 2012, 11).

Population

Hakunila is Vantaa's third biggest city district by population and fifth biggest by population density. In the future, the population of Hakunila is going to increase as Hakunila will be one of the growth areas in Vantaa (Vantaa alueittain… 2016, 258-259). Both today and in the future, Hakunila has more young people than those aged over 60.

The proportion of foreign country citizens is higher in Hakunila than the average in Vantaa. Almost one-third of inhabitants, 29 percent, speak a foreign language. Compared to Vantaa overall, there is a smaller proportion of inhabitants with higher education or those who work as entrepreneurs. Also, the average incomes of Hakunila inhabitants are lower and the employment situation is worse than the average level in Vantaa (Vantaa alueittain… 2016, 258-259).

In 2000 conflicts between Finnish and Somali youngsters broke out in Hakunila and inspired the "Hakunila Project." The project addressed the problems and succeeded in improving the safety of the area, by developing different ways of cooperation and negotiation (Rikoksentorjuntaneuvoston toimintakertomus 2003, 8). In 2015 Suomen Kotiseutuliitto chose Hakunila as the city district of the year because of its community spirit, success of reconciling conflicts, and the cooperation between the City of Vantaa, various associations, the church, and the neighborhood inhabitants (Vantaa alueittain… 2016, 259). Even still, today Hakunila is one of the areas where more disadvantaged people live than elsewhere in the capital region (Figure 8).

Sotunki is the second largest city district of Vantaa by area, but there are few inhabitants (Vantaa alueittain… 2016, 275).

Figure 8. *Geography of disadvantaged people in capital area 2016. (Data: Statistics Finland 2017).*

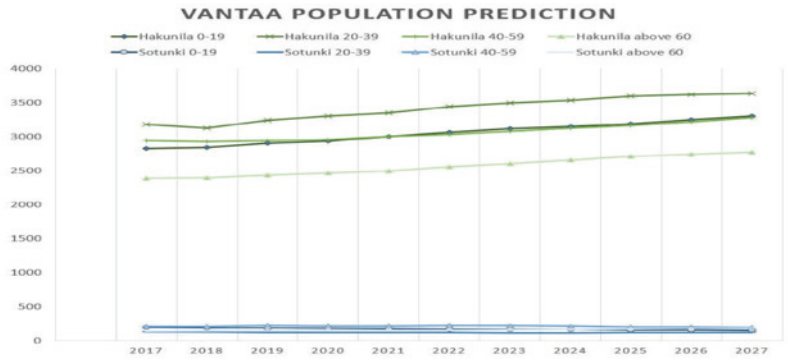


Figure 9. *Estimated development of age structure in Vantaa 2017-2045. Parallel to the global trend, Vantaa is an aging society and birth rate is decreasing. However, district predictions show slightly different patterns (Population projection… 2017).*

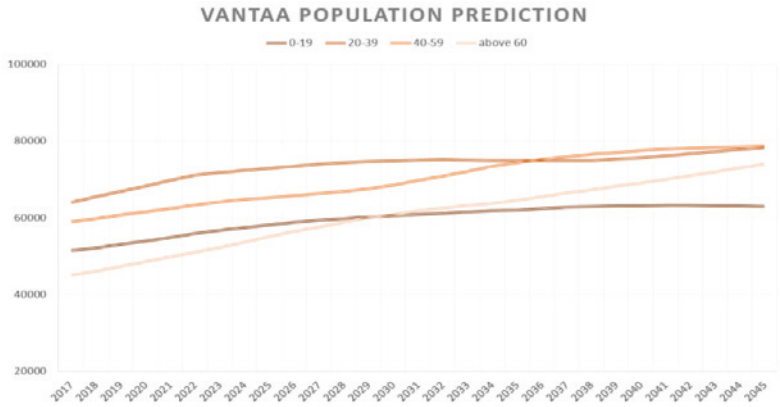


Figure 10. *Estimated development of age structure in Hakunila and Sotunki 2017-2027 (Population projection… 2017).*

As shown in Figures 9 and 10, the number of inhabitants is not estimated to increase in the future. Inhabitants of Sotunki are mainly families living in detached houses, and the proportion of school age children is clearly bigger than the average in Vantaa. Inhabitants tend to have higher education and higher incomes than the average inhabitants of Vantaa. More than one third of them are born in Vantaa. The unemployment rate is also lower, and the proportion of entrepreneurs is higher than the average for the whole of Vantaa (Vantaa alueittain… 2016, 275).

Livelihood

With respect of the number of inhabitants, there are quite a few workplaces in Hakunila, but the largest concentration of workplaces is in Vantaan Akseli, beside Hakunila (Hakunilan keskustan… 2017, 3).

Thus, the level of self-sufficiency in workplaces of Hakunila is only 34 percent, when self-sufficiency in workplaces in Vantaa is over 100 percent (Vantaa alueittain… 2016, 258). The most significant industries in Hakunila, by number of jobs, are transportation and storage; the second most significant are human health and social work activities (Figure 11).

The commercial services of Hakunila and Sotunki are concentrated mainly in the Hakunila center and in its shopping center. There are over 20 enterprises like restaurants, pharmacies, grocery stores, hairdressers and photographic studios. Currently the commercial services are not enough compared to the number of inhabitants. Nevertheless, the Center of Hakunila is serving the whole of eastern Vantaa. The purchasing power is directed outside Hakunila at the moment, but the potential for additional commercial services in Hakunila is good, be-

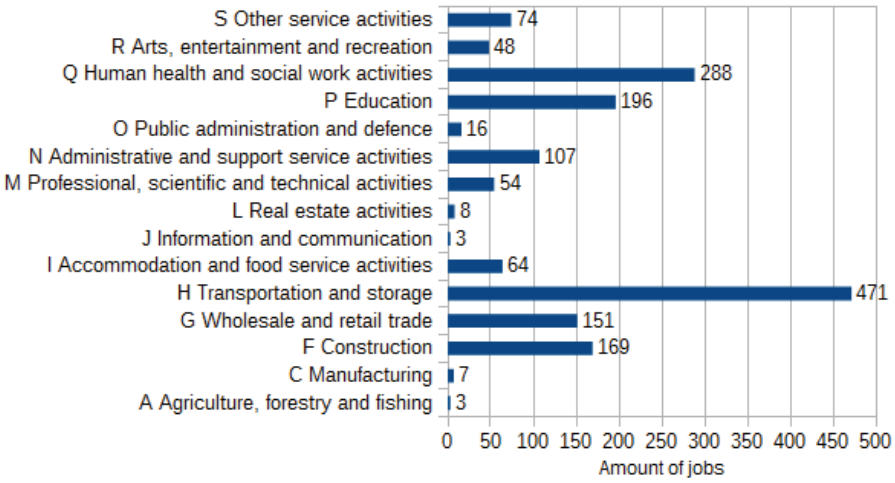


Figure 11. *Jobs in Hakunila by Standard Industrial Classification TOL 2008 (Työpaikat Vantaalla… 2017).*

cause there are more residences than commercial services and workplaces (Hakunilan keskustan… 2017, 3).

There are plenty of public services in Hakunila (Figure 12). The library, health center, child welfare clinic, church, youth club, daycare and Kela office are located in the center of Hakunila. Elsewhere in Hakunila there is also a retirement home, swimming pool, sports hall, as well as ten daycare centers, and three schools. In Sotunki there are no public services except Sipoonkorpi National Park and public outdoor recreation paths (Vantaan palvelukartta… 2017).

Planning

The current master plan of Hakunila and Sotunki and the detailed plan of Hakunila are presented in Figures 13 and 14. Currently there are five different plans underway in Hakunila. “Hakunilan keskustan kaavarunko” (2017), or Hakunila center plan (see Figure 15), is a preparatory vision made for the forthcoming master and detailed plans of Hakunila. It describes how the livability of Hakunila center could be improved and sets goals for land use, traffic, and services. In-fill housing development will be located in the Hakunila center and new housing will be located in the old bus depot area. They could become home to as many as 6,200 new inhabitants.

The increasing population makes it possible to improve the availability of commercial services and the city has set aside land for a new, larger shopping center. According to the Hakunilan keskustan kaavarunko (2017, 3, 11), the atmosphere and image of Hakunila center will be improved by constructing high-quality public areas and connecting Hakunila to the larger network of green areas. Public transit connections as well as bicycle and walking paths will also be developed.

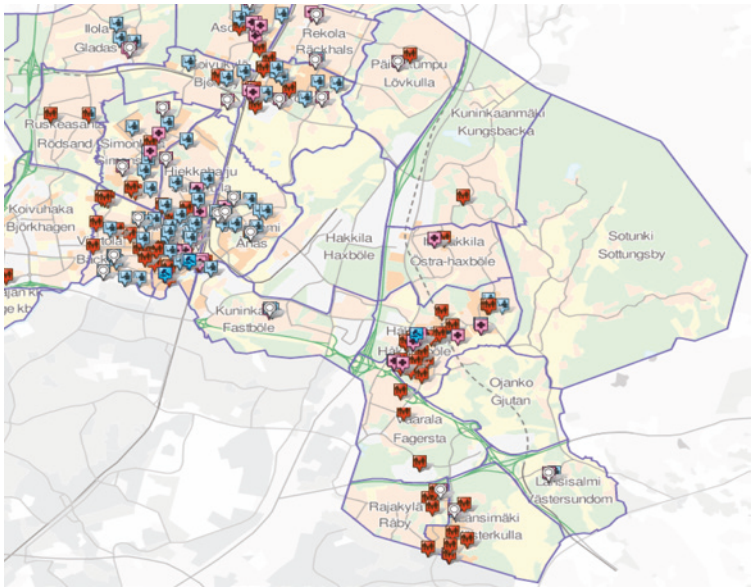


Figure 12. *Public services of the area are concentrated mainly in Hakunila. Points represent public services like education, social services, daycare and health care (Vantaan palvelukartta… 2017).*

Figure 13. *The current master plan of Hakunila and Sotunki from the year 2007. A new masterplan is underway. In this plan, the center of Hakunila is marked mainly as a city center area (C, red) and as an effectively built residential area (A1, darker brown). Light brown A2-areas are low and dense residential areas and lighter brown A3-areas are detached house areas. Lilac PY point out public services and administration areas. Orange P1 point out commercial service areas. The light red TP point out work places. The green VL-areas point out the recreational green areas and the VU-areas are for recreation and sports. Public transport connections are marked along Hakunilantie and Kyytitie (Vantaan palvelukartta… 2017).*

Figure 14. *The current detailed plan of Hakunila from the 1970s. The new detailed plan is underway. Hakunila is marked mainly as apartment buildings (AK, brown), different public buildings (Y, lilac), parking lots (LPA, lilac) and office buildings (K, orange) (Vantaan palvelukartta… 2017).*

In Sotunki there are no master plans or detailed plans underway, but outdoor recreation paths will be developed in the Sipoonkorpi National Park area (Vantaa alueittain… 2016, 275).

Sustainable Development

The City of Vantaa has been aiming for sustainable development since 1995. Current targets for environmental politics and sustainable development are defined in the City of Vantaa´s Environmental Policy 2012-2020 (2012) and in more detailed environmental programs of different city departments. The progress of the work is monitored annually and every few years to create environmental reports.

The main aim of sustainable development in Vantaa is to secure good living conditions for current and future inhabitants. The City of Vantaa is striving to implement economic action without endangering the carrying capacity of nature and social equity, while opportunities to influence surroundings are also being supported and improved (Kestävä kehitys… 2017). Vantaa wants to be seen as a bellwether in sustainable development (City of Vantaa's… 2012, 6; Figure 16).

According to information provided by the City of Vantaa regarding sustainability, the major environmental challenge in Vantaa is climate change and the most significant solutions to that are densifying the city structure and increasing public transport and cycling (City of

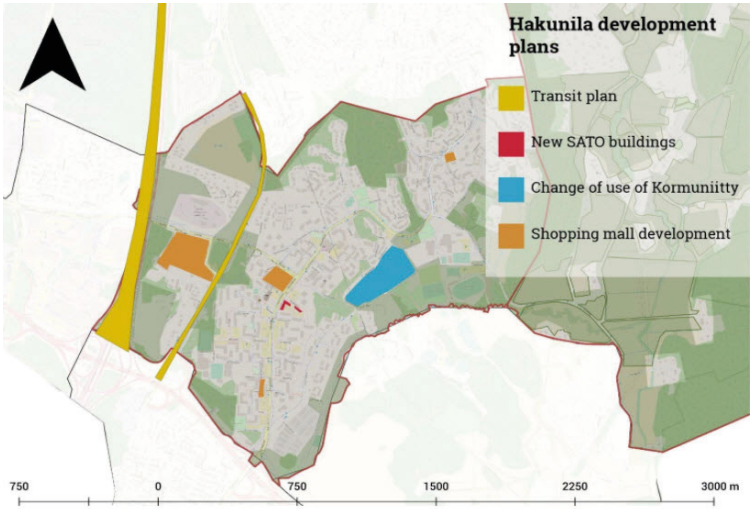


Figure 15. *Hakunila development plans (Vantaan palvelukartta… 2017).*

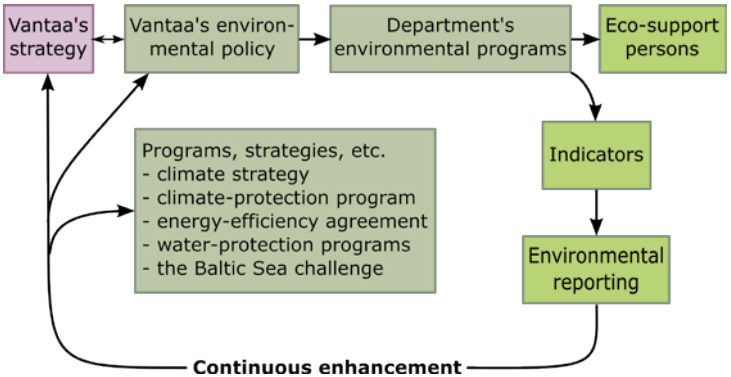


Figure 16. *Structure of environmental management in Vantaa (City of Vantaa's… 2012, 14).*

Vantaa's… 2012, 8). Energy production has to be developed more sustainably as well as the consumption habits of citizens, through reinforced sustainability education. Greenhouse gas emissions are acknowledged in the City of Vantaa's own public procurements. The second largest environmental problem is the loss of biodiversity caused by the fragmentation of habitats and destruction of ecological connections, among other things. Renovating and rebuilding Vantaa's numerous flowing waters and creeks is one priority in securing biodiversity. The third significant environmental problem in Vantaa is noise, which is controlled mainly by planning.

In addition to the environmental policy and various reports, the City of Vantaa has other tools which help to improve sustainable development: (1) Eco-support persons help employees in every workplace of the City of Vantaa to improve environmental sustainability; (2) environmental education starts when children enter daycare and it continues at school, in workplaces, and even in retirement homes; (3) Vantaa measures the standards of Fair Trade and, among other things, it means that equal rights of employees and welfare of nature are respected in public procurements, and that those products are not produced by child labor; and (4) the City of Vantaa's guidelines to resource efficiency will be finished in 2017. The goals are to reach a carbon neutral and waste-free city by 2050, and to learn to use natural resources as sparingly as possible (Kestävä kehitys… 2017).

Concepts

Sustainable Development and Sustainability

In this section we define some of the concepts we have researched and been inspired by. These concepts are used in guidelines and are inspiration for both the creation of the SWOT analysis and the future scenarios. Sustainability and sustainable development are concepts often thought of as referencing the same thing, and it is hard to find a definition that explains the difference. Here, we define sustainability as the ethos, and sustainable development as the practice; different definitions are used by different disciplines. And we also define sustainable development, which is the practice of sustainability, as defined by a range of scholars and institutions (Koglin, 2009).

Many definitions of sustainability posit economic, social, and ecological capital as equal pillars of society, which means that they can replace each other by fulfilling somewhat similar needs. In this situation, the sustainability of society is located at the intersection of these three dimensions (Heikkurinen 2014, 11; Figure 17). However, many critics (e.g. Latouche 2010; Heikkurinen 2014; Caradonna et al. 2015) point out that in the current economic system, the economic factor or pillar is too often given top priority. Social welfare is taken into account if possible, only within the limits of the economy, and the environment is either forgotten or seen as a commodity (Tikkanen 2015). This definition of sustainability is quite similar to the sustainable development definition, and it is referred to as weak sustainability (Heikkurinen 2014, 11).

By contrast, the concept of strong sustainability defines categories based on their interdependencies. Nature is not dependent on anything, which means it does not depend on either economic or social factors to survive (as opposed to the views many humans have). For this reason, ecological capital holds the highest place in the hierarchy, surrounding and supporting both social and economic capital. The middle circle, social capital, or humans, are dependent on nature, and unable to survive without it. In a like fashion, the economy is dependent on social capital, as it is a human invention--there is no economy without people. The concept of strong sustainability sees nature as a precondition and a restrictive factor for humans and economic systems. Thus, capitals of each dimension - economic, social, and ecological - are complementary in relation to each other. Both economic and social welfare can be implemented only if natural resources are lasting (Tikkanen 2015). The main idea behind strong sustainability is that because humans are part of nature, we

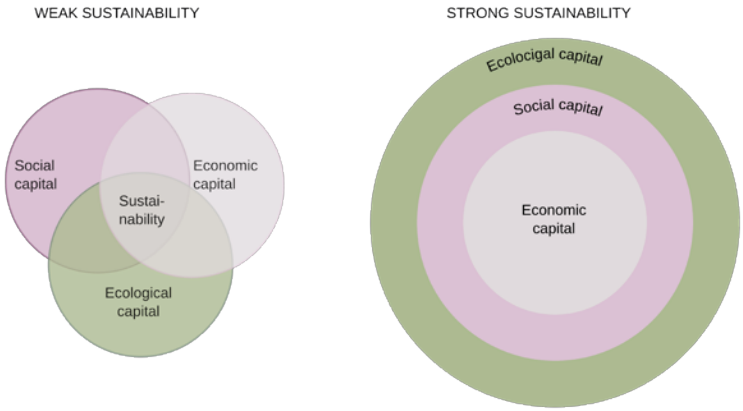


Figure 17. *Concepts of weak and strong sustainability (Tikkanen 2015).*

cannot live as if it did not exist (Heikkurinen 2014, 12).

The definition of sustainable development by the United Nations' (UN) Brundtland Commission (Our Common… 1987, 41) is one of the first and most used definitions. It says:

> *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.*

However, we do not like this definition, as we feel it is elusive, and very often used to pursue personal agendas that can be contradictory. We see examples in both public and private sectors of organizations that only use sustainability as "green washing," while continuing to do things business-as-usual. This means that the way things are done does not change at all.

Lastly, Arjan van Timmeren (2014, 1) defines sustainability more like a process or transition strategy than an end in itself. Although it resonates on all fronts: social, economic and environmental, there is no unified theory for it. Creating a theory would be difficult, because sustainable development is a moving target. Sustainability know-how is developing all the time and different solutions are needed in different places. There is no "constant recipe" or "one size fits all" solution for sustainability. According to Timmeren (2014, 1), "sustainability often relies on the management of transitions—a shift to doing things differently." In the end, sustainable development depends on humanity's mind and that is why it is so important to produce more knowledge and innovation about the complexity of problems, environmental technology, design, and adaptation to change. This way of thinking resonates more with our way of thinking, because we think that in order to act sustainably, and for real sustainable development to happen, the way we go about our businesses, our policies, our practices, our habits, our education, and everything that makes us social beings, must change. Starting from the economic and governance models, maybe we can integrate the value of ecosystems and natural resources - their

respect, preservation and recognition of our dependency - into the definition of sustainable development.

We feel it is relevant to define what a sustainable city is. For this matter, we will use the term referring to the UN's eleventh goal (Goal 11… 2015), where they define sustainable cities and communities. The core concept is to "make cities and human settlements inclusive, safe, resilient and sustainable." The UN mentioned several urban challenges and set sub-targets and indicators to complete them. The pathway concerns four main issues: continuing to thrive, improving resource use, reducing pollution, and reducing poverty. Besides, the UN has projected the future as "opportunities for all, with access to basic services, energy, housing, transportation and more." (Goal 11… 2015)

Resilience

Ecologist Crawford Stanley Holling (2013, 250) defines resilience as "a measure of the persistence of systems and their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables." This definition has its roots in ecology, in which change and disturbance are not opposite to each other, but instead are seen as variables to alter the system to make it stronger. It means that with each incident, the system goes back to stability (having in mind that stability is not real, as systems are constantly changing), to maintain its identity (van Timmeren 2014, 12-13).

According to van Timmeren (2014, 13) resilience has three defining attributes, which are, "the amount of change the system can undergo and still retain the same controls on function and structure, the degree to which the system is capable of self-organization and the ability to build and increase the capacity for learning and adaptation." As for cities, van Timmeren (2014, 13) thinks that resilience means "innovative capacity, a dense and varied social fabric, decentralized control and physical infrastructures that allow future adaptations."

Economic Degrowth

François Schneider, Joan Martinez-Alier, and Georgios Kallis (2010, 512) define degrowth as follows: "Sustainable degrowth is defined as an equitable downscaling of production and consumption that increases human well-being and enhances ecological conditions." Degrowth is striving for sustainability, but departing from many other ideologies; it does not believe that it is possible to decouple economic growth from the use of natural resources. Until now, economic growth has only led to an increase in the use of resources, although humanity should reduce its aggregate demands on the biosphere (Caradonna et al. 2015, 2-3).

The goals of degrowth could be compacted as follows: (1) to strive for sustainability by questioning the idea of economic growth and cultural domination of economy; (2) to model and develop society, institutions, and social systems without economic growth; and (3) to decrease production and consumption (Järvensivu & Järvensivu 2017). The ideology of degrowth suggests that people reduce economic activity and the material throughput of the economy, at least in developed countries by downscaling consumerist lifestyles, by moving beyond conventional energy sources, and by rethinking technologies in use (Caradonna et al. 2015, 2).

There is no reason to reject technological development completely, but it is important to understand their contributory role in current environmental problems. Environmental problems cannot be solved only with the help of technology; there is still a need for changing consumption habits (Caradonna et al. 2015, 2).

Ecomodernism

Increasing room for nature and reducing human impact on the environment have been the only aims for the environmental ideal, while economic growth has been a key player in human societies and developments. Following the discussion, a group of eighteen scholars from different institutes have defined a concept which focuses on human impacts on the environment, ecomodernism (An Ecomodern-

ist Manifesto 2017):

> *A good Anthropocene demands that humans use their growing social, economic, and technological powers to make life better for people, stabilize the climate, and protect the natural world. [...] Intensifying many human activities – particularly farming, energy extraction, forestry, and settlement – so that they use less land and interfere less with the natural world is the key to decoupling human development from environmental impacts. These socio economic and technological processes are central to economic modernization and environmental protection. Together they allow people to mitigate climate change, to spare nature, and to alleviate global poverty.*

This definition shows a strong belief in technology and the "decoupling of human well-being from environmental impacts" (An Ecomodernist Manifesto 2017).

Green Economy and Green Urban Economy

A green urban economy can be defined resulting in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP 2011, 2). It is a process that focuses on the respect of both social and environmental aspects regarding the activities in an urban area. This means that the main drivers of development are focused on sustainability as we define it above (GIZ and ICLEI… 2012).

The above definitions of degrowth, ecomodernism, and green economy are based on economic factors. They are similarly looking to target the economy towards sustainability, yet they differ in how this could be achieved. For ecomodernism, the main target is to decouple the economic growth from harmful impacts, opposing degrowth, which seeks a shift in values where the economy is not expected to increase, but rather the wellbeing of society and the environment. As for green urban economy, we could say it goes half way, where it still seeks growth, but it also seeks social and environmental wellbeing. We think it is important to define them, as we were inspired by them to create our different scenarios.

Agrarian Urbanism

Agrarian urbanism is a design method that includes agricultural considerations in urban environments, such that urbanites participate in the sustainable production of food (Duany 2011). This food production is not intended to provide an income for any member of the community, but to create a local food economy, utilize green space, and increase social contact through a planned, productive activity. A residential unit may include a plot of garden land, a greenhouse, balcony gardens, roof gardens, or a window box, depending on the type of construction. Communities may choose to mandate a certain amount of space on each property be used for growing food, but the resident may outsource that work to a gardener if they prefer. In communities with a large output, a central storage and processing facility may be held in common (Duany 2011).

This is intended to provide a closed loop for several natural processes. Agricultural water collection, filtration, and storage features would be designed as recreational areas, which would preserve pervious areas. Less energy would be needed for transporting food, and some jobs would be created in the area to maintain gardens for residents who do not want to maintain gardens themselves. Composting food waste for use in residents' gardens would reduce the export of nutritive waste from the area. Local production of food also allows residents to be more confident about the fertilizers, pesticides, and additives used (or not) (Duany 2011).

Urban Permaculture

Permaculture is a term created from the words "Permanent Agriculture," and it is the study, ethics and design principles used in the observation, and application of ethical and ecological principles when planning, designing, developing, maintaining, organizing, and preserving the spaces that sustain

life in the present and future (Hieronimi 2009).

Like sustainability, permaculture follows the management of three core ethical principles: (1) earth care; (2) people care; and (3) fair share of the surplus. Earth care refers to responsible land use through long term planning, and an efficient use of energy and material flows. People care refers to the awareness of human rights and free will to decide for one's lives with not only freedom, but with responsibility and a balance between the individual and the common. And fair share of surplus refers to maintaining a balance of the above-mentioned factors and an equal distribution of the surplus, setting limits to production and consumption. This means that we should produce and consume only what we need, aiming to maintain a balance (Mollison 1988).

SWOT-analysis

In our SWOT analysis we defined strengths, weaknesses, opportunities and threats in relation to the future planning of Hakunila and Sotunki (Tables 2, 3). The analysis was used as a tool to collect the most important things from the information gathered, which provided us with an opportunity to further develop in each of the future scenarios.

Strengths

Sotunki is a cohesive community with an organized, independent village council. Sotunki has well-preserved natural and cultural historic areas. Agriculture continues in the area, and it is physically close to Hakunila, home to hundreds of residents interested in local and organic agriculture (REKO Hakunila 2017). The residents of Sotunki have higher incomes and education levels than the Vantaa average. The proportion of entrepreneurs is higher than average, and the unemployment rate is lower than average. (Vantaa alueittain… 2016)

As for Hakunila, there is a strong identity among the inhabitants, especially after the creation of murals by international artists that brought a sense of pride. There is the Taito Ry - Hakunila Handicrafts Center, where residents go to work on different projects. A large proportion of foreign-born residents enrich the Hakunila atmosphere and cultural offerings, including restaurants. Good sports and outdoor activity facilities exist in both Hakunila and Sotunki. Hakunila enjoys direct bus connections to Helsinki center and east Helsinki via Mellunmäki. A youth center offers young people a place in the Hakunila shopping center, which is itself in the center of Hakunila. Housing is affordable, and a variety of tenancy types are represented in Hakunila. Public services are centrally located in Hakunila.

Weaknesses

Hakunila has a high number of bars in relation to the number of inhabitants, and the alcoholism in the area is noticeable. This has contributed to the bad reputation of the area. On top of that, Hakunila is described as a "nothing happens" or "sleeping" neighborhood, meaning that people only go there to sleep and not to spend time in the area. This was reiterated during our interaction with residents. The unemployment rate of Hakunila is higher, education levels are lower, and incomes levels are lower than average Vantaa inhabitants. Additionally, according to our map analysis, disadvantaged people are concentrated in the area. The area is car-dependent, with car parking near most buildings and on the southern border of the district. Outdoor areas are maintained poorly, green areas include yards or untended forests, the architecture is dominated by high-rise blocks of flats in one or two colors of concrete, and many of those buildings need paint or exterior renovation. The current shopping center is in the old two-level square style, and though it is occupied and in use, it requires exterior renovation as well.

There are few connections between Hakunila and Sotunki, and few connections to Sotunki from anywhere else, making it very hard to access the neighborhood except by car. Sotunki has no shop or post office, and the

Table 2. *Summary of SWOT-analyses on Hakunila.*

Strengths
• strong identity within the inhabitants
• murals created sense of pride of the area
• foreigners enrich atmosphere and cultural offerings
• good sports and outdoor activity facilities
• direct bus connection to Helsinki
• existing knowledge about solving problems with youngsters
• large proportion of young people
• youth club as youngster's own place in center
• cheap housing
• good public services
• active multicultural associations
• city of Vantaa develops the area as one of the growing centers
	Opportunities
	• interface possibilities with agricultural Sotunki and Ojanko via local production and consumption relationship
	• working as an entrance to Sipoonkorpi National Park
	• Sipoonkorpi creates possibilities for
	  ○ nature studies
	  ○ tourist industries and more jobs
	  ○ improving the image of the area
	• mixing residential demographics as an opportunity for increased tolerance and education
	• immigrants will increase the diversity
	• number of inhabitants is bigger than amount of jobs and commercial services → possibility for new commercial services and jobs.
	• 6,200 new inhabitants in the future
	• new master plan improves public transportation
	  ○ tram connection to Tikkurila?

Weaknesses • bad reputation of the area • "sleeping neighborhood" • high unemployment rate • population with lower education level and incomes • disadvantaged people are concentrated in the area • social problems like bored young people, alcoholism and racism • dependency on cars • poor maintenance of public outdoor areas • large parking lots • dreary architecture of buildings • buildings need to be maintained and painted	Threats • Lahdentie dense mixed-use construction could lead to the loss of green areas • large proportion of foreigners can lead to worse segregation • climate refugees

Strengths
• local cohesion within the inhabitants
• active village and other associations
• preserved natural and cultural historic areas
• idyllic landscape
• long and interesting history of the village
• villagers interest to practice local and organic agriculture
• population with higher education and incomes
• a lot of entrepreneurs
• low unemployment rate
• good outdoor activity possibilities
	Opportunities
	• interface possibilities with urban Hakunila via local production and consumption relationship
	• working as an entrance to Sipoonkorpi National Park
	• Sipoonkorpi creates possibilities for:
	  ○ nature studies
	  ○ tourist industries and more jobs
	  ○ improving the image of the area

Weaknesses • lack of public transport connections • isolated • good accessibility only by car • withdrawn community? • lack of services nearby	Threats • densification pressure • social problems of Hakunila could decrease also well-being of Sotunki

Table 3. *Summary of SWOT-analyses on Hakunila.*

nearest schools are in Ojanko. Thus, Sotunki residents must leave the neighborhood for most daily functions, and there is very little to encourage them to do their shopping and socializing in nearby districts, if they must drive no matter where they are going.

Opportunities

The clear interface opportunity between agricultural Sotunki, Ojanko, and urban Hakunila could be a local production and consumption relationship. This could benefit both food producers and service providers. Both Hakunila and Sotunki could work as an entrance to Sipoonkorpi National Park for the whole capital area, which would benefit forest studies, tourist industries, job opportunities, as well as improve the image of the area.

The plan to build a new shopping center with a focus on walkers and bicyclists will draw commercial services further from Sotunki, which could potentially make Sotunki residents more willing to shop in smaller Hakunila shops where parking is available. From the social perspective, mixing residential demographics provides an opportunity for increased tolerance and education. Also, the predicted immigrant population growth will increase the diversity of the area. There are more inhabitants in Hakunila and Sotunki than there are jobs; the unemployment rates indicate an available labor force.

According to the plans for the area, the aim of the master plan is to increase public transport for better mobility and decrease reliance on cars (Hakunilan keskustan… 2017). When the plans are executed, the parking lots will be underused, creating opportunities for repurposing. The residents have pride in their neighborhood, so improvements to the area's reputation would be multiplied by their willingness to talk about it. The proposed plan to change the transit modes for the area could make the district better connected to the rest of Vantaa. (Hakunilaan Lahdenväylän… 2017)

Threats

The plans to shift Hakunila's center and develop Lahdentie into dense mixed-use

construction could lead to the loss of green areas (Hakunilaan Lahdenväylän... 2017). These changes could also affect the Hakunila-Sotunki relationship ecologically by removing a key piece of the old green belt. Currently, the green belt areas connect Sotunki and Nissas to Ormberget, to north-eastern Vaarala, and to the network of green spaces that continue west to the Vantaa River. Moving the green belt would impact the movements of animals that use the green belt to get around. Hakunila has a higher-than-average share of unemployed residents, ratio of rental apartments, and proportion of foreign-born residents than Vantaa overall; continued segregation might be reflected in poor reputation, education outcomes, and a lack of resources to adapt to the changing climate (Vantaa alueittain… 2016). It also reflects the financial accessibility of the district and its appeal for immigrants; should the worst case of climate change occur and people migrate through necessity from nations experiencing adverse effects such as drought or natural disaster, it is reasonable to expect Hakunila would receive a greater percentage of those climate refugees than the average for all districts in Vantaa.

SCENARIOS 2050

In the Framework section, we detail the process of how we determined the scenarios to portray, the information to include°°°, and the voices that narrate each story. Here, we present four scenarios: Tech Driven Community, in which area development is driven by technology and the residents; Transitional Urban Villages, in which the area undergoes degrowth directed by residents; An Unequal Future, in which the economy continues to globalize and area development is driven by government policy; and From Materialism to Mental Development, in which the region undergoes government-directed degrowth. We illustrate Hakunila and Sotunki in each scenario, and describe the ways in which sustainability is prioritized.

Tech Driven Community

Narrator: A climate immigrant male, who lives in an apartment building in Hakunila with his wife and son. He has his own business (around) local products and keeps his lifestyle up-to-date with the trends.

In 2050, community and private sectors play significant roles in a new economic structure. The green urban economy idea is a global mainstream model which brings opportunities for green investments. Sharing economy businesses are implemented through improved platforms. The innovation encourages citizens to have fully-equipped facilities with environmental friendly branding (Figures 18, 19).

I suddenly woke up from a horrible dream of a big flood in my motherland. It has been almost 30 years since I was forced to leave my city because of the disaster. With the help of the government, I was placed in an old apartment in Nissas. After getting married, I moved to another, newer building close by. The high-rises constructed in 2025 are flexible to adapt to both technology and climate change.

I shook off the sadness. My stomach was crying for the first meal. I picked some berries from our planting slots by the window and put them into breakfast bowls. Oatmeal and milk are from the local store which has online ordering and home delivery services.

This morning, I left at the same time as my son. From our front door, we saw the amazing scene when sunlight touches the trees on the edge of Ojanko. Ojanko is all open views of farm fields and low houses. When we turned west and faced the Hakunila side, the skyline was totally different. There are a lot of medium high-rise buildings with different shapes. The streets used to be car lanes before local activists decided to make changes. Cars were pushed out of the center. The small roads around the school were made into pedestrian-only zones. Past the school, on Lahdentie, there are only buses and trams.

I sent my son off to school and caught a tram to today's workplace. I have my own business but do not have a permanent physical office space. I work with goods produced in my community, trying to add value and find new uses for them. On this particular day, I tested new food printing techniques with the 3D printer. So, I went to the maker space to use the machines. The community requested space for the machine studio from the municipality almost two decades ago, and the municipality allowed us to use a portion of the old shopping center if we kept emissions and waste below a certain level. Back in the 2020s, I had to catch a bus to the center to use facilities like these.

After I got off the tram, I walked for a few hundred meters, passed an old parking lot which is now half park, half neighborhood kitchen-garden. Most of the former parking areas are small separated patches because they keep the same boundaries and there is no drive to build on them. Buildings in the Hakunila center are tall, and the gaps between each are already narrow enough. Each block has a mix of types of space, which encourages people to walk instead of drive. While big-window retailers are on the ground floor, the upper floors have several purposes, such as offices, co-creation spaces, and residential areas. Twenty years ago, the recession hit the real estate market when several anchor businesses moved out of the buildings. Service providers launched online platforms as their primary service line, so physical locations were no longer in demand. The space became cheap, and rather than allow the spaces to become run-down, the community, entrepreneurs, and building owners worked together to fill those spaces with restaurants and cafes with different international flavors. The neighborhood became much livelier.

Like other co-working spaces, the Hakunila maker space provides several facilities, which are flexible enough to accommodate many kinds of users, so the lifespan of the interior decoration is longer than in a fixed-function style space. Electricity for all machines and lighting comes from neighborhood providers. The dense part of Hakunila hosts a micro grid for the large blocks. The energy comes from a combination of solar glass and rooftop vertical-blade wind turbines. Finland stopped using coal or fossil fuels after 2021.

My wife called during lunchtime and asked me to bring her backup generator and to pick her up after work. I used the smart mobility platform to reserve a shared car for the afternoon. My wife works as a manager at the Sotunki Nature Center. The center is located in Kormuniitty (technically Ojanko, but everything in Ojanko is named after Sotunki anyway). It provides knowledge and courses for local farmers and gardeners. She sometimes gives a food preservation course for kids. Tomorrow the Center is going to have a dried fruits event. The Nature Center is off grid as a demonstration, but may need extra support for the energy-intensive process of drying a lot of fruit at once.

It rained heavily for an hour, but there was no flood. The city drainage system was improved years ago from the vote through the Happy Citizen app, which enables citizens to make reports to municipal service departments and vote for their community's problems, to gain the municipal government's attention. With the collaboration of the municipality, some old and inefficient buildings were torn down. The areas became temporary runoff catchments before a proper drainage system was implemented. When buildings are outdated, sometimes it is more environmentally reasonable to tear them down and replace them with more modern construction than to retrofit them, or worse, continue using them. This is particularly true of buildings containing hazardous materials or insufficient insulation.

I walked out of the car-free zone to pick up the reserved car at the parking structure. This structure is quite old, although it is the latest automated parking

lot in the district. The smart mobility company built a vertical parking garage in order to save space and also to protect their vehicles from winter conditions. Minor roads in the area have been narrowed to two lanes and have a dedicated space for bike lanes.

After setting up the generator at the Nature Center, I drove my wife's colleague home. She lives in Sotunki with her big family. They are farmers; they grow primarily rye and ox peas, and keep chickens and sheep. Along the way, we saw some changes in the area. Most lands here are still used for agricultural purposes. There are new middle-scale farm buildings such as greenhouses and warehouses. Although the winter is shorter, and the growing season is longer, farmers seek out new (and profitable) challenges by growing expensive sub-tropical fruits and vegetables which would usually be imported from as far away as Kenya. They also increase their available area with vertical stack planting. Above the outdoor spaces, I saw some monitoring drones, which report to farmers what areas of the field are receiving too much or not enough water, as well as alerting the farmer to possible invasive species or undesirable insect infestation. There are also several automated machines on the ground. Some machines are shared within the farming collective. There is an active farming community which takes products to market and coordinates who will grow what, to fit the local supply to the local demand as much as possible. They also work closely with the Nature Center.

I parked next to my wife's colleague's husband's truck. Sotunki is still a car-dependent society; even though they voluntarily stopped driving personal cars, the transportation system isn't perfect, and they still need to drive for some things. Once a week, her husband drives into Hakunila to collect biowaste to compost and use as fertilizer in the fields. In return, he sells some of his harvest at a discounted rate at the Hakunila farmer's market. We enjoyed tea with her family before we returned home. To send the car back to the smart mobility garage, I only had to turn on the self-driving mode and leave the vehicle. The car drove itself back to its 'home'. This saved me fifteen minutes driving the car back and walking home.

My son returned from his volunteer activity just after we arrived. The area is safe to let children be on their own during the daytime. After school, he signed up to walk dogs at the community rescue center on Hevoshaantie. Our neighborhood funds the dog rescue, which also teaches volunteers about the care of animals. Technically it is well-automated, and the machines could take care of the dogs' physical needs, but dogs are social animals and have psychological needs best attended by humans. People of different ages, social statuses, and beliefs share their kindness here and build empathy among living creatures.

I was tired from driving, so I decided to lie back on the couch instead of joining the Tuesday sauna club. Sauna has not changed in Finnish culture, but we rotate days to normalize electrical demand. People go for relaxation and socialization in an environment which VR (State Railways) could not replace. While my wife and I prepared our dinner, my son practiced drums on the VR console. VR provides the opportunity to practice many kinds of instruments without the expense of buying them separately, and we don't have to hear it when he practices.

For dinner, we tried my wife's new insect menu. Then my son told us about his day. The school had a visit from the Sipoon trekking club. The retiree volunteers promoted their new research device. To improve geographical data without invading privacy, new walking sticks have been fitted with sensors, but with no way of collecting personal information. The sticks gather nature conditions such as air quality, soil quality, moisture, and

Figure 18. *Hakunila Crossing of Hakunilantie and Oritie towards north in 2050. Here we can see parking spaces have been repurposed; to community building, urban gardens. All technique of outdoor planting, glasshouses and stack kitchen are implemented. Part of traditional car lanes have delivered to trams and public robot buses. The obvious biking and walking path are setup and subdivided in order to encourage active (walkable) lifestyles. Denser mixed-use building structure is another enable. Solar glass technology is automatically in new built construction. Also, some old buildings (facades) have been renovated towards resilience design concept. Some drones flying for delivery purpose.*

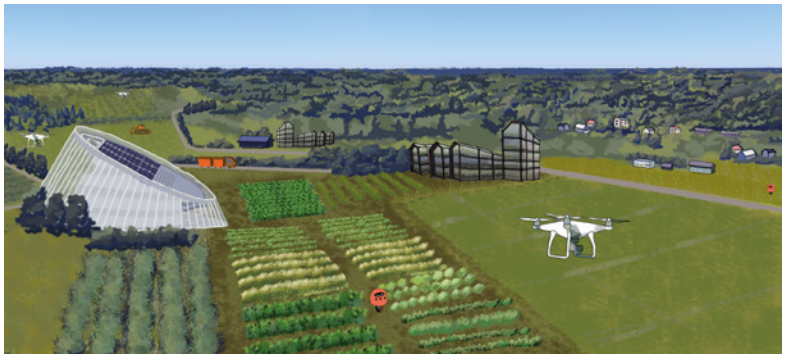


Figure 19. *Sotunki View to Sotunki from Bisajärventie in 2050. Here we see a new Nature Center nearby a larger housing community. It is laboratory for renewable energy and agriculture. Glasshouses encourage new types of farming. Drones and robots are effective labor-saving machines.*

temperature, but there is no IP address or physical address to associate with the data. It interfaces with an existing app that provides guidance through Sipoonkorpi, so that we don't disturb sensitive areas or happen upon private property by mistake. The trekking club members hope to expand their data set for more intensive study, and we enjoy picking berries and mushrooms in the National Park, so we decided to spend this weekend at Sipoonkorpi and try these new walking sticks. These days, people do not need to own their own outdoor gear. They can reserve hiking gear from Sipoonkorpi's own platform and receive them at the official park entrance or by drone delivery service to other paths into the park. Returning the equipment works similarly.

We do not have a robot maid, but the after-meal cleaning is not as time-consuming as it was thirty years ago. Waste is automatically sorted and travels by chute to the bins downstairs. The biowaste will go to Sotunki, but some older products or mixed compound waste needs to be transported to the recycling center outside the district. Much of the recyclable materials can be reused at the co-creation center for handicrafts and new products.

Finally, I returned to my comfortable bed and warm blanket. For a few minutes more, I used my tablet to browse online shops for new gadgets. There are so many inventions from other ordinary people; if I bought one, the plans would be sent to my tablet and I could order them to be printed at the maker space.

Transitional Urban Villages

Narrator: A single mother of twins; 32 years old. Working as a part time farmer, plus a role assigned to her by the community every two years. She lives in Sotunki and at the moment she runs the trade between Hakunila and Sotunki.

In this scenario, development followed a degrowth model, focusing on supporting the local economy and the wellbeing of inhabitants. Decision making went back to a local level, and different nonhierarchical structures were created as an egalitarian model of governance. The importance of communal living is enhanced, and citizens are active participants of the development of their area (Figures 20, 21).

Today is December 22, 2050. I woke up at 5:30 am to a cold dark morning of -1°, typical to this time of year, but according to my Dad, not as cold as it used to be. Last night there was so much snow that the window from my earthship was almost covered in snow, a very weird thing for this time of year. Good thing the walls are thick, with proper insulation and a heat-saving system, developed specifically for Finland by the architect Michael Reynolds and a group of students from Aalto University. We are not dependent on the grid and we generate our own heat for the house, greenhouses, and livestock barns. My Father was one of the pioneers in the village to build an earthship, and he has helped build many others, as well as a permaculture school in Kormuniitty and improvements for the infrastructure of Hakunila.

This earthship was built in 2018 on my grandparent's land. Both my Mom and Dad were thriving architects living in Helsinki and decided to move back to Sotunki in 2020, due to the realization that moving off-grid was a good solution for the future of the planet. I was only a baby back then and I barely remember, but growing up in Sotunki has been a great life. We are a very tight community and all the villagers are very active in participating and helping each other. We were pioneers in Finland to make the transition, and we did it voluntarily. Other places had a rougher time transitioning after the global economy collapsed.

I am about to prepare breakfast for my children and Father before we go to work at the greenhouse. Today is market day, which means we have to be at Hakunila by

8 am to sell what we have produced at the farmer's market, where producers from both areas get together to exchange goods. In the winter it gets harder to produce things, but within the community we have implemented technologies that help us grow vegetables all year round, even during the darkest times. At the moment we have potatoes, cabbage, kale, and pumpkins. Some of it will be preserved by my Father with other elders, for selling later on and for our own consumption. But today we have an overproduction of pumpkins and potatoes, as well as eggs from the chickens. I'll see if I can exchange these for fish to surprise the children for Christmas. Otherwise we might have to kill a few chickens for the parties.

This is the only time of day I get to relax before starting the day. I make myself a warm infusion of the herbs in season; rosemary and dill. This ritual reminds me of my Mother, but she used to drink coffee. She was born in Syria and came to Finland to seek asylum, as many others did in 2015. She was quickly integrated and continued studying and working, because of her architecture degree. But many didn't have the same luck. She died two years ago from lung cancer due to the bad air quality back home. This time of day I dedicate to myself and my Mother. I wonder how it was to grow up where she did, and what kind of life she had when borders were so important, and it was still possible to travel by air. Right now, I would not be able to go there even if I wanted to; the heat is so strong you could die. There's nothing but sand, wind and desolation; nothing will grow there. I can't believe that used to be a thriving land so long ago, it seems crazy to think how much the world can change, and how it was possible for humans to devastate the land so much. But here it's another story, we have an easy and happy life and we don't depend on much to survive, but we do depend on each other.

Now it is time to wake up my kids. I was lucky to have twins Anna and Antti, so I didn't have to go through the same situation twice. I have always been a strong independent woman and I don't believe in marriage and love. But I had always wanted children, so at 29 I put my name on the list of women looking for a sperm donor and a month later I had a date to go to the clinic at Hakunila. I decided to go with the most real possible experience and I was given a list of candidates who kindly donate sperm to women like me. I chose the baker's son, he is a healthy man my age and we had the most compatible genes. Now my kids are 3 years old and soon they will start learning about the world. But for now, I take them to the community house where the elder women take care of children. Children learn about the environment at a young age. All members of the community have to go there and teach at some point. It is part of the community's governance. To belong to the community, you have to work for 2 years providing a particular service and then we rotate. At the moment my Father is the "Aabo", which means he is the leader of the governance committee, and he is the one who communicates with the other community heads as well as the mayor of Vantaa, who at the same time is selected by the board of Aabos and serves the same time. We call this system a "Wallad".

After getting dressed, we go to the community kitchen where the people in charge of the food are preparing the breakfast. I have this task on Mondays, but today is Thursday and Mari, my best friend, is the cook. This year we didn't get to do it together because we spent too much time talking and my Father separated us. We have porridge, which has been produced locally. We grow grains such as oats, rye, and wheat throughout the harvesting months, grind them using energy from our local gym bikes, and store them to consume throughout the year. The surplus is also exchanged at the farmers markets. Our economy is not dependent on monetary value, but rather on the exchange of goods or services. Everyone has a service to offer to the community and no one is left out.

Today's conversation around the table circled around the amount of snow we got this morning. The weather is so unpredictable, and no year looks the same. The elders are still talking about when the years were more "normal" and you could predict the kind of winter we would have. They talk about when we will reach normality, if it will ever happen again. It is hard to imagine "normality;" the unpredictable is normal to me. After we finish eating, we help put the remaining waste in the communal biodigester. The kids love doing this. In exchange, we get some humus and liquid fertilizer, which we will use to feed the plants. We have five tanks in the village which get several kinds of waste and produce different fertilizers. Some get food and plant waste; others get human and animal feces. They provide all the fertilizers we require to maintain our crops, and we all get a share according to how much farmland we have. The first time I got the job cleaning out the dry toilet remains, I was angry because my Mother didn't like the idea and she always said it was a dirty job, but to be honest I liked it. It was very quiet, and you only had to do it once a month (plus it was a great and easy workout). It is not dirty at all, unlike what my Mother told me, and it is what keeps our crops so healthy. I don't understand why older generations have such a problem dealing with processed human waste; it doesn't even smell bad at this stage.

Now it is time to go harvest the crops and put them in the communal truck that goes into Hakunila. Usually we walk or use bikes, but when more people are going or when we go to the farmers market we use our truck, which runs on biogas from the digesters. At the moment I am working as the truck driver. I don't like the job that much because the idea of driving such a large machine makes me nervous, but I like to get there faster and without having to carry all the goods. It has been hard to adjust to driving, as Hakunila is much bigger and more densely populated, I get very nervous when we go in on the same lane as the tram. There are a lot of people around walking and I fear I might cause an accident. As we tank up the truck I get very excited; we have a lot to offer and it seems like I will be able to get some good products. Some of the other villagers and I have been hoping to surprise the children by getting some fish for our winter parties. The youngest ones have never tried fish, and it is a great thing that salmon have returned to the Vantaa river. This is a sign of how well the environment is doing thanks to practices like ours. Maybe I can take the kids to fish one day.

Everything is packed and now at 7:30 I am ready to go to the market. Mikko, my neighbor, has also been assigned to go to the farmers market with me, which I enjoy a lot because we are good friends. Driving from Sotunki to Hakunila is very short, only 6 minutes, but it seems as if we are two worlds apart. They have big buildings and roads, a contrast to rural Sotunki, though not quite as extreme as Tikkurila or Helsinki. It is impressive to see big constructions made of glass and steel; they are becoming obsolete because they are hard to maintain and sometimes it is better to recycle the materials. We get to the market and there are already some people getting their stalls ready; it is going to be an exciting day. Setting up is easy; we have done this many times and we know what we are doing. Soon we are set up and other people start coming in. Today I agreed with Mikko that he will stay at the stall while I look for trades. I hope to find some knitwear from the elder craft workshop where both locals and immigrants interact and get integrated while having an easy and fun job. They knit everything from wool colored with natural dyes, such as the beautiful light blue from the lupine flowers that are abundant in the meadows. I brought calendula extract to exchange for two sweaters for the kids; they are growing so fast these days. I know I can always exchange their small clothes for bigger ones down at the clothes center, but I want to surprise

Figure 20. *Hakunila Crossing of Hakunilantie and Oritie towards north in 2050. Here we can see how parking lots have been turned into areas for growing food, and as a growing forest. On the back, the farmer's market is held at the community center, where the old shopping mall used to be. We can see the tanks to store rain and snow water, which can be later used for irrigation.*

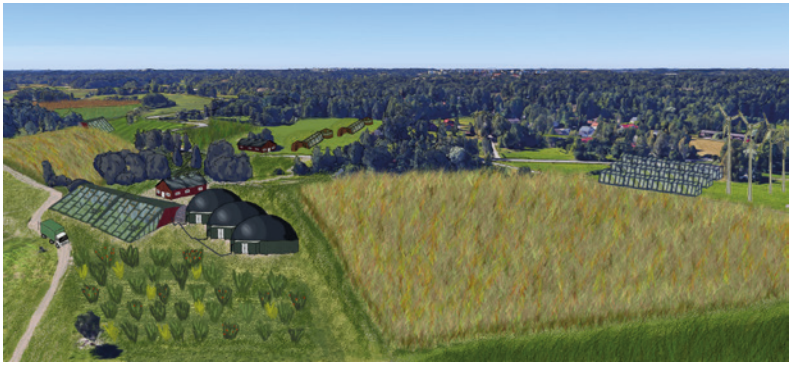


Figure 21. *Sotunki View to Sotunki from Bisajärventie in 2050. Here we have a view of the community center, a big earthship with lots of space for a diversity of activities, and the biodigesters that turn the biowaste into gas, which fuels and gives heating in the hardest months, but also creates the fertilizer for the crops. There are windmills and greenhouses on the far left side, and the plantations are very efficient.*

them, as they have been so good.

I find a good deal for the salmon, I will give them a sack of oats and two pumpkins in exchange for ten salmon. The day is more productive than I expected. I bump into my old teacher, who soon will take the kids once a week to teach them about forest conservation. She is quite a woman and I have always admired her courage. She was part of the team who helped replant a forest on the premises of one of the old parking lots after their demolition and she knows so much about nature! She used to be a scientist in a big lab, but now she retired to only be a teacher in the community; sometimes she still helps researchers and I enjoy helping her when she monitors the quality of the soil in the area. We talk about the options for the kids' education. When they start learning I have to get involved again with the school, education and the research being held by the foresters.

It was a good day. Even though people in Hakunila grow their own crops in their communal gardens, we are still producing more than them. Coming here is always good to see what they are growing and if they have implemented new systems. They have rain barrels and pipes, so they can use water from rain and snowmelt to water their crops; this prevents runoff and reduces demand for treated water. We've traded everything we wanted to trade, and packing our winnings in the truck takes the rest of our energy. The way back home is quiet; we are both exhausted.

After going to the communal house to unpack the truck, it is time for me to go the greenhouse to take care of the plants. It is quite an easy task most of the time, as a lot of systems are self-regulated. I need to refill the fertilizer and water tanks, and then I make sure that the plants are looking good and get rid of dry leaves, which I will put into the worm compost. The children come with me to the greenhouse; they are too young to help but they love playing around and they start learning about plants from a very young age. In addition to our greenhouse, there's a small garden inside the house where I grow some herbs and things to make infusions and some natural remedies. They are mostly for personal use, but this year the crop was good and now there's so much growing that I will dry them and take them to the communal house where they can be used to make herbal remedies. It is not much, but it sure will help and I will get some essences for the sauna. How I wish I could go to the sauna today, but I am too hungry and too tired already.

It is finally time for dinner; I am too tired to talk to anyone and can't wait to get to bed. I eat quickly and I head home early. Tonight, my Father will help put the kids to bed and tell them a story about the old days. It is good to have him around.

An Unequal Future

Narrator: A 30-something technology professional in an automated Hakunila, living in a four-person flat-share and working remotely.

In this scenario, technological development and global trade are cornerstones of the economy and society. The government sets environmental, social, and economic policies to ensure that, even as technology and business continue to develop, the environment and individuals are not left to the mercy of market forces. Citizen involvement in their community continues in an ad-hoc fashion. Municipalities plan using ecomodernist ideals (Figures 22, 23).

I woke up this morning to the sounds of my favorite musician from Korea playing out of my Sony mobile phone. I've never met the musician in person, but we communicate online and collaborate on new music from time to time. Of course, we didn't collaborate on my alarm tone - that would be tacky - but she seems like a nice enough person. Or he. It's difficult to tell over the internet.

I slide out of my bed-- designed in Finland but manufactured in Russia, where fiber is now grown sustainably, and robots are available to make the metal springs. My apartment automatically fades on the lights-- high efficiency LEDs-- and controls the color temperature to simulate the sunrise. Outside, it is the coldest day of this winter, -10˚. In my apartment, it is a comfortable 18˚. The heat was generated weeks ago from gas produced by our sewage, but the unpleasant work all happens in the waste facility in Viikinmäki. My building, constructed in the 1970s, has been retrofitted to increase interior thermal mass and isolation from external conditions. The new facade is much more stylish, and art from international artists encourages the community to maintain it. My windows are three layers of glass; the exterior layer is solar glass that generates enough electricity during the few daylight hours to run my apartment's automation control system. During the summer, the windows generate enough electricity to open and close vents and moderate the indoor temperature. Due to climate change, summers get up to 35˚ and sometimes I need to run the air conditioner to keep from melting into my cork flooring.

Before I can function as a person, I need coffee. Coffee is still the fuel that makes civilization happen. I cross the generously sized 40 square meter common area to the kitchen. My housemates aren't even awake yet; we are awake in varying shifts. Today I can work remotely, and don't even have to get dressed if I don't want to. The internet in our building was upgraded ten years ago to be reliable and fast. That took a government order to do, since the majority of the building's residents are over 70 years old and don't see any point in improving an apartment they will soon vacate.

The apartment, having detected that I am awake, has already started the Italian-made coffee maker. It grinds fair trade Sumatran beans, packs them into the group, and regulates the temperature and pressure of the water to brew exactly the cup of coffee I like. It's ready as soon as I get to the kitchen, and I stand at the counter to drink the coffee without having to do any high-level mental processing until I'm caffeinated.

I contemplate my exotic kitchen in a half-awake stupor. My countertops are granite, mined and polished in Finland, but my cabinets are made of sustainably logged hardwood from Tanzania. My pots and pans were made by robots in Romania, from metal mined in Norway by other robots. My furniture, designed by Finns (I am a patriot, after all) is recycled acrylic and made in the UK by a French company. It was expensive, but everything in the room will last at least fifty years-- the warranty period required by the government to stop the planned obsolescence craze of the 2000s. When we're well and truly done with it, it will be hauled to Vantaan Energia's trash-to-energy incinerator and turned into enough heat and energy to sustain my four-person commune for a week.

The first of my flat mates emerges from his noise-isolated room. He is about my age and has a full-time job (20 hours a week) in the second-hand store in the shopping center nearby. Mostly, he says, that means talking to elderly people and drinking coffee. He won't leave for work for another four hours, but he likes to take the dog to the dog park for an hour every morning.

I tell the kitchen what to make for breakfast and return to my room to get dressed. My clothes are made of Egyptian fiber, but designed by a Finnish company and made in nearby Tikkurila by-- you guessed it-- more robots. I work for the company that designs those robots, and I need to be "at a meeting" in about an hour. I put on a pressed shirt and blazer, but stay in my pajama pants. The webcam only sees from my chest up anyway.

The dog wanders in, lazily checks out my room, and then goes to the kitchen

to receive food from the automated feeder. His food is supposedly chicken-flavored, but meat is printed in a laboratory these days, so who even knows what a real chicken tastes like. The government issued a cruelty-free mandate over a decade ago, and my family was vegetarian even before that. It's easier and cheaper to buy things grown in places with the least water stress-- vegetables (grown in Holland, Kenya, and Costa Rica) and grain (France, India, and China) than it is to by lab-printed sustainable meat (Kerava).

I eat the breakfast my kitchen cooked. It's delicious.

I go to my room and fold my bed into the wall and then fold out my desk from the bottom of the bed. My computer starts up, interfaces with the apartment, and adjusts the lighting in my room to a warm afternoon color temperature. I log in to my company's VPN and sit through the meeting patiently, then spend another couple of hours creating maintenance plans and ordering replacement parts to be printed in Myyrmäki. I then log off, close my computer, and order the kitchen to cook me lunch.

The kitchen informs me that we are almost out of potatoes. I could order a drone to drop some off, but it's a clear day outside and I might as well enjoy the limited hours of natural sunlight. I put on pants and a winter coat, and head out to the local shop.

There are no more cars in central Hakunila, but the neighborhood is very pleasant even in winter, so I don't mind walking. Lighting is good, and the new towers were built without corners to avoid blind spots. There are no private yards reserved for each building, but all green spaces connect and flow between each other. Kids play rambling games of tag between the buildings. I walk under trees, on a path created from recycled granite products. The lighting is powered by solar panels in Spain, or maybe wind mills in the North Sea.

Usually there are plenty of birds and squirrels in the area, reminding us that we came from the woods even if we live in modern apartments, but the morning's frozen rain has driven them all into their own homes. Only a crow is still out, trying to figure out how to get into the bins. He won't succeed; the bins are sealed until the collection robot comes to replace the bin with an empty one. The filled bin will be loaded into a truck and taken either to the trash-to-energy plant or to the biowaste digester at Ämmässuo, to become heat and organic humus, which will then be added to Finland's potato fields. Potatoes… I have to remember to buy potatoes...

I pass one of my neighbors, wrapped in so many clothes that I can hardly tell who they are. I say hello anyway, just in case they're someone I know, but I don't know most of my neighbors so it's unlikely. I know my flat mates, and my Mother lives in nearby Sotunki. I know some people from the gym. Otherwise, most of my socialization happens online.

I walk to the end of the row, through the buffer layer of trees. The trees prevent the noise and pollution from the transit system from reaching our living spaces, and also provide a space for rainwater and snowmelt to sink into the ground. It also sequesters carbon left in the atmosphere by generations passed, so maybe one day we will return to the Eden of pre-Industrial times. Maybe not.

I hop on the tram. The tram is more of a light rail train, shiny and modern and always clean. There is no driver, but a dedicated circle of grannies rides the tram around during the day and makes sure the youth understand they are being watched. They are armed with smart phones and often post public videos of misbehaving youth, so parents will be aware of what their kids are doing. Luckily, there is enough digital entertainment for young people as

well as the sports center for youth who aren't interested in computers. I used to wish for a movie theatre when I was young, but now I can stream anything I want to the television in the common area of the apartment, or to the screen in my room (and then I don't have to wear pants).

The tram goes all the way into the shopping center, so I step from the tram onto an indoor platform. Downstairs is a large Walmart-- it used to be a Prisma, but then the Walton family purchased it about ten years ago, and now we can buy whatever they want us to buy, but very cheaply. It's a good fit for Hakunila, because most of our community chose to live here because they don't make a lot of money. The only limitations on what I can buy here are my wallet (my primary influence) and the government policies on imports. The government has specific regulations on what kinds of products can be sold, according to the product's environmental impact and the social conditions under which it's produced. In my opinion, this is fine, but my Mother regularly complains that she has to pay more for fair trade coffee than she did two decades ago, when it was still possible to buy coffee grown by slaves in a country with no social protections. Justice isn't a priority for her, but I'm glad the government stepped in. Many countries did this, particularly in the EU, and now we don't have to worry about supporting warlords, gangsters, sweatshops, or child labor.

I do miss Pop-Tarts, though.

I choose instead to go up to the second floor, where the automated kiosk is. I don't have to talk to anyone in order to buy a bag of potatoes, after all. I type my product name into the kiosk screen, choose a variety of potato, and give my fingerprint to confirm the payment from my bank account. Behind the kiosk, in the shop warehouse, a robot retrieves a bag of potatoes and shuttles it up to the kiosk, where it passes through a chest-level door via a rolling belt. I take my potatoes and go back downstairs, passing dozens of people who chose to go to the shop the old-fashioned way and talk to actual human cashiers. Some people still don't trust a robot to pick their produce, and that's okay.

The shop crowd is the portrait of ethnic diversity, but most of us are in the same socioeconomic bracket. There are some luxury apartments in the area, and a row of hipster-friendly townhouses on Lahdentie, but most people with a high income own self-driving Audis to take them wherever they would like to go-- including nicer shops, cleaner gyms, more upscale restaurants, classy pubs-- all of these in other neighborhoods. But they can't use their fancy cars in Hakunila's old center, so they tend to live on the outskirts. Their children attend the same schools as everyone else's children-- the schools are all pretty much the same in every way-- but they can go out of the neighborhood to socialize. They probably go to a real movie theatre.

Okay so maybe I am still dreaming of a real movie theatre after all. Perhaps I will start one. Businesses are very easy for individuals to start, but the competition is global and it's often very stressful. Perhaps I won't start a movie theatre.

I get back on the tram without having to step outside at all, which is fine by me. The granny patrol greets me by name-- I don't remember any of their names, so I say 'Hello friends!' and politely listen to a story about knee surgery that happened two decades ago, before routine surgery was automated, and back when replacement parts were built to order in a specialty factory in France. It sounds dreadful. Another granny is going to have a modern, automated knee surgery, and is receiving a replacement joint which was 3D-modeled from an MRI of her own knee and printed in the hospital in Tikkurila. She doesn't even have to go to a full hospital, but she feels hospitals are somehow

Figure 22. *Hakunila Crossing of Hakunilantie and Oritie towards north in 2050. Here we can see parking spaces turned to be forests. Some earthships are blend in these young forest areas. Road surfaces are semi-nature to continue green functions. Cars are pushed put. New round buildings have been a new characteristic of this area.*

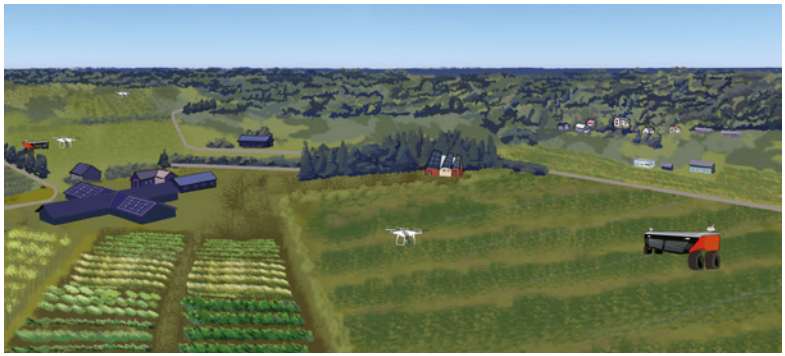


Figure 23. *Sotunki View to Sotunki from Bisajärventie in 2050. Here we see old building structures have been retrofitted. Brand new buildings are small scale structure. Drones and robots are part of future agriculture.*

better than local clinics.

The tram is unusually crowded, which is when I realize that I accidentally got on the tram going in the wrong direction. Instead of going back down the old main road, it turns left from Kyytitie and tours through Nissas, a sleepy residential neighborhood of corporate-owned apartments. The tram is full of tourists, some from Finland and some from abroad, on their way to Sipoonkorpi to see the rare spectacle of untouched nature. I'm not a fan of that sort of thing, but there are places where the climate has destroyed the ecosystem or where everything has been paved over, so there are people who must travel to experience such things. I'm lucky enough that I experience that when I leave my apartment, whether I want to or not.

Lots more young adults board the tram here with sports gear, going to the sports center on the border of Sotunki and Ojanko. The tram tours through Sotunki, where merrily-lit single-family houses dot the hillsides and robot-farmed fields separate one side of the valley from the other. The residents of Sotunki have very little to do with us, except when they take the tram into Hakunila to visit the shop or continue on to Tikkurila. Most of their errands, in theory, could be done by drones or by using private cars, but they're an odd group of hippies and seem to prefer the more ecological tram. They have a shared driverless car that they can summon to take them on particularly long or cargo-heavy trips. I guess people whose livelihood is agriculture never really leave behind their concern for the land.

The tram makes it back to Hakunila eventually. I leave the tram and walk through the former carpark, now forest. The crow is gone. The towers have lights in only a few windows. Many of my neighbors have taken the tram to Tikkurila to do fun things, or from there they've taken the train to the center for an evening of drinking and a night of probably more drinking. I could do the same, but it's not really my style. Instead, I ride the lift to my apartment and walk into the common room to find it covered in flat mates.

Two of my flat mates are unemployed. They wake up late, they spend most of the afternoon producing videos of the dog to post on the internet, and then spend the evening playing video games. Sometimes, they don't leave the apartment for days. When we first moved in together through the apartment trade program, I tried to push them to go out and get "real jobs" but as time went on, I realized they were probably not particularly welcome in a highly-competitive economy. It's not that they are bad people in any way, just that they aren't good at capitalism. But they don't hurt anyone, and they're fun to hang out with, so they're very good at being flat mates. It's not so different from what people in my grandfather's generation did, except in my grandfather's generation, they used their government support money to buy alcohol.

My flat mates told the kitchen to make macaroni casserole and are now eating it drenched in ketchup. We stream half of a season of The Simpsons, passing around our one set of VR goggles between episodes. We're not wealthy enough for everyone in the house to have their own pair of VR goggles, so the rest of us have to watch on the regular thin-film screen mounted on the wall. It's very retro-2020. It has been suggested that we listen to "the wireless" to make the retro experience complete, but there hasn't been even one radio station for twenty years.

At almost midnight, the dog interrupts us and demands to be taken out, so I do a quick circle of the area. More people are home, but it's the enforced dark time to accommodate bats, flying squirrels, owls, and nocturnal insects. They are busily attending their natural processes, turning tree waste into humus and eating garbage and spreading seeds. I can hear them, but

not see them-- the path lights are hooded and dimmed, and the windows are all automatically darkened. Hakunila is the animals' territory between 23:00 and 04:30.

I go back in with the dog. It goes immediately to sleep on one of my flat mates' beds. I take a shower, brush my teeth, and then go to my own room and fold the bed out of the wall. This was a pretty good day. I set my alarm and climb into bed. Tomorrow, I will decide whether or not to start a movie theatre business.

From Materialism to Mental Development

Narrator: A 74-year-old lady, who worked as a landscape architect in the City of Vantaa. She lives in Sotunki with her farmer husband. They don't have their own children, but they have worked as foster parents for two girls, who have already grown and left home to study.

This scenario aims to reflect living in a degrowth society, in which the administration on many levels lead the society to decrease production, consumption and human's harmful impact on nature. The emphasis of living moves towards mental development and a local, stationary life, instead of consumerism and world-traveling (Figures 24, 25).

It's interesting to think about how the world has changed in my lifetime, for example technology and consumption. When I was a child, computers started to become more common. Then came mobile phones and all technology started to develop faster. Flat screen TVs, smart phones, self-service checkouts, drones… I can't even remember all of the gadgets we had. Somewhere along the line, technological development crossed the limits of wisdom into the absurd. We had coffee makers integrated with mobile phones, dysfunctional solar roads, and of course battery-powered machines to froth milk that fit in your handbag, so you could froth milk on the bus if you wanted to. In the 2010s climate change was finally accepted as an unavoidable truth, and the end of reliance on oil was closer than ever. Huge amounts of carbon, in the form of oil, coal and natural gas, were moved from the ancient and stable storage of soil to the atmosphere. The news became an evening review of new environmental catastrophes. Micro-plastics and contraceptive hormones caused destruction in water ecosystems. Even sand almost ran out, used up by the construction industry. Biodiversity decreased while the number of humans increased, and at the same time natural areas shrank due to new construction to house the new humans. Cities grew and expanded. Outside the cities, the countryside and natural areas suffered the impacts of our demand. It was a decade of harsh contradictions: we knew that the direction of development was wrong, but consumption increased anyway, driven by self-interest.

At the beginning of the 2020s, things started to change. I was then in my 30s and I first noticed that almost all younger people were vegetarians. I, too, was worried about the environmental impact of my food, so I decided to follow their example. It was easy, because vegetarian food was already served everywhere in daycare centres, schools, restaurants, and also in my workplace lunch cafeteria. Cooking magazines were full of vegetarian and vegan recipes. Of course, there were some lifestyle beef eaters, but it went out of fashion. Then the Greens won the parliamentary election in 2019, and in the same year, leading food specialists changed official guidelines for nutrition to favor even more vegetables. Consequently, the government of Finland decided to serve only vegetarian food in daycare centres, schools, and government workplaces to save money and the environment. Half of all adults were overweight, so the decision was a good start for improving health as well.

Looking back, it is easy to see that decision as part of the social continuum, which started a long time ago when environmental education entered the daycare and school curricula. Early education gen-

erated the enthusiasm necessary for such a big social change to happen when the children became adults. Like the prohibition of smoking in restaurants in 2007, the change created public conversation, but it subsided quickly, and people adapted to the new situation surprisingly well. Later the EU stopped subsidies for cattle, and the carbon tax was introduced to add the price of carbon emissions to meat and milk products. Meat and milk products became a luxury that we eat only on special occasions, and the number of beef cattle eventually decreased. In my home district of Sotunki, few of my neighbors still have cows, sheep, goats, and horses, because the EU has an ecological subsidy to support pastureland for their biodiversity. Animals work also as tourist attractions for agritourism farms. Sheep and horses are so beautiful in the Sotunki landscape and I'm happy that visitors of Sipoonkorpi National Park can also enjoy seeing them.

Vegetarian food was a good and easy start. The changes in traffic were a bit more complicated, and inspired strong opinions. I worked as a landscape architect and a city planner in the City of Vantaa's Department of Land Use, Building, and Environment. We conducted the "Car Free Capital Region (CFCR)" project, which involved the cities of Helsinki, Espoo, Vantaa, and Kauniainen. Together, we studied strategies to reduce traffic and related pollution. When the final decision of the project was announced in the third quarter of 2027, it made international news: the capital region of Finland would become the largest car free zone in the world. The only vehicles allowed into the capital region would be delivery trucks, emergency service vehicles, and public transport vehicles. Planning and preparation took six years and the first trial was started in Helsinki city center in 2033. Then the transitional period took five more years.

Later, when the whole area had public transport service by commuter trains, trams, metro, and electric and biogas busses, freight transportation shifted to the public transport network as well. This change helped to increase the utilization rate of public transport, because before the change, commuter trains were almost empty during the day from 11AM to 15PM. Vehicles have compartments and cars designed for freight. Because public transport doesn't have stops in front of every store, it is common to see transporters walking with trolleys on the street. The idea of freight transport is based on the Lean philosophy, which means that we shouldn't keep a large stock of items at the point of purchase, but transport the right amount of goods to the right place at the right time. Less dispersed storage made for lower heating costs and increased available floor space, so shops seemed larger but were smaller in total square meters.

I feel that taking private cars off the roads made citizens of the capital region more equal. Before, we privileged people slowed down traffic and took up space with our private cars, but now we all have quality public transport and we must all be able to look each other in the eye. My commute by tram to Tikkurila or a visit to Helsinki by light rail takes only as much time as it took before by car, even without a traffic jam. Of course, the ticket still costs a little money, but I think we all enjoy the cleaner and more silent environment. I am happy because I don't need to worry about maintaining or repairing my car and changing tires twice a year. Also, I don't need to buy insurance for my car anymore, and the number of traffic collisions has decreased dramatically.

The CFCR project and subsequent car-free policy released a lot of land from use. Motorways and parking lots disappeared. One lane of the motorway to Lahti and Ring Road III were repurposed into light trails. Additionally, parking lots became green spaces. Land use was re-planned with the influence of landscape architects, geographers, sociologists, biologists, environmental scientists and the general public to create the most livable possible

paradigm. I remember it was such a rewarding job, where we could learn from each other. We decided to have only one high level park in each district and all other released areas were returned to nature. Old pavement was ripped up and sorted for reuse in other applications. Aggregates were also removed and reused, and the ground was reshaped to look more natural. The advice of environmental scientists and biologists was to allow the Finnish Formula 1 driver Kimi Räikkönen's strategy to be employed; when Kimi was guided via headphones during the race, he answered: "Leave me alone; I know what I'm doing." Similarly, all the land under the roads and parking lots was left alone to be restored by Mother Earth herself. This benevolent abandonment started in 2034; sixteen years later, there are still only small birches, willows, aspens, bird cherries, smaller pines, and spruces. One very nice thing was when the Sotunki Nature School started to study these succession areas with children and curious adults. Now everybody can read from their website about the re-emerged species they found there. I hope we have learned that even though forests can be easily and quickly cut down, it takes a long time for a real forest to grow again.

In 2036, the domestic production and importation of daily consumer goods was restricted by the government of Finland, because there were serious requirements to decrease consumption and the amount of waste. For example, meeting the demands of Fair Trade and environmental standards were required for imported daily goods. Other restrictions related to decreasing the wide variety of wares sold in grocery stores, which was one of the main causes creating pointless waste and traffic. Now there are only two to three ketchup brands in grocery stores, instead of the seven brands that were there previously. I don't miss them because, in any case, I used to buy that one brand I already knew. Of course, one could say that, "variety is the spice of life," and that is why they were initially originated. However, most of us think that wide varieties aren't worth destroying nature for. This change caused larger consequences as well, when the huge hypermarkets located on the fringe of cities disappeared. They were based on wide variety, but basically the variety included just many brands representing each basic product and only few special products, which weren't sold in smaller grocery stores. Eventually, the change led to smaller grocery stores, but the number of them increased. Now we have many small grocery stores in every city district of Vantaa within walking distance for everyone. They are no longer full of different kinds of beer brands like neighborhood small Siwas and Alepas were in my youth. Instead they improved their variety of daily goods. In Sotunki we have three grocery stores now, instead of only one previously. It made life easier and simpler, because we don't need to spend a lot of time in huge hypermarkets anymore, first trying to find the ketchup, and then secondly trying to choose the best brand. It was also one step toward a more local and stationary life, because it reduced the need to travel. At the same time, it decreased the amount of freight traffic.

In 2031, member countries of the Organisation for Economic Cooperation and Development (OECD) decided to stop mining new metals, rock materials, and fossil fuels. It was another turning point, which no one could have imagined in the 2010s. Before the decision, when the result of the conversation was still uncertain, a famous cartoonist drew a cartoon presenting the globe after a hundred years, where humans had mined down the Alps and other big mountain ranges. However, in 2031 poor Mother Earth was full of pits and deep tunnels, but luckily some untouched ground was still left. We had to cope with those metals and rock materials we had unearthed onto the ground. Metals were not such a big problem, because they can be reused over and over again. Recycling of metals was made more effective and all unused metals were taken in use. New techniques were developed to sepa-

rate different metals from each other, and sorting was also considered from the point of the production of new goods, as well as from the point of recycling, to make it easier. The use of metals became more effective and consequently we don't have metallic furniture anymore, because furniture can be made of wood or other renewable materials. I understand the pain, when some architects cried, when the copper handrails at Finlandia House were replaced by wooden ones, but maybe it was necessary. The recycling of rock materials was also started, and old artificial fills were sifted. It is still more complicated than recycling metal, because pieces of rock are ground into smaller and smaller pieces over time, until you left only with useless dust. However, the use of rock materials decreased when traffic reduced.

The importation of oil and other foreign fossil fuels to Finland stopped finally in 2035 and nuclear power plants in Finland stopped at the same time. The oil didn't run out, but the rest of it is saved for use to meet the most critical needs. Domestic decentralized biogas production was already running at full pace. In addition, we had domestic and foreign wind and solar energy, as well as geothermal heat, but together they were used to manufacture less energy than before. For example, the City of Vantaa limited the room space per person to 25 square meters to save energy. To help change living habits, the city

Figure 24. *Here we see Hakunila, which has changed more than Sotunki. There are only busses and trams on the roads and the curbsides grow meadow instead of lawn. The parking lots are now forests or vegetable gardens. Inhabitants are not self-sufficient in food production, but gardens help them maintain their relationship with nature and ease their subsistence. All the lowest areas between watersheds were changed to forests to collect and purify storm waters. There are now much more inhabitants than before because of climate refugees. Only a few new, low apartment houses have been built, but people live denser than before. While the area needed for living is smaller, and there aren't any private cars, paved areas are also smaller and life is getting closer to the nature. The biggest change is the renovation of the apartment houses. The ideas for that were collected from inhabitants by the Hakunila International Organization, which is an active player in the area. Then the renovation project was made in cooperation with the joint-stock property companies, the City of Vantaa, and the Hakunila International Organization. Now apartment houses are painted with warm, earthy colors, which also made the atmosphere of Hakunila warmer and happier.*

started a project which supported local associations to find the best solutions for living. The purpose was to increase local empowerment, because it benefits all parts of society, while one-sided top-down policies often only cause harm. For example, the Hakunila association established dormitories in old apartment houses, which were popular especially with the youngsters and the elderly, who now enjoy a more social way of life. Some apartment houses just made some of their apartments smaller for those who like to live alone or with a partner. Personally, I lived with my husband and his parents in a one-family-house in Sotunki. We shared the kitchen and living room but also had our own rooms. When granny and grandpa died, we worked as surrogate parents for two children, whose parents had problems. We didn't want to have our own child, although all couples could have one, because we knew that the size of the population is the biggest problem of the world. That's also why all states have restrictions in relation to the number of children couples can have. Nowadays, in 2050, the number of people is really decreasing around the globe and we are happy about that. I am also so happy that I got the opportunity to enjoy parenting. Leena and Anni are both studying now, and their future seems lighter regarding the current state of the environment, in comparison to the environmental situation we went through in the 2010s.

This decentralized biogas production is such an interesting thing. Our generation demolished many of the great achievements of the 20th and 21st centuries, like the sewerage system, which dissipated fresh water to be used for washing toilet bowls, but the system was material intensive and inefficient. Now all houses have their own biogas plants that convert our waste, such as feces and organic waste from our foods and gardens, into natural gas. All kinds of biowaste are currently very valuable, because we need them to produce heat, electricity, and biogas fuel for vehicles. Even the problem of dog poop on the streets has been solved now. In the countryside, where the public transport isn't profitable, all private cars use biogas or electricity. Farmers are also the main producer of biogas for vehicles. Here in the city, many housing companies and dormitories have signed contracts with the City of Vantaa, and their inhabitants can cut hay and herbaceous plants from certain public green areas twice a year to get more biowaste. All open and semi-open green class A2 and A3 maintenance areas have been changed into meadows, whereas previously there was only a boring lawn or a few rowan or linden trees. Today those meadows are full of flowers, and butterflies and other insects. Cutting and collecting the hay has decreased the number of nutrients in the soil and old traditional plants got a new chance to grow. Cutting the hay is also good physical exercise for many people and so reasonable while biowaste furthers their self-sufficiency in energy production. All those nutrients are accumulated to the final sludge of gasification and it is a very valuable soil enrichment, which is used in communal gardens and agriculture. Then the biowaste is transported to the countryside, such as Sotunki, where it is transformed into fertilizer for our crops. Because nutrients aren't mined anymore, and artificial production of nitrogen consumes too much energy, it is important to recycle them as well as possible and prevent them from ending up in the water systems. Our system is a closed loop system.

We don't have the option to have a lot of stuff anymore, or to compete with each other for the quantity of stuff. We don't travel by air anymore, there is no longer night time lighting outdoors, and we have given away many things which were previously important to us. But still I think the quality of life is getting better all the time. The way of life is slower and the "hurry feeling" has almost disappeared.

Because work is almost as profitable as before, we work only 6 hours a day. All

work is aimed at improving the wellbeing of nature, to fulfill basic needs of people in a fair and equal way, and to improve the mental health of people. It led to the change in the economic structure. Food production serves more jobs, although tractors and other machines have not been totally abandoned. Simple calculations told us that if we assess the whole life cycle of machine work and compare it to human and animal labor, machine labor is less energy efficient and less resource efficient. Education for ecologically harmful jobs, like pilots and marketers, was stopped or decreased. Representatives of these fields have gradually changed their occupation to more sustainable ones. In some trades, the content of the job was changed to more ecologically sustainable activities. For example, hairdressers no longer use toxic chemicals and additionally the hairstyles have changed to more natural styles. At the same time the production of luxury, high consuming and ecologically harmful products like luxury cruisers, furs, and jewelry are slowly being reduced in number and amount, because of government sanctions for socially horrible and high-carbon products and imports. Also, advertising was forbidden, because its aim is mainly to create more unsustainable needs by manipulating people

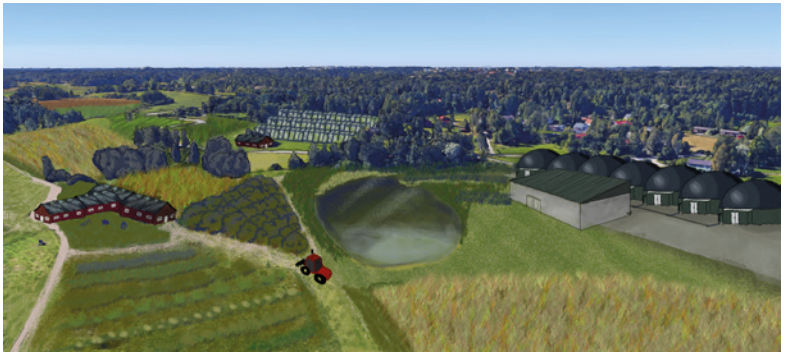
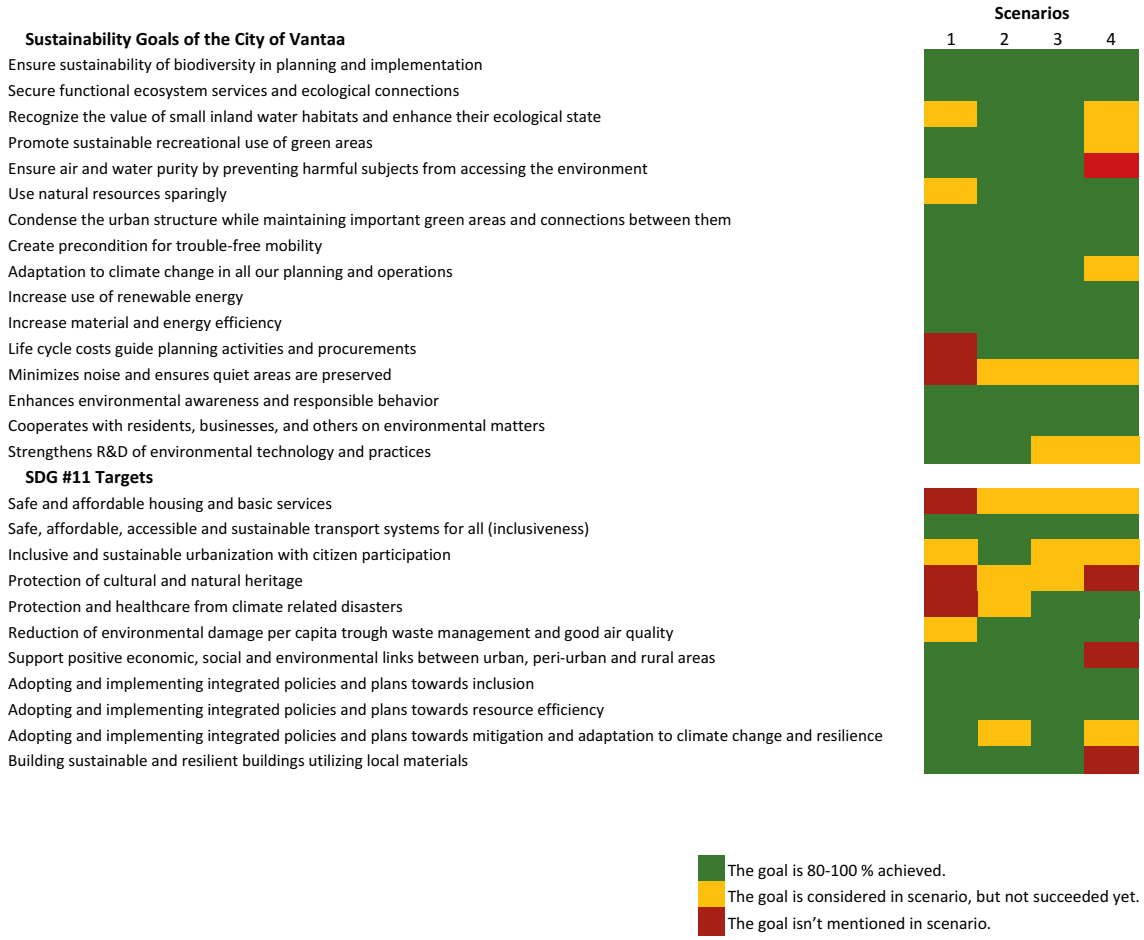


Figure 25. *Here we see a beautiful view to Sotunki, which is still agrarian and close to nature, because there are many culturally, historically and environmentally valuable areas. Biogas busses replaced private cars on the roads. The fields are a little bit smaller by area, because settling pools and wetlands take their place filtering and retaining nutrients. Wetlands are important habitat for many birds and insects, which have improved the biodiversity of the area. The waterfront border strips of the water system are ten meters wide, instead of three meters previously, and small forests are growing there. Depending on work, you can see biogas tractors or people and horses working on the fields, which is of course a big change compared to earlier, when bodily work was almost forgotten. At the same time nature tourism is more visible in Sotunki's current landscape and small businesses have grown around it. Sipoonkorpi National Park attracts visitors from the capital region, when people spend more time in nature. But maybe the biggest change can be seen if you have the possibility to peep inside the houses and their gardens. There are more people living in houses and one-family-houses have larger vegetable gardens than before. Many of the households are self-sufficient in food production while in denser built areas the households are only partly self-sufficient.*

Table 4. Assessment of scenarios.



with unfairly. The amount of paper and digital waste decreased heavily, and also landscapes became more beautiful without those big advertisement signs. I think nobody really misses those visual pollutants anymore.

While people had to give away so many things, the main question was what would replace the materialism. The answers were education and mental development, which could satisfy the higher levels of Maslow's hierarchy of needs than pure material needs. I guess it stretched teachers to inspire people to find the joy of learning and of mental development. Finnish society improved the education of teachers, and from 2025 to 2035 educated twice as many teachers and psychologists than in the 2010s to reach the goal, and I think it worked. While we have more free time, we really need reasonable action like physical exercise, arts, philosophy, history, psychology, and nature and outdoor activities.

Afterwards everything seems to be crystal clear, but I really need to write a whole section about why the governance of capital region cities was ready to make big changes like the car-free zone, and why states were finally ready to reduce the consumption of natural resources. Those goals of sustainability were written into their strategies for years. For example, you know those goals of sustainable development by the United Nations, which touched every nation. And at a lower level, for example, the City of Vantaa wanted to be "a city that acts as a trailblazer in sustainable development" in their environmental policy for the years 2012-2020. In the same paper they told that they wanted to ensure "good living conditions for present and future generations," and also to take ecological perspectives and fairness into account in solutions and decision-making, but also keep the economy balanced.

Then some environmental disasters happened around the world. India experienced extreme air pollution that served as a warning that the earth cannot simply absorb everything that we add to it. New studies proved the same thing: everyone is affected, whether or not they are the polluter, and one person can mess it up for everyone. Governance everywhere in the world just had to change their ranking order and put the environment before their economy, because we are all primarily dependent on nature. In Vantaa, for example, the ruling politicians started to implement sustainability strategies for cities instead of green-washing and other rhetorical means.

Conclusions

As a team, most of us had never worked with scenario planning before. It was a lot of fun to write the stories and envision different futures for the area. Scenario planning is a good tool to use when trying to understand what the future can look like according to the current state of affairs, but it can be used in a variety of ways. It was especially interesting for us to understand, through our story-telling, how we could picture how current technologies can develop into other things.

While working with this paper, we understood that the future might have aspects of all the scenarios. In fact, sustainability is not mutually exclusive with any combination of economic growth or degrowth, governmental or community involvement, technology, or lack thereof. A socially and environmentally sustainable future is possible with diligent attention by all actors.

Ideally, at this point a comparative impact assessment would create a comprehensive model of each scenario and reveal which elements of these scenarios cause or prevent environmental impacts in several categories. This is not possible with the level of uncertainty in future scenario planning. Additionally, scenarios contain activities

(such as farming vegetables in greenhouses, or automating public transport) which can be performed in low impact or high impact ways.

However, because of the level of uncertainty, we assessed the scenarios according to their alignment with the City of Vantaa's sustainability goals and the UN's Sustainable Development Goals. Overall the scenarios are sustainability-driven, but they do not necessarily follow other agendas. Table 4 helps illustrate whether the scenarios are in line with sustainability for both Vantaa and the global sustainability goals.

Our green growth scenarios reflect a future in which sustainability goals, such as those put forward by the United Nations, are generally accepted as necessities. The proper goal of the green growth-movement is to decouple economic growth and environmental problems from each other, like carbon emissions, for example. A central means to decoupling is technology, which could help to decrease consumption. For example, led-lights consume less energy, and dematerialization, which could decrease material consumption, similar to how digital communication can decrease space consumption. The workable decoupling would make it possible to have both the economic growth and welfare of nature, and thus also the welfare of humanity. No state has yet succeeded in reaching perfect decoupling, yet the UN still aims to find a solution. Our scenarios present many promising technologies, which could help humanity to decrease consumption. Before the implementation of new technologies, we suggest using life cycle analysis, for example, as a tool to ensure that the new technology does not consume more than expected.

Our degrowth scenarios represent a marginal ideology, which sees the decreasing of consumption as the only truly workable means when trying to achieve sustainability. Its strength is that it would be the most effective in adapting to the changing climate and the disasters that may come with it. An increasing amount of research (e.g. Latouche 2007; Heikkurinen 2014) has shown that reduction of consumption as the only driver for change is not enough, because that effort might result in an overall consumption increase in another area. For example, buying an electric car might lead to a higher use of the car itself, thus increasing the level of consumption on cars and on fossil fuels.

One of the problems of degrowth is that people are not yet willing to decrease their consumption and compromise their living standards. However, there are real existing signs which give us hope, like the increasing trend among young people toward vegetarianism and living without a private car. Degrowth would still require both free will of the people and top-down policies to push society towards sustainability. The problem with top-down policies is the current economic models, which are focused on economic growth while overlooking environmental or wellbeing goals. Nobody knows what would happen to the world economy if the economic model shifted towards degrowth. Would it mean we would enter an era of crises and wars, or could humanity adjust to a different way of doing things? We are not able to answer this question, but we attempted to highlight that it is possible to reduce consumption and increase the quality of life of citizens through planning.

Given the opportunity to continue, we would elaborate each of the tools and strategies in the scenarios, place them in a physical location or range within the Hakunila-Sotunki area, and relate them to Vantaa and Finland overall. It is easy to see, for example, that the top-down scenarios (3 and 4) encourage a wider perspective, while the bottom-up scenarios (1 and 2) involve a strong sense of place and community identity. Our next step would be to meet with a wider sample of residents and planners of Hakunila and Sotunki and assess how feasible and realistic the scenarios are, as well as how to plan for the future.

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Commentary:

Thinking of desirables futures, imagining better cities

by Juanjo Galan & Johan Kotze

Humans´ dreams are highly connected to cities. Like no other place, cities display our values, hopes, fears, knowledge and technologies, and at the same time, are the consequence and the cause of the complex interaction of our socio-cultural, political and economic systems, between themselves, and with the environment. Somehow, cities are one of our best mirrors, or even a magnifying lens portraying our lights and shadows. It has always been like that, and it will probably continue being like that, since in the end, cities might be the logical consequence of the activity of a social and highly transformative species like humans.

Following the text “Sustainable Futures for Hakunila and Sotunki,” this short epilogue aims to frame some of the topics treated in this interesting text. Firstly, if we assume that cities are the expression of human conditions, societal values and human knowledge, what kind of cities can we envision and pursue now? Secondly, and in order to answer this initial question, we can formulate two sub-questions: (1) which permanent and conjunctural factors are affecting the transformation of cities nowadays; and (2), how can we integrate all those factors, limitations and expectations in speculative models that could help us to visualize desirable futures for our cities and, hopefully, react accordingly? Lastly, in the pursuit of sustainable cities, what constraints and potentials does nature place on urban greenspace management and planning?

These issues are not new. Speculation and future-oriented thinking have always been part of human intellectual activity and cities have usually been present in the visualization of future societies and of the formal and social structures that could foster and sustain them. From classical times to the contemporary era, philosophers, writers, scientists, artists and planners have understood the transformative potential of cities. Sometimes emphasis was placed more on form, sometimes more on function, but in all cases, the need to integrate different dimensions has always been part of the agenda of urban visionaries. Cities are an invitation to transversal systems thinking.

QUESTION 1: What drives the contemporary evolution of cities?

Due to the high concentration of technological, economic and cultural capital, cities have the potential to express - with special intensity and speed - the evolution of human civilizations. This evolution happens within some socio-cultural contexts which determine the goals, within some economic and knowledge frameworks that draw the possibilities, and within some environmental conditions that define the material and physical limits. Those goals, opportunities and limits are not static and are constantly challenged by human ingenuity.

We are currently living in a unique situation in which the very same goals of human development are being scrutinized and in which the acceptance of some global limits and the achievement of the above-mentioned new goals are supposed to define new conditions in the evolution and management of the urban system.

These new goals and limits are epitomized by the sustainability concept (and its increasing court of related terms), which are activating a potential shift of paradigms in the way in which we, humans, interact with the environment and amongst ourselves (more on sustainability later). Interestingly, reality shows some evident conflicts between what we pretend to do, and what we finally do; some clear contradictions between what we want to be, and what we are, both as individuals and as collectives. The conflict between the defiant Promethean and the prudent Malthusian awakes again with renewed

vigor.

This is precisely where the students have placed their work, in the unclear dialectics between different and interconnected concepts such as sustainability, consumerism, materialism, development, growth, etc., as well as in the values and socio-political systems that could move the evolution of cities in one direction or another.

It is particularly interesting to see how the authors apply concepts like Sustainability, Sustainable Development and Resilience in Hakunila and Sotunki and how these concepts are articulated through strategies such as Economic Degrowth, Ecomodernism, Green Economy, Agrarian Urbanism or Urban Permaculture. Their work distills an explorative character and concentrates on the definition of qualitatively different alternatives rather than on the objective identification of urban drivers or in the deep understanding of the relationship between different urban factors or dimensions. The result is a fresh text that provides an avenue for further and deeper discussions.

In addition, the text proposes a world in which technology and science are highly subordinate to a sustainability-based agenda and in which there is a general and unquestioned commitment to sustainability goals. Interestingly, this radical, even utopian, scenario can be perceived as an extreme representation of the increasing "scientification" and "ethicalization" that we might already be experiencing in urban planning and that has been highly supported and retrofitted by the use of the sustainability concept and its environmental, social and economic dimensions.

QUESTION 2: How can the evolution of cities be imagined?

Modelling is a game in which we often need to choose between accuracy and free speculation. We can know what we have approximately, we can detect some trends and then, as in a chess game, we can try to forecast some possible future moves and scenarios. The more factors and complex interconnections we have in the game, the more options we get, arriving, in complex and dynamic systems, to the point at which consistent and reliable predictions become a challenge.

Cities are one of those complex and dynamic systems. The appearance of unexpected new rules or actors in the "City game" can invalidate previous predictions. On the contrary, the existence of frameworks, like planning systems that limit the degrees of freedom of some factors, facilitate the definition of more certain futures.

This is where the students invite us to follow them in their adventurous speculation. In their particular case, they decided to restrict their options by proposing a single goal: sustainability, and by defining two variables or factors to achieve the proposed goal: technology and governance.

The combination of those two factors create four hypothetical and qualitatively different scenarios to increase the levels of sustainability of Hakunila and Sotunki: The "Tech Driven community" scenario is based in the advanced use of new technologies by self-organized communities. The "Transitional Urban Villages" scenario also presents a community-based society fully committed to decreased consumption and to the use of low technology. On the other hand, the "unequal future" scenario illustrates the intensive use of technology in a policy driven society to achieve "green" economic growth. Finally, the "from materialism to mental development" scenario describes a shrinking economy in which the low use of technology and a policy-driven society produce a sort of extra planned and decentralized system.

The four scenarios are described in a narrative style and between the lines, include some contextual information about the possible catastrophic or extreme events that could have led to a radical change in the life style of the inhabitants of Vantaa and in their approach to technology and governance.

The "scenarios" method, together with the chosen narrative style, proved to be a productive and inspiring way for the authors to develop their visions for future Hakunila and Sotunki, which in this case, prioritize open speculation over accuracy or methodo-

logical consistency. However, the text can open a constructive discussion on the importance of identifying the different drivers and factors affecting the evolution of any system that is studied, as well as of understanding their mutual interrelationships. In particular, and following the reading of the text, some key questions arise: Can sustainability become the leading goal of the evolution of cities, or does this goal have to coexist with some others? Are technology and governance the most relevant factors affecting the sustainability path? Is the emergence of more autonomous and autarchic communities and the de-specialization of labor compatible with the very essence of cities and with human history?

Again, we find that imagining the future of cities requires a deep integration of disciplines dealing with the different dimensions of human beings, with the elaboration of complex and collective systems and with the capacity of planning to create physical and functional infrastructures for cities.

Humans and the "other" nature?

One of the key issues in any sustainability reflection is the relationship between humans and the "other" nature and between human systems and "other" systems. This dichotomic separation is clearly artificial and is located right at the core of the sustainability discussion. Accordingly, the text developed by the students explores new ways for the coexistence of human beings within nature. This exploration includes the introduction of key concepts that hybridize different types of infrastructures; that approach the "other" nature from a more symbiotic point of view; or that use new tools or methods to understand the relationship of humans with the environment. Even though the role of nature (the "other" nature) in cities was not dealt with explicitly in the text, we nonetheless provide some thoughts on its role in the sustainability debate and emphasize the effects of fragmentation (a main driver in the contemporary distribution of greenspace in cities) on nature and humans alike.

Sustainability is a highly anthropocentric concept, its main goal being to sustain today's human population (and the future population) on earth. Urban sustainability aims at the modest and efficient use of natural resources, thus decreasing the ecological footprint of the city, or of people in general. At the core of sustainability is nature (the "other" nature), especially its ability to provide ecosystem services. Cities of the future will depend heavily on existing greenspace within its borders to provide these vital services.

For nature to flourish in cities, landscape ecological principles can help guide design and planning. For instance, the single most important feature of the landscape that affects biodiversity positively in cities is patch size, followed by corridors (connectivity) and vegetation structure (Beninde et al. 2015). Not surprisingly, these features are most at risk due to a preference in densification policies (see Dallimer et al. 2011), which result in the loss and fragmentation of habitat. The issue of densification vs. sprawl is also of importance to the city of Vantaa, where the benefits of transport and energy savings in a consolidated city needs to be weighed against the cost of losing biodiversity and ecosystem services, e.g., storm water management. Fragmentation theory recommends a land-sparing policy through which fewer larger fragments are preserved at the expense of a higher number of smaller patches (land sharing), but, surprisingly, a recent meta-analysis suggests the opposite (Fahrig 2017). The optimal solution in urban areas may lie somewhere between, with both large and small green fragments dispersed throughout the cityscape with functional connectivity between them (either in the form of corridors or stepping stones). The quality and type of urban greenspace is also important to urban biodiversity, as suggested by Joscha Beninde et alia (2015). Indeed, certain natural features of urban forest, for instance, promote biodiversity and can be considered hotspots, such as dead and decaying wood and wet areas (see Noreika et al. 2015). The challenges that remain in the planning of urban greenspace for the sustainability and benefit of

nature include greenspace quantity, quality, type and spatial arrangement, to name a few.

Urban greenspace provides a plethora of services to people. A sustainable city also includes a population that is physically and mentally healthy, and knowledgeable about nature. The increasing disconnect from nature, or as James R. Miller (2005) put it 'the extinction of experience, is a concern since it is clear that contact with nature has measurable physical and physiological benefits, even increasing with an increase in species richness in these urban green spaces (Fuller et al. 2007). However, there is a danger in exposing people to urban nature if such nature only consists of common and generalist species (Samways 2007). In this sense, urban greenspace should not only be 'sustainable', providing services we need, but also contain elements of pristine nature to be explored and experienced by the citizenry.

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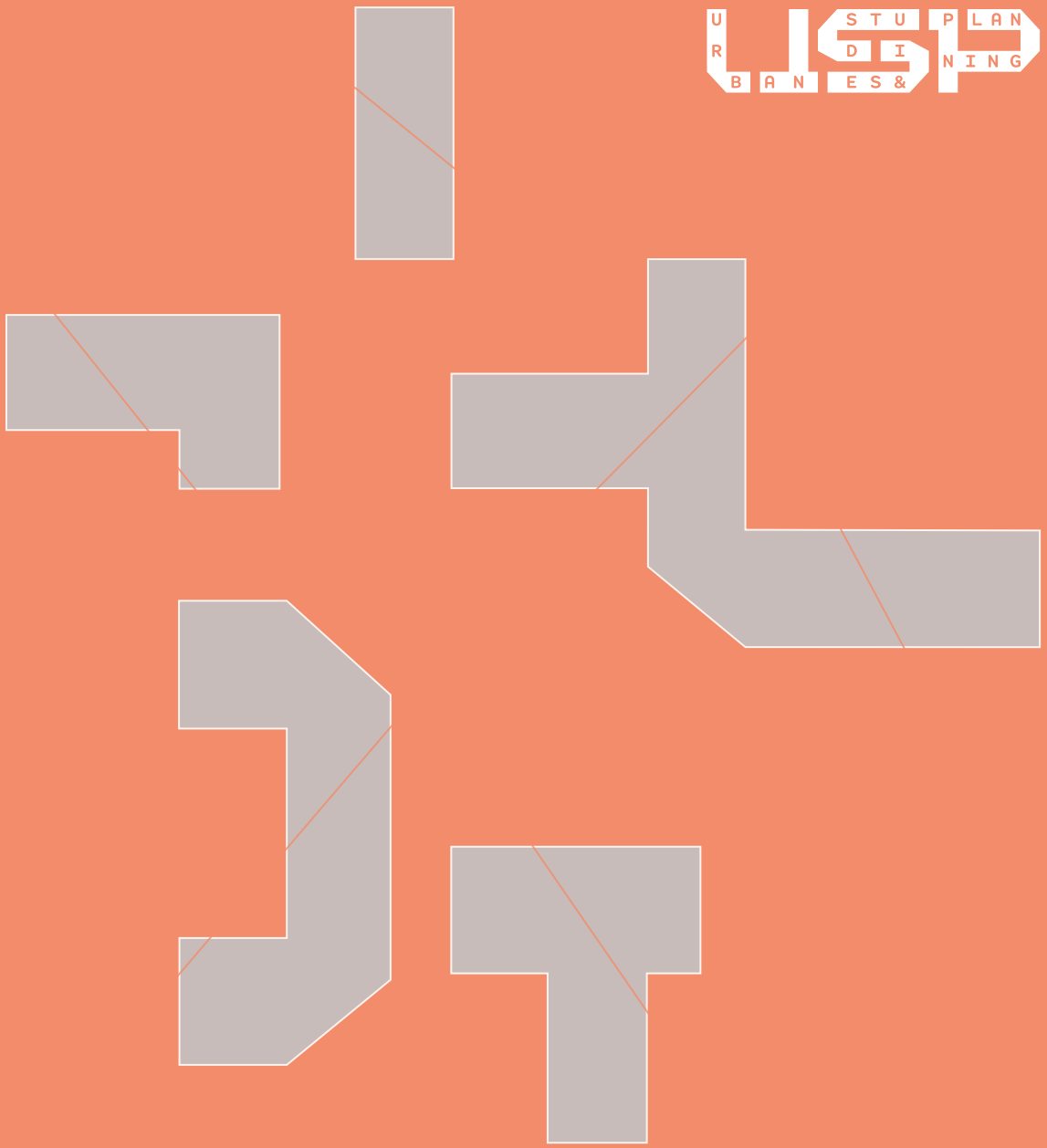
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A new turn in the development of the region?

Future perspectives on the settlement and planning in the Helsinki region

by Matti Kortteinen & Mari Vaattovaara

If one looks at the recent public discussion on urban policies in the Helsinki Region, it would seem that we are living through a period of profound change in the development of the region, a turning point that is especially affecting the position of the suburban fringe. Helsinki seems to be doing well as far as migration and population growth are concerned but the fringes that have relied on detached housing, have suffered (Figure 1.; see also Laakso 2012).

There seems to have been a drastic change in the favor of Helsinki, starting in 2007-2008, while during the period from 1994 to 2007, Helsinki was suffering from a loss of educated people through migration (Broberg 2007). A discussion on the change and its significance is important from the perspective of urban policies. At least two possible interpretations emerge, with different policy implications.

After the change was observed, public discussions emerged quite soon. They linked the development to the urbanization of people's preferences (values and attitudes) and recognized similar trends in Stockholm and elsewhere. This quickly became the predominant interpretation. The end of the so called Nurmijärvi-phenomenon (people moving to the detached fringe outside the urban region, thus decentralizing the urban structure) was suddenly adopted as an explanation, and the concept of "New Urbanism" was

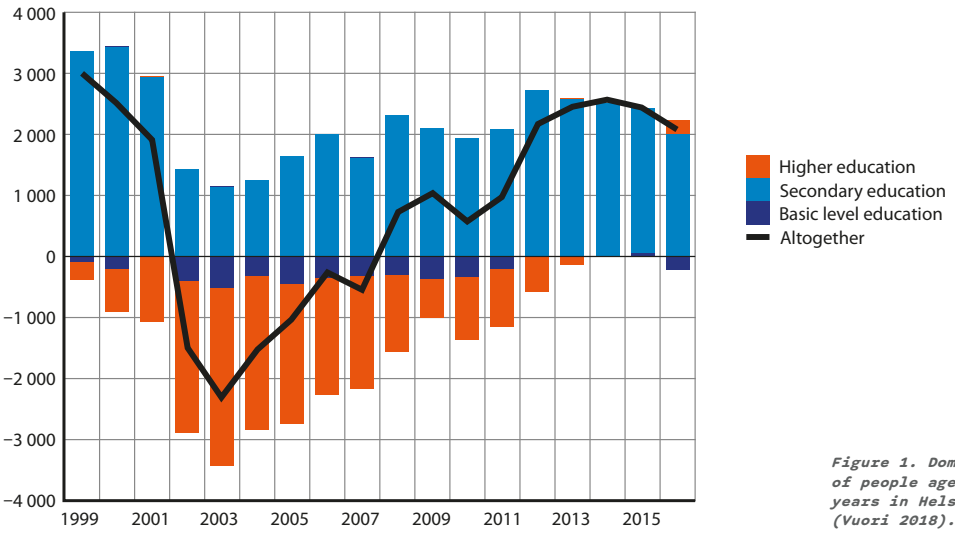

Figure 1. Domestic net migration of people aged between 20 and 64 years in Helsinki in 1999-2016 (Vuori 2018).

introduced in order to describe the change that was assumed to be a permanent new feature in the development of the region.

The argumentation was straightforward: in Finland, being the late-comer in urbanization, subjective changes were first lagging behind, and then catching up.

As to the position of Helsinki, the change and the interpretation had great significance. Whereas the city was facing a financial crisis about a decade ago, Jan Vapaavuori (NCP) the mayor from 2017 onwards could now even lower the rate of the municipal tax. As the new development is expected to be permanent, it is being assumed that the position of Helsinki within the region has permanently changed towards the better. For example, The New Master Plan of Helsinki (City Plan 2018) is based on the assumption of continuous strong growth of Helsinki up till 2050.

City growth and public satisfaction

The problem with the interpretation from a research point of view is that empirical evidence on a major change of people's orientations is scant or lacking. The official National Inhabitant Survey (Asukasbarometri) on people's attitudes, evaluations and preferences towards housing in 2016, shows that the proportion of respondents who favor high-rise housing in urban centers has grown to exactly 20 percent of the respondents (Strandell 2017). In other words, the proportion of the minority preferring urban surroundings in centers has grown a little while the proportion preferring high-rise suburbs has somewhat diminished. The overall result is no surprise: there is a gradual slow urbanization in the attitudes but nothing that could explain the fast change.

A research project, funded by the Academy of Finland in 2011-2015 ("New urban poverty and the renovation of prefabricated high-rise suburbs in Finland, PREFARE") entailed detailed analysis of the values and housing satisfaction of people living in the Helsinki Region. The mass of the data gathered outnumbers everything done in the district on the subject (n = 20 000), and the spatially stratified data (a random sample of the population in the region) enabled a comparative analysis between the different sections or parts of the region for the first time ever.

One of the analyses was focused on the data that was obtained by asking the people how satisfied they were with the choices they had made as to their housing. The analysis was made by comparing the center urban area of the region (the center of Helsinki), the high-rise suburban fringe and the detached fringe further away. With the assumed subjective urbanization of people's values and attitudes, one would have expected to get results that would highlight or emphasize the benefits of urban living, at least among the people who had chosen to live in the urban center of the region.

People with wealth can afford to follow their preferences in the housing market better than the rest, and for this reason we controlled not only for income, but also for education, age, family structure, gender etc. (see Tuominen 2014). As a result, we ended up comparing similar people in differently urbanized surroundings, measuring how they liked their housing in 2012.

The results were a surprise. The respondents' housing satisfaction was significantly higher in the detached suburban fringes than in the center or in the high-rise suburbs. In addition, a simple explanation for this result emerged: if one held constant two features of the housing surroundings - high-rise and dense housing with socially mixed surroundings - the whole result vanished.

In other words, it was the high-rise and dense and mixed housing that lowered the satisfaction of the population in the center districts of the region (Tuominen 2014). These very features - high-rise, dense and mixed - are the features that characterize urbanity in the region. It seems quite difficult to claim that the turning point could be based on a change in people's values and evaluations. To be blunt, there has been no research that would point towards a drastic subjective urbanization of the population in the region.

If this holds true, how should the change

be interpreted? Another simple idea emerges: The exceptionally strong economic downturn, the longest in recorded history, has triggered a new wave of migration that has very little to do with the subjective orientations of people. During the first major wave of urbanization - in the 1960s and 1970s - people did not move into the cities and to Helsinki because they preferred urban living but because they had to. This could also apply to the new wave of the results which we see now in the statistics. If this is the case, the policy implications of the change seem somewhat different. To get to grips with this it is necessary to develop the interpretation with the help of the data we now have.

Economic factors and migration

Economic fluctuations have had a significant impact the growth of the detached belt of housing between 1994 and 2008: every slump, however minor, resulted in a downturn in detached housing construction, and was eagerly commented on in public by the proponents of the center municipalities. Finland has only very recently started to recover from the industrial collapse that began in 2008 and led to the loss of a significant part of its economic base (Figure 2). The recovery will most likely take some time, as the distance economic gap between Finland and most European countries (including the other Nordic countries) is a major one. The pattern of the migration towards Helsinki (see Figure 1) seems to be following the pattern of the slump, with its two consequent drops, the first in 2008-2009, then a small upswing which resulted in a new slump in 2012-2013.

In addition, urban and capital regions usually react to economic crises stronger than rest of the country. When unemployment is high, for example, it is usually higher in the cities, and vice versa, when the economy improves, unemployment tends to fall faster in the cities. Accordingly, the exceptionally long and difficult down-swing of the economy has had a strong effect on the economy in Finland's main urban areas (see Figures 3 and 4).

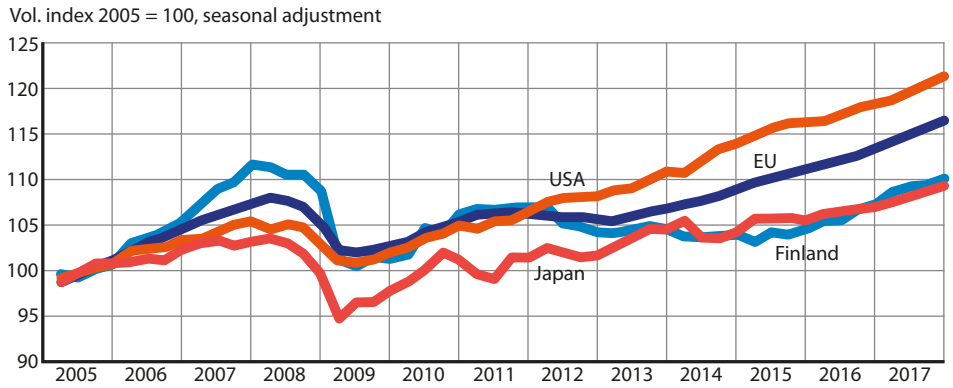

Figure 2. GNP quarterly in Finland, EU, USA, and Japan in 2005-2017 (Elinkeinoelämän keskusliitto 2017).

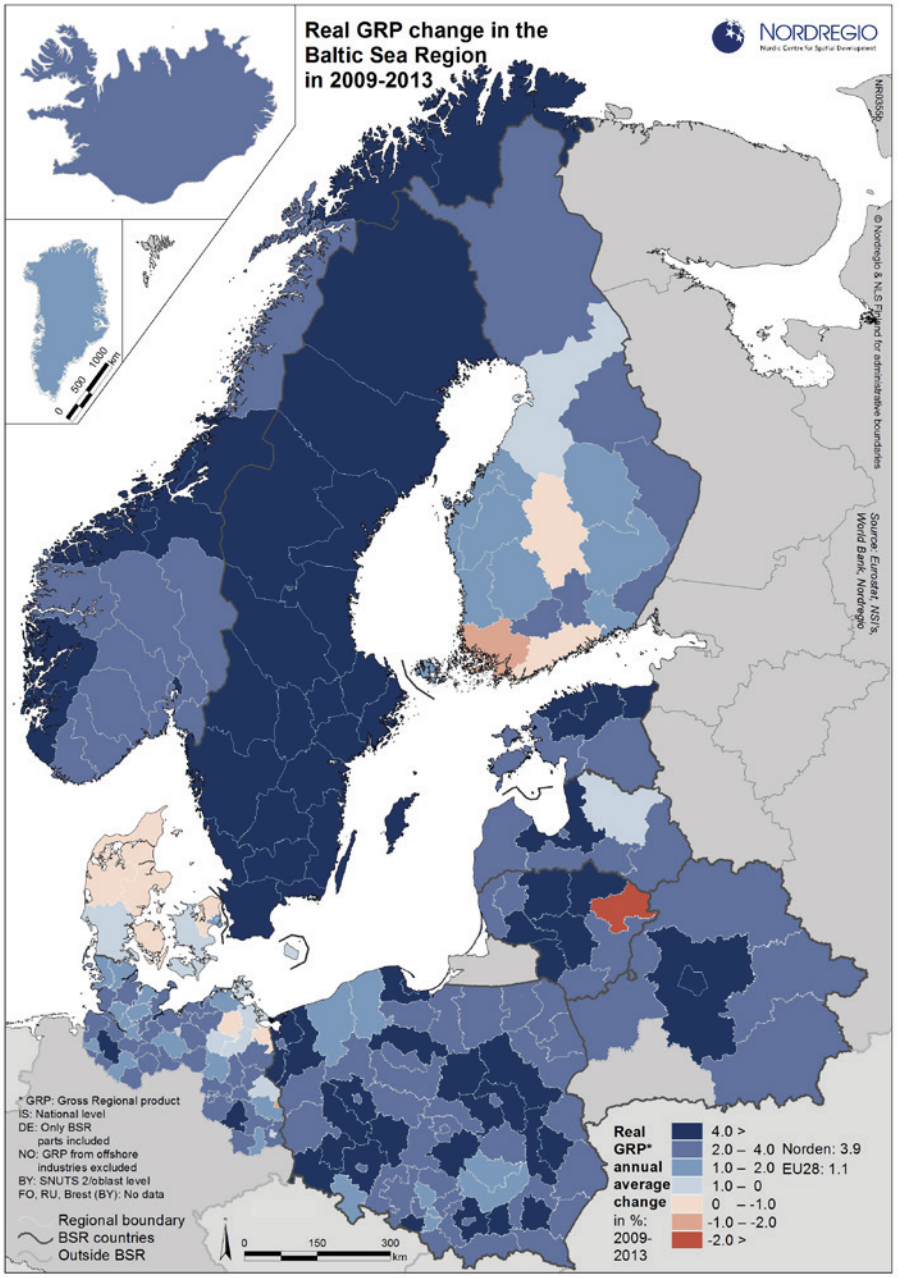

Figure 3. The real GRP change in the Baltic Sea Region during the years 2009-2013. The maps shows that the reduction of GRP was between 0 - 1 percent in Uusimaa region (Nordregio 2016).

The second element of the interpretation is that economic crises trigger new waves of internal migration with two main elements: some parts of the country end up having serious economic difficulties, and well-educated people seek work in bigger city centers. This is happening simultaneously with the influx of the new wave of migration from abroad.

But why should people settle down in the center and not in the fringes? This is easy to interpret on the basis of previous knowledge on how economic fluctuations affect people's lives. It is during up-swings that divorces, suicides and a range of signs of human suffering flourish - together with massive construction projects and risk-taking. Why? During up-swings people tend to take risks, some of which come off, but during slumps people minimize their risk-taking and refrain from everything that could entail a risk, as the future itself is a risk (Heikkilä et al. 2001). In other words, it could be that only economic calculations are behind the down-swing of the migration of the well-off to the fringes: people would rather settle down to living with less room (Laakso 2012), and in surroundings that do not appeal to them as much (Tuominen 2014), for economic reasons, trying to avoid excessive risks.

We know that the new patterns of migration favoring Helsinki have been linked with a simultaneous crowding in Helsinki. The space per capita has started to diminish (Laakso 2012). In other words, it could be that people (including families with children) are trying to cope during the depression with less space than they need and that (with a new economic upswing) this will burst out into demand for family dwellings once the economic opportunities are there. If this

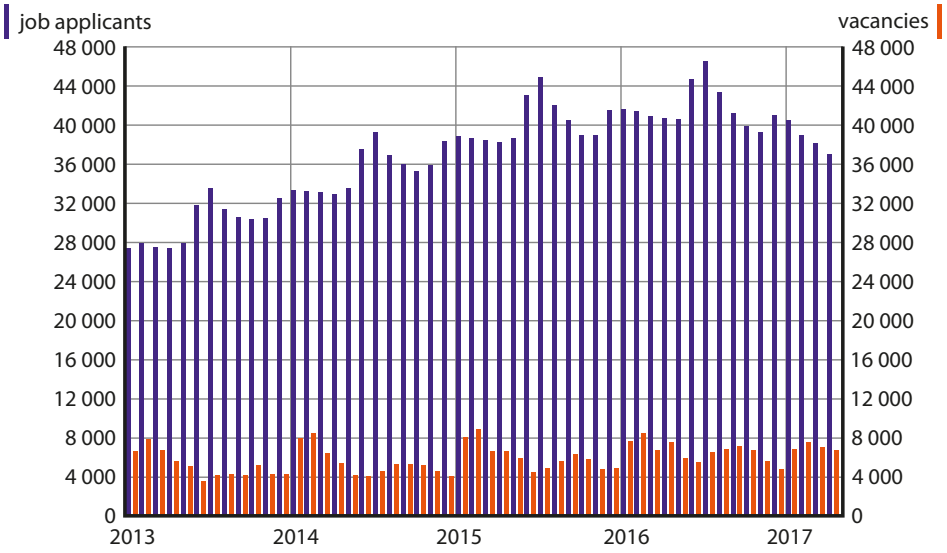

Figure 4. Unemployed job applicants and vacancies announced by the TE Offices at the end of each month in 2013-2017 (Salorinne 2017).

was to be a valid interpretation, we could be heading towards a new turn of the tide in the development of the region, and also in the patterns of migration. All we would need is a new reliable economic upswing.

Future remains unpredictable

Which interpretation is valid, which one is to be trusted? To be frank, we cannot be sure. The first one can be criticized as wishful thinking. The second is based on data better, but what we do not know is whether it holds true, and if so, to what extent. This gives us a good basis for discussing regional urban policies, for this is the basic setting in politics in general: in politics you work with matters you basically have no way on knowing ("it is difficult to do forecasts, especially on the future"). So, what do you do?

The Helsinki New Master Plan (City Plan 2018) is heavily based on the assumption of strong future growth, and on the growing success of Helsinki within the region. On this basis the city suddenly appears as being brave enough (1) to make plans on the so-called city boulevards (making it more difficult for private cars to enter the city from the ring), a plan that would have been impossible to present during the previous period (1994-2008); and (2) to introduce innovative changes in housing policies, towards producing even smaller apartments.

The criticism against the boulevards is simple: with the assumed growth of the city, the narrowing of the main roads would produce massive traffic jams and make living conditions along the roads (in any case) unsuitable for housing. The counter-argument is related to the basic objectives of the policy: it is an attempt to spread of the urban center of Helsinki further into the fringes, and at the same time, to produce a major change in the patterns of mobility of the population (with the boulevards, public transport is the only sensible way of getting into the center).

The policies make perfect sense if you assume there will be a permanent change in people values and attitudes towards favoring dense, high-rise and small. However, if you take the available research results into consideration, and acknowledge that there is no evidence of this, how do the policies look like as to their future effects?

Previously both business firms and the population tended to opt out of the crowded center to the fringes (cheap land, more room, optimal places and spaces). If the accessibility of Helsinki becomes even worse than before, this will provide new incentives for both to move out. In addition, the new obstacles are permanent (as opposed to taxing the traffic, for instance): if you use millions of euros to make the roads narrower with new housing production, you cannot reverse this the moment the results become negative. In addition, by changing towards even smaller apartments, Helsinki would risk driving out families with children, and creating a platform for the spread of neighborhoods of excessively high turnover rates (i.e. producing neighborhoods where no-one lives permanently). Neighborhoods such as these tend to develop into concentrations of social exclusion (with the wealth being concentrated in neighborhoods with family-sized dwellings).

If this were to happen, wth the choices it is making today, Helsinki would be promoting exactly the development it has been trying to prevent. In other words, with no reliable knowledge on future developments, and contrary to what we know, Helsinki is at present taking a huge risk as to its own future.

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USP Studio Publication 1

ISSN 2489-8007 (print)

ISBN 978-951-51-4193-4 (print)

ISBN 978-951-51-4194-1 (PDF)

https://www.helsinki.fi/en/programmes/master/urban-studies-planning

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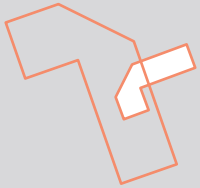

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Confused Suburban Identities: A Case Study of Helsinki Region

USP Studio Publication 1

Aalto University

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