ENERGISE

EUROPEAN NETWORK FOR RESEARCH, GOOD PRACTICE AND INNOVATION FOR SUSTAINABLE ENERGY

Project acronym:	ENERGISE
Title:	European Network for Research, Good Practice and Innovation for Sustainable Energy
Grant Agreement number:	727642

COUNTRY REPORT:

FINLAND

EXTRACTED FROM D2.5: PRODUCTION OF 30 NATIONAL SUMMARY BRIEFS

Deliverable 2.5 description:	30 national summary briefs of national energy supply and demand.
Lead parties for deliverable:	AAU
Deliverable 2.5 authors:	Charlotte Jensen, Inge Røpke (AAU), Gary Goggins, Frances Fahy, Eimear Heaslip (NUIG), Marko Hajdinjak, Desislava Asenova (ARC Fund), Mathias Claeys Bouuaert, Tomislav Tkalec, Lidija Živčič, Renda Bellmallem , Kristjan Čoklc, Camille Gomes (FOCUS), Edina Vadovics, Kristóf Vadovics, Jozsef Slezak, Gergő Horváth, Szandra Szomor (GDI), Marfuga Iskandarova, Audley Genus (KU), Eoin Grealis, Annika Musch, Henrike Rau (LMU), Eva Heiskanen, Senja Laakso, Jari Kolehmainen, Eeva-Lotta Apajalathi (UH), Julia Backhaus (UM), Laure Dobigny, Marlyne Sahakian (UNIGE).
Cite as:	Jensen et al. (2018) *30 national summary briefs of national energy supply and demand.* ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Grant Agreement No. 727642, Deliverable 2.5.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 727642.

ENERGISE partners	Logo
National University of Ireland, Galway (NUIG), University Road, Galway, Ireland	
Aalborg Universitet (AAU), Fredrik Bajers Vej 5, Aalborg 9220, Denmark	
Kingston University Higher Education Corporation (Kingston), River House High Street 53-57, Kingston Upon Thames KT1 1LQ, United Kingdom	
Universiteit Maastricht (UM), Minderbroedersberg 4-6, Maastricht 6200 MD, Netherlands	
Université de Genève (UNIGE), 24 rue du Général-Dufour, 1211 Genève 4, Switzerland	
GreenDependent Institute (GDI), Eva utca 4, Godollo 2100, Hungary	
Ludwig-Maximilians-Universitaet Muenchen (LMU Muenchen), Geschwister-Scholl-Platz 1, Muenchen 80539, Germany	
Focus Drustvo Za Sonaraven Razvoj (FOCUS), Maurerjeva Ulica 7, Ljubljana 1000, Slovenia	
Applied Research and Communications Fund (ARC Fund), Alexander Zhendov Street 5, Sofia 1113, Bulgaria	
Helsingin Yliopisto (UH), Yliopistonkatu 4, Helsingin Yliopisto 00014, Finland	

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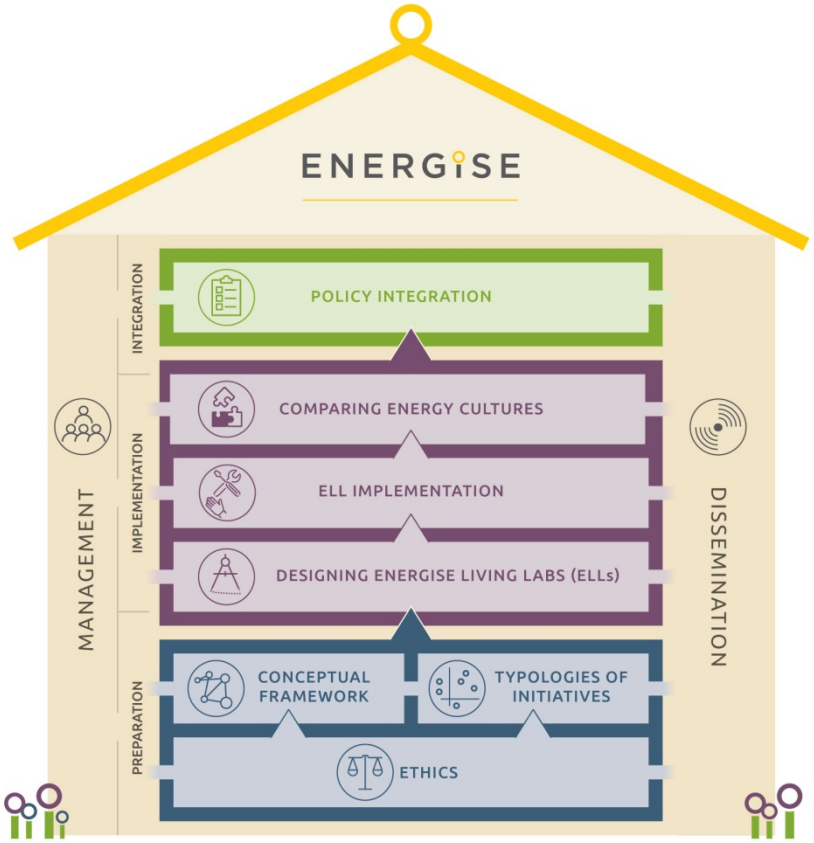
ENERGISE PROJECT

ENERGISE is an innovative pan-European research initiative to achieve a greater scientific understanding of the social and cultural influences on energy consumption. Funded under the EU Horizon 2020 programme for three years (2016-2019), ENERGISE develops, tests and assesses options for a bottom-up transformation of energy use in households and communities across Europe. ENERGISE's primary objectives are to:

- **Develop an innovative framework** to evaluate energy initiatives, taking into account existing social practices and cultures that affect energy consumption.
- **Assess and compare the impact** of European energy consumption reduction initiatives.
- **Advance the use of Living Lab approaches** for researching and transforming energy-related practice cultures.
- **Produce new research-led insights** into the role of household routines and changes to those routines towards more sustainable energy.
- **Encourage positive interaction** between actors from society, the policy arena and industry.
- **Effectively transfer** project outputs towards the implementation of the European Energy Union.



INTRODUCTION

This document is one of 30 national briefs, demonstrating key aspects of national energy supply and demand dynamics. Each brief is comprised of five sections:

Section 1 summarises the energy profile of the country. The section provides basic quantitative information of demand demographics and usage profiles, market trends and energy supply profiles, as well as qualitative reflections on current national energy policy. ***For all the briefs, the quantitative information is derived from ec.europa.eu/eurostat (2015 data), eea.europe.eu (2015 data), and climate-zone.com, unless otherwise stated.***[1] The qualitative reflections are based on a literature reviews and desk-research. References for the literature review and the desk-research are provided in footnotes or in section five.

Section 2 summarises the nationally based sustainable energy consumption initiatives (SECIs) that have been identified as part of ENERGISE WP2 framework (Jensen, 2017). Each SECI has been coded according to the Problem Framing Typology developed in ENERGISE WP2 (Jensen et al, 2017b).

Section 3 provides a *good practice* example of a national SECI that corresponds to category 3: “Changes in Everyday Life” or 4: “Changes in Complex Interactions” in the Problem Framing Typology. Please refer to Jensen (2017) and Jensen et al (2017b) for more information on the way the data for the good practice SECIs has been researched and documented.

Section 4 provides a brief summary of major nationally specific trends and their implication for energy consumption policies.

Section 5 provides an overview of sources used for qualitative assessments, and can be used as inspiration for further reading.

The national briefs provide contextual socio-material information for the further work to be carried out in Work Package 4, Work Package 5 and Work Package 6 in ENERGISE.

1.1 WP2: TYPOLOGIES OF ENERGY INITIATIVES

ENERGISE WP2 is a systematic criteria-guided review and classification of existing sustainable energy consumption initiatives from 30 European countries (EU-28, Switzerland, and Norway), which provides a comprehensive European database of energy initiatives involving households, and related typologies of sustainable energy consumption initiatives. This extensive synthesizing work guides the selection of Living Lab design elements for ENERGISE and future energy consumption research, policy and practice.

[1] Some piecharts will be empty, as no information is available.

This is done in order to

- Construct innovative typologies of sustainable energy consumption initiatives that can inform further research and action.
- Identify key success factors and related indicators, focusing on individual-level, collective, organizational, institutional and societal aspects of energy consumption, which will inform subsequent WP 3 (Designing Living Labs), WP 4 (ENERGISE Living Labs) and WP 5 (Capturing Energy Cultures).
- Progress the goals of the European Energy Union by creating a publicly archived open access dataset of sustainable energy initiatives across 30 countries in Europe.

Suggested further reading:

Jensen (2017) *Identification of key success factors and related indicators.* ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Grant Agreement No. 727642, Deliverable 2.2.

Jensen et al. (2017a) *Establishment of a comprehensive open access dataset of sustainable energy consumption programmes and Interventions.* ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Grant Agreement No. 727642, Deliverable 2.3.

Jensen et al. (2017b) *Constructions of typologies of sustainable energy consumption initiatives (SECIs).* ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Grant Agreement No. 727642, Deliverable 2.4.

Sources of quantitative statistics (unless otherwise stated):

Climate data:
http://www.climate-zone.com/continent/europe/

Demography data:
http://ec.europa.eu/eurostat/statistics-explained/index.php/Population_structure_and_ageing

http://ec.europa.eu/eurostat/statistics-explained/index.php/Educational_attainment_statistics

Dwelling type data:
http://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Distribution_of_population_by_dwelling_type,_2015_(%25_of_population)_YB17.png

Energy demand and supply quantitative data:
http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_consumption_in_households

Final energy consumption of households per capita data: https://www.eea.europa.eu/airs/2017/resource-efficiency-and-low-carbon-economy/household-energy-consumption

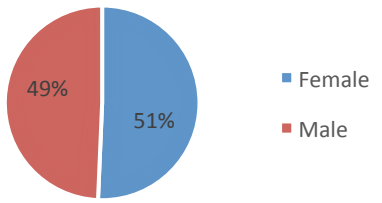
MWh conversion data:
https://www.unitjuggler.com/convert-energy-from-toe-to-MWh.html?val=893.9

FINLAND

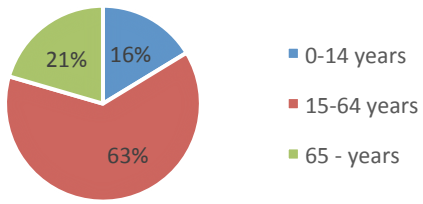
Authors:
Eva Heiskanen, Senja Laakso, Jari Kolehmainen, Eeva-Lotta Apajalathi

DEMOGRAPHY, ENERGY CONSUMPTION AND ENERGY SUPPLY

GENDER PROFILE



AGE PROFILE (2016)

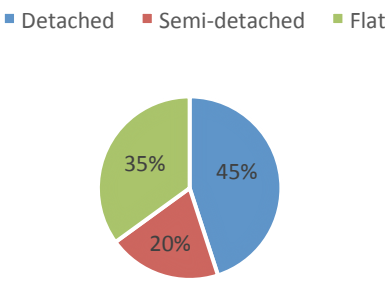


CLIMATE:

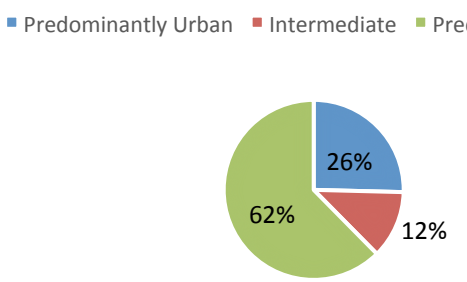
Cold temperate, partly subarctic.

EDUCATIONAL PROFILE (25-54Y, 2016)

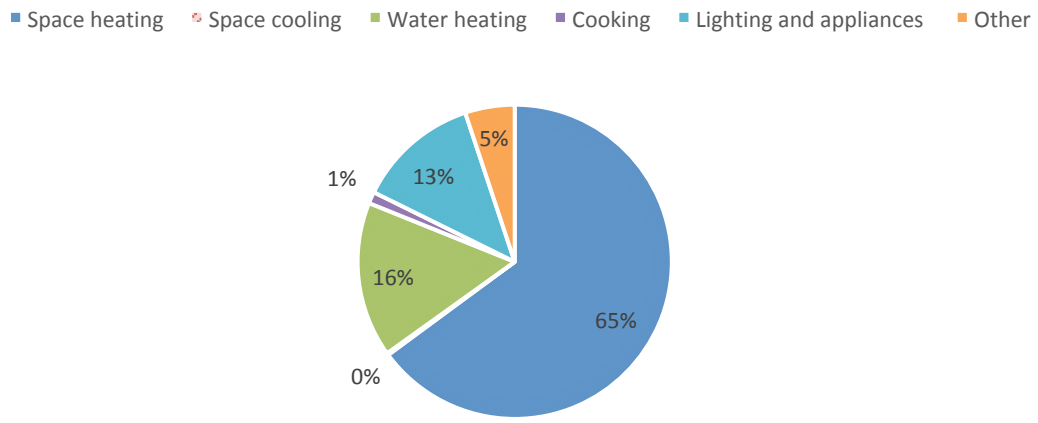
COMMON DWELLING TYPES (2015)



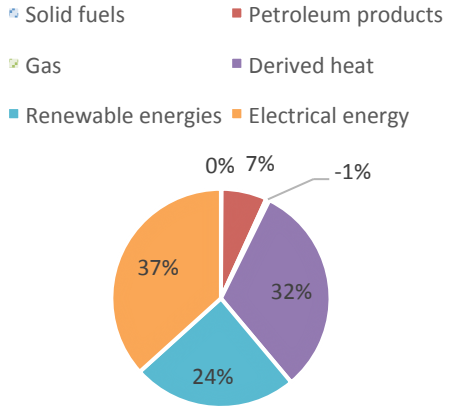
URBAN - RURAL DISTRIBUTION (OECD)



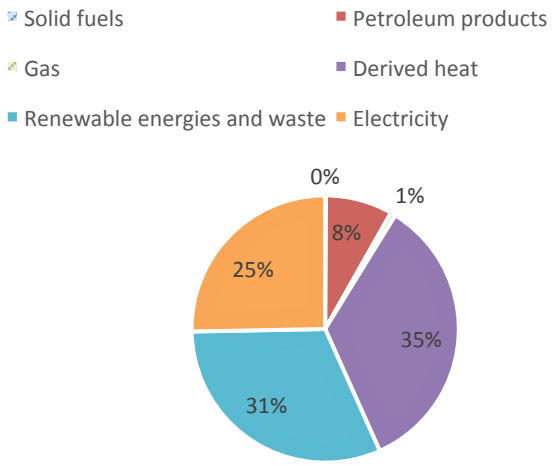
RESIDENTAL FINAL ENERGY CONSUMPTION BY TYPE OF END-USE (2015)



SHARE OF FUELS IN THE FINAL ENERGY CONSUMP. IN THE RESIDENT. SECTOR (2015)



SHARE OF FUELS IN FINAL ENERGY CONSUMP. - RESIDENT. SPACE HEATING (2015)



FINAL ENERGY CONSUMPTION FOR HOUSEHOLDS, PR CAPITA (2015)

10.396 MWh

ENERGY SYSTEM AND ENERGY POLICY TRENDS

Energy system

Finnish electricity distribution grids were originally developed by municipalities or local industries. Most of the about 80 distribution grids in the country are still owned by municipalities, but a few larger companies have acquired a number of distribution grids as well. All distribution grids are connected by a transmission grid owned and managed by Fingrid, a company with majority state ownership. Electricity markets were liberalized in 1995/1997. About 120 companies produce electricity for the retail market and many of them are still owned by municipalities (Finnish Energy Industries, www.energia.fi).

The gas grid only extends to parts of the country, and serves mostly industry and energy companies.

District heating networks are local monopolies. There are more than 100 units producing district heat for 166 municipalities and their residents. About 2/3 of the district heat is produced with combined heat and power production (CHP) (Finnish Energy Industries (www.energia.fi).

Particular socio-material aspects that influence energy consumption

Like other Nordic countries, indoor temperatures are rather high (about 21ºC) in Finland. Finns are accustomed to stable indoor environments and well-functioning, rather automatized systems. Finns are also rather keen on adopting technological novelties (like heat pumps and LEDs).

Officially, there are about 2 million saunas in Finland. Unfortunately, individual saunas have become a standard feature also in apartments, though this trend might be declining in cities due to space constraints. In Helsinki, public saunas have made a comeback, so perhaps the individualizing trend is ending.

Household electricity has been relatively cheap in Finland, hence concerns about electricity costs are limited to people with direct electric heating, mostly outside the large cities. People living in apartment buildings also do not pay individually for heat (and usually not even for hot water, but a fixed, monthly charge of about 20 euros/person), and district heat is relatively cheap in cities due to the widespread use of CHP. Because of this, city dwellers in particular are not too concerned about energy use.

Current Trends in Energy Policy

Smart energy systems and smart grids gained momentum in Finland around 2010. Virtually all Finnish electricity consumers have automatic meter reading installed. There is interest in developing products (e.g. IoT, building automation, smart controls) also for export markets. There are also several developments ongoing in developing smart district heating systems. Demand response (flexible use of heat and power depending on supply and demand) has become a hot topic in quite recent years.

There is also a strong interest in smart cities. There are more than 20 pilots ongoing in different parts of the country, in particular, attempting to integrate smart and sustainable aspects into new

districts.

There is a strong rhetoric supporting energy efficiency, but actual measures are relatively limited. Partly this is because Finns believe they are already world leaders in energy efficiency. Some of this may be true: Finnish energy-intensive industry is relatively energy efficient because energy costs are such a large share of costs. Buildings are relatively energy efficient because about 75% of them (by building area) were built after the 1970s (Statistics Finland 2018b). Gradually, Finnish energy policy is recognising that energy demand is stabilising, but there are still few policies or measures to actually reduce energy demand, apart from informative and fiscal policies (energy taxation). A voluntary agreement scheme for energy audits and improvements has successfully engaged large energy users, but does not extend to households expect insofar as some rental housing providers are involved.

Refurbishment of buildings is gaining increasing attention, since a large share of buildings are approaching their first major renovation. There has been small (10-15%) financial support available for apartment buildings, but this has been cut due to overall budget cuts. When major renovations are undertaken, the building code prescribes energy efficiency improvements.

Energy community is not a strong topic in Finland. There are some programmes and pilots, more in the countryside, where for example, there has been a development of “heat entrepreneurship” in which forest owners supply heat to e.g. municipalities. Carbon-neutral municipalities is a programme currently (2017) involving 33 municipalities that have committed to reducing their greenhouse gas emissions by 80% from 2007 levels by 2030. In general, however, energy is considered to be the domain of experts and large companies, and official policy has not made a large effort to engage citizens.

Finnish energy policy has for a long time been focused around the needs of industry, which consumes more than 40% of all the energy used in the country. Since the share of households is relatively small in international comparison, they have not been a major focus of energy policy. The share of renewable energy has grown steadily since the late 1970s, but much if it still comes from black liquor and other forest residues used by the pulp and paper industry. However, Finnish Energy policy has gradually grasped that other renewable energy sources than bioenergy need to be developed, and increasing support has been directed to the development of wind power. Renewable energy amounted to 36% of the total energy production in 2017 (Statistics Finland 2018c). Energy efficiency is considered important in official energy policy, but we have no quantitative targets, though the ideal scenario is for energy demand to stabilise. There is no feed-in-tariff for small-scale energy production, indeed, no support at all for renewable energy investments by households (apart from a tax deduction from labour costs). The current government aims to increase renewable energy sources to more than 50% and increase domestic energy provision to more than 55% by 2030. Additional, Finland aims to phase out coal and halve the use of mineral oil and increase the renewable share in transport fuels to more than 40% by 2030 (MoEE 2017). Two Finnish companies are also trying to build nuclear power plants. The official energy scenario (MoEE 2017) envisages that 29% of total energy demand will be produced by nuclear power in 2030, when the current share is 19%.

Trends in national campaigns

Finnish national energy campaigns are mainly organised by Motiva, a state-owned company promoting energy efficiency, renewables and materials efficiency. Campaigns have not been a strong

focus in recent years, rather the provision of locally targeted practical advice and engagement. This advice focuses on sensible use of energy, i.e., auditing, metering, automation, adjusting controls, refurbishment and renewable energy – and, most recently, demand response. Energy Saving Week is one of the nation-wide campaigns for homes and workplaces, but it focuses more on bottom-up pledges by e.g. workplaces, where the participants select their own measures and targets.

OVERVIEW OF NATIONAL SECIS

Below please find a list of Finnish SECIs that have been researched and documented through WP2 of ENERGISE. The SECIs are researched, selected and documented based on a set of requirements and research interests (please see Jensen 2017 for details). *The list should not be regarded as exhaustive or representative of all kinds of energy initiatives carried out in the country.*

Micro-ESCOs	 Changes in Complex Interactions
Open Homes Energy Walks	 Changes in Individuals' Behaviour
Carbon neutral residential area Skaftkärr	 Changes in Everyday Life Situations
Evaluating heat pumps	 Changes in Technology
Carrotmob	 Changes in Everyday Life Situations
Environmental Agents	 Changes in Everyday Life Situations
Billing feedback trial	 Changes in Individuals' Behaviour
Energy Expert	 Changes in Individuals' Behaviour
HEAT '07	 Changes in Technology
Green Office	 Changes in Individuals' Behaviour

Motivoittaja	 Changes in Technology
ENEOKO Energy and heating system information for detached houses	 Changes in Technology
Ilmari Climate education project	 Changes in Individuals' Behaviour
Climate communication campaign	 Changes in Individuals' Behaviour
Wattitalkoot	 Changes in Individuals' Behaviour
Energy efficient student housing	 Changes in Everyday Life Situations
HSY:n aurinkoenergian ja hukkalämmön karttapalvelu (Map service for waste heat and solar potential)	 Changes in Technology
Tarmo+	 Changes in Complex Interactions
EUGUGLE	 Changes in Complex Interactions
Jyväskylän Energian Talo a	 Changes in Technology
Smart Kalasatama and Hima application	 Changes in Complex Interactions
ECOHOME Education, training, tools and services to enhance sustainable household consumption	 Changes in Complex Interactions
Heat promise (Helenin lämpölupaus)	 Changes in Individuals' Behaviour
Climate Info (Ilmastoinfo)	 Changes in Individuals' Behaviour
Climate Street (Ilmastokatu)	 Changes in Complex Interactions

Balance your house (Tasapainota Talo)	 Changes in Technology
Anticipatory quality training in building inspection (Rakennusvalvonnan ennakoiva laadunohjaus)	 Changes in Complex Interactions
Solar collector self-building courses	 Changes in Everyday Life Situations
Green doors (Vihreät ovet)	 Changes in Individuals' Behaviour
HSL new customer procurement (uusasiakashankinta)	 Changes in Everyday Life Situations
Towards Resource Wisdom (Kohti resurssiviisautta)	 Changes in Complex Interactions
Resource wise housing (Resurssiviisas asuminen)	 Changes in Individuals' Behaviour
Wisely-lighted housing association (Viisaasti valaistu taloyhtiö)	 Changes in Technology
The bus leap (Bussiloikka)	 Changes in Everyday Life Situations
Future Household	 Changes in Everyday Life Situations
Kangas	 Changes in Complex Interactions
PiggyBaggy	 Changes in Everyday Life Situations
Carbon-free May (Vähähiilinen huhtikuu)	 Changes in Everyday Life Situations
Ilmankos	 Changes in Individuals' Behaviour
Kierrätyskeskus, 4V (Care, Affect, Enjoy, Flourish - Helsinki Metropolitan Area Reuse Centre project to promote an environmentally friendly way of life and community solidarity)	 Changes in Everyday Life Situations

HOAS Laboratorio	 Changes in Everyday Life Situations
Climate Diet (Ilmastodieetti)	 Changes in Individuals' Behaviour
Energy Thriathlon	 Changes in Individuals' Behaviour
Handyman About Town	 Changes in Everyday Life Situations
Negawatti	 Changes in Technology
Carbon neutral Harakka	 Changes in Technology
Language tree (Kielipuu)	 Changes in Individuals' Behaviour

‘GOOD PRACTICE’ EXAMPLE OF FINNISH SECI

The Smart Kalasatama and Hima Application[2] is a Finnish SECI that appears to take on the understanding of energy consumption being a result of everyday life dynamics, and thus changing energy consumption patterns mean understanding and targeting how everyday life is organised. In the following sections, the Smart Kalasamata and Hima application is introduced, described and discussed.

Brief Description

The new Kalasatama area of Helsinki is an experimental innovation platform to test and co-create various solutions, such as smart urban infrastructure and services. Smart Kalasatama is a large living lab initiative in which new technologies are tested and developed in real life through piloting, in close co-operation with residents, companies, city officials and other stakeholders. The construction of the area started in 2013 and will continue until 2030’s. The project is coordinated by Forum Virium Helsinki. In 2015–2017, the Smart Kalasatama project is run as part of a six-city smart city programme. The Hima pilot is one of the pilots. It is about smart energy monitoring and control with a system developed by Helen (municipal energy company) and ABB. The application is tested as part of Smart Kalasatama in two apartment houses. Other projects include, for instance, sharing spaces for joint use, sharing of electric cars and smart lighting. An agile piloting programme tests new ideas fast and affordably with small inputs from the city (1,000-8,000€).

Contextualization

To boost new sustainable urban solutions, the Helsinki City Council decided 2013 to make one of the new area construction sites, the Kalasatama harbor area, a model district of Smart City development. By 2030 the area will house about 25,000 residents and offer jobs for 8,000 people. Currently, there are about 2,000 residents. It was originated by a consortium including the local energy company and other large companies to develop new ‘smart grid thinking’ based business. Later, the City of Helsinki and Tekes joined the project and Kalasatama was turned into ‘smart city’ area with more diverse aims (Heiskanen et al. 2018).

Aims and objectives

Finland wants to be a forerunner in supplying sustainable and clean technology innovations, and Helsinki wants to address carbon neutrality aims by 2050[3]. Kalasatama provides a platform to co-create smart urban infrastructures and services. The aim is also to create a city district that saves one hour of residents’ time per day. The idea is that Kalasatama is a real-life testbed for new services to be scaled up elsewhere.

Methods for intervention

Smart Kalasatama is based on the utilization of different technologies and solutions that all use ICT and open data. Several hundred participants – large and small companies, research, public sector, and citizens – are already involved in developing Kalasatama as a

[2] Further examples of Smart Kalasatama’s pilots and projects are available at http://fiksukalasatama.fi/2153/ and information on Hima at https://hima.helen.fi/#/howto.

[3] https://forumvirium.fi/en/introduction/building-an-open-and-smart-helsinki/; https://eu-smartcities.eu/place/helsinki; https://fiksukalasatama.fi/en/the-test-lab-of-a-smart-city/

smart district. Helen, together with partner organisations, develops smart grid and services such as electric car network and battery energy storage. The focus is on experimenting with new solutions at varying scales in real life with residents (Mustonen et al. 2017). The Developers' Club gathers all businesses in the area, city administration and resident associations together four times a year to discuss the development of Kalasatama[4]. This has been a completely novel way to cooperate at the city district level in Finland.

Steps of implementation

Smart Kalasatama was funded by Smart City programme of Tekes in 2013-14 and from 6Aika in 2014-20. 6aika is funded by the European Regional Development Fund (80 meur) and European Social fund. The experimentation in the area began already in the planning phase of Smart Kalasatama program with short-term public library services and food club pick-up services. Since 2015, several pilots have been made in collaboration with the city, private companies and residents. The residents have participated in stakeholder workshops, tested individual services (such as 'mobility as a service'), replied to surveys and been partners in Smart Kalasatama projects (such as opening housing companies' clubrooms to public use). The agile piloting program (2016-2017) has arranged three themed open calls for companies to apply for a small 1,000-8,000€ seed money to test their services. The idea of agile piloting has also spread in Helsinki (Heiskanen et al. 2017). The Hima home automation pilot started in 2015. The home automation infrastructure is built-in in the two apartment buildings participating in the pilot[5].

Results/outcomes

Each round of agile pilots is evaluated by an outsider organisation, and so far the results have been mainly good. The participating companies and organisations have gained new information on customer requirements and preferences and have been able to adapt their services. Agile pilots have produced applications and digital services that improve e.g. food and waste management, as well as a neighborhood aid platform (Hämäläinen & Tyrväinen 2016). The two apartment buildings participating in the Hima pilot are new and therefore quite energy-efficient already. Almost all of the participants used the on-off switch of the built-in home automation infrastructure. Additional services, such as the HIMA web portal for monitoring usage and the almost real-time information on energy consumption has led to more personal insight for residents on their household's consumption habits (Linkola 2016). This shows for example as switching off heat lamps on the balcony and using sauna less often, according to resident's own opinions. Also some residents use dishwasher during the night hours when electricity is cheaper.

The role of the households

Households have suggested and tested new solutions and the aim of the whole project is to engage residents. The residents in Kalasatama have been active in experimenting, especially in the case of agile pilots. The residents also have several Facebook groups. The role of households especially for the diffusion of quick, grassroots experiments to other areas in the city has been crucial. Most of the residents that have moved to the area were aware of the smart and experimental nature of the district when making the decision to move in – some of them have even considered unfortunate that there are not more radical experiments to participate in. For the home automation pilot Hima the participating households have given feedback actively. They did not participate in the design phase, but the piloting process has been crucial for further development of the service.

[4] https://fiksukalasatama.fi/en/building-blocks/innovators-club/
[5]

Location

Smart Kalasatama is geographically limited within the new residential area of Kalasatama. The smart district idea was built around an energy company consortium, which was already working in the area on smart grid business. The built-in home automation infrastructure in apartment buildings in Kalasatama is required in the land transfer conditions, which encourages building and piloting the Hima home automation monitoring service. The agile pilots programme running in Kalasatama has successfully spread to other districts.

Was/is the initiative successful?

The initiative has been successful in testing new ideas and technologies and residents have been satisfied with Hima (Heiskanen & Matschoss 2015). Some of the new solutions have been scaled up in the city. However, as the stakeholders' expectations towards the Smart Kalasatama are high, the level of ambition has not reached all expectations, but some would have wanted even more ambitious experiments in terms of environmental sustainability, such as greater energy efficiency, green roofs and solar panels. The city administration has not been able to work as fast as expected, and not all new technologies or services have scaled up as the entrepreneurs had hoped. In the case of agile pilots, the time frame of experimentation has proved too short to gain enough knowledge on the functionality of new services (Heiskanen and Matschoss 2018). However, the current funding of Smart Kalasatama program only ended in late 2017, and therefore a final evaluation cannot be made yet.

Textual and communicative aspects of initiative

Energy consumption is framed as a challenge to be solved by smart solutions – not only by actions of individual households, but especially by changes in ways of energy provision and of organising services. Reduction in energy use seems to be a positive side product of Smart Kalasatama, which has incorporated energy consumption into the promise of "one hour more free time in a day" for the residents. Energy consumption in seen as a wider issue, to which the experiments made in the area might partly respond. Households are not required to use energy in certain manner, but rather encouraged to pay attention to the topic. The city of Helsinki communicates the experimental nature of the area locally and at Smart City events abroad in a proud and positive manner. As the Kalasatama district is rather compact geographical area, there is quite strong "Kalasatama identity" related to the project. Communication is nurtured, e.g. in the Developer's Club meetings, Facebook groups and agile pilots in which the residents participate.

The physical/technological aspects of the initiative

ICT and open data have a significant role in Kalasatama. Many solutions, such as Hima application, have been developed from the beginning in Kalasatama, which has been important for Helen to gain knowledge on how people use the new services. The automatization of energy use and demand side management aim at cutting the peaks in energy demand. The idea is that experiences and critical mass created by experimenting might enable changes in energy system also on a larger scale. The land transfer conditions related to the plan of the area enable pushing solutions and technologies, such as the home automation system.

Shared understandings related to initiative

In Kalasatama the goal for saving residents' time one hour per day by using smart services is commonly acknowledged. However, as always, there are also diverse understandings

and expectations. The reduction of energy usage is embedded in using the smart services and manifests as a positive side effect; the reasons for using smart services is about saving both time/effort and energy with an emphasis on the 'smart'. Smart Kalasatama aims to optimise the current ways of using energy, rather than seeking any extreme or radical changes in everyday energy use.

CONCLUDING REMARKS AND POLICY IMPLICATIONS

The Finnish SECIs reflect Finnish energy policy insofar as they are largely locally based, combine energy saving with other concerns, and aim to develop combinations of technical and social solutions from the bottom up. Older SECIs are more focused on technology or individual behaviour change, whereas newer ones focus more on everyday practices and complex interactions between households and systems of provision. There is a development toward more living lab types of approaches (testing technologies in real-life contexts) and toward integrating energy projects in broader sustainability, liveability and innovation contexts.

Many of the SECIs are not so much reflections of national energy policy, but rather complements to it. Several municipalities have their own climate targets and have engaged in developing new or renovated residential areas where energy conservation is included in the planning targets and attempts are made to involve residents. Because heating is such a large share of residential energy use, many SECIs focus on reducing heat demand or promoting residential-scale renewable energy. Many of the newer SECIs also focus on technology development, but with the engagement of users, their everyday practices and sometimes even addressing the complex interactions between technologies.

This emerging tendency is reflected in the Smart Kalasatama case. Energy saving is becoming part of a broader tendency in urban planning to promote sustainable lifestyles. In this way, energy considerations are embedded in wider urban planning targets. And on the other hand, urban planning – at its best – is not seen merely as physical infrastructure planning. It is also about a redistribution of power, where conventional ways of infrastructure development are challenged, new networks among diverse players are forged, and new solutions are sought for via experimentation. On the other hand, in such a diverse 'smart city' context, energy and resource conservation may have to compete with other agendas, such as the development of new technology and commercial services. In this sense, Smart Kalasatama is typical of other such developments, with the same strengths and weaknesses. For example, there might be a need for more assessment of whether 'smart' solutions – or in general new technical solutions – deliver the promised environmental benefits.

An important policy implication is that local governments are close to citizens and can influence many of the conditions for energy saving and sustainable consumption. However, local governments might lack the resources and also the power to innovate, to evaluate projects and in particular, to scale up innovative practices. Because of this, central governments and the EU might offer more funding for such innovative projects, but also require more and better evaluation and diffusion.

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