SMART SOLUTIONS
FROM FINLAND

Tekes

Kuva: Sakari Piippo

Foreword

Finland is a northern, sparsely populated country, where conditions vary greatly between different seasons. Life and traffic must flow smoothly whether the temperature outside is -20 C or +20 C degrees.

These stringent conditions are forcing innovation.The aim of this brochure is to introduce a variety of Finnish smart solutions and projects that Tekes has recently funded. Thematic areas covered are Smart Energy, Smart Building, Smart Transport and services related to these themes. Some Smart City examples are also presented.

Tekes works with the top innovative companies and research units in Finland. Every year, Tekes finances some 1 500 business research and development projects, and almost 600 public research projects at universities, research institutes and universities of applied sciences.

Research, development and innovation funding is targeted to projects that create in the long-term the greatest benefits for the economy and society. Tekes does not derive any financial profit from its activities, nor claim any intellectual proprietary rights.

If you want to know what innovative is going on in Finland and find Finnish partners, please contact Tekes.

Karin Wikman
Program manager
Tekes Witty City -program (2014-2017)
www.tekes.fi

Did you know this about Finland?

- 5,5 million inhabitants. Biggest cities Helsinki (613 000), Espoo (261 000), Tampere (220 000), Vantaa (208 000), Oulu (194 000), Turku (182 000)
- 1st in World Economic Forum's Human Capital index (2015)
- 4th most competitive country in the world (WEF 2015)
- 3rd least corrupted country in the world (Transparency International 2014)
- 1st in learning skill among 15-year olds in Europe (Pisa 2012)
- Most stable society in the world (FPP 2014)
- Best framework conditions for entrepreneurship in Nordic countries (Nordic Growth Entrepreneurship Review 2012)
- Finland is one of the Innovation leaders in the EU (Innovation scorebord 2015).
- Strong commitment to innovation by both the public and private sector. R&D expenditure above 3 % of GDP, about 3% of work force involved in R&D, being one of the highest shares in the world

Companies, cities and projects

Smart Cities

Tampere
Turku
Oulu
Lahti
Joensuu
Jyväskylä

Smart Energy

Future Flexible Energy Systems
Sundom Smart Grid (Vaasa), a unique pilot
Wirepas, connectivity solutions
SenCity project
Tehomet Lightning solutions
Greenled Lightning solutions
Valopää Lightning solutions
Solixi, energy storage

Smart Transport

PayIQ - Mobile payment for public transport
Sito, Finnish Engineering Company, Mobility As a Service (MaaS)

Smart Buildings & ICT

Power Balance Management
Future Dialog Mobile application between cities and communities
A-Insinöörit, Planning Company
Terrasolid, Point cloud processing, analysis and visualization software solutions
Citynomadi Map based information on city areas
Vincit, Software development expert

Research Projects

Living Lab Bus (LLB) - environment
Neo-Carbon Energy
DRUMBEAT

SMART CITIES | SMART ENERGY | SMART TRANSPORT | SMART BUILDINGS & ICT

SMART CITY SOLUTIONS
IN FINLAND

Tampere

THE CITY OF TAMPERE

Smart Tampere brings together local and international companies, universities, organizations, citizens and the city government to enable digital solutions for a smarter Tampere and to develop these solutions into exportable products.

The city itself has multiple roles in this new way of city development. Instead, and in addition to, the traditional role of procuress the city can act as a testing ground, can bring the right parties to work together or, for example, enable new solutions through city planning.

So far, Tampere has been able to ensure city development investments of over 6 Billion for the next 10 to 15 years. Smart Tampere program's key goal is to make sure these investments are used to build a smarter city and to secure economic growth.

Future Smart City development examples:

Tampere Central Deck and Arena

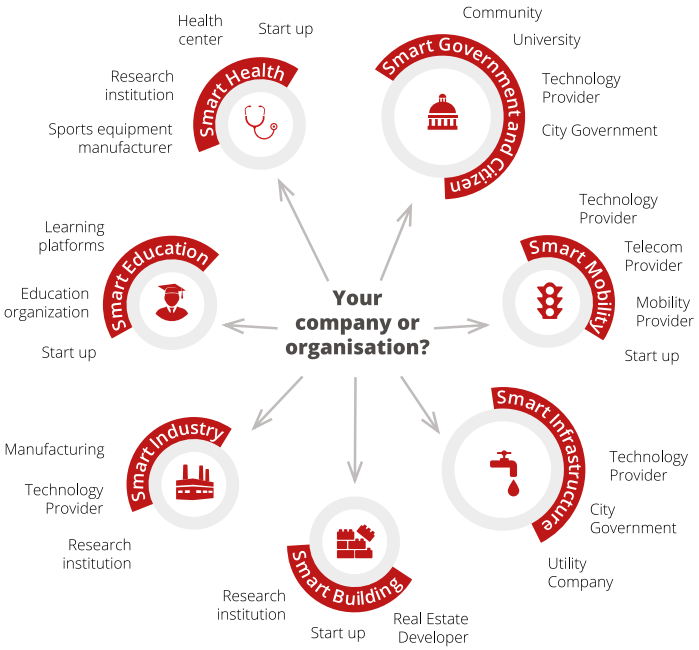
Central Deck and Arena is urban scale development on top of existing railway tracks in the heart of the city. The 110,000 m2 will hold a multi-purpose arena with capacity of 11,000 people, office blocks topped by residential towers, a hotel and a casino. Constructions start spring 2017.

Hiedanranta

An old pulp factory area right on the shore of Lake Näsijärvi is being built into what the Finnish media called "Dubai of Finland". The area will offer housing for 15,000-25,000 residents and jobs for 12,000-14,000 people. International vision competition just closed and zoning will begin 2017.

Light Rail

As a new form of public transportation in Tampere the light rail will offer a perfect testing ground for smart mobility solutions, as well as, smart building and smart infrastructure solutions. We are one final decision away from starting the constructions by the end of 2016.



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All Bright!
TAMPERE
FINLAND

Turku – Smart city

The City of Turku aims to be carbon-neutral by 2040 and strongly promotes sustainable energy transition, circular economy and smart mobility. Smart city is also safe.

Mobility as a Service

Turku is a pioneer city in integrating public transport in Mobility as a Service (MaaS) solutions. MaaS combines different transport modes into user-friendly mobility service packages. Regional bus tickets will be included in the local MaaS package (cooperating company: Tuup Oy (FI)). Last-mile-by-taxi pilot cooperation project between regional bus traffic and local taxi operators started in September 2016 (IQ Payments Oy (FI), INIT Gmbh (DE) and Western Systems Oy (FI)). A new international MaaS project was launched this autumn together with Madrid, München, Stockholm and Ruse.

The fully integrated mobile ticketing system of regional bus traffic has over 20 000 registered users, and has tickets, monthly passes and reload functionalities to account based products (IQ Payments Oy). The regional bus traffic has an ID based multimodal and integrated ticketing system (INIT Gmbh and Western Systems Oy).

Diverse electric mobility

Turku introduced electric buses in public transport in September 2016. The bus line from the city center to the port and to the airport will be operated with electric buses. Six buses and two opportunity charging stations will serve the 12 km route with over one million passengers annually (Linkker Oy (FI), Heliox B.V. (NL), Schunk Bahn- und Industrietechnik GmbH (DE), Turun kaupunkiliikenne Oy (FI), Oy Turku Energia – Åbo Energi Ab (FI)).

An autonomous passenger ferry is planned for the river Aura with possible connection to Ruissalo Island. The electric ferry functions without crew and is operated from a remote control center. The project is developed in cooperation with Finnish maritime industry, universities and research institutions. An electric funicular railway will connect Aura riverside to Kakola, the 19th century prison area that will be converted into a residential use.

Public security and safety

Public security and safety are in the essence of modern urban life. City of Turku is deeply committed to build safe living environment through public-private partnerships including involvement in solution implementation. Close co-creation relationships between all stakeholders help companies to develop successful products and provides them with references for internationalization. At the moment City of Turku is setting up a safety & security ecosystem around smart guidance systems. It includes the city as a platform, multinational companies providing comprehensive systems with open interfaces, and SMEs as solution providers.

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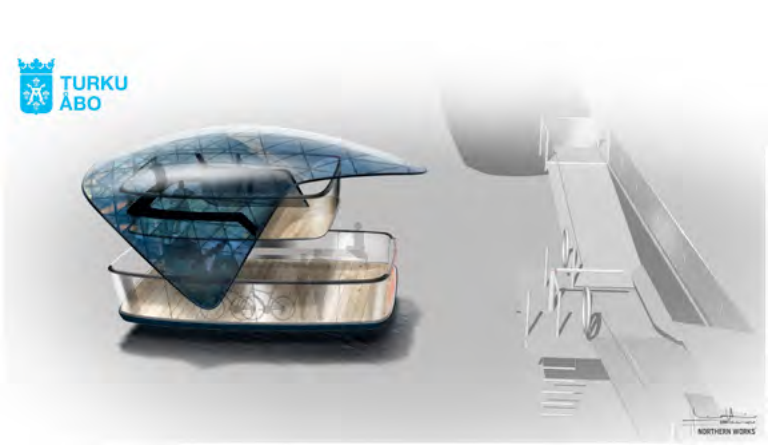
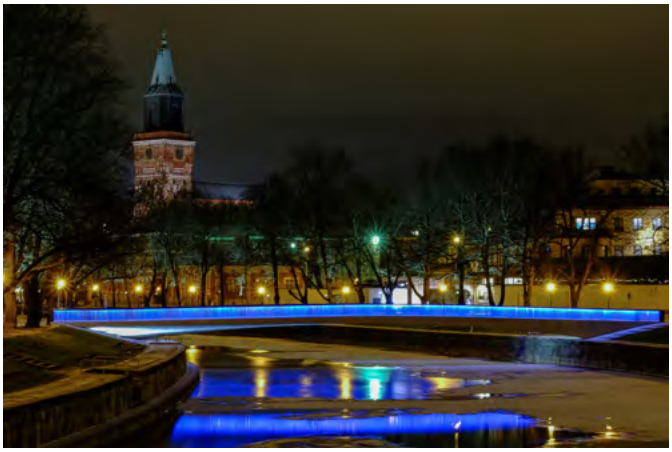
TURKU SCIENCE PARK
Innovate to accelerate

TURKU FINLAND





Oulu – Building a Smart City

Oulu – Living Lab Procedure in a Nutshell

City and Building Supervision define the land lease criteria

▼

City of Oulu rents the building sites in the Living Lab area to companies

▼

Companies develop their own solutions supported by the Building Supervision and the city

▼

The solutions are presented together by the companies, Building Supervision and the city

▼

Building Supervision or the city gather the experiences and make a report

▼

Building Supervision and the city share the experiences and results to new builders

For 15 years the City of Oulu has developed the quality of buildings and construction by Proactive Quality Management of Building Supervision. The focus has been on issues like moisture management, energy efficiency, renewable energies, renovations, and healthy built environment. Proactive Quality Management has been targeted to contractors, building companies, designer and single-family home owners. During the years of development of this proactive work model, Building Supervision has organized hundreds of education sessions and completed several national and international projects funded by the city, Tekes, EU and the Ministry of Environment.

City of Oulu as an Enabler

The City of Oulu offers platforms for companies to develop new solutions and test out their inventions. There have been several areas in the city where companies have had a chance to do such piloting. At the moment the area of Hiukkavaara, old military area, works as a large scale living lab for both development of city planning and construction. Over 20,000 people will live and work in the area. Oulu is an extraordinarily good location, especially for construction piloting, with the climate changing from extreme cold to warm summers.

Oulu also supports smart businesses by doing matchmaking between companies, participating citizens in planning and supporting start-ups. Oulu works towards continuous development and evolution between the platform environments.

Renewable Energies and Future Houses

At Hiukkavaara there is a focused piloting area of energy efficiency, renewable energies and new technologies. This area was built during two projects RESCA Oulu and Future Buildings and Renewable Energy (www.tulevaisuudentalot.fi). Goal of these projects was to develop and utilize the latest IoT technology with various kinds of renewable energy sources and many new solutions for the hybrid forms of heating were developed. Part of the challenge was also safe structures and healthy houses. The area continues to be of great interest to international guests and more piloting platforms are being built in Hiukkavaara.

Focus in the Future

BIM models will have a bigger role in future building processes. Oulu is prepared to enable and support this evolution by providing new target areas for companies and professionals as a development environment. Along with the fast moving ICT technology development, Building Supervision of Oulu is participating in an EU / Interreg Nord project aiming to promote the use of BIM models in construction and the use of models in planning permission work.

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Joensuu

– platforms for development collaboration

Joensuu is looking forward to the realisation of well over €1-billion investments in the symmetric city centre, green industrial park and public buildings by 2030. We aim to do this as a smart strategy and to look for partners and networks to join the operation.

New symmetric city centre

This future centre of travel services, living, business and recreation is located in the beautiful river bank environs, in the very centre of the city, and joins the old town with two new bridges. Over 60,000 m2 of varied forms of construction are envisaged under public and private partnerships. There is an abundance of opportunities for smart living, mobility and energy.

GreenPark – Modern industrial park within the city

All logistical solutions are available, being next to the railway and in-land freshwater harbour with access to the Baltic Sea and beyond, offering possibilities of a 40,000 m2 extension with smart economy and energy solutions. The biggest forest machine factory in Europe is located in the neighbour.

Innovative learning environments

Joensuu's education cluster is being developed in close R&D collaboration with the University of Eastern Finland, other educational institutions and with city schools. We want to modernise our learning environments to facilitate future-oriented learning - developing smart people and environments.

Welcome to make Joensuu, the European knowledge centre for forest bioeconomy, to be carbon-neutral by 2030!

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City of Lahti

Hennala – a pioneer area of electric transportation

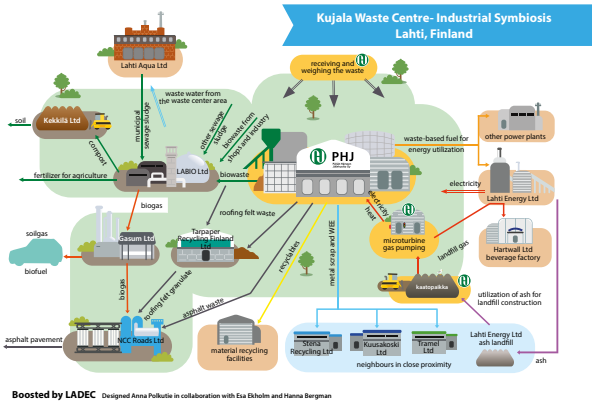
Hennala is a district in Lahti, Finland, that is being built into an innovative pioneer area of technologies, services and operation models related to electric transportation. This area will be connected also to city centre of Lahti using new solutions of future mobility. The area will minimise the life cycle costs of mobility and environmental stress by combining the best technologies in the industry with crowd-sourcing of traffic.

The area focuses on various solutions and services to combine traffic (MaaS, Mobility as a Service) and the utilisation of renewable energy sources to fuel electric transportation. The possibility of joint ownership and rental business for electric cars and charges are being surveyed in the area.

Kujala waste centre – Finland's most significant area of recycling business activities

Resource-smart collaborative production and consumption create new business in today's industrial value networks. In the Lahti region, life cycle thinking regarding products and materials has resulted in a symbiosis in the Kujala area, which has grown into Finland's most significant area of recycling business activities and an advanced demonstration of industrial symbioses. The businesses operating in the area utilise each other's effluents, know-how and services in their production.

In 2014, the Kujala waste centre received almost 200,000 tonnes of waste. 91% of the total waste amount and up to 95% of municipal waste was utilised. Today, the landfill site only accepts waste that cannot be utilised as materials or energy. Thanks to the new material and energy utilisation solutions, less than 10% of the annual incoming waste ends up in the landfill site.



Finnish national road 12 – Smart solutions and recycled materials

The new Finnish national road 12 (VT12) will be the national main road connection between east and west, the construction of which will begin in the spring of 2017. The project is to be fully completed in late 2021.

The new national road will advance the development possibilities for land use and the business sector in the entire Lahti region. It will particularly speed up the development of the Nostava logistics area and create functional, efficient traffic connections to the Kujala industrial and logistics areas. VT12 will also strongly affect the development of the central Lahti and Hollola areas, as through traffic is directed away from the urban areas.

The construction of VT12 will extensively utilise smart solutions for optimising the traffic and recycled materials for coating the road. The construction of VT12 will emphasise environmentally friendly solutions.

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Uudenmaan liitto
Nylands förbund

Leverage from the EU 2014–2020

European Union
European Regional Development Fund

LADEC
LAHTI REGION DEVELOPMENT

Business LAHTI REGION

LAHTI

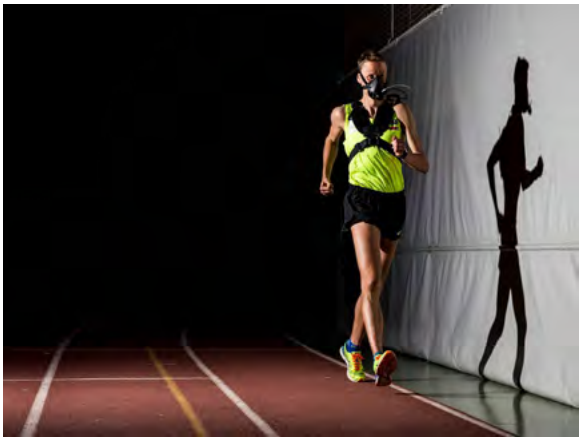
Jyväskylä on the Move

Lively and big on variety, passion for sport and well-being. Home for students, events, unspoiled nature along ease of living. In central Finland, nearby everything.

Jyväskylä is world-renowned for sport and health science and a hub for this industry in Northern Europe. Key Finnish research organisations and academic training programmes can be found in Jyväskylä working close the University of Jyväskylä's Faculty of Sport and Health Sciences.

Sport and health science research brings business opportunities for companies, as markets for health and well-being technology solutions are growing rapidly. ICT and cybersecurity are integrated into solutions. Great example of business success is Firstbeat Technologies. Their technology transforms heartbeat data into personalized insights on stress, exercise and sleep. Half of NHL teams optimize their performance with Firstbeat.

Jyväskylä's population and business life are growing. City development platforms; Hippos, Kukkula and Kangas offer opportunities to get involved and speed up growth.



Hippos2020 and Kukkula - 1 billion investment for the future well-being

Hippos aims to be the most versatile indoor sports centre in the Nordic area through construction of purpose-built, adaptable premises that can accommodate a wide range of disciplines. Facilities for sports and physical activity will cover almost 100 000 floor square metres. In addition, Hippos will feature a sports laboratory, business and office spaces, as well as commercial premises. Construction of the new Hippos will commence in 2017 and the area should be up and running by 2020. Neighbouring area Kukkula involves the construction of a completely new central hospital for Central Finland as well as the creation in the new hospital's surroundings of services and new business activity dedicated to wellness and health promotion.

Kangas - Wise, lively and safe hybrid area

Ambitious planning, a smart urban structure and the very latest in municipal engineering is combined to create a unique, high quality environment. In the future Kangas will be home for more than 2100 jobs and 5000 people. In all Kangas is an investment of 1 billion EUR. Reasons to be proud of development in Kangas are for example resource wisdom, %-culture, cybersecurity strategy and co-creation with universities and businesses.

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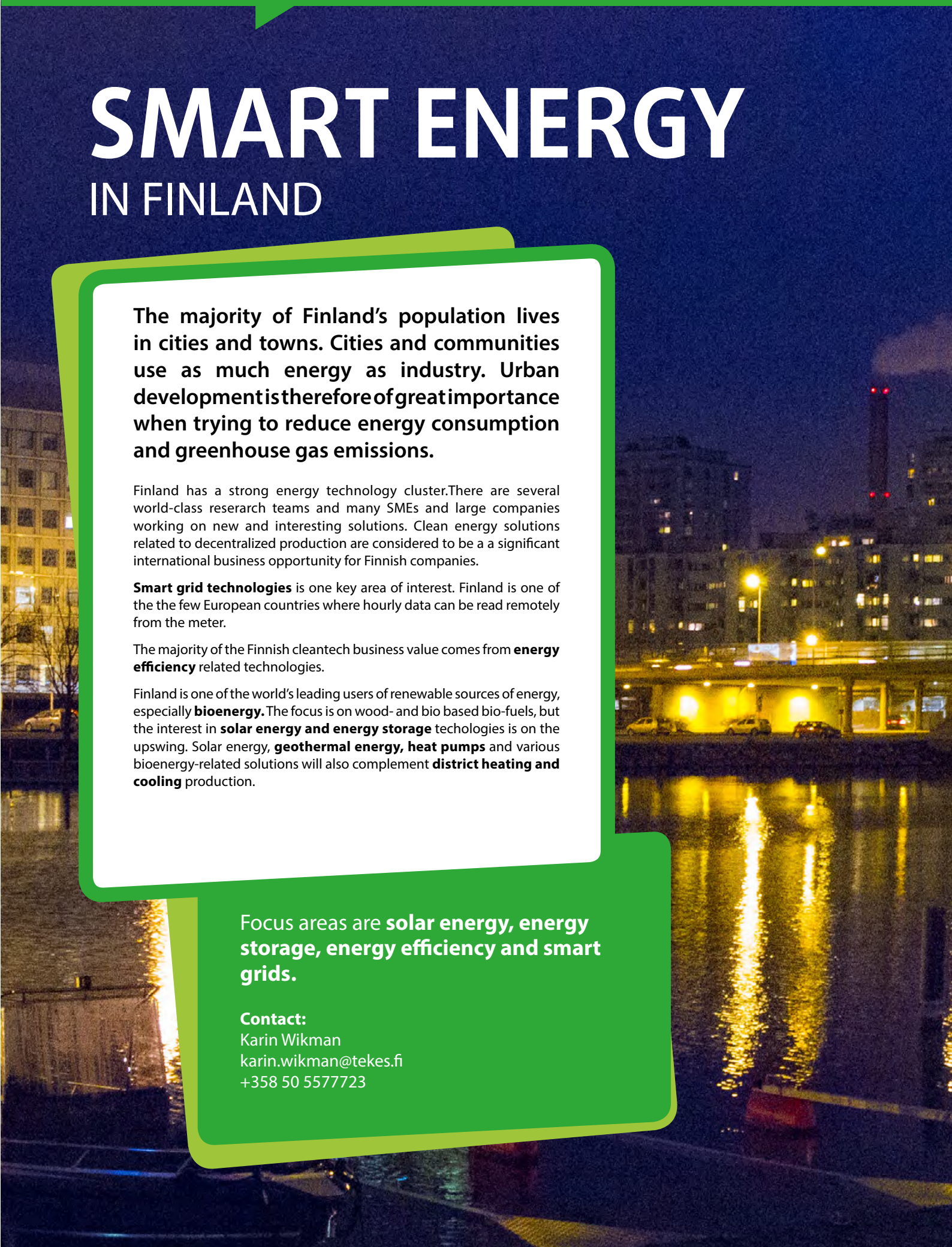
#BusinessJKL
#kaupunginkangas

JYVÄSKYLÄ

SMART ENERGY
IN FINLAND



The majority of Finland's population lives in cities and towns. Cities and communities use as much energy as industry. Urban development is therefore of great importance when trying to reduce energy consumption and greenhouse gas emissions.

Finland has a strong energy technology cluster.There are several world-class reserarch teams and many SMEs and large companies working on new and interesting solutions. Clean energy solutions related to decentralized production are considered to be a a significant international business opportunity for Finnish companies.

Smart grid technologies is one key area of interest. Finland is one of the the few European countries where hourly data can be read remotely from the meter.

The majority of the Finnish cleantech business value comes from **energy efficiency** related technologies.

Finland is one of the world's leading users of renewable sources of energy, especially **bioenergy.** The focus is on wood- and bio based bio-fuels, but the interest in **solar energy and energy storage** techologies is on the upswing. Solar energy, **geothermal energy, heat pumps** and various bioenergy-related solutions will also complement **district heating and cooling** production.

Focus areas are **solar energy, energy storage, energy efficiency and smart grids.**

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Future Flexible Energy Systems
consortium

FLEX^{e} is a consortium in Finland gathering 17 companies and 10 research institutions or universities covering the entire value network of energy systems. The consortium covers a broad spectrum of competences ranging from electrical energy engineering, technological knowhow for energy generation, ICT, and system automation, as well as expertise in energy production, transmission, distribution and usage.

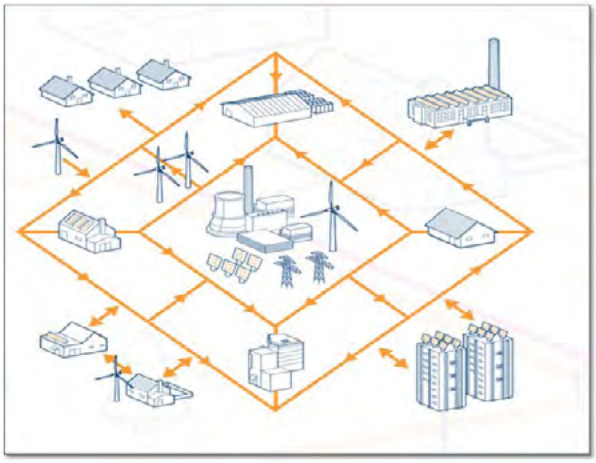
The aim is to create novel technological and business concepts enhancing the radical transition from the current energy systems towards sustainable systems. FLEX^{e} combines smartness, flexibility, environmental performance and economic success with customer acceptance and engagement. The following topics have been selected to be in focus of research:

- Systemic views on the transition to business ecosystems of a future flexible energy system – understanding future demand profiles and the role and value of different flexibility options;
- Optimised and secured integration and operation of future energy networks;
- Flexibility management of distributed resources – increasing efficiency across the whole energy system and supporting active participation of all partners of the system;
- Flexible generation for future energy system – new operational modes for secure, cost-effective, clean and competitive supply.

More information:
clicinnovation.fi/activity/flexe

Smart Grid Pilot Project in Vaasa

The energy operators in the Vaasa region, in Western Finland, test and pilot the most recent smart grid technology in the village of Sundom. The goal, of the globally unique smart grid pilot project, is to make electricity delivery more reliable, and to establish the preconditions for distributed power generation, grid control, and use of solar and wind power in the region's households.



Consortium:

ABB Oy, Vaasan Sähkö Oy, Vaasan Sähköverkko Oy, Anvia Telecom Oy, Technology Center Oy Merinova Ab and University of Vaasa

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MERINOVA
TECHNOLOGY CENTRE

Wirepas

Wirepas is focused on providing the most reliable, optimized, scalable and easy to use device connectivity for its customers. Wirepas Connectivity is a de-centralized radio communications protocol that can be used in any device, with any radio chip and on any radio band. With Wirepas Connectivity there is no need for traditional repeaters because every wireless device is a smart router of the network. The connected devices form the network - easy as that. Wirepas has its headquarters in Tampere, Finland and offices in Brazil, France, Germany, South Korea, the UK and the United States.

Things connected – Naturally

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SenCity project

The SenCity project pilots smart outdoor lighting in different kinds of urban environments. Electric supply and communication available in centrally located smart lighting, attracts other solutions, such as data gathering or base station installations, to be integrated with lighting infrastructure.

The SenCity activities focus on three aspects:

1. to study users' needs and experiences of intelligent lighting,
2. to develop and test new technologies such as sensing, data analysis and communication needed for user-centric designs and services, and
3. to generate business opportunities for smart, data-based services. In the pilots, the aim is to employ lighting infrastructure as a service platform - an IoT backbone - in intelligent cities.

Together, separate pilots in six cities around Finland create a living lab ecosystem for developing and testing innovative solutions in the future.

The SenCity project group consists of collaborating research institutions, cities, and companies in lighting and ICT fields.

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Tehomet

Tehomet is the Nordic countries' largest manufacturer of custom steel and wooden light poles and lighting masts. We offer a wide selection of lightingpoles as a platform for smart city infrastructure, manufactured from steel, wood or aluminum.

Our strength is on creating a solutions specially tailored for your unique needs. We have designed nd manufactured customized, distinctive architectural outdoor lighting wonders which illuminate and inspire in Nordic regions and across the Europe market areas.

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Greenled

Greenled Oy is a Finnish provider of lighting solutions to companies and the public sector. We assist our customers in enhancing their business activities by sustainable lighting solution. Our product range covers everything from single products to execution and management of the whole lighting project.

Greenled Sirius luminaire´s

The timeless Scandinavian design of Sirius is ideal for city environments built in different times. Like a good durable design, good appearance, durable materials, and functionality meet in Sirius. The luminaire family includes several options for different needs from highways to the streets of cities and dwelling areas, light traffic routes and parks.

Sirius is reliable platform for Smart City innovations through lighting grid.

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Valopää

VALOPAA Ltd. is a provider of intelligent outdoor and industrial lighting solutions. Our offering includes LED luminaires, intelligent lighting control systems, as well as lighting technology. VALOPAA solutions create energy efficient and pleasant lighting.

Our iLUMNET product line offers intelligent lighting control products and cloud based lighting control services that provide energy efficiency and operational effectiveness for industry, commerce and outdoor lighting solutions. iLUMNET solution combines cloud based lighting management with easy access to smart city systems and locally controlled reliable and responsive lighting. VALOPAA delivers iLUMNET solutions and technology to luminaire manufactures, constructors, lighting operators and other customers.

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Solixi

Solixi produces clean heat, levels energy production and price peaks, optimizes energy efficiency and minimizes the use of grid energy.

New profitable, reliable and smart energy system is now available.

Solixi water boiler capacity counts in MWh's, not in kWh's, volume in cubic meters, not liters. Temperatures vary 0-125°C, not 30-70°C.

Solixi solar concentrator enables high nominal power all day long, not 0-4h. For the first time concentrated solar power on rooftop.

Solixi heat pump doubles efficiency, both heat and cold are stored.

Solixi controller works offline and is connected to a cloud service. Boiler charge or discharge mode change according to weather and energy price forecasts.

Additional water heaters, heat pumps, heat recovery and cooling devices can be connected.

Solixi combined with clean grid power enables 100% emission free heating and cooling. Solixi is an economical choice for an eco-oriented city, company or building.

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SMART TRANSPORT

ACTIVITIES IN FINLAND

The traffic and transport sector is facing major changes. More and more people are seeing their mobility and transportation needs as services they prefer to buy easily. Owning vehicles is not any more a must for the younger generation.

Tekes' Smart City programme focuses on:

Mobility as a Service (MaaS), which means providing a travel service with one ticket from door-to-door, enabling routing, booking, paying etc. with one user-friendly application on your mobile device. Different players are currently running numerous pilots and demonstrations around Finland. There are also many new companies being founded that provide MaaS services.

Autonomous driving (robot cars) is one of the most promising mobility technologies. Owning a car is no longer compulsory when you can simply order a self-driving vehicle to your door when required. Technologies in this area still need development and Tekes is involved in certain infrastructure platform projects where the likes of sensor and communication technologies are being tested in real conditions. These platforms are also open to international enterprises for testing their technologies and service concepts.

Electric vehicles and traffic. All kinds of vehicles will gradually be electrified in the future. Electric passenger vehicles are becoming mainstream in some markets. Public transportation is also most likely going to be electric in the near future. Heavy machinery companies have started to introduce hybrid or pure electric work machines to the market. New businesses have been created that provide services for electric vehicle owners, such as charging. An electric bus manufacturing business has also been launched.

Light (electric) vehicles. More and more people are using light vehicles in their daily life. Cycling has become a very popular form of commuting to work in many countries, also in Finland. A considerable amount of tourism-related income is generated by cycling services. In Finland a new law came into force in 2016 that allows the use of light electric vehicles in public places and lanes. Tekes is involved in many activities where light vehicle businesses are being developed.

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PayIQ

PayIQ develops cloud-based intelligent mobile solutions for public and private transport utilizing Microsoft Azure technology.

We are the leading mobile payment solutions enabler for Mobility as a Service (MaaS) operators. Our focus is on mobile tickets, security and safety serving all travel means including various flavors of shared economy. PayIQ is a Microsoft CityNext Partner and active member in Global MaaS Alliance

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SITO

SITO is a multitalented company in the field of infrastructure, traffic solutions, logistics, land use, environment and digital services. Our versatile services cover all stages of the design process, from consultation to project management.

Through our national, regional and local digital cloud based services, we improve the maintenance of the basic registers, zoning, building control, and related services provided by municipalities' technical offices, the management of infrastructure property, as well as mobility and transport services.

Our mission is to help cities and public & private sector customers to gain cost efficiency by digitalization. Examples of SITO's Smart City Solutions are: Open 4D City Model in City Planning and Building Inspection, Construction site management with GIS and BI, e-Commerce solutions for the cities, Integrated mobility services (MaaS).

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SMART BUILDING & ICT
IN FINLAND

Finland is situated in the northern hemisphere, between the latitudes 60° and 70°. The average temperature in Helsinki on the southern coast of Finland is approximately 6°C and the seasons vary from hot summers to cold and snowy winters. The harsh weather conditions have forced us to be innovative in developing smart and resource-efficient solutions. These solutions highlight advanced concepts for city planning, as well as sustainable and smart living, energy, and mobility services integrated to modern ICT technologies. Sustainable built environment is completed with advanced waste management, lightning and recycling. These themes are not Finnish-specific: they can be shared globally. Buildings and real estates account for approximately half of the total capital and 40 percent of energy and material resources globally. Buildings are becoming smarter and increasingly data intensive.

The Finnish state-of-the-art competence can serve as a base for the solutions that are developed for global needs. Finnish companies and research teams have specific competences in areas like ***Building Information Modeling (BIM), Energy efficient construction, Energy efficient homes*** and ***Home automation, Smart Workplaces and Indoor air quality***. Finnish cities, research teams and companies have progressive activities on developing participatory, sustainable and **digital urban planning** including public-private-people partnership.

We want to remain a forerunner in supplying sustainable innovations also in the future. In the following pages you can find few examples of innovative products, solutions and services related to smart buildings. Tekes provides an easy access to the Finnish innovation ecosystem, and a significant link to Finnish companies that participate actively in different research and development projects. Please feel free to contact the Tekes experts for additional information.

We are at your service!

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Power Balance Management in Consumer Stores and Warehouses

The project is focusing on new balancing power concepts, which are able to use the reactive demand flexibility of buildings and more specificly in consumer stores and warehouses. The need for balancing power is increasing with the increase of wind and solar energy and decrease of fossile-based balancing power.

The project is formed of a group of companies, research organizations, consumer store chain and a grid company, which are together developing a new power balance management business eciosystem and flexible demand based business models. The main driver of the project is the increasing demand response as part of power balance management.

Consortium:
VTT Technical Research Centre of Finland, Oulu University, Rejlers Oy, Emtele Oy, GEF Oy, Jetitek Oy

Contact, more information:
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Future dialog

Future societies are shaped by today's technology. We enable engagement and create dialog among communities and cities. The mission of Future Dialog is to turn passive community members into active participants utilizing modern day mobile technology. We provide community members with a private channel for having an impact on communitys´s decision making. A channel that is always available.

Future Dialog provides its customers with personalized mobile applications. Customers can modify the applications and create content using a simple user interface. The solution enables effortless content creation using standardized content cards. Users can publish questionnaires, collect feedback and communicate utilizing videos and pictures for example. All the information gathered from the application users in addition to time and location can be utlized for further targeted communication. The collected data and data analytics is available online.

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FUTURE DIALOG

Cityfier / A-Insinöörit

Cityfier is a digital service innovation that applies latest game engine technology to measure distances between the qualitative components of future neighborhood. Cityfier can estimate the best location and assess the increase in the value of your investment for coming years.

A-Insinöörit Oy is a growing international expert in construction management and design. We have vast experience in the successful management and design of demanding large-scale construction projects. We excel at even the most demanding projects by combining our 50 years of experience with the latest technology and expertise.

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Terrasolid

Terrasolid develops software for processing airborne and mobile point (LiDAR) cloud data and images providing solutions for 3D City, 3D Mapping, Powerline Management, Road Authorities, Forestry and Mining.

With our applications you can create a photorealistic 3D city model for planning, analysis and visualization or analyze road surface to detect potential water puddle areas or other signs of bad road condition. Mobile LiDAR data can also be used to analyze traffic sign visibility, classify visibility obstacles and analyze different type of road slopes.

Mobile LiDAR data, scanned on railway or tram infrastructure, meets high-accuracy requirements and provides detailed and accurate spatial information of tracks, overhead wires, platforms, bridges, tunnels and other structures. Matched and classified with Terrasolid software, the point cloud itself or vectorized objects can be utilized in many tasks of planning, construction, engineering and maintenance.

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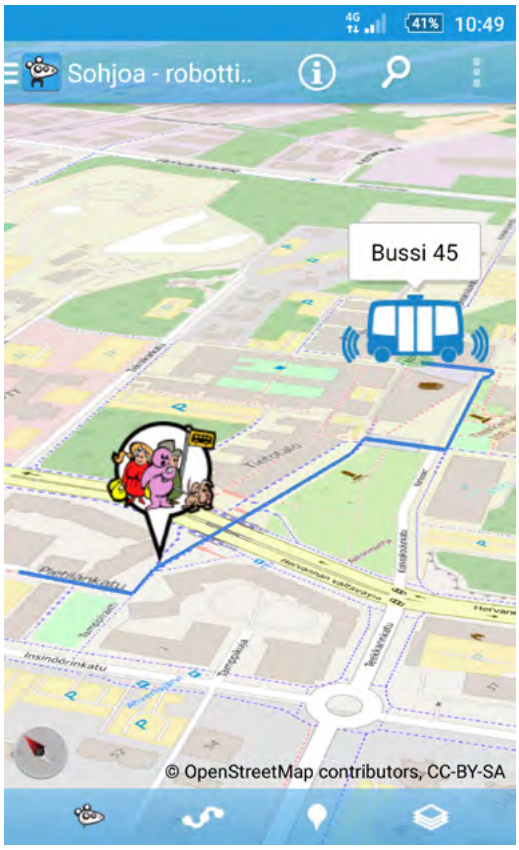
Citynomadi

- Seamless indoor and outdoor location: hospitals, venues, industrial buildings
- Beacons to track persons and items, IndoorAtlas to cover the indoor location, and GPS to cover outdoors
- Visualisation of the maps for different user groups by combining the open source, sensor and big data
- Gamification, crowdsourcing and customised information, such as enquiries gathering through a map interface
- Strict user credential groups for industrial use
- Cost benefit, quick and handy OFFLINE map interface for the green environment, logistics, schools, tourism, culture, media, commercial ...
- Free Nomadi app in 7 language and counting
- Get yours for FREE on app.citynomadi.com



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Vincit

intoParking takes a whole new and efficient leap in parking control. Parking control has never been this easy. With automatic procedures such as license plate recognition, mobile payment check, the address check based on the GPS, photographing the car and sending ticket reports to city office in real time makes traffic wardens' actions four times faster compared to traditional ways in parking control. This allows controlling broader areas with same resources.

intoParking App and intoParking Cloud

intoParking solution consists of two products. intoParking App offers new digital tools for traffic wardens through smartglasses and Android smartphones. intoParking Cloud is a parking control cloud service, including for example automatic ticket and claim for correction processing, as well as electronic services for drivers.

intoParking is developed by Vincit Oy. Vincit Oy is a Finnish software company which has been ranked first at Best Workplaces in Europe by Great Place to Work Institute. Vincits customer satisfaction rate is top class.

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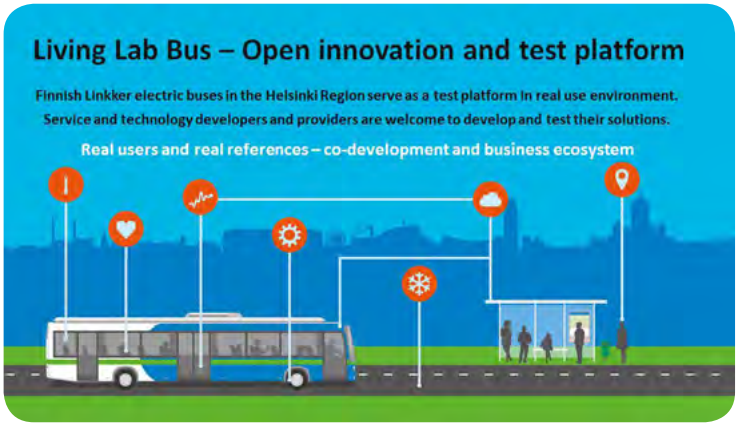
Living Lab Bus (LLB) - environment

Living Lab Bus – Innovation and test environment

The Living Lab Bus enables development, testing and demonstration of various services and technologies in a real use environment. A fleet of innovative electric buses in normal operation in the Helsinki Region are used as a concrete test environment. The environment is implemented in co-operation with private companies and research organisations together with the support of the public sector. In addition to those involved from the beginning, third parties are welcome to get in contact to participate and use the platform to test their own solutions.

Consortium: Ajeco Ltd., EEE Innovations Ltd., Foreca Ltd., iQ Payments Inc., Linkker Ltd., HSL, City of Helsinki, City of Tampere, VTT Technical Research Centre of Finland Ltd., Aalto University, University of Tampere, Tampere University of Technology



More information:
www.vtt.fi/sites/livinglabbus/

Neo-Carbon Energy

An emission-free energy system for the future

Neo-Carbon Energy is creating an entirely new system for generating energy that is emission-free, cost-effective and independent. The aim is to design a system that is based mainly on solar and wind power and make 100% renewable and emission-free energy system possible. A vision of the needs of such a system and its societal impacts is created as well as commercial potential identified.

Among the project focus areas are the development of electricity grid-balancing energy storage technology, integrating and electrifying different energy using sectors (called sector bridging), and thereby solve the intermittency problem of solar and wind energy. The project has for the first time created a global energy internet model capable of simulating the hourly operation of the future energy system. During the project a proof-of concept plant is built that produces fuels from CO2 and water captured from the air.

Our vision:
https://www.youtube.com/watch?v=wcRuTnNYMqI

Consortium:
VTT Technical Research Centre of Finland,
Lappeenranta University of Technology,
University of Turku

More information:
www.neocarbonenergy.fi
facebook.com/neocarbonenergy
Twitter: @neocarbonenergy

DRUMBEAT

Web-enabled Construction Lifecycle

In the future networked society a Web-based approach to connect building information to other data will make it easily accessible and greatly increases its value. The Drumbeat project takes practical steps to implement the Web of Building Data concept in real industry-driven use cases focusing on different phases of the construction lifecycle: design coordination, supply-chain management and facility management. The ultimate aim is the emergence of an open ecosystem around the Web of Building Data platform; the platform will be provided as open source software, and other companies and student groups will be activated in its use.

Consortium: Aalto University, VTT Technical Research Centre of Finland, Trimble Solutions Oy, Solibri Oy, Parma Oy, Skanska Oy, Granlund Oy, Progman Oy, A-Insinöörit Oy

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Tekes – the Finnish Funding Agency for Innovation

Tekes is the most important publicly funded expert organisation for financing research, development and innovation in Finland.

www.tekes.fi/en

Tekes