

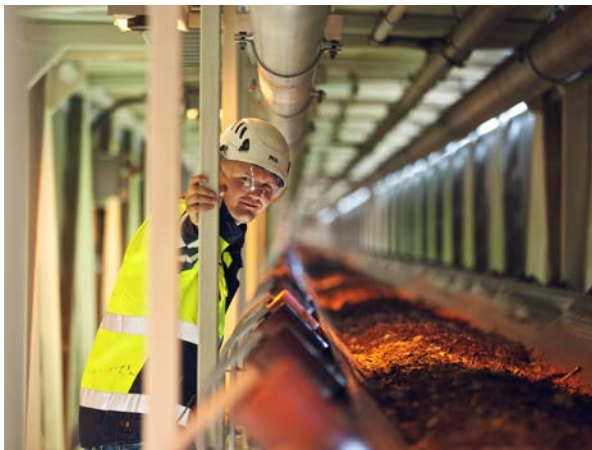
ENG

GREEN

for real

GREEN

ENERGY SHOWROOM



Contents

INTRODUCTION	3
AXCO MOTORS	4
EKOGEN	6
FORTUM	8
GASUM	10
GREEN ENERGY FINLAND	12
ITULA	14
LAPPEENRANTA & WIRMA	16
LAPPEENRANNAN ENERGIA	20
LCA CONSULTING	22
LOAS	24
LUT	26
NORDIC SET GREEN	28
THE SWITCH	30
SYKLI	32
TECHNOPOLIS	34
TIETOKOURA	36
TUULIMUUKKO	38
VALTIA	40
VISEDO	42

Ecological actions and new business operations

THE GREEN ENERGY SHOWROOM IS A NETWORK OF GREEN ENERGY OPERATING IN LAPPEENRANTA, AND ITS MEMBERS ARE UNITED IN THE EFFORT TO ACHIEVE A MORE SUSTAINABLE TOMORROW.

The network was established by local businesses in the energy and environmental industry, the City of Lappeenranta and Lappeenranta University of Technology (LUT). The coordinator of the Green Energy Showroom is Wirma Lappeenranta Ltd.

The purpose of the Green Energy Showroom is to increase networking by enterprises, develop the operational environment, showcase the region's high-tech sites and network the operators of the Green Energy Showroom with LUT's Green Campus entity. The network activates the entire region by arranging competitions and events.

The products and services of companies and organisations that belong to the network are based on the use of renewable energy, energy-efficient solutions and competence that promotes sustainable development.

The network's coach is LUT, which encourages network members to innovate solutions that, in addition to green values, include business potential and create new jobs.

This brochure contains the basic information on the network members. For further information about the Green Energy Showroom as well as ongoing and completed green energy projects, please visit www.greenenergyshowroom.fi. The site is a window, open for everyone, to the green competence of Lappeenranta.

Permanent magnet drives churn out green electricity

AXCO-MOTORS' GENERATORS OPERATE AT HIGH EFFICIENCY, ALMOST OR ENTIRELY WITHOUT ANY OIL REQUIRED BY THE TRANSMISSION. THAT IS WHY THEY ARE PERFECTLY SUITED FOR HYDRO AND WIND POWER PLANTS.

The energy efficiency of AXCO-Motors' generators is at the top of its class. Generators manufactured in Lappeenranta have been installed in hundreds of hydro and wind power plants all over Europe.

– In the British Isles, Benelux countries and Northern Italy, for instance, says Managing Director **Asko Parviainen**.

Direct-drive, or ungeared, permanent magnet electric motors can rotate energy from even low cascades at high efficiency.

A permanent magnet electric motor is easy to maintain and it is an ecological alternative. It has no gearboxes, so the risk of malfunctions is small and there are no maintenance breaks to impede the operation of a power plant.

The generators are designed and assembled in Lappeenranta. The manufacturer also handles the commissioning of its generators. AXCO orders components from subcontractors based in Finland and Central European countries.

AXCO-MOTORS DEVELOPS AND MANUFACTURES DIRECT-DRIVE ELECTRIC MOTORS FOR DISTRIBUTED ENERGY GENERATION AND SPECIAL APPLICATIONS. AXCO-MOTORS PRODUCTS ARE USED IN SMALL WIND POWER PLANTS, HYDROPOWER PLANTS AS WELL AS IN ELECTRIC AND HYBRID VEHICLES, AMONG OTHER THINGS. TWO-THIRDS OF THE COMPANY'S PRODUCTION IS EXPORTED.



A permanent magnet electric motor is easy to maintain and it is an ecological alternative.

Local energy is generating savings and employment.

Energy from nearby forests

THE PRODUCTION OF A MICRO POWER PLANT THAT USES FOREST-PROCESSED CHIPS AS ITS FUEL MEETS THE ENERGY NEEDS OF A SMALL VILLAGE.

Ekogen Oy's micro power plant produces both heat and electricity simultaneously. The plant's annual production is enough to satisfy the heat or electricity needs of a residential area, a small industrial establishment, a farm or a greenhouse.

The plant's operation is based on gas turbine technology to which Ekogen has connected its proprietary, efficient heat exchanger. The wood fuel burns at a temperature of over 1,000 degrees and leaves behind nothing but ash.

The fuel, forest-processed chips, is obtained from within a range of 20–30 kilometres.

The micro power plant fits inside four sea containers and is brought assembled onto the plot where it is connected to the heating, electricity and data networks.

The micro power plant is reliable, economic and ecologic. Key of Ekogen technology is to combine proven

technology in a completely new way. Ekogen has several competent partners who supply the components and provide after sales services. Produced particles from incineration of chips remain in the flue gas circulation. The flue gas is not in physical contact with process air and thus ash particles cannot flow through the turbine.

– This guarantees long life cycles, maximum production of energy and low maintenance costs for the customer. In all of our client cases we are able cut energy costs at least half and up to 75 %, says CEO **Iikka Pihlainen**.

Ekogen provides complete service with the power plant delivery including sourcing energy subsidies, building permits, construction, installations, commissioning and training. An unmanned Ekogen micro power plants operates automatically, under remote control. The future is looking very bright with huge demand in decentralized energy production.

EKOGEN OY IS A PIONEER IN DISTRIBUTED ENERGY PRODUCTION, WHICH DEVELOPS NEW SOLUTIONS FOR THE UTILISATION OF LOCAL ENERGY. A MICRO POWER PLANT THAT PRODUCES HEAT, COOLING AND ELECTRICITY OPERATES AT AN EFFICIENCY RATE OF MORE THAN 75%.



Regional interfaces from the GES network

SUSTAINABLE DEVELOPMENT, THE SOLAR ECONOMY AND THE POSSIBILITIES OF REGIONAL DEVELOPMENT CONVINCED FORTUM TO JOIN THE GREEN ENERGY SHOWROOM NETWORK.

Fortum's operations include the production and distribution of heat and electricity, along with provision of expert services in the energy sector. Key parts of the company's strategy are sustainable development and the solar economy. In both these sectors, Fortum is engaged in extensive cooperation with Lappeenranta University of Technology (LUT). Together, Fortum and LUT have taken part in national development programmes aimed at improving energy efficiency. The latest result of this collaboration is the establishment of Finland's first and only solar economy professorship at LUT.

The Imatra hydropower plants in the South Saimaa region are among Fortum's most significant production units for renewable energy.

Fortum is also visible in South Karelia in the shape of Fortum Power Solutions, its service provider. It executes the strategy of sustainable energy by providing its customers with expert services and solutions based on energy efficiency, low-emission production, productivity and life cycle management. These include operating and maintenance services for power plants as well as the overhauling and servicing of the main equipment.

FORTUM POWER SOLUTIONS, WHICH OPERATES WITHIN FORTUM POWER AND HEAT OY, PROVIDES SERVICES AND SOLUTIONS TO HUNDREDS OF CUSTOMERS ALL OVER THE WORLD. KEY CLIENTS INCLUDE ENERGY COMPANIES, THE ENERGY INDUSTRY AND OTHER OPERATORS IN THE ENERGY BUSINESS.



>> www.fortum.com/powersolutions



Fortum Power Solutions offers operation and maintenance and related expert services for power plants and industrial facilities.

H

Gasum supplies biogas, natural gas and liquefied natural gas (LNG).



Striving for a sustainable tomorrow

NATURAL ENERGY GASES MAKE A SIGNIFICANT CONTRIBUTION TO THE ATTAINMENT OF FINLAND'S NATIONAL EMISSION GOALS.

Gasum is a Finnish expert on natural energy gases (natural gas and biogas). The company imports, transmits and supplies natural energy gas for energy production, industry, households and road and sea traffic. Biogas and liquefied natural gas (LNG) diversify the use of natural energy gases in traffic on roads and at sea. With its sustainable solutions, the company offers a cleaner alternative for the immediate surroundings, the Baltic Sea and the climate.

Gasum develops Finnish energy infrastructure by investing in the LNG market, biogas business and traffic services. The gas pipeline is a logistically efficient and environmentally friendly transmission method that enables the constant transmission of large quantities of gas without any emissions.

The natural gas pipe from Russia is connected from Imatra to a network covering all of Southern Finland. Gasum's customers in South Karelia include the natural energy gas distribution company Imatran Lämpö Oy, the municipality of Ruokolahti, Lappeenrannan Energia Oy and several paper, cardboard, pulp and steel industry businesses. The company has filling stations for gas vehicles in Imatra and Lappeenranta.

Gasum is actively developing the Finnish biogas industry. Biogas is obtained from Finnish raw materials at landfills, wastewater, farms and wood-based biomass. At the moment, the greatest benefit from biogas is in the form of fuel for traffic and industry.

– Biogas is affordable. The end result of incineration is only water and carbon dioxide, says Customer Manager **Ari Seppänen**.

Gasum is Finland's leading supplier of biogas and liquefied natural gas. The company started several surveys to develop the production of biogas and utilise liquefied natural gas (LNG) as a fuel for vessel traffic in the Baltic Sea. Gasum owns the majority of the LNG distribution business of the Norwegian company Skangass.

Gasum, Helsingin Energia and Metsä Fibre Oy, which is part of Metsä Group, are reviewing the construction of a bio refinery producing biogas in Joutseno. Gasum, in collaboration with various businesses and organisations and LUT, supports the profiling of South Karelia as an energy hub in Finland.

GASUM IS A FINNISH EXPERT ON NATURAL ENERGY GASES IN THE NORDIC MARKETPLACE. THE COMPANY HAS MORE THAN 300 EMPLOYEES IN FINLAND, SWEDEN, NORWAY AND ESTONIA. IN 2013, ITS TURNOVER WAS €1.1 BILLION.

Gasum

>> www.gasum.com

Micro power plant is part of today

SOLAR AND WIND POWER PLANTS SAVE THE ENVIRONMENT AND INCREASE CONSUMER INDEPENDENCE.

GreenEnergy Finland from Lappeenranta specialises in solutions in distributed energy production, from accumulator-driven cabins on the islands, to solar power plants and wind turbines connected to the national grid.

GreenEnergy Finland is a company that provides comprehensive products and solutions in renewable energy technologies. The company designs its own systems and imports the components needed in solar electricity systems and wind turbines. It also provides the necessary technical installation and maintenance services.

GreenEnergy Finland has delivered several solar power plants in various parts of Finland.

– With the current prices of energy, this equipment pays for itself to the consumer in 10–15 years, depending on several parameters, in as little as 8–9 years for enterprises and organisations that receive energy subsidy. The life cycle of the equipment is more than 30 years; if and when the price of electricity increases, the repayment period will be even shorter, says Managing Director **Miko Huomo**.

The price of electrical energy can be calculated for the entire life cycle. The most beneficial option is to try to use the electrical energy produced in buildings. In many localities, excess electricity can be sold to the energy company. Various energy establishments are developing different models for this at the moment.

GREENENERGY FINLAND'S OPERATION ALSO INCLUDES IMPORTATION, PRODUCT DEVELOPMENT AND SALES OF WIND TURBINES, SOLAR PANELS AS WELL AS ELECTRIC SCOOTERS AND BICYCLES SUITABLE FOR LOCAL CIRCUMSTANCES.



GreenEnergy Finland develops new solutions in distributed energy in collaboration with universities. Objects of product development include energy reserves, electrical vehicle supply equipment (EVSE) and Smart Grid technologies.



Businesses requires ever better energy efficiency from their premises.

Energy-efficient heating operates according to the circumstances

THE HEATING OF RESIDENTIAL AND COMMERCIAL PREMISES CAN BE MANAGED IN AN ENERGY-EFFICIENT MANNER, WITHOUT COMPROMISING COMFORT.

A ceiling panel developed by Itula Oy contains so much intelligence that it can operate as either a heater or cooler, depending on the situation. When heating, a radiator distributes heat from water led to the panel into the room. And when cooling, cold water flows through the panel. The ideal temperature of the premises remains constant, regardless of any changes in circumstances, so no one needs to freeze or overheat.

Jukka Itkonen, the Chairman of Itula's Board of Directors, points out that energy costs make up an ever greater share of household expenses.

– However, they can be cut by reducing consumption. Itula's mode of operation is geared towards saving energy, he says.

Itula's services include comprehensive solutions that include the modelling, design and manufacture of heating and cooling systems, delivery to the work site and, when necessary, system installation and testing. In addition to its own products, the company uses technical building products from international manufacturers, where the common denominator is energy efficiency.

ITULA OY IS A FAMILY BUSINESS FROM LAPPEENRANTA, ESTABLISHED IN 1990, WHICH SPECIALISES IN ENVIRONMENTALLY FRIENDLY HEATING AND COOLING SYSTEMS THAT ENHANCE ENERGY EFFICIENCY.



Lappeenranta is going green in a big way

LAPPEENRANTA HAS TAKEN BIG LEAPS TOWARDS BEING A CARBON NEUTRAL CITY. THIS DEVELOPMENT TOWARDS BECOMING A LEADING CITY OF RENEWABLE ENERGY AND GREEN TECHNOLOGY IS SPEEDED UP BY WIRMA LAPPEENRANTA OY.

The city is part of the HINKU network of carbon neutral cities, and it has pledged to reduce its greenhouse gas emissions by 80 per cent from the 2007 level by the year 2030.

Lappeenranta is taking part in the nationwide Innovative Cities programme, where the goal is to promote the development and implementation of sustainable energy solutions. Almost 80 per cent of all waste produced in Lappeenranta is already recycled. Approximately 80 per cent of the district heat in Lappeenranta is produced using bioenergy.

Energy efficiency is improved by focusing construction on areas where the infrastructure and services are ready. The city is consistently improving the energy efficiency of its own buildings, taking account of the environmental impacts in its own procurement and encouraging residents to do the same thing.

– Through municipal decision-making, we can affect land use, energy product and emissions, thus reducing the environmental effects of the community, says Development Director **Markku Heinonen**.

Lappeenranta has the largest inland wind farm in Finland. UPM will start the production of biodiesel at its factory site. Production of solar electricity is enhanced by purchasing excess electricity from households, for instance. Lappeenranta was the first city in Finland to buy solar electricity from households. In the harbour, some of the electricity for the boat berths is produced using solar panels, and charging stations for electric vehicles will be built in Williparkki Oy's car parks. In terms of practical energy problems, city residents are guided by an energy advisor.

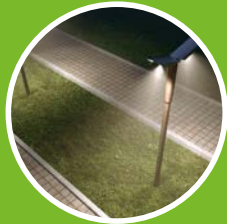
Sustainable development across all of South Karelia is guided by the protection of the Little Saimaa area and the Green Energy Showroom network project.

The Showroom network is coordinated by Wirma, a development company owned by the City of Lappeenranta and surrounding municipalities. Wirma also implements the Innovative Cities programme, and it contributes in many ways to the development of competence in green technology.

– Our goal is to bring new competence in the energy and environment sector to the province, as well as business



“**Lappeenranta** is the best climate city in Finland. It was ranked among the top 14 out of 160 cities in the Earth Hour City Challenge 2014 competition arranged by the World Wildlife Fund (WWF).”



A significant share of future jobs will be related to international business operations in environmental technology.



operations that could offer a growth sector for the future and profile the region as a hub of energy expertise, says Wirma's Managing Director **Markus Lankinen**.

Pilots coordinated by Wirma aim at global business operations that will benefit all parties: Environmental technology enterprises obtain references, and the city gets closer to its green goals and improves its image at the same time.

Instead of traditional solutions, Lappeenranta is boldly looking for new kinds of technologies for the processing of wastewater and municipal waste, for example. Future projects that concern the entire province include the waste-free world at Kukkuoinmäki, the improvement of water quality in Lake Saimaa, and wastewater investments.

In environmental and energy matters, Wirma and the City's key partner is Lappeenranta University of Technology (LUT). Spin-offs that have emerged from LUT's research projects already employ hundreds of people, directly and indirectly.

The city promotes the growth and internationalisation of sustainable development business operations by taking part in the implementation of investment objects, offering different experimentation environments and arranging competitions.



>> www.lappeenranta.fi

>> www.wirma.fi

A pioneer in environmentally friendly energy production

RENEWABLE, DOMESTIC ENERGY SOURCES HAVE A SHARE IN THE ENERGY PRODUCTION OF LAPPEENRANNAN ENERGIA THAT CLEARLY EXCEEDS THE NATIONAL AVERAGE.

Approximately 80 per cent of the district heat needed in Lappeenranta is produced in Kaukaan Voima Oy's biopower plant, of which Lappeenrannan Energia owns 46 per cent.

Lappeenrannan Energia buys carbon dioxide-free district heat from the power plant of FC Power Oy in Joutseno, and wind energy from Suomen Hyötytuuli Oy.

In addition to basic products, electricity consumers are sold Forest Power and Wind Power products that have received an EKOenergy label from the Finnish Association for Nature Conservation.

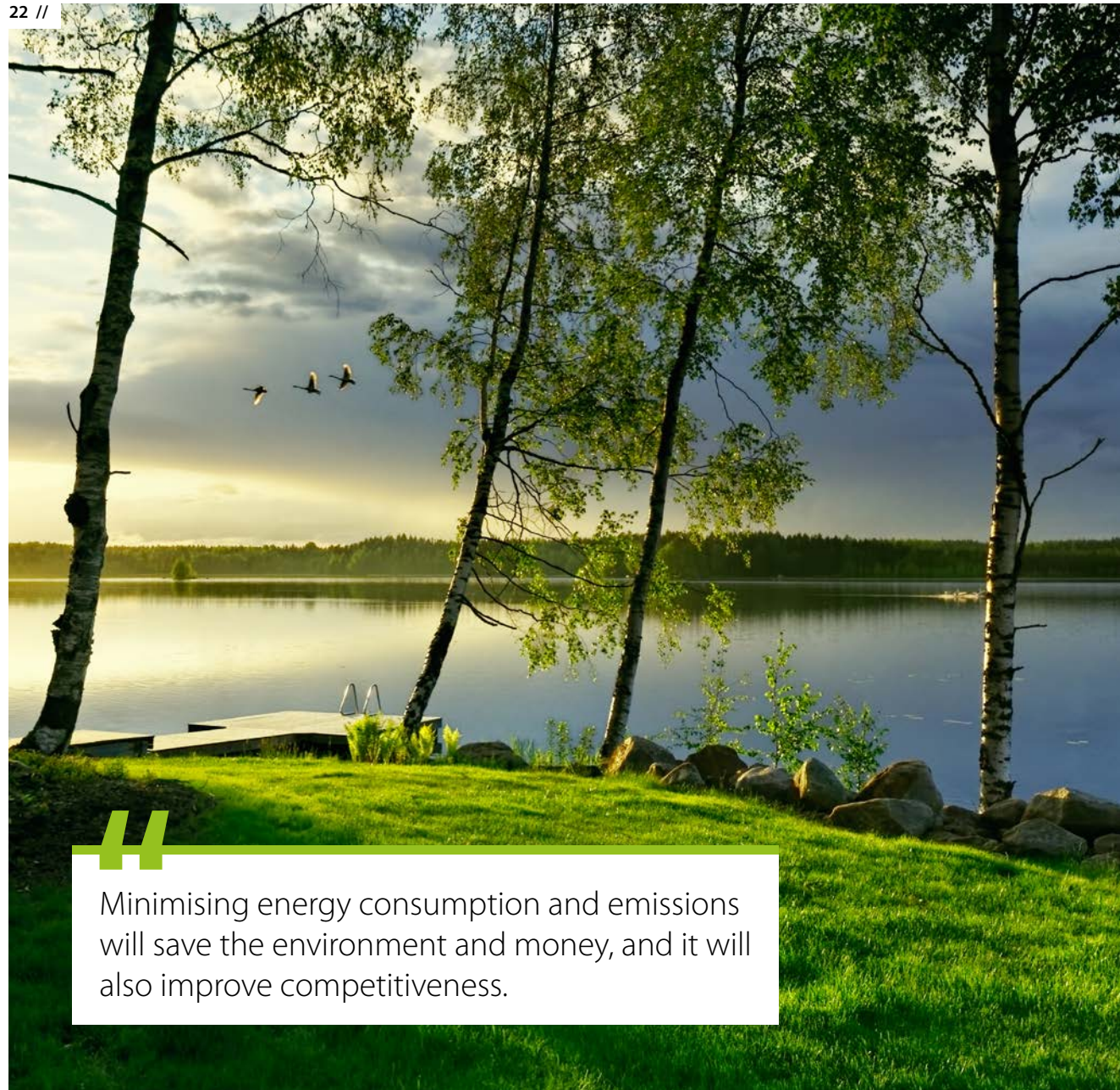
In addition, Lappeenrannan Energia buys excess energy from households, small producers of solar energy. – If necessary, we can act as a "test platform" for businesses in the energy industry. For instance, a company called Tietokoura has developed its software in our operational environment, says Managing Director **Reijo Kolehmainen**.

One pilot is the Rauha hybrid energy unit, whose heat production is based on a combination of ground heat, solar energy and natural gas. This small, local unit is the first of its kind in Finland.

LAPPEENRANNAN ENERGIA OY IS 100% OWNED BY CITY OF LAPPEENRANTA. THE MAIN FUNCTION OF LAPPEENRANNAN ENERGIA IS PRODUCTION, DISTRIBUTION AND SALES OF DISTRICT HEATING, NATURAL GAS, ELECTRICITY AND WATER. LAPPEENRANNAN LÄMPÖVOIMA OY, LAPPEENRANNAN ENERGIAPERKOT OY AND LAPPEENRANNAN VERKONRAKENNUS OY ARE PART OF LAPPEENRANNAN ENERGIA GROUP. LAPPEENRANNAN ENERGIA OY ACT AS SHAREHOLDER IN KAUKAAN VOIMA OY, SUOMEN HYÖTYTUULI OY AND TUULISAIMAA OY.



In the district heat of **Lappeenrannan Energia**, renewable fuels account for two-thirds and its carbon dioxide emissions are more than 50 per cent smaller than the average in Finland.



Towards a more resource-efficient society

LCA CONSULTING OY CARRIES OUT PROJECTS THAT IMPROVE THE MANAGEMENT OF ENVIRONMENTAL EFFECTS OF COMPANIES AND SOCIETIES.

– Our objective is to improve the resource efficiency of our customers and further that of the entire society. That is also the most important environmental objective of the EU, says the CEO of LCA Consulting Oy, D.Sc. (Tech.)

Antti Niskanen.

LCA Consulting offers companies and societies business development services, the majority of which is based on life cycle modelling.

– We use the methods and tools of the academic world. We use them to clarify the energy and material flows of our customer companies. The objective is to reduce the costs and harmful environmental effects caused by the flows and direct waste into recycling, says Niskanen.

Life cycle and resource efficiency assessments are mainly carried out for large companies and the public sector. The assessments are based on the assessment method of the environmental effects of products, also known as the Life

Cycle Assessment. The target can be either a customer's whole production or a part of it, such as energy or waste management.

Modelling or cost calculation is primarily based on data received from the customer, which is analysed systematically and impartially. In addition to results, LCA Consulting presents alternatives to further procedures.

For example, the modelling of a regional energy system can be used for calculating the current environmental effects of the energy production of the system, the energy transfer network and the consumption targets. Various scenarios can be used for testing how the development procedures of regional energy systems should be directed so that their effects are as cost-efficient as possible.

LCA Consulting's service portfolio also includes energy reviews and municipal reviews of renewable energy.

FOUNDED IN 2013, LCA CONSULTING OY IS A LAPPEENRANTA UNIVERSITY OF TECHNOLOGY SPIN-OFF COMPANY. EXPERTS WHO WORK IN THE COMPANY'S PROJECTS EITHER HAVE A MASTER'S DEGREE IN ENVIRONMENTAL TECHNOLOGY AND/OR ENERGY TECHNOLOGY OR A DOCTORATE IN TECHNOLOGY.



Minimising energy consumption and emissions will save the environment and money, and it will also improve competitiveness.



By its example, **LOAS** aims to permanently transfer the principles of sustainable thinking to its young residents.

Student buildings save water and energy

REPLACEMENT OF WATER FIXTURES IN DWELLINGS REDUCED THE WATER BILL BY € 100,000.

Lappeenranta Student Housing Foundation (LOAS) builds and maintains Finland's greenest student housing community. The most significant measure improving energy efficiency – the replacement of water fixtures – reduced the annual water consumption in the student buildings from 142,000 to 130,000 cubic metres. At the same time, the water bill was reduced by €100,000. The decrease in water use also cuts down on the heating bill, and the effects are directly passed on to housing costs.

By its example, LOAS aims to permanently transfer the principles of sustainable thinking to its young residents. Energy consumption optimised to the best level possible

can be maintained through monitoring and servicing. Heat recovery through air conditioning systems is developed. Renovations improve the energy efficiency of the buildings. Everything that can be is recycled – and even partners are expected to employ energy-efficient solutions.

The newest LOAS student building has solar panels on its roof. They produce approximately 8,000 kWh of electricity per year for the building.

– Once the panels become sufficiently economical, we will add them to old buildings, says Property Manager **Paavo Leinonen**.

LAPPEENRANTA STUDENT HOUSING FOUNDATION (LOAS) IS A NOT-FOR-PROFIT ORGANISATION THAT ADMINISTERS ABOUT 80 STUDENT BUILDINGS IN LAPPEENRANTA. LOAS HAS APPROXIMATELY 3,000 RESIDENTS TODAY.

LOAS

Green research on a green campus

LUT STUDIES, TEACHES, PRODUCES AND USES RENEWABLE ENERGY.

Wind and solar power plants on the Green Campus of Lappeenranta University of Technology (LUT) produce electricity for research purposes and for charging electric vehicles and bicycles, for instance. Use of the electricity produced is monitored and it drives the smart electricity grid of the campus.

A considerable share of the University's research is aimed at the energy and environmental sectors, with approximately 250 researchers and experts taking part in various related projects. Indirectly, the energy field employs employees of the Mechanical Engineering faculty, among others.

– We focus on topical matters requiring actions, such as combating climate change, ensuring the constant availability of water and energy, and the comprehensive management of waste, says Professor **Juha Varis**.

LUT is the engine, research unit and coach of the Green Energy Showroom network. LUT helps network members make their current operations more energy-efficient and leads them to innovate new solutions in sustainable development that entail significant business potential.

The cooperation between the University and enterprises has already generated successful spin-offs. They employ, directly and indirectly, hundreds of people in the province. The Green Campus acts as both a test platform for innovations and an "exhibition space" that is open all hours.

LUT observes the principles of sustainable development in its own operation. The Green Campus has been recognised in the International Sustainable Campus Network-competitions as the world's best university campus for sustainable development. WWF has awarded LUT the Green Office label.

THE STRATEGIC COMPETENCE AREAS OF LAPPEENRANTA UNIVERSITY OF TECHNOLOGY, ESTABLISHED IN 1969, INCLUDE GREEN ENERGY AND TECHNOLOGY, THE CREATION OF SUSTAINABLE COMPETITIVENESS, AND ITS OPERATIONS AS A BUILDER OF INTERNATIONAL CONNECTIONS WITH RUSSIA. THE SCIENTIFIC COMMUNITY INCLUDES 6,500 STUDENTS AND EXPERTS.



LUT
Lappeenranta
University of Technology



LUT is Finland's largest instructor and researcher in the energy industry, with experts in the entire energy chain, from energy sources to end use.

A smart city is **ecological**

NORDIC SET GREEN IMPROVES THE ENERGY EFFICIENCY OF CITIES, ONE BLOCK AT A TIME.

Nordic Set Green Oy Ltd (NSG), established in 2011, develops and delivers Smart City solutions as well as ecological and energy-efficient construction solutions to international markets.

NSG has implemented several projects in developing countries. One of the company's most recent international projects is a hub of smart buildings implemented in the Chinese city of Jina. This site combines the latest technical building services from Finland and state-of-the-art Chinese interior design. The air quality of all the region's hotel rooms and conference and public premises

is monitored through the constant measurement of indoor air (temperature, air humidity, CO2 and particles), and the energy efficiency of the buildings is adjusted using smart building automation.

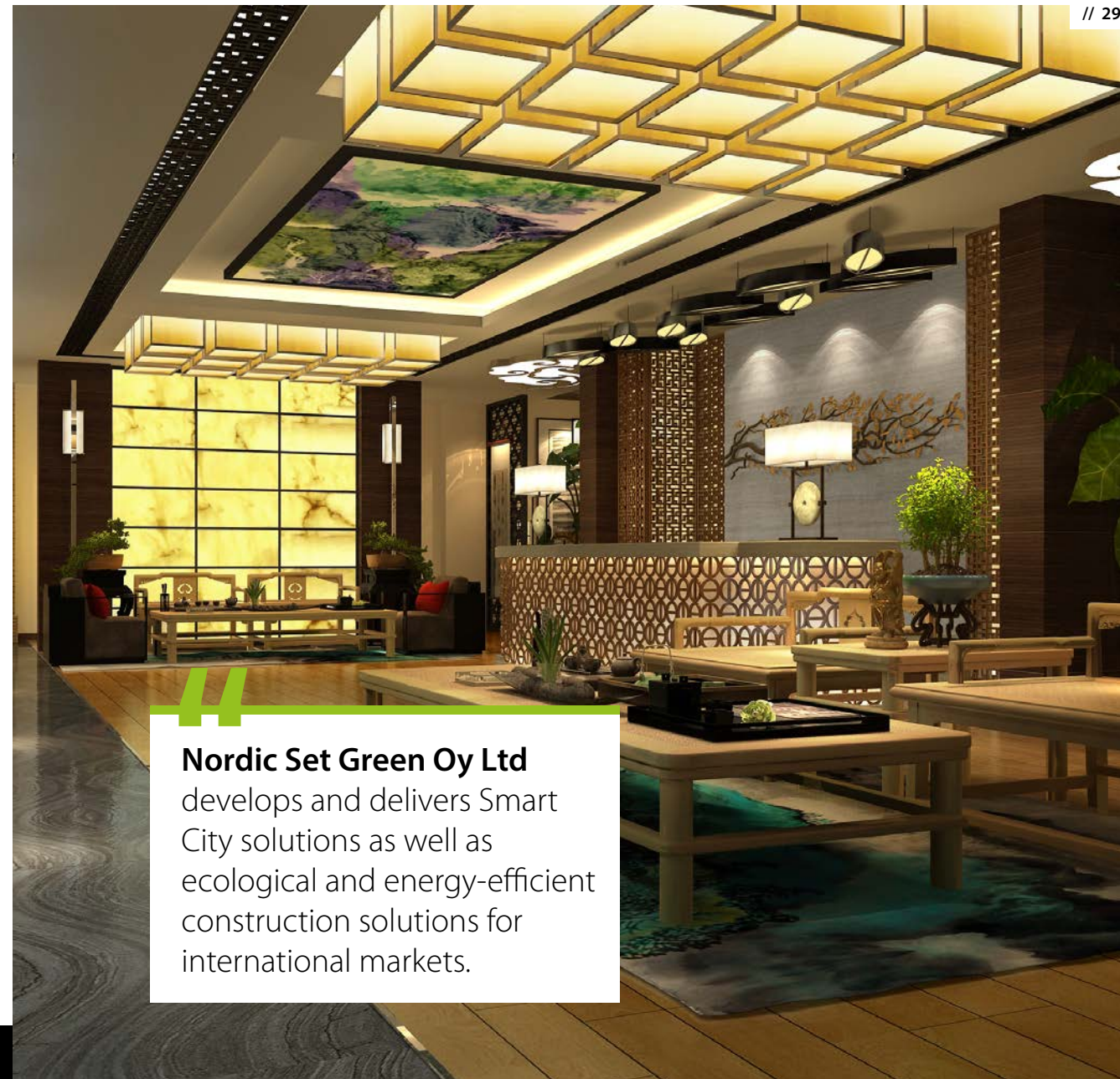
In addition to building automation solutions, NSG provides soil and water cleaning solutions, especially in water and land areas contaminated by oil.

The company collaborates with top research centres in the Nordic countries. Since January 2013, NSG has been an official partner of Lappeenranta University of Technology in a joint Finnish-Chinese project related to nanotechnology.

NORDIC SET GREEN OY LTD IS A SUBSIDIARY OF THE SET GROUP, A MEMBER OF CLEANTECH FINLAND AND THE LEADER OF THE BUSINESS OPERATIONS OF THE NORDIC GREEN SOLUTION CLUSTER.



>> www.nordicsetgreen.com



Nordic Set Green Oy Ltd develops and delivers Smart City solutions as well as ecological and energy-efficient construction solutions for international markets.

Electricity from nature with permanent magnet technology

THE SWITCH SUPPLIES SYSTEMS THAT TURN WIND AND SOLAR ENERGY INTO ELECTRICITY.

The wind, sun and ocean waves are energy sources, the capacity of which is in constant flux. Using new technology, such variable-capacity energy can be made useful and the production of renewable energy profitable.

The Switch has developed a permanent magnet generator – a full-power converter system that ensures maximum recovery of energy.

– Our solutions are used the most at wind power plants, says **Matti Nikkinen**, Director of the Electric Motor Unit at The Switch.

Solutions provided by The Switch are used in industry as well. The permanent magnet generator full-power

converter systems are especially suitable for processes that consume a lot of electricity, but where the consumption varies.

– The shipbuilding industry is an important customer, Nikkinen states.

Systems based on permanent magnet technology improve energy efficiency by reducing the total consumption of energy and by reducing emissions as well as the life cycle, maintenance and fuel costs of the equipment.

IN LAPPEENRANTA, THE SWITCH DESIGNS AND MANUFACTURES GENERATORS AND POWER CONVERTERS MOSTLY FOR WIND POWER PLANTS. THE COMPANY HAS A FACTORY IN VAASA AND ITS HEAD OFFICE IN VANTAA, 16 SALES OFFICES ALL OVER THE WORLD AND A FACTORY IN CHINA. APPROXIMATELY 98% OF THE COMPANY'S PRODUCTION IS EXPORTED.



>> www.theswitch.com

The Switch did not invent permanent magnet technology, but it made it available to the marketplace.

Sustainable development requires new competence

OPERATE EFFICIENTLY WITH REGARD TO RESOURCES, RECYCLE, AND RECOVER HEAT. SYKLI'S TRAINING EVENTS REINFORCE THE ENVIRONMENTAL COMPETENCE OF PROFESSIONALS FROM DIFFERENT INDUSTRIES.

The SYKLI Environmental School of Finland is a national specialist vocational college that trains employed professionals in environmental competence. SYKLI offers adults preparatory training and expert courses in water, waste, property and energy management duties. The training events are implemented in accordance with sustainable development.

– Knowledge increases demand. The more people know about, say, the requirements of energy efficiency, the more training you need in order to fulfil those demands, says **Mikael Ollikainen** from SYKLI's Lappeenranta office.

The Environmental School of Finland's customers include enterprises, municipalities, government agencies, educational institutions and private individuals. The operating area comprises the whole of Finland. Training events have also been arranged in Russia, where training has been provided to employees at the waterworks in Petrozavodsk, among others.

In addition to providing training, SYKLI operates as an implementer and expert in a project that promote green values.

THE ENVIRONMENTAL SCHOOL OF FINLAND OFFERS TRAINING AND DEVELOPMENT SERVICES BY UTILISING NATIONWIDE COOPERATION NETWORKS. SYKLI IS OWNED BY HYVINKÄÄN-RIIHIMÄEN SEUDUN AMMATTIKOULUTUSSÄÄTIÖ, PAM SERVICE UNION AND THE YMPÄRISTÖYRITYSTEN LIITTO. THE ENVIRONMENTAL SCHOOL OF FINLAND HAS OFFICES IN RIIHIMÄKI, HELSINKI AND LAPPEENRANTA.



Competence requirements pertaining to sustainable development include resource efficiency, the environmental economy and consumption management.

The operational environment in sustainable development

THE PRINCIPLES OF ECO-EFFICIENCY STEER THE OPERATION OF TECHNOLIS, FROM TECHNICAL BUILDING SERVICES TO SANITATION.

Technopolis is a listed company that has implemented operation in line with sustainable development in its properties for a long time. The energy efficiency and environmental friendliness of properties are based on up-to-date property technology, constant monitoring of sites and, in particular, human presence. A professional in property maintenance who is familiar with the sites can find information on continual measurements of electricity, heat and water information that can be optimised to achieve savings.

Regular maintenance, low-flow water fixtures and efficient waste management pay for themselves in no time and reduce the burden on the environment. Solutions that

improve energy efficiency also increase customer comfort. Workplaces must be healthy, and there should be no compromise on this.

These days, green criteria are weighty aspects when choosing premises. If a business wants to act in an energy-efficient manner and consider the environment, the easiest way is to lease premises from us, says Director **Markku Hokkanen**.

For its own business operations, Technopolis searches for growth and diversity for companies emerging in the energy and environmental industries. In that sense, Lappeenranta is an ideal operational environment.

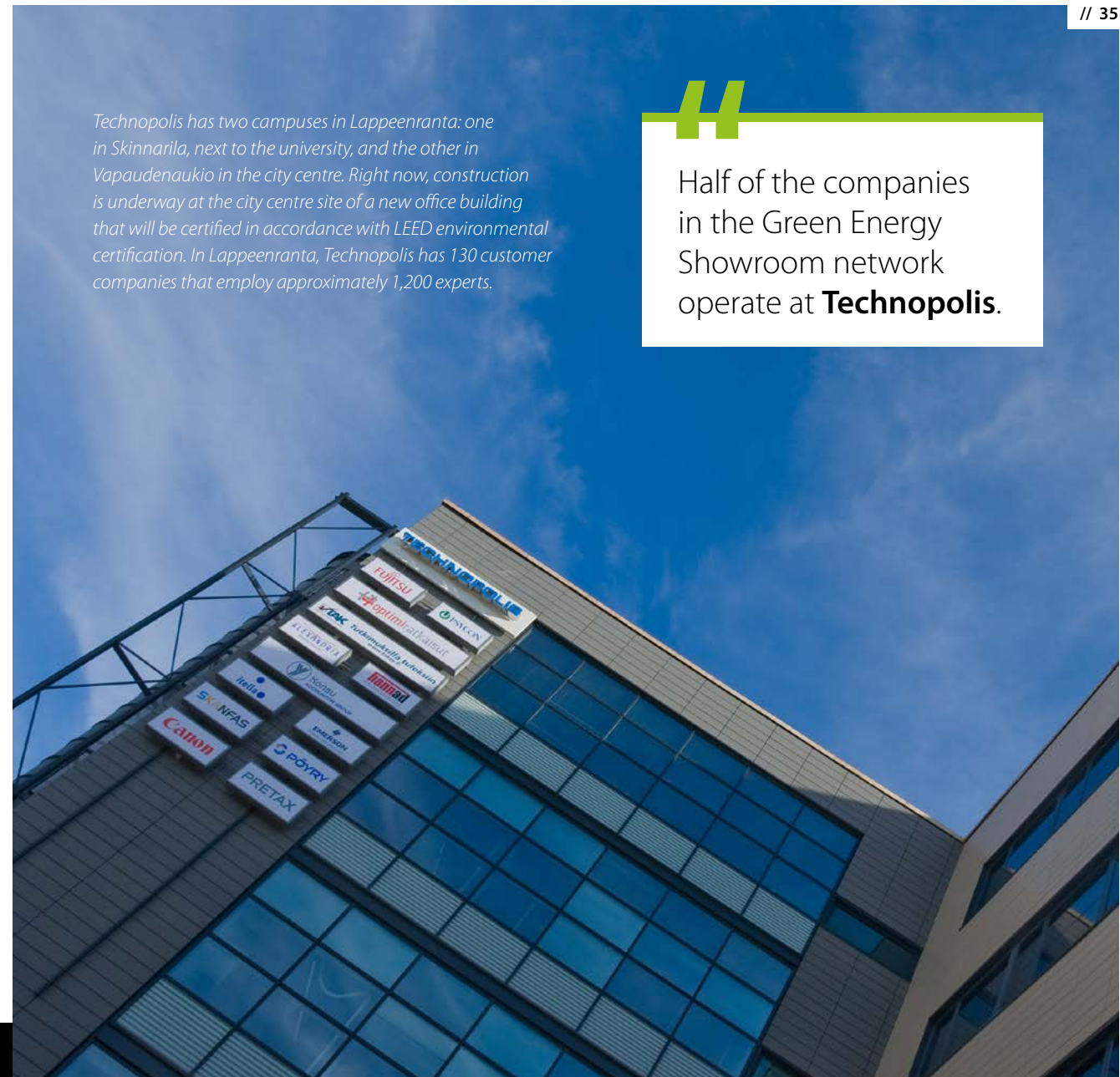
THE BUSINESS CENTRES OF TECHNOLIS ARE LOCATED IN OULU, ESPOO, VANTAA, HELSINKI, TAMPERE, KUOPIO, JYVÄSKYLÄ AND LAPPEENRANTA, AS WELL AS IN ST PETERSBURG, TALLINN, OSLO AND VILNIUS. THE FINNISH BUILDINGS USE ELECTRICITY PRODUCED WITH RENEWABLE ENERGY SOURCES.

TECHNOLIS

Technopolis has two campuses in Lappeenranta: one in Skinnarila, next to the university, and the other in Vapaudenaukio in the city centre. Right now, construction is underway at the city centre site of a new office building that will be certified in accordance with LEED environmental certification. In Lappeenranta, Technopolis has 130 customer companies that employ approximately 1,200 experts.

||

Half of the companies in the Green Energy Showroom network operate at **Technopolis**.



Monitoring of consumption is heading in a greener direction

INFORMATION PRODUCED BY TIETOKOURA'S SYSTEMS ENCOURAGE BUSINESSES AND CONSUMERS TO ALTER THEIR ENERGY BEHAVIOUR.

Tietokoura is Finland's leading provider of data systems for electricity sales and communications services for energy and water companies. Tietokoura's data system services are used by umbrella organisations in the energy industry, more than 100 energy and water companies and, indirectly, by hundreds of thousands of their customers, among others.

The systems involve a strong advisory and information aspect that reaches the end users. Using web-based online and reporting service products, customers can monitor their energy consumption with an accuracy of

one hour. Monitoring consumption data encourages both enterprises and consumers to change their consumption habits to a more energy-efficient direction.

– Increasing energy efficiency is the best way to reduce your carbon footprint. Our customers even use information provided by our systems to help them decide which equipment to purchase, says Managing Director

Jorma Laukkanen.

In its own work environment, Tietokoura is committed to green values and is striving for a completely paperless office.

TIETOKOURA OY IS A DYNAMIC IT SOFTWARE AND PROJECT COMPANY THAT WAS ESTABLISHED IN 1996. ITS MAIN CUSTOMERS INCLUDE COMPANIES IN THE ENERGY AND WATER MANAGEMENT INDUSTRY AS WELL AS CLIENTS THAT NEED WEB-BASED SOLUTIONS IN THEIR OPERATION.



Increasing energy efficiency is the best way to reduce your carbon footprint.

An inexhaustible energy source as a raw material

TUULIMUUKKO PRODUCES ELECTRICITY FROM A RAW MATERIAL THAT IS FREE AND WILL NEVER RUN OUT.

TuuliMuukko, which began operations in the summer of 2012, is the first wind park in South Karelia. It produces electricity using seven wind turbines with a total capacity of 21 MW.

The turbine blades, erected on either side of Highway 6 on a heath with favourable wind conditions, rotate at an elevation of 150 metres. Passers-by can see for themselves how the rotor blades rotate and produce renewable energy without making a sound.

– The wind farm has become a popular site for visits.

Presenting the operation of the wind farm in its authentic environment is marketing of green energy at its best, says Managing Director **Juha Tuominen**.

The wind farm achieved its production goal in its first full year of operation. Electricity produced by the seven wind power plants can heat 3,000 single-family homes, for instance.

Electricity produced with this wind power is sold by Lappeenrannan Energia.

TUULIMUUKKO IS A JOINT VENTURE OWNED BY LÄHITAPIOLA INSURANCE'S WIND ENERGY FUNDS AND TUULISAIMAA. THE WIND FARM WAS BUILT BY TUULISAIMAA, WHICH HAS SEVERAL WIND FARM PROJECTS UNDERWAY IN VARIOUS PARTS OF FINLAND. TUULISAIMAA SPECIALISES IN THE DEVELOPMENT AND IMPLEMENTATION OF WIND POWER PROJECTS.



TuuliMuukko's annual production is sufficient for 3,000 electrically heated single-family homes.





Residents and the sun produce 20 % of the heat energy of a property. We just need to recover it.

An energy-efficient building adapts to its surrounding conditions

WHEN ENERGY MANAGEMENT IS CREATED BASED ON THE PURPOSE OF USE, IT WILL REDUCE HEATING COSTS AND IMPROVE THE CONVENIENCE OF INTERIOR SPACES.

With operations based in Lappeenranta, ESaver Oy – Valtia has developed a comprehensive energy service process which includes property mapping, planning of necessary solutions, installation of building engineering, and the wireless supervision of building automation that is available 24/7.

– Our service is a continuous process which adapts to the changes that occur during the life cycle of a building, says Sales Manager Simo Rounela.

Valtia has carried out service processes for energy management in residential buildings, business premises and industrial properties. The company can also handle the acquisition solutions of renewable energy.

On the other hand, the heating costs of an old block of flats can be reduced by using a heat recovery system,

which can replace as much as half of the purchased energy required to heat the property.

– Normally, a building is heated from April to October with the same energy that the ventilation has previously ejected, specifies Rounela.

Valtia's energy management solutions are based on measurement data collected from sites and on savings calculations based on the data. Sites that are being remodelled are measured for energy consumption and the quality of indoor air, the condition of the current ventilation equipment is checked, and the operation of building engineering is monitored. In new construction projects, Valtia's experts are involved as early as the planning phase.

FOUNDED IN 2014 IN LAPPEENRANTA, VALTIA IS A FAMILY BUSINESS THAT OFFERS ENERGY MANAGEMENT SERVICES COVERING THE WHOLE LIFE CYCLE OF RESIDENTIAL BUILDINGS, BUSINESS PREMISES AND INDUSTRIAL PROPERTIES. VALTIA'S SERVICES INCLUDE COMPREHENSIVE ELECTRICAL DESIGN AND AUTOMATION SYSTEM DESIGN AS WELL AS CONTRACTING. VALTIA DELIVERS COMPREHENSIVE DIGITAL SIGNAGE SOLUTIONS TO VARIOUS INDUSTRIES.



>> www.valtia.fi

Minimising fuel costs with hybrid solutions

HYBRID POWER TRAINS THAT COMBINE ELECTRICITY AND DIESEL ARE THE CREAM OF THE CLEANTECH CROP.

VISEDOR's technology combines a combustion engine and an electric drivetrain into a hybrid solution that consumes less fuel and rarely needs any maintenance. In addition, this new technology helps significantly reduce the emissions and noise levels of vehicles and mobile machinery. VISEDOR's technology is suitable for both fully electric and fuel cell solutions.

VISEDOR develops and manufactures electric drivetrains for heavy-duty vehicles and machines. These energy-efficient hybrid systems are suitable for use in mobile container cranes, construction and mining industry machinery, agricultural and forestry machines, buses and ships, among other things. The company's customers include

many internationally-known manufacturers.

– We are not just about green values. A hybrid vehicle is an investment that pays for itself in savings in fuel and maintenance costs, says Technology Director **Kimmo Rauma**.

VISEDOR's success is boosted not only by a topical product but also by significant customer relationships and correct timing. Ninety per cent of the company's production is exported. In the past few years, the company's turnover has grown by 100 per cent per year.

In 2013 and 2014, VISEDOR was ranked among the top 20 growth companies in Finland.

A heavy-duty hybrid machine or vehicle pays for itself in the first one to three years of operation.

VISEDOR'S HEAD OFFICE AND ASSEMBLY LINE ARE LOCATED IN LAPPEENRANTA. THE COMPANY HAS TWO PRODUCTION UNITS AND A SALES OFFICE IN GERMANY, AND SEVERAL SALES PARTNERS IN EUROPE AND ASIA.

VISEDOR
electricity in motion

>> www.visedo.fi

GREEN ENERGY SHOWROOM

DO YOU WANT TO BE PART OF THE NETWORK
OR KNOW MORE ABOUT THE ACTIVITIES?

Hanna Huppunen

Wirma Lappeenranta Oy

tel. +358 40 652 7389

hanna.huppunen@wirma.fi



www.greenenergyshowroom.fi



Leverage from
the EU
2007-2013

The Regional Council of South Karelia has supported the Green Energy Showroom project financially through the European Regional Development Fund programme.