



# Technological solutions for energy efficiency

## Examples

**EFFECT4buildings Toolbox:**  
Technological solutions; Annex 1



The project “Effective Financing Tools for implementing Energy Efficiency in Buildings” (EFFECT4buildings) develops in collaboration with public building managers a comprehensive decision-making support toolbox with a set of financial instruments: **Financial calculation tools; Bundling; Funding; Convincing decision makers; Energy Performance Contract; Multi Service Contract; Green Lease Contract; Prosumerism**. The tools and instruments chosen by the project has the biggest potential to help building managers to overcome financial barriers, based on nearly 40 interviews with the target group. The project improves these tools through different real cases.

To make sure building managers invest in the best available solutions, more knowledge on different possibilities is needed as well as confirmation from colleagues that the solutions performs well. EFFECT4buildings mapped **technological solutions** for energy efficiency in buildings with the aim to share knowledge and experiences of energy efficiency solutions among building managers in the Baltic Sea Region.

Thank you for your interest in how energy efficient solutions have been implemented in practical life.

The purpose of this document is to support building managers in making investment decisions in energy efficiency solutions. To get a better overview of available solutions, more knowledge about the technics as well as their profitability, together with experience from others who have implemented the solutions.

## Partners



HEDMARK  
FYLKESKOMMUNE



STOWARZYSZENIE  
GMIN I POWIATÓW  
MAŁOPOLSKI



EFFECT4buildings project is implemented with the support from the EU funding Program Interreg Baltic Sea Region (European Regional Development Fund) and Norwegian national funding. The aim of the project is to improve the capacity of public building managers in the Baltic Sea Region by providing them a comprehensive decision-making support toolbox with a set of financial instruments to unlock the investments and lower the risks of implementing energy efficiency measures in buildings owned by public stakeholders. More information: <http://www.effect4buildings.se/>

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## Mapping of technological solutions

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Companies who produce innovative technological solutions based on latest knowledge needs more information on the needs of the public building owners including needs of financial solutions. Public building managers needs better knowledge on existing solutions, their profitability and how to order them to benefit the highest possible value.

To enhance the dialogue between building managers and technology solution providers, the project partners mapped the different innovative technological solutions that are available in the Baltic Sea Region.

The ambition has not been to map all the solutions, but to provide good examples of technologies and to map what is missing among these solutions.

The technological solutions were divided in different categories and was implemented based on partners own knowledge, interviews with the target group, cooperation with clean tech clusters as well as desktop research.

The result is an excel-list of mapped technological solutions, divided into the following categories:

- Building envelope
- Heating & Cooling
- Ventilation
- Water
- Lighting
- Electricity
- Building management system/ICT solution
- Other solutions

## Building envelope

Company, country, and web	Energy efficiency solution
<b>3vision</b> Sweden <a href="http://www.3-vision.se">www.3-vision.se</a>	Wood building system, wood fiber insulation in passive house standard.
<b>Ecowool, ltd</b> Latvia <a href="http://www.ekoiso.com">www.ekoiso.com</a>	Cellulose insulation material from recycled news papers. Cellulose insulation fibre ( $(\lambda)=0,039$ W/mK;) of 15 cm is equivalent to: 18 cm of mineral wool, 46 cm of aerocrete, 50 cm of wood logs, 35 cm of keramzit, 146 cm of brick wall.
<b>Fakro</b> Poland <a href="http://www.fakro.pl/">www.fakro.pl/</a>	Windows, roof windows and accesories to windows.
<b>Grundels</b> Sweden <a href="http://www.grundels.se/">www.grundels.se/</a>	System for installing an energy saving glas on existing windows. <u>Energy saving potential:</u> The U-index can be lowered from 2,8 to 1,3. 20 % energy efficiency by being able to lower heating.
<b>Isover Saint Gobain</b> France <a href="http://www.isover.com/">www.isover.com/</a>	A broad range of insulation solutions
<b>Leksandsdörren</b> ABSweden <a href="http://www.leksandsdorren.com/">www.leksandsdorren.com/</a>	Energy efficient external doors
<b>Lendager group</b> Denmark <a href="http://lendager.com/en/">lendager.com/en/</a>	Several upcycle products, for example concrete floor, cladding, brics, concrete walls.
<b>Oknoplast</b> Poland <a href="http://oknoplast.com.pl">oknoplast.com.pl</a>	PVC windows, window components, doors and roller shutters
<b>Paroc</b> Finland <a href="http://www.paroc.com/">www.paroc.com/</a>	Insulation and other products. Acoustics. Sandwich panels
<b>RB&amp;B, ltd</b> Latvia <a href="http://www.ekovate.lv/lv/">www.ekovate.lv/lv/</a>	Natural insulation material from cellulose (ecowool), that is blown onto the surface; wood-fible planches; and from hemp. Ecowool specific heat capacity (c) = 2000 J/kgK, ( $\lambda$ )=0,036 W/mK; wood-fibre: (c) = 2100 J/kgK, ( $\lambda$ )=0,053 W/mK; hemp: (c) = 2300 J/kgK, ( $\lambda$ )=0,04 W/mK
<b>Rockwool</b> Denmark <a href="http://www.rockwool.dk/vaerd-at-vidе/indeklіma/termisk-indeklіma-og-isolering/">www.rockwool.dk/vaerd-at-vidе/indeklіma/termisk-indeklіma-og-isolering/</a>	Rock mineral wool, systems and solutions to improve energy efficiency, acoustics and fire safety of buildings and technical installations

<b>Termoorganika</b> Poland <a href="http://termoorganika.pl/">termoorganika.pl/</a>	Expanded polystyrene boards – insulation material containing graphite composite which enhances the insulation properties of expanded polystyrene.
<b>Werrowool</b> Estonia <a href="http://werrowool.eu/en">werrowool.eu/en</a>	Cellulose fibre Werrowool for insulation, panels or blown loose wool.
<b>Virte Solar roof</b> Finland <a href="http://www.virtesolar.fi/en/virtesolar-roof">www.virtesolar.fi/en/virtesolar-roof</a>	Building integrated solar roof and solar facade

## Heating & cooling

<b>AS Simone</b> Latvia <a href="http://www.aluksnesenergija.lv">www.aluksnesenergija.lv</a>	Remote control of the heating system and diagnostics for errors Renovation of heating pipes and boiler systems. <u>Energy saving potential:</u> Possible to reduce heat consumption ~10-15 %/month, ~-20% heat loss from heat transfer by pipes, ~+30% efficiency for heating boilers
<b>Bosch</b> Denmark <a href="http://www.bosch-climate.dk">www.bosch-climate.dk</a>	Hybrid heat pump: Absorb 6000 GHP
<b>Buderus</b> Poland <a href="http://www.buderus.com/pl/pl/">www.buderus.com/pl/pl/</a>	Logatherm WPT heat pumps for heating and cooling. Possible to supply with energy from photovoltaic panels <u>Energy saving potential:</u> 30 - 70 % energy saving for heating
<b>Danfoss</b> Denmark <a href="http://heating.danfoss.com">heating.danfoss.com</a>	Wireless radiator thermostats
<b>Eptec Energi AS</b> Norway <a href="http://www.eptec.no">www.eptec.no</a>	Eptec cooling equipment, industrial heat pumps and heat exchangers. <u>Energy saving potential:</u> 30 - 70 % energy saving for heating
<b>Extuna AB</b> Sweden <a href="http://www.extuna.se/en/">www.extuna.se/en/</a>	Wood stoves and boilers
<b>Green Fuel Energy</b> Estonia <a href="http://www.gfe.ee/">www.gfe.ee/</a>	Combined heat & power plant that works on woodchip
<b>Herz Baltija</b> Latvia <a href="http://www.herz-energie.at/en/products/">www.herz-energie.at/en/products/</a>	Wood pellet boilers with efficiency coefficient >90% and a high degree of automation, for example automated ash cleaning and electronic controller so that the boiler can control heating and DHW circuits.
<b>Herz</b> Poland <a href="http://www.herz.com.pl/">www.herz.com.pl/</a>	Thermostatic valves. Renewable energy sources from maintenance-free biomass boilers and heat pumps.

<b>Itula Oy</b> Finland <a href="http://www.itula.fi">www.itula.fi</a>	Radiant heating and cooling systems
<b>JÖAB</b> Sweden <a href="http://www.johnohren.se/">www.johnohren.se/</a>	Systems for wood chip burners. Local power plants.
<b>Mekano i Malung AB</b> Sweden <a href="http://www.mekano.nu/">www.mekano.nu/</a>	Specialists in woodchips, burners, boilers
<b>RotoTec AS</b> Norway <a href="http://www.rototec.no">www.rototec.no</a>	Geothermal heating and cooling. Ground-sourced heat pumps. <u>Energy saving potential:</u> From electrical heating to geo heating energy saving will be between 50-60 %
<b>Thermo Control AS</b> Norway <a href="http://www.thermocontrol.no">www.thermocontrol.no</a>	Cooling systems, heat pumps and air treatment units. <u>Energy saving potential:</u> 30 - 70 % energy saving for heating
<b>Vaillant</b> Poland <a href="http://www.vaillant.pl/">www.vaillant.pl/</a>	Heat pumps with the option of connecting 1 of 3 different, lower heat sources (brine-water, water-glycol-water, air-glycol-water) <u>Energy saving potential:</u> 30 - 70 % energy saving for heating
<b>Viessmann</b> Germany <a href="http://www.viessmann.dk">www.viessmann.dk</a>	Hybrid heat pump: Vitocaldens 222-F

## Ventilation

<b>Airmaster</b> Denmark	Decentralized ventilation: Airmaster 1000
<b>Airobot</b> Estonia <a href="http://airobot.ee/en/">airobot.ee/en/</a>	Heat recovery ventilation unit with the ability to make independent decisions <u>Energy saving potential:</u> Heat recovery efficiency up to 95%
<b>Caverion</b> Denmark <a href="http://www.caverion.dk/">www.caverion.dk/</a>	Climaceil / KlimaTak: demand driven airflow and temperature
<b>Effektiv Energi</b> Norway <a href="http://www.effektiv.energi.no">www.effektiv.energi.no</a>	Regulating ventilation based on logging of CO2 level, and forecasting of energy consumption for early warnings of operational challenges. <u>Energy saving potential:</u> 20-40 % energy saving for ventilation (and often also effect savings)
<b>Eva sistēmas, ltd</b> Latvia <a href="http://www.co2.lv">www.co2.lv</a>	Zehnder ComfoAir Q: local intelligent ventilation and recuperation device with heat and moisture recovery. Electric power <130 W. <u>Energy saving potential:</u> Heat recovery <95%
<b>Healthy homes</b> Sweden <a href="http://www.healthyhomes.se">www.healthyhomes.se</a>	Demand controlled zone ventilation and without need to change filters.

<p><b>JS Concept / JS ventilation</b> Denmark <a href="http://www.jskoncept.com">www.jskoncept.com</a></p>	<p>Installation free ventilation and cooling fan for natural ventilation.</p>
<p><b>Lindab</b> Sweden <a href="http://www.lindab.com/">www.lindab.com/</a></p>	<p>Ventilation systems</p>
<p><b>LUNOS Latvia, ltd</b> Latvia <a href="http://www.lunoslatvia.lv">www.lunoslatvia.lv</a></p>	<p>LUNOS e<sup>2</sup> decentralized recuperator - small and low electricity consumption (power density 0,09 W per m<sup>3</sup> air). <u>Energy saving potential:</u> Heat recovery &lt;90%</p>
<p><b>Majaelpo.lv</b> Latvia <a href="http://www.majaelpo.lv/">www.majaelpo.lv/</a></p>	<p>PRANA recuperator. <u>Energy saving potential:</u> Heat recovery &lt;90%</p>
<p><b>Nordisk Energiptimering AB</b> Sweden <a href="http://www.nordiskeo.se/">www.nordiskeo.se/</a></p>	<p>Cleaning of ventilation systems, heat exchanger and cooling systems</p>
<p><b>Pro-vent</b> Poland <a href="http://www.pro-vent.pl/">www.pro-vent.pl/</a></p>	<p>50 types of recuperators supported by dedicated automation. <u>Energy saving potential:</u> 20-40 % energy saving for ventilation</p>
<p><b>SIA "Viridi Lux"</b> Latvia <a href="http://www.viridilux.lv">www.viridilux.lv</a></p>	<p>Decentralized ventilation and recuperation ventilators - Twin Fresh COMFO.</p>
<p><b>SmartVent</b> Denmark <a href="http://www.smartvent.ee/ENG/">www.smartvent.ee/ENG/</a></p>	<p>Schedule based HVAC automation systems instead of demand-based indoor climate control, for healthy and energy efficient buildings. <u>Energy saving potential:</u> 10-50% lower energy use</p>
<p><b>Viessmann</b> Poland <a href="http://www.viessmann.pl/">www.viessmann.pl/</a></p>	<p>Apartment ventilation system with heat exchanger <u>Energy saving potential:</u> 20-40 % energy saving for ventilation</p>
<p><b>Wolf Technika Grzewcza Sp.</b> Poland <a href="http://wolf-polska.pl/">wolf-polska.pl/</a></p>	<p>Ventilation with a heat recovery, maximum efficiency 180/300/400 m<sup>3</sup> and economical fans and simple operating panels. <u>Energy saving potential:</u> Heat recovery &lt;95%. 20-40 % energy saving</p>

## Water

<p><b>FM Mattsson</b> Sweden <a href="http://www.fmmattsson.se/">www.fmmattsson.se/</a></p>	<p>Energy efficient water taps. <u>Energy saving potential:</u> 15-30 % of hot water savings. Calculation example for 100 apartments: 10 000 kWh per year</p>
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<b>Isakssons AB</b> Sweden <a href="http://isakssons.com/">isakssons.com/</a>	Heat exchanger for waste water, especially for swimming halls, sport arenas and hotels that uses a lot of water. <u>Energy saving potential:</u> Calculation example: 50 kW unit with 30 % efficiency saves 37 000 kWh. 150 kW unit with 90 % efficiency saves 225 000 kWh.
<b>Orbital Systems</b> Denmark <a href="http://orbital-systems.com/">orbital-systems.com/</a>	OAS Shower use water without wasting it. <u>Energy saving potential:</u> Up to 90 % of the water and up to 80% of the heating energy, while at the same time increasing flow and temperature stability.
<b>Pure Water Scandinavia AB</b> Sweden <a href="http://www.purewater.se/">www.purewater.se/</a>	Water purification
<b>Riga Energy agency</b> Latvia <a href="http://www.rea.riga.lv">www.rea.riga.lv</a>	Heat recovery from wastewater. Suitable for houses with big amount of wastewater and big hot water consumption. Two devices „Menerga AquaCond” with heat exchangers with productivity 2,4 m <sup>3</sup> /h hot water. <u>Energy saving potential:</u> Possibility to decrease heat energy consumption for hot water heating in multi-story buildings with 60%.
<b>Roheline Mõte</b> Estonia <a href="http://www.heateco.eu/">www.heateco.eu/</a>	Heat exchanger HeatEco 60 <u>Energy saving potential:</u> up to 60% of hot water from the first minute spent under the shower.
<b>SLO Latvia, ltd</b> Latvia <a href="http://www.slo.lv">www.slo.lv</a>	Solar collector water heating for hot water and partly for heating. <u>Energy saving potential:</u> ~400 m <sup>3</sup> gas heated hot water a year replaced with sun heated water

## Lighting

<b>Aura Light</b> Sweden <a href="http://www.auralight.se/">www.auralight.se/</a>	LED lighting (indoor and outdoor) and lighting steering systems. <u>Energy saving potential:</u> 80 % energy saving potential compared to old lighting
<b>Cityntel</b> Estonia <a href="http://www.cityntel.com/">www.cityntel.com/</a>	Easy-to-install and cost-effective Smart Street Light Control. <u>Energy saving potential:</u> Together with modern LED luminaries achieving savings up to 85% of operational energy costs and up to 70% of maintenance costs
<b>Gridens Technologies</b> Estonia <a href="http://gridens.com/en/">gridens.com/en/</a>	Intelligent energy efficient streetlights and control systems. <u>Energy saving potential:</u> Can reduce energy consumption up to 90%
<b>Lightcare</b> Denmark <a href="http://lightcare.eu/">lightcare.eu/</a>	Full Dynamic Circadian Lighting custom-designed for the healthcare sector
<b>Motiva / Valaistustieto</b> Finland <a href="http://valaistustieto.fi/">valaistustieto.fi/</a>	Intelligent light solutions. <u>Energy saving potential:</u> 50-80 %

<p><b>Nike-Servodan</b> Denmark <a href="http://www.nikoservodan.com/">www.nikoservodan.com/</a></p>	Indoor lighting control
<p><b>Phillips</b> Denmark <a href="http://www.signify.com/global/our-company/news/press-release-archive/2018/20180206-philips-lighting-installs-first-commercial-power-over-ethernet-connected-lighting-system">www.signify.com/global/our-company/news/press-release-archive/2018/20180206-philips-lighting-installs-first-commercial-power-over-ethernet-connected-lighting-system</a></p>	Power over Ethernet (PoE) technology in a smart office, enabling office workers to personalize their office lighting using a smartphone app
<p><b>Riga Energy agency</b> Latvia <a href="http://www.rea.riga.lv">www.rea.riga.lv</a></p>	Replacing natrium lamps to LED with voltage regulation distant management. <u>Energy saving potential:</u> 0,35 MWh on one lightning appliance (equal to 50 kg CO2).
<p><b>SLO Latvia, ltd</b> Latvia <a href="http://www.slo.lv">www.slo.lv</a></p>	OSRAM SubstiTUBE®. PROLog lightning energy-audit sensor – logger and PROLog software from STEINEL Professional. PROLog calculates the wasted light and energy amount.
<p><b>Solatube</b> Sweden <a href="http://www.solatube.se">www.solatube.se</a></p>	Lamps without electricity. Catches daylight/sunlight and bring it into the building with tubes.
<p><b>Theusled</b> Poland <a href="http://www.theusled.com/">www.theusled.com/</a></p>	Lighting designs, LED diodes and advanced automation systems for optimum lighting systems in any facility. <u>Energy saving potential:</u> 50-90% for lighting
<p><b>Valtavallo</b> Finland <a href="http://valtavallo.fi/?lang=en">valtavallo.fi/?lang=en</a></p>	Led lighting <u>Energy saving potential:</u> 50-90% for lighting
<p><b>Zumtobel</b> Denmark <a href="http://www.zumtobel.com/com-en/index.html">www.zumtobel.com/com-en/index.html</a></p>	LED down lights, some with wall wash function. Planor MTP reduceres glare and makes light damping easy to control. <u>Energy saving potential:</u> Differs, but usually 30-70%

## Electricity

<p><b>ABB</b> Denmark</p>	Battery system for storing renewable energy
<p><b>AS Simone</b> Latvia <a href="http://www.aluksnesenergija.lv">www.aluksnesenergija.lv</a></p>	Installation of solar panels for industrial buildings
<p><b>Electrolux</b> Sweden <a href="http://www.electrolux.se/">www.electrolux.se/</a></p>	Energy efficient equipment for kitchens, washing and drying. <u>Energy saving potential:</u> Example of 50-80 % energy savings for public washing machines

<b>Energiapartner</b> Estonia <a href="http://energiapartner.ee/">energiapartner.ee/</a>	Solar energy solutions
<b>Energogen</b> Estonia <a href="http://energogen.ee/">energogen.ee/</a>	Solar energy solutions
<b>Ferroamp AB</b> Sweden <a href="http://ferroamp.com/">ferroamp.com/</a>	Technology for electricity storage and monitoring/control systems for energy use, DC loads. Solutions to combine with solar energy. Equalizers.
<b>GEF Ecosystem + GEF Vision</b> Finland <a href="http://new.gef.fi/en/services/gef-visiontm">new.gef.fi/en/services/gef-visiontm</a>	Solar power management system and consumption management of property electricity. Energy storage management and demand response services.
<b>Goliath wind</b> Estonia <a href="http://www.goliath.ee/">www.goliath.ee/</a>	Production & sales of wind turbines
<b>Hager</b> Poland <a href="http://www.hager.pl/">www.hager.pl/</a>	Solutions and services for electrical installations in residential, commercial and industrial buildings; energy distribution, cable management and building automation. <u>Energy saving potential:</u> 3-6 % energy saving of the involved technical equipment.
<b>Innogie</b> Denmark <a href="http://innogie.com/">innogie.com/</a>	Solar panels that replaces traditional roof. The roof modules overlap both by length and width, providing a tight thermal envelope. Danish Design Award.
<b>Latvenetgo</b> Latvia <a href="http://www.latvenergo.lv">www.latvenergo.lv</a>	Smart electricity meters. <u>Energy saving potential:</u> In the first year of operation the pilot target group decreased their electricity consumption by 10-15% which is equal to <55kg CO2 per year per household.
<b>Legrand</b> Poland <a href="http://legrand.pl/">legrand.pl/</a>	Electrical and digital building infrastructure. <u>Energy saving potential:</u> 3-6 % energy saving of the involved technical equipment.
<b>Naps Solar</b> Estonia <a href="http://napssolar.ee/">napssolar.ee/</a>	Production and selling of solar panels
<b>Roofit.solar</b> Estonia <a href="http://www.roofit.solar/">www.roofit.solar/</a>	Photovoltaic metal roofs
<b>Smartecon</b> Estonia <a href="http://smartecon.ee/">smartecon.ee/</a>	Sales and installation of solar panels
<b>Solarest</b> Estonia <a href="http://www.solarest.ee/">www.solarest.ee/</a>	Production and selling of solar panels

<b>Svesol AB</b> Sweden <a href="http://www.svesol.se/">www.svesol.se/</a>	Solar energy systems, PV and solar heat
<b>Tietokoura</b> Finland <a href="http://www.tietokoura.com/en/">www.tietokoura.com/en/</a>	Solution for electricity trading for electricity pricing, risk management or the communication of the related information to customers or partners.
<b>Ubik Solutions</b> Estonia <a href="http://www.ubiksolutions.eu/">www.ubiksolutions.eu/</a>	Power optimizer & micro-inverter for solar panels. <u>Energy saving potential:</u> Up to 30% higher energy harvest

## Building management system/ICT solution

<b>AMS</b> Poland <a href="http://www.amspolska.pl/pl/">www.amspolska.pl/pl/</a>	Advanced power technologies, including electric car charging stations from home chargers to ultra-fast charging stations. <u>Energy saving potential:</u> 3-6 % energy saving of the involved technical equipment.
<b>Bionova</b> Finland <a href="http://www.bionova.fi/en/">www.bionova.fi/en/</a>	Software solutions with environmental and life-cycle cloud software 360optimi, One Click LCA and Ecomptner brands including life-cycle assessment, energy efficiency and energy solutions, identify and access new markets, sustainable procurement and policies, One Click LCA cloud software for product, building and business sustainability assessment.
<b>Caverion Norge AS</b> Norway <a href="http://www.caverion.no">www.caverion.no</a>	EOS - Energy monitoring system for systematic mapping of energy and possible savings as well as an online portal for full overview at any time. <u>Energy saving potential:</u> 25-45 % total energy reduction per year
<b>Cebyc AS</b> Norway <a href="http://www.cebyc.no">www.cebyc.no</a>	Energy management software program Energinet (energy monitoring system) and a web based, real time carbon, energy and sustainability management system, built to meet the requirements of the GHG Protocol Corporate Standard, ISO 14064, ISO 50001, ISO 15927 and DIN EN 16247. <u>Energy saving potential:</u> 2-5 % energy saving
<b>Danfoss</b> Denmark <a href="http://heating.danfoss.com">heating.danfoss.com</a>	One overall management system for all heating and ventilation from central panel for monitor and control temperature in every room by wireless radiator thermostats. Also possible to set day/night or holidays mode.
<b>Develco</b> Denmark <a href="http://develco.com">develco.com</a>	IoT devices, such as Develco Products' smoke alarm and motion sensor: Open hardware platform and support for solution providers
<b>Dunderdon</b> Denmark <a href="http://dunderon.se">dunderon.se</a>	DyCon - full-automatic building regulation (holistic perspective). <u>Energy saving potential:</u> 35 %

<b>Effektiv Energi</b> Norway <a href="http://www.aktiv.energi.no">www.aktiv.energi.no</a>	Wireless mesh network for regulating waterborne heating systems and artificial intelligence that learns the building's thermodynamics. <u>Energy saving potential:</u> 10-25 %
<b>Energidata</b> Denmark <a href="http://energidata.dk">energidata.dk</a>	"MinEnergi" (My energy) provides municipalities with energy consumption data based on reports from the registered municipal institutions and properties. Offer also option with active energy management by controlling energy consumption. <u>Energy saving potential for option:</u> 30-40 %
<b>Entro</b> Norway <a href="http://www.entro.no">www.entro.no</a>	Energy monitoring system to help keep energy use under control on weekly basis. Detecting non-conformities and identifying possible measures. <u>Energy saving potential:</u> Entro's energy programme will within 3–4 years give 15–30 % savings
<b>eSmart</b> Sweden <a href="http://www.esmart.se">www.esmart.se</a>	Software for collecting energy data and visualizing energy use momentarily
<b>Fututec</b> Estonia <a href="http://www.fututec.com/">www.fututec.com/</a>	Information system for real estate management, which improves the collection, storing and analysis of data, and the efficiency of real estate management.
<b>Granlund Oy</b> Finland <a href="http://www.granlund.fi/en/">www.granlund.fi/en/</a>	Software products for maintenance management system; Granlund Manager. Energy calculation software and design related database and calculation applications.
<b>Hofor EnergyKey /ForsynOmeter</b> Denmark	EnergyKey: strategic energy monitoring, energy management and energy conversion in the municipality's premises
<b>IC-meter</b> Denmark <a href="http://www.ic-meter.com/">www.ic-meter.com/</a>	IC-meter for measuring and document the indoor climate
<b>Kamstrup A/S</b> Denmark <a href="http://www.kamstrup.com">www.kamstrup.com</a>	Meters for Smart Grid, Water, Heat and Cooling.
<b>Leanheat</b> Finland <a href="http://leanheat.com/">leanheat.com/</a>	Intelligent heating management with price optimization and demand response for district heating. Energy saving potential: 10-20%
<b>Momentum Software</b> Sweden <a href="http://www.momentum.se">www.momentum.se</a>	Software for collecting energy data, analyzing and visualizing + benchmarking different buildings. Energy saving potential: 10-20%
<b>QT Systems</b> Sweden <a href="http://www.qt-systems.se">www.qt-systems.se</a>	Individually measurement of electricity and water for each apartment. Power control for car engine heater.
<b>Riga Energy agency</b> Latvia <a href="http://www.rea.riga.lv">www.rea.riga.lv</a>	Energy management with ICT in a public building including smart meters, automatic consumption data reading and transmitting, link to consumption regulatory devices, internet software for data analysis and long-term data storage. User behaviour change based

	on the advised optimal consumption regimes from energy data analysis and remote management block parameter change. Energy saving potential: >15% heat energy and <19 t CO2 reduction per year in the pilot building
<b>Sauter Norge AS</b> Norway <a href="http://www.sauter.no">www.sauter.no</a>	BMS/building automation system, including advanced space management in private and public buildings. Design, commissioning / testing and integration of 3rd party products as well as delivery of distributions as well as subcontractors and field equipment.
<b>Schneider</b> Denmark <a href="http://www.schneider-electric.com/en/product-category/1200-building-management/">www.schneider-electric.com/en/product-category/1200-building-management/</a>	Building automation and control systems / smart building management
<b>SIA "Teliko"</b> Latvia <a href="http://www.teliko.com">www.teliko.com</a>	Teliko product "MetBOX" to remotely read the heat energy meters, supply/return temperatures and flow to be able to analyse and change settings.
<b>Siemens</b> Germany <a href="http://www.siemens.com">www.siemens.com</a>	System intergration usch as DESIGO™ which is based on an entirely open system platform. Also expertise within ESCO-projects
<b>Softa-talo Aida</b> Finland <a href="http://www.aida-energy.com/main.php">www.aida-energy.com/main.php</a>	Energy optimization program using possible restriction of overflow and overpressure in buildings for energy savings e.g. in water, district heating, oil, natural gas and steam consumption. Energy saving potential: 10-30 % savings in district heating, oil, natural gas and water consumption.
<b>Sympower</b> Estonia <a href="http://www.sympower.net/">www.sympower.net/</a>	Demand response aggregator for balancing the grid, where demand is adjusted to meet the grid needs, by controll of connected appliances such as heating systems, water boilers, ventilation systems, energy storage devices, and more. Cloud-based platform.
<b>Telia</b> Estonia <a href="http://www.telia.ee/">www.telia.ee/</a>	Smart home system connected to the Cumulocity cloud platform to exchange data between various stakeholders, devices and platforms. Empowering the consumers, leading to better decision-making and more energy-efficient behavior.
<b>Themo</b> Estonia <a href="http://themo.ee/en/">themo.ee/en/</a>	Intelligent floor heating controller & electric radiator controller by using spot prices and weather forecast.
<b>Trend</b> Denmark <a href="http://www.trendcontrols.com/da-DK/Sider/default.aspx">www.trendcontrols.com/da-DK/Sider/default.aspx</a>	CTS systems for controlling, regulating and monitoring heating and cooling systems, as well as other technical installations.
<b>Vitani</b> Denmark <a href="http://vitanigroup.com/">vitanigroup.com/</a>	Demand controlled solutions for ventilation and heat, adapting to behavior of the user

## Other solutions

<p><b>Bakeri</b> Estonia <a href="http://bakeri.ee/">bakeri.ee/</a></p>	<p>Full solutions for building's energy production, heating and management.</p>
<p><b>Energima Elverum AS</b> Norway <a href="http://www.energima.no">www.energima.no</a></p>	<p>Energy analyzes and the choice of profitable investments. Installations.</p>
<p><b>Hoiam Kokku Grupp</b> Estonia <a href="http://hoiamkokku.ee/">hoiamkokku.ee/</a></p>	<p>Analysis of buildings heating, ventilation, electricity, lighting and water usage together with full solution offers for improvements</p>
<p><b>Invent AB</b> Sweden <a href="http://www.invent.st/">www.invent.st/</a></p>	<p>Building automation, monitoring systems, ventilation systems, EPC solutions</p>
<p><b>Saint Gobain</b> France <a href="http://glass-compass.com/">glass-compass.com/</a></p>	<p>Glazing for windows</p>
<p><b>Sol Navitas</b> Latvia <a href="http://www.solnavitas.eu">www.solnavitas.eu</a></p>	<p>Thermal solar energy and PV solar panels to provide heated and fresh air with the help of solar energy.</p>
<p><b>Honeywell</b> Denmark <a href="http://buildings.honeywell.com/">buildings.honeywell.com/</a></p>	<p>ESCO, operational efficiency, automation and building management</p>
<p><b>Velux</b> Denmark <a href="http://www.velux.com/">www.velux.com/</a></p>	<p>VELUX Integra® roof windows</p>

## GreenEST Summit 2018

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*“What to do when the smartness stops? This aspect is important when it comes to smart buildings”,* said Jurgo Preden, CEO of Thinnect. Future for buildings was the focus of the first GreenEST Summit. More than 200 energy efficiency experts, building managers, architects and 18 greentech solutions providers gathered together on October 30 in Tallinn Creative Hub to improve energy efficiency in buildings.

The aim of the GreenEST Summit was to bring together and enhance the dialogue between technology solution providers and buyers – building managers from the whole Baltic Sea Region and other EU countries.

A total of 15 experts with inspirational presentations and in panel discussions talked about topics like indoor climate, nearly zero energy buildings, energy performance contracting, smart technologies etc. Rene Tammist, Estonian Minister of Entrepreneurship and Information Technology, introduced with the current situation in Estonia, telling that Estonian buildings use about 10% more energy than elsewhere in Europe. For more information: <https://www.tehnpol.ee/eesti-hooned-tarbivad-rohkem-energiat-kui-euroopas-keskmiselt/>

At the same time 18 technology solution companies from Estonia, Finland, Norway, Sweden, Poland, and Latvia presented their engineering solutions with a detailed explanation and demonstration of the basic principles of their operation. The greentech company's solutions were remarkably diverse, starting with water mixers with reduced warm water use, eco wall boards for thermal insulation, apps for the energy monitoring to solar panels and ending with a whole construction of passive building. *“To show so many profitable solutions at one event gives building managers a lot of inspiration and new ideas on what can be done. At the same time, GreenEST Summit was a great opportunity for the solution provider to meet new customers,”* said Marit Ragnarsson, County board of Dalarna, Lead partner in EFFECT4buildings project.

EFFECT4buildings project team made interviews with representatives of companies and prepared some brief introduction about each solution/product.

Look inside the GreenEST Summit and watch after movie: <https://www.youtube.com/watch?v=ix2NZ4w4BN0> You can view the Summit pictures here: <https://tinyurl.com/y99vcp32>



*“The GreenEST Summit 2018 in Tallinn was a remarkable event with 250 participants from more than 8 countries. We’ve received very enthusiastic feedback from participants regarding the Summit content, exhibition and demonstrations. We want to keep the momentum by announcing that the Call for Contributions for the 2019 GreenEST Summit in Tallinn is now open! Next year’s theme is Mobility & Logistics. See you again in 29th of October 2019”* said Ragmar Saksing, Greentech Sector Manager, Tallinn Science Park Tehnopol.

GreenEST Summit 2018: Future for Buildings was organized by Science Park Tehnopol in the framework of the project “Effective Financing Tools for implementing Energy Efficiency in Buildings” (EFFECT4buildings). EFFECT4buildings is implemented with the support from the EU funding Programme Interreg Baltic Sea Region (European Regional Development Fund) and Norwegian national funding. The aim of the project is to improve the capacity of public building managers in the Baltic Sea Region by providing them a comprehensive decision-making support toolbox with a set of financial instruments to unlock the investments and lower the risks of implementing energy efficiency measures in buildings owned by public stakeholders. For more information: <http://www.effect4buildings.se>

## Examples of technological solutions around the Baltic Sea Region



### Company

Smart Load solutions OÜ, Estonia

### Product

Themo – thermostat for electrical floor heating that monitors different conditions (temperature, weather forecast, etc) inside and outside of the home and optimizes the energy use according to the actual energy price fluctuations.

### Features

Simple installation, on-line and app surveillance. An interactive LED circle on the thermostat indicates the current energy price. When glowing red the price is at its peak signaling that might be a good idea to shut down other energy consuming devices in the home.

## Energy savings

Savings of up to 60% of energy cost possible. When a lot of renewable energy is available in the grid the energy price drops and the thermostat will use this kind of green energy and thus reduce the amount of fossil energy used.

## Interesting facts

The product was originally developed by some PhD students in Tallinn. The company has made an extra effort in product design, won second place in Design Award Estonia.

Read more on [www.themo.io](http://www.themo.io)



## Company

Passive House Factory, Latvia

## Product

Passive houses in two versions; energy use 15 kWh/square meter or 30 kWh/square meter annually.

## Features

Up to five stories possible. The building elements are pre-manufactured for quick assembly on building site. Standard models and personalized designs possible as

well as public buildings like kindergartens, schools or offices.

### Energy savings

The construction is optimized for a healthy indoor climate all year round with e.g. insulation, ventilation, air-tight solutions and heat recovery, achieving an almost self-sufficient solution.

### Interesting facts

So far (autumn 2018) around 10 houses built in Latvia. The company's construction is the first prefab house being certified in Latvia. The company's operation started in 2017 and marketing abroad is planned.

Read more on [www.passivehousefactory.com](http://www.passivehousefactory.com)



### Company

Airobot, Estonia

### Product

Smart heat recovery ventilation unit.

### Features

Monitors and controls the indoor climate. Temperature, moisture, CO<sub>2</sub>,

ventilation etc and adjusts according to needs and set parameters. Also goes into low-consumption mode when there is no one in the room and automatically starts cooling during summer or increases the ventilation when someone is using the bathroom. Can be installed in old and new apartment buildings or offices, hotels, etc. Maintenance need is supervised via on-line interface and manual maintenance needed twice a year normally.

### Energy savings

Up to 40% of energy use.

### Interesting facts

Planning to start marketing/exporting the units to EU countries with similar climate.

Read more on [www.airobot.ee](http://www.airobot.ee)



### Company

Velux Active, Denmark

### Product

Automated indoor climate control connected to roof windows or flat windows.

### Features

Supervision of indoor climate (temperature, moisture, CO<sub>2</sub>) and automatically opens windows activates blinds and shutters. Can also be controlled manually. Set values can be controlled and altered via the product app.

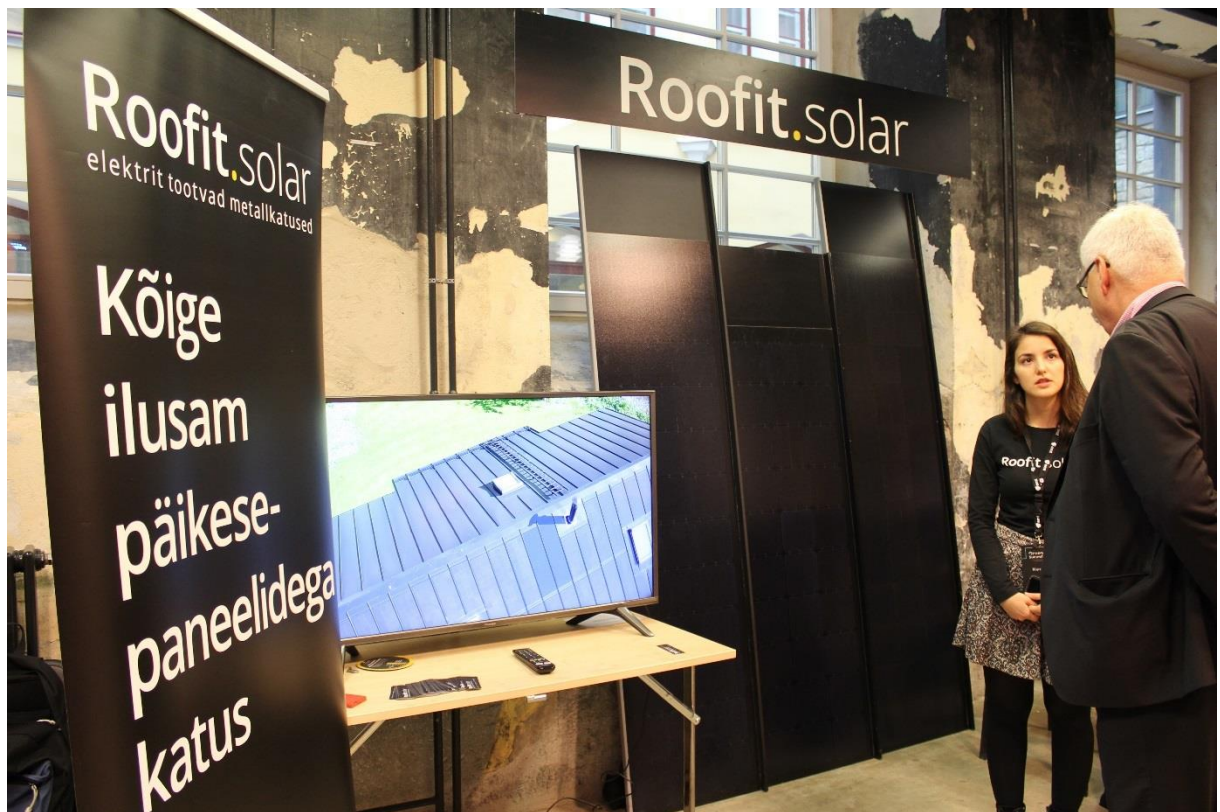
### Energy savings

Can be connected to solar panels, maintains a healthy indoor climate.

### Interesting facts

The product is a result of a cooperation between Velux Group and French company Netatmo. Marketed world-wide. A healthy indoor climate is vital because the people in the northern countries spend around 90% of the time indoors.

Read more on [www.passivehousefactory.com](http://www.passivehousefactory.com)



### Company

Roofit Solar, Estonia

### Product

2-in-1 roof solution with integrated photovoltaic solar panels.

## Features

Suitable for new buildings like private homes or public buildings or for complete roof renovations. While the solar panels are integrated the installation is fast and more economical – in comparison with separate roof and solar panel installation. Looks like a standard roof. Can be connected to the grid and surplus energy can be distributed to the grid during sun intensive periods. Estimated life-time 50 years.

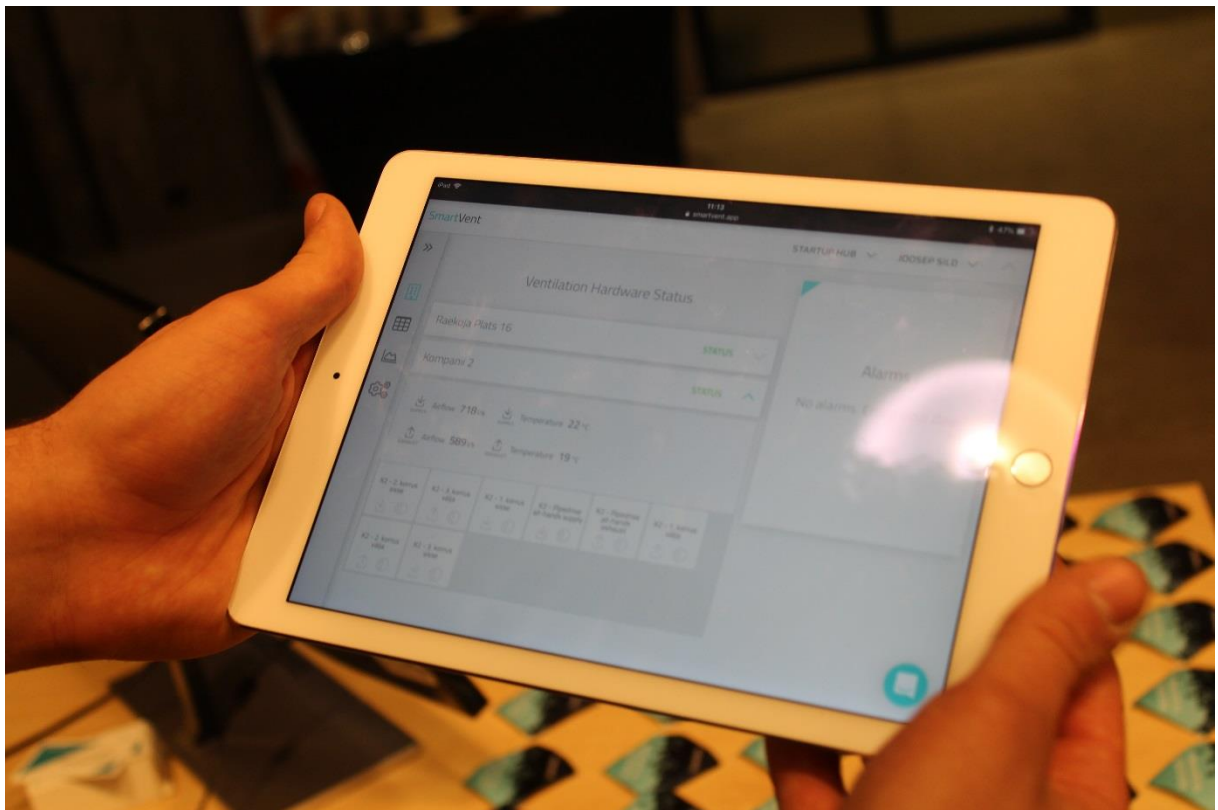
## Energy savings

Produces 8-7000 kWh solar energy depending on roof size and the location/angle.

## Interesting facts

The first roofs were installed in 2017 and has operated for a full season. The company aims to market their products mainly in Estonia and Scandinavia.

Read more on [www.roofit.solar](http://www.roofit.solar)



## Company

Tarkvent OÜ, Estonia

## Product

SmartVent, a cloud-based solution for indoor climate surveillance.

## Features

Developed for mainly larger apartment buildings, commercial and public buildings. Monitors air climate and energy use in individual rooms or areas. Alarm and user feedback functions. Possible to get a quick overview/status report via the cloud-based interface and historic report for follow-up.

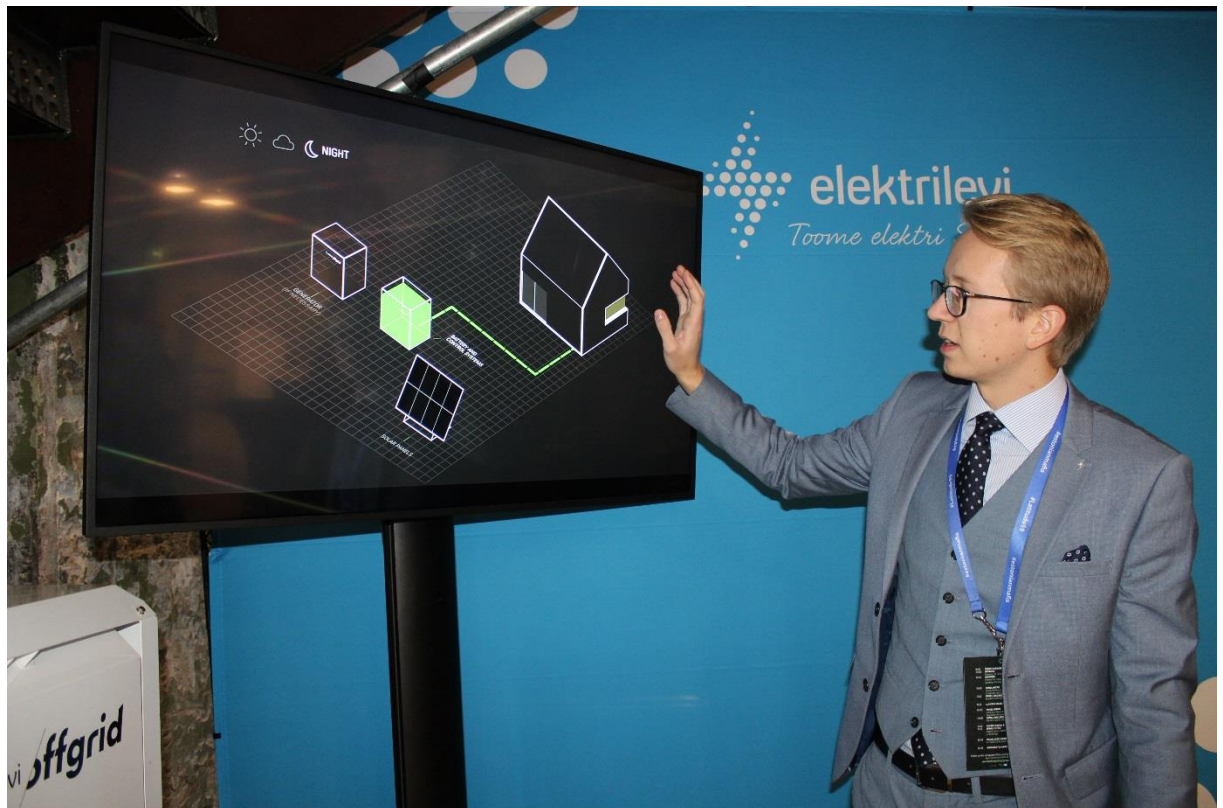
## Energy savings

Possible to achieve energy savings via better control of hardware, making planned adjustments and maintenance instead of urgent actions.

## Interesting facts

The company is also established in Latvia and Finland. Installation of SmartVent in the first school building is scheduled in 2009.

Read more on <https://about.smartvent.app/>



## Company

Elektrilevi, Estonia

## Product

Off-grid energy supply solution for remote buildings.



## Features

Consists of free-standing or roof mounted solar panels, battery pack and a diesel generator. The solar panels are automatically charging the battery pack for energy use during dark hours. Diesel generated energy used when the battery pack runs low. Installation time around two days. Special attention has been taken to reduced sound level.

## Energy saving

Less fossil energy use than solutions with only diesel generated energy. The diesel engine runs for about 5% of the time and need to be fueled once a year – less energy used for transports.

## Interesting facts

Currently set-up at four pilot sites and many pending projects. Elektrilevi is Estonias largest energy supplier and the solution is also developed as a possibility to replace old and energy lines to reduce the total cost of electricity supply for rural homes and other remote buildings. Especially suited for summer homes.

Read more on <https://www.elektrilevi.ee/en/offgrid>



## Company

Fututec, Estonia

## Product

Information system for real estate management.

## Features

Cloud-based software intended for large real estate owners like shopping galleries, large buildings, offices and others. Enables collection, analysis and storage of energy use data. Modules for maintenance and statistics.

## Energy savings

Mutual energy saving agreements between owner and tenants can be supervised and controlled resulting in reduced energy use and split cost reduction.

## Interesting facts

Launched an up-dated version with extended features for shopping centers in November 2018.

Read more on <https://www.fututec.com/>



### **Company**

FM Mattsson Mora Group, Sweden

### **Product**

Water mixers and showers with reduced warm water use.

### **Features**

Mixers with “cold start” with handle in front position enables short rinses without any use of warm water. Showers with special jet design reduces the water flow with maintained shower comfort.

### **Energy savings**

Two installed mixers using this “cold start” can save up to €150 annually (based on a family with average consumption). The example is based on an energy price of €0.01/kWh, water €0.2 /1000 liters, warm water feed temperature of 60 degrees C and cold-water feed of 10 degrees C. Actual savings depends on user behavior and which mixers that are replaced.

Top shower model can cut water and energy use in half.

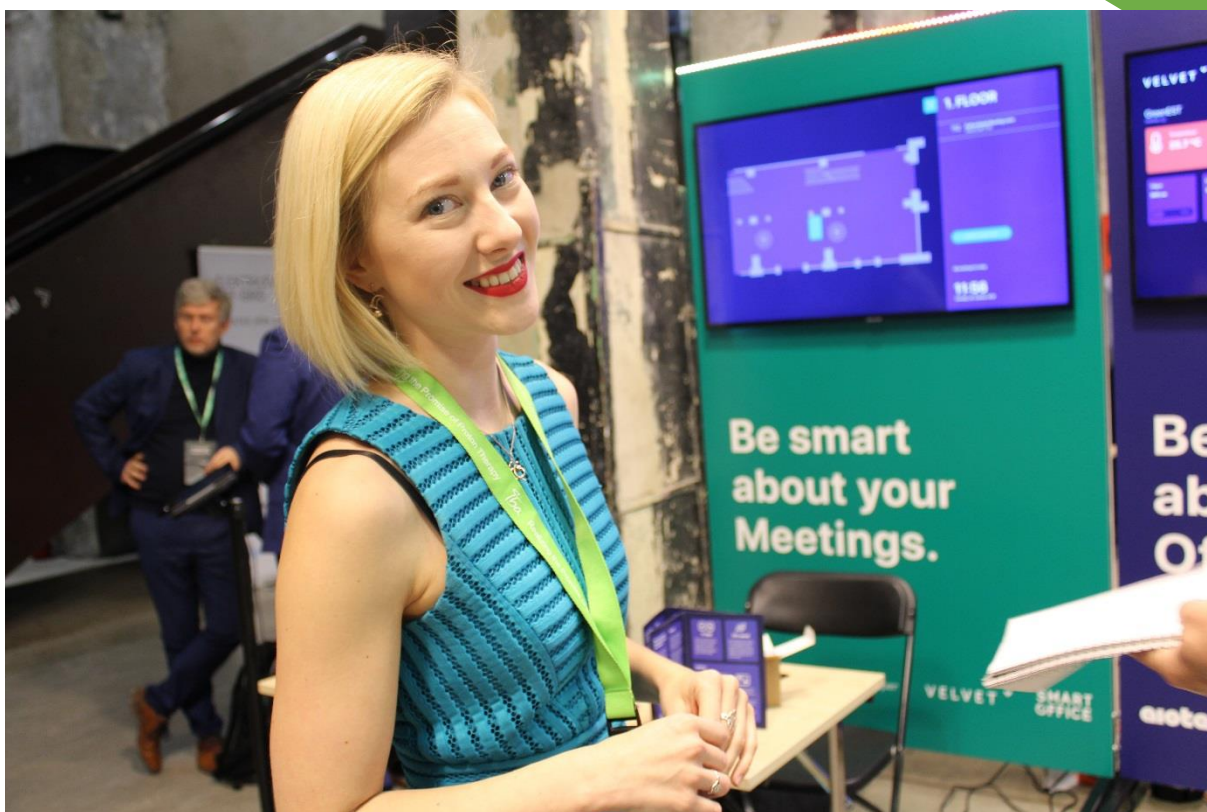
### **Interesting facts**

World-wide marketing and representation in most European countries. The company has developed “green solutions” for several years and has more recently experienced an increased interest for energy saving solutions on many markets.

Read more on <https://www.fmmattsson.com/>

### **Company**

Aiotec, Estonia



### Product

Smart Office

### Features

A system for resource management of meeting rooms including surveillance of room climate (temperature, noise, oxygen and more) and adjustments to fit current use. The concept includes everything from booking system to detection of occupancy in the room and adjustments (e.g. increased ventilation) accordingly. Can be connected to all standard on-line booking systems.

### Energy savings

When meeting rooms are unoccupied or pre-booked and released the low-occupancy mode is activated, reducing the need for energy use (heating, ventilation, etc) from around 600 W/h to 150 W/h = 75% savings.

### Interesting facts

The system also collects data about the length of each meeting. Records from 117 632 meetings using the system in Estonia shows that a “standard meeting” is 56 minutes long. Three companies, Aiotex (IoT infrastructure services and hardware), Velvet (design) and Roomkeeper (software solutions) have collaborated during the development.

Read more on <https://smartoffice.live/>



### Company

Itula, Finland

### Product

Itugraf, radiant heating and cooling panel.

### Features

Ceiling-mounted panels, heated by warm or cooled by cold water. Low intensity infrared waves distribute the heat or the cooled air. Graphite filling inside the panels ensures efficient thermal conductivity. Suitable for installation in larger buildings; offices, hotels, public buildings and industries and warehouses.

### Energy savings

Up to 30% of energy used for heating or cooling. Can be connected to all kinds of energy sources, including green energy like wood boilers and solar energy.

### Interesting facts

Itula is the leading supplier of radiant heating and cooling systems in Finland and has been active for almost 30 years.

Read more on <https://www.itula.fi>



## Company

Effektiv Energi, Norway

## Product

EE+ Hands on adaptive regulation for waterborne local and district heating.

## Features

A digital platform for energy- and cost-effective management, operation and maintenance. Indoor climate is supervised via wireless sensors with value signals that are reported to smart software. Correct operating temperature is calculated maintaining the temperature at a desired level.

## Energy savings

10-25% of the purchased energy.

## Interesting facts

Effektiv Energi is collaborating with district heating company Eidsiva Bioenergi in Hamar, Norway, on how to develop services behind the substations to its customers. Also interested in developing partners in other countries.

Read more on <https://www.aktivenergi.no>



**Company**

Vesta Eco, Poland

**Product**

Insulation products made of agricultural biomass (from annual plants) for eco buildings.

**Features**

Different kinds of fiber board for all insulation purposes. Produced in a hydrothermal process with hot pressing for low energy use during process. Max width 120 mm. Gives several positive indoor climate effects, e. g. effective insulating against noises.

**Energy savings**

Specific properties of the product allow it to protect buildings against overheating during summer and excessive cooling during winter.

**Interesting facts**

The raw material is retrieved from the company’s agricultural surroundings, around 1/3 of the residue is used. The rest goes to animal food and is left on site. Products also used for renovation of historical buildings. Active in Poland and the neighboring countries.

Read more on <http://www.vestaeco.com>



## Company

Wisemet OÜ, Estonia

## Product

Remote reading systems for water meters in apartment buildings.

## Features

Collects data from sensors, e.g. temperature, humidity, CO<sub>2</sub> in the room. Supervision of water, heat, gas, electricity, etc. Accessing of all data via one single gateway and function for sensor control.

## Energy savings

Irregularities like water leaks can be spotted at once.

## Interesting facts

Up to 1000 sensors can be connected.

Read more on <http://www.wisemet.ee>





## Company

Healthy Homes, Sweden

## Product

Endura Delta, a demand-controlled heat recovery unit.

## Features

Collects data from sensors, e.g. temperature, humidity, CO<sub>2</sub> in the rooms and adapts the ventilation accordingly. Heat from extracted air will be transmitted to the supply air. Equipped with an automatic summer bypass where the heated air doesn't pass through the heat exchanger thus achieving a cooling effect. Also equipped with a frost protection mechanism. Can be monitored and controlled via an app. Suitable for family homes, summer houses and apartment buildings.

## Energy savings

Up to 89% of the heat in the ventilated air is transferred to the incoming air. Can be set in holiday mode for minimum energy use.

## Interesting facts

The need for ventilation usually peaks in the morning during bathroom and kitchen use. A second peak, on a lower level, is in the evening at dinnertime. During traditional ventilation the air flow usually exceeds the need during most of the day but is insufficient during the morning peak.

Read more on <https://www.healthyhomes.se>

## Airobot's smart ventilation unit monitors and controls the indoor climate

High efficiency and good health where the two key aspects when Estonian company Airobot developed their solutions for monitoring and controlling of the indoor climate. "It is all about surveillance the levels of temperature, carbon dioxide and moisture levels and avoid overventilation and restore any deviations back to normal levels automatically."

Airobot calls their product Airobot S a "full self-thinking ventilation unit". The unit monitors air pressure, temperature, moisture, CO<sub>2</sub>, ventilation etc., by built in sensors and adjusts according to needs and set parameters.



*Photo source: The company Airobot*

"The energy consumption can be cut by up to 40 percent when you ventilate according to the actual needs instead of conventional ventilations parameters. When the low-consumption mode is in operation, for when there is no one in the room, it also contributes to the lowered consumption."

"Energy consumption can be cut by up to 40 percent when you avoid over-ventilation."

The equipment can be installed in old and new apartment buildings or offices, hotels, etc. and be connected to all heat sources. It is also possible to control and monitor each apartment in a building individually. Airobot recommends installation of the equipment – a

unit about the size of a washing machine – in the washing room or by an entrance where it can be connected to the ventilation ducts. The equipment is also designed to be as silent as possible.

### **Easy installation and low maintenance**

"Installation is easy, and the need of maintenance is low. We recommend filter changes about twice a year."

The maintenance need can also be supervised via on-line interface. Here you will also find detailed statistics about the conditions and consumption history. The system can also be monitored via a physical panel.

In summertime and when the indoor temperature is rising the Airobot ventilation system automatically starts cooling. It also increases the ventilation when someone e. g. is using the bathroom.

### **Securing a healthy climate**

"The overall indoor climate affects the health of the residents more than you might think. This has been a very important factor during the development and with the Airobot S you can really secure a good climate for the residents. We have also put a lot of effort into making it as affordable as possible to achieve the best investment, quality and energy saving ratio."

Airobot is now marketing their product on a wider market.

"Initially we are aiming for the Scandinavian and the German markets where the climate is similar to our climate in Estonia. To fully utilize the benefits there is a need for general high-tech awareness among the users."

### **About the company**

Airobot OU, is an Estonian technology company, has been developing Airobot devices in collaboration with scientists from the University of Tartu and Tallinn University of Technology since 2013. Read more on [www.airobot.ee](http://www.airobot.ee) (available in English).

## Adaptive regulation for waterborne local and district heating - Effektiv Energi AS



Effektiv Energi AS (Efficient Energy) is an entrepreneurial Norwegian company that develops the EE+ concept for energy and cost efficiency of waterborne local and district heating. “This field is somewhat overlooked but has a great energy saving potential”, says Bjorn Naustvik at Effektiv Energi AS.

The EE+ Hands on is an adaptive regulation system for waterborne local and district heating. It features a digital platform for energy- and cost-effective management, operation and maintenance. Indoor climate is supervised via wireless sensors. The sensors are placed in selected zones (e. g. in selected apartments in the building) and a practical display show the temperature and the relative humidity. At the same time the value signals are reported to smart software for regulation of each section. Correct operating temperature is calculated maintaining the temperature at a desired level.

“By utilizing the latest technology for district heating regulation, it is possible to save 10-25 percent of energy used.”

“EE+ Hands on utilizes IoT (Internet of Things) and AI (Artificial Intelligence) to secure the correct amount of energy being used. The Hands on replaces the traditional regulation that takes place based on the temperature outside the building. In this way it is possible to save 10-25 percent of energy and contribute to a stable indoor climate in buildings while reducing return temperature,” says Bjorn.

### **Reduces costs**

The EE + concept constitutes a digital platform for providing services that will reduce management, operation, and maintenance costs, as well as increasing the energy efficiency of waterborne energy systems. The concept helps to reduce energy consumption in existing buildings and supports the role of the district heating industry as actors in the green shift to meet climate challenges.

### **Reducing power peaks**

Also included in the EE+ concept is the Digital Twin for Waterborne Energy Systems (Utilizing Open BIM) and SmartGrid to reduce power peaks, make heat production more energy efficient and help integrate different energy solutions locally.

### **Developed in cooperation**

The system is being further developed in cooperation with Eidsva Bioenergi, a regional district heating company in Norway. “Our focus is of course energy and cost effectiveness for the entire supply chain for district heating companies. We want to expand our business also other countries, primarily to potential partners in Sweden and Denmark that have district heating companies that are similar to those in Norway.”

### **About the company:**

Effektiv Energi is collaborating with district heating company Eidsiva Bioenergi in Hamar, Norway, on how to develop services behind the substations to its customers. More information: <https://www.effektivenergi.no>

## EWTG ventilated window frames increase energy efficiency

Modern building construction technique can actually cause new problems. A combination of perfect insulation, airtight and inadequate ventilation of the building can result in polluted and moist air indoors. For those who work or live in the building this might cause problems, such as breathing problems, fungi, allergies and a negative impact on the energy balance. Polish EWTG has developed a solution; a thermal ventilation system for window frames.

“Ventilation is a prerequisite for a healthy internal climate. Air circulation ensures that polluted and humid air is replaced with fresh air, which significantly improves the quality of life of its inhabitants”.

The EWTG product TunalTopNeo is a thermal ventilation system for window frames. It can be used in all types of window joinery made of wood, aluminum and PVC. The inflow of air into the interior through a special grill shape directs the air up, thanks to which the colder air mixes better with the warm one.

### A patented valve

The ventilation function is managed by a special valve, a patented ZR valve, guaranteeing constant air flow regardless of atmospheric conditions or pressure. The valve opens or closes accordingly. Maintenance of the ventilations systems should be done at least once a year. “The Tunal ventilation has a significant impact on the internal climate and the energy efficiency.”

“The choice of a ventilation system significantly affects the energy class of the building. The energy class of the building clearly indicates the energy efficiency as well as the economy from purchase to the building’s entire life-time. In combination with energy efficiency, high-quality insulating materials Tunal ventilation also has a significant impact on the energy efficiency.”

### Deliveries to window manufacturers

The ventilated window frames are delivered to window manufacturers that incorporate them into their finished windows. EWTG has its own transport fleet to guarantee deliveries without damage and dimensional restrictions – and timely deliveries.

### About the company:

The EWTG company was created as a result of over 15 years of experience in the B2B sector. The ventilation systems for window frames have been produced since 2013.

They offer two possibilities of cooperation with window manufacturers. Depending on the demand, they can provide the profile chosen by the RAL color or veneer indicated.

In 2016, EWTG also started preparations for the launch of a new line of Retro-line products targeted at the door joinery segment.

More information: <http://ewtg.pl/en/home/>

## Savings from mixers and showers - FM Mattsson Mora Group

"Few are familiar with the savings from mixers and showers". To save resources is not a new idea at FM Mattsson Mora Group. Development of their water and energy saving mixers and showers started some 20 years ago. A patent for a one-grip lever was the starting point for the "green" product lines that has been developed since then, resulting in numerous energy effective products.

"We probably jumped the gun a bit, but demand for water and energy saving solutions is now constantly increasing", says Frank Rälög, business development manager at FM Mattsson Mora Group. "But I must say that the set requirements, in connection with both public and private, project procurements, are chokingly low. There is definitely a need for more awareness in this field!"

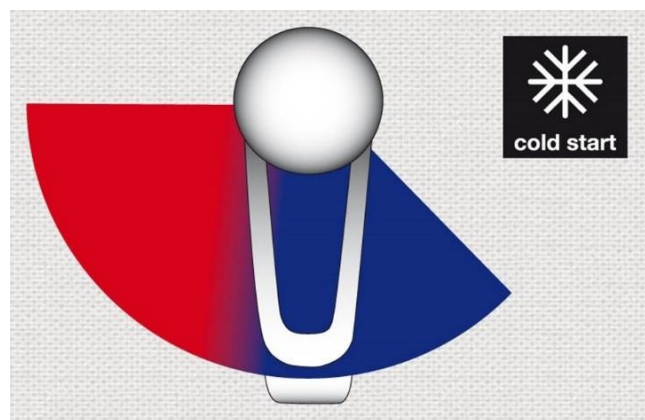
On the FM Mattsson domestic market in the Nordic countries water and energy has traditionally been regarded as endless resources, except for in Denmark where costs are significantly higher and because of this FM Mattsson Mora Group has several energy consultants serving their customers there. However, in recent years Frank has noticed a change because of e. g. water shortage (in Sweden) and an increased focus on energy issues. And there is lots to be saved.

"Choosing the right mixer can save up to 30 percent and when it comes to showers it is almost possible to cut the water and energy consumption in half."

*Installation of mixers using "cold start" can save a lot of energy and the pay-back time is short.*

### This is how it works:

The normal lever position on a one-grip mixer is straight forward. When lifting it up in this position it is constructed to feed only cold water (no mixing of warm water). Turning the lever to the left give you warm water and to the right colder water. Traditional levers in the "straight-forward-position" start to mix in warm water immediately. The most common – when a mixer is used – is a very fast rinse. During this rinse the warm water never reaches the user. Instead it stays in the water pipe, thus making no use of the heat.



A test show that installation of two mixers using this "cold start" can save up to €150 annually (based on a family with average consumption). The example is based on an energy price of €0.01/kWh, water €0.2 /1000 liters, warm water feed temperature of 60 degrees C and cold-water feed of 10 degrees C. Actual savings depends on user behavior and which mixers that are replaced.



*Choosing the right mixer can save up to 30 percent of the energy used in order to heat the warm water.*

### The shower is the most wasteful:

The biggest energy consumer is however the shower and FM Mattsson Mora Group offers a number of technical solutions in order to reduce the amount of heated water used – with maintained shower comfort. This is achieved by reducing the flow through a clever design of the shower jets and by mixing in air. "Traditional showers use around 10-12 l of water a minute. Our A class (top range) showers consume six liters per minute", says Frank.

The lowered consumption must not impair the user comfort, Frank Rälg emphasizes. Energy smart solutions should only be noticeable on the water and heat invoices. This is something often forgotten when a new building or refurbishment is calculated.



*The biggest energy consumer is the shower and FM Mattsson Mora Group offers a number of technical solutions in order to reduce the amount of heated water used.*

**The payback time for an installation of an energy saving shower (compared with a traditional) is from less than a year to around three years, depending on the current water and heat costs.**

#### Use the life cycle cost:

"To use the life cycle cost as a factor is much more rewarding. Here we have products that are slightly more expensive, an investment that is easy to motivate if you consider the entire lifetime. Despite this, many choose cheaper solutions in newbuilds and refurbishments, saving small amounts initially."

He wishes for an increased awareness, clearer regulations and focus on energy issues from those who establishes building standards and laws.

"As a supplier we must also be responsible and stress the issues. This can be done by for example explaining the importance and meaning of different classifications and eco labels. We have also recently launched a special website in order to put water consumption topics higher on the agenda.

#### Development continues:

FM Mattsson Mora Group now take the next step developing even more advanced technology using electronics, on-line units that can visualize the water and energy consumption in a simple manner. This will also open new opportunities to e. g. communicate with heat pumps and ventilation in the smart buildings of tomorrow.

"It is important to understand that the possibility to save energy depends on both technology and the end customer behavior. Interestingly though; our old ideas about how our products are being used is now verified when we can follow them on-line via internet."

"Developing smart ideas on how to economize the use of water and energy is fundamental to us and without doubt something that we will continue to do."

#### Want to know more?

FM Mattsson Mora Group offers plenty of information on their web sites, available in several different languages, and is present on other social medias. On the website a savings calculator is found where you can explore the possible savings by entering your own data. You are also always welcome to get in touch with the company's sales representatives or contact someone at the head office in Sweden.

#### About the company

FM Mattsson Mora Group manufactures water and thermostat mixers mainly for the Nordic market and is also present internationally in Europe via their own sales companies. FM Mattsson was founded in 1865 and was merged with Mora Armatur in 2003. Later on, Danish Damixa was incorporated in 2014. The company is the leading supplier in the Nordic countries and is listed on the stock exchange Nasdaq Stockholm.

## Healthier homes and reduced energy use with ventilation - Healthy Homes



There are lots to be gained from ventilation that works “on demand”. The company Healthy Homes in Sweden is in the forefront with ventilation systems that adapt to occupant behavior and needs.

“We want to avoid over-ventilation of the different rooms and spaces in the home and instead use the energy to ventilate when it is actually needed, one of the developers Jonn Are Myhren, explains. For example, when you wake up and use the bathroom, shower and the kitchen in the morning the ventilation is increased, and the ventilation is reduced during the day if there is no one at home.”

Our heat recovery unit Endura Delta is fully automated and works 24-7. It collects data from sensors, e.g. temperature, humidity, CO<sub>2</sub> in the rooms and adapts the ventilation accordingly.

*Photo source: The company Healthy Homes*

“Even smell is surveilled and will kick in extra ventilation, a much-appreciated feature especially when there is activity in bathrooms and kitchens. During traditional ventilation the air flow usually exceeds the need during most of the day but is insufficient during the morning peak.”

### Efficient heat recovery

The second peak, although at a lower level, emerges in the evening at dinnertime when activities like cooking and other demands for increased ventilation.

**With a heat recovery rate of 87% more heat is transferred from the extract air to the incoming air compared to most other similar systems on the market. In addition, even more energy is saved due to lower fan operation, thanks to the automatic function and reduced ventilation during several hours a day.**

### ... and cooling function in summertime

Endura Delta can also be set in holiday mode for minimum energy use if there are no residents at home. The Endura Delta is further equipped with an automatic summer bypass were the heated air doesn't pass through the heat exchanger thus achieving a cooling effect.

Technically the system is based on a plate heat exchanger (PHE), with 87% efficiency, using maximum 85 W per fan. In this way the in- and outgoing air is never in contact thus avoiding smell to be recirculated. The system is compatible with “smart homes” systems and it is also passive house certified.

### What kind of buildings can it be installed in?

“It is developed for family homes, apartment buildings and summer homes, existing ones or newbuilds. As our company name “Healthy Homes” indicates, it is suitable wherever you want to improve the indoor climate. In addition to all ventilation benefits it is also equipped with a filtering function to reduce pollen and other unwanted particles in the incoming air.”

“There are also more practical aspects such as easy installation that have been taken into consideration and is now much appreciated by our customers.”

Automatic or user surveilled and operated? Both options are possible. The system is app controlled and the actual levels of temperature, moisture, CO<sub>2</sub> and ventilation activity can be monitored. The active user can adjust and personalize/maximize the benefits via the app.

For the more passive user an easy filter exchange once a year is all maintenance that is needed.

### **Started as a research project**

What came as a surprise during the development, besides the energy aspects, was the fact that the indoor air in the sleeping room could reach unhealthy carbon dioxide levels during the night.

### **Improved health and energy savings**

“Actually, the indoor climate can often be poorer than we realize. Our aim is to make homes healthier to live in and save energy at the same time. Just imagine if you are suffering from headaches or other conditions that can be related to poor indoor climate – or maybe even caused by the building materials – and this can be fixed by improved ventilation. We think that an investment in better and more energy efficient ventilation has many benefits.”

### **Want to know more?**

A brochure in English can be downloaded on Healthy Homes website <https://www.healthyhomes.se/enduradelta>

You are also welcomed to contact Healthy Homes directly:

Telephone +46 (0)739 47 48 71

E-mail: [info@healthyhomes.se](mailto:info@healthyhomes.se)

### **About the company**

The Healthy Home story started in 2012 when researchers at Dalarna University, Sweden, realized that the most efficient energy savings in homes can be achieved by reducing the ventilation down to one third when there is no one there. In cooperation with the Belgium company Renson a development project was started, and systems were developed for Scandinavian climate and tested for several years.



## Ceiling panels for efficient heating and cooling - Itula

Been to Finland and visited some offices, public buildings or schools? Have you noticed the panel ceilings? These are quite often delivered by Itula Oy, a Finnish company that has delivered radiant heating and cooling panels for almost three decades.

“This kind of solutions are very common in Finland and also much appreciated in the rest of Europe, but we now want to make other markets really understand the benefits”, director of export sales Mr. Hannu Janhunen explains. “They are very advantageous when it comes to energy use both in winter and in summer.”



*Photos from Itula Oy archive*

Actually, Itula states that it is possible to save up to 30% of energy used for either heating or cooling in building. The product ItuGraf– radiant heating and cooling panels – are ceiling-mounted. They are heated by warm water or cooled by cold water. Low intensity infrared waves distribute the heat surfaces or cool the room. Graphite filling inside the panels ensures efficient thermal conductivity.

An energy saving of up to 30% for heating or cooling in an office, a public building or an industrial building is possible.

### **The best indoor climate**

“In this way you also achieve a nice indoor climate without dust, draft or noise. Evenly distributed temperature in the room without the need of excessive ventilation.”

Hannu emphasizes the overall life-time economy regarding the heating and cooling of a building.

“You need to take all factors into account; from the initial investment, via the actual energy use and its cost to the service and maintenance cost. In our opinion ItuGraf saves money in every stage. We have made many calculations that shows that our panels are very competitive in the long run.”

### **For larger buildings**

The Itugraf panels are suitable for installation in larger buildings; offices, hotels, public buildings and industries and warehouses. In accommodation houses ItuGraf panels are coming just now very popular in Finland. They can be used with all energy sources, including green energy like wood boilers, geothermal and solar energy, that produces hot (or cold) water and it can also be integrated easily with other building services. The panel can be installed into the false ceiling or it can be installed as freely hanging. The system is maintenance-free and suitable for both new and renovation constructions.

### **Design features**

Itula offers different kinds of design alternatives to suit the architecture and indoor design of the building. The lighting can also be integrated.

-The overall feature of ceiling mounted equipment is very appreciated while there is no need for radiators or other equipment that takes up space on the floor or on the walls. This makes it easier to furnish an office or to optimize the use of the floor space for example in industry or in your home.

The panels are manufactured in Ruokolahti, Finland and exported world-wide. The panels are CE-marked, and an EU Declaration of Performance (DoP) is available on request.

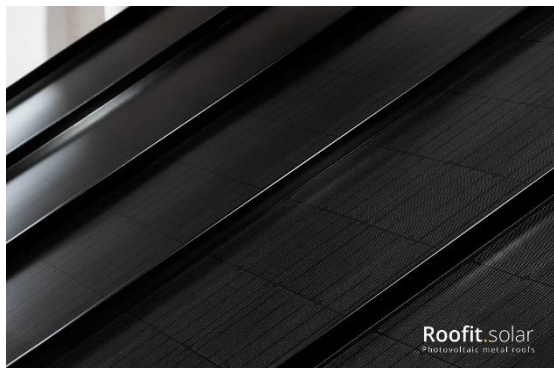
### About the company

Itula Oy is a Finnish family company specialized in environmentally friendly heating and cooling systems that enhance energy efficiency. Itula is a leading supplier of radiant heating and cooling systems in Finland, active for almost 30 years. More information: [www.itula.fi](http://www.itula.fi) (English version available)

## 2-in-1 solar panel solution - Roofit.solar

**Newer research has proven that solar panels are more suitable than you might think also on latitudes in the far north. Estonian company Roofit Solar Energy has created their concept on the theme – a metal roof with integrated photovoltaic solar cells – suited for the weather conditions in Scandinavia and the Baltic Region.**

“According to the latest technology the solar cells are laminated on the metal roofing material. You can use the solar material on the entire roof or – depending on your preferences and energy output wishes – to some parts of the roof. It looks like a normal metal roof, but it is a roof that really contributes to a green energy solution for the building,” says Helen Anijalg, Marketing and export manager at Roofit.solar.



Set aside the aesthetical values, the main advantage compared to conventional solar panels is the installation cost and environmentally thinking - less layers of different materials on roof. Instead of mounting the roof and the solar panels separately you install them both simultaneously.

“It is almost as easy to install as an ordinary roof. This really saves time and labor cost. We also supply full information about the installation to make it as smooth as possible.”

*Photo from Roofit.solar archive*

### Sustainable energy for every household

The roof panels come in two sizes, 515 x 1640 mm weighing 11.6 kg and 515 x 1995 mm weighing 14 kg. The smaller produces 105 W and the larger 130 W. The metal sheet thickness is 0,5 mm, but the final product is 4mm thick. The standard color is black as most cost-efficient material. But for a full roof the production will depend on roof size and the location/roof angle, for example 100 m<sup>2</sup> roof will be ca 14kW.

The panels are suitable for new buildings like private homes or public buildings or for complete roof renovations. Each solar panel can produce 105-130 W depending on size. Excess energy can be fed to the grid or be used to charge an electrical car. But what about the life-time?

### Solar panels will last for at least 30 years

“All solar panels experience a small degrade annually. The roof materials as such have a lifetime of 50+ years. Our solar part of the roof can last for more than 30 years. After 30 years you can still have 85 % of initial power output.”

The material has also been tested for impact of heavy hail, mechanical impact and overall strength with no damage to either the surface or the energy production function. But what about dust or other debris, will that affect the function?

“This has not been a problem; the rain does the cleaning. And fortunately, there is a lot of rain on our latitudes in the north of Europe.”

## Energy to the grid

All solar panels produce excess energy during the summer months and the surplus is possible to feed and sell to the general grid.

“This is of course an option that is interesting, but also dependent on the current feeding tariffs and ultimately a political question on how you want to promote solar energy and those who invest in solar panels. As an alternative use of the energy not needed in the household can be used for charging an electrical car.”

### About the company

Roofit.solar is a relatively new company and the first roofs were installed in 2017 and have operated since then. The team behind Roofit.solar has experience in research, large-scale international energy projects, production and material science as well as export. Roofit.solar initially aims for the markets in Scandinavia and later rest of Europe. More information: <https://roofit.solar/> (in English)

## Solar Heat water storage - Janni energietechnik

Josef Janni is the creator of a company in Switzerland's Janni energietechnik. He started the business in the middle of the seventies with making solar collectors. The vision was to create a system that made a building self-sufficient in heating and hot water with only the sun as an energy source. Their solution is hot water storage in big tanks. The company makes everything them self from calculation, manufacturing and installation. This system is installed in more than 100 buildings today and the demand is growing.

### System

An insulated water tank is placed in the middle of a building and sun collectors is placed on the roof. The tank size is 50-200 cubic meters and a minimum height of 5 meters to get a good thermal stratification in the tank. The sun collectors charge the tank with energy. The highest temperature in the tank is 95°C when it's fully charged. A 100 cubic meter tank has 2kW energy loss when the temperature is 95°C, this loss is absorbed by the building and used as heating. In the summertime the tanks losses can be ventilated to avoid need of cooling the apartments. The system needs some other kind of energy source for example biofuel to secure the temperature in the tank.



Source: Solarpartner Süd GmbH

## Pros

- 100% renewable energy
- Store energy in water is much cheaper than other known options
- Buildings use the energy losses from the tank.
- Saving energy in water has several benefits nontoxic, thermal stratification, easy to exchange energy.
- The system uses few valuable natural resources
- Low maintenance
- Simple technics
- Long lifecycle

## Cons

- Space consuming
- Expensive
- Needs some sort of backup system to ensure temperatures in cold winters
- Fairly untested in northern Europe
- Difficult to implement in old buildings

More info: <http://jenni.ch/home-345.html>

