

FLAME



*Cleaner
Future*

Future energy | Oilon worldwide | Industrial heat pumps | Oilon ACE

FLAME

OILON'S CUSTOMER MAGAZINE • 8



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Oilon is creating a cleaner world by developing and manufacturing efficient and low emission energy, heating and cooling solutions for industry, property and energy company use.

Our focus areas are energy efficiency, reducing emissions and utilization of renewable energy sources.

Oilon is a Finnish family company employing over 350 people in Finland, China, Russia, the United States and Brazil.

CHIEF EDITOR: *Kaisa Törmänen*

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“Breaking new ground in the energy sector hasn’t always been easy, and seeing our efforts bear fruit has given us cause for celebration.”

TERO TULOKAS
Oilon’s CEO

Journeying towards a cleaner future with our customers

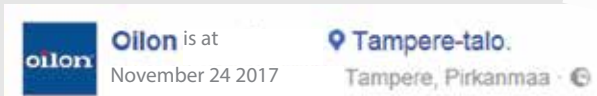
Welcome to our customer magazine, themed Cleaner Future. The energy sector is experiencing the most significant transition in industrial history, as the direction of energy production is about to be guided by environmentality and energy efficiency, instead of being solely dependent on cost. Reducing carbon dioxide and other greenhouse gas emissions is an inevitability, one that will change the energy business and the whole of society in a multitude of ways. Paralleling the efforts to slow down climate change, another significant adjustment under way is the improvement of air quality in metropolitan areas by reducing the emissions of energy use.

Oilon has decades of sustained effort in developing cleaner combustion technology. Our emphasis during the last few years has been on developing combustion technology for natural gas, and reducing emissions. It’s evident that our investment has paid off. One good example is our success in China, where the standards for combustion emissions are the second strictest in the world, after California. However, China differs from California in that meeting the standards at the expense of efficiency is not allowed. We have also had combustion technological solutions for utilizing renewable bio oils and gases for a long time now. The constantly tightening emission standards will oblige us to keep on evolving, and that is a challenge Oilon is keen to answer.

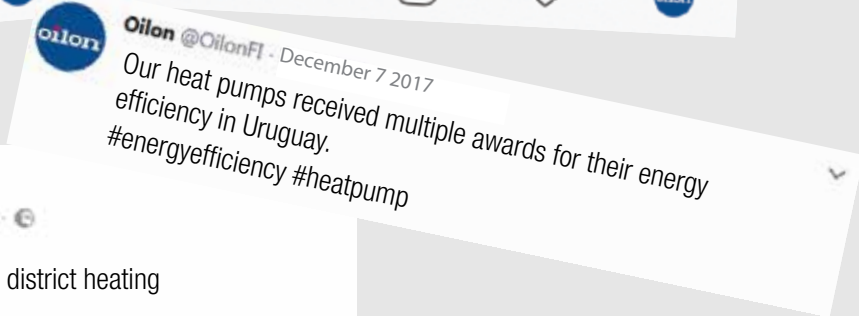
Moving forward, heat pumps are going to have a very central role in heating and cooling. A leading Nordic energy company has estimated that heat pumps and renewable surplus electricity will produce over half of its district heating as soon as the year 2050. Oilon anticipated this trend some twenty years ago when we added heat pumps to our product family. Ever since, we have had an open-minded approach to developing new ground source heat products and different applications for utilizing waste heat. Breaking new ground in the energy sector hasn’t always been easy, and seeing our efforts bear fruit has given us cause for celebration. We have already carried out hundreds of inspiring projects, some of which are showcased in this issue.

As Oilon’s new chief executive officer, I will be taking up the torch right where Eero Pekkola left it after twenty and more years at the helm. We are going to continue investing in new markets and commit to developing and improving our products even further. We are also making major investments in new, more efficient forms of trading and data collection in order to serve our customers even better.

To conclude, I would like to thank all of you, our customers. Without your support we wouldn’t be where we are right now. I hope that you decide to continue journeying with us towards a cleaner and more sustainable future. It’s a major challenge, but we are ready to take it on!



Kaukolämpö 2017 in Tampere rounded up Finland's district heating experts. #districtheating #oilon #thewarmway





Oilon @OilonFI · May 17

Oilon's burners ensure an optimal combustion process in the world's largest biopower plant under construction in the UK.
#bioenergy #oilonburners

Oilon added 3 new pictures
November 6 2017

Greetings from Shanghai! Boiler Shanghai exhibition is one of the largest burner and boiler events in China. We are also the primary sponsor of the event. #oilonchina #thewarmway



Oilon @OilonFI · November 22 2017

Together with Beijing Enterprise Water Group, Oilon signed a memorandum of cooperation concerning the utilization of waste heat. Present in the signing were Mayor of Helsinki Jan Vapaavuori and top officials of the city of Beijing and Beijing Enterprise Group. #oilonchina #beijing #heatpumps #recyclingenergy



Instagram



Oilon's Chairperson of the Board Päivi Leiwo meets the President of China Xi Jinping during his state visit in Finland.

The Office of the President of the Republic of Finland
#statevisit #presidentofchina #china #finland



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WeChat: scan the code with your phone





Oilon ACE burner

- Capacity range 6–90 MW
- Gaseous and liquid fuels, simultaneous combustion
- Very low combustion emissions (Low- $\text{NO}_x < 30 \text{ mg/Nm}^3$)
- Good ratio (1:8)
- Good efficiency, no abnormally high residual oxygen content, modern control automatics

Oilon becomes China's leading burner manufacturer

Ultra low emission Oilon ACE is on a mission to conquer the world, starting with China

Oilon's ACE burner series has been triumphant in China. The development process was rendered possible by well-timed and adequate investments in research and development. The burner has made Oilon one of the first Western companies to meet the country's extremely strict emission standards for nitrogen oxide.

The ACE is especially popular in Beijing, which has the strictest emission standards in the world. Europe is following suit, and a reference document obliging large combustion plants to use the best available technology was released in 2017.

– When the news on the extremely strict emission standards broke, we realized that this would be our opportunity to do something unique and be one of the first companies to break into China's changing burner market, says Oilon's R&D Director of Combustion Technology, **Joonas Kattelus**.

Computational fluid dynamics accomplishes very low emissions

– We set our sights high with these unprecedented standards. We knew we would have to develop and adopt a completely new technology to meet them. The development project turned out to be smooth, however. Within a year from starting the design phase we had released an ultra low emission burner series with cutting edge technology, Joonas Kattelus describes.

Oilon's proprietary computational fluid dynamics (CFD) tool played an important role. The team utilized it in new ways in developing the ACE. Prior to the ACE, computational fluid dynamics was mostly used for analyzing the burners' individual properties. For the ACE project, CFD was employed right away to be the primary tool to guide the development process. By doing so, the team could test, measure and compare different concepts with great computational precision.

– We had researched different methods of reducing emissions and tested the burner's properties multiple times with CFD before ever moving forward with constructing the initial prototype. We acquired a lot of data before the prototype phase. This included the burner's emissions, configurations, flame structure, flue gas recirculation and performance in different environments. By using computational fluid dynamics we could also easily observe that the burner's performance wasn't hindered by the drastic drop in emissions, Joonas Kattelus describes.

Despite the ACE's very low emissions, no corners were cut when it comes to adjustability, flame structure or other properties of the burner. The ACE reduces combustion emissions with fuel and air phasing, and by utilizing internal and external flue gas recirculation optimally.

Now CFD has become a mainstay in R&D. It is used for modeling the combustion process, emission reduction and the design of new products.

"We succeeded because we have an extremely proficient development team, and because the company was not afraid to invest resources in the development process."

R&D prepares for the next generation of burners

Oilon is one of the leading developers in low emission burner technology. The European burner market will also change due to new emission regulations, and Oilon is already answering the demand with its wide burner capacity range.

Research and development is crucially important for the company, reflected in the money invested, 6 percent of the annual turnover.

– R&D's goals are synonymous with our customers' expectations. In developing combustion technology, special emphasis is placed on reducing combustion emissions, on technology utilizing bio and waste-based fuels, and on energy efficient solutions, such as electronic control systems.

Ease of use and practical design are also vital parts of research and development at Oilon, Joonas Kattelus relates.

– We know we can reach even lower emissions. The nitrogen oxide emissions of the next burner generation will be even closer to zero. We won't be resting on our laurels. We seek to develop our burners' properties constantly. The market is changing by the day and we have a burning desire to succeed, Joonas Kattelus continues. 🍷



30 000 megawatts worth low emission heat to China

China sets another global first with very strict emission standards for gas combustion in the capital Beijing. This follows a number of other restrictions on emissions that reduce the quality of air, with Beijing being especially focal. Since 2016, an emission requirement directed at heat plants and a number of other facilities has restricted nitrogen oxide emissions to a maximum of 30 milligrams per normal cubic meter. Europe is following accordingly, and the new BREF document has limited large plants to nitrogen oxide emissions between 10 and 60 mg/Nm³.

2016 and 2017 saw Oilon replace or modernize 8000 megawatts worth gas burners in heat plants and other Chinese facilities with models conforming to the extremely strict emission standards (Ultra Low-NO_x). Prior to this, the company delivered as much as 20000 megawatts of low emission technology to the country, capable of meeting the 100 mg emission limit.

– Other provinces in China are going along with Beijing's model and now large cities like Xian and Tianjin are adopting the low emission technology. The market sector in China is still growing due to the country-wide effort to begin restricting emissions. As the competition steps up, responding to customer demand quickly is going to be imperative. Oilon's strengths are its long legacy and substantial clientele base in China, describes CEO of the Wuxi factory, **Sami Pekkola**.

JBC Industrial Services awarded for energy efficiency



JBC Industrial Services, representing Oilon Burners in Great Britain, was awarded for its energy efficiency in the Motion Control Industry Awards in Birmingham. The award is granted annually to a company that has made a significant contribution to environmental issues, such as energy savings or emissions control. The jury was impressed by the energy savings that the Ecosafe automatics, jointly developed by Oilon Burners and JBC, was able to generate compared to its rivals.

JBC Industrial Services helps its customers reduce emissions and energy consumption, as well as improve their production processes. JBC's clientele base includes a number of major industry players, including pharmaceutical GSK and luxury car manufacturer Bentley.

– The burner and its electronic control system have the largest effect on the boiler's capacity and thus can also achieve the largest savings in energy consumption. A friend recommended Oilon Burners to me and after visiting their burner factory I was thoroughly convinced by their high-quality products and friendly, expert staff. Our customers have also been convinced by the Finnish-made burners, which are downright superior when combined with our Ecosafe automatics, achieving a stellar 10:1 ratio, plus considerable energy savings, rejoices company founder **John Bashall**.

Luxury car manufacturer reduces energy consumption and emissions

British luxury car company Bentley is one of JBC's oldest customers. Two Oilon's gas burners were installed in their factory. The burner-boiler combination systems are controlled by the Eco-safe automatics, developed by JBC.

– There was a drastic reduction in electricity and gas consumption after Oilon's GP-450 M LN burners were commissioned. These burners are equipped with O₂ trim control and their fan motors are modulated with Oilon's Variable Speed Drive technology, relates Managing Director of JBC Industrial Services, **Geoff Sutcliffe**.

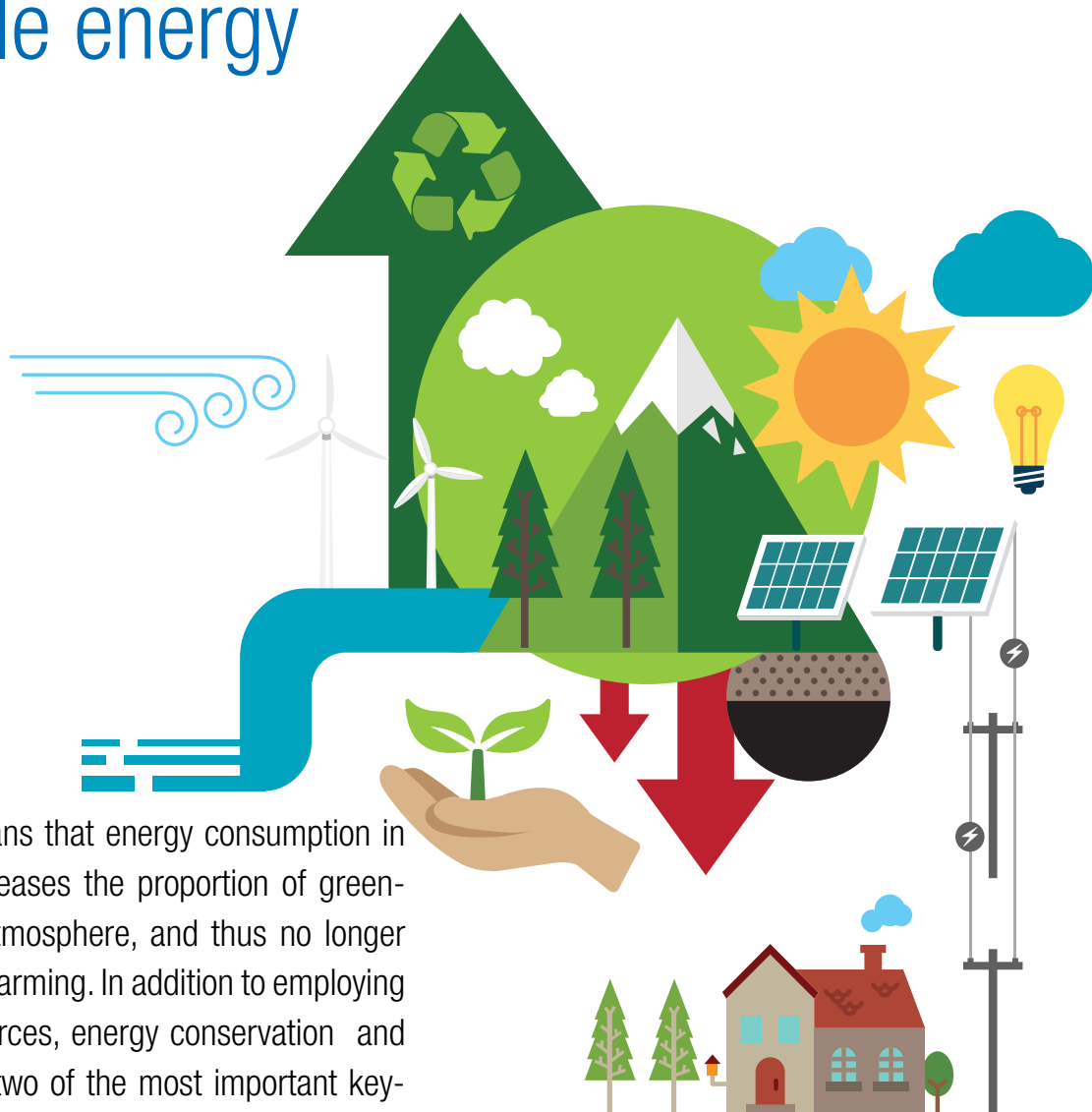
These Low-NOx technology burners have low nitrogen oxide emissions and conform to the European Union's tightened emissions restrictions for medium-sized combustion plants.

Pharma factory now gets steady steam even on partial load

Pharmaceuticals and health product manufacturer GSK's factory decreased its fuel consumption with six Oilon burners, installed by JBC Industrial Services. These burner-boiler combination systems are also controlled by the Ecosafe automatics.

– Our customer's previous equipment could not achieve the desired ratio, and the burners kept starting and stopping constantly, especially during the summer months. This strained the devices and increased fuel consumption. We refitted the target with Oilon's modulating burners, which are able to achieve a 10:1 ratio. The system operates smoothly, even with low steam. We are saving substantially more energy than before, Geoff Sutcliffe describes.

Climate neutral future requires energy efficiency and new ways of utilizing renewable energy



Climate neutrality means that energy consumption in society no longer increases the proportion of greenhouse gases in the atmosphere, and thus no longer contributes to global warming. In addition to employing renewable energy sources, energy conservation and energy efficiency are two of the most important keywords as we journey toward a climate neutral future.

The Paris climate agreement guides the signatory states to reduce their greenhouse gas emissions to stop the global temperature rise to a maximum of 2 °C above preindustrial levels. The EU for example has committed in its climate and energy framework to reduce its emissions by 40 percent by the year 2030. The Union's long-term target is to reduce the emissions by 80–95 % by the year 2050. This calls for massive and rapid measures in several areas, including transportation and industry, but also in properties, which in the future are going to become producers of energy in increasing numbers.

Most of contemporary energy production is based on burning fossil fuels, but they must be replaced with renewable energy sources moving forward. Other major trends revolutionizing the energy industry include reduced production costs of renewable electricity, increasing support for low emission energy production, progress in energy conversion and storage technology, and digitalization.

Natural gas is still going to increase its share in the fuel market in the next few decades, because the combustion process produces less carbon dioxide emissions than other fossil fuels. Its emissions also have the lowest impact on air quality out of all fuels when low emission Low-NOx technology is utilized. This makes natural gas especially popular in metropolitan areas.

– Energy production of the future will be very different from today. It is going to be largely reliant on renewable electricity, and controlling its production volatility with energy storing, demand responses and rapid gas-operated electricity production.

We are also going to see an increase in decentralized production, and utilizing heat pumps and district heating, at least in the most densely populated areas, Oilon's Chief Executive Officer **Tero Tuolokas** says.

Renewable electricity, district heating networks and heat pumps will become increasingly important

Renewable electricity is increasing its share in the overall energy palette at a rapid pace, and is projected to become the largest source of primary energy within this century. The growth is mostly driven by the improved cost efficiency of production. Renewable electricity is already growing its production capacity faster than other methods of electricity production, but not quickly enough to answer the rise in demand or replace the current capacity. For example, renewable sources can't provide enough electricity for direct electric heating, except in special cases. Being able to answer the demands of industry, households and other properties will require that electricity is utilized more in heat production. Using energy efficient heat pumps is one way of accomplishing this.

Solar and wind electricity are already very close to being competitive with traditional modes of production, but their fundamental problem is the production capacity's dependency on weather conditions and time of day. This leads to a situation where electricity consumption and other production must be controlled depending on the weather and hour.

District heating networks are becoming increasingly important, because they can utilize heat pump technology to collect and distribute renewable and waste heat. Networks can also balance out the fluctuation in production and consumption. Transferring waste heat into the district heating network recycles energy and simultaneously reduces the carbon dioxide emissions in heat production. Two-way utilization of district heating networks is already a reality as heat pumps transfer recycled heat back to the network from locations like data centers, cooling storages and properties.

District heating will keep growing in popularity going forward. This will include utilizing biofuels, waste and heat pumps, and ecological combined production of heat and electricity or cooling. Separated production is being reduced to only serve as the mode of backup and peak production. Energy efficient heat pumps are able to refine a kilowatt of energy into a sixfold amount of heat. When they are used for simultaneous heating and cooling, the ratio for both processes goes as high as one kilowatt to ten.

Abandoning fossil fuels is already possible with hybrid solutions

The energy sector is becoming ever more diverse as new modes of production become available and consumers utilize multiple energy sources. Using many different sources of renewable energy and recycled heat gives rise to an immense amount of new ways to produce and consume energy. The number of technologies used in the production process and consumption targets will increase alike. It is quite likely that the majority of properties will use multiple parallel energy sources in the future.

– Hybrid solutions using multiple modes of heat production already enable us to abandon fossil fuels partially or completely. To illustrate, the heat energy of an individual target can be sourced from solar collectors in the summer, and for the greater part of the year, a heat pump, which is supported during the coldest

months with district heating, or a gas or liquid-operated heating boiler that simultaneously operates as a backup heat source.

The operational reliability and adjustability of the backup source is paramount, and combustion technology is going to stay relevant in the future, but its role is about to change radically, narrates Tero Tulokas.

Consumers and storages provide energy for a two-way transfer network

Current transfer networks are becoming more and more important in energy production. So far, their operation has mostly been one-way for the average consumer, but in the future we are going to see a significant portion of the consumer base become energy producers as the energy networks start operating in two ways. Consumer-produced electricity is already being sold back to the electricity networks. In the future, heat, cooling and even gas are going to be produced at the consumer level. This trend is facilitated by the rising energy prices and the Paris climate agreement, which steers the signatories towards seeking the most cost efficient energy production solutions

The need to store energy will also grow when the demand for electricity and the production of renewable energy do not meet due to the varying availability of renewable sources. For example, it is already possible to store renewable electricity in gas or liquid form by using Power-to-Gas and Power-to-Liquid methods to compensate for peaks in consumption. Smart systems and the Internet of Things (IoT) will have a central role in controlling energy storage in the future. The heat accumulation potential of properties will be utilized actively in balancing energy production and energy networks.

Climate neutral future is within our reach

In order to meet the targets set in the Paris climate agreement, significant political action is required, but also changes in the ways that consumers operate and commodities and energy are produced.

– Achieving a climate and carbon neutral future is possible, but that calls for a radical change toward energy efficiency in energy production and society as a whole. Increasing the use of renewable and recycled energy all the way to the primary forms of energy is going to have a significant role in accomplishing that change, Tero Tulokas says. 🍷

Energy company Helen produces

Energy efficient cooling with heat pumps outside of the traditional district cooling network

District cooling is becoming ever more popular as the expectations on urban housing and working conditions grow. Helen uses heat pumps to produce cooling outside of the primary district heating network and recycles the surplus heat produced by properties for utilization in the heating network.

Finland has also seen the demand for cooling and related services increase, as the energy efficiency of buildings is improving, and the benefits of comfortable living conditions and indoor temperature control at the workplace have been recognized.

– The demand for cooling is constantly increasing. People have gotten used to pleasant indoor temperatures while driving, shopping and working. Finns value high-quality indoor conditions, and temperature control has an important role. Indoor cooling is a basic feature of modern building services engineering and smart building technology, says **Marko Riipinen**, Senior Vice President of Sales and Customer Services at Helen.

The best city energy in the world

Operating in the Finnish capital Helsinki, energy company Helen's trigeneration model, where electricity, district heating and district cooling are generated in the same process, was awarded for being the most efficient city energy solution in the world. Helen has over sixty years of successful district heating experience in Helsinki, and has provided district cooling services in the downtown area since the early 2000s. They also sell electricity country-wide. The company relies on its broad production structure and diverse production palette to achieve complete climate neutrality together with its customers.

Heat pumps produce a significant and annually increasing portion of Helsinki's district heating and cooling. One of the units in the district cooling network covering the downtown is the heat pump plant in the Sörnäinen area, built beneath the Katri Vala Park in 2006. Exceptionally energy efficient, it is the largest heat pump facility of its kind in the world. Katri Vala's pumps produce cooling, and refine waste water and the return water used in district cooling to produce recycled heat for the district heating network in the capital area.

Helen also produces cooling in the Salmisaari cooling plant, and a new heat pump plant is under construction beneath the

nuclear center of the city. The company utilizes heat and cooling accumulators and underground cooling centers to adjust to the round-the-clock changes in heating and cooling demand.

Property-specific heat pumps for cooling and district heating

Helen wants to offer cooling services to its customers across the city. The primary district cooling network is mostly located in the areas of the city center with the largest portion of commercial and office buildings. Building a district cooling network across the whole city, thus emulating the district heating model, is unfounded.

Realizing that heat pumps can produce heat and cooling simultaneously kickstarted the cooling concept developed by Helen: property-specific heat pumps can be used to provide cooling services to customers within the company's district heating network. This concept makes it possible to offer energy efficient cooling services to customers without having to build a district cooling network.

In property-specific cooling, the Helen-owned heat pump installed in the customer's property produces cooling and transfers the generated heat into the district heating network. The cooling service offered to the customer acts as Helen's decentralized heat source for the district heating network.

No wasted energy

– The water used in the cooling service is served to the customer at eight degrees and the return water from the property is sixteen degrees. At that temperature level, the return water is not hot enough for heating purposes or fit for transfer via the district heating network, unless heat pump technology is utilized. We do not want to lose any heat energy, so we refine and transfer it to the district heating network. There might be no need for heat in the cooling target, but there is always demand somewhere in Helsinki. For example, you need hot domestic water even during summer, Marko Riipinen says.

Helen's award-worthy energy efficiency

Helen's trigeneration model of city energy production, which is based on the joint production of electricity, heat and cooling for the needs of Helsinki's residents and companies was awarded for being the most efficient in the world. Helen's production structure and the energy solutions provided to customers support the long-term target of climate-neutral energy production.

About Helen

- In 2017, Helen produced 6300 GWh of electricity, 7100 GWh of heat and 140 GWh of cooling
- Helen consists of: 3 combined heat and power plants, over 10 heating centers, 3 underground cooling centers, the largest heat pump plant of its kind globally, 2 cooling storage facilities and an electricity storage.
- One of the largest producers of solar electricity in Finland, the largest heat storage in the country being planned
- Significant investments in electronic transportation, smart energy solutions and demand responses.



Photo: HELEN/ Taru Hynynen

Taking the idea a bit further, from the point of view of heat production, buildings act as solar thermal collectors.

– The sun, people and machines – they all heat buildings. Helen's cooling service offers a smooth solution for indoor temperature control. The heat is transferred to the district heating network with the help of well-designed building services engineering and the CHC concept. In other words, district heat is thermal energy produced by the sun, devices and people. Heat pump units that produce heat and cooling make up a smart application when they are connected to a network, Marko Riipinen describes.

– Property-specific heat pumps reduce the need for primary energy. We use the term recycled heat, which is also part of a circular economy, adds Oilon's Sales Manager **Jussi Alpua**.

Straightforward solutions

Helen uses property-specific heat pumps to produce a cooling service that is just as easy and effortless as traditional district heating.

– We want to offer cooling solutions to our customers all over Helsinki. We are a full service company, so our customers don't need to worry about the devices or their maintenance, Marko Riipinen says.

Dense urban areas limit the installation possibilities of technical equipment on building facades. For example, installing roof condensers that traditional water cooling systems require is prohibited in many places.

– We offer our customers a comprehensive energy partnership, where we provide them all the energy they need, meaning electricity, heating and cooling. Our customers appreciate the fact that our cooling service leaves the building's outward appearance untouched, as well as our concept of recycling the heat that was generated during the cooling process, Head of B2B **Jyrki Eurén** says.

– Offices, public and commercial properties have shown interest in the cooling service, and apartment buildings may boost their levels of living comfort by adding cooling during pipe repair. Real estate investors look for energy efficient cooling, because it is a factor when properties are graded for their sustainability, Jyrki Eurén continues.

ChillHeat industrial heat pumps answer customer demand

Oilon's ChillHeat industrial heat pumps have been installed across Helsinki for property cooling and as heat sources for the district heating network.

Marko Riipinen is satisfied by Oilon's resourcefulness and solution-seeking attitude even during troublesome situations.

We need business companions for the heat pumps, and Oilon has a significant role in that area. Our partnership has been excellent and the Oilon crew really take the trouble to find the best solutions for our customers. For example, the boys really

showed that "where there's a will, there's a way" when dealing with a practically inaccessible target, he describes.

There's one key difference between a property-specific heat pump and traditional district heating.

– A heat pump can produce the exact temperature required by the customer. For example, producing secondary fluid for the needs of the commercial sector or food business, Jussi Alpua explains.

Maintenance contracts for assured efficiency

Oilon is responsible for the maintenance of the property-specific cooling equipment it supplies. The maintenance contract includes routine maintenance, remote surveillance, fault repair and other potential maintenance. Real-time remote surveillance makes it possible to use the measurement data in life cycle planning, and resolve possible fault situations quickly, usually without the need for on-site consultation. Remote surveillance and routine maintenance are performed to prevent any unexpected need for fault repair.

The purpose of the maintenance contract is to guarantee the reliability and efficiency of Helen's cooling service by looking after the cooling equipment.

– Together with Oilon, we have come up with an exhaustive maintenance contract based on our customers' needs. When contracts are drafted with proper groundwork, cooperation is smooth and produces long-term benefits. This ensures that we can supply reliable cooling services to our customers, says Helen's Condition Management Specialist **Antti Leskinen**.

CHC

Helen's joint production of electricity, district heat and cooling received an award for being the most efficient city energy solution in the world. CHC stands for Combined Heating and Cooling.

Smart city energy system recycles heat

Heat pumps have an important role in a modern city energy system based on jointly utilized cooling and heating. Buildings are incorporated into the city's energy system when their surplus heat is recycled with heat pumps for utilization by customers elsewhere in the network.

– Helen is an innovative forerunner in utilizing heat pumps and has persistently worked on the joint production model in its larger plants, and has paid attention to the potential that heat pumps have for individual properties, boasts Oilon's Chief Business Officer of Industrial Heat Pumps and Cooling **Martti Kukkola**.

Nearly every city in Finland uses district heating, producing approximately fifty percent of the heat required by the residential and service buildings in the country. The other half is still produced with fossil fuels, such as natural gas, coal or peat.

– Methods of heat production will keep on diversifying in the future, and emissions will continue to decrease. Heat pumps are going to take on a bigger role and energy companies will increase their utilization in cooling and heating, like Helen does. The energy companies hold a key position in getting the most out of the constantly developing heat pump technology. Increasing the share of renewable fuels and use of alternative, environmentally sound ways of production, such as heat pumps are the primary means of reducing the environmental impact of heat production, Martti Kukkola continues. 🍷

Finland's energy system is reliable and efficient

The Finnish Energy Club, founded by Finnish energy companies, found in its comparison that the key performance indicators of the country's energy companies are looking excellent. The Energy Club finds that the reliability, efficiency and minimal energy loss are the result of the companies' expert management of the overall process and information, in addition to the proper scaling and control of the facilities and networks.

Key performance indicators	Finland (200 companies on average)
Network heat losses of production	6 - 9 %
Make-up water replenishment need per year	1
Reliability	99,98 %
CHP share of DH production	76 %
DH generation efficiency	93 %
RES share of DH production	38 %
Staff productivity (GWh / employee)	20

Source: Finnish Energy Club



ChillHeat industrial heat pumps generate energy efficient heat and cooling for Helen

Oilon's ChillHeat industrial heat pumps are suited for heat and cold generation, jointly or separately. In the CHC concept developed by Helen energy companies use heat pumps to provide energy efficient cooling services to customers all across their district heating networks. The concept produces cooling and district heating to the network by utilizing heat pumps installed inside properties. CHC stands for Combined Heating and Cooling.

Optimal heat and cold generation with great efficiency

Simultaneous generation of heat and cold demands a lot from the technical properties of a heat pump, because the temperature differential between the two generated commodities is substantial. The requirements of simultaneous generation have been taken into account in the design of ChillHeat industrial heat pumps. They are able to generate heat and cooling precisely, with a wide partial power range and a good coefficient of performance.

Haaga's renovated rescue station cools down with a heat pump

After renovation, the rescue station in Haaga now has a comfortably cool indoor temperature that the personnel may enjoy before and after their demanding duties. The new cooling system was installed during the station's comprehensive restructuring. Cooling is generated by an on-site heat pump owned by the energy company, which also transfers the heat produced in the cooling process to the district heating network.

Heat pump:

Oilon ChillHeat P300 SU HC VFDx2

Cooling target: cooling network of a rescue station

Cooling capacity: 250 kW

Heating capacity:

401 kW, condensation to the district heating network

Water temperature:

10 °C/ 80 °C (cooling/heating)



The Kaupinoja district cooling plant of Tampere is located on the shore of Näsijärvi, from where it also receives most of the cooling needed.

Two new water coolers deployed in Europe's largest lake sourced cooling plant



Tampereen Sähkölaitos is the largest supplier of lake sourced remote cooling in Finland and Europe. One kilometer long and 1.4 meters in diameter, a water pipeline pumps cold water from the deep of Lake Näsijärvi to the remote cooling plant in the Kaupinoja shore, which distributes remote cooling across Tampere's growing remote cooling network.

Oilon is responsible for the delivery, installation and commissioning of the two new water coolers in the plant in 2019. Completed in 2017, the plant already has two operating water coolers supplied by Oilon. The two new 6.5-megawatt coolers will increase the plant's mechanical cooling capacity to 23 megawatts. In addition, Oilon is responsible for the maintenance of all supplied machinery.

– We are preparing for an additional increase in remote cooling demand brought about by the new construction projects in the city. As the plant's cooling capacity increases, we will be able to produce cooling in an even more energy efficient manner, says **Kari Wessman**, Project Manager in Tampereen Sähkölaitos.

Lake source cooling is extremely energy efficient

The operation of the remote cooling plant in Kaupinoja is mostly based on free cooling, which utilizes cool lake water. During warm season the cooling capacity generated by the lake water is not sufficient on its own, so additional cooling produced by large water cooler compressor units is required. Most of the cooling energy is lake sourced, however. Kari Wessman has calculated that approximately eighty percent of the annual cooling energy is sourced from Lake Näsijärvi.

The remote cooling plant in Kaupinoja owned by Tampereen Sähkölaitos is located ashore Lake Näsijärvi, which is the primary source of the plant's cooling energy. The cooling devices use ecological ammonia as their refrigerant. The cooling system is fully automated, and the unoccupied cooling plant is remotely supervised from the company's power plant in Lielähti.

– I am delighted that we have had the opportunity to partner up with Tampereen Sähkölaitos in building this very energy efficient remote cooling system. The Kaupinoja plant is an all-around excellent example of a centralized remote cooling solution. Now the residents of Tampere get to benefit from very energy efficiently produced cooling, praises Oilon's Chief Business Officer of Industrial Heat Pumps and Cooling **Martti Kukkola**.

Data center heats Swedish homes

Energy company E.ON and cloud technology company Online Group partnered up for a joint construction project in Vallentuna, near Stockholm, Sweden. Their new data center is one of the most ecologically advanced in the world. Cooling the center's servers generates waste heat, which is transferred into Vallentuna's district heating network with energy efficient heat pumps and is then used to heat the city's households. The center is cooled with renewable energy.

Energy efficient even with partial load

– The entire cooling capacity of the data center is transformed into heat energy and transferred into the district heating network with two Oilon ChillHeat P300 industrial heat pumps, describes E.ON Project Manager **Nils Svensson**.

The ChillHeat heat pumps simultaneously cool the center and utilize the generated waste heat to produce high-temperature heat energy for the district heating network. The total cooling capacity of the data center is 500 kW in the first phase, with a final capacity of 2000 kW.

– Oilon's heat pumps provide us the benefits of excellent energy efficiency, the option for partial loads, HFO refrigerant, high-temperature output and compact size, Svensson praises. The heat pumps in Vallentuna are scaled for producing 85-degree water, but can reach up to 100 degrees if required. The equipment uses the R1234ze refrigerant, which has a very low environmental impact.

– The heat pumps in Vallentuna retain their superb energy efficiency even when used at a lower capacity. Heat pumps are usually equipped with eight compressors. This makes it possible to modulate the cooling capacity between 10 and 100 percent without diminishing the coefficient of performance, says Oilon's Sales Manager **Samuel Östman**.

– In the Vallentuna center, the waste heat is captured with heat pump technology exclusively. It is economically competitive, energy efficient and ecological, Östman continues.



Photo: Shutterstock



Oilon ChillHeat P series industrial heat pumps

Oilon ChillHeat P industrial heat pumps produce high temperatures precisely, reliably and energy efficiently, making use of the broad control range. They can produce water temperatures of up to 100 degrees with an ecological refrigerant.

ChillHeat industrial heat pumps can be used for energy efficient cooling, heat production, or combined cooling and heating in a wide variety of targets.



Oilon thrives in North America

Oilon's North American operation has expanded, and the Thomasville factory is currently manufacturing burners to multiple customers in the United States, Canada, Central America and the northern parts of South America.

Natural gas burners in particular are seeing great demand in the United States due to the fuel's low cost. **Johan Tallberg**, CEO of Oilon US, feels the North American market has a promising outlook:

- The industrial sector is making new investments while restructuring the old technology. The region has a lot of old boilers that can be restructured to use new, energy efficient and fuel-conserving burner technology.
- Our customers value our extensive industrial experience and worldwide network. Oilon's international customers appreciate the fact that customer support, training and maintenance services are readily available around the world, Johan Tallberg continues.



Hurst Boiler and Welding Company was convinced by Oilon's global expertise and fluent customer service

American Hurst Boiler and Welding Company has manufactured, designed and serviced steam and hot water boilers for over 50 years, garnering an international reputation of quality and efficiency. Hurst's boilers have been delivered alongside Oilon's burners across the world, including South America, Asia and the Middle East.

Oilon and Hurst began their collaboration in South America, and when Oilon founded their Thomasville factory in 2014, Hurst Boiler and Welding Company was its first customer.

– Working with Oilon in South America proved them to be worthy of the reputation that proceeded them, a reputation of excellence. Not only does the company employ experts with comprehensive knowledge but with excellent customer service skills and hitting project milestones on time, every time. Oilon is a company we want associated with Hurst Boilers and were very excited to see come to the North American Market, says **Tommy Hurst**, President of Hurst Boiler & Welding Co., Inc.



Professionals from various sectors attended the commissioning of Oilon's new burner and modern boiler automatics. Chief Executive Officer Sebastian de los Rios of Energy Boilers (third from the right) was responsible for the process.



Mount Gay Rum Distilleries invests in modern and energy efficient burner-boiler systems

Located in the island country Barbados, the Mount Gay Rum Distilleries is among the best-known rum manufacturers in the Caribbean, as well as one of the oldest active rum distilleries in the world. Even though the distillery still uses a steam-operated boiler as part of its rum manufacturing history tour, it invests in modern and energy efficient production equipment.

Energy Boilers, Oilon's partner in the Caribbean, restructured the rum factory with an energy efficient single-boiler burner and boiler automatics. Oilon's GKP-600 burner with WiseDrive automatics saves energy, produces homogenous steam, operates reliably and produces less noise than before. The CEO of the company, **Sebastian de los Rios**, was responsible for commissioning the burner and automatics. He also trained the customer for safe and efficient operation of the equipment.

– The Mount Gay distillery now operates with a modern, fully automated and energy efficient burner-boiler combination. Touch screens make supervising and controlling the operation easy, Sebastian de los Rios describes.

European electrical system

– Barbados uses the European electrical system, so our international expertise was one of the factors in making this deal happen. Being a Finnish company, we know the European electrical system in addition to the system used in North and Central America, says the CEO of Oilon US, **Johan Tallberg**.

Energy efficient burner-boiler expertise over two generations

Operating from Florida, Energy Boilers represents Oilon's burners in the Caribbean area. The company has specialized in importing new technology and energy efficient solutions to the Caribbean region, where industrial companies have started paying attention to reducing emissions and fuel expenses. Energy Boilers enables the companies to adopt high-quality technology and efficiency.

– The Caribbean islands are full of old, unsafe burner-boiler combinations whose energy efficiency is poor. We want to help in replacing that equipment with modern, safe, reliable and energy efficient technology. By doing so, the companies in the region save money and energy, Sebastian de los Rios describes.

Energy Boilers is a family company. Sebastian's father **Julian de los Rios** has worked in the boiler business for 40 years. He founded Thermodynamics Engineering, who have modernized boilers in Colombia with Oilon's burners and have made Oilon one of the largest burner manufacturers in the country.

– We want to repeat our Colombian success in the Caribbean. Oilon's burners are reliable, safe, efficient and have low energy consumption. Their operation, maintenance and solving possible problem situations is easy. The combustion process is optimal and their overall performance is great. I'm grateful that we are able to import Oilon's burners specifically in the Caribbean and Latin America, Sebastian de los Rios says.



Gazprom high-rise heated by Oilon's burners

Russian gas and oil conglomerate Gazprom is building a vast business center in Saint Petersburg, dubbed Lakhta Center. The complex will feature a record-breakingly tall skyscraper.

Constructed with a facade manifesting the northern landscape, the business center will include a tower section resembling an ice ridge. At 462 meters, the building will be Europe's tallest. In addition to accommodating the company's headquarters, the Lakhta Center will, among other facilities, house congress halls, shops, restaurants and activities related to art, science and education, such as a planetarium and various showrooms.

The center and its domestic water are heated by four Oilon-manufactured burners and their control cabinets. Oilon's reseller Riico was responsible for selling the burners, and the installation was done by Progress Company.

– Being part of such a monumental construction project in Russia is amazing, rejoices Oilon's Area Sales Manager in Russia, **Andrei Sonin**.

On top of the architectural splendor, the Lakhta Center project also invests in smoothly flowing public transportation, ecologicality and cutting edge technology. Some examples of the latter are the 34 extra fast elevators, modern ventilation and fire protection equipment, and new methods for noise reduction in the shopping center.

Photo: Lakhta Center





Yili dairy improves production process and energy efficiency

China's leading milk product company Yili's dairy in Weifang produces ice cream and milk, among other products requiring sterilization in very high temperatures.

The dairy improved its energy efficiency and production process significantly by introducing an Oilon heat pump. They used to struggle with reaching the extreme water temperatures required by the complex milk treating process. Now Oilon's ChillHeat P series industrial heat pump produces the 80 and 10-degree water temperatures with excellent energy efficiency.

The heat pump improved the treating process, resulting in considerable cost reductions and energy savings for the dairy. Yili's experience with Oilon's products was so positive that they also adopted the company's heat pump technology in their new dairy in the Anhui region.

BOE Technology Group saves energy

Chinese smart technology giant BOE Technology Group is the largest manufacturer of smart devices, computer monitors and television screens in the world.

BOE's newly established Research Institution of Display Device requires simultaneous heating and cooling. The company commissioned two ChillHeat industrial heat pumps, manufactured by Oilon. ChillHeat heat pumps are able to generate cooling and recover heat at the same time. This decreases the consumption of purchased energy considerably, saving BOE money.



New factory in Russia

Oilon is expanding in Russia with a new burner factory in Saint Petersburg.

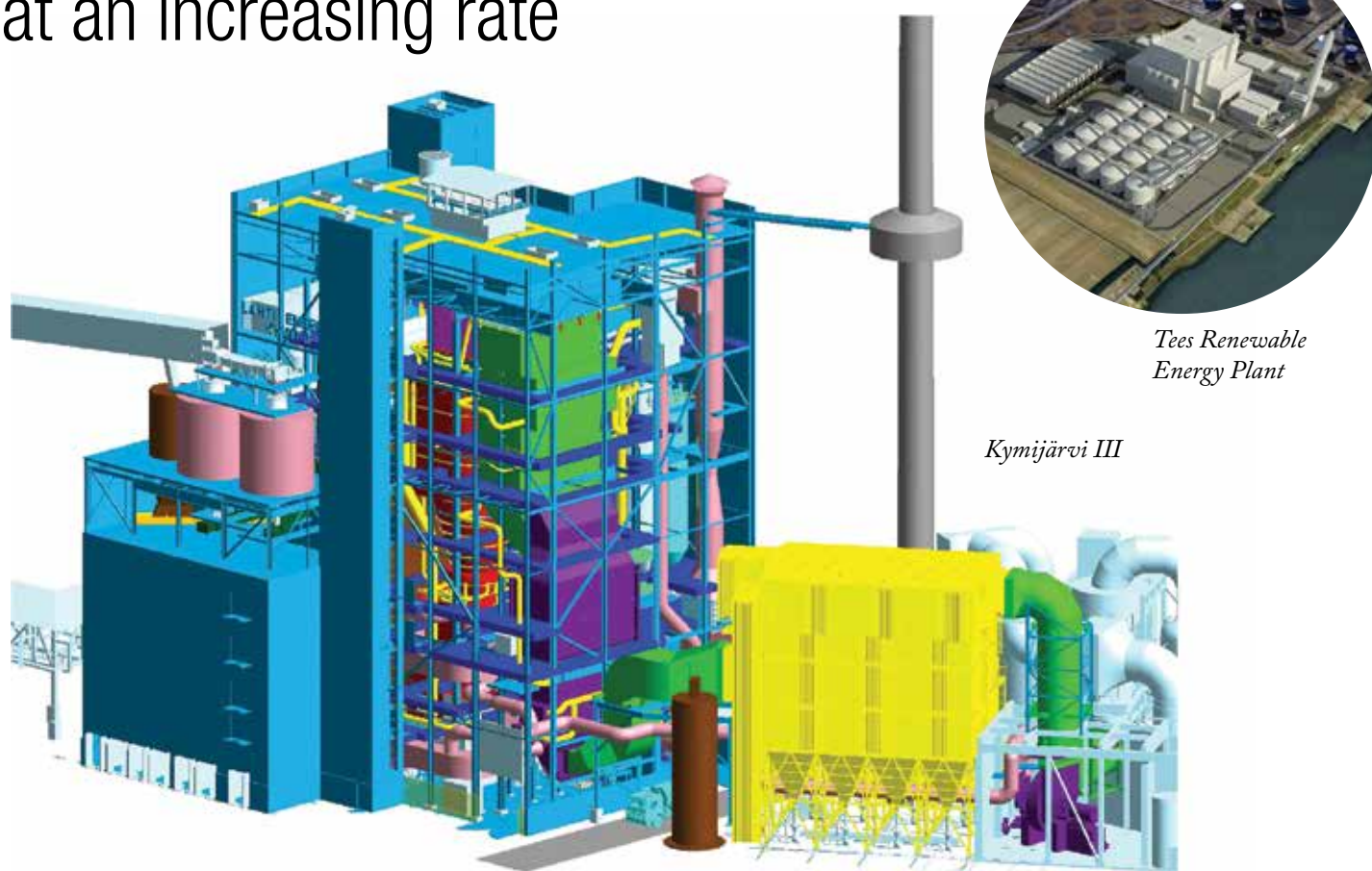
– Our modern production facilities are in Staro-Panovo, located in southwest Saint Petersburg. At least initially the factory will be manufacturing and testing Oilon's series 3 and 4 oil, gas and dual fuel burners, says Production Manager **Evgeny Kirillov**.

The Saint Petersburg sales office has relocated to the factory premises. Oilon's has delivered burners to Russia since the 1960s, and the first sales office was founded in the 1990s.

– We cooperate with several boiler manufacturers in Russia. Oilon's other sales offices are located in Moscow, Yekaterinburg and Novosibirsk. The country has seen some challenging years but the current outlook is positive, relates Oilon Russia's CEO, **Martti Kauhanen**.



Biopower plants constructed at an increasing rate



Oilon and the world's leading manufacturer of circulating fluidized bed boilers (CFB) Sumitomo SHI FW have a long history of collaboration in burner solutions. Power plant technology is trending towards biomass, and biopower plants are becoming more popular as the demand for renewable energy is growing.

Pilot burner ensures an optimal combustion process

Oilon's expertise is in pilot burners, required in the start-up of an incineration plant, and in some cases, balancing the combustion process as a support burner.

– The most important property for a pilot burner is reliability. The burner must start its operation rapidly and preferably at the first press of a button, even after extended breaks. The quick start-up process is especially important when used as a support burner. If the combustion temperature happens to decrease, the quick start-up of the support burner is essential for restoring the optimal combustion process.

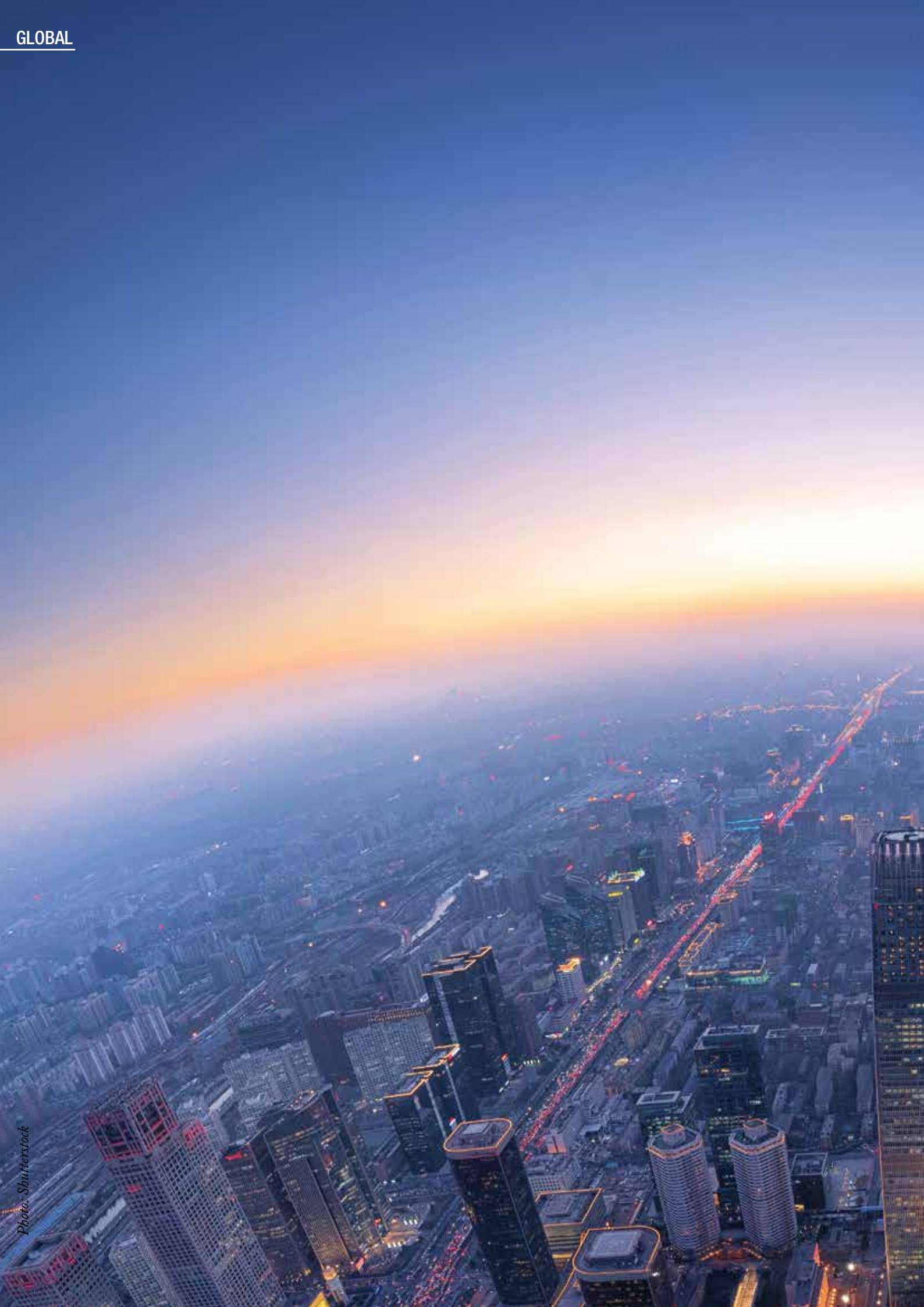
A failure will cause a temporary shutdown of the power plant, says Oilon's Chief Business Officer in Power Plant and Process Burners, **Tapio Murtonen**.

Grand-scale expertise and hometown know-how

Oilon and Sumitomo SHI FW have agreed on a pilot burner delivery for two biopower plant CFBs. Once completed, the Tees Renewable Energy Plant in the UK is going to be the largest new biomass-fired power plant in the world, capable of providing 600 000 households with electricity, and heating for the adjacent areas.

Built by Lahti Energia in Oilon's hometown, the Kymijärvi III bioenergy heating plant will replace a 1970s-era coal plant, reducing Lahti Energia's annual carbon dioxide emissions by 600 000 tons.

Both biopower plants will be commissioned in 2020, powered by certified wood-based biomass, such as logging residue chips and sawmill by-products. 🌱



China pioneers air pollution abatement

Next target: hazardous waste

China has tackled the air pollution problem plaguing its cities and has invested in improving their air quality by setting the tightest emission standards for nitrogen oxides globally, among other measures. Air pollution-related surveillance has been tightened and failing an emission standard inspection may lead to a company's production being limited, or even a complete shutdown of the polluting facility.

The strict discipline is starting to show results in the air quality of the capital city, Beijing, where the amount of smog is reported to have been significantly reduced compared to previous years, and the reduction in the amount of fine particles and sulphur dioxide in the air has been particularly notable. The air quality varies greatly from city to city, however, and further measures to reduce air pollution in the country are expected

China invests in environmentalism

Other sectors of environmental protection are also gaining attention. Protection of soil and water, and reduction of noise pollution and waste are being enforced more strictly through national legislation and local governing

bodies. The regulations have been set to protect the environment and improve its quality. There are also plans to reduce carbon dioxide emissions with a nation-wide emission trading system.

New facilities for hazardous waste

China has also begun handling hazardous waste more efficiently as it has come to realize that its capacity to deal with such waste has been inadequate for a long time.

– China has been a pioneer in reducing nitrogen oxide emissions. The legislation on energy efficiency and waste management is also about to change, and we are going to witness China become a global leader in these sectors, as well. Treatment plants for hazardous waste will see significant market growth, because the country's government is going to require that multiple plants are built and pertinent technology is invested in, says Oilon's Chief Executive Officer in China, **Sami Pekkola**.

Burner systems for hazardous waste treatment plants

Oilon has supplied seven hazardous waste treatment plants in China and Singapore with burner systems. The burners were delivered with valve units and automation. Oilon's clientele includes notable international players, such as Veolia, Suez Environnement and Shandong NHU Holding Group from China.

Oilon ACE is taking over China! For more on the extremely environmental burner, see page 6.



Oilon Monox burners

The energy efficient gas and dual-fuel burners in the Monox series are designed and produced to achieve higher output at a lower cost than before, capable of generating up to 13.3 MW. Monox burners are equipped with a fixed fan, installed in the burner housing.



Monox burners save energy in a General Motors car factory

Global automotive giant General Motors keeps a close watch on the ecological impact, energy consumption and cost efficiency of its production. South American top seller Chevrolet Onix is manufactured in the Brazilian city of Gravataí, located in the state of Rio Grande do Sul.

Oilon's energy efficient Monox burners now heat two hot water boilers used in the factory's painting line.

Energy savings above expectations

– Our initial target was an eight-percent reduction in natural gas use when we replaced the first one of the old burners with our Monox model. Energy consumption had gone down eleven percent after the first heating season, calculations showed. Our burner helped reduce energy consumption even more than targeted, tells Oilon's Service Manager **Marcus Libanori**, who was involved in the project.

The Oilon Monox GP-1000 M burner used by the car factory is equipped with a frequency converter and uses the WiseDrive operation system, which utilizes an oxygen sensor to adjust the turndown ratio. The Monox series is built on Oilon's WiseDrive technology, whose broad control range enables very energy efficient use and low consumption around the year. In addition, the boilers and painting line in the factory have been equipped with flow and temperature sensors for observing the ratio of consumed and produced energy.

General Motors monitors the ratio of energy consumption in relation to production volume constantly. The energy-saving measures also improve the cost efficiency of the company's business operations. Inspired by the excellent energy conservation figures, General Motors acquired another Monox burner to improve the factory's energy efficiency even further.

Brazilian economy on an uptick

Brazil's economy has struggled in recent years.

– It is finally looking like the economy of the country has turned a corner and hardships are a thing of the past. For example, the Gravataí factory is planning on switching back to operating in three shifts, says Oilon's CEO in Brazil, **Pertti Latikka**.



Krakatau Steel, Indonesia



Vanderbijlpark Works,
South Africa

Utilizing blast furnace gas requires special expertise

Specializing in responsible energy solutions, KPA Unicon has decades of experience in energy production projects, and has delivered over one thousand oil, gas and biomass-utilizing facilities worldwide. KPA Unicon and Oilon have a long history of cooperation in burner solutions.

In their latest mutual project, Oilon and KPA Unicon supplied the ArcelorMittal steel factory Vanderbijlpark Works with burner systems for burning coke oven and blast furnace gases. Vanderbijlpark Works manufactures steel, which generates coke oven and blast furnace gases in the process. These gases are utilized in energy production in the boiler house supplied by KPA Unicon.

Boiler houses designed for burning blast furnace and coke oven gases have to operate on the steelworks' terms in a challenging environment. Moreover, the properties, availability and pressure of the burned gases vary, which places special demands on the burning process.

– We have cooperated with Oilon in targets requiring standard and special application burner equipment for almost thirty years.

Our collaboration has evolved over the years and our combined expertise and innovations have resulted in a large number of successful challenging projects, says KPA Unicon's Director of Oil, Gas and Minerals **Juha Sormunen**.

Blast furnace gas is a challenging fuel

Blast furnace gas is a challenging, low heat value, low energy content fuel that requires a special feed method and technology. Many steelworks around the world use Oilon's unique technology to utilize blast furnace gas in energy production.

Vanderbijlpark Works, South Africa

Owned by the largest steel producer in the world, ArcelorMittal, Vanderbijlpark Works is the largest manufacturer of steel in Sub-Saharan Africa.

KPA Unicon has supplied the steelworks with a boiler plant with two boilers which is used for the energy utilization of blast furnace and coke oven gases. The boiler plant is equipped with Oilon GT-50S burners, burner automation and valve units for all fuel types.

Krakatau Steel, Indonesia

Oilon's longest-standing international reseller, Singapore-operated Pacific Central Teknik has been responsible for a turnkey delivery of a boiler solution to Krakatau Steel's steel factory in Jakarta. The solution is designed for burning blast furnace gas, and includes an Oilon GT-50S burner and a furnace.

Oilon Selection Tool helps with heat pump choice

The Oilon Selection Tool is an application targeted at resellers and design companies, developed to facilitate the selection and dimensioning of a new heat pump. Once the basic data of the heating target is entered, the application lets the user select a suitable heat pump quickly and reliably.

The application offers detailed information on Oilon's wide range of ground source and industrial heat pumps. It is being constantly developed, and the next update will add a tool for finding the right industrial or power plant burner.

– We created the Oilon Selection Tool to lighten the workload of designers and our resellers. Selecting and dimensioning the suitable heat pump is quick and easy. The application offers a clear and structured summary, which can also be printed to let the customer see the information used for dimensioning and an estimate on the device's energy consumption, Oilon's R&D Manager **Mikko Auvinen** describes.

Optimal dimensioning saves money and energy

The Oilon Selection Tool facilitates the dimensioning and selection of a properly scaled ground source heat pump and thermal well, or other heating circuit. An optimally dimensioned heat pump performs efficiently and achieves the largest possible cost and energy savings.

In addition to using the building information and heat pump capacity for calculation, the application also utilizes a climate model which takes different heating needs and the thermal conductivity of the bedrock into account. The user may choose between full or partial load dimensioning. The application can be used for heat pump dimensioning in buildings of all sizes, from a one-family house to a shopping center or an industrial hall.

It provides the user with a clear visualization of the energy consumption of the building, the heat pump's capacity, and the required and generated output. This makes comparing devices easy.

– The Oilon Selection Tool lets the user compare the annual expenses of different heating methods. You can examine the produced and consumed ground source heat energy on a month-to-month basis, if need be, Mikko Auvinen describes.



The most energy efficient solution for the most demanding targets

The Oilon Selection Tool helps in selecting the most energy efficient solution for industrial processes or large properties, which require large amounts of heating and cooling capacity.

– This application makes comparing the heat pumps and their heating and cooling capacities, electricity consumption, coefficient of performance and other interesting information effortless, says Mikko Auvinen.

Oilon ChillHeat industrial heat pumps can produce cooling and heat simultaneously. The most energy efficient solution for the targets requiring the largest amounts of heating and cooling capacity often involves a configuration of several heat pumps.



MICHELE DANELON

Occupation: head designer

Education: B.A. in Design,
Mechanician

Place of residence:
Lahti, Finland

Native country: Italy

Motto: Sincere and positive
dialog achieves the
best results.

Head designer is the impresario of aesthetics and usability

It is essential that a growing, international company is able to impress its worldwide clientele with quality products. Design is an important part of the overall product planning process at Oilon. The purpose of design is creating recognizable, reliable and true-to-the-brand equipment that is easy to use, install and service.

The carefully defined color scheme of red and black along with the flame emblem are the hallmarks of Oilon's design around the world. But there is more to design.

– I contribute the end user's perspective to the planning process. As a designer, I'm not only responsible for the exterior of a device, but also its usability. The reliable, first-rate appearance must be accompanied by ease of use, relates Oilon's Head Designer **Michele Danelon**.

Creative working environment and functioning communication are the preconditions for success

The head designer works in close collaboration with the research and development team, which requires good interaction.

My job is to design and work on concepts that take aesthetics, usability and processibility into account. I offer different options for discussion, and some of them get processed further. One must have the courage to experiment, and the chance to fail, because an idea that is deemed unworkable in some respect may lead to a new solution, Michele Danelon says.

Seen and unseen detail

The job of a designer entails solving nearly, and sometimes completely, invisible problems. Designing the protective cover for the large-scale Oilon ACE burner required paying attention to numerous factors, and coming up with a new mounting solution.

– We wanted to equip the protective cover with a service hatch that was modeled after Oilon's flame emblem, but without any visible handles or mounting brackets. We came up with the idea to have a magnet-operated hatch. I developed a solution that set the hatch correctly in place regardless of the burner's mounting position. We had to take many things into account to design a functional service hatch for the customer, Michele Danelon describes.

Design thinking to guide overall operation

Michele Danelon is looking to unify Oilon's brand image and utilize holistic design thinking as a more comprehensive philosophy. Oilon's product and service design is about to become even more uniform as a new design handbook for products and services is completed.

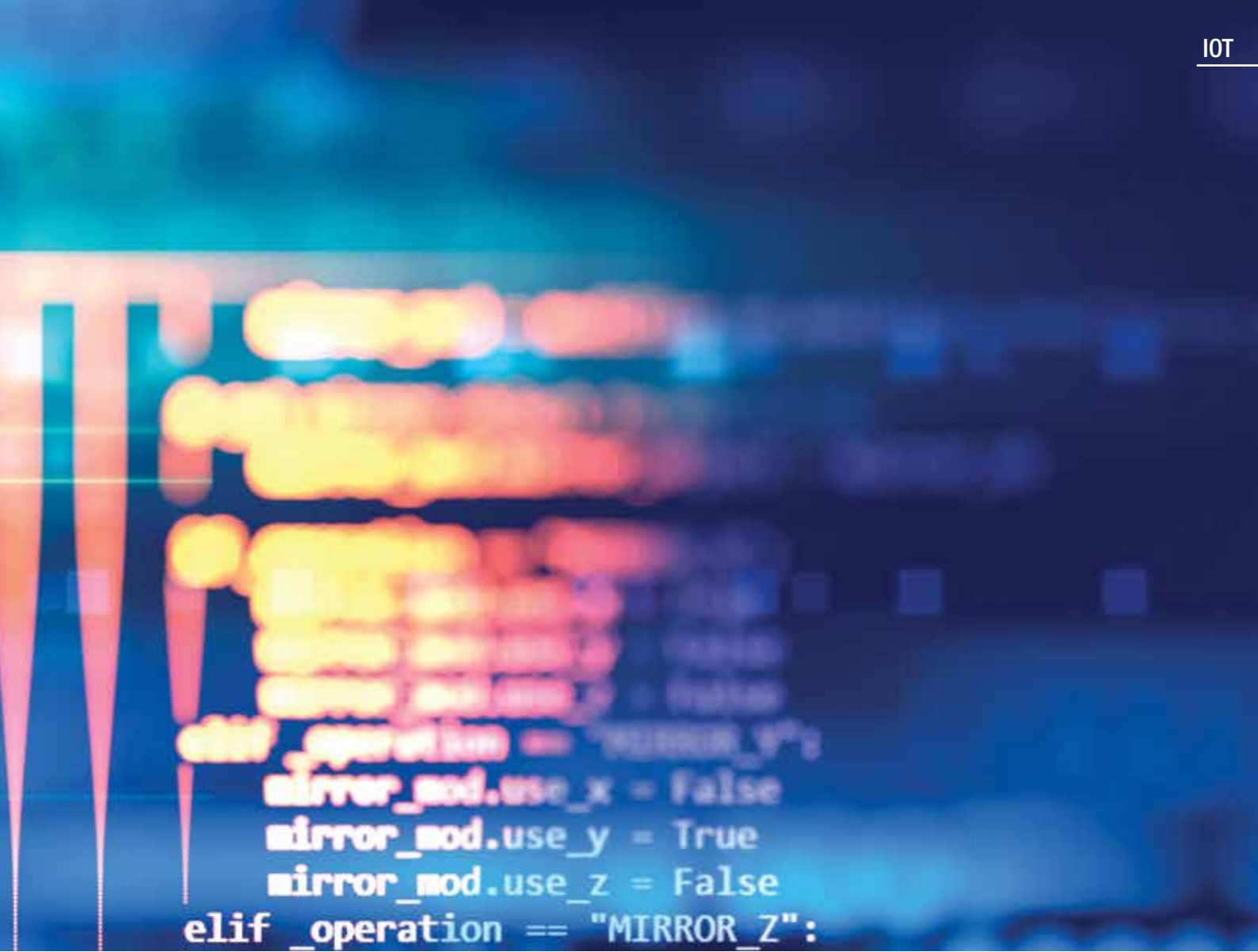
– Design thinking is a comprehensive working culture where collaborative brainstorming and problem solving is integral to every sector of a company's operation. Design thinking is characterized by a positive attitude towards new and daring ideas. Having the courage to experiment and think up new ideas can bring about good elements that can be refined and utilized in product development. Fluid collaboration and dialog are the keys to integrating a product's appearance, technical solutions and usability into a whole that is optimal for the customer, Michele Danelon says.

Oilon's Global Monitor ensures efficient heat pump operation

What is the Internet of Things?

The Internet of Things refers to appliances and devices that are connected to the Internet. The devices use sensors to measure their operation and surroundings, transmitting the information forward by utilizing software and data connections. The devices use the collected data to optimize their performance automatically and they can be controlled via remote access.

The IoT is a combination smart devices, people and processes, enabling new business models in many industrial fields. Already existing examples include smart grids, smart transportation and smart cities.



```

elif _operation == "MIRROR_Y":
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    mirror_mod.use_y = True
    mirror_mod.use_z = False
elif _operation == "MIRROR_Z":

```

Oilon's Global Monitor technology tracks heat pump operation in real-time and sends a report to the company's maintenance team if the device does not operate at the desired coefficient of performance, or if there are changes in the operation that could be indicative of a future problem situation or the need for maintenance.

The application monitors equipment operation and efficiency, and can provide the customer with seasonal reports that present a handy overview of the key performance indicators, time-trends and saved energy expenses. The report is going to include a summary on the operation of multiple devices or device configurations.

– Global Monitor ensures that the heat pump performs optimally in all situations. The Oilon team is

notified if the device is not performing as intended. This enables us to react quickly and pre-emptively to possible maintenance needs and problem situations, explains Oilon's R&D Director in Heat Pumps, **Juha Aaltola**.

Bespoke products and services

The large amounts of data collected by Global Monitor also benefit Oilon's research and development team, who use it for developing future devices and services. The system is designed to work even with large device configurations, and with long-term data preservation and analysis in mind.

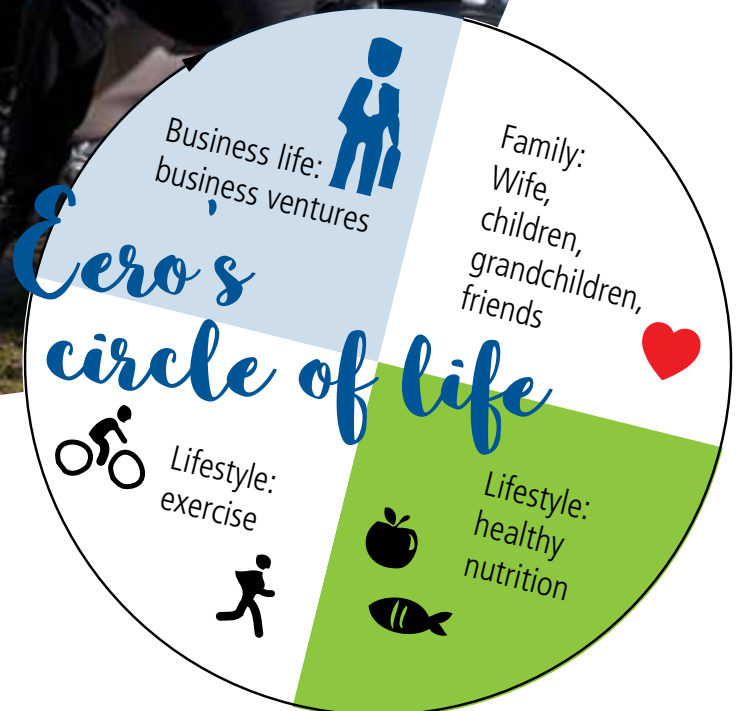
– This allows us to customize the services and products to suit our customers' needs even better. We haven't utilized the IoT on that scale in the burner industry yet, but I see no reason why we couldn't in the future, as long as data security is properly handled, says Oilon's Chief Executive Officer **Tero Tulokas**. 🍷

Eero Pekkola retires atop the energy industry

Having a penchant for new opportunities, courage and the floundering domestic market were the catalysts of Oilon's international success



Eero Pekkola joined Oilon at the age of fifteen for a summer internship. Now he has retired from the CEO position after guiding Oilon to international success in cleantech. We caught up with Eero to find out how all this came to be and how the pensioner life is shaping up.



After the internship, he majored in mechanical engineering and racked up all-round experience in the business world, taking care of international trade, among other pursuits – only to return to Oilon, this time as the Vice Managing Director and eventually, the Chief Executive Officer. Leading the company for 25 years gave him a unique perspective on the ever-changing energy industry.

From household burners to the industrial scale

Pekkola had been keeping his eye on the interesting burner company. When he started as the Vice Managing Director in 1992, household burners were Oilon's primary commodity, comprising 70 percent of the turnover.

– Our competitors were making bank with household burners, and we were also tempted to go even further in that direction. After some serious strategic thought, the management group concluded that in order to be a serious contender in the household sector, Oilon would have had to grow its production volume enormously. In addition, our rivals had the geographical advantage, as well, Eero Pekkola reminisces.

Oilon opted to target its R&D resources towards the industrial and power plant burner market instead, and saw its turnover grow while gaining some foothold internationally. It was rough at the onset. Rival companies outdid Oilon's production volume by dozens of times, even in the industrial sector.

– Our competitors in the industrial burner market were large, internationally acknowledged brands. Industrial burners were also more challenging technically. However, years of investment in research and development paid off, and we were able to produce competitive products. As almost always, the R&D department was our key to success, Eero Pekkola says.

Heavy oil is out, gas is in

Back in that era, the burner market Oilon competed in was all about heavy fuel oil. Oilon had mastered the difficult burning process that heavy fuel oil requires, as well as manufacturing the complex and heavy burners.

The business was changing, however. Along with the rest of the industry, Oilon adopted light fuel oil, and in particular, gas. Even though competition was just as fierce in the lighter and technically less demanding gas burners, the company was once again able to come up with a competitive burner palette, gaining success in the key markets of China and Russia.

The simplicity and lightness of the new burner type required an entirely new attitude. There was no lack of motivation, though, because the household burner market had become much less lucrative than before. Today household burners bring in 6 percent of the company's turnover.

From zero to hero in China

Oilon had been looking to expand beyond the domestic market since the company's inception. Already in the household burner era sales operations were established in Sweden, Norway, Denmark and Russia.

Research on the Asian market in the early 90s made Oilon set its sights on China, a country familiar to Pekkola.

– Entering the Chinese market was no easy task with all the established European brands already competing in the area. In the beginning, “need not apply” was pretty much all we got for our efforts. But we kept our head and persistently approached the local boiler manufacturers. Ultimately we were able to convince people with our products and formed partnerships with companies that took us seriously, he says.

– Forming partnerships with opinion leaders was especially important in the Chinese market.

The top boiler factories in the country became interested in Oilon and eventually the sales pick up steam. In 2013, Oilon was chosen as the leading burner brand by Chinese boiler manufacturers, holding that distinction ever since.

– Another key element in all this is the brilliant talent we managed to recruit in our Wuxi factory. Their role has been a decisive factor in our success. The initial CEO was a veteran of the business from Hong Kong. The subsequent Finnish CEOs have been the only Finns ever employed in the factory. Now that the payroll has exceeded 100 people, we also recruited a Finnish Vice Managing Director, Pekkola tells us.

The entire company was committed to breaking into the Chinese market. Many board members, directors of Sales, R&D and Administration and employees have visited the country dozens of times. Pekkola himself recalls at least a hundred business trips to China.

– Time and again, research and development was behind our success. Furthermore, the entire company has demonstrated a willingness to grow and exceptional tenacity and commitment, the kind that breaking into a new market requires. We were able to be there for our customers, reacting swiftly to answer their needs, Eero Pekkola sums up.

In addition to Asia, Oilon has also increased its market share especially in the Russian, North and South American markets.

– We have believed in our success. China was a lesson on how to be truly competitive and gave us the courage to expand further. Today Oilon has excellent retailers around the world, he continues.

Three signposts on the road to success: R&D, marketing know-how and adaptability

Eero Pekkola is visibly proud of Oilon's versatile expertise brought about by the significant investments in research, development and commercial ability.

– There is reason to be grateful for the owners' commitment and investment in growth and development, he rejoices.

– Oilon had expertise of bio gas and oil long before they broke into the mainstream of the business.

Oilon has also developed excellent solutions for burning process gases and hazardous waste, Eero Pekkola continues.

“Oilon’s ability to adapt to new things is wonderful. I have observed that nothing in the world stays constant – doubly true for the energy industry.”

Heat pump technology is one of Oilon’s newest business segments. Eero sees it as the next step for the company.

– Heat pump technology is going to focus on larger and larger units. Research and development plays an important role in this area, too.

– Cleantech is an amazing line of business. Oilon has gained recognition in the sector for reaching low emission levels, developing hybrid technology and introducing heat pumps into the energy industry. It is a very alluring business, so the competition is going to keep the company agile. I see Oilon’s prospects for future success and growth as excellent, Eero Pekkola ruminates.

The warm way

Oilon’s employees have an immediacy and a way of engaging with people that inspired the company slogan “the warm way”.

– There’s an enormous amount of humaness in Oilon’s business. Oilon’s employees have always encountered people with exceptional warmth, and that has been beneficial for the company and its partners, Eero Pekkola says.

Eero’s circle of life

When Eero was busy representing Oilon around the globe, his wife took care of the home and children. Retirement has let him restructure his daily schedule. Now his circle consists of the four most important aspects in life: his wife, children and grandchildren, exercise and healthy nutrition, and, of course, business.

– The food circle inspired me to come up with a life circle, now that I finally could. That means balancing out the good things in life, and not letting others dictate time management. The optimal pie chart of life also includes business ventures, so I am a board member in a few companies. Following the business life keeps my mind fresh, Eero Pekkola concludes.





Reliable and approved burner system for gas

LNG (Liquefied Natural Gas) is an ecological fuel that eliminates maritime sulphur dioxide emissions completely and reduces nitrogen oxide emissions significantly. LNG use in marine traffic is likely to increase in the future, because the International Maritime Organization (IMO) is imposing stricter restrictions on sulphur dioxide emissions. Scheduled for 2020, these restrictions will extend beyond the former Emission Control Areas.

Evaporating gas is utilized

Despite its numerous benefits, methane-rich natural gas becomes a hazardous greenhouse gas once it reaches the atmosphere. Its adverse impact on climate warming is even stronger than carbon dioxide's. Therefore international seafaring conventions prohibit the release of methane and require that the gas evaporating from the ships' tanks is processed.

– Ships using LNG must have a processing system approved by a classification society, says **Jani Kurikka**, Sales Manager at Oilon.

One energy efficient implementation is to use a boiler to burn the evaporating gas. Using a boiler ensures that fuel isn't wasted and a significant portion of the energy is utilized.

Oilon has developed a burner system for this purpose. It comprises of a burner, a GVUR gas unit and an automation system. The system is designed, manufactured and approved according to the requirements of the classification society, IGF and IGC codes and the customer. Alternatively, the system can be realized by following the Gas Combustion Unit requirements set by the classification societies.

– Our system burns gas safely and with good energy efficiency, and utilizes the evaporated portion in the ship's heating system, Jani Kurikka says.

Marine burners since 1963

Oilon's marine burners are used for heating and gas pressure control in freighters, tankers and cruisers worldwide. Oilon manufactures burners according to the requirements of almost every classification society.

The burners are compatible with steam, hot water and thermal oil boilers, and can burn almost any fuel used in marine traffic. Low-emission Low-NO_x burners are also available.



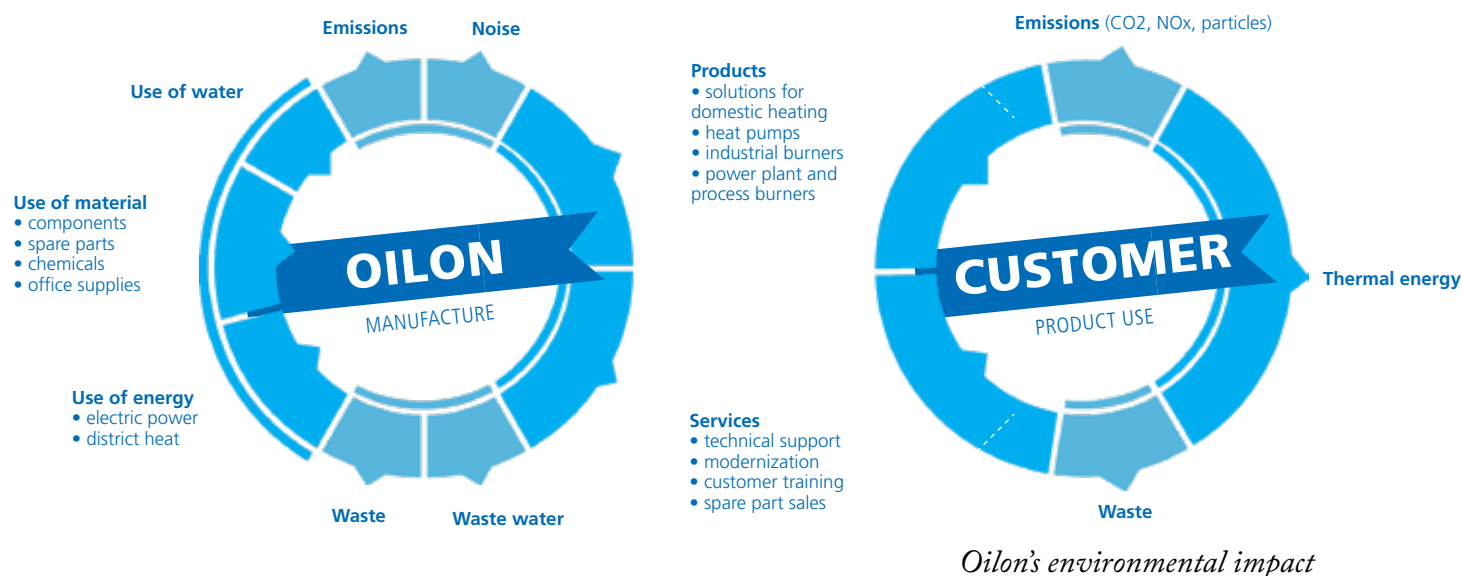
Maritime industry terms

Classification society = An expert organization that promotes and oversees safe seafaring and environmental protection.

IGF = Gas and low-flashpoint fuels code.

IGC = The international code of the construction and equipment of ships carrying liquefied gases in bulk.

Circular energy in a circular economy



The purpose of a circular economy is to save natural resources by keeping raw materials and resources in circulation for as long as possible. Resources are used with maximal efficiency and minimal waste. This also applies to energy. Oftentimes it is also the most reasonable approach from an economical standpoint.

Circular economy is connected to unprejudiced product design, which seeks to utilize resources efficiently, lengthen the device lifecycle, improve energy efficiency and increase recycling. Digital services introduce new possibilities for recycling and sharing economy, which refers to purchasing services instead of material goods. Energy efficiency, low emissions, utilizing renewable energy and energy recycling are among the goals that companies using energy have set for themselves as they move towards circular economy.

Heat pumps recycle energy

Oilon's heat pumps reduce energy consumption and carbon dioxide emissions significantly. When the waste heat generated in production or cooling is recycled to another segment of the production process or to indoor heating purposes, energy is saved. Our heat pumps have enabled our customer companies to abandon fossil fuels partially or completely.

The real-time remote surveillance of the pumps enables us to address possible problem situations quickly. Our around-the-clock service ensures that the devices can operate energy efficiently at all times.

– The energy recycled by heat pumps can be utilized within the company or transferred into the district heating network. Heat pumps refine waste heat into a useful and valuable form of energy, describes Oilon's R&D Director in Heat Pumps, **Juha Aaltola**.

Renewable fuels and energy efficient burners contribute to circular economy

Oilon's energy efficient and low emission burners are suited for use with various renewable fuels.

– We have developed and manufactured burners that use pyrolysis oil and bio oil for many years. We have also developed solutions for utilizing odorous and flue gases in energy production, among other things. Reducing combustion emissions, developing technology based on renewable bio and waste fuels, and coming up with solutions that promote energy efficiency are constant focus areas for the research and development team, says R&D Director of Combustion Technology, **Joonas Kattelus**.



Key figures

Heat input: 75 °C
Capacity: 1.4 MW
Coefficient of performance (COP): 4.6
CO₂ emission savings
2400 tCO₂ per year

Meat refinery gives up oil as energy source

Finnish meat refinery demanding a large cooling capacity has saved energy and lowered its carbon dioxide emissions with Oilon's heat pumps, to the extent that they have abandoned oil as energy source almost completely.

– Initially the refinery used oil for heating the premises and domestic water.

They had parallel heating and cooling systems. Cooling was used for large food premises and refrigerating the products. The issue was that the heat generated in the process was wasted, narrates R&D Director of Heat Pumps, **Juha Aaltola**.

Oilon installed a ChillHeat industrial heat pump to connect the two systems. ChillHeat transfers the heat generated in cooling to assist with heating the premises and domestic water.

– The ChillHeat heat pump enabled them to give up oil use for the most part. Economic savings were significant, with a short payback period, Juha Aaltola says.

Maintenance and modernization prolong product life, keep consumption and emissions in check

Oilon's maintenance service, technical support and user training prolong the operating life of the equipment and ensure that its coefficient of performance, fuel consumption and emissions stay optimal. Our maintenance and spare-part service secures the operation of our devices worldwide.

The purpose of modernizing is to lengthen the operational life of the burner, while improving the reliability and technical standards of the equipment to meet the present-day fuel, consumption and emission requirements.

– The modernization process is tailored according to our customer's needs. Modernizing a burner always calls for a case-by-case approach, where we acquaint ourselves with the burner and the conditions of the facility, Chief Customer Service Officer **Jukka Luostarinen** relates. 🍷

Oilon's Webshop now sells ground source heat pumps

Our Webshop has provided spare parts for burners and ground source heat pumps. Now we have expanded to selling ground source heat pumps in addition to spare parts.

Oilon's Webshop is open around the clock, worldwide. Domestic deliveries are shipped on the day of the order.

Visit Oilon's Webshop!
webshop.oilon.com



Ground source heating and heat recovery ventilation can halve the heating expenses of an apartment house

Photo: Shutterstock

Heating expenses for Finnish properties keep on rising and housing associations look for solutions to reverse the trend. Ground source heating and recovering heat from exhaust air can lower the heating expenses in old apartment blocks by up to 50–70 %, depending on the location and target.

– Heating is the largest individual expense for a housing association, so it's worth paying attention to. A solid rule of thumb is that the larger the energy consumption, the larger the relative savings will be, says **Petri Virta**, Oilon's Chief Business Officer of Ground Source Heat Pumps and Real Estate Burners.

Property values go up and energy bills decrease

The Tullinniitty housing association from Orimattila, Finland adopted Oilon's ground source heating technology and introduced heat recovery ventilation (HRV), which recovers the waste heat in exhaust air and recycles it back for property heating.

The project was commenced when house manager **Matti Korkeamäki** presented the idea for reducing heating expenses to the association board. The general meeting eventually approved the proposal to switch to ground source heat and heat recovery ventilation.

– Our goal was to save money, and we did. The association's energy bill has halved after adopting the new heating system,

Matti Korkeamäki recounts. – We use the saved euros to pay off the loan we took out to pay for the heating project, meaning the investment won't ever increase the condominium charge, he continues.

In addition to improving the fiscal balance, the housing association's image has also improved with the introduction of ground source heat and heat recovery, projecting environmentality and diligence.

The level of living comfort has also gone up a few notches, as the upgraded, automatically adjusting ventilation enhances air quality.

Effortless solution for residents

Installing the ground source heat and recovery ventilation system will interfere with the residents' day-to-day life for only a few brief days

– Drilling the thermal wells usually takes around two days, causing a bit of noise. The installation process causes an interruption in heat and water supply on one of the days. Otherwise the installation is largely invisible to the residents, says **Saija Hakonen**, CEO of Suomen Kiinteistölämpö, who install Oilon's ground source heat pumps and heat recovery ventilation solutions.

Quality equipment and expert partners

Housing associations that plan on switching to heat recovery ventilation usually choose ground source heat, because both systems are heat pump-based.

The combination is usually the most energy efficient and eco-

nomical solution for associations. Building services engineering, location and other properties of the building may lead an association to use ground source heat or HRV in isolation. The HRV system can be combined with other heating methods, such as district heating.

Saija Hakonen encourages housing managers and housing association decision-makers to go ahead and find out whether ground source heat and HRV are good fits for their needs.

– We evaluate and dimension every target individually and give our honest view on the solutions' suitability. Proper dimensioning and properly-sized equipment are crucial for achieving functional and energy-saving solutions.

Oilon's ground source heat pumps for property use are manufactured in Lahti, Finland, and they can be purchased through expert HVAC and ground source heat companies.

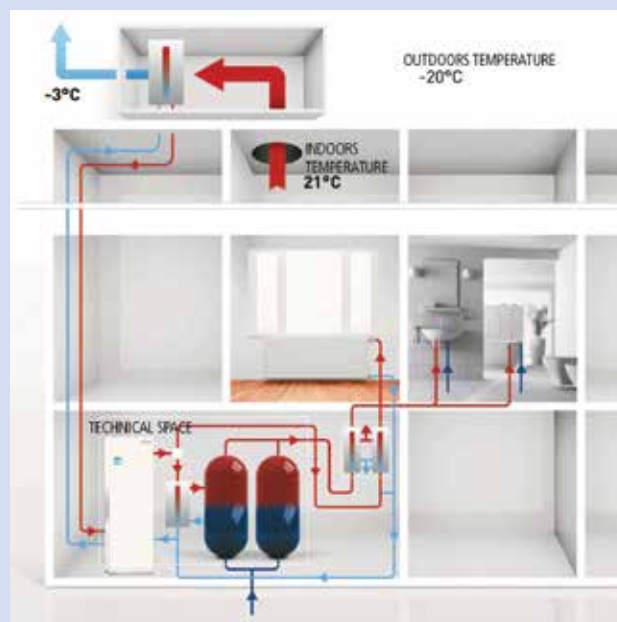
– Domestic production ensures that spare parts and technical support are readily available if needed. We are familiar with Oilon's technology and cooperate closely with the manufacturer, says Saija Hakonen.

Oilon's heat pump is a part of the Naavatar HRV system, jointly developed by six building services engineering companies.

– Every HRV target with Naavatar installed has reached or exceeded the savings that we had projected, Petri Virta describes.

Old apartment houses are full of potential

– The market potential of HRV systems in Finland is enormous, we are talking up to 60000 apartment buildings. The system is a great fit for Scandinavian countries, as well, due to similar building services engineering and heating conditions. 🍷



The Naavatar HRV system saves energy in a smart way

Naavatar is a heat recovery ventilation system that enhances energy management in old apartment houses by recovering the heat in exhaust air and returning it to utilization in property heating. This makes properties more ecological and energy efficient while also reducing their fixed expenses.

Smart heat recovery ventilation

- reduces energy consumption
- lowers heating expenses
- improves air quality in apartments and
- reports savings.

Naavatar is a turnkey aggregate combining the expertise and quality equipment of six top players in building services engineering.

Visit www.naavatar.fi

TULLINNIITY HOUSING ASSOCIATION

Location: Orimattila

Built: 1973

Capacity: 36 apartments, 6 floors

Restructuring: from district heat to ground source heat and HRV in 2014

Energy conservation: 50 percent off the heating bill

Heating system:

- Oilon RE 85 kw heat pump
- two 1500-liter buffers
- four thermal wells
- heat recovery ventilation system

Oilon worldwide





Heat pumps
MAX IV, particle accelerator laboratory
Sweden



Burners
Kymijärvi III,
bioenergy heating plant
Finland



Burners
Lakhta Center
Russia

Burners
Imperial Porcelain Factory
Russia

Burners
Beijing Benz, car factory
China

Burners
ENN Group, energy company
China

Burners
Samcheok, power plant
South Korea

Heat pumps
Yili, dairy
China

Burners
OKI, pulp and paper factory
Indonesia



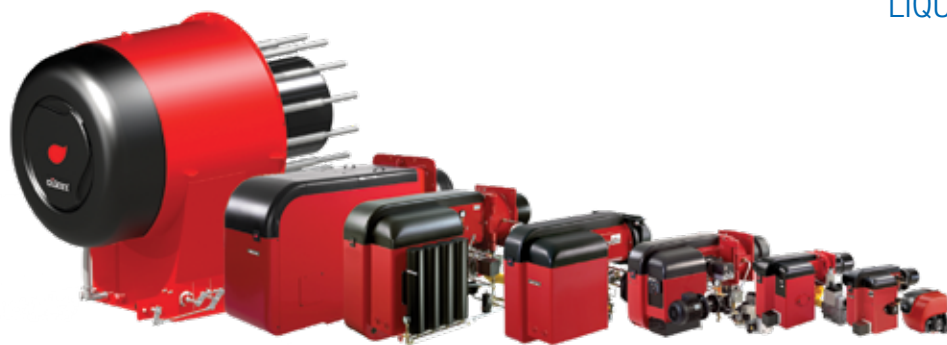
Heat pumps
Vinhomes Central Park
Vietnam

Heatworks



LIQUID AND GAS BURNERS

Capacity range: 12–90 000 kW



CHILLHEAT INDUSTRIAL HEAT PUMPS AND WATER COOLERS

Capacity range: 60–5000 kW



GROUND SOURCE HEAT PUMPS

Capacity range: 4–96 kW



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