

Leaf

Customer
magazine

■ Issue 10

**The energy
transition
is promoted
by Oilon
products**



Clarity, convenience,
and improved service
through digital
evolution

| **PAGE 10**



Oilon helps Puratos
at the forefront of
sustainability

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Oilon's 92 per cent
environmentally
friendly burner
portfolio

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Editorial



Tero Tulokas
CEO



Environmental responsibility is at the heart of our strategy. With our products and services, we help customers strengthen their environmental responsibility."

As the world moves from one crisis to another, companies who have built trust and can keep up their service have an edge. Responsibility is valued more than ever. In these difficult times, our approach to doing business has proven its worth, enabling us to keep serving our customers throughout each crisis. In 2022, Russia's war of aggression against Ukraine cast a shadow across the globe. Oilon condemns Russia's unprovoked invasion and deeply sympathizes with the people of Ukraine in their great distress.

Consequently, in 2022, we started to discontinue our operations in Russia in stages. Our factory in St. Petersburg was permanently closed in November, while our Moscow sales office was shut down earlier in the year. Additionally, we donated EUR 50.000 to help Ukraine through different channels.

Oilon's responsibility efforts span six decades Oilon has been a forerunner in responsibility through out the company's six decades of history. In 60 years,

Oilon has grown from a two-man garage firm into a global forerunner in environmental technology. Today, our responsibility is summed up in our environmental and corporate responsibility policy, which is divided into financial, social, and environmental responsibility.

Environmental responsibility is at the heart of our strategy. With our products and services, we help customers strengthen their environmental responsibility.

Earlier, companies would invest only if there was money to be gained or when forced to do so; these days, investments in emission reduction are often voluntary.

Skilled and motivated personnel are our most important asset and the foundation of profitable business. We are proud to be able to offer meaningful work with an international scope. Oilon has a very low employee turnover, with the longest careers exceeding 50 years in length.

In addition to offering greener solutions, we aim to actively reduce our own environmental loads. In 2022, we became one of 1,000 pioneering companies committed to the Science Based Targets initiative's most ambitious, 1.5 °C target of reducing our emissions levels. This effort is a cornerstone of Oilon's sustainability strategy; it is also part of a broader development initiative that extends into establishing the best possible social and governance culture across the entire group.

As a third-generation family business, we want to preserve nature and enable a future worth living for future generations. The best way for us to contribute is through our products. Combined with clean combustion technology, heat pumps provide crucial solutions for low-carbon energy production.

News



Oilon's responsibility efforts have received the silver EcoVadis rating

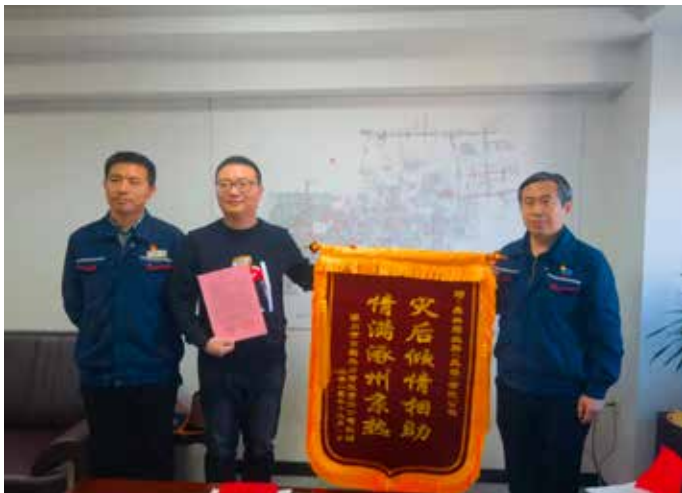
Oilon's responsibility efforts reached a major milestone when Oilon was awarded the silver rating by EcoVadis. EcoVadis is one of the largest business sustainability rating providers in the world. The organization considers companies' responsibility through four themes: Environment, Labor & Human Rights, Ethics, and Sustainable Procurement.

A silver rating reflects Oilon's commitment to responsible business and our compliance with the principles of sustainable development. The first time Oilon participated in an EcoVadis review was in 2022. At that time, Oilon received a bronze rating.

"We are extremely pleased for the recognition received by our responsibility efforts. Last year, we updated Oilon's quality and corporate responsibility policy and published a new ESG report. Additionally, as part of our sustainability efforts, we've joined various high-profile public initiatives, such as SBTi and

the UN Global Compact in the last few years. Compared to last year, our ratings improved especially in the Environment category, and it's great to see that our work has borne fruit," says Oilon's Head of QHSE Anne Hakamäki. This year, we will continue our efforts and keep promoting development within these important themes.

EcoVadis is the world's leading corporate sustainability rating system that assesses companies' sustainability performance in the areas of Environment, Labor & Human Rights, Ethics, and Sustainable Procurement. The rating system is based on international sustainable development standards, including Global Reporting Initiative, UN Global Compact, and ISO 26000, which cover more than 200 consumption categories in more than 180 nations worldwide.



Oilon assisted Zhuozhou City in reconstruction: Overcoming difficulties together and creating a better future

Since July 29, 2023, Zhuozhou City, Hebei Province, has been hit by historically rare heavy rainfall, and extreme weather has brought severe flooding disasters to the region. In this disaster, the Huatian Road Heating Plant, Tuanjie Boiler Room, 29 Thermal Power Stations, Primary Pipelines and other heating equipment including boiler combustion system, fan system, valve units system, BMS system, FGR system and other facilities belonging to Zhuozhou Jingre Heating Co., Ltd., a subsidiary of Beijing district heating Group, were seriously damaged and suffered huge losses.

At this difficult and critical moment, CSD department of Oilon Company responded quickly, provided professional technical assistance with hard work, contributed to the post-disaster reconstruction work, and ensured the normal heating supply in 2023~2024 in a timely manner. Beijing District Heating Group issued a letter of thanks and a banner to Oilon Company, in which they expressed their gratitude for the recognition of Oilon's professionalism and strong support in detail.

Now that Zhuozhou has returned to normal production and living order, Oilon will continue to leverage our expertise to provide efficient and reliable energy solutions for more communities and enterprises. Let's look forward to a better future together!

Approvals for Oilon heat pumps

Oilon ECO Inverter+ 7-25 ground source heat pumps and Oilon RE heat pumps intended for medium-sized and large buildings have been awarded the BAFA certificate by central licensing authority BAFA, the German Federal Office for Economic Affairs and Export Control.

Oilon ECO Inverter+ and Oilon RE (33 -96 kW series) ground source heat pumps intended for medium-sized and large buildings have now been EHPA-tested by a third party. We have verified the energy efficiency of our ground source heating pumps in an EHPA-accredited testing laboratory. The next step forward is cooperating with customers to achieve the full EHPA Quality label.

The ChillHeat P heat pump range received the ETL Mark. In the United States and Canada, conformity of products is often demonstrated by a third-party certificate, and the ETL Mark is one of them. In everyday speech, the words UL machine and UL certificate are often used; to be precise, these units carry the ETL Mark that demonstrates that the product conforms to the requirements of certain UL standards and those of the North American markets.



New spare part search in Webshop

We are thrilled to announce a significant enhancement to our Oilon webshop: the new Spare Part Search feature. This innovative tool is now available and ready to transform our customer service experience.





Oilon's heat pump expertise recognized as best in class in Europe

Energy technology company Oilon and Helen, One of Finland's largest energy groups, have received the esteemed Heat Pump Award in the DecarBuilding series for their jointly-developed heat pump solution. Granted by the European Heat Pump Association (EHPA) since 2011, the award serves to recognize the most innovative and energy-efficient heat pump projects in the continent.

The award-winning project involved a heating and cooling solution for a new apartment building. Completed in 2021, the system utilizes the building's waste heat in various ways. The building, which is located in Helsinki's Postipuisto district, has a total of 113 apartments as well as a grocery store.

The beating heart of the system is a high-capacity heat pump. Besides ground source heating, the unit can utilize waste heat from the building's waste water and apartment cooling as well

as the grocery store's refrigeration equipment. The recycled energy is used for heating the building, producing domestic hot water, and, in the summer months, for apartment cooling. District heating is used for backup in case there is a fault and to provide supplementary heating during the coldest days of winter. On days when the building generates more heating than it consumes, the surplus heat can be sold as district heating and channeled into Helen's district heating network.



Recycling makes sense even in energy production

Developed jointly by Oilon and Helen based on the principles of circular economy, the new hybrid solution sets a new standard for the energy efficiency and environmental impact of new buildings. The solution is the result of long-term product development between the partners, with a unified focus on heat pump technology and waste heat recovery. The most innovative aspect of the system is that different heat sources can be utilized in different combinations at different times of the year, resulting in optimal performance and minimizing the building's carbon footprint. This is made possible by an Oilon ChillHeat heat pump, which can adjust its output intelligently from very low levels to maximum capacity within a wide range of temperatures.

The adoption of bidirectional energy production and consumption is part of the trend that drives building heating and cooling towards improved sustainability. Oilon's heat pumps

play a key part in this development: they allow companies and property owners to utilize renewable energy sources and waste heat. Additionally, they are an excellent fit for smart networks and electricity-based energy production.

Excellent experiences from the first year of operation

Antti Leskinen, who serves as the project lead for Helen, describes the Postipuisto pilot project as a wonderful and interesting yet challenging undertaking. The success of the project is based on careful planning. The companies have a long history of shared innovation in waste heat recovery, which served as solid groundwork. In Helsinki, for example, Helen extracts heat from waste water at the Katri Vala heat pump plant, the largest of its kind in the world.

"There were no major issues with the Postipuisto system in its first year of operation. We kept a close eye on energy streams and system operation and fine-tuned the system along the way, exactly as planned," Leskinen says.

Two energy sources rose above the others: condensation heat from the grocery store and ground source heating. Additionally, the system recovered considerable amounts of energy from wastewater and apartment cooling. In summer, the heat pump transfers surplus heat to boreholes for storage. In the coldest days of 2022, district heating was used to even out peaks in power consumption. Versatile, flexible, and responsive energy use creates new opportunities for housing construction in the future.

“For Helen, Oilon is a long-standing and reliable heat pump partner. They have deep understanding of the field, which is evident in the quality of their products and, for example, the way they implemented the automation system for this complex system,” Antti Leskinen says.

Postipuisto apartment building (Rullakkokatu 1, Helsinki). The reduction in carbon dioxide emissions from heating, domestic hot water and cooling based on actual consumption compared to typical emissions for 2021 declared by Helen.

Technical data: Energy solution used in the Postipuisto apartment building (Rullakkokatu 1, Helsinki)

Heat sources: Ground source heating, waste water, condensation heat from a grocery store’s refrigeration equipment, apartment cooling. District heating as a secondary and back-up heat source. District heating evens out energy peaks in the coldest days and accounts for approximately 1/3 of the building’s annual heating.

Heat sink: Heating, domestic hot water, and the local district heating network.

Cooling sources: Domestic hot water production and boreholes for ground source heating.

Cooling sink: Apartment and space cooling.

Cooling capacity: 100 kW (7/12 °C and 40/80 °C), COP_{tot} 4.9.

Heating capacity: (ground source heating) 115 kW (0/3 °C and 30/55 °C), COP_h 3.2.

Energy class: Class A building, annual consumption 9500 mq < 75 kWh/m².

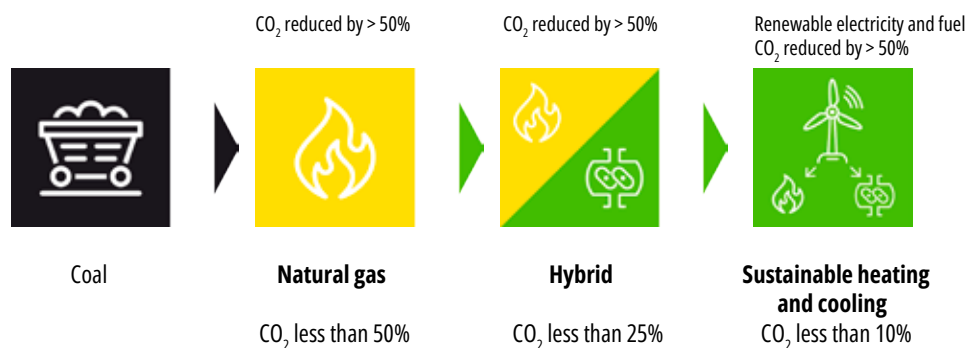
The system’s 16 ground source heat pump boreholes are used for thermal storage.

In summer months, solar panels provide a portion of the electricity used by the building’s systems.



“The annual emission reduction is 137 t CO₂.”

A dependable companion on the journey towards electricity-based energy production



The first step in reducing emissions from energy production is to replace coal or other fuels that put a heavy burden on the environment with natural gas, netting an up to 50% saving in CO₂ emissions. Another major benefit of natural gas combustion is that sulfur emissions and particulate emissions are eliminated. The cleanest possible combustion can be achieved with Oilon's ultra-low-NO_x products, such as Oilon Ace.

Natural gas combustion will be followed by hybrid solutions that combine energy produced by combustion with heat pump solutions. Heat pumps allow operators to use the energy produced more efficiently, for example, by capturing waste heat and utilizing it in heating and process applications.

Heat pumps can also extract heat from free sources, such as the soil. CO₂ emissions are cut in half again, amounting to a 75% total reduction from the original. Additionally, reduced energy consumption results in substantial savings in energy costs. For hybrid operation, Oilon offers ground source heat pumps and the Oilon ChillHeat range of industrial heat pumps and chillers. Burners remain a key component of energy production.

The end goal is to produce heating energy, cooling energy, and fuel with renewable electricity, again reducing CO₂ emissions by half. The highest temperatures required by industrial processes will be produced using renewable and the cleanest possible fuels, such as hydrogen produced using wind power. Compared to coal combustion, the CO₂ emissions sustainable heating and cooling will be reduced by more than 90%.

Clarity, convenience, and enhanced service through digital evolution



With a long history of creating tailored solutions for customers, Oilon has well-established customer service capabilities. However, as the company grows, it needs to evolve with new digital solutions that bridge gaps between stakeholders, providing enhanced service all round.

For a decade already, **Michele Danelon** has helped Oilon create products that connect with people. "When I started at Oilon, I would draw designs for burners and heat pumps based on market needs and with an eye on our production capabilities. I would approach the projects from the user's standpoint," Danelon says.

Today, digital evolution is a priority in Oilon's service offering. As Oilon's Digital Business Manager, Danelon is tasked with creating a vision for a user-centric digital business and commercialization of digital products. The principal idea is that users should have access to all digital services in one place. According to Danelon, it all boils down to transparency. While



product continues to be king, well-implemented services help users find what they need and expand the products' capabilities.

What brings the concept together is OilonONE, a hub which serves as a one-stop shop for digital services. The aim is to make it easy to find links for relevant information. Different services should be interlinked behind the scenes so that information passes effortlessly to everyone involved.

"The OilonONE environment serves as the landing page. The goal is that people like to spend time there, to have relevant activities for them," Danelon says. The platform needs to be as simple and easy to use as possible. To achieve this, there are only five links on the landing page.

Direct access to all digital services through one platform

The stars of the show are Oilon Selection Tool (OST), Oilon Webshop, and Oilon Device Portal. You can also access the company's training offering and the company website through the portal.

Each service has a clear function: OST helps with product selection and system design, and the webshop allows you to find spare parts and accessories. The new Oilon Device Portal, in turn, will help you get the most out of the products you already have.

The-soon-to-be-launched Oilon Device Portal is an online repository of Oilon products. When you access the service, you are presented with a list of the Oilon products you have pur-

chased. By clicking a product on the list, you gain immediate access to all relevant resources. You can browse through the product's documentation or get in touch with Oilon. Instead of sending an e-mail to ask for materials or services, you can directly access what you need.

"Thanks to digital interfaces, you'll be able to find the service you need without having to call, send an e-mail, or visit our website. Whatever you need to sustain and maintain your Oilon product, it can be found where everything interesting happens: around the product itself," Danelon says.

"Having all the documents in the portal improves transparency. Our end goal is preventive maintenance, which ensures that the products are always in prime condition and work flawlessly. Once a product is connected to Oilon Cloud, we, the customer, and our service partners can all check the operating data to see what's wrong."

Many issues can be solved without sending a technician over – a greener alternative, especially considering that Oilon's customer base spans the globe. "The device portal has a massive savings potential for both us and our customers, as we can make decisions based on more detailed data."

Bringing Oilon closer to the customer

OilonONE serves both customers and internal users. To ensure the flow of relevant information to everyone, linking the hub with internal systems is essential. In Danelon's vision, various internal services and the other systems behind the scenes are connected to OilonONE "with a huge cable". This kind of integration can have wide-ranging benefits, such as a more transparent order-to-delivery process.

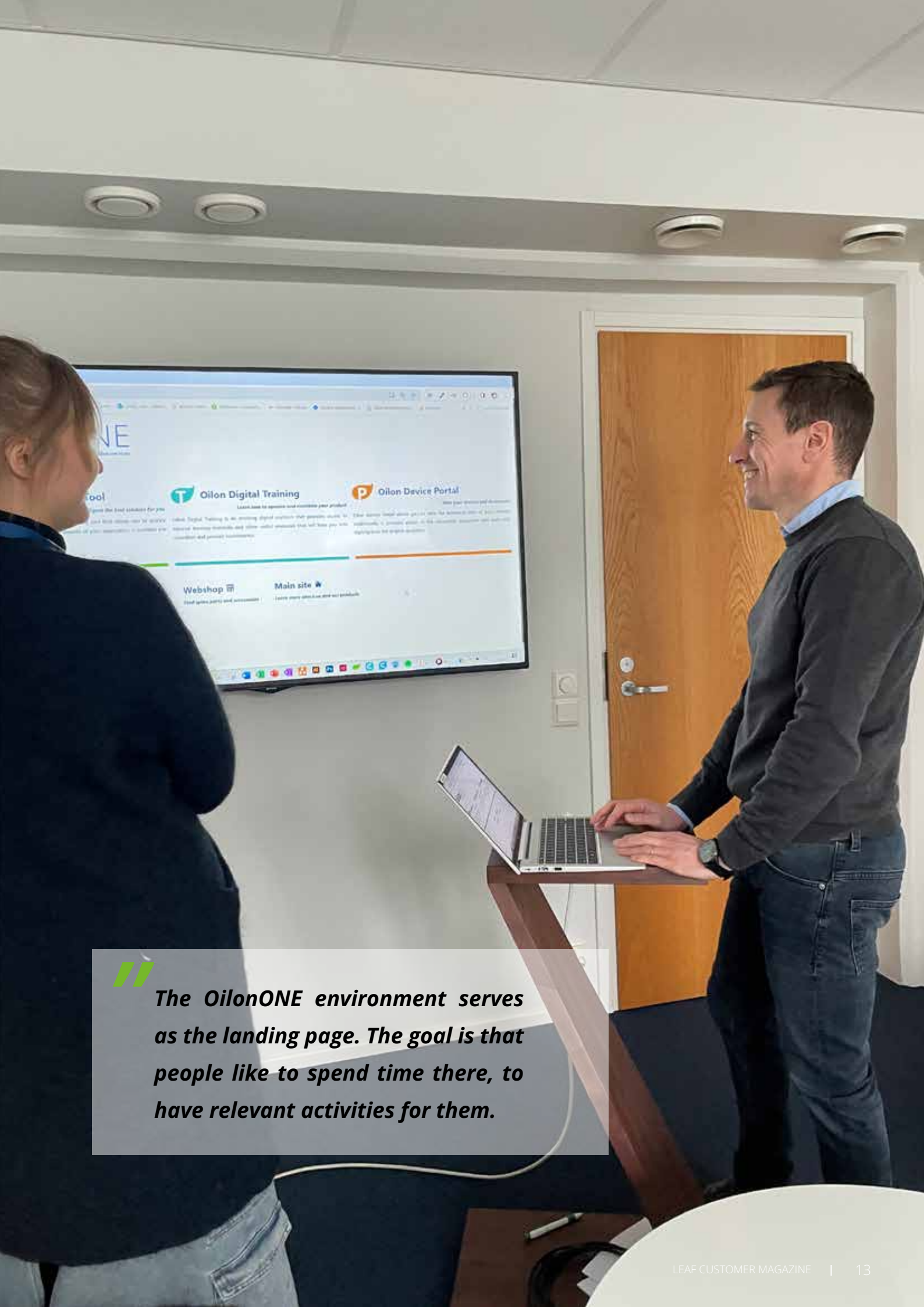
"Customers can see when the product will be delivered and check its status in our production. The system will alert when the product needs servicing, and the customer can schedule a service call straight from the portal," Danelon says. What would previously have required a lot of back and forth in e-mails and phone calls between internal and external stakeholders can now be handled using the device portal.

Many of the benefits are shared by internal stakeholders. Danelon describes creating API interfaces between different systems as a wonderful opportunity to build bridges over different silos. Bridging communication gaps and adding data analysis will make it easier to create shared metrics, for instance, for delivery reliability. With data analysis, identifying repeated issues or defects that could otherwise go unnoticed for some time becomes much easier.

Continuous improvement based on tangible data

Data-driven operations is one of the cornerstones of the Oilon strategy, and following statistical data from various touch-points will allow the development team to identify what works and what doesn't. "Of course, we interview customers and collect their feedback from different sources. Using statistical data allows us to identify spots that cause unnecessary friction. We can determine that maybe the device portal is the best place for a link to the webshop, for example," Danelon says.

Continuous improvement is not always easy, and often you end up having to kill your darlings. "We aren't interested in features that are just nice to have. What we are really after is a convenient, simple system that provides direct and indirect added value to customers and users," Danelon concludes.



The OilonONE environment serves as the landing page. The goal is that people like to spend time there, to have relevant activities for them.

Oilon Webshop serves customers every day of the year

From a customer standpoint, one of the biggest benefits of an online storefront is accessibility. Currently, Oilon Webshop serves customers in Europe, but there are plans to extend service coverage over the Americas in spring 2024.

The webshop's largest customer group is Oilon dealers and the company's contract partners. According to Oilon group's Sales and Marketing Director **Sami Pekkola**, the bulk of the customers come from Finland, but the share of international customers is growing.

The webshop offers spare parts for all Oilon products. "Even though Oilon has been a burner specialist far longer than a heat pump business, heat pump customers have also found their way into our webshop," Pekkola says.

Quick and easy

In Pekkola's view, the biggest benefits of Oilon Webshop are the speed and convenience of shopping, and customers will definitely enjoy the competitive pricing as well. As an example of the convenience Pekkola mentions the serial number search. Introduced in early 2024, the feature makes the order process faster and easier for the customer. Users can search for spare parts for products made from 2016 onwards based on the product's serial number.



Pekkola praises the webshop's outlet section as another great new feature and one that is well-received and recognized by the customers. The outlet section offers a wide range of products at a special price.

Generally positive feedback

Customers can send feedback to Oilon directly from the webshop, and Oilon measures customer experience through, among other factors, feedback received. Customer feedback is regularly reviewed and discussed in work group meetings. For example, if a customer sends an improvement proposal, the group will consider if it can be realistically implemented. According to Pekkola, the user interface is one of the areas that has received updates based on feedback. Customers are regularly notified of such changes.

The feedback received for the webshop is generally positive, and the overall rating is good. The latest feedback report covered the views of 282 customers. Overall, they gave Oilon

Webshop a score of 4.3/5. A large portion of the written responses highlighted the ease of ordering and fast delivery.

Oilon Webshop is under constant improvement, and the company's goal is to provide an even better shopping experience for all customers.

Welcome to Oilon Webshop!





Oilon helps Puratos at the forefront of sustainability



Puratos is a Belgian manufacturer of innovative products in the bakery, confectionery and chocolate sectors, present in more than 100 countries. Recently, the company took an important step towards a new sustainability footprint: the company's chocolate factory in Brazil became a benchmark for being the first of the group to complete the zero-emissions project. Now, any bar, gram or unit of chocolate produced leaves this factory with zero CO2 emissions into the atmosphere. The company, which already had chocolates produced with international quality standards, adds more value to the market by contributing to the global demand for reducing emissions.

And the main tool for this significant improvement is the Oilon ChillHeat heat pump.

Oilon heat pump took over the hot water production of the factory, which previously used a boiler fed with LPG fuel. Heated water is an important input in the manufacture of chocolate, since, in addition to being used in the melting of its fat, it also keeps the line heated in the process, thus allowing the handling of the raw material.

Emissions are eliminated by replacing the fossil fuel (LPG) heating source with electricity, Oilon ChillHeat's energy source. The electricity used by the factory was renegotiated and purchased only from sources with renewable energy duly accredited with the seal of zero CO2 emissions. In addition to the high environmental gain, heatpump produces hot water with an operating cost around 70% cheaper than the previous one, and eliminates an entire supply chain for the fuel which,

before, was transported to the factory through trucks, which also emitted gases into the atmosphere.

In its cafeteria, for example, Puratos also replaced the ovens and other accessories that used gas by others with technology based on electricity, such as electric induction, which means that fuel is no longer used in any direct or indirect process within the facility.

Oilon ChillHeat heatpump produces hot water and chilled water, replacing part of the work of air conditioning and cooling chillers in the industrial park, which results in high performance and operational cost optimization.

“The solution that our partner Oilon brought with the heat pump, the Chillheat, was an innovative solution for us, because we were able to end any and all consumption of fossil fuels in our factory, and Puratos Brasil chocolate factory became the first carbon neutral plant within the Puratos group.”, said **Fábio Vigário**, director of operations at Puratos Brasil.

Puratos now focuses on monitoring the implementation of this project and its replication potential in the other units of the group.

Heat pump is already prepared and adapted to the demands of industry 4.0. Its automation relies on embedded IOT technology, which allows automatic monitoring of the equipment 24 hours a day, 7 days a week, in addition to remote access and monitoring of the production and use of the resource. The system also counts the energy produced and consumed and manages to compile powerful energy reports, which allow a high degree of management. Furthermore, it allows the configuration of alerts that, in any eventual abnormality or anomaly, are sent digitally to those involved. Such monitoring allows the anticipation of any problem in its initial or pre-mature stage in an automatic and integrated way.

In addition to financial, environmental and technological gains, the equipment comes with a much higher load control than the previous one, with modulation of the compressor motors through a frequency inverter, thus allowing better adaptation to the variations and seasonality of the factory process.”

“Contributing to a greener and more sustainable world is Oilon’s purpose. Puratos’ Policy demonstrates in practice that energy efficiency and sustainability are pillars that can, and should, go hand in hand. The demand for decarbonization is for today, and it has been a pleasure to help Puratos achieve this goal, says **Marcus Libanori**, CEO of Oilon South America, which has been developing the heat pump market in the region since mid-2017. We have excellent references in several segments such as pharmaceutical, food, services, dairy and energy”, he concludes.

Technology at service

Oilon Chillheat heat pump is an equipment that enhances the waste heat of a process through the use of a compressor coupled to a refrigeration circuit. Refrigerant condensation, the cooling tower or the chilled water itself from refrigeration equipment are rich sources of heat, allowing Oilon ChillHeat to draw large amounts of thermal energy for the purpose of evaporating the refrigerant fluid. The use of this heat to heat the process water is the great advantage of the Oilon heat pump, being able to take advantage of this thermal exchange of the refrigerant, both in evaporation and condensation, making it the most economical equipment available on the market, in addition to having the advantage of the decarbonization of the process. Chillheat can deliver temperatures up to 120 degrees celsius.





“And the main tool for this significant improvement is the Oilon ChillHeat heat pump.

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Highlights of 2023

FEBRUARY

AHR Expo



MAY

ISH China International HVACR Exhibition

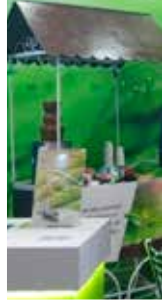


AUGUST

Boiler World Expo



Bombas d
Oilon Chil



SEPTEMBER

Febrava 2

MARCH

IHS Frankfurt



JULY

Shanghai International Heating Technology Expo



po in Nairobi



BER
023



SEPTEMBER

2.5 ppm NOx Achieved!

DECEMBER

Oilon Leaf podcast's first season, Spotify wrapped



NOVEMBER

Bring Your Child to Work Day in Lahti



DECEMBER

Christmas tree in Lahti office



**A unique solution
based on an
Oilon ground
source heat pump
provides heating
for a historical
hydroelectric
plant**



For a hundred years, the Kuhankoski hydroelectric plant utilized waste heat from its own generators for heating. In Easter of 2023, the old plant was left in reserve as its replacement became operational. The plant no longer provided the necessary waste heat, requiring another solution that would keep the plant in good working order.

“Kuhankoski is a valuable heritage site. We needed to find a heating solution for the plant, since from that point onwards, it would serve only as a backup, and for the most part, remain unused,” says **Hannu Ruotsalainen**, who serves as the CEO of Koskienergia Oy.



At the planning phase, Hannu's team came up with the idea of using waste heat from the new plant for heating the old plant. The biggest challenge was the new plant's nature as a peaking power plant; sometimes it would stay unused, then run at full capacity, or at any capacity in between, generating a highly variable amount of waste heat.

At the tendering phase, the company investigated if equipment suppliers could offer a heating solution that could adapt quickly to changing conditions.

"For example, not a single hydroelectric set manufacturer we asked for a quotation had experience in anything like this. Finally, we found a simple and insightful solution, which is based on ground source heat pump technology," Ruotsalainen says.

Oilon's ground source heat pump is the heart of the heating system

The solution uses the side streams from the new plant's energy production as the system's "ground loop". The heat pump recovers waste heat from generator cooling water, which would otherwise simply be pumped back into the river with the excess heat. The heat is extracted from the cooling system's secondary side by a heat exchanger. A heat pump transfers the energy to the old hydroelectric plant, which is right next to the new one.

The primary component of the heating system is an Oilon RE 96 ground source heat pump with a 96-kW heating capacity. If the new hydroelectric plant runs at partial capacity or

additional heating is required due to, for example, extremely low temperatures, the heat pump is supplemented by four 23-kilowatt air-to-water heat pumps. Additionally, the system has a 107-kW electric boiler as a backup.

"We built the solution offered to Koskienergia around an Oilon ground source heat pump, since the units have proven themselves as high-quality products with extreme reliability. Another thing we appreciate is Oilon's life cycle services. The unit will serve well for a couple of decades, and the end customer won't ever have to deal with potential problems alone," says Sami Päijänen from Lämpöpalvelu Oy, the overall heating system supplier in the project.

"If there is an issue, we have quick access to local support and service – in Finnish, of course."

The plant was in normal service during installation, which was a major challenge. To ensure safety, careful advance planning was required. As the site itself had a unique heritage, Lämpöpalvelu Oy paid special attention to the appearance and placement of recirculating fans and other visible equipment.

Ruotsalainen praises the end result in every respect.

"Now we can sell all the electricity we produce in the marketplace instead of wasting it on heating. I'd estimate that we'll save tens of thousands of euros every year. Additionally, this is a great boon for the climate, as the hydroelectric power we produce will hopefully replace energy produced by fossil fuels."

Oilon joins the world's largest corporate sustainability initiative



#UnitingBusiness

WE SUPPORT THE MISSION OF THE UNITED NATIONS GLOBAL COMPACT TO **MOBILIZE A GLOBAL MOVEMENT OF SUSTAINABLE COMPANIES AND STAKEHOLDERS TO CREATE THE WORLD WE WANT**

Oilon Group has joined the United Nations Global Compact Initiative – a voluntary leadership platform for the development, implementation, and disclosure of sustainable and socially responsible business practices. Oilon is proud to join the thousands of other companies globally committed to taking responsible business action to create the world we all want.

The UN Global Compact is a call to companies everywhere to align their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption, and to take action in support of UN goals and issues embodied in the Sustainable Development Goals (SDGs). Launched in 2000, the UN Global Compact is the largest corporate sustainability initiative in the world, gathering almost 20.000 corporations and organizations from more than 160 countries, and more than 70 Local Networks.

– Responsibility is one of Oilon's values and at the core of our business. Engaging in the UN Global Compact is a natural next step in our sustainability work. It is an honor to join this initiative and cooperate with the United Nations and this community in our way to more sustainable world, says Oilon Group CEO Tero Tulokas.

Participating in the UN's Global Compact initiative means that the Oilon Group undertakes to strategically promote the UN's sustainable development goals in its operations, and to report on its progress within a year of joining the commitment, and annually thereafter, following the UN's Global Compact reporting procedure.



The world's first carbon neutrally produced whiskeys are distilled using Oilon heat pumps

The unique zero-emission distillation process of the Irish Ahascragh Distillery has been implemented with a comprehensive system design applied from the process industry: at the core are Oilon's high temperature heat pumps, with which all the waste heat is put to use.

In the village of Ahascragh, about a two-hour drive from Dublin, there lies an over 200-year-old brick mill where grain was ground into flour from the early 1800s until the 1950s. Now, this magnificent historic building has been given a new life as the world's first carbon neutral whiskey distillery, which opened its doors in the summer of 2023.

'Distilling whiskey is very energy intensive: Each bottle of traditionally distilled whiskey produces 3-4 kilograms of carbon dioxide emissions. Now, we are proud to be able to offer consumers a whiskey alternative whose production has not harmed the environment,' **Gareth McAllister**, the owner of Ahascragh Distillery, says.

Unlike other distilleries in Ireland, heat is provided to the distillery through heat pumps which means that there will be no flue related emissions, or impacts on the local environment.



Almost 120-degree water for the process with the help of pumps

Ireland produces plenty of green electricity: In 2022, 34 percent of the country's electricity production (about 13.2 TWh) was wind power. Instead, thermal energy in the island state is still largely produced with fossil fuels. Even thermal energy used in whiskey distillation has traditionally been produced with natural gas.

'In Ahascragh, the heat needed for the process is produced by high temperature heat pumps instead of natural gas. The pumps are powered by wind-generated electricity. In this way, we have been able to get rid of fossil fuels and the process has become zero-emission,' McAllister explains.

Oilon has delivered two P450 series heat pumps and one smaller P150 heat pump to the distillery. P450 series pumps are capable of producing temperatures of up to 120 degrees, in Ahascragh the design temperature is 115 degrees. The pumps also use the latest refrigerant technology: they have a very low GWP value (Global Warming Potential).

Oilon's experience in process industry heat pump solutions was utilized in the project. The Irish company Astatine which specializes in carbon-neutral turnkey solutions was responsible for the overall design of the system.

Waste heat recovery and circulation, COP up

Two parallel processes work in the distillery: the actual distillation process where alcohol is alternately steamed and condensed in a closed circuit, and the automatic cleaning process of the equipment, which requires a significant amount of warm water.

'The total COP has been raised to an exceptionally high level by applying the operating methods of the process industry: heat pump technology is combined with process know-how, i.e., all generated waste heat is recovered with the pumps and utilized at another point in the process,' Astatine's manager **Tom Marren** says.

The heat pump design, heat recovery and thermal storage means that the energy inputs to the distillery are a third than that of traditional technology.

At the high temperatures of the P450 pumps, the distillation process itself is running. In this process the alcohol alternately vaporizes and condenses in a closed circuit. The pumps are equipped with separate heat exchangers which also produce lower temperature water for the washing process. The smaller P150 pump produces domestic hot water which can be used for additional cooling of the distillation process if necessary. 'Comprehensive system planning and combination of processes was crucial in terms of COP and, of course, reducing emissions. The total COP of the process is an astounding 6.5. In other words, for every kWh of electricity used by the heat pump, it generates 6.5 kWh of energy for use in the process. This level of energy efficiency is exceptional and it can only be reached by utilising the energy flows in the process optimally,' says Sales and Marketing Director **Sami Pekkola** from Oilon.



Big Coincidence at Small Finland in Brazil: Penedo and Oilon Collaborate for Sustainable Innovation

Penedo, Brazil – Penedo, affectionately known as “Small Finland” due to its unique Finnish heritage, has once again made headlines for its remarkable connection with Finland. The town belongs to Itatiaia municipality, in the Southern of Rio de Janeiro state, and is very known as a touristic city, specially during the winter when the weather is colder than other places as it is located in a mountainous region. The town, in an unexpected turn of events and a “Big Coincidence”, as very nearby the city of Penedo, a Finnish company, Oilon, have joined forces to implement an innovative solution that will have significant environmental benefits.

Oilon, a renowned Finnish energy technology company, has provided a cutting-edge solution to an automotive industry company located just 2 kilometers away from Penedo. The solution aims to decarbonize the heating process of the manufacturing plant, resulting in substantial energy savings and a remarkable reduction in carbon dioxide (CO₂) emissions.

By implementing Oilon’s solution, the automotive industry company expects to save more than 3.5 gigawatt-hours (GWh) of energy annually, which is more than 75% energy savings. This significant reduction will not only contribute to cost sav-

ings but also have a positive impact on the environment. The estimated decrease in CO2 emissions amounts to a remarkable 884 tons per year, further emphasizing the project's environmental significance.

The forerunner solution consists of using a water-to-water heat pump to produce heating to the process. This heating is generated by electricity and as heat pump produces much more useful thermal energy than its consumption the solution has 2 straight and relevant impacts: energy and CO2 emission savings. Oilon ChillHeat is taking the energy from the cooling tower, which was being used to waste some residual heat from the company's chilling process. This heat was completely wasted to the environment. Instead of that, now heat pump is taking this heat and using as the main heat source to produce hot water up to 75 Celsius degrees using 75% less energy consumption. Moreover, now the energy input to Oilon's CHill-Heat heat pump is the electricity – which is by the way net zero carbon electricity as it comes from only traceable renewable energy – where before the heating source for this process was a conventional steam boiler with natural gas.

Replacing the natural gas by electricity, the company can save about 200 Kg of CO2 emissions per each megawatt-hours (MWh) of energy production and also reduce energy consumption to this process in about 750 kilowatt-hours (kWh) per each produced heating megawatt-hour (MWh). As a result of energy savings, the operational cost for this heating process has strongly reduced, generating a saving higher than 50% on the conventional heating operational costs with steam boiler, leading the solution to a very short ROI (Returning of Investment) time.

"Oilon ChillHeat solution is the unique solution where can generate up to 9 or even 10 thermal useful energy units and due to that can align cost reductions and decarbonization in the same package, removing the onus from the conventional heating sustainable packages where do reduce the CO2 emissions, but increase the operational costs. In this project we are producing almost 8 thermal useful energies counting cooling and heating using only one electrical energy input. Apart from heating saves our solution is also providing relevant savings for the cooling process, as Oilon ChillHeat has absorbed a relevant workload from the cooling tower system, reducing the electricity consumption and also water evaporation losses on these resources" says **Marcus Libanori**, Oilon South America leader and also responsible for this project since sales process up to startup and commissioning.

The collaboration between the company located in the most influence town in Brazil by Finnish culture and Oilon serves as a testament to the power of international partnerships and sustainable innovation. With Penedo's Finnish heritage and its reputation as "Small Finland," the district has now a new connection with the Finnish culture.

This groundbreaking initiative demonstrates global market commitment to sustainability and aligns with global efforts to combat climate change. The adoption of advanced technologies from companies like Oilon showcases the industrial sector determination, specially the automotive one, to embrace

cleaner and more energy-efficient practices.

Being the first automotive company to have praised the partnership with Oilon, highlighting the project's potential to inspire other companies in the region and the sector to follow suit and adopt similar environmentally friendly solutions. By showcasing the benefits of sustainable practices, the company hopes to encourage a broader shift towards cleaner technologies and a greener future.



"We first developed contacts with customer's engineering staff to show the huge benefits of Chillheat solutions couple of years ago. After the customer's technical team visited one of our ChillHeat units in operation since 2019 they better understood the high efficiency and reliability of our machine and after that relevant visit the purchasing decision was taken" says **Eduardo Kubric**, Oilon dealer who has started and leaded this process since 2019.

As the news spreads about this remarkable coincidence between "Small Finland" and the Finnish company Oilon, Penedo's reputation as a Finnish hub continues to grow. The collaboration serves as a shining example of how global connections can lead to local transformations, helping communities reduce their carbon footprint and contribute to a cleaner planet.



Oilon delivers low NOx combustion equipment to a pioneering 1400 MW district heating project in Kazakhstan

Oilon is delivering 20 low NOx burners to a massive district heating project in Astana, the capital of Kazakhstan. Two large district heating plants with a heating power of 700 MW each will be serving new advanced residential areas of Astana, called Telmana and Turan.

The identical plants, which use natural gas as their primary fuel, will each host ten Oilon ACE burners.

"This deal is the largest for us in Central Asia to date and we see it as just the beginning," says **Taras Golub**, Sales Director at Oilon.



"This pioneering project is a great example of how the government is investing in regular people's lives. The new district heating power plants will be an important step towards a more environmentally-friendly way of keeping citizens warm and improving air quality."

Positive and significant market outlook in Central Asia

The continental climate in Astana brings winter temperatures as low as -30°C or -40°C. Previously, the heating solutions in the city, which has a population of 1.4 million, were very localized and fossil-fuel based, relying on light fuel oil and heavy oil that resulted in high emissions and poor air quality.

Now, Astana is taking a lead in investing in gasification, and smaller cities are likely to follow. A major driver for energy technology improvements in this former Soviet market is their newly formed government with a new, more western-oriented approach to politics and a focus on improving the quality of life for citizens and allocating resources to support this goal.

"Kazakhstan is contributing to the green transition, applying the most stringent European and North American emission level standards. Along with high performance, clean combustion was a top priority for the client, and the burners' emission levels are well below the European standards", says Golub.

"This pioneering project is a great example of how the government is investing in regular people's lives. The new district heating power plants will be an important step towards a more environmentally-friendly way of keeping citizens warm and improving air quality."

Fuel flexibility and low emissions

Oilon's delivery includes three types of ACE burners: models GT-70A, GKT-70 A, and GT-90 A. ACE burners can typically reach NOx emissions as low as 60 mg / nm³ and adding flue gas circulation NOx can reach emission levels as low as 30 mg/nm³.

"Along with low emissions, Oilon ACE burners have a high capacity and performance, making them a great reference case for us in this market. They are also fuel-flexible, with natural gas as the primary fuel and the ability to use light oil as a secondary backup when needed," explains **Anton Spiridonov**, Regional Director at Oilon.

In addition to the 20 low NOx burners, the delivery package also includes the designated combustion air fans and automation.

"This case is a great example of our ability to provide clients with a 'full package', including not only the burners but also the related equipment and software," says Spiridonov.

Oilon's entire delivery will be ready by the end of this year, with the entire boiler plant project estimated to finish in 2025.



Emergency services station utilizes reliable ground source heating from Oilon

In spring 2022, Hollola's decision-makers had to face some cold facts. It was only five years since the Finnish municipality's new emergency services station had been completed, and now the compressors in both of the station's ground source heat pumps had broken down. To make things worse, the warranty period had just expired.

"When we started investigating the problem, it was revealed that the compressors in the heat pumps represented new, experimental technology that promised much but delivered little in practice. We weren't alone with this problem, and there weren't any spare parts available for the equipment any longer. As the manufacturer couldn't come up with a satisfactory solution for the problem, we were forced to start tendering for new ground source heat pumps," says **Arto Nuuttila**, the property manager for Hollolan Tilapalvelut Oy.

Oilon's ground source heat pumps came out as the winner of the tendering process. The heat pumps stood out not only due to their competitive pricing but also their reliable and well-established technology as well as the excellent reputation of HC-Systems Oy, the company responsible for system installation. What finally decided the matter was that the products were already at hand, as the heat pump sector continues to be plagued by component shortages due to high demand and the COVID-19 pandemic.

"We could thank our lucky stars with this delivery. We had a couple of Oilon RE84 heat pumps in stock, and they fit the project perfectly. As the project involved an important public utility, we were prepared to stretch our resources and reserve the products for Hollola, even when the municipal decision-making process did take some time," says Oilon's Sales Manager **Simo Ruusunen**.

"The installation project comprised removing the old equipment and installing new heat pumps. When we started investigating the site, we noticed that there were problems with the original installation. These were fixed when we installed the new products. We optimized the system by adjusting flow rates and through similar means. This project is a good example of our operating philosophy: instead of adopting a narrow-minded approach and doing just what was ordered from us, we focus on ensuring the reliability and energy-efficiency of the entire system," says **Henri Rämänen**, the CEO of HC-Systems.

The end result is a system that provides the emergency services station with heating and cooling exactly as it was originally intended to. There is plenty of hot water available, and the feedback from end users has been positive.

"I'm more than happy with how the project was handled. We were in a tough spot, and both Oilon and HC-Systems were prepared to be flexible and, at the same time, provide excellent customer service. Another thing we like about the new units is that they could be integrated into our building management system. For us, it is important that we can monitor system operation remotely," Nuuttila says.

"HC-Systems installed two 84-kW Oilon RE84 ground source heat pumps. This is a reliable and popular solution for energy-efficient heating and cooling in medium-sized and large buildings. Up to 16 Oilon RE units can be joined together for a maximum total capacity of 768 kW. An RE84 heat pump has two compressors, providing an excellent capacity range and fault tolerance. The advanced Economizer EVI function provides outstanding performance for our RE ground source heat pumps. This means more heating and hot water for the end user with top-rated COP," Ruusunen says.





Oilon's 92 per cent environmentally friendly burner portfolio

Oilon organized an internal investigation into the sustainability of the company's burner products. The primary starting point was the EU taxonomy, which sets requirements for investments that support sustainable development. The results were impressive: as many as 92 per cent of the company's burner products met the criteria.

One of Oilon's primary goals is to be a leading manufacturer of clean combustion technology. The company allocates more than 6 per cent of their turnover to product development. In recent years, Oilon has invested heavily in heat pump technology. However, clean combustion products continue to play a critical role in Oilon's business.

"In the future, a substantial portion of combustion will be replaced by electricity-based technology, such as heat pumps and electric boilers. This is especially true in low-temperature applications," says Oilon Group's Chief Technology Officer **Joonas Kattelus**. There are still many applications where combustion is necessary. In ships and planes, for example, fuels are an excellent way to store energy. They can also be used to balance out the supply and demand for heating. In such applications, replacing fuels exclusively with batteries is not sensible. Correspondingly, process and industrial applications will continue to require the high output temperatures provided by combustion technology far into the future.

Fuel is the single largest factor

As a rule, gaseous fossil fuels generate lower emissions than liquid fossil fuels. When fired, fuel oils release not only CO₂ but also sulfur dioxide, nitrogen oxides, and various particulate emissions, such as soot. Compared to oil, natural gas burns extremely cleanly. It has zero sulfur dioxide and soot emissions.

According to Kattelus, the majority of the company's portfolio was recognized as sustainable. This included all products that fire sustainable fuels, traditional and low-NO_x natural gas burners, as well as start-up and support burners delivered to waste incineration facilities and plants that utilize biofuels.

"This breakdown was based on the idea that if we replace coal combustion with natural gas in China, for example, we achieve a massive one-off reduction in NO_x, particle, and CO emissions." Kattelus estimates that coal combustion generates roughly twice as much CO₂ as firing natural gas.

Like any fossil fuel, natural gas combustion does produce CO₂ emissions, which increases and intensifies the greenhouse effect. According to Kattelus, Oilon has managed to reduce the other emissions to such a low level that combustion itself is extremely clean.

Russia's war of aggression against Ukraine has dramatically change the global energy landscape. This shift speaks for phasing out natural gas as an energy source. The idea is further supported by the fact that renewable fuels typically have smaller CO₂ emissions than fossil fuels.

"Currently, governments around the world are especially interested in hydrogen. Hydrogen can be produced through electrolysis with sustainable electricity, such as wind power. In this application, it serves as a form of energy storage,"



In this application, it serves as a form of energy storage,” Kattelus says.

From the combustion standpoint, hydrogen is clean, as its combustion product is water. However, hydrogen burns very intensely and with a hot flame. The hotter the flame, the more harmful nitrogen oxides, or NOx compounds, are formed. In Oilon ACE burners, NOx emissions are minimized with combustion air and fuel staging, which results in a wide, cool flame. Additionally, the flue gases generated during combustion are directed back into the flame inside the boiler, further cooling down the flame.

Hydrogen is not a foolproof solution. Current infrastructure is unsuitable for hydrogen storage and transportation without extensive retrofits, and hydrogen requires additional attention to safety. One alternative to clean hydrogen is synthetic methane made from hydrogen. Methane has almost exactly the same properties as natural gas, which allows it to be used directly in current systems. Hydrogen can also be used to produce ammonia, which is completely free of CO2 emissions. Ammonia is not without its problems: it is toxic and has high NOx emissions.

“Operators in Far East seem to be especially interest in ammonia. In Japan a South Korea, people are investigating new solutions,” Kattelus says. In large coal plants, ammonia is seen as a fuel of the future, and many boiler manufacturers have already asked if their boilers could be converted to ammonia use.

Adopting renewable fuels requires investments. According to **Tapio Murtonen**, Oilon’s Chief Business Officer , if you want to use another fuel in an Oilon industrial burner, a new burner is typically required. In process and power plant burners, a less extensive retrofit is required.

“In a typical retrofit project, we will install the necessary fuel lances and valve units and make some adjustments to the automation,” Murtonen describes.

Achieving circular economy and protecting the environment

In industrial operations, a large portion of the side steams still goes to waste. It used to be commonplace to get rid of challenging process-based fuels through flaring. This is no longer always the case, as the interest in alternative fuels and utilizing waste energy has increased due to increasingly stringent emission standards and rising energy prices.

“Initially, gases would be released to the atmosphere, then flaring was invented. The energy was lost in the winds, but the emission levels dropped. In modern solutions, the gases are fired in a boiler, allowing companies to recover the energy contained in the gas,” Murtonen says.

The more process industry side streams are harnessed, the more the range of available fuels will increase. Already today, Oilon delivers burners for various challenging fuels, such as the blast furnace gas and coke oven gas generated by steel production. Additionally, the company has decades of

experience in oil refinery and process industry gases.

"The fuels produced as a byproduct are not always uniform, and the inlet pressure can fluctuate. We need to design the equipment so that variance is under control. This requires different sensors, regulators, and special automation solutions," Kattelus says.

According to Kattelus, pyrolysis oils have recently started to generate renewed interest. After the early 2000s, they were dismissed as too challenging to be used as a fuel. Being acidic, pyrolysis oils would corrode components, and their properties could suddenly change, clogging fuel lines. There is some indication that the latest pyrolysis oils have better properties. The PH value is still low, which means that the components must be made of acid-proof steel.

Oilon burners are also used in fluidized bed boilers as start-up and support burners. These boilers are used for firing biofuels and for producing energy from municipal waste left over after recycling and reuse.

"Fluidized bed boilers, which are most often used to fire woodchips and similar biofuels, were recognized as sustainable. The boiler is first heated up to 850 °C with start-up and support burners, after which biomass or municipal waste is fed into the boiler," Murtonen says.

For many types of hazardous waste, incineration is the only reasonable disposal option. In hazardous waste management facilities, gases and liquids are fired with special burners. Part of the waste is fed past the burners into the boiler, where it is incinerated safely. This way the hazardous waste can be prevented from harming the atmosphere, waterways, and terrain.

The last eight per cent – a problem or an opportunity?

Oilon still produces burners that do not meet the criteria for sustainable development. The last 8 per cent of the portfolio consists of heavy oil burners and light fuel oil burners, which are primarily used by the marine industry.

"Burners that use only oil as a fuel account for a relatively small portion. For the most part, the products are gas and gas/light fuel oil burners," Murtonen says. In the long run, Murtonen believes that the share of oil burners will decrease even further, as marine regulation becomes more stringent every year. When discussing future fuels in the marine industry, three candidates rise above the others: ammonia, synthetic methane, and synthetic methanol.

"The marine industry is looking for new solutions. We have some methanol projects underway as well. We have started discussions with classification societies, exploring what kind of equipment and safety systems will be required. Additionally, we've started development initiatives with some of our customers," Murtonen says.

"Methanol is an option that seems to pop up frequently," Kattelus confirms. "It is a good renewable fuel: a liquid fuel that doesn't need to be pressurized, which simplifies logis-



tics. In many respects, methanol is similar to light fuel oil, which means that our current technology can be used with relatively minor modifications.”

Methanol is a forest industry side stream and a byproduct of biodiesel production. It can be produced from biomass, hydrogen, and fossil sources. Regardless of the source, methanol has substantially lower emissions than traditional fossil fuels.

In land-based applications, biodiesels have proven to be an excellent alternative to traditional fuel oils. According to Kattelus, the properties of the Finnish Neste My biodiesel are so close to traditional fuel oil that it can be used with current technology and, at the same time, reduce the plant’s emission levels. In Oilon burners, you typically only need to replace the flame detector to make the entire burner range compatible with biodiesel.

The best burners in the world are made for real-world conditions

Oilon uses computational fluid dynamics (CFD modeling) as part of the product development process. The company’s experts create digital prototypes and simulate burner operation before building a physical prototype.

Increasingly stringent emission ceilings require extremely careful engineering and extensive testing. With CFD modeling, Oilon can simulate dozens or even hundreds of different burner geometries before creating the first prototype.

Antti Hämäläinen works as a product developer at Oilon. One of his main jobs is to test Oilon ACE burner products.

“We make countless changes to the prototype. It’s not often that the burner is completely ready after CFD,” Hämäläinen says. “When we test our products, the goal is to get the conditions as close to those at the customer’s plant. We have a lot of different boilers, and we always select the one that is closest to the customer’s boiler.”

The product developers draw fuel lines to the burner and build the required automation. Air temperature, humidity, and pressure all influence the combustion process. There are numerous other factors, some of which can be impossible to take into account. This makes feedback from the field worth its weight in gold.

“The situation at the customer site can change rapidly,” Hämäläinen says. “Here at Oilon we can do almost anything, but the personnel on the field do not have a toolbox that would allow them to fiddle with the tiniest details. This is why we test different settings in several furnaces, making sure that the product is ready. The goal is that you can simply bolt the unit to the boiler and press start. If there are problems, we will recreate the conditions as closely as possible at the lab and troubleshoot the problem through testing.”

Installation sites and customer needs vary greatly, and there have been some surprises over the decades. Mechanical Engineer **Jarmo Haverinen** reminisces about problems

caused by unusual transportation arrangements. In one case, burners were attached to boilers already at the customer’s factory. The burner-boiler combinations were taken to the installation site by truck, and some burners became damaged during transit. Once the issue was identified, the customer could be advised on how to support the burners, avoiding damage to burner flanges.

Ignition problems are another topic about which Oilon collects data from the field. Practical experiences have shown that careful testing is essential. When the production of a certain ignition transformer ended, the company had to find a replacement as quickly as possible. At the customer site, it became apparent that the new component had a lower ignition current, which caused problems with long ignition cables. The issue was corrected and Oilon learned a valuable lesson.

“We perform so much testing at the lab that the machine is fully operational and ready for use. We perform tests upon tests and run the machine in all possible combinations. The final product looks completely different from what we started off with. That’s what product development is all about,” Hämäläinen concludes.

Standardized products ensure availability

Murtonen agrees that it is essential to make sure the products are ready for use. Even though performance and emission levels are a priority, reliability is what serves as the foundation.

“The burners must be reliable, which means that they need to be robust and ready to use at all times. In a word, the burners need to have an excellent availability,” Murtonen says. Another significant factor is the burner capacity range. Steam boilers, for instance, require a wide turndown ratio.

Installation sites and applications vary greatly. Burners used in marine environments and those using corrosive fuels need to be corrosion-proof. Luckily, customers can anticipate their future needs – an important consideration, says Murtonen, as a burner will serve the customer for around 25 years.

The decrease in natural gas availability in Europe generated strong demand for dual-fuel burners and other alternative burner solutions. Increasingly often, customers select a product with minimal emissions, and oil is no longer viewed as a sustainable solution.

“What sets us apart from the competition is that we achieve the lowest emissions in the world with good efficiency and low residual oxygen,” Murtonen says.

For example, Ultra Low NOx burners based on pre-mix technology can achieve emission levels lower than 2.5 ppm (5 mg/Nm³). Even with their top-tier performance, the burners are easy to maintain and install. The bulk of the technology is the same as in traditional burners.

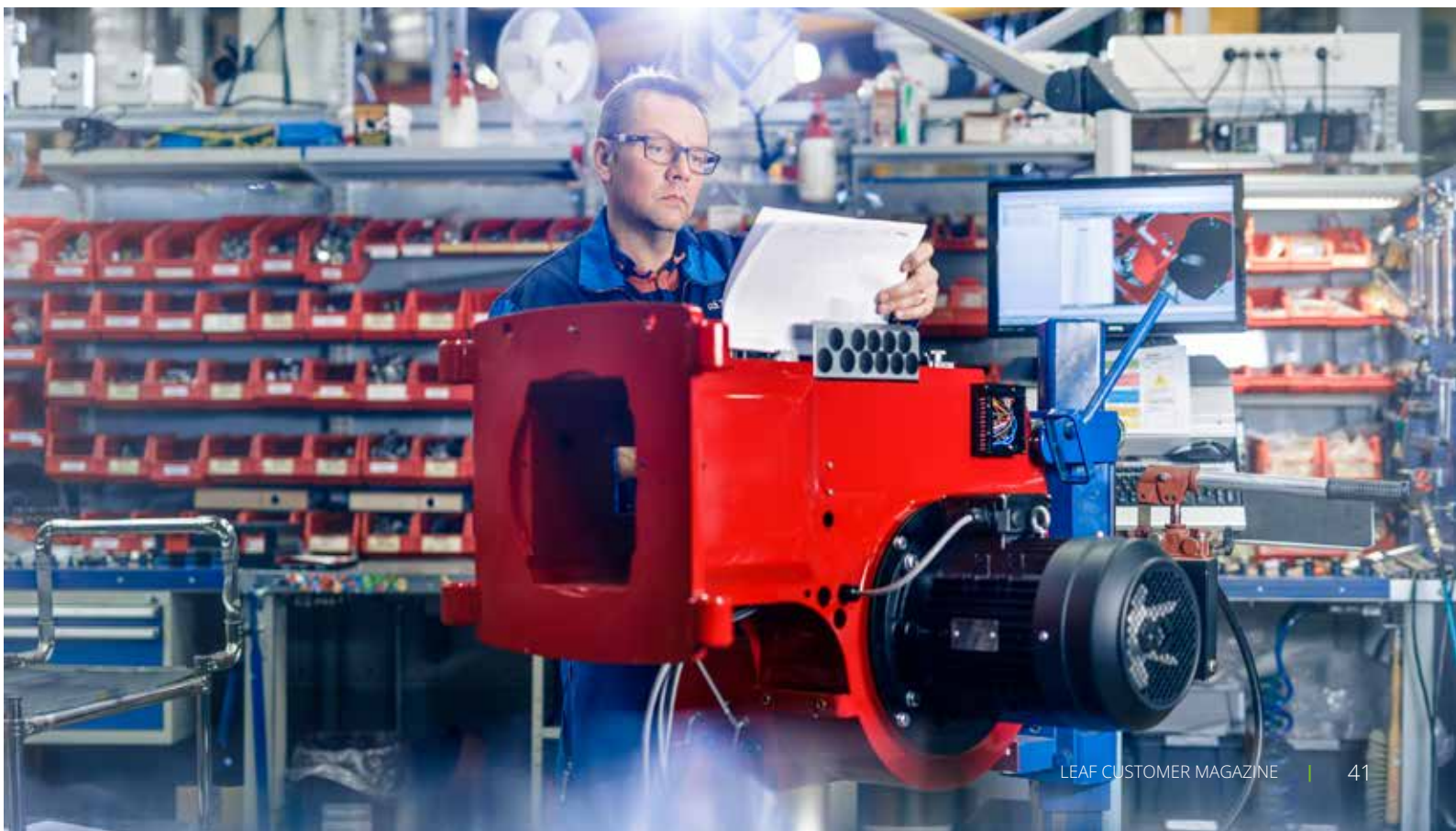
Adapting clean combustion technology to varying conditions requires balancing out countless factors. However, since the

products are standardized, planning out a system takes little time, and stable performance is guaranteed. According to Murtonen, the customer simply indicates the emission requirements, and a suitable burner is selected based on this information. If the customer needs an Ultra Low NOx burner, for instance, there will be no additional work involved.

“Power plants may require solutions with multiple burners. In these projects, we need to consider burner placement, meaning how the burners should be located on the boiler walls for optimal emission performance,” Murtonen describes. “Oilon’s team of experts will handle this and find a solution by selecting the burners and the necessary automation. Once this is completed, the delivery proceeds as usual.”

Oilon’s product selection promotes circular economy. The company’s burners can be used to produce clean energy and harness side streams. Oilon industrial heat pumps, in turn, allow operators to use the produced heat more efficiently and utilize energy that would otherwise be evaporated into the atmosphere.

In the future, more electricity-based sources will be used, decreasing the share of combustion technology. At the same time, in light of ever-tighter emission standards and the expanding range of clean fuels available, there will be a need for increasingly versatile combustion solutions. Sustainable burner solutions and systems based on renewable energy complement and support each other.





Posti's new logistics center utilizes Oilon ground source heat pumps

In October 2023, Posti opened a new regional terminal that serves as a hub for mail and parcel delivery. The terminal serves each of the about 150,000 postal customers in and around the city of Mikkeli. The terminal building utilizes ground source heating installed by JP-Yhtiöt Oy.

JP-Yhtiöt Oy is part of the Quattro Mikenti group, one of the largest building system specialists in Finland. The heat pumps used in the project came from Oilon.

"We have always been extremely happy with Oilon products. Additionally, we knew that a standard solution wouldn't do here, and it turned out that we did need Oilon's expertise and support in system design. This has been a very significant project for us," says **Joonas Halinen** from JP-Yhtiöt. The terminal heating system is powered by two heat pumps,

RE96 and RE33, with a combined capacity of 129 kilowatts. The heat pumps are used to heat a 1,500-liter buffer tank that serves radiator circuits and fan convectors.

"Additionally, the heat pumps are used for heating a 500-liter domestic hot water tank that provides hot water for the personnel," Halinen says.

Engineering support and hands-on help for site personnel

Each day, a large number of freight trucks bring mail and parcels to the terminal and leave with a new load. The terminal features around 15 loading bridges with huge roll-up doors.

"Naturally, we equipped the loading bridges with deicing equipment to prevent them from becoming life-threateningly slippery. Additionally, we installed fan convectors, or, air curtains at the roll-up doors. In cold weather, when a door opens, they'll start blowing hot air. This prevents cold air from creeping into the bay. This is the kind of thing that needs to be considered when designing a heating system," Halinen says.

Unlike a typical building, the terminal has a complex heating system with several different adjustable circuits: radiator circuits, ventilation, loading bridge de-icing equipment, fan convectors for roll-up doors, and ground source cooling. To ensure energy efficiency and smooth operation, each circuit must be integrated into the overall system in a smart way.

"When you have different heating circuits, ground source cooling and so on, you need a partner that can help with connection diagrams and connection work when need be. In these kinds of big projects, it is a definite plus to have support and safety only a phone call away and, if need be, even hands-on help at the site," Halinen says.

The Oilon team is also extremely happy with the long-standing co-operation with the company. This project was no exception. Oilon's Sales Manager **Mikko Laaksonen** can only praise JP-Company's expertise both in this project and overall.

"We really appreciate the kind of long a customer relationship that we have with JP-Yhtiöt. They are a reliable contractor, and over the years, co-operation has always been smooth and professional, just like in this project. It was a pleasure to be part of it," Laaksonen says.



Fortum to select Oilon as the heat pump supplier for heat recovery from a major data center complex

In the future, Oilon heat pumps will recover waste heat from a large data center complex and convert it into emission-free district heating for a city and two other communities in the Helsinki metropolitan area. This will be the largest system for recycling waste heat from data centers in the world and the largest delivery contract in Oilon's history.



Microsoft is building a data center complex in the Helsinki metropolitan area. Fortum, Finland's leading energy company, will recover the waste heat from the complex and reuse it for district heating. This will be the largest project for recycling waste heat from data centers in the world.

Oilon will supply Fortum with the industrial heat pumps required by the heat recovery system's two heat pump plants. For Oilon, this is the largest delivery in the company's history.

"The delivery is valued at approximately EUR 15 million. This project is a true testament to our ability to provide large-scale solutions and support our customers in the green transition," says Oilon's CEO **Tero Tulokas**.

Fortum is a forerunner in reducing CO2 emissions from energy production and aims at reaching carbon neutrality by 2030. The company continuously seeks out and implements the best and most cost-effective ways to break free from using fossil fuels for heating production. In this, heat pumps have a vital role to play.

"In the future, district heating networks will increasingly serve as a platform for recycling energy, allowing stakeholders to utilize different heat sources and energy streams. Heat pumps make this all possible. In this project, for example, cooling the data centers will inevitably generate waste heat, and this technology will allow us to recycle that heat," says **Thomas Ekholm**, head of energy solutions, Fortum Finland.

Record-breaking coefficient of performance from energy recycling

Fortum's two heat pump plants will be equipped with a combined heating and cooling solution, CHC for short. The heat pumps will provide cooling to the data centers, recover the waste heat generated, and transfer the recovered energy into the local district heating network. In other words, the plants produce heating and cooling at the same time.

"By recycling energy streams effectively, we can achieve outstanding coefficient of performance values. The total COP of the system is 6.6, which means that for each unit of electricity, the heat pump generates 6.6 times as much energy for heating and cooling," says **Jussi Alpua**, Oilon's sales manager responsible for industrial heat pumps.

Oilon will deliver several S series heat pumps for both heat pump plants. Each unit weighs as much as 10 cars, or around 15,000 kg. Each plant has an output temperature of 85 °C. Together, the two plants will produce nearly 40 MW of district heating.

The first heat pump plant is currently being built in Kirkkonummi, and the first heat pumps will be delivered to the site in early 2025. The Espoo project will follow a half year later.

At full capacity, the waste heat recovery system will produce enough emission-free district heating for 100,000 customers. This accounts for 40 per cent of the 250,000 district heating customers in Espoo, Kauniainen, and Kirkkonummi. For Fortum, this means a permanent CO emission reduction of up to 400,000 tonnes per year. Furthermore, the two heat pump plants will correspond to more than 1% of the emission reduction required for achieving Finland's carbon neutrality target.

Internationally significant project

Finland's ambitious carbon neutrality target sets Finland at the forefront of EU countries. As Finland's leading energy company, Fortum is now providing a persuasive practical example of how the target can be reached – in a project utilizing Oilon technology, no less.

Traditionally, heat pumps have been seen primarily as a means of making heat generation more efficient in industrial applications and energy production. In recent years, the trend has started to shift towards using heat pumps also as a primary method of energy production on a wider, industrial scale.

"From a technological standpoint, the big thing is that we've created a powerful overall solution by utilizing a combination of several heat pumps. This provides an extremely wide operating range, allowing the system to respond to process requirements, especially the varying need for heating and cooling, in a flexible and accurate way. By connecting some of the heat pumps in series, we can utilize staged heating and cooling production. This provides an excellent coefficient of performance across the entire capacity range," says **Martti Kukkola**, Oilon's chief business officer for industrial heat pumps and chillers.

According to Kukkola, this project is a great example of combining two trends: electrification of energy production and recycling energy by utilizing waste heat. The project is extremely interesting not only from a national standpoint but also at the international level.

"Large global companies are keeping an close eye on what we do to achieve carbon neutrality in energy production here in the northernmost reaches of Europe. This reference case will open many doors for Oilon in the international market, providing access to increasingly large projects. In the future, heat pumps will play a bigger role not only in the global marketplace but also in Oilon's business," Kukkola says.

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ChillHeat industrial heat pumps and water chillers

Capacity range: 60–5,000 kW



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Ground source heat pumps

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