



Nevel business white paper

# The journey to future-proof industrial infrastructure

Digital solutions are becoming increasingly valuable tools in the drive to improve efficiency, minimise waste and cut costs in industrial energy production and by-product management. Industrial sidestreams such as energy, water, cooling, heat and waste provide opportunities to enhance economies of scale. In this business white paper Nevel shares insights into the role of digitalisation and new competences in energy transformation. We also provide an overview of our working model, which has already proved successful in both creating closed-loop factories and generating cost savings.

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## New technologies and ways of working will create opportunities for next-level utility infrastructure

In today's business landscape, industrial companies are strongly focused on improving sustainability and protecting the environment – while simultaneously maintaining competitiveness. More environmentally friendly behaviour often goes hand in hand with cost efficiency as more efficient use of resources – as well as taxation and emission allowances – drive sustainable decisions. In practice, improving sustainability means some form of circular economy, where resources are not consumed unnecessarily, even if they are renewable, and everything is reused or recycled.

Digital solutions and machine learning are becoming increasingly valuable tools in the drive to improve efficiency, minimise waste and cut costs.

This is why some industrial companies have developed concepts for “green” or “closed” factories, where the goal is to become CO<sub>2</sub> neutral. These concepts cover the entire sustainability value chain – water, waste, sidestreams and energy – and aim to identify efficiencies and fully reuse resources, generating only products and no waste.

These drivers are changing how industrial infrastructure solutions are planned and delivered. In the long term, the increasing focus on sustainability means fossil fuels are likely to be phased out and new technologies and ways of working will open up opportunities to improve resource efficiency and create more circular economies.

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For example, Sandvik Coromant, a Swedish supplier of cutting tools and services to the metal cutting industry, has reduced the use of heating oil at its factory in Gimo by almost 70% and reduced carbon dioxide emissions to almost zero in partnership with Nevel. With no need for fossil fuels, the factory is not burdened with oil taxes, and maintenance costs have been reduced since oil boiler safety is no longer a concern. Furthermore, the new solution has also freed up equity for the company's core business activities.

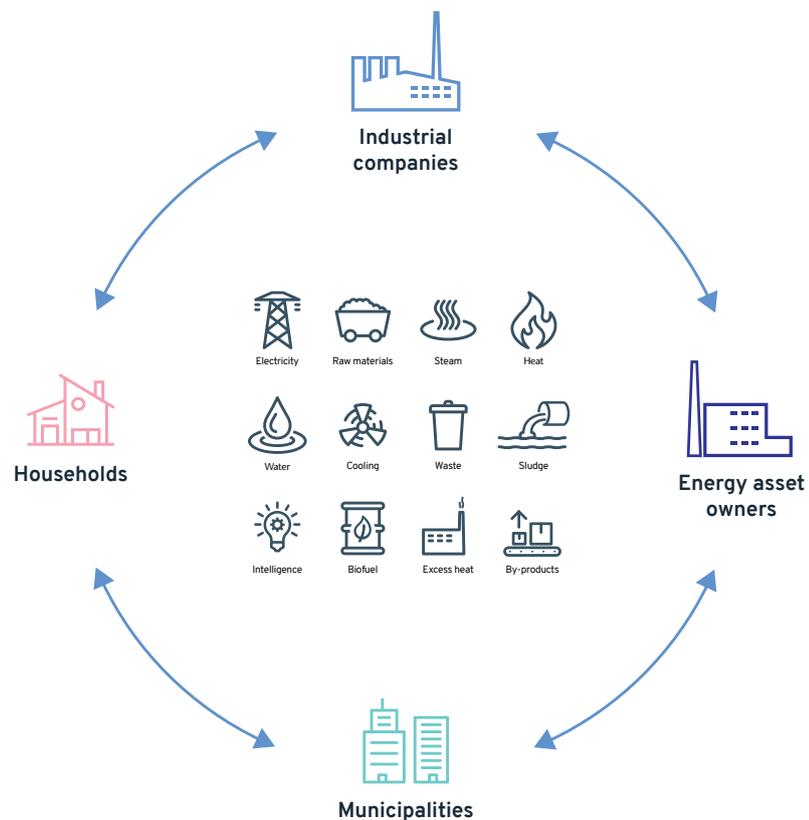
Another case in point is Fazer's confectionery plant in Lappeenranta, Finland, where the new heat and steam plant built by Nevel supplies more environmentally friendly heat and steam. The new plant uses low-emission natural gas but is designed so that biogas can be used in the future to further improve sustainability.

## Gaining a competitive edge through increased resource efficiency

Improving resource efficiency is a simple way to impact the bottom line while also complying with regulations and meeting sustainability demands. Optimising energy, material and information flows enables the creation of local ecosystems that not only benefit each stakeholder, but society as a whole. Industrial sidestreams such as energy, water, cooling, heat and waste provide opportunities to enhance economies of scale both within and between sectors – for example between industries and municipalities – and realise mutually beneficial synergies.

For instance, Nevel has helped Sandvik Coromant to recover and transfer residual heat from one part of its Gimo plant to another. By using what would previously have been wasted, greenhouse gas emissions have been reduced by up to 1,850 tonnes per year, equivalent to the annual emissions of 1,200 cars.

Another example can be found in Utajärvi, Finland, where the Kinnusen Mylly oat mill, the municipality of Utajärvi and Nevel have jointly developed an efficient way to benefit from various cross-sector opportunities while also producing carbon-neutral energy. Nevel's heat plant produces energy for the oat mill and a nearby feed mill as well as district heating for the municipality of Utajärvi. All the energy is produced from oat hulls recovered during milling, creating a local circular economy supply chain.



*Energy, material and information flows form a platform economy where industrial and municipal cooperation enables economies of scale.*

Working together, the goal is to build a future-proof infrastructure that improves business performance while minimising emissions and waste, responding to the desire for a carbon-negative future. It's a future in which companies, whatever they produce, can operate closed-loop factories that manage energy and material flows in a way that eliminates waste by reusing or recycling inputs.

In practice, this means improved material and energy efficiency combined with increased use of renewable energy sources and advanced technology. Combining modern technology with high levels of automation and machine learning will open up even more opportunities in the future. But developing and providing these kinds of new services and operating models requires new ways of working and the right expertise.

In order to take maximum advantage of all these opportunities, industrial companies should waste no time in starting to map out the infrastructure development and investment required for an energy-optimised and resource-efficient future.

## Digitalisation helps take utility infrastructure optimisation to the next level

Smart utility infrastructure management is a mixture of digitalisation, automation and human intelligence; the key is to find the right combination to meet individual business needs and take operations to the next level.

Implementing digital technologies – like data analytics to optimise operations and reduce costs, and machine learning to analyse and respond to trends – can lead to new business opportunities and improved profitability.

A sophisticated digital operations and maintenance platform provides the opportunity to digitalise both production and offsite operations. Based on centralised data and analytics, the digital operations and maintenance platform gathers all the data needed to support business decisions, bringing significant synergy benefits along with direct cost savings.

A key enabler for efficiency is data transparency. When raw process data is sent to a cloud-based digital operations and maintenance platform, it can be analysed, filtered and enriched with the help of machine learning to enable decision making based on agreed KPIs. This facilitates improved production planning and streamlining as well as higher quality reporting. Once refined, the data enables improved management and control. With better access to information, energy and material flows can be optimised to reduce emissions, residual products and waste.

When automation is controlled by machine-learning models and machine intelligence, human error and performance variations between shifts are eliminated. And since data is constantly being collected and analysed, site operators have a much better understanding of what's going on, leading to better decisions and improved efficiency. Potential problems can also be spotted in advance and preventive maintenance undertaken to avoid expensive downtime. The result is less ad-hoc maintenance and more time for planning and development.

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As the importance of data and automation grows, data security is vital to ensuring business continuity. Malicious cyber-attacks are a risk that need to be planned for in order to minimise any disruptions to business. Though no personal data is handled with industrial infrastructure, site data still needs to be handled confidentially and in a way that ensures the availability of all services. This requires a redundant server platform and backup components and systems as well as continuous risk analysis and mitigation efforts.

Nevel has positive experiences of increasing efficiency through digital operations from its own operations.

With the Nevel Remote operations and maintenance platform we have been able to optimise the combustion process based on data and reduce residual oxygen levels, CO<sub>2</sub> and NO<sub>x</sub> emissions. Higher energy efficiency and changes in the operational model have enabled annual OPEX savings of EUR 600,000.

The Nevel Remote operation service was fully implemented at one of our own plants in Forssa, Finland, in 2017. The combined heat and power generation capacity of the power plant is 66 MW. We have fully implemented the digital operations and maintenance platform with the most sophisticated digital technology available. The site is operated 24/7 from our remote operations centre and we use machine learning to optimise plant operations. Employees at the plant work normal working hours and are primarily focused on preventive maintenance work. With the Nevel Remote operations and maintenance platform we have been able to optimise the combustion process based on data and reduce residual oxygen levels, CO<sub>2</sub> and NO<sub>x</sub> emissions. Higher energy efficiency and changes in the operational model have enabled annual OPEX savings of EUR 600,000.

While IoT and automation reduce the number of man-hours in production, they also require new competences. In the energy sector, the estimate is that 44% of work can be automated (source: McKinsey Global Institute, A future that works: automation employment and productivity). But what does this mean in practice?

Antti Salmi, Manager, Automation and Analytics at Nevel, explains, “I manage the entire Nevel Digital operations and maintenance platform, covering dozens of sites. We have centralised the traditional on-site operations and maintenance functions and are able to operate several plants and projects simultaneously by taking advantage of machine learning and using data streams from various plants. Through our automation system, we can access data from multiple sites to compare, benchmark and optimise operations. My work is all about data management and making sure our platform is always functional and constantly developing.

“With our help, customers can track the desired information, such as production efficiency or material loss. We are able to demonstrate tangible savings through reduced fuel consumption and improved production predictability.

“In practice, our customers benefit from economies of scale since the system learns continuously; tasks can be automated and the solutions become more intelligent. They also benefit from increased transparency over their production processes because we can spot issues and trends online in the data that can't be seen on the ground. We are also able to predict production and support production planning – it's like looking through a door instead of a keyhole.”

## A voyage of co-creation – working and learning together

A smart working model is needed to build a competitive edge and take utility infrastructure to the next level. At Nevel, we plan industrial infrastructure for energy, material and information flows together with customers. We have experience of hundreds of implemented projects. Our aim is to implement investments according to a set plan and objectives, as well as secure benefits based on customer needs.

Building a working model for planning, implementing and running the required infrastructure for energy, material and information flows is not a core competence of most industrial companies. Similarly, the capital expense of new infrastructure, with its traditionally long payback times, is not a particularly attractive use of financial resources for most. Outsourcing of services is typically done in order to:

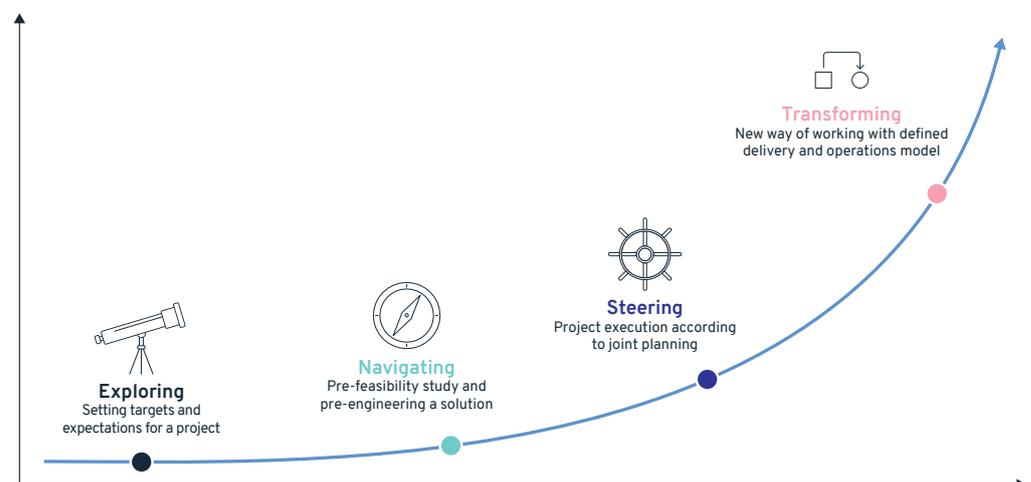
- enable lower production costs,
- share risks as well as having relevant investment models, and
- focus on primary business while a trusted partner assumes responsibility for infrastructure needs and for helping make smart investments and creating a circular economy.

A key to maximising the potential benefits is enabling co-creation of the model with other market players, such as municipalities, and integrating everybody into the same ecosystem.

It is assumed that outsourcing the planning, implementing and running of the required infrastructure for energy, material and information flows provides cost benefits in the long run for two key reasons. Firstly, a partner, such as Nevel, operates a large number of production units, achieving economies of scale for bigger volumes and thereby driving down the unit costs of production and services. Secondly, were an industrial company to run their infrastructure with internal expertise alone, there may not be a big enough incentive or sufficient focus to generate efficiencies and improve productivity.

## How to start?

The working model we recommend should support decision making and provide clear milestones on how to progress and what steps are needed. At Nevel, we call this working model the “voyage” for building next-level utility infrastructure.



Nevel's working model, the voyage, for building next-level utility infrastructure.

The voyage begins with setting targets and expectations for a project. In practice this means creating potential scenarios and steps for cooperation. Deciding on the joint targets requires analysing processes, data, capacity and assumptions as well as building a calculation model for comparing options. An important step in the process is identifying or pre-engineering a solution that fits the set targets. Defining the cooperation model for decision making is followed by project execution according to joint planning.

There is a difference between having a vision and having a clear plan of action for how to achieve that vision, and what detailed goals you want to prioritise, fulfil and measure.

Kenny Westlund, Sales Director, Nevel industrial infrastructure solutions, explains how Nevel works together with customers. “Together, we can see which efforts produce the best results in both the short and long term and which goals are reasonable. We then match the results against the customer’s overall goals. There is a difference between having a vision and having a clear plan of action for how to achieve that vision, and what detailed goals you want to prioritise, fulfil and measure. It is about the steps you take to find long-term viable solutions, where you do not sub-optimize with poorly planned investments in quick-fix solutions that then become unnecessary.

“What is evident in the dialogue with our customers is that they benefit from a clearly improved climate profile while also saving costs. We use the best suppliers we can find for the plant itself and the concept we put together. Of course, we design everything in consultation with our customers in order to minimise the impact on daily operations and scarce project resources.

“We know that there are industrial companies that have short payoff times on their investments, perhaps as little as 24 or 36 months. Most energy plants have a depreciation period of 15 years or longer and do not fit into the normal return requirements that the companies have. It can therefore be difficult to allocate funds to the investment, plus the companies usually want to use the funds for their core business.

“This suits us very well as our starting point is an energy outsourcing model where we build, own and operate the plant. This is a basic offering, but we are always open to other opportunities, and the starting point is that we can help with long investments of 15-20 years. In most cases, the customer receives a positive cash flow from day one.”

## Nevel, your next-level industrial infrastructure partner

Nevel provides industrial customers with expertise and experience on material, information and energy flows and their management to help make smart infrastructure investments and optimise operations. We offer energy solutions including steam and heat, industrial scale cooling and heat recovery, and side stream and material efficiency solutions such as waste recovery and utilisation. We also offer industrial water treatment solutions such as demewater and nutrient recovery.

Nevel's model means we are responsible for planning, implementing and operating the required infrastructure for our customers' businesses. With this approach, which we call the voyage, industrial companies can outsource their infrastructure needs to us, allowing them to focus on their core business. Nevel's Remote operation service increases efficiency in energy production and industrial by-product management by using a sophisticated digital operations and maintenance platform to centralise and automate operations. This improves plant performance and decision making, reduces OPEX and emissions, and improves reliability and availability. The Nevel Digital operations and maintenance platform is system independent.

We have partnered with Telia, who monitor and test our environment to check for vulnerabilities and continuously develop security solutions. The network used for our services is secure and isolated from the rest of the corporate network. In line with Nevel's sustainable thinking, Telia Helsinki Data Center is a LEED (Leadership in Energy and Environmental Design) GOLD certified data centre where the heat generated from operations is reused in the local district heating network to warm 25,000 homes, reducing annual CO<sub>2</sub> emissions from heating by 103,000 tons.

If you are interested in discussing a potential cooperation model for your business, please contact our experts or leave us your contact details. We are happy to provide further information.

### CONTACT US

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Nevel is an advanced infrastructure company, committed to taking its customer's utility infrastructure to the next level. The company operates more than 150 energy production sites and manages over 40 district heating networks with the most sophisticated digital platform in the industry. Nevel employs 125 experts in Finland, Sweden and Estonia. The company's turnover is EUR 100 million. Nevel is owned by Vapo Group.