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By replacing older air handling units, you can save many kilowatt hours and in many cases get the money back within 2–5 years. Have a look in your plant room – it's the most profitable sustainability investment you can make, says Johanna Runesson, IV Produkt.

The most profitable sustainability investment is in your plant room

In recent years, ventilation has been placed high on the global agenda. The COVID-19 pandemic highlighted the importance of a good indoor climate, and the energy crisis in recent years has shone a spotlight on the importance of energy saving. IV Produkt has been vocal about energy saving since the 1990s and in the autumn of 2023, the focus on making more people aware of potential energy savings in buildings increased further. Since then, IV Produkt has helped save millions of kilowatt hours through projects that replace older air handling units.

“When replacing older air handling units, many kilowatt hours can be saved, and in many cases, you will recoup your investment within 2–5 years”, says IV Produkt CEO Mattias Sjöberg. Read more about energy efficiency, good indoor climate, and the company’s growth journey on pages 2 and 3.

Property owner of Nepia House will save 108,000 kWh/year

The property owner at Nepia House, a three-storey office building at Newcastle Quayside, wanted to make energy savings and decarbonisation measures. The building previously had a 20-year-old air handling unit that lacked integrated cooling, had belt-driven fans and reheating coils. Thanks to a new air handling unit from IV Produkt,

the property owner will save 108,000 kWh/year and recoup the investment in just over 3 years. Learn more about this project on page 4.

Hotel's new air handling units save 315,000 kWh/year

On page 5, find out how replacing three older air handling units saves 315,000 kWh/year at a Holiday Inn hotel in central Berlin. Easy-to-understand investment calculations and the Easy Access concept were deciding factors.

Energy efficiency in focus – what to consider

The focus on energy efficiency continues on pages 6 to 9. IV Produkt discuss the advantages of completely replacing older air handling units, rather than only replacing the fans in existing units. You can also read about what to consider when designing cooling capacity.

The widest range of air handling units on the market

IV Produkt has the widest range of AHUs on the market, all of which can be equipped with various types of heat exchangers, integrated cooling units, and integrated reversible heat pumps, complete with control equipment. The range has now been supplemented with the Envistar Flex in single-stacked configuration. Read more about this on page 10 and 11.

News and references

On page 12, you will find where to find latest reference cases and latest news on energy efficiency and good indoor climate.



IV Produkt expands production premises with 5,000 m².

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Replacing older air handling units saves kilowatt hours and money

Today, sustainability is high on the agenda. There is much discussion about energy efficiency and life-cycle cost, concepts that IV Produkt was already focusing on in the early 1990s, and which the company then consolidated into the business idea: “IV Produkt develops, manufactures, and sells environmentally-friendly and energy-efficient air handling units”. In autumn 2023, IV Produkt took another step in its journey towards improving the energy efficiency of buildings.

Greater focus on energy saving

“The debate today is very much about how we

can generate new energy in society; there is far too little talk about saving energy,” says CEO Mattias Sjöberg. “In Europe, 220 million buildings are not considered energy efficient. That’s 85% of the total building stock. The potential savings are enormous.”

Most profitable sustainability investment

When it comes to energy efficiency, the focus is often on replacing windows and lighting, or installing additional insulation. According to Mattias, many people do not realise that the greatest energy savings can be made in the plant room: “When replacing older air handling units, many kilowatt hours can be saved, and in many cases, you will recoup your investment within 2–5 years. You could compare this to solar cells, which is another sustainable

investment, but here it will take you 6–10 years to recoup your money.”

In the autumn of 2023, IV Produkt started a major campaign to widely communicate the potential of energy savings in buildings. Since the start of the campaign, through deliveries to customers who have replaced older air handling units in buildings, the company has contributed to a saving of several million kilowatt hours, and this is just the beginning.

“We see that more and more people are making this type of investment in their properties, and we are certain it will continue. The energy crisis in recent years has once again shown the importance of energy saving,” Mattias continues.

New EU requirements start wave of renovations

The revised EU Energy Performance of Buildings

Directive (EPBD) was adopted in March 2024. The directive will affect opportunities for property owners to obtain financing from banks, which has further strengthened the incentive to optimise energy use in their buildings. Buildings are rated on a scale from A to G and, according to a report from Danske Bank, it is likely that a property will need to be rated as A or B for institutions and funds to invest. Property owners will need to present a detailed plan for future energy optimisation in order to gain easier access to financing.

These stricter guidelines from the EU will be a driving force for more property owners to opt to replace their older air handling units. This investment is positive for the environment, the people in the building and for the property owner, who can obtain financing on better terms, lower their costs and increase the value of their property.



Concept image of the expanded 5,000 m² production premises.

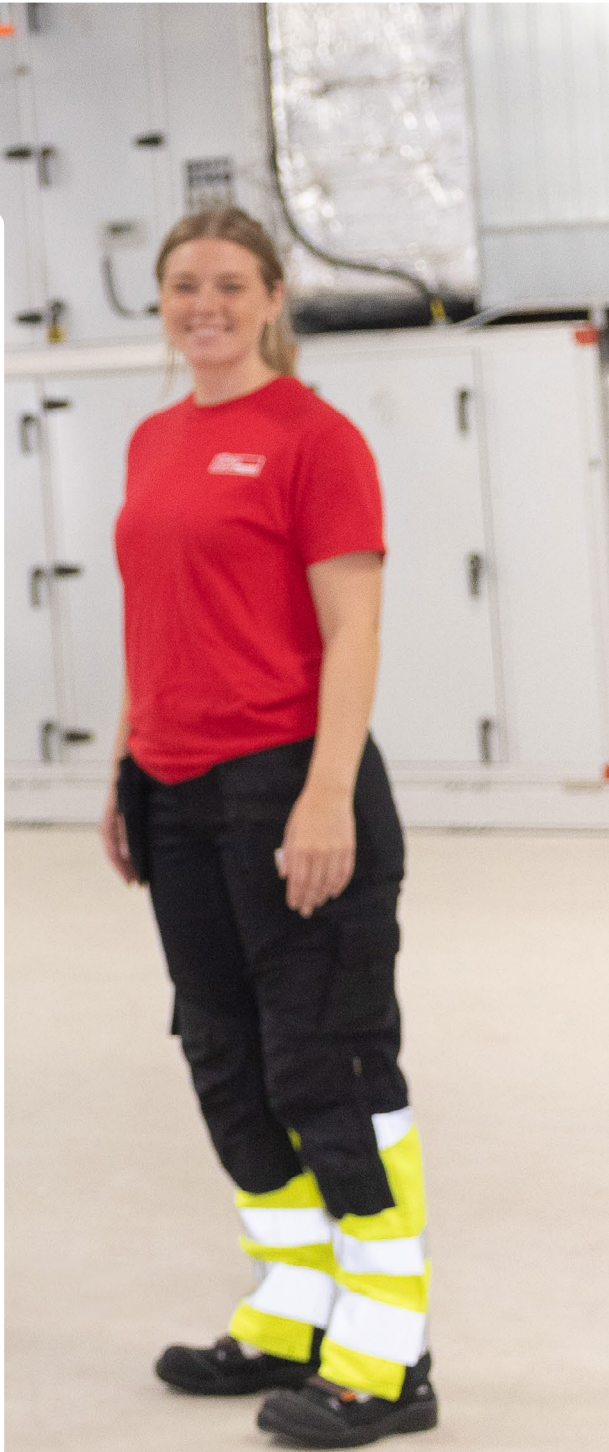
Expanding with 5,000 m² of new production facilities

The emphasis on and increasing demand for more energy-efficient buildings is one of the reasons for IV Produkt’s strong growth. In 2019, the company reached its target turnover of SEK 1 billion – one year ahead of schedule. When reaching this milestone, a new and ambitious target was set of SEK 2 billion by 2026. IV Produkt has come a long way to achieving this goal and by 2023, turnover was SEK 1.8 billion. “Over the past five years, we have invested 400 million SEK in new machinery and expanding our production facilities, office space, and land holdings. It’s these earlier investments that have created the conditions for us to continue growing,” says Mattias. “That is why we are now expanding our production facilities by an additional 5,000 square metres, taking us

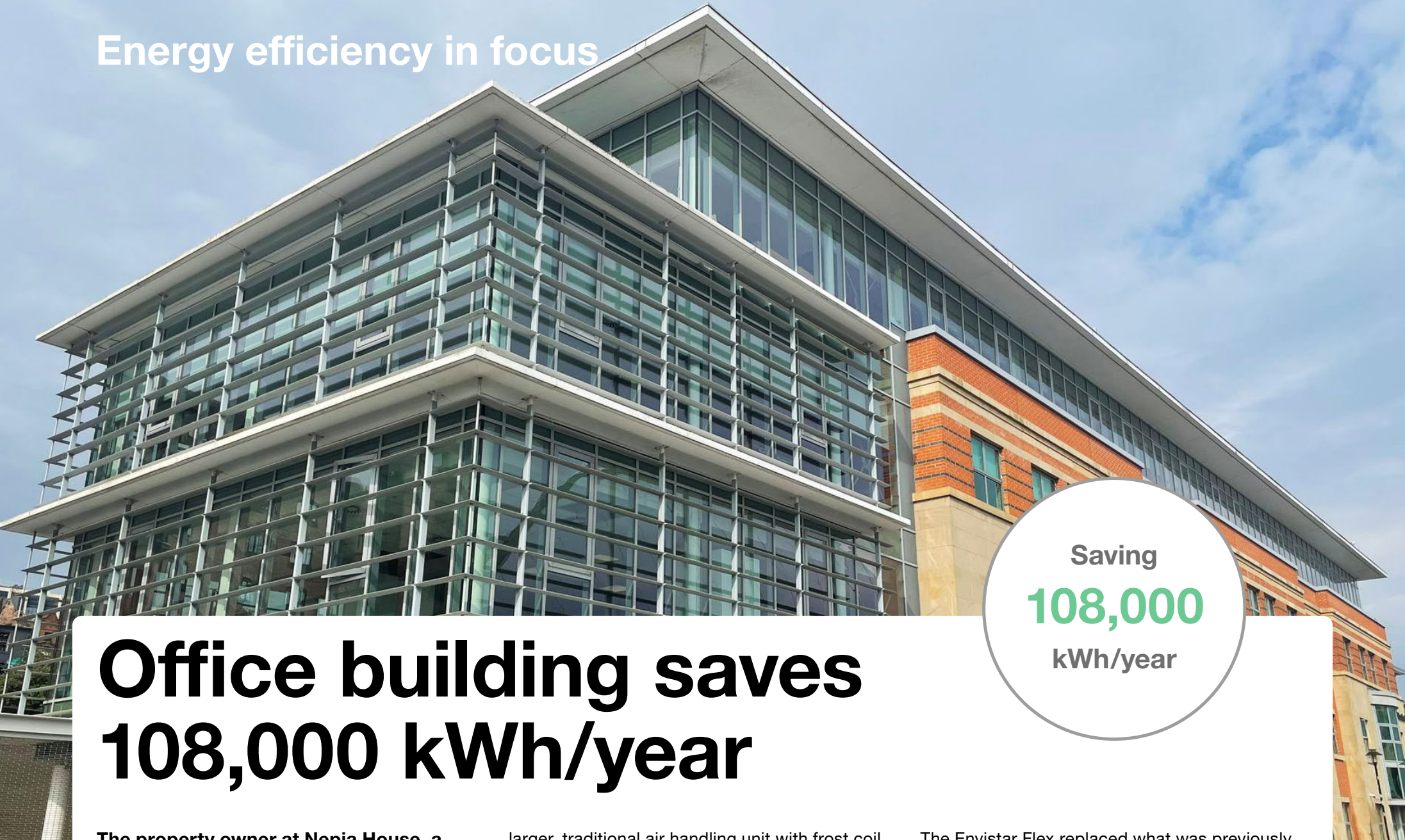
beyond a capacity of three billion SEK.”

The future looks bright

Despite a decline in new construction in certain segments of society over the past year, IV Produkt has great faith in the future. Among other things, this is due to the company’s ability to undertake energy renovations of existing properties and its focus on innovative products. “We have the widest range of air handling units on the market, and our goal is to lead the way in innovation. We developed our Easy Access concept to facilitate site transport, and it is ideal when working in older buildings, for example, where the passageways are narrow and you want to avoid impacting the building. We create a good indoor climate and save energy. It is already high on many people’s agendas and it will be even more important in the future”, says Mattias.



The picture is taken in one of the plant rooms at the Swedish shopping centre Gekås Ullared. In total, there are over 130 air handling units in various plant rooms.



Saving
108,000
kWh/year

Office building saves 108,000 kWh/year

The property owner at Nepia House, a three-storey office building at Newcastle Quayside, wanted to make energy savings and decarbonisation measures. The building previously had a 20-year-old air handling unit that lacked integrated cooling, had belt-driven fans and reheating coils. Thanks to a new air handling unit from IV Produkt, the property owner will save 108,000 kWh per year and recoup the investment in just over 3 years.

Great energy savings and short payback time

Peter Wilson, sales representative at IV Produkt, made an investment calculation that showed that a new air handling unit would provide an energy saving of 108,000 kWh per year and the money would be recouped within 3.3 years.

– A frequent challenge of refurbishment work can be to motivate a client to buy into the design proposal due to the upfront capital costs. It can sometimes be difficult to convince a client of the importance and benefits of upgrading to more energy-efficient systems, when the existing services appear to be working fine. However, our investment calculation presented the upgrade project in a language that all parties speak, with the financial and environmental benefits clearly visible, and that's how this project materialized, says Peter.

Envistar Flex with integrated reversible heat pump and controls

The choice fell on an Envistar Flex unit in size 480 with the integrated reversible heat pump ThermoCooler HP, integrated controls and an IV Produkt Cloud connection. Wilson continues:

– The building was previously serviced by a

larger, traditional air handling unit with frost coil, plate heat exchanger and reheat coil. Upon the initial site survey it was apparent that space would be at a premium. With multiple ventilation systems distributing through the plant room, a robust AHU replacement strategy was required to minimise unnecessary works. Due to the compact footprint, flexibility and multiple configurations offered by IV Produkt's Envistar range, the new unit could easily be installed and integrated with the existing duct systems. We opted for a tailored solution from IV Produkt using Envistar Flex, to ensure that minimal modifications were required to existing services when installing and fabricating ductwork connections, continues Wilson.

Easy Access facilitated the on-site transportation

The air handling unit was also in Easy Access configuration, which means that the unit is adapted to be transported through a standard opening of 90 centimetres.

– The installation was a smooth process.

The Envistar Flex replaced what was previously a much larger unit, benefiting the plant room by improving access and maintenance clearances throughout, Wilson concludes.

Great energy savings and better indoor climate

Once commissioned, the Envistar Flex with ThermoCooler HP will give significant energy savings and improve the indoor climate. And thanks to the cloud service IV Produkt Cloud, the air handling unit can easily be monitored remotely.



Peter Wilson, sales representative at IV Produkt.

The property and the energy efficiency improvement project

- **Ventilated office area:** 2,200 m²
- **Operating time, ventilation:** 3,600 h/year
- **Energy use, old air handling unit*:** 164,000 kWh/year
- **Energy use, new air handling unit*:** 56,000 kWh/year
- **Total energy savings:** 108,000 kWh/year
- **Energy savings/m²:** 49 kWh/m²/year
- **Time required to replace the unit:** One day
- **Payback:** 3.3 years

* The air handling unit's energy use for electricity and heating.

Energy price for electricity: 0.40 EUR/kWh.
Energy price for heat: 0.16 EUR/kWh.
With higher energy prices, the payback time would have been even shorter.

Saving
315,000
kWh/year

Hotel's new air handling units save 315,000 kWh/year

The hotel Holiday Inn Berlin City Center East Prenzlauer Berg had 30-year-old air handling units with controls that partially no longer worked, inefficient belt-driven fans and non-existent heat recovery. This resulted in reduced comfort for employees and hotel guests as well as high operating costs. After all three units have been replaced, the hotel saves 315,000 kWh/year – and the investment will be repaid already after 4 years.

With its approximately 1,300 employees, Daume Gruppe performs installations and maintenance for hotels, shopping centers, offices, manufacturing facilities, and more. The company carried out maintenance for heating, ventilation and sanitation at the Holiday Inn and suggested optimisation of the ventilation.

– The first thought was only to replace the fans, but after seeing the complete installation it was determined that there was no heat recovery. Then it was suggested to replace the entire air handling unit, says Marco Mittermüller, head of the service department at Daume Gruppe.

Daume Gruppe and IV Produkt's sales representative Jens Musigk-Thum did an investment calculation to present the benefits of replacing the entire unit to the property manager at Holiday Inn.

– At first, the plans were to only replace one unit, but when the property manager saw the investment calculation, he suggested that all three air handling units should be replaced, Mittermüller continues.

The investment calculation clearly demonstrated the benefits

The new investment calculation concerned the replacement of all three air handling units. It showed that Holiday Inn would save 315,000 kWh/year and recoup the investment within 4.1 years.

– The investment calculation freed the mind in a way – to not only replace certain components, but instead the entire air handling units. It was clear that there would be significant savings and seeing the numbers clearly in a graph supported the ambition to implement the measure at the

customer, notes Matthias Klein, project manager at Daume Gruppe.

Easy Access simplified on-site transportation – a decisive factor

The air handling units serve three different types of premises: breakfast, lobby and conference room. The units were transported via a staircase, a small lift and through a door to the plant room.

– The transportation went very smoothly. Thanks to Easy Access, the components could be easily brought in, and with integrated control, the systems could be replaced in just one week. Installing external controls would have taken four weeks. This allowed the hotel to continue operating. Delivery on a Tuesday and commissioning on Thursday the following week, notes Klein.

Great improvement of the indoor climate and big savings

After the air handling units have been running for over a year, the employees and guests of Holiday Inn feel a great improvement of the indoor climate and a lot of energy has been saved.

– There is a big difference. The air quality is good and the ventilation is controlled via a CO₂ sensor. Above all, the cooling has improved. This is because the new system has the latest generation controls and new components. The new system also has cooling recovery. If we only look at the

cooling, we get a higher cooling capacity with the same electrical load, which increases comfort, says Matthias Klein.

Great potential in replacing older air handling units

There are more older units that need to be replaced in various properties.

– We have many good experiences together with IV Produkt from previous projects. Easy Access, integrated controls and help with investment calculations are some of the reasons why we chose to work with IV Produkt. Going forward, we have more projects where we will work together, concludes Marco Mittermüller.



The new air handling units in place in the plant room at Holiday Inn.

The property and the energy efficiency improvement project

- **Ventilated area:** 493 m²
- **Operating time, ventilation:**
Lobby: 8,760 h/year
Breakfast room: 3,000 h/year
Conference room: demand control, 2,000 h/year
- **Energy use, old air handling units*:** 360,700 kWh/year
- **Energy use, new air handling units*:** 44,600 kWh/year
- **Total energy savings:** 315,000 kWh/year
- **Energy savings/m²:** 640 kWh/m²/year
- **Time required to replace the three units:** 7 days
- **Payback:** 4.1 years

* The air handling unit's energy use for electricity and district heating.

Energy price for electricity: 0.30 EUR/kWh.
Energy price for heat: 0.08 EUR/kWh.
With higher energy prices, the payback time would have been even shorter.



Refurbish old units or invest in new?

The air handling unit to the left is from 1996 and has a well-maintained exterior. What many may not consider is that the temperature efficiency of heat exchangers was significantly lower 20 years ago, and this can have decreased further over time. In addition, older units often have belt-driven fans with low efficiency. Altogether, this results in a unit with high energy use, which can be very costly. What should you consider when deciding whether to refurbish older air handling units (by replacing the fans, for example) or replace the units entirely? The calculations below compare replacing fans with installing a new air handling unit.

The energy use of the existing unit is approximately 196,000 kWh/year. If only

the fans were to be replaced, the unit's total energy use would fall to 180,000 kWh/year, which results in a saving of **16,000 kWh/year**. If we replace the entire air handling unit instead, energy use drops to 39,000 kWh/year – a saving of **157,000 kWh/year**. The same new fan consumes less energy in a new optimised unit than it would have done in the old one. Of the total savings, the largest proportion comes from greatly improved heat recovery, increasing from approx. 40% to over 80% in temperature efficiency.

Benefits of replacing the entire unit

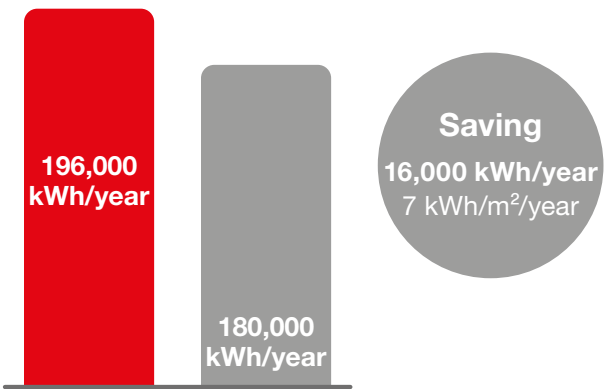
Replacing inefficient fans can be a good solution for slightly reducing energy costs and optimising the air handling unit's specific fan power value (SFPv). However, heat recovery is neglected and the SFPv could have been further reduced with a

new and better optimised air handling unit. Your operations may also have changed since the old unit was installed, and you can therefore take the opportunity to optimise the air handling unit to correspond to the existing operation. When only replacing the fan, there is a big risk that other equipment may also require servicing and repair in the near future.

Energy saving and increased property value

All energy saving measures are positive, and a full unit replacement provides the greatest energy savings. It is now becoming more common to replace older air handling units to reduce energy use and thus also lower operating costs. In addition, it increases property value and reduces environmental impact.

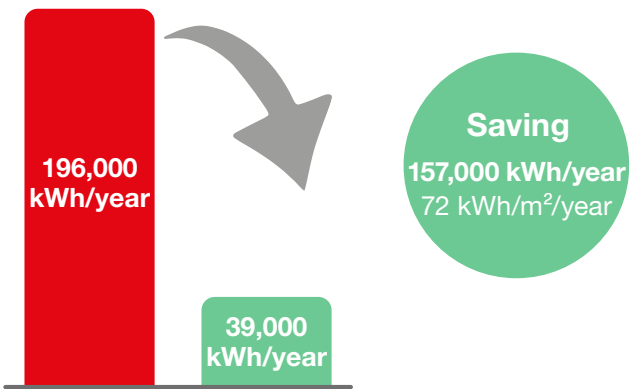
Fan replacement



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 - Energy saving
 - Short installation time
 - Marginally increased property value
- - No savings on heat recovery
 - No warranties on other equipment
 - Apart from the new fans, the unit has old technology with high maintenance costs
 - Higher internal pressure drop than a new unit

Unit replacement



- +

 - Optimised energy savings for both electricity and heat energy reduces net operating costs, which increases the property value
 - Lower SFPv reduces energy use
 - Heat recovery of over 80%
 - Correctly sized duct connection allows for lower pressure drop & lower energy use
 - New control equipment enables both optimisation according to ventilation needs and access to cloud services
 - Warranties
- - Larger initial investment
 - Longer installation time



Investment calculation documentation

Scan the QR code to download investment calculation documentation when replacing air handling units. You can bring it to your plant room and write down applicable values, such as the year of installation, operating time, and air flow. Then contact IV Produkt and they will help you calculate the energy savings and ROI period for your project.

What to consider when designing cooling

There are some old key indicators for calculating temperature and relative humidity that are used out of habit, such as a lower temperature but high humidity. Taking climate change into account, it is a good idea when designing cooling capacity to consider the current climate conditions where the unit will be installed.

When calculating cooling, many people base their calculations on the highest measured temperature at a certain time and highest measured relative humidity at another point in time. These two maximum values do not typically occur at the same time. This results in an oversized air handling unit that is more expensive to buy, is costlier to run, harder to control and less efficient. It's like buying a big bus when you just need a car. What is recommended instead? How can temperature and relative humidity be used to calculate an appropriate size for the air handling unit?

Comparison between different capacities

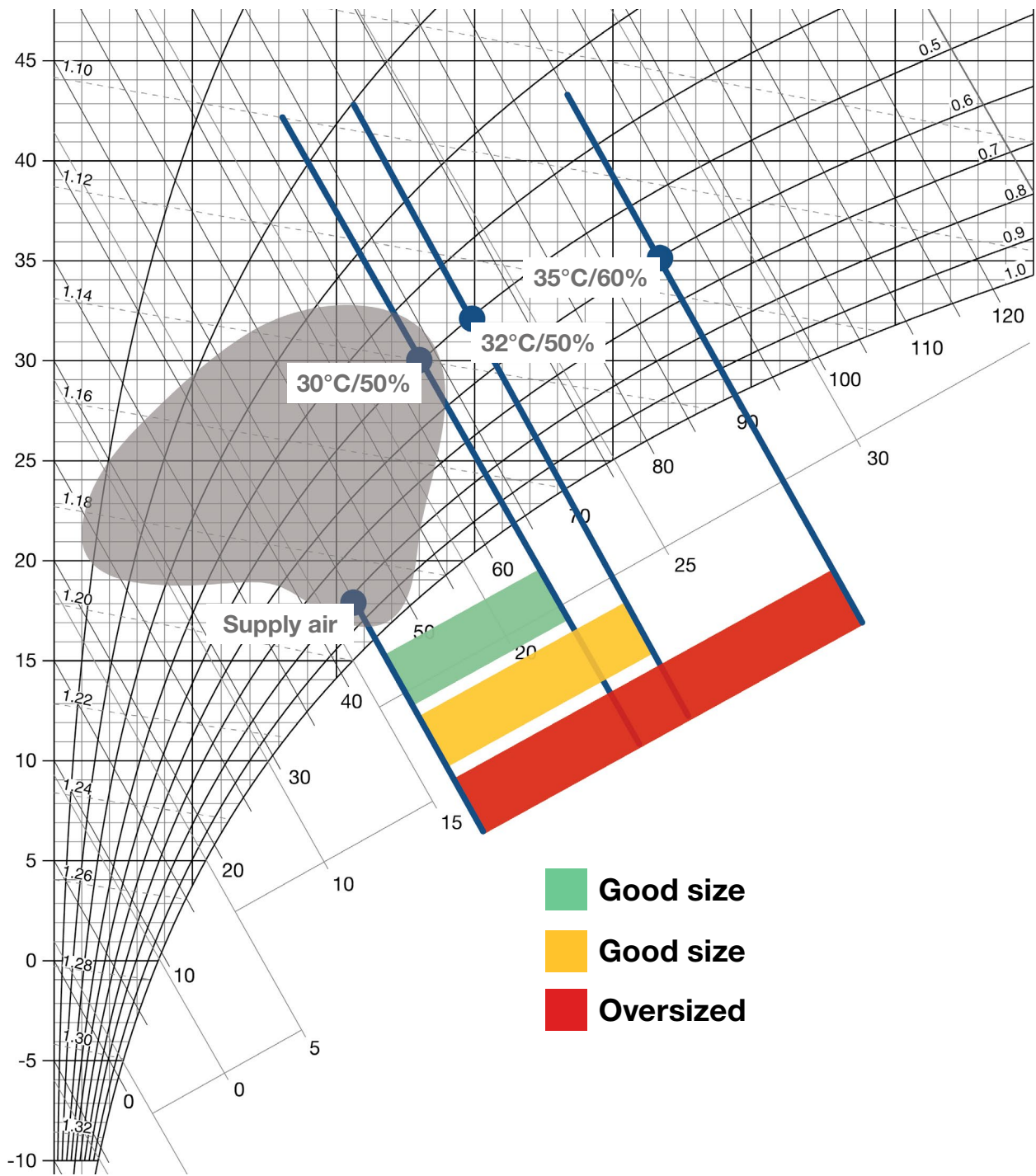
The important thing is to compare the temperature and relative humidity at the same time. The grey area represents the most common temperatures and relative humidity over a summer. The diagram shows three different output levels that are compared to each other to indicate how much energy is required to reach a supply air temperature of 18°C for the different values.

30°C/50% covers the cooling needs on most days

35°C/60% falls far outside the grey area, indicating that this state rarely occurs. This means that it is unnecessary to have overly high cooling capacity because the unit becomes too large and costly. 30°C/50% is sufficient to cover the cooling needs on most days. Although there will be a few days that fall outside the cooling capacity, the unit will still deliver a good power while maintaining good control functionality throughout the cooling season.

Efficient and reliable with good control

At 30°C/50% or 32°C/50%, the cooling capacity is appropriately sized in this case and still has good capacity for the hottest days. This results in an air handling unit that is energy efficient, cost-effective and reliable with good control functionality. **Note:** While air handling units with integrated cooling in warmer climates are sized to deal with higher temperatures, they still adhere to the same principle as above.

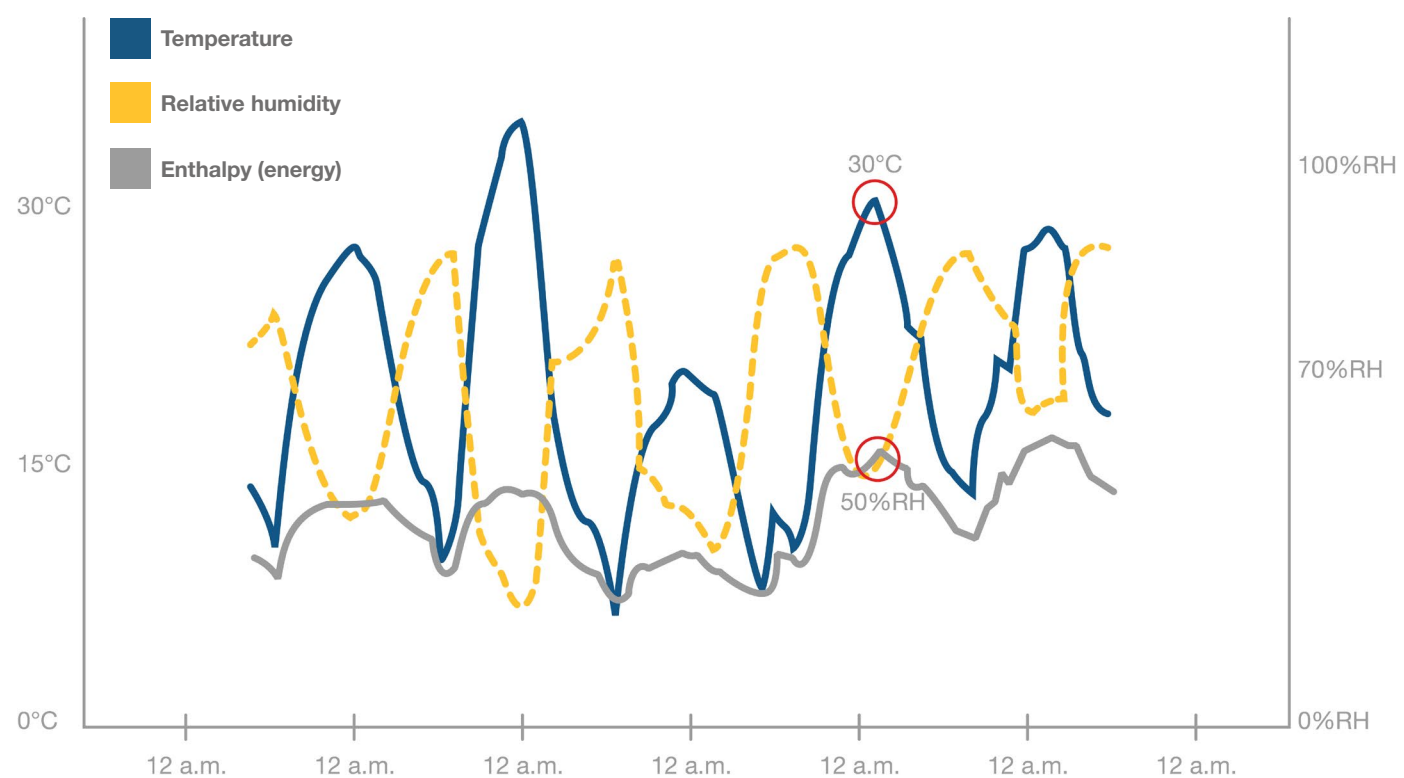


Summary

- When reading maximum temperature and relative humidity, read the data for the same day
- Consider whether the **key indicators** you use need to be **updated**
- **Air handling units with integrated cooling** that has the correct cooling capacity are **energy efficient, cost-effective, reliable** and have **good control functionality**



Example: **Correct** data reading



You should read the values on the day when the temperature was at its highest and also measure the relative humidity on the same day. When you choose 30°C/50%, which refers to a total energy (enthalpy) of 64.1 kJ/kg, you get an output level that can handle almost all of the year's operating modes. On the occasions during the year when the temperature is higher than calculated for, the total energy is usually lower than at the calculated time.

With several flexible product series, IV Produkt can meet most demands. They have delivered thousands of air handling units to schools, offices, hospitals, sports arenas and blocks of flats all around Europe.

IV Produkt offers a wide range of air handling units with air flows ranging from 360 (0.10) to over 72,000 m³/h (20 m³/s). The units can be equipped with various types of heat exchangers, integrated cooling units, and integrated reversible heat pumps, complete with control equipment. Units in the Home Concept series are tailor-made for renovations and new-build apartment buildings, and can handle air flows of up to 23,400 m³/h (6.50 m³/s).

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Great flexibility

IV Produkt's great flexibility is apparent in a range of products that covers everything from small, top-connected units that save floor space, to large units with an air flow over 72,000 m³/h (20 m³/s). Each unit size is available with various fans and motors in order to optimise efficiency and reduce electricity consumption, i.e. optimised for the lowest possible specific fan power value (SFPv).

Integrated reversible heat pump and integrated cooling unit

For these units, it is possible to choose the integrated ThermoCooler HP reversible heat pump or the integrated cooling unit, EcoCooler. In ThermoCooler HP, the installation for cooling and additional heating for ventilation are integrated in the unit. In most cases, there is no need for electrical air heaters, by-pass coils or outdoor cooling installations. The responsibility for the installation lies with one supplier instead of a group of several different parties.



Easy Access facilitates on-site transportation

IV Produkt developed the Easy Access concept in order to easily transport units into buildings. Units with an air flow of approximately 16,200 m³/h (4.5 m³/s) can be transported through a door with standard dimensions. Easy Access enables great cost savings compared to assembling the unit on-site. Installation is faster and the method avoids making holes or causing other damage to the building. Counter-flow heat exchangers and rotary heat exchangers can also be separated for easy transport through standard doors. The entire installation is CE marked.

Integrated control equipment

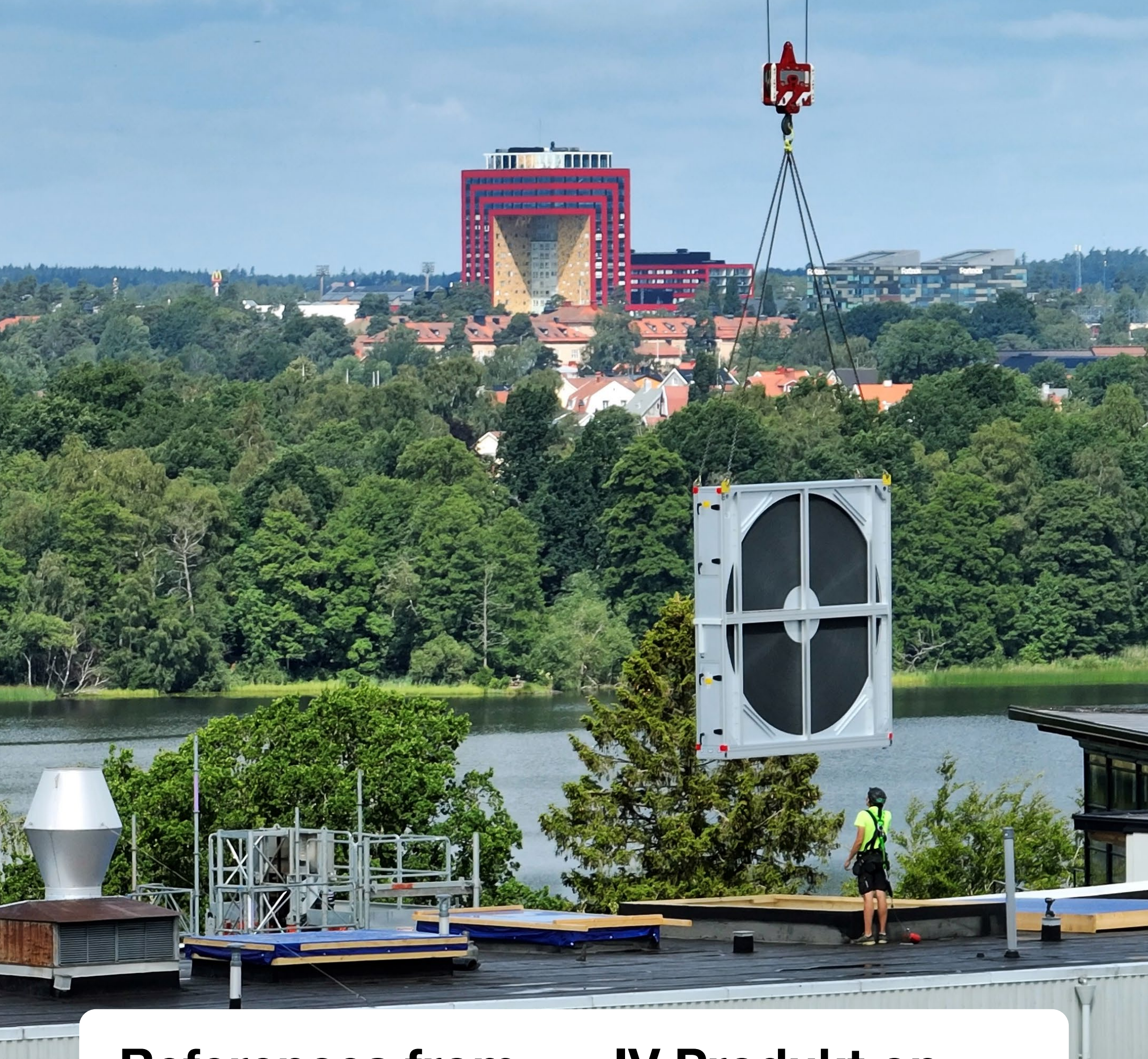
The entire Envistar range has integrated control equipment with software developed by IV Produkt. IV Produkt Cloud is a cloud service that enables you to monitor your facilities no matter where you are. You can easily see alarms, adjust values and monitor energy use.



Envistar Flex in single-stacked configuration

In addition, the Envistar Flex series is now complemented by single-stacked units with integrated control equipment and fully separated supply and extract air sections. The units can be placed separately from each other. For example, the extract air section can be located on one floor and the supply air section on another. It may be advantageous to choose this solution if the supply or extract air section needs to be placed outdoors or on another floor where the existing duct system cannot be adapted to double-stacked units, or when air environment requirements demand fully separated airways.





References from all over Europe

Through many years of experience, IV Produkt has gained a unique understanding of the requirements placed on different types of buildings, such as schools, offices, museums, shopping centres, hospitals and blocks of flats. Learn more at ivprodukt.com/references

IV Produkt on LinkedIn

Our LinkedIn contains current topics, such as **energy efficiency improvements**, **good indoor climate**, smart solutions and product development.

Follow us by scanning the QR code.



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Air handling with focus on LCC