



Strategic investments for Europe

Evidence from cost-effective
energy efficiency stories





EUROPEAN ALLIANCE TO SAVE ENERGY

Creating an Energy-Efficient Europe

If you would like to learn more about the activities of the European Alliance to Save Energy (EU-ASE), please contact info@euase.eu / www.euase.eu

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Foreword Commissioner Arias Cañete

The proactive international involvement of the business community has played a leading role in the climate talks leading to the successful conclusion of the Paris Agreement last year.

I am absolutely convinced that the firm commitment of the business community to stay on its toes and innovate will be the key to drive the transition required to stay well below 2°C and to pursue the 1.5°C goal.

I welcome the efforts by the European Alliance to Save Energy (EU-ASE) to bring together successful stories from across Europe, which shows that energy efficiency is a synonym of productivity gains, revenue growth, industrial competitiveness and job creation.

Greenhouse gas emission reductions can be achieved through cost-effective investments in energy efficiency, notably in sectors like buildings, transport, agriculture and waste which represent about 60% of the EU's total emissions.

Therefore, I believe that putting Efficiency First at the core of the Energy Union is of crucial importance.

My hope is to keep working together to raise awareness about energy efficiency investments and their vital contribution to meeting the EU long-term energy and climate goals.



Miguel Arias Cañete

*European Commissioner for
Climate Action & Energy*

The success stories presented here show that energy efficiency investments produce gains in productivity, revenue, industrial competitiveness, and job creation.

Foreword EU-ASE Honorary members

We can take pride as representatives of European citizens when legislation that we draft and adopt has a positive impact on citizens and businesses. A proactive policy environment can set the conditions for job creation, industrial investments and economic growth.

The success stories presented here show the positive impact of industry investment in energy efficiency, but they would not have been possible without EU laws promoting the refurbishment of the building stock, eco-design standards, policies to drive energy services or smart lighting systems, as well as funds and projects in R&I. Energy efficiency investments generate returns as a result of energy cost savings, but regulation is needed to incentivise the market uptake of successful business models. Consequently, each EU legislator has a role to play in uncapping the potential and creating a framework that allows long-term investments to flourish.

The creation of the Energy Union represents an opportunity to remove the multiple market failures and administrative barriers that still hinder the full development of energy efficiency technologies and services. We look forward to contributing to the forthcoming legislative process, and we support the creation of an energy-efficient Europe for the good of economy, environment and society at large.



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Introduction EU-ASE Chairman

Following last year's adoption of the Sustainable Development Goals and the Paris Agreement at COP21, we recognize – in both the public and private sectors – the urgent need to move from 'paper to practice' and to replicate and scale-up sustainable technologies and best practices. Doing so will unlock the multiple economic, environmental and social benefits that are needed to create a sustainable development pathway in 'our' 21st century.

This is especially true in the area of energy efficiency. Consequently, we are addressing one of the main hurdles to the accelerated adoption of energy efficient products and solutions -- which is a widespread lack of awareness about existing energy efficiency solutions and their cost-effective, socio-economic benefits. This is why we are pleased to present this collection of business success stories.

Energy efficiency makes economic sense because it has a direct impact on our energy productivity. Simply put, it creates business opportunities, increases competitiveness, generates local jobs and provides the opportunity to rethink the energy infrastructures Europe needs. It also possesses a greater environmental justification -- because after the adoption of the COP21 Agreement, only best-available technologies and replicable business models need to be promoted for a valuable and timely contribution to EU low-carbon economy goals both by national and local governments and by the growing number of companies that are committed to reducing carbon emissions and ecological footprints for themselves and their customers.

My colleagues and I welcome the recognition in the Energy Union Communication that energy efficiency is an energy source in its own right. Unfortunately, administrative barriers and market failures hinder energy efficiency investments from flourishing to the degree that would be needed and for which all technology and solutions already exist today. Currently half of the EU's cost-effective energy saving potential is untapped, due to a still-lagging ambition level for energy efficiency.

Energy efficiency must be considered a political priority through an EU binding target of at least 40% for 2030. This will give a clear signal to the investor community at large, and it also aligns well with the political position expressed on more than one occasion by the European Parliament and with the requirements set out by the objectives of the Paris Agreement. Such a target would generate annual savings worth €1tr-€2tr during 2020-2030 and create between 1 and 1.5 million jobs, mostly dedicated to renovating our existing infrastructure and continuing to develop Europe's world-leading, innovative technologies.

We look forward to contributing to the forthcoming legislative debate by presenting our energy-efficiency investment success stories and emphasizing the reasons why the EU should set the conditions for their replication across Europe and at the international level.

Energy efficiency must be considered a political priority through an EU binding target of at least 40% for 2030. This will give a clear signal to the investor community at large, and it also aligns well with the political position expressed on more than one occasion by the European Parliament and with the requirements set out by the objectives of the Paris Agreement.



Harry Verhaar
*Head of Global Public
& Government Affairs*
Philips Lighting

New city quarter sets green standards

A whole new city quarter called HafenCity has been built in the heart of Hamburg in Germany. The energy used for heating and cooling is kept to a minimum thanks to the optimization of heating systems inside the buildings and to the supply of heat via a district heating network. The district heating network makes it possible to recover and utilize the heat, which is produced in the nearby power plant that would otherwise be lost. It is currently Europe's largest inner-city development project, where city planners have chosen the most sustainable and economically advantageous solutions.



Danfoss' technologies in HafenCity

CLIENT DETAILS

Location: Hamburg (Germany)

"Given a choice, I would certainly opt for Danfoss products. The quality of the equipment is outstanding, and the available service and support is also a big plus. For more complex installations, Danfoss specialists help us with questions regarding the construction and design."

Judith Huber-Jahn, Project Manager, Reese Beratende Ingenieure

EU-ASE MEMBER DETAILS

Danfoss

"HafenCity is not only one of the most sustainable city quarters, it is also among the most comfortable and innovative places I have been to. It demonstrates how much a city can benefit from a holistic approach. By planning, both at district and individual buildings level, it was possible to find the best and cheapest solutions."

Lars Tveen, President of Danfoss Heating Segment



THE PROBLEM

Key Facts and Challenges

Every day, more than half of the energy used for the generation of electricity vanishes into the air. The heat, a by-product of the generation process, is often not utilized. Furthermore, buildings are often inefficient due to suboptimal temperature controls and poorly balanced heating systems. For multifamily buildings, this means that some apartments are overheated, while others remain too cold. Installing automatic balancing, for example, can reduce their energy consumption by about 20%.

Faced with these challenges, the municipality of Hamburg decided to plan a new city quarter that would untap all the saving potentials, with a focus on reducing the energy demand in buildings and optimizing the energy supply. Innovative and healthy buildings complemented the design criteria.



THE SOLUTION

The investments into individual room temperature controls and automatic hydronic balancing, which "get the basics right" are low, payback is fast, and return on investment is large. Still, despite the huge benefits, a large part of Europe's buildings lack these fundamentals – not in HafenCity, though. The buildings are equipped with technologies, which control the energy consumption of heating and cooling systems and deliver a comfortable indoor climate.

In addition, the combination of heat and power (CHP) ensures that surplus heat from the nearby power plants is used to heat buildings, instead of going to waste. This way, 90% of primary energy can be utilized.



THE RESULTS

Hamburg realized its vision for HafenCity, as well as its 2020 goal of reducing CO2 emissions by 40%.

The consumption of power, heating and cooling is kept to a minimum in buildings and in the supply system. Hamburg supplies 19% of all households with district heating, compared to only 13% on average in the remaining parts of Germany. Danfoss helped saving approx. €3.7 million in fuel costs and 14,000 tons of CO2 every year (compared to a conventional fossil heat supply).

Cities can reduce their electricity bill by 25-40%* in less than 3 years

Few persons know that the distribution of drinking water and the treatment of waste water is energy intensive. According to the UN, 8 % of the world's electricity consumption is used by water facilities. The city of Aarhus has demonstrated that it is possible to reduce to zero the electricity bill related to the water supply and waste water treatment of 200.000 people. If it was replicated at global scale, it would save as much electricity as the global production of wind power and solar energy.

This is achieved through energy saving, advanced process optimization and the recovery of the energy embedded in the sludge of the waste water.

CLIENT DETAILS

Aarhus Water A/S - Marselisborg catchment area

Location: Aarhus (Denmark)

"The difference between 25 years ago and today is that processes now run right at the limit – but not beyond. And to achieve that we cannot do without the precision control we can get from variable speed drives".

Flemming Husum, Plant Manager, Marselisborg WWTP

EU-ASE MEMBER DETAILS

Danfoss

"It is a ground-breaking innovation. As far as we know, no other plant has managed to save so much energy and at the same time produce twice more energy than they consume solely by recovering the energy embedded in the household wastewater. Scaled up, it means that the huge energy consumption from water and wastewater facilities could be avoided, turning the single largest electricity consumer in municipalities into energy-neutrality."

Mads Warming, Global Segment Director W&WW



THE PROBLEM

Key Facts and Challenges

Water and wastewater treatment plants (WWWTP) account for 25 – 40 % of the electricity consumption of cities*. This is explained by the fact that WWWWTP operate 24/7 and consume a lot of energy to pump, distribute, collect and treat the water throughout the city. The demand upon wastewater treatment quality has also significantly increased the energy consumption.

The water cycle is characterized by high load variations. Without the right handles, the motor systems will run with full power independent of the required duty. It is as if you would always drive your car at full throttle, consuming the maximum amount of gasoline and then regulate your speed with the breaks.



THE SOLUTION

The first step is to ensure that we utilize just the amount of energy that is needed to perform the duty. This is possible via the installation of variable speed drives that basically act as the control handles of anything that rotates (the pumps, blowers, mixer etc.).

The second step is to optimize the system via process sensors and computer controls.

The third step is to recover the energy embedded in the sludge that remains from the waste water treatment. Biogas is produced on site and used to generate both electricity and heat that is sold to the nearby electricity and district heating grids.



THE RESULTS

Both the energy savings measures and energy recovery made it possible for the WWTP to produce twice more than it consumes. This is enough to cover the total energy need of the water cycle (producing, distributing and treating drinking and waste water). This result has been achieved without using neither solar or wind energy or adding organic material from e.g. the food industry or sludge from other WWTP. Return on investment has been less than 5 years. The investment can be replicated for the majority of water facilities globally thereby turning a very energy intensive industry into energy neutrality.



Marselisborg catchment area



A few of the 290 Danfoss' AQUA variable speed drives

*Source: EPA USA

Keeping things cool at Facebook data center

Data centres are equivalent to the brain of our economy. They process, store and enable all our online activities, emails, social media and online services. Yet they are energy intensive. Data centres at global level already consume more electricity than the UK and emit the same carbon footprint as the airline industry. A very large data centre may consume 30GWh of power per year, which is comparable to the power consumption of 5000 to 10 000 households. Their number is likely to triple in the next decade which makes their energy efficiency politically relevant.

At the same time, electricity is usually the largest single element of operating costs for data centres, varying from 25 to 60%, which means that energy efficiency can become a true competitive advantage. The ML System supplied by Condair with Danfoss high pressure pumps, in conjunction with other energy savings measures, slashes nearly 50% of energy costs compared to traditional cooling methods and provides contaminant-free humidity. This system was implemented in a massive data centre of Facebook in Lulea in Northern Sweden which became one of the world's most advanced and energy efficient.



Facebook's Lulea data center in northern Sweden

CLIENT DETAILS

Condair/Facebook data center

Location: Lulea (Sweden)

"Server farms generate huge amounts of heat and cooling them is a major source of energy consumption. Facebook takes its environmental pledges seriously, and deserves to be "liked" both for saving energy and for radically reducing the risk of airborne pathogens for the people who maintain the servers."

Kasper Gissel, Managing Director Condair



Danfoss' high-pressure pumps



THE PROBLEM

Key Facts and Challenges

Data centers consume a lot of power to run their IT equipment and to cool it. You surely have noticed how warm your computer gets when it is working, it is the same in data centres.

In the data center of Facebook in Lulea, the pumps which are used for the cooling and humidification system must distribute up to 13,000 litres of water per hour with zero risk of oil contamination to keep hygiene intact.

Most pumps need oil-based lubricants to keep moving parts working smoothly, and in most cases lubricants are not a problem. Yet, in advanced evaporative cooling and humidification applications things are different. Even infinitesimal amounts of atomized oil droplets can be enough to tip the balance between "clean" and "not clean" – and jeopardize staff health, hard-won ISO 22000 certification as well as an entire business model.

The challenge therefore was to pump 13,000 litres of mineral-free water per hour at high-pressure – without using oil-based products for lubrication.



THE SOLUTION

The Facebook's Lulea data center has been provided with an evaporative cooling and humidification system from Condair that uses Danfoss' high-pressure pumps. The ML System® humidifies and cools Facebook's massive space of 28,000 m². The innovative solution has a cooling effect of 8,8 MWh, but uses as little as 63 kWh per hour to achieve it. Energy consumption for evaporative cooling dips as low as 0.005 kWh per kW of cooling. In conjunction with other energy saving measures, the ML System® slashes nearly 50% of energy costs compared to traditional cooling methods.



THE RESULTS

In addition to providing energy cost saving and contaminant-free humidity, Condair's ML System also maintains humidity at optimal levels to keep electrostatic discharge in check and prevent damage to sensitive electronics – and even worse- data loss.

The result is that Facebook's Lulea data center is one of the most advanced and energy efficient with power usage efficiency (PUE) of just 1.05. It gets its electricity exclusively from hydropower and is thus 100% reliant on renewable energy resources. And it is clean.

Enhancing energy performance through simultaneous heating & cooling

Trane has created an innovative unit that offers an efficient and sustainable solution for achieving the transformation to a high performing building. Ideal for new constructions and building renovations alike, the Trane Balance™ multi-pipe unit delivers simultaneous heating and cooling by regaining and repurposing heat.

CLIENT DETAILS

25 hotels

Location : Southern Europe

EU-ASE MEMBER DETAILS

Trane (Ingersoll Rand)

“The Trane Balance™ Multi-pipe unit offers the most efficient and environmentally friendly technology on the market. The multipipe unit can provide simultaneous cooling and heating. Trane Balance™ Multi-pipe units can operate at more than 20 different combinations of cooling and heating load levels”.

Louis Rompre, Unitary Portfolio Manager,
Trane Europe

or renewable energy is used for heating. The first cost investment is lower than when using the traditional boiler+chiller and offers full energy recovery which is the best return on every kW/hour of electricity.

Our ability to recover energy to pre-heat the sanitary water and the swimming pool was also a strong point that helped us close the deal with a Hotel in the South of France.

In conclusion, when combining innovation, efficiency, and best long term environmental solution, with simultaneous cooling and heating, reliability, plus technical expertise and 24/7 service support, the Trane Multipipe unit becomes the best choice available.



Trane Balance™ multi-pipe unit



THE PROBLEM

Key Facts and Challenges

A set of hotels had to replace their existing heating and cooling systems composed by 15 years old boilers and chillers.

When the owner of a Hotel in the South of France decided to upgrade the hotel's heating and cooling systems, he faced considerable challenges. The initial investment for replacing both systems was very high. Additionally, he was looking for a solution that would allow him to recover and reuse energy as well as not taking too much space. Given these requirements and having in mind the considerable initial investment, the owner also wanted a system that would still respect government regulation for the next 20 years, with the lowest impact on the environment and limited exposure to refrigerant regulation.



THE SOLUTION

Transformation to a high performance building can be achieved through shifting from using a separate boiler and chiller to the Trane Balance™ multi-pipe unit, which makes simultaneous heating and cooling possible. The Trane multi-pipe unit offers the possibility to recover energy that would have been wasted and save money while reducing the impact on the environment. Either rejected energy is repurposed for heating



THE RESULTS

For a hotel, where the need for heating exists throughout the year, the multi-pipe unit offers the possibility to regain and repurpose heat (e.g. the heat produced naturally in a conference room filled with people can be used to heat the water in the hotel pool) and to produce the heat in a renewable way (e.g. in winter it works as an air cooled heat pump if there is only heating demand).

On average, after the deployment of Trane multi-pipe units, primary energy savings of 1,226,000 kWh resulted per hotel. The annual estimated energy cost savings are approx. € 44,000 per hotel and the annual carbon footprint reduction is calculated at 250 tons of CO2 emissions.

Using the Trane multi-pipe unit will trigger multiple indirect benefits as well. For example, by replacing several HVAC units with one multi-pipe unit, space is freed up for other uses. At the same time, it has a positive impact on employment, creating highly skilled jobs, training opportunities on the benefits of reusing waste heat and of renewable energy, as well as job security for service technicians as the unit operates all year round.

Industrial competitiveness: Kingspan renovates its own plants to achieve Net Zero Energy by 2020

Kingspan believes in leading by example. Since the introduction of their Net-Zero Energy initiative in 2011, which aims at improving energy efficiency, producing energy on site and purchasing renewable energy across its entire worldwide operations, various manufacturing sites have undergone deep renovation. Various solutions have been used that include energy efficiency measures such as high performance building envelopes and intelligent LED lighting, and renewable energy generation such as Kingspan Energy Rooftop solar PV and Kingspan Solar Thermal Panels. One such site that has undergone a deep renovation is its site in Selby UK. This success story presents the benefits of deep renovation of an industrial building owned by Kingspan themselves.



Kingspan plant in Selby



Kingspan Smart-Lite lighting system

CLIENT DETAILS

Kingspan

Location: Selby (United Kingdom)

EU-ASE MEMBER DETAILS

Kingspan



THE PROBLEM:

Key Facts and Challenges

In 2013 a building products manufacturing plant for high-performance insulation materials belonging to Kingspan Insulation in Selby, West Yorkshire, was chosen by the Group to be upgraded with a roof mounted PV system. The building however, needed a comprehensive programme of improvement with its old roof, inefficient lighting and a poor overall EPC rating of an 'F'.



THE SOLUTION:

First and foremost, the building required a replacement of the existing ineffective and inefficient roof with an enhanced insulated system. 30,000 m² of high-performance Kingspan Trapezoidal Roof insulated panels have been chosen to replace the old roof, delivering a low infiltration and weatherproof solution.

This was followed by an installation of an impressive rooftop solar PV system of a total size of 2.467 MWp. As part of its turnkey service, the Kingspan Energy expert team of PV engineers carried out detailed surveys of the structural strength of the roof. They designed, positioned and installed the systems' arrays to ensure maximum performance. The solar PV array covers over 15,000 m² of the roof space (equivalent to two and a half football pitches) and is expected to generate 2.14 GWh of electricity

per annum, making a significant contribution to powering the plant's electricity needs. The client also decided to opt for a 100% Kingspan Energy funded solution, that allowed for the system installation without any upfront capital cost involved (within the same build program as roof replacement).

Finally, a full LED lighting system upgrade took place. Kingspan Smart-Lite lighting system will allow to achieve major financial and environmental benefits and together with the roof mounted PV system, will provide the building with an effective and efficient solution to all of its energy needs.



THE RESULTS

Expected savings for the renovated building due to enhanced roof insulation, Solar PV and LED lighting system over the next 25 years amount to:

- Energy 79.2 Gwh(equivalent to 6,980 homes)
- Cost £5.2 million
- Emissions 34,895 tonnes

As a result of the project, the building's EPC rating has increased from an 'F' to an 'A'.

Knauf Insulation

How insulation cut Hungarian family's energy bill in half

Two families took part in an ambitious experiment in 2013-2015 organised by Knauf Insulation and scientists in Hungary to see exactly how much money could be saved through renovation. Two homes, comparable in size and occupancy, had their energy use measured for six months. One home was thoroughly insulated with Knauf Insulation. The second house that fell into the lowest 'Category G' of energy efficiency was left untouched. The house without insulation spent €835 on winter heating while the insulated house saw their energy bills cut by 46%. They spent a total of €455, adding up to a saving of €380.

CLIENT DETAILS

The Tikász family

Location: Hajdúnánás (Hungary)

"We are very happy that our house was insulated. As well as big cost savings on our bills, the insulation has also improved the acoustics of the building. We felt the difference even during the retrofit – it was a warm summer and our home was cooler and more comfortable inside".

EU-ASE MEMBER DETAILS

Knauf Insulation

"One effective way of improving a home's energy efficiency is to install insulation. In fact, simple wall and roof measures can cut by half the energy needed to heat and cool a building. This project set out to prove this point".

László Kanyuk, Knauf Insulation's spokesman in Hungary



THE PROBLEM

Key Facts and Challenges

Around 70% of the total natural gas consumption of an average household in Hungary is used for heating the building and around 85% of homes in Hungary fall into the lowest 'F' or 'G' energy categories.



THE SOLUTION

Two homes, comparable in size and occupancy and only 7km in distance, had their energy use measured for 6 months. The only difference was that just one home was thoroughly insulated with Knauf Insulation products – 25cm Glass Mineral Wool in the loft and 20cm Rock Mineral Wool boards on the facades. Scientists from the Budapest University of Technology, the Hungarian Energy Efficiency Institute and Pannon Building Workshop Ltd all worked closely

on the unique project constantly monitoring the energy use required to keep both homes at 22°C during the day and 19.5°C at night. Results were automatically updated online every 15 minutes.



THE RESULTS

The family who had undergone the renovation saw their energy bills cut by 46%. Their house is now a 'Category A' building, consuming 56 - 75kWh/sqm/year compared to 400-500kWh/sqm/year for the uninsulated 'Category F' building. The uninsulated house spent €835 on winter heating while the insulated house spent €455, adding up to a saving of €380.

What is significant is that the winter of 2013-14 was unusually warm. The average winter temperature in Hungary is normally 3°C lower. If this had been the case the benefit of the insulated house could have been much higher.

Not content with monitoring the energy savings of winter fuel consumption, Knauf Insulation also turned its attention to how the two homes behaved in the summer taking measurements from June to August.

During that period, the outside temperature versus indoor temperature of the two houses was monitored. The non-insulated house's inside temperature was more reactive to outside temperature changes, than the insulated one. The insulated house's inside temperature varied only in a 2°C degree range (the average internal temperature was 23°C) despite the outside temperature fluctuating between 20.5 and 40°C degrees, while the uninsulated house's inside temperature varied (during the same period) between 21.3°C and 26.8°C. If a pitched roof area is not insulated, the inside temperature of the roof can heat up to extremes. When the outside temperature was 37°C, the pitched roof area's thermometer in the non-insulated house showed 45°C degrees.



The Tikász family



Knauf insulation's material

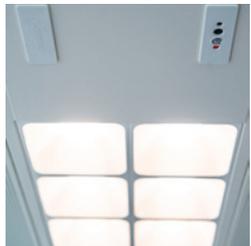
Philips Lighting

Connected office lighting system

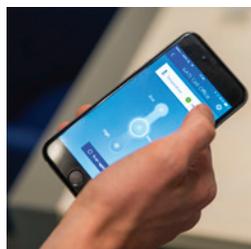
Lighting accounts roughly for 19% of the world's electricity use. Approximately 40% of all the electricity used in buildings comes from lighting. This is the reason why OVG Real Estate requested the support of Philips Lighting to develop a smart lighting system for Deloitte's HQ in Amsterdam.



The Edge



Philips Lighting connected system



Smartphone app connected to the lighting system

CLIENT DETAILS

"The Edge", a cutting-edge office building developed by OVG Real Estate for Deloitte.

Location: Amsterdam (The Netherlands)

"We are proud to implement and co-create this building management system together with leading companies to drive value for building owners, tenants and office workers. This project fits our ambition to stay in the driver's seat for sustainable office innovation."

Coen van Oostrom, Founder and CEO from OVG.

EU-ASE MEMBER DETAILS

Philips Lighting

"The LED lighting alone is 80% more efficient than conventional lighting. Personal control of the lighting by employees actually increases efficiency as general lighting levels can be kept lower. The potential savings on a building's operational costs will be significant, given that heating, cooling and lighting together account for 70% of a building's energy usage."

Jeff Cassis, Business Leader Professional Systems



THE PROBLEM

Key Facts and Challenges

Deloitte needed an innovative, more intuitive, comfortable and productive environment for its employees. Deloitte also wanted to raise the bar in data analytics with revolutionary insights in the use of office space, paving the way for offices worldwide to reduce their CO2 footprints.



THE SOLUTION

The world's first connected lighting system was installed at "The Edge".

The Philips Lighting connected lighting system uses Power-over-Ethernet (PoE) to connect office lighting fixtures to the building's IT network. The system acts as an information pathway, with sensors capturing anonymous data on room occupancy, temperature and humidity. At the same time it gives office workers more control

of their open-plan environment, aiding comfort and productivity.

The office lighting fixtures interface with other building systems such as heating, ventilation and IT services.

The facility manager has a single system showing real-time and historical views of building utilization. For example, he or she could see that, on a Friday afternoon, a particular floor is not used and adjust the temperature, lighting, and cleaning roster accordingly.

Having an integrated view of a building's occupancy patterns and energy usage provides for more informed decision-making with unprecedented levels of energy and operational efficiency.

The Philips Lighting system allows office workers to control the lighting in open plan offices as well as temperature in meeting rooms, to suit their individual preferences. Their smartphones will detect their location from overhead lighting fixtures via an app. The fixtures, outfitted with wireless communications devices, form a dense indoor positioning grid, like an indoor GPS, which support a range of location-based services, such as way-finding. Through a smartphone app, the system could also provide workers with useful information such as the nearest empty meeting room.



THE RESULTS

Deloitte's HQ in Amsterdam "The Edge" is the world's most sustainable building.

For building owners, the system offers new value that goes beyond energy-efficiency and cost savings; advanced capabilities such as indoor positioning combine with the intelligent system to enable comfort, personalization, and safety, increasing the total value of a building and making it more attractive to tenants.

Standards-based PoE-enabled fixtures also deliver significant cost savings on lighting installation. As these fixtures receive both data and power over a single Ethernet connection, there is no need for expensive electrical wiring, reducing installation costs by up to 50%.

The largest street lighting project in the world

The Government of the city of Madrid has the ambition of becoming a Smart City. Namely, the local Government identified lighting as one of the main causes for its high energy bills and inefficiency, but where cost-effective improvements can be easily achieved. 100% of Madrid's street lighting was converted while enabling the transition towards a safer, more sustainable and energy efficient capital.

CLIENT DETAILS

The Government of the city of Madrid

Location: Madrid (Spain)

"This will be the biggest technological renewal ever seen in Madrid City. A change that will allow achieving some important goals. The new lighting installation allows us to make significant progress towards becoming a smart city, which is more sustainable and, in conclusion, a more livable city."

Ana Botella, Madrid's mayor

EU-ASE MEMBER DETAILS

Philips Lighting

"The lighting renewal project in Madrid is a step forward in the creation of a city prepared for the future. Philips Lighting's contribution towards Madrid's efforts to become a smarter, safer and energy efficient city takes account of the needs of citizens and consumers by providing a lighting infrastructure that offers benefits beyond illumination."

Juan Sanabria, CEO



THE PROBLEM

Key Facts and Challenges

Madrid wanted to reduce its energy consumption, extending the lifespan of the city lighting and controlling light pollution by enabling the regulation of the intensity of light when and where it's needed. All of this at no additional cost to its citizens.



THE SOLUTION

The renewal process in figures:

- 225,000 street lights were replaced with Philips Lighting technology (including luminaires on avenues, streets, historic monuments and parks);
- 84,000 were locally manufactured Philips Lighting LED lamps and luminaires, including 51,000 globe-shaped lampposts and 33,000 LED plates to be installed within existing lampposts

- The remaining street lights were equipped with more energy efficient non-LED lighting solutions provided by Philips Lighting.

Replaced lamps and lampposts were recycled by Ambilamp in accordance with current regulations for the safe disposal of products containing heavy metals, such as mercury.



THE RESULTS

The city will save over 44% of its energy consumption after installation, which was completed in 2015.

The products will finance the cost of the technology upgrade providing the city of Madrid with the best quality of street lighting for a brighter, safer and smarter city at no additional cost to its citizens. The project has been conducted in collaboration with ESCO energy service companies hired by the Madrid city council through a public bidding process.

The new city lighting system benefits from a command panel capable of regulating the intensity and duration of lighting across the city according to where it is most needed.

This project will also boost the local economy as all the LED lamps were produced in the Philips Lighting Factory in Valladolid, creating 180 additional jobs.



Renewed street lighting in Madrid



Philips Lighting LED luminaire

The light as a service for Schiphol Airport

Thanks to an innovative partnership between Philips Lighting and Schiphol Group, the new lighting in the terminal buildings at the Amsterdam Airport were renewed at no cost for Schiphol authorities which just pay for the light they use.



New lighting system in Schiphol airport

CLIENT DETAILS

Schiphol Airport

Location: Amsterdam (The Netherlands)

“It is Schiphol's ambition to become one of the most sustainable airports in the world. We believe in a circular economy and want to play an active role in its realization. The collaboration with Philips Lighting marks a good step in this direction. Together we left the beaten path to develop an innovative, out-of-the-box solution. We set a new standard that matches the ambition level of the airport”.

Jos Nijhuis, CEO and president of Schiphol Group

EU-ASE MEMBER DETAILS

Philips Lighting

“We are pleased to make an important contribution to Schiphol's ambitious sustainability targets. We believe that more and more forward-thinking businesses will move to a Light as a Service model. After all, most of us are used to this kind of model - for example I drink water but I don't have a reservoir in my basement. Many people are used to pay-as-you-go models. Add to this considerable energy savings from LED technology and the sustainability of the overall system and the proposition is compelling.”

Frank van der Vloed, General Manager, Philips Lighting Benelux



THE PROBLEM

Key Facts and Challenges

Schiphol Group was looking for a sustainable solution for the new lighting in the terminal buildings at Amsterdam Airport Schiphol limiting costs, but improving safety and comfort for passengers.



THE SOLUTION

Philips Lighting proposed to consider the light as a service meaning that Schiphol pays for the light it uses, while Philips Lighting remains the owner of all fixtures and installations. Philips Lighting and Cofely will be jointly responsible for the performance and durability of the system and ultimately its re-use and recycling at end of life.

In association with architects Kossmann Dejong and Philips Design, lighting fixtures were specially developed for the airport to last 75% longer than other conventional fixtures as the design of the fixtures improved the serviceability and therefore improved the lifetime. In addition, the fixture components can be individually replaced. This will reduce maintenance costs and means that the entire fixture does not have to be recycled, resulting in the greatest possible reduction in raw material consumption.



THE RESULTS

By using energy-efficient LED lamps, a 50% reduction in electricity consumption will be achieved over conventional lighting systems.

By applying circular economy principles, Schiphol Group and Philips Lighting have created a new standard in the transition towards sustainable lighting.

The innovative light design also provides a better lighting experience and is part of an extensive renovation of the terminal intended to increase passenger comfort and capacity at Schiphol.

Schneider Electric

Le Hive and Art & Fact: the world's first building to meet new energy management standard ISO 50001

Schneider Electric is the worldwide specialist of energy management in buildings, factories, data center and energy network. We provide a combination of technologies, solutions and services that not only significantly improve energy efficiency but also address safety, comfort, satisfaction and productivity of people. We have implemented our own solutions, combining technologies such as control, monitoring, automation and data analysis for example, at the The Hive, Schneider Electric headquarters. We have done without interrupting the building activity. The building's average annual consumption per m² has fallen of 47%.

CLIENT DETAILS

Schneider Electric

Location : Rueil-Malmaison (France)

EU-ASE MEMBER DETAILS

Schneider Electric

"At Schneider Electric, we are convinced that the best way to prove the performance of our products and solutions is by testing them out on our own buildings. In a context of increasing energy costs, the HIVE demonstrates the potential savings that any building can make. In addition, this project is the proof that, thanks to intelligent solutions, energy efficiency goes hand in hand with user comfort."

Luc Rémont, President of Schneider Electric France



THE PROBLEM

Key Facts and Challenges

Buildings are responsible for 40% of annual energy consumption. As the global specialist in energy management, Schneider Electric's offering includes a complete range of technical solutions and services for smart management of buildings and optimization of their use. We are convinced that the way to prove the performance of our products and solutions is by testing them out on our own buildings. The HIVE objective was to demonstrate the potential savings that any building can make, and to prove that thanks to intelligent solutions, energy efficiency goes hand with hand with user comfort, safety and productivity.



THE SOLUTION

A clear understanding of energy consumption per zone of activity in a non-residential building is a necessary first step for any energy efficiency improvement. At the Hive, all the building's energies and systems share the same architecture, EcoStruxure™, and all are managed

by a shared control system, the Continuum Building Management System™ (BMS) which enables native integration of all systems through a shared IP3 network.

- Real-time monitoring of consumption for improved eco-performance: every 10 minutes, all these consumption readings are transferred to an energy monitoring portal, StruxureWare Energy Operation™, which provides information about the building's energy consumption, propose good practice and automatically process requests for action received from the building's occupants.
- Charging stations for electric vehicles: at the front of the building, parking spaces have been equipped with three dual stations for regular charging, and one fast-charging station for several electric vehicles.
- Integrating renewable energies: Schneider Electric fitted the Hive with a 90 m² photovoltaic solar awning that uses Schneider Electric's own technology.



THE RESULTS

The ISO 50001 certification was achieved as a result of the implementation of our own energy efficiency solutions, such as energy monitoring and control, efficient IT cabling, and motor control for pumps and fans. By integrating all buildings systems on the Hive, Schneider Electric's headquarters achieved to reduce energy consumption by 47%.

At The Hive, Schneider Electric demonstrates that implementation of the company active energy efficiency solutions, including sharp data analysis, daily monitoring and staff behavioural education have resulted into massive energy consumption reduction, effective water and waste management: 100% of waste is recycled or energy recovered.



The Hive, Schneider Electric's headquarters



EcoStruxure™, only one architecture system to manage all building energy

Energy efficiency in social housing in Reggio Emilia

Schneider Electric together with the social housing company of Reggio Emilia (ACER) have deployed WISER™ – an energy management box – in social housing, to improve householders' living conditions and achieve energy savings. Developed by Schneider Electric, WISER™ is a “plug and play” system which manages heating, electrical appliances and domestic hot water production while measuring and displaying its energy consumption. In 2014/2015, the average global saving for each apartment was 16.13%, and the global saving in gas consumption for all apartments was 26.6%. Easily replicable thanks to its excellent return on investment and simple architecture, our pilot case based on WISER™ is emerging as a reference for public authorities.



WISER, Schneider Electric “plug and play”

CLIENT DETAILS

ACER – Azienda Casa Reggio Emilia /Reggio Emilia Housing Company (Italy)

“ACER Emilia-Romagna manages over 80,000 apartments. The Emilia-Romagna Regional Government has approved, in December 2013, with investments for €100m, a social housing reform promoting energy efficiency. Up to at least 50% energy will be saved; up to €700 yearly less in the energy bill for each apartment and generalized smart energy efficiency technologies are being used. Thanks to systems like WISER™, it will be possible to move in the light renovation direction and make a first step of energy saving possible for a lot of buildings”.

Marco Corradi, President - ACER Reggio Emilia and Member of the Board of Directors HOUSING EUROPE

EU-ASE MEMBER DETAILS

Schneider Electric

“Energy efficiency – in Italy, with an annual average business value of around €5,200M - plays a strategic role to meet the Paris Agreement and the EU 2030 targets. Improving energy efficiency leads, like in Reggio Emilia, to innovative solutions, integrated technologies and increasing the living and services standards”.

Laura Bruni, Director - Influence and Government Affairs Italy



THE PROBLEM

Key Facts and Challenges

The targeted ACER social housing building, constructed in 1969, is composed of four above-ground floors, with six apartments.

ACER needed an energy efficient solution because of its mission priorities:

- Pursuing a policy of improving quality of neighborhoods by means of urban requalification projects;

- Researching innovative construction systems that make it possible to drastically reduce building and management costs, at the same time trying to find all-encompassing solutions in the social, environmental and economic sustainability;
- Proposing flexible housing solutions that correspond to the different needs of the citizens in the various moments of their lives;
- Increasing availability of social housing buildings;



THE SOLUTION

- Thanks to an immediate configuration and to its intuitive graphic interface for the final user, WISER™ has allowed a quick installation of all necessary devices in all six apartments.
- The smart control and regulation of the temperature in the apartments has been carried out through thermostats, digital valves, boiler and heating devices; Room by room management, for better comfort and efficiency one; Energy Button to switch the home in one click in energy savings mode.
- The Cloud technology has allowed continuity of the service and constant data accessibility (WISER™ Apps to control the home from everywhere).



THE RESULTS

The expected savings for the six buildings were between 10% and 20%, more than enough to provide a satisfactory return on the initial investment, i.e. less than €600. The average global savings for each apartment were of 16.13%, and the global savings in gas consumption for all apartments 26.6%, exceeding our expectations and delivering an excellent return on investment. This last figure translated into an annual savings of more than €300 by family on its yearly heating bill.

All figures have been certified by the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA).

Tour Majunga, a New SmartBuilding on La Défense Skyline

In the heart of La Défense – Europe’s largest purpose-built business district – stands the Majunga tower, owned by Unibail Rodamco. At 195 meters, Tour Majunga is the second-tallest tower in France, and is an open, bright, and environmentally friendly building. Schneider Electric, as the global specialist in energy management and leader in energy efficiency, played an important role in the Majunga project, providing the building with its electrical distribution system with digital services and solutions that bring greater efficiency and comfort. The SmartStruxure™ solution enables analysis and monitoring of the buildings performance throughout its entire life cycle. Thanks to the information provided by the WorkPlace Efficiency™ service, users can connect to the Majunga tower services portal, enabling them to remotely control the rooms’ lighting, temperature, and blinds from their smartphone.

CLIENT DETAILS

Unibail Rodamco, Majunga tower

Location: La Défense, Paris (France)

“Schneider Electric’s solution meets our expectations in a digital way, which is perfectly in line with our vision of the commercial property”,

Bruno Donjo de Saint Martin, Managing Director, Offices France at Unibail-Rodamco

EU-ASE MEMBER DETAILS

Schneider Electric



THE PROBLEM

Key Facts and Challenges

Challenges for the Majunga tower were to change working patterns, enhance employee well-being and productivity, and above all to reduce energy consumption and carbon footprint. Ever since its design phase, the Majunga project has aimed to create a building that enables its occupants to significantly reduce their energy consumption and carbon footprint. Specifically, the building has a primary energy consumption of less than 80 kWh PE/m²/year, which is five times more efficient than other office blocks. Its carbon footprint is four times lower than the average for buildings on the outskirts of Paris.



THE SOLUTION

- The integration of Schneider Electric’s building energy management system, SmartStruxure™ solution powered by StruxureWare™ Building Operation software, helping to achieve the very highest levels of space management and energy efficiency.
- Schneider Electric also implemented the WorkPlace Efficiency™ service, which through a network of sensors can adjust lighting and HVAC levels to optimise energy performance.



THE RESULTS

The building has a primary energy consumption of less than 80 kWh PE/m², which is five times more efficient than other office blocks. Its carbon footprint is four times lower than the average for buildings on the outskirts of Paris. In recognition of this, the tower won a BREEAM Award in 2012, which is the world’s foremost environmental assessments method and rating system for buildings.

The SmartStruxure™ solution enables analysis and monitoring of the buildings performance throughout its entire life cycle, bringing together control and management of the building’s energy distribution, HVAC, lighting, blinds and fire safety.

Thanks to the information provided by the WorkPlace Efficiency™ service, users can connect to the Majunga tower services portal, enabling them to remotely control the rooms’ lighting, temperature, and blinds from their smartphone.



Tour Majunga



SmartStruxure

Schneider Electric’s building energy management systems

Energy management system to ensure high levels of energy efficiency

With 15.8 mio square meters of floor space (2013) Siemens is also one of the world's largest real estate owners. The costs involved in running this enormous real estate inventory make up a significant proportion of Siemens' running costs and they impact directly the ability to compete successfully. A key to reducing these operating costs lies in improving energy efficiency - a goal Siemens Real Estate (SRE), the real estate company of the Siemens group, has been pursuing for years.



The Crystal



Siemens's Designo building management system

CLIENT DETAILS

The Crystal

Location: London (UK)

EU-ASE MEMBER DETAILS

Siemens AG

Jochen Schweitzer, Sustainability Manager



THE PROBLEM

Key Facts and Challenges

The Crystal was designed by architect Wilkinson Eyre to be one of the world's most sustainable buildings housing a conference center, a total floor area of over 6,300 square meter and a 2,000 square meter exhibition area. In line with Siemens Real Estate sustainability strategy, Siemens new builds should be at least 25% more energy efficient than local regulations prescribe, regardless of whether the building is a production plant or an office building.



THE SOLUTION

Additionally to a wide range of measures, such as solar panels, heat pumps, and roof-mounted photovoltaic, Siemens' own Designo building management system is used to ensure high levels of energy efficiency.

The Siemens building management system, Designo is used to control all heating, ventilation, air conditioning and lighting in the Crystal.

21 free programmable controllers integrate 3,500 data points from sensors, meters and actuators in order to control operation of two ground source heat pumps, air handling units, a natural ventilation system, several heating and cooling distribution systems including e.g. chilled beams, all lighting systems, domestic hot water preparation including renewable energies from solar thermal panels etc.

Board room and conference rooms are fitted out with individual room controllers and graphic room operation touch panels to control climate, blinds and lighting scenarios. KNX, BACnet and Dali networks are used to integrate all room systems and communicate all information to the central management station

Designo CC is used as management station beside the BMS controllers also integrates Fire Safety and Video Surveillance systems including an intelligent perimeter supervision system. All systems are controlled from the central command and control room.



THE RESULTS

The Crystal is an all-electric building as it doesn't burn any fossil fuels for the generation of heating or cooling. Instead it employs two ground source heat pumps which obtain the energy necessary for the climatization of the building exclusively from renewable sources. The Crystal includes a geothermal pipe network in the ground below the building and 1600 m² photovoltaic panel on its roof which provide 99% of the required energy. Equipped with these active systems in energy generation and distribution and many passive systems in the building envelope the Crystal is able to reduce its energy consumption by 42% and its GHG emissions by 71% compared to a building equipped with standard technologies.

Ensuring comfort

Built between 1962 and 1967, a skyscraper in Brussels undertook a renovation to improve its outdated energy system, reduce its carbon footprint and increase its real estate value. Through the stipulation of an Energy Performance Contract, Veolia was responsible for implementing a multiannual plan for maintenance and renewal.

CLIENT DETAILS

Tour du Midi

Location: Brussels (Belgium)

“Since these installations were put into place in the Tour du Midi, the results were more than convincing since 2008, we cut fuel consumption by 37 % and electricity production by 29% which corresponds to a CO2 emissions reduction of 6017 tons (equivalent to that of 4233 cars or 1800 houses).”

Sarah Scaillet, General Administrator of the National Office of Pensions (ONP)

EU-ASE MEMBER DETAILS

Veolia

“In Northern Europe, the economic impact of global warming cannot be overlooked. Hence, energy efficiency has become a major issue: it is about consuming less energy while maintaining the same level of comfort. Veolia develops for its clients innovative energy production techniques. Through thermal regulation, the installation of heat pumps and a cogeneration systems, The Tour du Midi achieved substantial energy savings.”

Patrick Labat, CEO, Veolia Northern Europe



THE PROBLEM

Key Facts and Challenges

The Tour du Midi is one of the highest towers in Belgium, 150m high, 38 floors, 62,000 m2 of floor space and can accommodate about 2,500 office workers. The client wanted to improve the overall energy performance of the building while ensuring user comfort. In particular, the client requested to:

- Monitor the energy consumption, optimize all energy installations and set long-term plans in terms of energy savings
- Reduce the impact of the volatility of energy prices
- Educate staff on energy savings
- Increase the building's value
- Reduce emissions by at least 1,500 tons of CO2 per year.



THE SOLUTION

The reduction in energy consumption was achieved through the definition of an Energy Performance Contract and the creation of an Energy Team ONP/Veolia under control of an Energy Manager.

Under these conditions, the following results were achieved:

- Definition of an action and investment plan
- Deployment of 70 smart meters to monitor and control energy consumption
- Analysis of energy consumption and subsequent proposals of new energy projects related to the ultimate goals
- Installation of a heat pump (600 kW) and of a 200 kW cogeneration power system.



THE RESULTS

Veolia implemented a multiannual plan for maintenance and renewal.

The customer gets a comprehensive view of the energy consumption thanks to a user interface and comprehensive reporting of performance levels achieved.

During the first 4 years of the contract the following results were achieved:

- 37% fuel consumption (from 760,000 liters in 2009 to 440,000 liters in 2013)
- 29% electricity consumption (from 8,900 MWh in 2009 to 6,300 MWh in 2013)
- Reduction of 6,017 tons of CO2
- In addition, users were educated and empowered in reducing energy consumption.



Tour du Midi



Veolia's heat pumps and cogeneration system

Renovation of heating plant in hospital

The old central heating plant fed a stem network, which provided heat to the entire site of the Erasmus Hospital in Brussels. It was substituted to reduce energy consumption under an Energy Performance Contract stipulated with Veolia.



Hospital ULB Erasmus



Veolia's cogeneration motor with gas

CLIENT DETAILS

Hospital ULB Erasmus

Location: Brussels (Belgium)

EU-ASE MEMBER DETAILS

Veolia

"This contract illustrates how Veolia can serve clients in the tertiary sector. This project also illustrates the importance how important it is to reason in terms of primary as opposed to final energy saving, that do not take into consideration all potential gains resulting from investments in modernization of production and distribution of heat and electricity".

Pierre Eymery, Head of Public Affairs at Veolia



THE PROBLEM

Key Facts and Challenges

The site of the Erasmus Hospital in Brussels covers a hospital complex with 1000 beds and a number of university buildings. The central heating plant feeds a stem network, which provides heat to the entire site.

The evident inefficiencies and loss of the system forced the Hospital to substitute and renew it under the following requirements:

- Reducing costs associated with infrastructure (130,000m²)
- Ensuring visitors' comfort
- Ensuring reliable production from energy installations
- Improving performance of the thermal power station and heat distribution



THE SOLUTION

Veolia proposed a complete renovation of the heating plant and heating network by converting steam-based heating equipment into hot-water heating with installation of 2 cogeneration motors with gas (1.4 MWe each one). Veolia ensured funding and the guarantees of results.



THE RESULTS

While ensuring management, maintenance and total guarantee of the 2 motors for a 15 years period, Veolia allowed the Erasmus Hospital in Brussels to save 18% on gas and electricity bills.

In addition, via the Energy Performance Contract stipulated, Veolia guarantees performance of the power station and, therefore the savings generated thereby.

It also created new jobs opportunities as a team of 15 people are based on site and present 24h/24 since 2008 to ensure a proper security service.

University of Ghent: warranty on energy savings

UGent is a pluralistic educational institution with 14 sites in and around Ghent. As an energy conscious college, UGent needs a partner that can take energy saving measures in a proactive manner.

CLIENT DETAILS

UGent

Location: Ghent (Belgium)

EU-ASE MEMBER DETAILS

Veolia

"Veolia is proud to help the University of Ghent achieve its commitments to continuously improve its energy performance and hence contributing to climate change mitigation: In the framework of an innovative contractual framework, Veolia provides performance warranties on energy saving and 70% of produced heat through biomass/cogeneration".

Gérald ROY, CEO Veolia Belgium



THE PROBLEM

Key Facts and Challenges

UGent comprises more than 41.000 students and 900 staff members. The evident inefficiencies of the outdated heating system brought the University to look for a private partner which would be able to modernize the installations in order to achieve simultaneously sustainability (by relying on biomass), comfort and cost-efficiency.



THE SOLUTION

Veolia implemented an integrated solution through an action plan comprised of several steps and encompassing the management of fuel, electricity and water consumption.

- Replacement of existing boilers by condensing gas boilers and biomass installations on 2 sites
- Development of an efficient energy system through the collection of energy data and the setting of performance warranties
- Daily management and preventive maintenance to enhance the life expectations of the installations
- Treatment and bacteriological monitoring of the water used in the central heating installations as well as in the cooling towers.



THE RESULTS

Through the maintenance contract and the commitment on energy saving, the project allowed UGent to effectively cut its CO2 emissions by 57%, leading its partner to emit 1500 tonnes less CO2 every year. 70% of heat production is now ensured through biomass / cogeneration.

In addition, the energy savings thus achieved cut UGent's water, gas and electricity bills by 5%.



University of Ghent



Veolia's condensing boilers and biomass installations

About EU-ASE



EUROPEAN ALLIANCE TO SAVE ENERGY

Creating an Energy-Efficient Europe

About EU-ASE

EU-ASE was established in December 2010 by some of Europe's leading multinational companies. The Alliance creates a platform from which our companies (1E, Danfoss, Ingersoll Rand, Kingspan, Knauf Insulation, Opower, Philips, Schneider Electric, Siemens and Veolia) can join with politicians and thought leaders to ensure the voice of energy efficiency is heard from across the business and political community.

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