

Best practice guide for Renewable Energy Transition of SMEs

Deliverable number: D.1.2.1

Date: 31 December 2024

**Interreg
Danube Region**



**Co-funded by
the European Union**



SMEnergy

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1. Introduction

1.1 About the Energy Transition Project for SMEs



The [Interreg Danube SMEnergy project](#) focuses on the crucial role that institutions play in supporting small and medium-sized enterprises (SMEs) to achieve sustainable energy goals and reduce their carbon footprint. SMEnergy aims to equip institutions with the knowledge, resources, and strategies necessary to guide SMEs in transitioning to renewable energy sources effectively.

Many energy-intensive SMEs struggle with the shift to renewable energy. For one, they face difficulties in identifying reliable suppliers and navigating the necessary steps, especially considering the varying supplier qualifications across the Danube region. In the midst of an energy crisis and increasing decarbonisation pressures, these businesses receive far too limited support. To address this gap, the project will establish a pilot network of regional service centers designed to assist SMEs in their renewable energy transition. This will include a tailored “energy transition roadmap”, adaptable to different levels of maturity.

Through transnational collaboration, the project will create a Green Energy Knowledge, Operation, and Service Hub (GEKOS), which will provide institutions with a centralised, single-channel service platform, a cross-border database, and a marketplace to streamline support for SMEs. The ultimate goal is to develop national and transnational strategies, along with accessible toolkits, to enhance institutional capacity in supporting SMEs with renewable energy adoption. The project’s innovative aspect lies in its integration of comprehensive energy knowledge and a simplified service model, showcased through the partnership between energy agencies and business support organisations.

1.2 About the SME Energy Transition Best Practices Catalogue



This catalogue serves as a comprehensive guide for SMEs looking to adopt best practices in energy transition. It provides a compilation of successful strategies, case studies, and actionable steps that SMEs can implement to improve their energy efficiency and integrate renewable energy sources into their operations.

1.3 Global Challenges and Opportunities in Energy Transition for SMEs



SMEs worldwide face challenges in transitioning to sustainable energy, including high initial costs, lack of expertise, and regulatory hurdles. However, the global push towards a greener economy presents significant opportunities for SMEs to innovate, reduce costs and enhance their market competitiveness.

2. Key Terms

Energy Transition: Energy transition refers to the process of shifting from traditional energy sources like fossil fuels to renewable energy sources - such as solar, wind, and bioenergy.

SMEs (Small and Medium-sized Enterprises): SMEs are defined as businesses with fewer than 250 employees, an annual turnover not exceeding 50M EUR, or a balance sheet total of no more than 43M EUR. They play a critical role in the economy and are key to advancing the transition to sustainable energy solutions.

Sustainable Energy Practices: The Interreg Danube SMEnergy project's primary objective is to transition to renewable energy sources. Consequently, all energy efficiency measures outlined in this document are accompanied by the introduction of renewable energy. It is also recognised that non-consumed energy can play a role in achieving climate neutrality targets without the introduction of renewable energy sources.

The Danube Region: 14 countries across Central and Eastern Europe, is a focal point for transnational cooperation, especially in advancing sustainable energy practices and supporting the energy transition. The Interreg Danube Region Programme (DRP), funded by the European Union, empowers nations within the region to address shared challenges and capitalize on opportunities through innovative projects.

3. Models of Energy Transition and Related Projects

This section explores various models to facilitate energy transition among SMEs.

3.1 Axis Bentonit Ltd. (Hungary) - “A comprehensive approach”

Company Overview and Context



Axis Bentonit is located in Pétervására, Hungary (NUTS 2 region). It produces bentonite-based products, including pet litter, animal feed additives, natural cosmetics, and therapeutic animal care products. (Bentonite is a type of absorbent clay formed from volcanic ash. It's primarily composed of the mineral montmorillonite and is known for its ability to absorb water and swell.)

The company has over 50 employees and has significant exports to Serbia, Croatia, and Slovakia. The practice focuses on transitioning to green energy to improve efficiency and reduce costs.

The core issue addressed by this good practice is the high energy consumption and costs in the company's production processes, particularly for drying bentonite. The traditional methods were energy-intensive and relied heavily on natural gas, whose prices tripled over recent years. This increase, combined with rising electricity costs, posed significant

financial risks. The transition to green energy was driven by both economic pressures and environmental considerations, aiming to reduce dependency on volatile energy markets and align with sustainability goals.



Energy Efficiency Measures Axis Bentonit implemented multiple energy efficiency measures:

1. Transitioned from gas-powered to electric and solar-powered drying systems, significantly reducing reliance on natural gas.
2. Introduced microwave drying technology, which consumes 29% of the energy used by the former gas-operated systems.
3. Installed solar panels, enabling the company to feed 50 kW of power back into the grid and use an additional 50 kW internally.
4. Employed passive drying methods, heat pumps, and LED lighting to further optimize energy use. These steps collectively improved control over production costs and contributed to the company's environmental goals.
5. The company uses an energy management system to monitor monthly energy consumption and costs, ensuring efficient use of resources.

Resources and Implementation

The transition to green energy was supported by EU grant and included two main investments:

- Microwave drying technology.
- Solar power system (50 kW and additional capacity)

Outcomes and Impact

The practice is considered successful for several reasons:

- The company achieved a **36% reduction in specific energy consumption**, saving 748 MWh annually.
- The energy costs, which previously accounted for 32% of total production costs, have been reduced to 22%, resulting in a **16% reduction in overall utility costs**.
- The reliance on natural gas has halved, minimizing the company's exposure to energy market fluctuations.
- Additionally, Axis Bentonit achieved energy independence by being able to shift production entirely to electricity if gas supply issues arise.

Challenges, Risks, and Transferability

Technological Feasibility and Infrastructure:

- The microwave drying technology, while promising, carries high costs and risks of malfunction, potentially causing financial losses.

- Outdated electrical infrastructure and limited energy storage capacity hinder the full utilization of renewable energy.

Financial Risks:

- The transition to green energy requires costly technologies and infrastructure, which are difficult for SMEs to finance.
- Volatile energy prices pose significant financial risks, especially in competitive markets.

Regulatory and Market Risks:

- Changes in energy feed-in regulations can affect investment returns.
- Slow regulatory processes and reliance on energy suppliers complicate the adoption of efficient solutions.

Knowledge Gaps:

- A lack of expert advice makes it challenging to select the best technologies, exacerbated by the absence of free energy consultancy.

Market Limitations:

- High transportation costs and export market constraints may reduce the full benefits of the green energy transition.

Advice for transfer: This practice demonstrates the potential of combining various green energy technologies to achieve both economic and environmental benefits. Other regions can learn from Axis Bentonit Kft.'s approach by:

- Investing in renewable energy to reduce operational costs and environmental impact.
- Utilizing grants and government support to finance large energy projects.
- Implementing energy management systems for real-time monitoring and control of energy consumption.

3.2 Best Practice 2 - Austria - “Sonnenerde GmbH”

Company Overview and Context

Name: Sonnenerde GmbH

Location: Riedlingsdorf (Burgenland), Austria

Size: 25 employees



Sonnenerde GmbH was founded in 1998 and is based in Riedlingsdorf, Burgenland, Austria. The company specialises in the production of high-quality soils and substrates, with a strong focus on sustainability and environmental responsibility. The standout practice of Sonnenerde is their development and operation of an industrial-scale plant for producing biochar—a form of charcoal used to enhance soil fertility and sequester carbon dioxide

(CO₂). This facility is among the first of its kind in Europe, capable of producing approximately 2,000 tons of biochar annually. The core challenge that led to this innovation was the need to find sustainable methods to improve soil quality while actively reducing atmospheric CO₂ levels. Traditional soil enhancement methods often rely on peat, the extraction of which releases significant amounts of CO₂ and depletes natural carbon sinks. By producing biochar from organic waste materials, Sonnenerde not only enhances soil fertility but also sequesters carbon, thereby contributing to climate change mitigation.



The introduction of this practice was influenced by several factors:

- **Environmental:** The pressing need to combat climate change by reducing greenhouse gas emissions and enhancing carbon sequestration.
- **Economic:** The opportunity to create value-added products from organic waste materials, thereby reducing disposal costs and generating new revenue streams.
- **Regulatory:** Increasing governmental and societal pressure to adopt sustainable practices and reduce carbon footprints in industrial operations

Energy Efficiency Measures and Implementation

New thermostats have been installed in the halls, allowing for improved control of the fan heaters and enabling zone-specific regulation. Additionally, a needs-based reduction in room temperature tailored to the building's requirements has been implemented, and the control system has been adjusted accordingly. The hydraulic system has also been optimized to enhance the temperature differential between the flow and return circuits,

while various pumps have been adjusted to operate at one or two lower output levels. Additional planned measures from September 2024 to March 2025 include the installation of a new carbonization plant and the expansion of drying capacities. Furthermore, additional photovoltaic (PV) capacity of approximately 150 kWp will be added, complementing the existing capacity of 375 kWp.

Existing supply contracts with Burgenland Energie AG already ensure that 100% of the electricity used is accounted for as renewable. The planned expansion of the photovoltaic system aims to cover approximately 70% of the annual electricity demand with the company's own PV system, further reducing dependence on (external) energy suppliers

Outcomes and Impact

The company is among the global leaders in biochar production. It has been recognized as one of the Top 100 in the XPRIZE competition and has received prestigious awards such as the Energy Globe Award in Austria and the Burgenland Innovation Award. With the development of the world's first completely reimagined industrial plant—spanning from the processing of residual biomass to the delivery of finished products—the company sets new standards. Particularly noteworthy is that emissions are entirely eliminated in the plant's design

Challenges, Risks, and Transferability

One of the three production lines has been in operation for 1.5 years, providing valuable insights and optimizations that are now being incorporated into the new production units. The company emphasizes that the topic of biochar deserves much more attention, as it represents an excellent opportunity to take active measures for CO₂ sequestration and climate protection. Awards play an important role in this context, as they help reach more people, attract attention, and accelerate the large-scale implementation of this approach. Additionally, CO₂ certificates are a central part of the business model, making such honors an opportunity to identify potential buyers for these certificates. According to feedback, the company has invested €4.5 million in the operational implementation of energy- and environmentally-efficient measures.

3.3 Best Practice 3 - Austria - “Wolf Nudeln GmbH”

Name: Wolf Nudeln GmbH

Location: Güssing (Burgenland), Austria

Size: about 100 employees

Company Overview and Context

Wolf Nudeln GmbH (Limited) is an energy self-sufficient company and its production is completely CO₂-neutral. They are the only pasta producer to use only freshly cracked eggs from their own henhouse. The feed for the chickens comes from their own farm and from regional farmers. Both the electrical energy required and the thermal energy for drying the pasta are generated entirely by the company's own biogas plant. This is fuelled by the available resources of

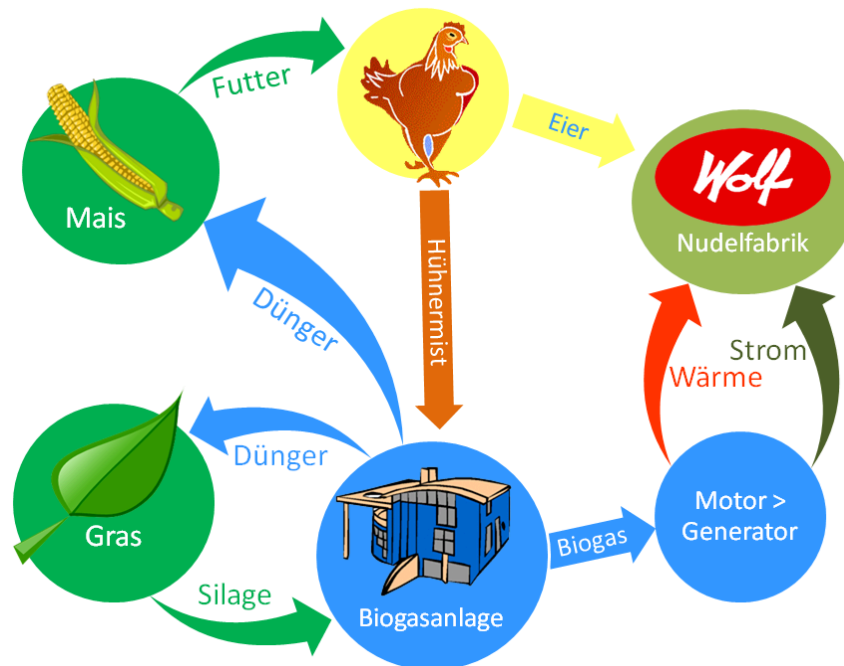


chicken manure and grass cuttings from their own and regional farms. The surplus electrical energy is fed into the electricity grid. Thanks to the sensible utilisation of thermal energy in the form of waste and cooling heat throughout the year, the efficiency of Wolf's biogas plant is significantly better than that of comparable plants. The fermentation end product from the biogas plant is spread back onto the field as a natural fertiliser.



Energy Efficiency Measures and Implementation

Wolf Nudeln GmbH in Güssing stands out for its significant investments in renewable energy and sustainable production methods. As part of its energy recovery strategy, the company operates its own biogas plant, which converts manure from its in-house poultry farming into electricity and heat. This ensures that the entire energy demand of production is met while maintaining carbon-neutral operations. This commitment is part of a comprehensive circular economy approach that minimizes waste and optimizes resource efficiency. Additionally, Wolf Nudeln places great emphasis on using regional products, reducing transportation distances and supporting local agriculture. Through these initiatives, the company seamlessly combines tradition with innovation, positioning itself as a pioneer in sustainable food production.



The in-house biogas plant of Wolf Nudeln GmbH, implemented between 2008 and 2010, is a cornerstone of the company's sustainable energy concept. With an electrical capacity of 500 kW, the plant generates approximately 1,000,000 kWh of renewable methane annually. It covers peak loads of up to 600 kW thermal power and an average load of 360 kWh. This innovative use of biogas enables the company to meet a significant portion of its energy needs in a carbon-neutral manner. Since 2018 the company has replaced conventional plastic packaging with innovative paper packaging, becoming a pioneer in using the mono-material paper Axello®ZAP. This special paper, developed in collaboration with Syntegon Technology and BillerudKorsnäs (Sweden), allows for easy recycling with less than 5% sealing material. The switch to paper packaging is an important step in reducing plastic waste and is part of Wolf Nudeln's comprehensive sustainability strategy, which has focused on carbon-neutral and energy-autonomous production since 2010.

Outcomes and Impact

90% of Wolf Nudeln GmbH's energy consumption is dedicated to pasta production, 5% is used for building operations, and another 5% for pasta transport. Energy costs account for 16-25% of total costs and therefore represent a crucial factor for the company. According to feedback, the company has invested €2.5 million in the operational implementation of these energy- and environmentally-friendly measures.

Challenges, Risks, and Transferability

The implementation of Wolf Nudeln GmbH's sustainable energy practices, particularly the biogas plant, involved some challenges. Technically, integrating the plant was demanding, as it needed to handle peak loads of 600 kW and an average load of 360 kWh. Financially, the high initial investment posed a risk, compounded by fluctuating energy prices and maintenance costs. Regulatory requirements, such as permits and compliance with environmental standards, also required significant time and resources.

The measures implemented by Wolf Nudeln GmbH are well-suited for regions with access to agricultural by-products like manure or grass clippings. Companies should carefully evaluate their energy needs and available resources before investing. Partnering with experts and leveraging subsidies can help overcome technical and financial challenges. In the long term, such projects offer clear benefits, including lower energy costs, independence, and a sustainable reduction in CO₂ emissions.

3.4 Biobäckerei Wagner's Electric Transport Fleet (Germany)



Company Overview and Context

Name: Biobäckerei Wagner

Location: Zugsberg, Germany

Size: 150 employees

Main activities: Production of baked goods for restaurants, supermarkets and five cafes/retail outlets

Biobäckerei Wagner delivers baked goods to restaurants/cafes, supermarkets, and its five retail outlets from its factory in Zugsberg, Germany 360 days of the year. Its most challenging delivery route is a 500 km round trip to Munich, meaning the bakery's

transporters can drive up to 180,000 kilometres annually. Previously, the bakery relied on diesel-powered vehicles for its fleet of 11 transporters. However, determined to align its operations with its eco-conscious values, Biobäckerei Wagner is now fully electric - fuelled by electricity generated directly from the bakery's own 328kWp rooftop solar system. In just over six months, the shift has resulted in a reduction of 260 tonnes of CO₂ – equivalent to planting approximately 7,750 trees and the investment saves the bakery approximately €15,000 monthly in fuel and maintenance costs.

Energy Efficiency Measures

In June/July of 2022, when diesel prices surged to around €2.30 per litre, Biobäckerei Wagner was spending nearly €30,000 per month on fuel alone. To counter the rising costs and reduce its environmental footprint, the bakery tested an electric transporter (EV) on a 150 km daily route. This short route required no en-route recharging, making it a practical and efficient starting point. Encouraged by the positive results, Biobäckerei Wagner gradually replaced all 11 diesel-powered transporters with electric transporters. In addition to the delivery fleet, the bakery also operates six sales vans (food trucks) for weekly markets – two of which are already electric. There are plans to replace the remaining four in the near future.

A key advantage of the switch to EVs is the bakery's ability to charge its vehicles directly from its existing 328kWp rooftop solar photovoltaic (PV) system. Deliveries take place between 3 a.m. and 10 a.m., allowing the EVs to be plugged in during the day when the sun is at its peak and eliminating the need for additional energy storage. Impressively, this integrated system of solar power and electric transport has made Biobäckerei Wagner 77% energy self-sufficient.

Resources and Implementation

The entire project was self-financed with the local bank and amounted to a cost of approximately €1.2 million. The estimated payback period is 12 to 13 years (excluding interest). The key components of the system include:

- 328kWp solar panels (€450,000)
- 10 EV charging points (€50,000)
- 11 Ford E-Transits and 2 electric sales vans (€50,000 each)

There was no formal concept. The bakery's primary goal was simply to generate as much electricity as possible from its rooftop solar panels. Then, due to the high diesel prices the bakery began exploring options to reduce its energy bill. Before the first step was taken, it was crucial that the factory manager supported and understood the technology – something that was easier because he had already been driving an electric vehicle for five years. Additionally, it was important that the PV system could meet the energy demands of the fleet.

The focus for the future is replacing the four remaining diesel sales vans with electric vehicles and exploring the integration of an energy storage system for greater self-sufficiency.

Outcomes and Impact

Financial: The switch from diesel to electric transporters that are charged by the bakery's own solar PV system has resulted in significant financial savings. The two main areas of savings are:

Fuel Savings: By substituting diesel with electric vehicles Biobäckerei Wagner saves approximately €7,000 per month.

Reduced Maintenance Costs: In 2023, the bakery's vehicle maintenance costs amounted to €95,000. However, for 2024 (up until October), the costs have significantly dropped to €35,000. One of the most notable savings is in brake replacements. With diesel vehicles, new brakes were needed every 30,000 km. In contrast, thanks to regenerative braking, the first electric transporter which is approximately 2 years old, just received new brakes after 125,000 km.

Environmental Impact: By replacing diesel-powered vehicles with electric ones and using renewable energy, the bakery has reduced its CO₂ emissions by approximately 260 tonnes in just 10 months. This is equivalent to planting around 7,750 trees.

Social Impact: The bakery's innovation has garnered widespread recognition. The transition to an electric transport fleet has attracted attention from both media and customers, enhancing the company's visibility and reputation. Ford spent two days filming a commercial featuring the bakery, while major media outlets such as BR (television), Der Bild Zeitung, and Passau Neuer Presse (newspapers) have covered the bakery. Additionally, customers ask about the progress and success of the electric fleet, many appreciate the environmentally conscious move, and new customer relationships have been established as a result of the green initiative.

Challenges, Risks, and Transferability

Despite the many benefits, transitioning to an electric fleet has not been without its challenges. It's important to recognize that an electric fleet may not be suitable for everyone. The fleet complements the bakery's operating hours. In saying this the bakery confronted and overcame a number of risks throughout the transformation process:

Technology: failure of the vehicles and perception by the drivers. To mitigate potential issues, Biobäckerei Wagner has kept a diesel vehicle in reserve as a backup in case any problems arise with the electric transporters. Additionally, there has been a significant learning curve, especially among drivers who are predominantly over 60 years old. Initially sceptical of the change, many drivers began to appreciate the advantages of the new vehicles once they were introduced, leading some to volunteer to drive them.

Range Anxiety: One common concern with electric vehicles is range anxiety. For longer routes, such as the 500km trip to Munich, the transporters require a quick 20-minute charging stop along the way. Drivers typically use this time for their mandatory breaks, effectively integrating the charging into their schedules.

For businesses considering a similar transition, Biobäckerei Wagner offers two key pieces of advice:

- **Test the Concept:** Start by purchasing an electric vehicle for personal use to evaluate its practicality.
- **Start Small:** Begin with one electric vehicle and gradually expand the fleet as confidence and experience grow.

3.5 Robotehnika d.o.o - Automation company (Slovenia)



Photo: Appearance of the company's building

Company Overview and Context

Name: Robotehnika d.o.o

Location: Markovci, Slovenia

Size: 50 employees

Main activities: CNC Production, Hydraulics (mostly work for the larger company Palfinger in Maribor), Product Automation (product line at customer's request).

Robotehnika d.o.o. is an engineering company based in Markovci, Slovenia, that has established itself as a reliable partner for complex industrial projects, particularly in CNC production, hydraulic system design, and custom product automation solutions. Since its inception, the company has focused on technical excellence and innovation to serve industries with precision-engineered solutions that enhance operational efficiency and reliability.

The core challenge that led Robotehnika d.o.o. to adopt this best practice as a power source was the high energy demand associated with their intensive CNC production, hydraulic systems, and automated machinery. Their operations require power, especially during working hours in the morning, when the workforce is fully engaged in production activities. The demand during these times led to high electricity costs and an

over-reliance on the external power grid, creating both operational and economic pressures for the company.

Energy Efficiency Measures

Robotehnika d.o.o. has taken significant steps toward energy efficiency and carbon reduction, centred around its solar power plant and strategic investments in energy-efficient machinery and climate control systems. Here's a closer look at their approach:

As a primary measure to reduce dependence on the grid and reduce operating costs, a solar power plant was installed in 2019 (before Covid). The solar power plant cost 140,000€ and currently saves about 45% per year, which results in significant energy savings. This system ensures a significant reduction in their carbon footprint. When the power plant produces more electricity than the building consumes, the surplus is returned to the electricity grid and sold on the energy market. This not only offsets costs, but also creates a new revenue stream for the company, making the solar installation financially sustainable in the long term. As part of their broader efficiency strategy, Robotehnika d.o.o. invested in energy-efficient heating and cooling systems for their facility. Climate control systems, particularly for industrial environments, are often significant energy consumers. They have also modernised its production equipment, replacing older machines with newer, energy-efficient models. These machines are designed to operate with optimised energy cycles, requiring less electricity per production unit. The new equipment functions in smaller, more controlled cycles.

Resources and Implementation

The company's practice in the field of renewable energy sources was financed with a combination of 80% internal capital and 20% subsidy SPIRIT (Public Agency of the Republic of Slovenia promotion of investment, entrepreneurship and internationalisation). The project was carried out with the expertise of qualified contractors who ensured high quality installation and integration. They are very satisfied with the financial structure and qualified workforce for installation.

Outcomes and Impact

The company's energy efficiency practice has proven to be an effective, sustainable solution that increases operational efficiency, lowers costs and reduces environmental impact that are:

- 45% reduction in electricity demand on the grid,
- around 100,000 kWh of renewable energy produced per year,
- 140,000€ initial investment, with potential revenue from energy sales to offset costs,
- roughly it is estimated that 40-50 tons of CO₂ emissions are saved annually.

Challenges, Risks, and Transferability

The company Robotehnika d.o.o. experienced a smooth and successful implementation of its solar power plant and energy efficiency upgrades without any major obstacles. This

flawless realisation can be attributed to careful planning, experienced contractors and a clear harmony between the company's goals and the chosen renewable energy solutions.

3.6 Hanželič d.o.o - Metallurgy (Slovenia)



Photo: Solar panels on the roof of the company

Company Overview and Context

Name: Hanželič d.o.o

Location: Markovci, Slovenia

Size: 26 employees

Main activities: CNC metal processing, laser cutting, measurement and control, turning, metal welding, sheet metal bending.

This company already produced solar panels little before 2010 because they wanted to save more on electricity and take care of nature, but above all to become a company with innovative ideas and to be in step with the time.

Energy Efficiency Measures

Although Hanželič d.o.o. is not currently taking significant steps to improve energy efficiency or reduce carbon emissions, the company can still benefit from step by step changes. Implementing energy audits, upgrading to more energy-efficient technologies, and exploring renewable energy solutions can help them reduce costs, improve sustainability, and future-proof their business against rising energy prices. They save less than 10% on energy.

Resources and Implementation

Hanželic d.o.o. financed its energy efficiency initiatives primarily through a combination of a loan, which is set to expire next year, and subsidies from Borzen, the Slovenian energy market operator that supports renewable energy and energy efficiency projects. They had some challenges with the expertise and skills of the contractors and also with the documentation. Energy efficiency and renewable energy practices were less developed over a decade ago, and specialised training and technical expertise in these areas were not as widespread.

In the years since their project, industry standards and training for renewable energy and efficiency have advanced greatly, making it easier to find qualified professionals.

Outcomes and Impact

While Hanželič d.o.o. see some small improvements in energy costs and environmental impact, the modest savings of less than 10% suggest that the practice was not fully successful. With strategic adjustments—such as expanding renewable capacity, upgrading equipment, and working with skilled contractors—they could achieve more meaningful gains in energy efficiency and cost reduction in the future.

Challenges, Risks, and Transferability

Hanželič d.o.o. faced several obstacles during the implementation of their energy efficiency practices. These challenges were technical, bureaucracy and regulatory aspects, leading to less-than-expected energy savings.

3.7 Miks d.o.o - Metalwork assembly and Electrical installations (Slovenia)



Photo: Solar panels on the roof of the company

Company Overview and Context

Name: Miks d.o.o

Location: Ptuj, Slovenia

Size: 8 employees

Main activities: Electrical installations, mechanical installations, measurements and control, production of electrical cabinets, plc programming.

In 2023, the company Miks d.o.o. decided to install solar panels. This decision was driven by a commitment to environmental sustainability and the possibility of good market conditions for the purchase of solar panels. By investing in renewable energy sources, the company wants to reduce its carbon footprint and contribute to a more sustainable future.

Energy Efficiency Measures

In 2023, Miks d.o.o. took important steps towards improving energy efficiency by investing in renewable energy sources and optimising its systems. The company installed solar panels worth under 10.000€ and upgraded to more energy-efficient heating and cooling systems. As a result of these improvements, they estimate annual energy savings of between 5.000 and 10.000 kWh. However, Miks d.o.o. currently does not have accurate calculations to compare its previous energy consumption with its current savings, making it difficult to quantify the exact financial impact or percentage reduction achieved through these energy efficiency investments.

Resources and Implementation

This company has demonstrated a strong commitment to sustainability by independently investing in renewable energy sources by 2023. The company financed the installation of solar panels and the introduction of energy-efficient heating and cooling systems entirely with its own resources, without relying on government aid or subsidies. This self-financed investment reflects their commitment to reducing their environmental impact while increasing energy efficiency. By prioritising these improvements, Miks d.o.o. has set a good example of how companies can transition to more sustainable operations using their own financial resources.

Outcomes and Impact

The energy efficiency initiatives undertaken by Miks d.o.o. have led to meaningful improvements in operational efficiency, cost reduction, and environmental sustainability. Although the company has only roughly estimated the outcomes, the key impacts include:

- approximately a 30% reduction in electricity demand from the grid, reducing reliance on external power sources,
- an initial investment of around 10.000€, with the possibility of recovering costs through the proceeds from the sale of excess energy,
- an estimated annual reduction of 30 to 50 tonnes of CO₂ emissions, making a significant contribution to environmental protection.

These measures, although based on preliminary estimates, show that Miks d.o.o. investments are effective in achieving both economic and environmental goals.

Challenges, Risks, and Transferability

While Miks d.o.o. faced some small challenges in implementing its energy efficiency initiatives, primarily administrative and regulatory hurdles, they are otherwise satisfied with their decision to invest in solar panels. The company faced some hurdles in navigating the required permits and regulations, which can be common when adopting renewable energy technologies. However, they found the process manageable and they are satisfied with the quality of the solar panels and the performance of the contractors involved in the installation. Despite these obstacles, the company is happy with its decision to invest in renewable energy and solar panels, they believe it was a positive and worthwhile choice.

3.8 Plzeňský Prazdroj (Czech Republic)

Company Overview and Context

Plzeňský Prazdroj, based in Plzeň, Czech Republic, is one of the largest breweries in the region and a significant exporter of Czech beer. The company is recognized for its commitment to sustainable business practices. Recently, it achieved notable accolades, including first place in the TOP Odpovědná firma 2023 (TOP responsible enterprise 2023) awards, showcasing its innovative approach to sustainability.

The Solar Energy Initiative aims to reduce carbon emissions and enhance energy efficiency through the installation of photovoltaic panels across its brewery locations. The core challenge leading to this initiative was the need to mitigate the environmental impact of production while adhering to stricter regulatory frameworks regarding emissions and sustainability.

Energy Efficiency Measures

Plzeňský Prazdroj has initiated a comprehensive program to install solar panels on the roofs of its operational buildings. The first solar power plant was launched in Velké Popovice, utilizing 288 solar panels on the wastewater treatment plant, covering 12% of its energy needs. A second phase will add 466 more panels on the bottling line, further increasing solar energy utilization.

The company plans to install a total of 3,400 solar panels, covering an area equivalent to four football fields, aiming to generate 1,600 MWh of electricity annually. This initiative is part of their broader strategy to achieve carbon neutrality by 2030, with the expected reduction of up to 500 tons of CO₂ emissions per year from the solar energy produced.

Resources and Implementation

The implementation of the solar energy initiative involves a substantial investment in renewable energy technology. While specific funding details have not been publicly disclosed, the financial resources for the solar installations likely come from both company revenues and possible external funding or incentives for renewable energy projects. Human resources include technical teams responsible for the installation, maintenance, and integration of solar technology into existing operations.

Outcomes and Impact

The results of the Solar Energy Initiative are already showing promise:

- 500 tons of CO2 emissions reduction annually from the initial installations.
- Significant strides towards the brewery's goal of carbon neutrality by 2030.
- Increased energy independence and resilience, reducing reliance on traditional energy sources.

Overall, the initiative exemplifies a successful approach to integrating renewable energy in industrial processes, with the potential for replicable outcomes in similar industries.

Challenges, Risks, and Transferability

Challenges faced during implementation included technical hurdles associated with the installation of solar technology on existing structures and ensuring the reliability of energy generation. Financial risks also arise from fluctuating energy prices and the initial investment costs for solar infrastructure.

For other companies considering similar initiatives, it is advisable to conduct a thorough feasibility study, seek partnerships for funding, and integrate sustainability goals into broader corporate strategies. The Solar Energy Initiative at Plzeňský Prazdroj serves as a model for how businesses can effectively transition to renewable energy, with adaptations possible for various industries, particularly in manufacturing and processing sectors.

3.10 Sustainability and resilience through RES at Intercam Ltd. (Bulgaria)

Company Overview and Context

The company INTERCAM Ltd is situated in the village of Hitrino, North-East part of Bulgaria. Its main activity is connected with the construction of lighting systems, photovoltaic installations (Fig. 1), etc. Up to now the number of installed PV parks is more than 500 with a total capacity of more than 3 GWp. The permanent staff of the company is less than 10 persons but when necessary additional workers are hired for the implementation of specific projects.

The best practice presented is related to the creation of a photovoltaic installation for own consumption. It should be able to cover some of their own energy expenses. The main reason that led to the implementation of this practice is the acquisition of new computer numerical control (CNC) cutting machines and the rise of the energy consumption and prices.



Photo 1. The results of one of the company's projects

Energy Efficiency Measures

The energy efficiency measure is a rooftop photovoltaic installation implemented in 2023 (Fig. 2). It consists of 26x450Wp PV modules, a total power of 12 kWp and a grid-connected inverter. This installation is able to produce approximately 8 000 kWh annually. Considering the constantly increasing prices of electrical energy in Bulgaria, the implementation of its own source of energy is a key factor for being competitive on the market.



Photo 2. Fragment of the implemented investment

Resources and Implementation

This good practice was financed with their own funds. The total investment is 12 800 BGN (approx. 6 400 EUR). Considering the main business of the company is construction of photovoltaic installations, this allowed significantly lower labour expenses for the implementation of this project. In other words, their own human resources were used.

Outcomes and Impact

The implementation of this best practice has created the following outcomes and impacts:

- Approximate 8 000kWh of annual electrical energy savings by providing energy for self-consumption;
- Increased reliability of the energy supply;
- Investment, which will provide profit in the long-term.

Challenges, Risks, and Transferability

Regulatory and Market Risks

The following risks could be identified for similar SMEs practices:

- The often changes in the national legislation in the field of energy production and consumption create uncertainties for investments in RES. Furthermore, big enterprises are more favoured by the government, compared to SMEs.
- The liberalisation of the energy market adds many risks for the owners of photovoltaic installations.

Capacity of SMEs

SMEs don't have qualified staff to optimize the operation of photovoltaic installations, such as:

- Cleaning of the PV surface;
- Technical maintenance;
- Real time monitoring.

Environmental factors

One of the major risks, associated with this best practice is related to the changing environmental factors:

- Different extreme weather conditions, such as wind and hail, could potentially lead to complete loss of the investment.
- Different environmental factors creating soiling (dusty environment, birds, nearby industries, etc.) could potentially reduce the PV output significantly (Photo 3).



Photo 3. Example for soiling of the PV panels surface

3.11 Best Practice 11 - Bosnia and Herzegovina - “Gold-MG Ltd Donji Žabar”

Company Overview and Context

Gold-MG d.o.o. Donji Žabar is a forward-thinking agricultural and livestock company in Bosnia and Herzegovina's Republic of Srpska, specialising in sustainable and organic products. With a team of 23, the company produces pelletized fertilisers, wood pellets, animal feed, and livestock. Notably, their 1MW biogas cogeneration plant operates on biogas derived from silage, manure, and agricultural by-products from various industries, converting waste into renewable energy. Their strong position in the local and regional markets, paired with regulatory support, has motivated their decision to invest in solar energy, with expansion into solar power targeted by 2025. This approach optimises resource use, mitigates environmental impact, and generates additional revenue through clean energy.



Energy Efficiency Measures

The biogas plant, a self-sustained pilot project engineered in-house, showcases Gold-MG's commitment to a circular economy. Through efficient waste-to-energy conversion, it addresses both waste management and renewable energy production, significantly reducing carbon emissions. The generated electricity is sold to the market, while grid energy supports their operational needs. This renewable energy cycle underscores Gold-MG's dedication to sustainable practices and positions the company as a regional leader in environmental responsibility.



Resources and Implementation

With a €5.1 million investment, the biogas plant was partly funded by the "Challenge to Change" project (SIDA) and EU4Agri programs, facilitating its operational growth. Future financial backing and skill-building in renewable energy will further strengthen the company's energy portfolio. Anticipated for 2025, a solar energy plant aims to diversify Gold-MG's energy sources, supporting greater energy autonomy.

Outcomes and Impact

Gold-MG's biogas plant generates sustainable income through domestic and regional electricity markets, including SEEPEX. While internal energy efficiency improvements are pending, the plant's output contributes to a broader environmental impact. It exemplifies how agricultural by-products can fuel renewable energy, positioning Gold-MG as a role model for sustainable agricultural practices in the region.

Challenges, Risks, and Transferability

Gold-MG overcomes significant challenges, including substantial initial costs and a need for specialised skills, by relying on internal engineering resources. The biogas plant's modularity enables scalability, potentially incorporating feedstock from local farmers. Given regulatory and market support, the financial risk is mitigated. This model holds promise for replication in agriculturally rich regions, especially where regulatory incentives and waste resources can support a similar approach.

3.11 MP Pandurević Ltd, Modriča (Bosnia and Herzegovina)



Company Overview and Context

MP Pandurević d.o.o., founded in 1906 in Modriča, Republic of Srpska, employs 166 staff and has a long tradition in producing wrought iron elements. The company offers a wide range of elements in various sizes and materials, with the ability to custom-make products to meet customer specifications. Additional services include bending, engraving, and processing client-provided materials. What sets MP Pandurević apart is its modern technology for heating materials using induction furnaces and its extensive machinery for forging, wiring, and shaping materials of various strengths. Their investment in solar power plants (SE Pandurević 1-5) with photovoltaic technology to generate electricity for self-consumption and sale to the grid was launched as a pilot project, yielding approximately 230 MWh of renewable energy annually.

Energy Efficiency Measures

The construction of a solar power plant for generating electricity for production purposes, along with installing a heat pump for heating, was completed in 2023 and throughout 2024.

Resources and Implementation

The project benefited from state incentives for renewable energy production and regulated support for energy buy-back and premiums, which facilitated the implementation, completed between 2023 and 2024.

Outcomes and Impact

The current annual energy consumption is 988.75 MWh, and the investment's complexity and innovation level were considered medium due to the combination of small solar plants.

Challenges, Risks, and Transferability



The company faces challenges with limited production capacity relative to its energy needs and dependence on solar availability. An expansion of capacity and further improvement in energy efficiency are recommended.

3.12 Best Practice 13 - Slovakia - Corplex Hurbanovo



Photo 1: PV array installed next to the Corplex powerplan in Hurbanovo

Company Overview and Context

The CORPLEX plant in Hurbanovo is one of the 6 CORPLEX Group plants. It supplies its products to customers in the region of Central and Eastern Europe. The total annual production of the Hurbanovo plant is close to 6,000 tonnes of returnable plastic packaging solutions. Of this, almost 50% is already produced thanks to the technological ability to recycle polypropylene material. The main product is Akylux®, a hollow polypropylene sheet. These are transformed into a specific packaging or storage product according to CORPLEX's own designs. Their lifetime is in the order of years and at the end of it CORPLEX ensures their full recycling in its own recycling line, offering customers the possibility to buy back the packaging waste at the end of its lifetime.

The company's long-term goal is to maximize and streamline material take-back. Whether it is Akylux® packaging at the end of its useful life or cardboard-plastic waste from other users. At the same time, CORPLEX strives to educate and inform about the differences in the use of disposable packaging and returnable packaging. And it's not just the industrial sector. The reuse of packaging, returnable packaging systems, the recycling of cardboard-plastic, the use of recycled material in production - these are all activities that are also applicable in everyday practice. In the future, CORPLEX will strive to find ways to improve the properties of recycled material and thus further extend its lifetime and increase the number of possible recycling cycles.

The company employs 150 employees in Hurbanovo with an annual turnover of 20 M EUR. The average energy cost calculation represents 5% of the company's turnover, thus an energy-intensive enterprise

Owns its own plant, warehouses, PV power plant with an output of ca. 600 kWp on the land. Diversification of power generation is one of the approaches to become less dependent on suppliers like ZSE / SE, with whom it is difficult to cooperate.

Energy Efficiency Measures

During the sharp rise in the price of electricity, the company was forced to reduce production and shut down several lines (extruders)

- 2021-50,18€/MWh
- 2022-264,87€/MWh
- 2023-117,38€/MWh plus distribution fees ca.25k€/month

Monthly consumption of electricity is approx. 150 MWh, annually. 1.8 GWh

Among other safety measures are installation of LED lights, various sensors monitoring the motion of the employees and managing light conditions accordingly, thermal insulation of the powerplant and offices.

The roof of the facility was not initially projected for the installation of PV panels, hence the land installation brings specific problems with the authorisation processes and extra legislative burden.

Resources and Implementation

Overall investment remains unknown. The whole amount of investment comes from internal sources. During the energy crisis, Corplex was subvented with 150.000 EUR from the state, that covers approx 1 month of production of the company. Time of implementation was 3 years with administrative burden and preparatory phase. Despite the effort, the PV array is not connected and is not producing electricity.



Photo 2: PP recycled granulate ready for further processing in the extruders

Outcomes and Impact

Expected yearly saving from 80k€ to 150k€, up to SPOT price when the PV production is set in the order and connected. They are considering, after the pilot stage of direct PV electricity usage, to eventually scale up their technology with the focus on accumulation.

Challenges, Risks, and Transferability

Even after three years of signing a contract for the supply of PV power, the plant is not producing electricity, mainly because of bureaucracy and the change in the legal personality of the company (restarting the whole approval process).

The need for a building permit, where, for example, it took more than 3 months for archaeologists to give their opinion, procedural shortcomings

Energy-related costs do not have any major impact on the profitability of the company, prices are flexibly reflected in the products the customer pays.

4. Summary of Best Practices

The document highlights diverse approaches to fostering SME transitions to renewable energy. Key examples include Austria's Sonnenerde GmbH, which leverages biochar

production for soil enhancement and carbon sequestration, and Biobäckerei Wagner (Germany), which operates an electric fleet powered by a rooftop solar PV system. Case studies from Slovenia, Hungary, and the Czech Republic illustrate how SMEs reduce costs, enhance sustainability, and achieve energy independence through solar installations, biogas plants, and innovative partnerships. A recurring theme is the role of tailored strategies - combining financial incentives, technical innovation, and regulatory support - backed by collaboration between SMEs, suppliers, and institutions.

5. Suggestions for SMEs

Perform Energy Audits: Begin with a detailed analysis of current energy use to identify inefficiencies and potential areas for renewable energy integration. Utilize energy management systems for continuous monitoring.

Leverage Financial Support: Seek grants, subsidies, or low-interest loans offered by institutions like Slovenia's Eco Fund or similar programs in other regions to offset initial costs.

Adopt Phased Implementation: Pilot renewable energy technologies in stages, such as starting with solar panel installations or upgrading heating systems, to minimize risks and optimize resources.

Build Expertise: Invest in training for employees and collaborate with technical experts or consultants to navigate technological and regulatory complexities.

Foster Collaboration: Partner with energy providers, local governments, and peer SMEs to share knowledge, reduce costs, and overcome barriers collectively.

Plan for Scalability: Design renewable energy systems with future expansion in mind, ensuring flexibility to meet evolving operational demand.

6. Suggestions for RES suppliers

Provide Comprehensive Support: Offer end-to-end services, including installation, maintenance, and integration.

Educate and Inform: Conduct workshops and provide SMEs with clear, jargon-free information about renewable energy technologies, financing options, and regulatory requirements.

Facilitate Financing: Work with institutions to offer financing packages or flexible payment options tailored to the cash flow realities of SMEs.

Enhance Reliability: Focus on robust systems that can withstand environmental factors and adapt to SME-specific operational needs, ensuring long-term value.

7. Suggestions for business communities

Create Knowledge-Sharing Platforms: Establish forums or networks like Germany's Energy Efficiency Networks to enable SMEs to exchange best practices, success stories, and challenges.

Collaborate on Energy Projects: Facilitate joint renewable energy projects or cooperatives, such as shared solar installations or biogas plants, to spread costs and benefits across participants.

Advocate for Policy Improvements: Work collectively to lobby for streamlined regulatory processes, subsidies, and incentives that support SME transitions to renewable energy.

Engage in Public Awareness Campaigns: Partner with local governments and NGOs to raise awareness about the benefits of renewable energy adoption within the community.

Support Sustainability Certification: Encourage member SMEs to pursue certifications or awards (e.g., Energy Globe Award) that recognize sustainability efforts and build their market reputation.

By focusing on these actionable steps, SMEs can reduce costs, enhance energy independence, and contribute to a greener future.