Scandinavian-Polish CHAMBER OF COMMERCE

# Scandinavian
## innovative solutions
manufacturing & cleantech

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Embassy of Sweden

# Scandinavian
# innovative solutions
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## Table of Contents

# Foreword

The Scandinavian-Polish Chamber of Commerce dedicated last year to the innovation in the Nordic Countries with a special emphasis on the innovativeness of the Scandinavian companies in Poland.

The result of our effort was a report presenting the phenomenon of Scandinavian innovativeness, possibilities of Scandinavian-Polish cooperation in this field as well as showcasing the most interesting case studies of the innovative solutions implemented by Scandinavian companies in Poland.

The report, however, did not exhaust the topic, on the contrary it became the starting point for further exploration and an in-depth analysis resulting in this publication.

This year we have focused on innovative solutions of the Scandinavian companies operating in the manufacturing and-clean tech sector, as the investors from Scandinavia have a lot to offer in this respect. We also present cooperation and experience exchange possibilities between Poland and Scandinavia, as well as opportunities and challenges which companies are facing while i.e. implementing clean technologies or the digitalization of industry. In the Publication we are showcasing examples of innovative solutions implemented by Scandinavian companies operating on the Polish Market.

We would like to extend our thanks to Monitor ERP and the Industrial Development Agency for their involvement and cooperation. We also would like to thank the Honorary Patrons for their support of our initiative.

We hope that this publication will be an inspiring read.

Agnieszka Kowalcze
Director

Carsten Nilsen
Chairman

# Scandinavian manufacturing & cleantech sector and global changes influencing the sector. Possibilities for Scandinavian-Polish cooperation

# Innovation in manufacturing & cleantech. Scandinavia, Poland and Europe

**364** bln EUR
is the combined value of the Nordic countries' export of goods in 2015

Polish export of goods in 2015 amounted to
**179,5** bln EUR

**5** mln people were employed in 2016 in the manufacturing sector in **Poland**

In Sweden, the industry sector and the industrial services sector account for **1** mln jobs

Industry 4.0, sustainable production, industrial skills boost and testbed Sweden are 4 focus areas of new Swedish government strategy „*Smart industry*" announced in 2016.

According to the EU study, some **79%** of companies that introduced at least one innovation since 2011 experienced an increase of their turnover by more than **25%** by 2014.

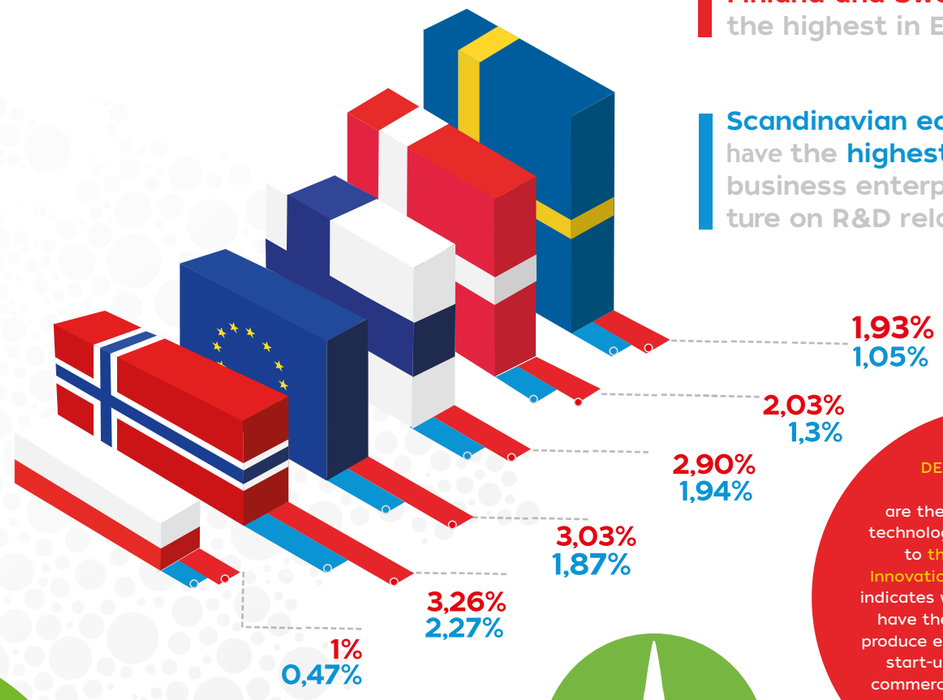
Recent studies estimate that digitization of products and services will add more than **€110 billion** of revenue for industry per year in Europe in the next five years.

Finland has the **highest number of R&D professionals** in the world which is **7,482** per million population (Bloomberg Innovation Index)

**According to the EU R&D Scoreboard 2016 Ericsson, Nokia, Volvo and Novo Nordisk and Sandvik** are the top five Nordic companies investing the most in R&D activities

**75% of the R&D** investments in Sweden is performed by the manufacturing industry

**Denmark, Finland and Sweden** belong to the group of **INNOVATION LEADERS** in Europe according to the European Innovation Scoreboard 2016.




**R&D expenditures** in relation to GDP (2015) in **Denmark, Finland and Sweden** are the highest in Europe

**Scandinavian economies** also have the **highest ratios** of business enterprise expenditure on R&D relative to GDP

DENMARK, FINLAND AND SWEDEN are the world's best at clean technology innovation according to the Global Cleantech Innovation Index 2017. The index indicates which courtries currently have the greatest potential to produce entrepreneurial cleantech start-up companies that will commercialise clean technology innovations over the next 10 years.

According to the Cleantech Finland Survey, the importance of Poland as a future market for cleantech technologies will raise from **18%** in 2016 to almost **40%** in 2020

**80 mln** PLN

were donated from the Norwegian funds in 2014-2017 to **28 Polish SMEs** from the **Green Industry Innovation** programme. Those investments in clean technologies and production process will decrease the $CO_2$ emissions by **50.000 tones** every year.

# Polish-Danish Cooperation on Innovation and Industry 4.0

Ole Egberg Mikkelsen
Ambassador of Denmark to Poland

**The world is on the brink of the fourth industrial revolution. The terms Industry 4.0, industrial internet, internet of things and so forth are often used to describe the same process. And Denmark holds a strong position when it comes to both the level of automatization in business and digitalisation in both business and the public sector. Innovation and Smart Manufacturing present fantastic opportunities to advance both the Polish and Danish manufacturing industry further and to increase the revenue and prosperity of the Polish and Danish societies. Almost 12% of the total Danish export comes from the clean-tech sector. Having taken the lead role in transitioning the Danish economy to being less reliant on fossil fuels is now paying off. But Poland is also benefitting tremendously from demands for renewable energy and energy efficient solutions by being one of Europe's leading exporting nations in insulation, windows and foundations for offshore windmills to the rest of the world.**

Industry 4.0 refers to a new wave of industrial technologies and puts emphasis on integration of physical and virtual production systems. In the world of Smart Manufacturing, physical production plants are becoming connected in an open network, the data is exchanged smoothly between production steps, and machines communicate effortlessly. The Industrial Internet contributes to every part of the production process. Manufacturers introducing Industry 4.0 solutions observe a dramatic increase in productivity and become competitive towards manufacturers producing in countries with much lower cost of labour, utility and capital. One of the key drivers of Industry 4.0 in Denmark is the ability to apply robotics in manufacturing. Denmark outranks many countries in the field of robotics and demonstrates an excellent track record of patent families for SMART robotics. An actual Robotics Cluster has been established in the southern part of Denmark.

Furthermore, implementation of Smart Manufacturing is both desired and encouraged in Poland. The main focus of Europe's biggest industry fair the Hannover Messe, where Poland was selected as official partner country, was the opportunities and challenges of Industry 4.0. In Hannover, both the Polish Prime Minister and the Minister of Economic Development underlined that one of the strategic objectives of the Polish government for the coming years was to ensure high levels of innovation and investments in automatizations within Polish industry. And the advantages are clear: Industry 4.0 will boost efficiency and competitiveness of the Polish manufacturing industry and create many new value-adding jobs.

Denmark encompasses the skills, knowledge and business environment to be an international leader in providing innovative Industry 4.0 solutions and smart services. Apart from being one of the top locations in the world for ICT activities, Denmark is a digital frontrunner. In addition, Danish companies offer access to a diverse pool of highly advanced technologies. However, further investments need to be made especially by the many Danish SME's, which form the backbone of the Danish economy. More people need to be educated and trained in technical and software development for Denmark to hold on to its front position.

For many years Poland has successfully attracted enormous amounts of foreign investments in manufacturing primarily due to Poland's highly skilled labour force, but also due to lower cost of production. In general, costs in Poland continue to be lower than in Western Europe, but Poland is facing bottlenecks in the labour market. In order to maintain high growth rates and consequently develop a manufacturing industry with higher level of value-adding activities, it is the ambition of the Polish government to encourage investments in a modernisation of manufacturing processes making them less labour intensive and more productive. In relation to foreign investors, the Polish Government asks for more investments of smart capital where focus is on innovation, tech-transfer and high value-adding production.

By presenting the Danish experience in lean and automated production, applied robotics and clean-tech, Denmark and Danish investors are relevant and solid partners to Poland. Through both own direct investments and partnerships with Polish companies, Danish companies can become the catalyst for Poland to reach a higher potential and to ensure successful implementation of the responsible development plan outlined by the Polish government. The exchange of knowledge and experience between Denmark and Poland at all levels will benefit both countries and ensure significant growth and prosperity.

# Finland - innovation driven country

**Hanna Lehtinen**
**Ambassador of Finland to Poland**

Manufacturing industry forms the backbone of Finland's economy. We transitioned from an agrarian society to an industrial one in stages. The vast forests of Finland were the natural growing platform for our manufacturing industry, and the forest industry has also helped other industries form in Finland. Finland has world-leading competences in innovation-driven sectors and industries that aim to utilize natural raw materials found in Central and Northern Europe. Here are three key sectors:

### Cleantech

Harsh climate and a lack of fossil fuel resources have forced our industry and society to minimise energy consumption and to innovate. Finland is a globally leading country in cleantech solutions. The cleantech business based on energy and environmental technology is one of the focal areas of Finland's business policy. With persistent long-term efforts and public-private-sector collaboration we have succeeded in protecting our nature - and building cutting-edge expertise in solving environmental problems. Finland is the world's leading researcher in the energy and environment field, with more than 40% of the public R&D funding going into the sector. More than a third of public R&D investments are made in cleantech.

### Bioeconomy

Finland's rise to become one of the world's most prosperous countries is based on our ability to utilize renewable natural resources, our green gold. Finland has strong know-how in technology, construction, energy, chemistry, food and health sciences. Innovation, cooperation and combined technologies in these fields make Finland a real pioneer in bioeconomy.

### IOT & Industrial Internet of Things - Finland as your partner in the next industrial revolution

Ranked third globally in the adoption of Industrial Internet of Things (IIoT), Finland is today making industries futureproof. In fact, Finland's track record in connecting people and devices continues to be undisputed globally, with Finnish companies designing top-tier process control and automation solutions for pulp and papermaking and chemical industries.

Finnish companies have developed an array of technologies to monitor, sense, optimise and automate energy streams from production to the end user. The best way to take advantage of Finland's IIoT process is to find the right partner - an innovative company that can connect industrial assets via IoT networks and cloud solutions, maximize efficiency and effectiveness of energy production and exploit the incredible potential of machine-to-machine (M2M) communication and Big Data.

At present In Poland around 200 Finnish companies have their subsidiaries in Poland and more than half of them have more diverse operation than just a sales office. Both sides have benefited from Finnish presence in Poland as over 30 000 Poles are making their living in Finnish companies. Large and steadily growing domestic market, central location and capable labor force are some of the many factors which make Poland such an attractive trade partner and investment destination for Finnish companies. Poland is the key manufacturing and sourcing market for the Finnish mechanical engineering industry and strong activities can also be found in chemical, pulp & paper, cleantech and ICT sectors. Nokia is one of the biggest R&D employers in Poland with over 5 000 employees in R&D. The co-operation between our Defence Industries is strong as exemplified by the co-operation on the "Rosomak" AMVs.

To build on these successes more intensified co-operation is on the way. Prime Minister of Finland Juha Sipilä together with the Polish Deputy Prime Minister Mateusz Morawiecki held a roundtable discussion on Innovations in the Energy Sector together with key Finnish and Polish companies in Warsaw in January this year. Prior to that the Minister of Foreign Trade and Development of Finland Lenita Toivakka visited Poland with a delegation of Finnish cleantech companies in June 2016.

For the Polish government, innovations are at the core of the future development of the economy. This is an opportunity to further intensify our bilateral relations in the fields of innovations. In the words of former Minister of Economic Affairs of Finland Olli Rehn: "*Real innovations are aimed at benefitting the world by addressing common global challenges, such as ageing, health problems, pollution or the inefficient use of energy. While advancing such innovations, we aim at anchoring the position of Finland as a reliable provider of solutions to global challenges.*"

# Innovation - the Swedish way

## In manufacturing, clean technologies and beyond

**Inga Eriksson Fogh**
**Ambassador of Sweden to Poland**

Innovation is highly prioritized in the development of our society and economy - as well in Sweden as in Poland. What lies behind the word innovation?

Innovation, in Sweden, is much more than technical or product innovations. Innovation is about processes, business models, leadership, social innovations but above all it is about mentality and a way of thinking. Knowing that it is safe to explore new territory, breaking new ground and overcoming challenges. Could be easy to say, but difficult to do.

In Sweden, when we speak about innovation, we start with the basic things in life. Parents giving you the freedom to be yourself, giving the children in school the possibility to do wrong, to question things everywhere in life. At work it is about having an open atmosphere, working in teams and co-create. From a political point of view, we have innovation strategies and support functions that enable everyone in society to work in the same direction.

Sweden as a small country is dependent not only on exports but also on being innovative in order to be globally competitive. The Swedish manufacturing industry is the backbone of the economy and the growth of Sweden depends on the success of the industry. Furthermore, our environment which we all share, depends on our industry being innovative. The impact of manufacturing industry on the environment is large and there is a need to continuously find new innovative ways of decreasing this impact, especially when we have a growth in our economy.

Industry and environment are interconnected, and one of the keys to success is cooperation across borders in society. Public sector, the manufacturing business, research and development need to work together towards the same goals. The fact that Swedish manufacturing industry is international and global is one of the reasons behind the Swedish industry being innovative. Engineering, steel, automotive and forestry industries are some examples where new innovative solutions that make it possible to enhance the environment. When a company acts on a global scene, you are exposed to influences and inspiration from other parts of the world.

One of the prioritized areas for Sweden in Poland in 2017 is sustainable urban transport. Public and private transport in our cities contribute to poor air quality and affect our health. Creating a good environment in our cities require both small and large efforts. Sustainable cities in both Poland and Sweden will have an impact on our common environment. Environmentally friendly and accessible public transport, electric or hybrid buses, is a rather obvious action point. Making it easier to use bicycles or walk is another. One of the definitions of a smart city is for the city to make it as easy as possible for the inhabitants to make sustainable decisions, among other with the help of digitalization. Our efforts to promote Swedish sustainable transport solutions in Poland is one step to facilitate smart cities in our common region.

As mentioned above, there are many success factors when it comes to creating an innovative economy and industry. Development of analytical skills in school, flat organizational structures in business, substantial financing for research and development, both public and private, public sector support and frameworks are a few of the areas having an impact on innovativeness. Last but not least, democracy is one of the driving forces behind creating an innovative society - freedom of expression, gender equality, diversity and cooperation are all factors that lay the ground for innovativeness. A society that tolerates a wide range of opinions and choices enhances the ability to innovate. Combined with desire for change, we will make our countries even more innovative together.

# Polish-Norwegian cooperation in green innovation

**Karsten Klepsvik**
**Ambassador of Norway to Poland**

Cooperation between Polish and Norwegian companies in developing green solutions for industrial production and waste management is significant and future prospects are promising.

In recent years, cooperation in this area was boosted through a dedicated program under a Norway Grants Scheme called Green Industry Innovation (GII). The program was launched in 2014 targeting small and medium enterprises, and received a very positive and broad market response. Out of 83 applications, 28 projects located all over Poland received financial support amounting to a total EUR 18 million. Additionally over EUR 27 million in private investments were mobilised in the form of the beneficiaries' own contributions, bringing the total value of the projects to over EUR 45 million.

The significant private capital participation in the program is important because it ensures commitment and reduces the risk of lost expenditures as the supported projects are more likely to respond to genuine market needs. At the same time, the grant recipients can rely on support by consulting companies specialized in the realization of such internationally funded projects.

Within the first Program area, the projects focus on the "greening" of enterprises' activities. The concept of "greening" includes measures aimed at adoption of modern technologies leading to reduced material intensity of production and minimized waste and pollution, as well as the application of technologies reducing energy consumption or making use of renewable energy sources. A second Program area concerns innovations in waste management that increase the efficiency of recycling processes and reduce the amount of waste going to landfills.

The Green Industry Innovation projects have been implemented across a broad range of manufacturing and service activities spanning the metal industry, the waste and motor sectors, and specialized printing services. In the majority of projects, new technologies were adapted to ensure higher quality of products, as well as energy and raw material savings.

One third of the projects are implemented in cooperation with Norwegian contractors and partners in different roles. Norwegian companies supply equipment and technical solutions; transfer knowledge to the Polish entity (including through technical training, workshops and development of CSR policy in companies); and take part in joint R&D activities. The development of new technologies/products where experiences are shared between the Polish and the Norwegian entities has been key.

While the current programme is in its final stage of implementation, a bilateral MOU for the next period of EEA Grants and Norway Grants (2014-2021) is still being negotiated. Poland will remain the largest beneficiary of the Grants. From the Norwegian side, we favour that funding, also in future, should be allotted to areas responding to the shared challenges facing Europe. Thus, innovation, research, education and competitiveness as well as environment, energy, climate change and a low carbon economy will be high on the agenda. The specific priorities within the new Program areas that are currently being negotiated between Poland and Norway, will certainly offer important opportunities and incentives for companies interested in developing innovative solutions.

Together Poland and Norway will continue to build a cleaner and smarter future.

# Support instruments for innovation – Industrial Development Agency

Agencja Rozwoju Przemysłu S.A. (Industrial Development Agency JSC) (ARP) has existed on the Polish marketplace for over 25 years.

Its main goal has always been to provide support for businesses in conducting and developing their operations, including during the restructuring processes. These assumptions still apply: we continue to support entrepreneurs by pointing them in the direction of further development, and we also provide expert support for implementing business solutions. Our support instruments are mostly financial products. We also provide investment sites and infrastructure in the Special Economic Zones managed by the ARP. Many years of experience and unique competencies on the market enabled us to develop an individual approach to project evaluation. This allows us to see business opportunities in those areas that others find unattractive or too risky. Since 2016, we have been operating as part of the Polish Development Fund Group. We cooperate with key Polish institutions, supporting entrepreneurs and responding to their needs and business challenges.

One of the important areas of our activity is the linking of partners interested in establishing a cooperation in the implementation of innovative projects. A good example is the ARP Technology Transfer Platform (TTP). The TTP is an Internet service where registered users may present their innovative resources, needs regarding innovation, and search the technology and expert database. Apart from extensive and constantly updated information system resources, another advantage of the TTP is its intelligent system of pairing technology providers and recipients. Currently, the Platform offers over 1,000 technologies for implementation. The ARP continues to expend the platform which plays a very important role in our every project.

Our flagship project which uses the transfer of innovative technologies is the ARP innovation Pitch. These are regular meetings conducted in the form of workshops for large and small enterprises. Their aim is to seek out the best solutions for business. Large companies such as PGNIG Termika, PGNIG Obrót Detaliczny, Polska Spółka Gazownictwa, Polskie Porty Lotnicze or URSUS present their technological challenges, and micro, small and medium-sized firms and scientific institutions promote their solutions. So far, we have been approached by over 250 companies wishing to collaborate with large firms. Twelve solutions which are ready for implementation have been selected. Proposals of this kind offer a good opportunity for business people to present their firm, its offer and potential co-operation possibilities.

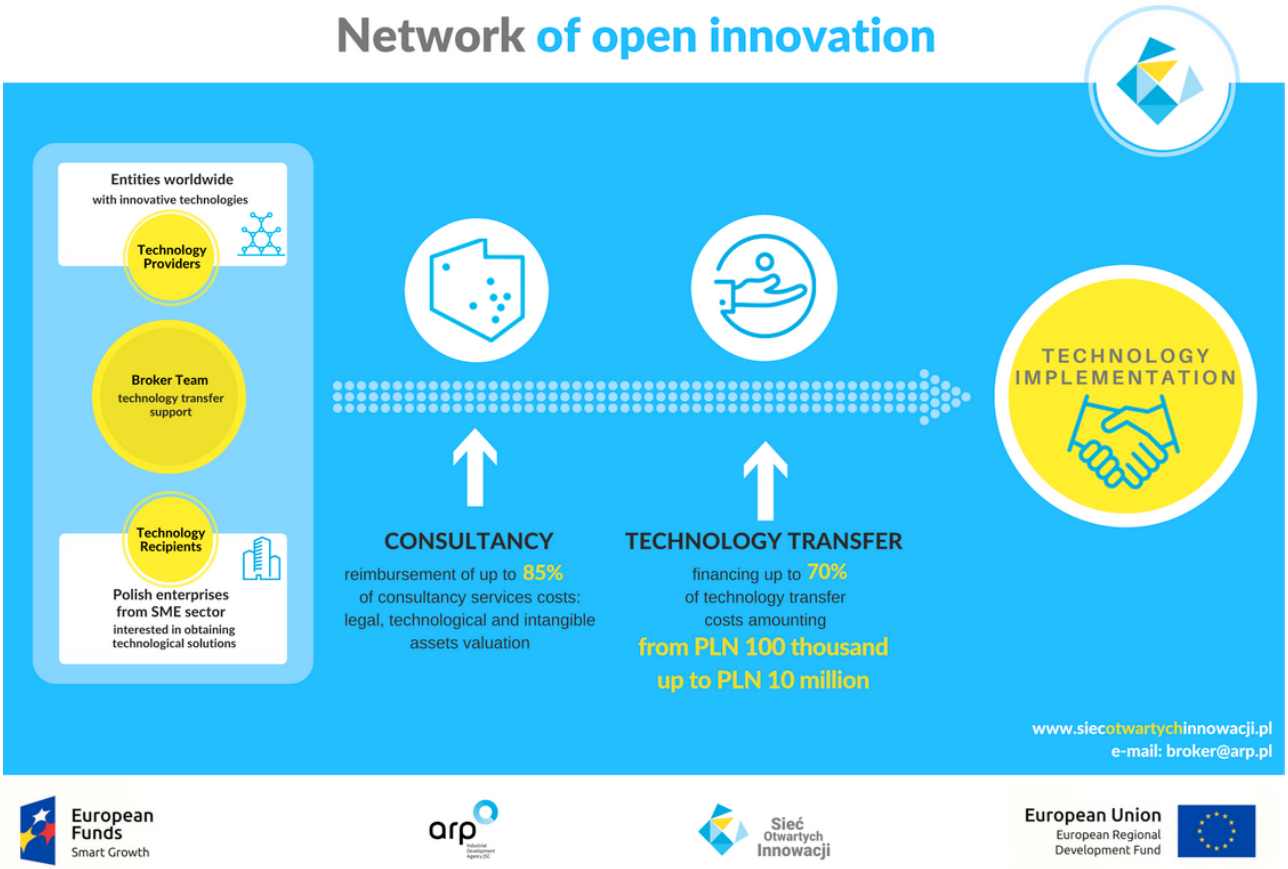
The ARP is actively involved and responds to the challenges of today's global economy, investing in companies promoting growth and innovative solutions. Our areas of interest include, among others, supporting the development of innovative industries, such as the video games sector. In mid-2016, together with the Silesian University and Cieszyn District, we formed ARP Games which is among the first market accelerators and the only such company focused on this sector. As part of the acceleration process, we have developed a dedicated sector support program which aims to help leverage the potential of Polish game developers and reduce the barriers to entry and expansion into domestic and foreign markets. The company has already concluded its first recruitment drives with 26 teams submitting their applications and eight have already taken part in the acceleration process. The location of the accelerator's head office is not unimportant. For years, the Artistic Department of the Silesian University in Cieszyn has been a forerunner of video game developers. Thanks to the accelerator program, we are creating working con-

ditions for the best specialists in Poland, and also look after the development of local business which is often underinvested.

The ARP also sees great potential for innovation and business in the space technology sector. By implementing a comprehensive action program that responds to key business needs, the ARP has become one of the key support institutions for the space industry. The projects under implementation include the organization of the first space company internship programme in Poland. As part of this programme eight young engineers have begun their career in the industry. Market development is also based on building the competencies and the goodwill of our portfolio company - Creotech Instruments. The ARP also supports student projects (the PW-Sat 2 satellite) and closely co-operates with the Faculty of Power and Aeronautical Engineering at the Warsaw University of Technology because advanced projects need highly qualified personnel. Activities of the ARP in the area of support of the space sector have been noticed by the Ministry of Economic Development and have been largely incorporated in the Polish Space Strategy.

We also develop our financial offer. Apart from loans for restructuring or development, the Agency also provides debt financing. It is addressed to small, medium and large firms operating in selected sectors. Financing is provided for the purpose of funding investment projects, working capital and contract performance. Loans are addressed to firms which operate in sectors characterised by rapid development: IT, space technologies, robotics/automatics, medical engineering, advanced energy technologies, industrial design. The financing period is between 1 and 5 years, and the standard financing amount is between PLN 0.5 and 20 million. Other benefits offered by the ARP include support in finding a co-investor or support in seeking funding from other sources.

Our offer also includes EU projects. The Open Innovation Network (OIN) - is a pilot project dedicated to building a culture of open innovations through stimulation and support for transactions involving technology transfer to enterprises, as well as creating a knowledge base about open innovations. Grant recipients for the project will be entrepreneurs from the micro, small and medium-sized enterprises who we are going to support substantively, operationally, as well as financially. The OIN also provides greater support for less industrialised regions - in accordance with the Regional Aid Map, entrepreneurs from the economically underdeveloped sections of the country may rely on greater funding. As part of the OIN it will be possible to acquire a maximum reimbursement of 70% of the total technology transfer costs - between PLN 100,000 and 10 million. The project also provides funds for consulting, i.e. costs of legal or technological services which we meet up to 85%. Its greatest advantage is the lack of restrictions - entities from all over the world may submit their technologies. The only condition is that the solutions must be implemented in Poland.



# Leading the way to Industry 4.0 – Scandinavian IT solutions

monitor ERP SYSTEM

*Safety and quality with an ERP system - case study by Monitor ERP*

**The Polish automotive industry is developing very dynamically. The leading role is played by component manufacturers. To stay competitive and win new orders, suppliers must meet stringent requirements, ensuring the highest level of safety and paying attention to timely deliveries, as well as to the quality and aesthetics of the product. This is why Klippan Safety, a partner of the world's largest automotive manufacturers, decided to implement the ERP MONITOR system.**

Automotive industry is one of the largest industrial sectors in Poland today. It ranks second behind the food industry, representing almost 10% of the value of production sold. According to the report "Automotive Industry in Poland 2016", part production was bigger than car production by 46 percent in 2015. This clearly indicates that the structure of the automotive industry has changed significantly in recent years.

Foreign car manufacturers, such as Volkswagen, Opel, and Fiat, have factories in Poland. Despite relatively insignificant position in the passenger car segment, Poland is known for the production of Solaris buses, which can be commonly seen on European roads. However, the real strength of the domestic automotive industry lies in the components and accessories successfully supplied to foreign markets. They are very often assembled on the manufacturing lines of well-known car brands.

## Highest quality and safety

An example of a company that meets specific industry and customer requirements is Klippan Safety. The company manufactures a wide variety of products that differ in purpose, size and complexity. Each of the products must meet stringent safety requirements, because health and life of people who occupy the vehicles in which they are fitted depends on it.

Klippan Safety has been growing very dynamically in recent years. The company develops and manufactures comprehensive safety, storage and clamping systems used in the automotive industry. It employs 270 people today, and records double-digit sales growth every year. High-quality Klippan Safety products are used by such prestigious brands as Mercedes, Volkswagen, Jaguar, MAN, Volvo and Scania.

## Developing competences

Outstanding financial results are not the only reason for Marek Pałac, Managing Director at Klippan Safety, to be proud of his company.

"Over the past two years, we have doubled our workforce and introduced a two-shift work system. In addition, we have increased the manufacturing floor by 20%. We have been also constantly developing the competences of our plant. We have extended our business by creating a design department, as well as expanding our logistics, purchasing and quality control departments," explains Marek Pałac.

Taking into account the growing needs of the company, Klippan Safety is planning to build a new manufacturing facility that will enable the company to fulfill even more orders and further develop its offering.

### Effective use of resources

There are hundreds different products in the company's portfolio, from fire extinguisher straps to webbings or belts for securing beds in the truck cab. The solutions must meet strict safety requirements, but also offer high quality and aesthetics as required by prestigious brands that are Klippan Safety's customers. This means that the company needs to maximize its resources, which would not be possible without the support of an ERP system.

The key module of the MONITOR ERP system which supports the development of Klippan Safety is the production planning. The application makes it possible to specify unit operation times and the components needed to make the final product. The terminals on the manufacturing floor allow employees to enter information which Klippan Safety's management uses to analyze the manufacturing process.

"We use MONITOR ERP to measure the performance of our employees. Based on the information entered by the team, we are able to accurately calculate the working time, and to determine what needs improvement," explains Marek Pałac.

With the electronic data exchange, MONITOR ERP also facilitates warehouse management, order management, as well as contact with customers or other company sites. Purchase planning is based on the analysis of orders entering the system. Before the introduction of the ERP system, Klippan Safety employees used simple solutions, such as Excel spreadsheets. These methods were unreliable, however, and wasted a lot of time, because they did not provide the opportunity to automate repetitive tasks.

### There is no time to experiment in the manufacturing business

Marek Pałac makes it clear that the need to implement the ERP system was closely linked to the expansion of the team. Simple spreadsheets worked well when there were 20 people working in the company, but with the increasing level of employment, it became necessary to implement an effective solution to manage the constantly growing business.

The advantage of the MONITOR system is the ability to adapt its functionality to the needs of manufacturing companies. There is no doubt, however, that only proven applications and an experienced deployment team can ensure business continuity. As Marek Palac emphasizes, "there is no time to experiment in the manufacturing business".

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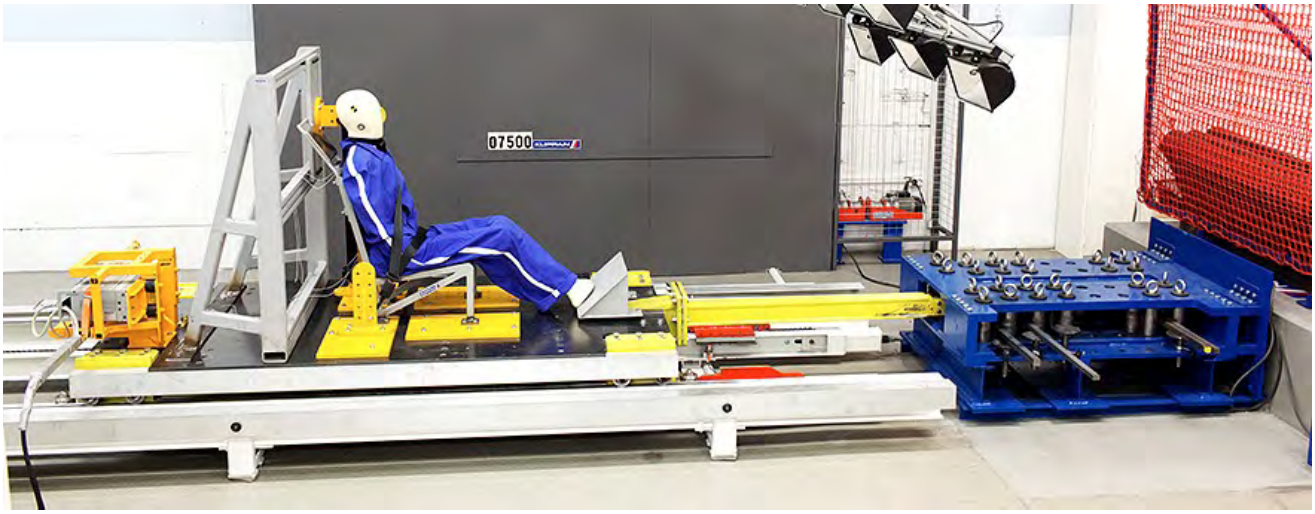


# Innovative solutions of Scandinavian companies – manufacturing, digitalization and clean technologies

# SCA Hygiene - Oława

**SCA** is a leading global hygiene and forest products company. SCA was founded in 1929 in Sweden where its headquarters are still today. The company develops and produces hygiene and timber products. SCA offers products of many well-known brands in more than 100 countries. In Poland, SCA operates in the sector of hygiene products: incontinence care products (TENA), professional hygiene products (TORK) and consumption goods (e.g. Libresse).

SCA has 750 employees in Poland, including 600 working at the manufacturing site in Oława in south-western Poland, producing personal care incontinence products and baby diapers. The factory in Oława was established in 1998. It has ISO 9001 and 14001 certificates as well as OHSAS 18001, BRC, IFS and FSC. The factory in Oława is one of the most modern production facilities of SCA hygiene products in Europe. The production value in 2016 was close to 1 billion PLN, with more than 90% of goods being exported to various countries, including non-European markets, such as China, Korea and Australia. The factory in Oława also serves as an International Distribution Center for five countries: Poland, Slovakia, Lithuania, Latvia and Estonia.

For years, SCA has been implementing the so-called *circular economy* - a business model with minimum resource utilization, reduction of waste and the creation of new ecosystem designed for product reuse. This approach requires new business solutions and innovations prepared as early as at the level of business plan and development.

Since early 1990s, SCA has used the LCA (Life Cycle Analysis) assessment of product life cycle, including full environmental analysis of product chain: from the purchase of raw materials and production, through transport to product use and waste management. SCA is constantly working on the improvement of efficient resource utilization, e.g. through energy efficiency and saving program (ESAVE) which has produced 9% reduction in energy use per 1,000 kg of manufactured product since 2010, corresponding to the reduction of energy use by 1.8 TWh. In 2016 alone, 101 projects were completed globally, which led to energy saving of 0.9%. SCA also initiated a program for raw materials called MSAVE, which is designed to optimize costs, minimize environmental impact and reduce raw material waste. SCA's goal is recycling and re-use of 100% production waste and by-products. Currently, 65% of products are recycled. Resource Management System (RMS) is used for continuous control of all processes, allowing to monitor energy, water, transport and raw materials used by the company.

### Cleantech in practice

Most of these solutions are implemented in the manufacturing facility in Oława. Since 2011, 100% of energy used in the factory comes from renewable sources, which is certified by TUV issued every 6 months. The energy is supplied mainly by Suwałki Wind Power.

2017 sees continued implementation of energy-saving projects as part of ESAVE. One of them is the replacement of all halogen and fluorescent lamps used in production halls. As part of this lighting modernization project, 1400 lamps will be replaced by 1260 LED lamps. This will bring about energy saving of 2,700 megawatt-hours in 2018 and a total of 5,000 megawatt-hours since the beginning of the project. Apart from calculable economic benefit, this project improved lighting in workplaces and passageways.

Large demand for compressed air used by SCA technologies makes the company very conscious of effective use of compressor rooms. In 2011-2013, SCA reduced pressure in compressor rooms which resulted in 7% saving of energy used for compressed air production. SCA also optimized software of air terminals for more effective use of heat recovery ventilation and central compressor control was mounted.

Another important initiative designed to minimize SCA impact on the environment is long-term and innovative strategy for heat recovery from air compressor room, which was started in 2013. The installment of heat recovery produced 70-degree water which was used to heat the factory in spring and autumn solely with the air recovered from compressors and to resign from electric water heaters in some rooms. Since their installment, the compressors also reduced $CO_2$ emission by 2200 tons and caused 50% reduction of gas consumption in the boiler house in 4-year period.

In the future, with the development of SCA plant and installing new compressors, the company will be able to produce even 90 $m^3$ hot water per hour. This, in turn, will be used in summer to obtain chilled water for the factory cooling systems and will produce further energy saving.

The preparation of these projects would not be possible without continuous expansion of resource utilization monitoring system. Our monitoring includes but is not limited to the use of compressed air at all production lines, the parameters of air terminal operation and even opening windows at individual offices. These data are analyzed in search of more processes with energy saving potential.

These innovations are only a small part of projects carried out in Poland. By making them familiar to hundreds of our employees plus our suppliers, cooperators and distributors we raise awareness of SCA philosophy in all these people.

The implementation of innovative products in Oława factory based on sustainable technology results in effective production management, protection of the environment and of the employees' health but also has impact on the prices of products making them available for Polish patients and public payers.
*Since 15th of June 2017 SCA name is changed to Essity.*

# Hempel A/S
# My Hempel digital customer portal

**Hempel** was founded in Denmark in 1915 by Jørgen Christian Hempel. In the post-war years it was transformed into the Hempel Foundation and is currently the world's largest paint manufacturer, represented in more than 80 countries. We employ approximately 6,000 employees, we have 27 manufacturing plants, more than 150 warehouses, 48 sales offices and 10 R&D centers worldwide. Hempel has been present in Poland since 1994 - the sales office, IT and finance departments are located in Gdańsk. The most modern Hempel factory was opened in 2010 in Niepruszewo near Poznań. In 2015 Hempel A/S celebrated its 100th anniversary.

Innovation is the key to the success of our company - from top quality paints for the Protective, Marine, Yacht, Container and Deco sectors to IT. It is exactly in the IT department where the My Hempel (a digital portal for customers) was created. It was implemented in Europe in June 2016, six months after the works began, and since the end of March 2017 the portal has been available to all Hempel customers around the world.

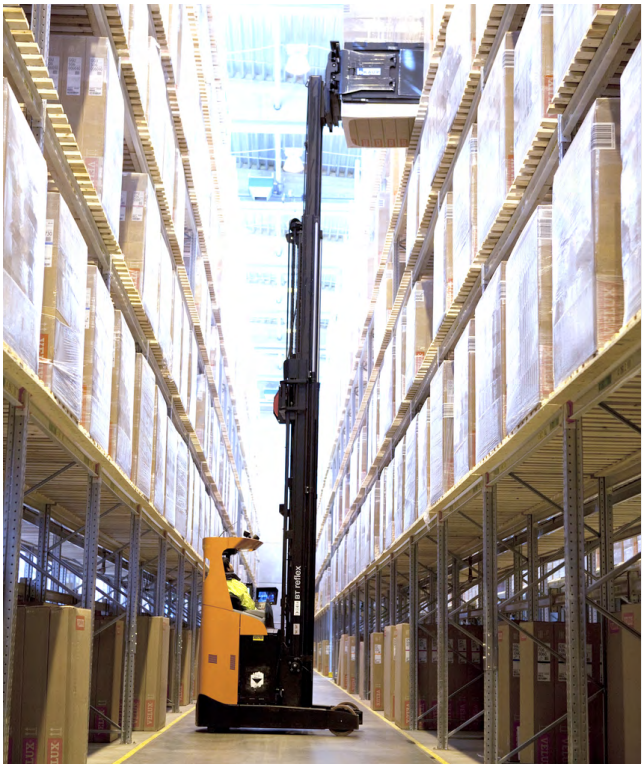
My Hempel is a customer centric web portal that offers an easy-to-navigate interface, including access to a product catalogue with an individual price list, the ability to shop online and the use of marketing materials. It is a modular platform where new features are added every month. The main features of the portal include: My orders, My invoices, My assortment, Marketing hub and many more. The interface is available in 25 languages, 24 hours a day, 7 days a week. My Hempel, unlike many other B2B solutions, is intuitive and easy to use as are the best systems in the B2C sector. The most important advantages of the system are time savings, all documents are in one place and its availability at any given time.

My Hempel is the most comprehensive solution in the paints and coatings industry. We use the services offered in the cloud model, which provides both the flexibility and scalability of the solution. The system was launched globally in an impressive amount of time and has been very positively received by customers. With My Hempel, we have enabled our customers to collaborate online - without compromises or restrictions. The benefit for Hempel is satisfied customers who save their valuable time using the My Hempel portal.

On the Polish market our partner in the project is the company Kambu Sp. z o.o. from Cracow. More information about the project is available at myhempel.hempel.com. To watch the customer testimonial video, please scan the QR code.

# VELUX Group

**The VELUX Group** and its sister companies are the largest window manufacturer in Poland. Two plants operate in Gniezno - one manufactures roof windows, and the other metal and plastic components. Namysłów is home to a roof windows facility and a distribution centre. A window village in Wędkowice near Tczew, owned by Dovista, a sister company, manufactures wooden fasade mounted windows designated for export. In Poland, the Group employs in excess of 3800 staff.



Logistics processes at VELUX reflect its drive to innovate. The climate strategy, announced in 2009 was closely linked with the implementation of this innovation. Pursuant to its objectiveness, the VELUX Group undertook to achieve a 50% $CO_2$ reduction by 2020 with respect to 2007, when 100,000 tonnes of $CO_2$ were emitted. Traditional windows are transported on pallets, and VELUX came up with the CUBE - new pallet-free handling and transport system. This solution means that a single transport carries more windows than if pallets were used. Hence, less journeys are needed, which translates into a fuel saving and thus a reduction in $CO_2$ emissions. This has far reaching consequences for the environment, as over the course of a year this reduces the total distance travelled by approx. 2.5 million kilometres. The fuel saving amounts to an equivalent of 800,000 litres of diesel, consumed by transporting finished products to the customers and return journeys with pallets. On a European scale, this generates an annual reduction of $CO_2$ emissions of 2,000 tonnes. The savings also apply to the used materials as this system eliminates wooden pallets. Production facilities acquire additional warehousing space and a convenient high stacking system, as the CUBES can be stacked one on top of another. Reducing the risk of damage to finished products is an added benefit, as it does away with the need to re-pack them by hand. H&S issues also see an improvement, as less manual forklifts are required to move the CUBES. Responsibility for the environment is deeply engrained in VELUX system of values and its aspiration to be a model company. Through implementing this solution, as well as other innovations, such as the use of a biomass fuelled boiler for heating, or an energy management system - over the past five years it was possible to reduce $CO_2$ emission by 36% in Poland, whilst seeing a growth in production.

# Fortum – multi-fuel CHP in Zabrze

**Fortum** is a leading clean-energy company that provides its customers with electricity, heating and cooling as well as smart solutions to improve resource efficiency. We want to engage our customers and society to join the change for a cleaner world. We employ some 8,000 professionals in the Nordic and Baltic countries, Russia, Poland and India, and 62% of our electricity generation is $CO_2$ free. In 2016, our sales were EUR 3.6 billion. Fortum's share is listed on Nasdaq Helsinki. www.fortum.com

Fortum is building a new multifuel combined heat and power (CHP) plant in Zabrze, Poland. The total value of the investment is approximately EUR 200 million (PLN 870 million). The new plant is planned to start commercial operations by the end of 2018, providing district heating to some 70,000 households in Zabrze and Bytom.

The new plant will primarily be fuelled by refuse derived fuel (RDF) and coal but can also use biomass and a mixture of fuels. The amount of RDF can be up to 50% of the total fuel usage. The residential and industrial waste for RDF is sourced locally. The new plant will replace the existing purely coal-fired, outdated units in Zabrze and Bytom. The investment is expected to significantly improve the efficiency of operations and reduce $CO_2$ and other emissions in the area.


The plant will have a production capacity of 220 megawatts (MW) including 145 MW of heat and 75 MW of electricity, and its annual production is estimated to be approximately 730 and 550 GWh of heat and electricity respectively. The construction project is estimated to begin in the summer, subject to the local environmental impact assessment process and other negotiations.

Efficient combined heat and power production is one of Fortum's three strategic core competences. With our experience in efficient energy production and focus on tackling climate change, we want to contribute to the ongoing transformation of the Polish energy sector. Poland is one of the biggest district heating markets in Europe, and we are well established there.

Fortum has been operating in Poland since 2003. It has currently three CHP units and over 800 km of district heating network, which serve in total 360,000 households in the cities of Płock, Wrocław, Częstochowa, Zabrze and Bytom. The total power generation capacity is currently over 200 MW and heat generation capacity over 1,100 MW. Zabrze is part of the fast developing Katowice area in Upper Silesia, with some 2.4 million inhabitants and 21 cities.

http://www.eczabrze.fortum.pl/
www.fortum.pl

# Stena Recycling

**Stena Recycling** is a leader of comprehensive solutions in the area of waste management, recycling and environmental services on the Polish and Scandinavian market. At 18 locations throughout Poland we process 630 thousand tonnes of waste a year that comes from business and industrial operations, obtaining new raw materials from them.

At Stena Recycling we help companies from the production industry not only in achieving appropriate recycling levels but also in analyzing the waste management systems in place at their companies in order to be able to manage the processes as effectively as possible.

Our innovative approach can be seen in many areas. One of them is implementation of solutions in the area of production engineering in the waste management systems at enterprises. We start by conducting a technological and logistical audit at the customer's registered office. We analyze the effectiveness of internal and external transport, the use of warehouse space, work of employees and efficiency of the machines. Next, thanks to 3D design, we visualize the most efficient placement of containers on the site or in the warehouse. We will utilize the dedicated space as best as possible by using an appropriate waste compacting and sorting system. We match the equipment to the quantity and type of waste and optimize the transport achieving the logistical minimum (full transports), making it possible to avoid empty or incomplete rides. This makes it possible to reduce the costs and to reduce the $CO_2$ emission to the benefit of the natural environment. We offer solutions which make it possible to reduce the time which the customer's employees spend on waste management, among other things, through dedicated Stena service. One of many examples of innovations which we implemented at our customers was optimization of work of a forklift truck by implementing a queue system (these are special wheeled containers which can be attached to one another like railway cars, which means that one truck can pull several containers at the same time). By implementing this solution we managed to reduce the working time of the forklift truck by 62%. The effect is reduction of costs ensuing from the use of the forklift trucks such as fuel or electricity and reduction of $CO_2$ emissions. Thanks to optimization of work at that particular customer we reduced the overall system costs by 40%. Thanks to an individual approach we not only improve the processes associated with waste management but also generate savings which may be used by the customer in other areas not associated with our business.

# Danfoss

**Danfoss** is a leader within the scope of energy saving and environmentally friendly solutions, reducing bills and $CO_2$ emissions. Danfoss products are used to heat and cool buildings, for refrigeration in the food industry, to control the operation of electric motors and to power agricultural and construction machinery. The company has 25,000 employees and its services are enjoyed by customers across more than 100 countries. For more information see www.danfoss.pl

Danfoss was one of the first international companies in Poland to begin their production after the political transformation. At present, the company has 7 manufacturing plants: in Grodzisk Mazowiecki, Tuchom, Warsaw, Koleczkowo and Żelazkowo, as well as in Wrocław and Bielany Wrocławskie. They operate in the areas of Heating, Cooling and Drives, as well as Power Solutions. In total, the Polish plants have ca. 1700 employees.

Each year, Danfoss invests in innovations globally about PLN 1 bn, which is 4% of the company's revenues. They have nearly 50 product lines that meet their customers' needs, and on average one new patent is granted daily. Over the last 25 years, Danfoss invested in Poland ca. PLN 800 million in factories and R&D. Investments in the Polish plants, including their modernization and optimization of systems that control ventilation, heating and cooling, improved energy efficiency. With these projects, the production plants in Grodzisk Mazowiecki and Tuchom will reduce CO2 emissions by ca. 900 tons a year in the next few years, and yearly savings on this account are estimated at ca. PLN 600,000.

In Poland, we optimize the energy efficiency by using Danfoss technologies in residential and non-residential construction. One of these solutions is the Smart Heating system.

The Smart Heating system adapts to the rhythm of the day, for improved comfort and energy savings. The simplest way to save energy at home is to turn down the heating when we do not need it. The ideal time to reduce heating bills is when we are out of the house or when we are asleep. And importantly, you do not have to remember to do it.

A range of innovative Danfoss Smart Heating solutions, means improving heating comfort and achieving energy savings has never been this simple. Our solutions put you in complete control of your home heating through the use of intuitive applications which make it possible to plan a heating schedule to match the rhythm of your day.

Danfoss Smart Heating deliver solutions for every home and will cater for every need - from independent, smart radiator thermostats all the way to a complete Smart Heating system for complete control of an entire system - anytime and from anywhere.

And that is the reason why choosing Danfoss Eco™ is worthwhile. It generates energy savings of up to 30%*.

An intuitive and user friendly Danfoss Eco™ App, uses Bluetooth technology for effortless control of radiator thermostats whilst at home.

All you have to do is download the Danfoss Eco™ App, activate Bluetooth and programme each Danfoss Eco™ thermostat independently. It provides you with an even simpler way to control electronic thermostats. It is also straightforward to define daily and weekly temperature reduction schedules. If there is more than one radiator thermostat in the room, the Danfoss Eco™ thermostat will show you which one you're setting. A red highlight will appear indicating that the smartphone has established a connection with a thermostat. Very low noise levels: In terms of noise levels, Danfoss Eco™ is the quietest in its class. Noise levels emitted by the thermostat do not exceed 30 dBA, which translates into peaceful sleep and further energy savings.

Bluetooth technology makes it possible to programme each Danfoss Eco™ thermostat from within 10 m. And obviously it is also possible to adjust the temperature directly - by twisting the thermostat analogously to a purely mechanical one.

# Poldanor

**Poldanor** is an agricultural company running its business activity in the northern Poland. The company farms about 14000 ha of land. It also produces pigs in over 30 farms and renewable energy in eight biogas plants.

In 2016 Poldanor put priority to animal welfare and high quality of the final product. This year the company launched a new product on the market - meat of pigs which were kept in the highest animal welfare standards and therefore never required antibiotic treatment. Moreover, those pigs received only feed free from genetically modified components. This pork meat is sold by Poldanor's sister-company Prime Food, which belongs to the same Group, i.e. Axzon Group.

The standards, covering pigs breeding, transport and slaughter in a specially selected production line dedicated to the new product, have been included in the certification program by an American audit firm. Poldanor is the only company in Poland which can offer commercial quantities of pork meat of such exceptional characteristics. Meat of that quality can be bought in Prime Food's outlet store in Przechlewo, in two online stores and it is also sold to the US market. Soon, it is going to get to other clients in Poland and later on - in Europe.

The company produces feed in its own feed production plant in Koczała. The feed is made mostly from grain planted on own fields, therefore the company maintains full control over the entire production process and over the 'from farm to table' cycle. Additionally, that cycle was complemented by the company's agricultural biogas plants which provide green energy and heat not only to Poldanor's plants but also to external users. In Nacław, for instance, Poldanor provides heat to the local school. Presently, Poldanor has eight biogas plants of the total output of 7.4 MW, which puts the company among the leaders of the biogas industry in Poland. In green energy production, the company uses such substrates as manure, maize silage and waste plants pulp. Currently Poldanor is working on the application of the so called second-generation raw material for biogas production. The aim is to minimise the use of maize silage as an input to the biogas plant.

In 2016 all biogas plants owned by Poldanor S.A. produced in total over 55 thousand MWh of electricity, which is equal to an annual demand for electrical power of over 16.5 thousand households.

Due to the investments in green energy the company once again was awarded the Corporate Carbon Footprint certificate as a proof of its neutral impact on the environment with regard to greenhouse gas emission per kg of final product.

# ROCKWOOL Group

**The ROCKWOOL Group** is an expert in sustainable construction and offers dedicated systems that help reduce energy consumption and noise pollution, increase fire safety and effectively combat water scarcity or floods. There are two factories in Poland – in Cigacice near Zielona Góra and in Małkinia, near Ostrowia Mazowiecka. ROCKWOOL Polska actively participates in social and educational campaigns on energy efficiency and fire safety.

Worldwide, 1 million people move to urban environments every week. According to the newest forecasts till 2050, 2,5 million people will be living in cities! Innovations, which are introduced by ROCKWOOL, serve to build safe and comfortable living conditions.

### Safety and comfort globally

Our heritage is rooted in stone wool – an extraordinary, versatile material, which, thanks to constantly introduced innovative technologies, is applied in increasingly new areas of the economy. In 35 countries from the natural raw materials we create building insulation, acoustic ceilings, external cladding systems to horticultural solutions and modified fibers used in various industries. We are also the world leader in stone wool solutions for power and industrial use as well as marine & offshore. Our knowledge and expertise translate not only to the comfort and safety of our customers' lives, but also to improving the functioning of societies globally – we are striving to have a significant impact on the development of modern technologies that protect the environment and reduce $CO_2$ emissions.

### ROCKWOOL Polska, the most modern factories

We meet the needs of today's market – investors, general contractors and developers are increasingly demanding higher quality, durability, performance and added value to products they offer. Increasingly, the energy efficiency and fire safety of buildings is becoming more important. Building materials are designed to help achieve these goals. ROCKWOOL, as a leader in stone wool solutions, has been observing and analyzing the market for many years, offering innovative solutions. *In ROCKWOOL we adhere to the principle that it is not enough to follow the market, it must be overtaken. In order to offer our customers the most innovative, best quality products and solutions, we also need to have the most modern production infrastructure* – says Andrzej Kielar, ROCKWOOL Polska Managing Director.

In 2016 the ROCKWOOL Group has finished an investment worth 80 million EUR – a new production line was

opened. The new production line allows for the introduction of a new product portfolio improved product quality and higher production efficiency while at the same time improving environment protection. The entire project was prepared by a team of specialists of the ROCKWOOL Group. The new line guarantees technologically the most advanced infrastructure to produce stone wool products in Poland. It is fourth such line in the world. The modernization was based on experiences from similar investments in the US, Holland and Denmark. The ROCKWOOL Group is closely monitoring developments in the market, examining the realities of new buildings, energy efficiency and fire safety requirements, and draws attention to individual guidelines for the different types of buildings – this way continues a modernization process of its factories which has started long time ago.

– *The new line in Cigacice lets us to use the newest technology to produce stone wool products. It will also allow to develop and expand on the market and introduce more modern products, as well as extend the use of stone wool in new segments. Our new portfolio of flat roof solutions and facade products which have special requirements for mechanical properties and fire safety are great example that ROCKWOOL is ready to meet growing demand for stone wool insulation* – comments Andrzej Kielar.

### 20 years of active development in Poland

Rockwool has invested in Poland since its inception more than 325 million EUR in modernization of two factories, technically advanced lines and modernization of existing infrastructure. The company has more than 1100 people and cooperates with many subcontractors who hire more than 3 thousand employees. – *The ROCKWOOL factories localized in Central Eastern Europe are one of the most modern and efficient in the whole ROCKWOOL Group. Our products and more than 50 prestigious awards and distinctions proof our constant and dynamic growth* – concludes Andrzej Kielar.

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