ON THE GREEN WAY

POLISH-SCANDINAVIAN COOPERATION ON THE WAY TO GREEN TRANSFORMATION

Scandinavian-Polish Chamber of Commerce

RESULTS OF SPCC SURVEY

ENERGY AND ENERGY EFFICIENCY

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Western harbour in Malmö, photo: Justin Brown/imagebank.sweden.se

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Agnieszka Zielińska
SPCC Managing Director

Carsten Nilsen
SPCC Chairman

Since the Scandinavian-Polish Chamber of Commerce foundation in 2004, its greatest strength has been the people and partnership based on dialogue. Experts' knowledge from various business fields and our shared values constitute great capital which is the inspiration for building economic relations between Poland and Scandinavia every day.

This publication is the crowning achievement of many conversations with leaders of companies associated with SPCC and how they perceive such an essential partnership in green transformation or energy security which has become of special importance for Europe in the recent weeks.

We present the companies' activities that lead to a better future, energy transformation and a circular economy. We often achieve more than commercial and operational effects of this cooperation - we complement our competences, stimulate knowledge exchange and, as a result, create added value for the whole economy and society, which the company would not achieve alone. These efforts need to be further strengthened. Therefore, it is crucial to have an ecosystem where companies, non-government organisations and authorities, both at the state and local government levels, have a chance for a constructive dialogue.

Business plays a key role here. It is no longer a question of integrating sustainable development into your business - that has become simply a business strategy per se for Scandinavian companies in Poland.

For years, Nordic countries have been leaders in renewable energy technology and circular economy. It is confirmed, among others, by the Environmental Performance Index (EPI) published in February 2022, with Denmark at the top of the ranking and Finland, Sweden and Norway in the top ten countries worldwide.

These resources constitute a great opportunity to accelerate green changes in Poland. The key elements are experience and innovations created by the cooperating teams, which develop new competences and technologies on local level.

We are facing extremely difficult challenges, not only in terms of climate. Today, corporate social responsibility is of particular importance and "Scandinavian gold", which is trust, is of particular value.

In uncertain and changing circumstances, we see more clearly what constitutes real value and is of most significant importance. Employees also perform such verification.

When our safety and future is difficult to predict, it is the organisations based on authentic values, consistent with the needs of local societies, and those who offer dialogue and partnership on many levels that will survive.

[1] https://epi.yale.edu/epi-results/2020/component/epi

ROYAL DANISH EMBASSY
Warsaw

Ole Toft
Ambassador of Denmark

Poland and Denmark has been closely cooperating in the **energy sector and the process of green transition** for the past decades.

With the existing crisis in Ukraine, it is now even more important to strengthen the Polish Danish cooperation. In these challenging times, **energy security** plays a key, more important role than ever before. Rising electricity, heat and gas prices are painful for everyone today. Ranging from large enterprises to small and medium-sized enterprises, ending with households and citizens.

Facing pandemic and climate challenges, and with the emerging energy security crisis, there is a need to *re-think* the way we shape our lives, our cities, buildings, urban spaces, and energy & water infrastructure.

Expansion of generating capacity is part of the solution. However, a change in the approach in energy policy from supply policy (production) to **demand side management policy** may have an equally positive impact on both the current situation, and future investments.

One of the key energy security projects is the Baltic Pipe. The Baltic Pipe project will allow transmission of gas from Norway to the Danish and Polish markets, as well as to end-users in neighbouring countries. It is also an important European Project. EU has included Baltic Pipe on its list of key infrastructure projects that are of common interest to Europe allowing **independency from current supplies** from Russia.

As Ambassador of Denmark, I would like to highlight that we are ready to continue sharing our **experience in the process of green transition** and be partner in developing green solutions for the future. Such partnership would be a clear win-win. It would reduce Poland's dependency on imported fossil fuels. We don't have to start from scratch if we want to build such a partnership. Leading Danish companies who are **global leaders in wind energy** as well as energy **efficiency in buildings and industry** already have close production ties to Poland.

Denmark is one of the **world pioneers of offshore wind energy**. Currently, with over 2,3 GW of installed wind power capacity, Denmark is the fifth largest producer in the world and the fourth in Europe. The **Danish developer Ørsted** is sharing its expertise in the offshore sector in Poland constructing an offshore farm on the Baltic Sea with its Polish partner PGE.

In the field of **energy efficiency** there is a strong legacy of Danish-Polish cooperation where Danish companies have played a major role in making Poland a European leader when it comes to supplying solutions within **energy management and energy efficient building materials**. And both in Poland and in Denmark we are strong in urban district heating systems and we work together in this field, focusing on the **new generation of district heating**.

The existing partnerships emerged because of free markets, foreign direct investments and because of the comparative advantages of Polish and Danish market actors in the energy-sector.

Joining Polish – Danish efforts to provide secure, affordable energy and increasing the quality of life are on the top of our agenda now.

The Royal Danish Embassy in Warsaw has initiated a **strategic 2-year long partnership project** inviting to cooperation with Polish cities and all relevant stakeholders providing sustainable solutions for cities and communities within the areas of **Energy Efficiency, Green Building & Urban Development, and decarbonising cities – all in the spirit of Circular Economy**.

The 2-year project's headline is **GREEN TOGETHER IN TWIN TRANSITION OF CITIES**, where twin stands **for Green and Digital** in parallel, but also for partnership and knowledge sharing between Danish and Polish cities´ stakeholders. Cities are becoming the catalyst for this transition.

Green Together – by joining forces we can reach our mutual goals faster.

Embassy of Finland
Warsaw

Juha Ottman
Ambassador of Finland

Finland together with the other Nordic countries is the global forerunner in mitigating climate change. Finland was the first country to introduce a carbon tax in 1990, the first country to write a circular economy road map in 2016, and our climate target is among the most ambitious in the world: to be carbon-neutral by 2035 – far ahead of the EU goal by 2050.

This is extremely ambitious goal that we aim to reach by speeding up emission reduction measures and strengthening carbon sinks. Climate solutions are developed on all levels of our society. Industries across the board, from high technology to forestry, have all created their own road maps to carbon neutrality. A new Climate Act will be adopted in 2022 with the aim to make sure that Finland reaches climate neutrality by 2035.

However, Finland alone cannot tackle the climate and environmental challenges we face today. **Poland** is an important partner for Finland and we see great potential for cooperation to meet climate targets set at the EU and UN levels. Below I will highlight a few examples on existing and potential fields of cooperation between Finland and Poland.

Smart and sustainable cities are hot topic in Nordic countries and in Poland. A great example of Finnish-Polish cooperation is the project of **Nokia** and the **city of Wrocław**. It aims at improving existing city services and support design and delivery of smart connections across healthcare, transport, education, security and local business incubation. Important part of the cooperation are the intelligent transport systems that will reduce congestion, pollution and CO_2 footprint.

Energy efficiency in buildings is a key part of a smart and sustainable city development. **YIT**, a leading development and construction company in Northern Europe, is creating sustainable, comfortable and safe urban environments in Poland by utilizing opportunities provided by the circular economy.

When thinking of smart and sustainable mobility, another area of possible cooperation between Finland and Poland is the **battery industry**. Finland is the only country in the world that can manage the whole battery value chain from minerals to recycling and thus plays an important role in the global shift towards electrification. A good start for fruitful bilateral cooperation in this sector was obtained at the New Mobility Congress in **Lodz** in October 2021.

According to PEP2040 energy strategy, Poland aims to reduce its dependency on fossil fuels by introducing **offshore wind** and **nuclear energy** in Poland. The **Team Renewable Arctic Finland** -ecosystem gathers over 20 top-tier companies providing broad offering of low emission solutions in offshore wind, special vessels and infrastructure. Finland has a long experience in nuclear energy, including high standards on radiation safety and waste management. **FinNuclear Association**, comprising of all key players in the field of nuclear energy in Finland, stands ready to share its experiences with Poland. Discussions on organizing a nuclear energy conference in Poland are ongoing.

To conclude, even though we live in a rapidly changing world, the necessity to go towards the green way is obvious. In order to be truly efficient, we need to join forces. This report shows that the possibilities for cooperation between the Nordics and Poland are broad and diversified. I hope we will use this potential to the fullest.

Embassy of Sweden
Warsaw

Stefan Gullgren
Ambassador of Sweden

Sweden and Poland enjoy strong relations. Some 700 companies with Swedish capital are present in Poland. They provide employment and investments, and tax revenues to the Polish treasury.

Swedish companies are at the forefront in areas such as innovation, sustainable and green solutions, energy efficiency, and circular material flows. A large number of highly competitive and successful Swedish companies are active in these sectors in Poland. They offer solutions which I believe are of interest and relevance to their Polish partners, who in turn will become more competitive as well.

In Sweden, we have applied a strategic approach to innovative and alternative solutions since the 1970s. Our challenge then was to deal with the effects on the environment following 100 years of industrialization, and the consequences of high prices, which made us aware of our unsustainable dependence on imported energy. In fact, there were few countries in the world in the early 1970s, which were as dependent as Sweden on important energy. In order to stay competitive, our companies had to find innovative solutions. Their efforts played a key role in reducing Sweden's dependence on imported oil.

Today, Europe faces a similar challenge. We must tackle global warming and we must reduce our dependence on imported fossil fuels. These are issues of the highest priority for our survival. For Poland, energy transformation and efficiency, as well as to create conditions for a circular economy, are necessary factors in order to maintain the competitiveness of the Polish economy and ensure Poland's energy security. In the housing and premises sector, to name one example, there is a significant potential for higher energy efficiency and large savings on costs.

Success is possible. In Sweden, the production of electricity and heating have become almost completely fossil-free. In 2020, renewables accounted for over 60 percent of gross final consumption of energy in Sweden. We have reached a leading position in the EU in this respect. The road to success was of course littered with mistakes. Intelligent people learn from other people's mistakes, not from their own. That is why I am sure our Polish partners will see the advantages of teaming up with Swedish companies. I know that Swedish companies are always interested in exploring such opportunities for collaboration. We at the Embassy of Sweden, together with our partners at Business Sweden, would be happy to assist in forging such partnerships

I am very grateful for SPCC's initiative to organize "On the GREEN WAY". It offers an excellent opportunity to share Scandinavian experiences with a wider circle of potential partners in Poland, and for Scandinavian and Polish companies to meet and discuss the prospects for cooperation in areas that will shape the future of innovation in modern Poland. I look forward to follow how Poland and Polish ingenuity will make its full contribution to the green transition of Europe.

Anders H. Eide
Ambassador of Norway

Polish-Norwegian energy cooperation is at the core of our bilateral relations. As an advanced and reliable producer of **energy** Norway is an important partner to Poland in making the country greener while at the same time contributing to Poland's **energy security**. Norway has solid competence, know-how and technology in several key sectors that are key to Poland's green transition.

Norwegian competence in the renewable sector stems from over 100 years of experience with **hydropower**. The share of renewables in Norway today currently exceeds 70%, whereas the share of renewables in electricity production is at. 98%.

Offshore wind production is an important renewable in the shift from fossil fuels to green, clean energy. Norway has increased its production and opened areas for offshore wind production in the North Sea. As members of the North Seas Energy Cooperation, Norway welcomes the recent EU strategy to harness the potential of offshore renewable energy for a climate neutral future. Norway's offshore wind industry has much experience and a proven track – record in challenging marine operations.

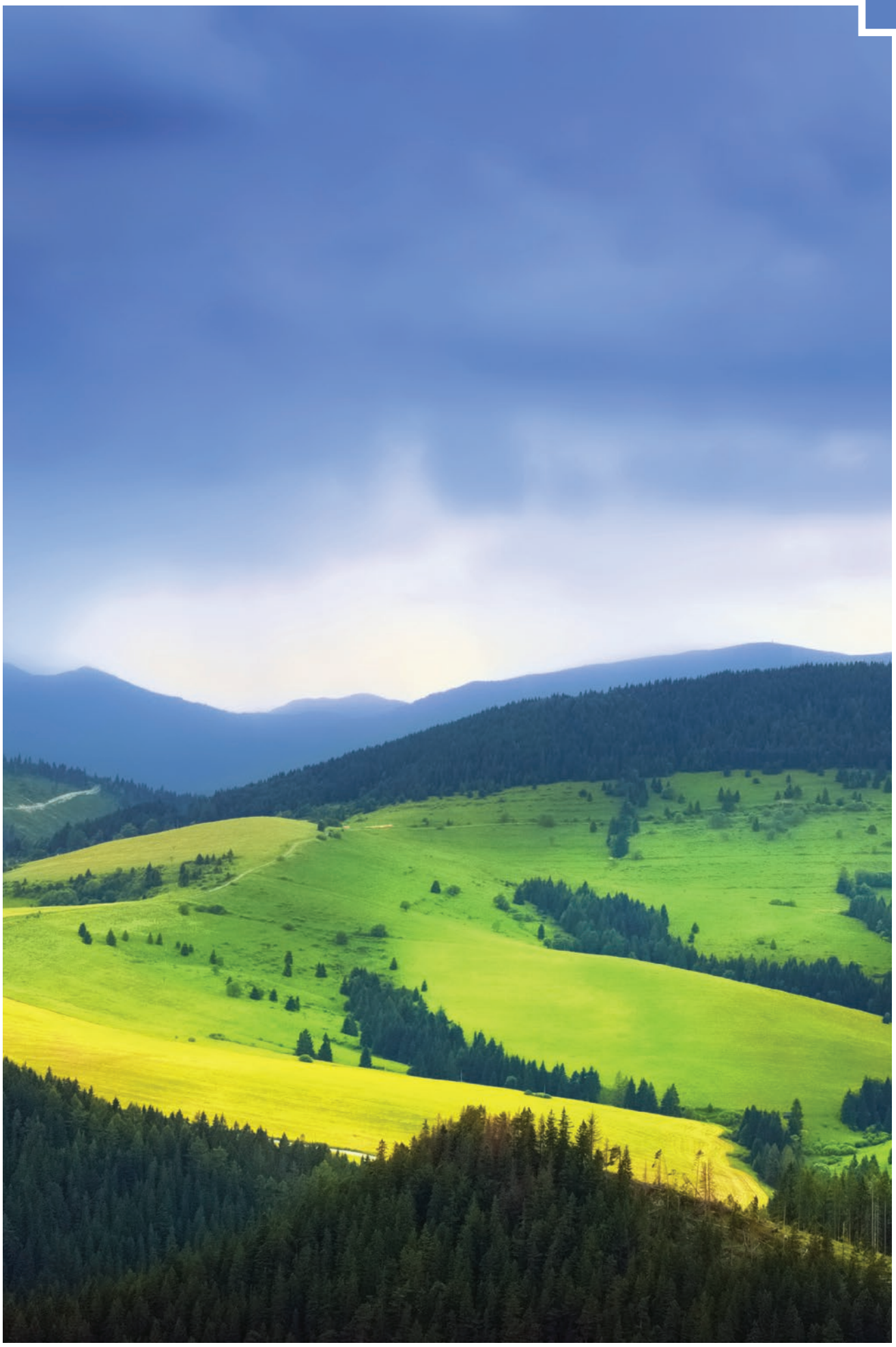
Carbon Capture and Storage is key technology to decarbonize Europe's energy intensive industries. Norway has 25 years of experience of safely capturing and storing CO_2 under our seabed and is a frontrunner in developing CCS technologies. The Longship project was recently launched in Norway and is a full-scale carbon capture and storage (CCS) project that will demonstrate the capture of CO_2 from industrial sources, as well as transport and safe storage of CO_2. The experience from the Longship project gives Norway a technological advantage in the CCS sector and contributes to creating climate solutions for the future. The learning opportunities are immense!

Hydrogen is yet another source of energy that serves in decarbonising the energy sector. Norway adopted a hydrogen strategy in 2020 and has the capacity to produce both renewable and low-carbon hydrogen. Large-scale production of low-carbon hydrogen requires **natural gas** with Carbon Capture and Storage (CCS). A hydrogen value chain could utilise existing gas infrastructure, thus reducing requirements for new investments in infrastructure.

Norway is a secure and reliable provider of natural gas to the EU. Natural gas may function as an important back up for intermittent renewable energy and can be, combined with CCS, a source for clean hydrogen. Almost all Norwegian gas is exported though pipelines to the UK and the EU. Norway supplies 20-25 percent of EU gas consumption. For Norwegian gas producers, Baltic Pipe will offer increased market flexibility establishing a new physical landing point in Europe. For Poland, the pipeline will enhance the energy security.

We are keen to help ensure that products, materials, and resources are used as efficiently as possible, for as long as possible. We believe that digitalization and advanced technologies are key drivers for the transmission to a **circular economy**. Norway is an important supplier of components and metals that are essential for **battery production, solar panel production, and the production of low-and zero- emission mobility**.

We are looking forward to cooperating with you!



THE RESULTS OF THE SPCC SURVEY AMONG SCANDINAVIAN COMPANIES ON THE IMPLEMENTATION OF SUSTAINABLE DEVELOPMENT STRATEGY AND APPROACH TO GREEN TRANSFORMATION

csrconsulting

Climate change and its negative impacts have for years been identified as the most pressing challenges we face today. Among the 17 Goals of the 2030 Agenda, it is the environmental ones, especially Goal 12. *Responsible Consumption and Production* and Goal 13. *Climate action* which are the most difficult for all economies to implement[1]. The negative consequences of climate change - such as more frequent sudden weather events leading to fires, droughts, and floods, or rising raw material prices - are increasingly being felt by business too. For their part, in recent reports, experts of the World Economic Forum have ranked climate change and the failure to address it as the top three risks.

In view of this situation, the pressure on business to take increasingly ambitious measures not only to reduce its negative impact on the climate and environment, but also to increase its positive impact by creating innovative solutions and offering appropriate products or services, is also growing. The aim of the survey conducted by the Scandinavian-Polish Chamber of Commerce was to analyze the activities of its member companies in terms of their approach to green transformation and identify the "green dimension" of their operations on the Polish market against the background of global business.

Are companies implementing sufficiently ambitious measures?

On a global level, 57% of the companies surveyed answered in the affirmative and 11% in the negative. It is worth noting that only a few percent of these strategies have credible reduction targets based on scientific data[2]. How does this look among the surveyed companies in Poland? Of the 38 companies that took part in the survey, 68% said they were taking appropriately ambitious climate protection measures. These declarations are supported by long-term climate neutrality strategies that 63% of companies have; another 21% plan to create such strategies in the next 12 months. **It can be seen that the companies participating in the survey are absolutely aware of the need to act at a strategic level and either already have strategies in place or are in the process of developing them.** Half of the companies surveyed have announced specific commitments to reduce their climate impact in the Polish market, and 13% plan to do so in the next 12 months. Nearly half of the companies (45%) provide training to their employees in the Polish market on climate challenges and actions taken in this area. Unfortunately, still more than half - 52% - do not.

> 63% of companies have long-term climate neutrality strategies; another 21% plan to create such strategies in the next year.

> Nearly half of the companies (45%) provide training to their employees in the Polish market on climate challenges and actions taken in this area.

Energy transition

One of the first tasks to be performed by companies in order to reduce their negative impact on the climate is to measure and analyse the carbon footprint of the business or individual prod-

[1] Report: https://www.sdgindex.org/reports/sustainable-development-report-2021/
[2] Climate Leadership In The Eleventh Hour, United Nations Global Compact, Accenture, 2021

Almost 58% measure their greenhouse gas emissions and 43% also include in the calculations Scope 3, i.e. that associated with impacts in the supply chain.

ucts and services. Among the companies surveyed, almost 58% measure their greenhouse gas emissions and 43% also include in the calculations Scope 3, i.e. that associated with impacts in the supply chain. Additionally, 21% of companies responded that they do not currently measure their carbon footprint but plan to do so in the next 12 months.

The urgent need to minimise the negative impact of business on the environment is accelerating the shift away from fossil fuels towards renewable energy sources. **Almost all companies surveyed (92%) agreed with the statement that the transition towards renewable energy sources significantly increases energy security**.

Scandinavian companies were asked what percentage of energy for day-to-day operations they obtain from renewable sources. Of the 28 companies that responded to this question, 32% gave specific values, the range of which was very wide, with the share of RES in individual companies measuring from 5% to 100%. Slightly more than 7% of companies declared that they have taken steps to switch to renewable energy in the near future and 21% indicated a zero share of RES in the company's energy mix.

Circular economy

Another essential element of the green transformation is the shift towards more sustainable, circular business models. In the case of the Scandinavian companies surveyed, 66% of them implement circular economy projects in Poland, such as using recycled materials in the production process, reducing water consumption and waste generation or educational projects. Another 8% plan to launch such activities within the next year.

Among the Scandinavian companies surveyed, 66% implement circular economy projects in Poland.

Is business meeting social expectations?

Is such business commitment sufficient? Does it meet public expectations? In a survey carried out last year[3] on the implementation of the Sustainable Development Goals in the Polish market, business was rated worse than other sectors (average 2.6 points on a scale of 1-5). 31% of respondents rate business commitment badly or very badly and 19% good or very good. Exactly half are unable to assess this commitment... because they have too little knowledge about it. This is an important signal for companies to communicate more effectively about their commitment and its effects. Today, declarations are no longer enough.

These negative sentiments are consistent with global ones and are not surprising. Immediately after the 2030 Agenda was announced, business representatives made declarations regarding action. After 6 years, however, it is clear that the scale of their actions is far too small[4].

So, what do Polish consumers think business should do? Nearly 40% of respondents expect business to take specific actions connected with the implementation of the 2030 Agenda and climate change goals, and almost 30% expect it to create products and services tailored to today's challenges. This is an important signal from consumers about the role of business in the green transition.

Barriers and drivers for a green transition

On the road to green transformation and more sustainable business models, we see factors, both internal and external, that support this process but also those that hinder it. The question was posed to more than 1,200 CEOs of global companies from 113 countries. Among the biggest obstacles to decarbonising business, difficulties in effectively measuring and managing ESG data across the value chain and the high price of new green technologies were cited. In the case of drivers, the important role of clear and consistent legislation was mentioned, which should oblige governments and companies to work together to protect the climate and the environment to a greater extent than before.

Also, in a survey carried out by SPCC, Scandinavian companies were asked to identify the biggest barriers and drivers of green transformation. The answers that the companies gave make up several key pathways and are mentioned on the next page. They certainly serve as a valuable starting point for a discussion on how to further lead green transformation.

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[3] Research by CSR Consulting and BNP Paribas within the 17 Goals Campaign partnership: https://kampania17celow.pl/raporty/badanie-konsumenckie/
[4] 2021 Sustainability Leaders, GlobeScan, SustainAbility Survey
[5] „Climate Leadership In The Eleventh Hour", United Nations Global Compact, Accenture, 2021

DRIVERS

Sustainability as an integral part of the strategy/ business model, including short and long-term goals, reporting on key indicators, employee education and training, and linking sustainability performance to the company's financial performance

Commitment to sustainability at every level: management, employees, suppliers and business partners, customers

Clear and understandable legal requirements, encouraging green transition

Energy transformation in Poland – easier access to RES, favourable renewable energy purchase agreements, support for financing green investment projects

Strategic collaboration between companies – sharing knowledge and good practices, joint search for innovative technologies and transparency and ambition in partnership project

BARRIERS

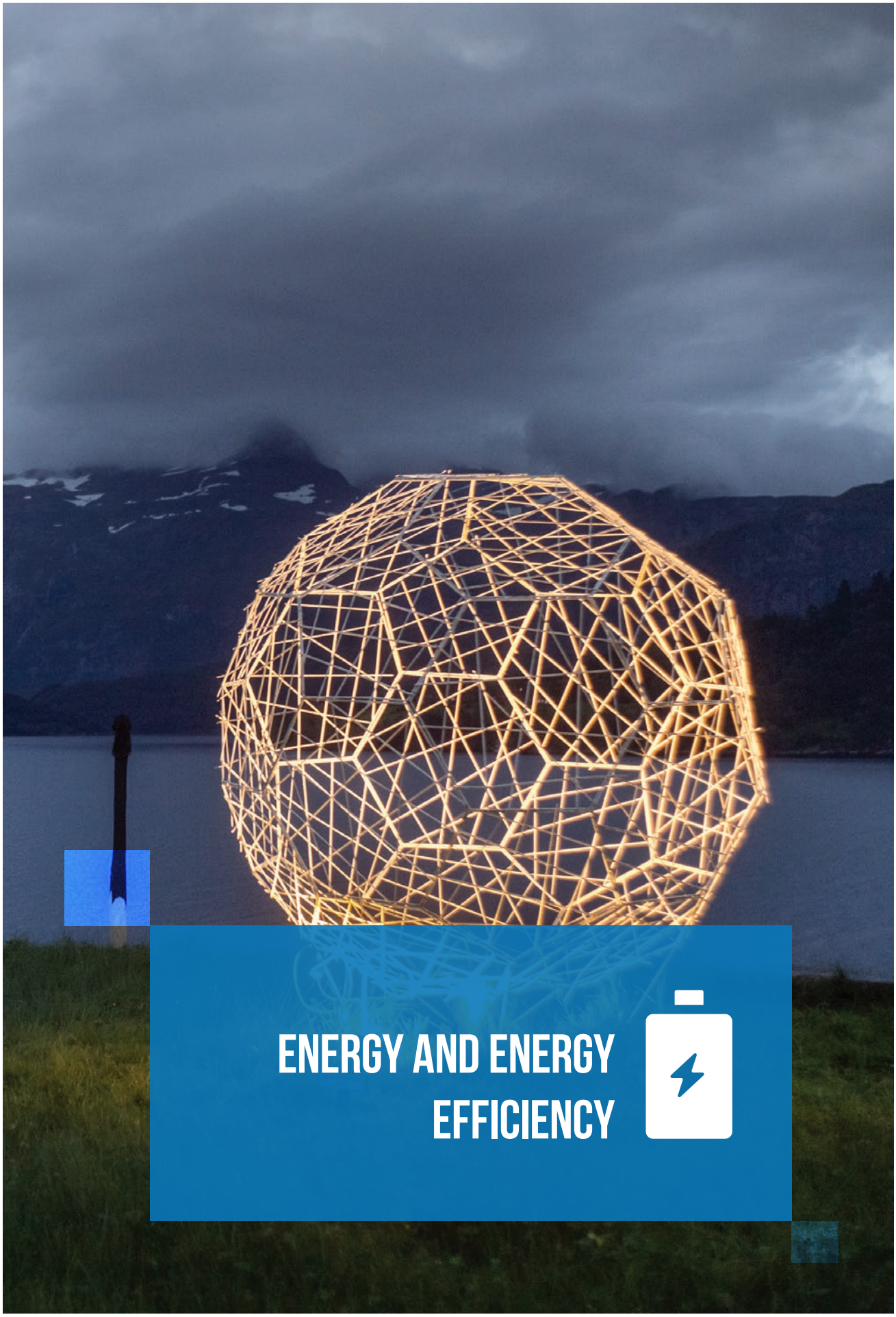
High transition costs and a short-sighted perspective: prioritizing short-term profits over long-term viability of green transition and climate responsibility - many green transition goals are long-term goals, difficult to monetize in the short term

Chaotic and dynamically changing legislation as well as outdated legal requirements and excessive bureaucracy

Lack of national structures and solutions: difficulty and limited possibilities to use RES, high dependence on fossil fuels, lack of economic incentives and proper financing for green investment projects

The need to change many processes simultaneously, which is a major challenge for companies

Resistance to change, resulting from low environmental awareness and knowledge – both in the business environment (reluctance on the part of management, focus of business partners on absolute cost reduction) and at the level of national administration (which hinders the emergence of systemic solutions)



ENERGY AND ENERGY EFFICIENCY

Britt Smelvær sculpture in Førdefjorden in Norway, photo: Oddleiv Apneseth/norden.org

Paweł Nowak, Marta Nowak

SCANDINAVIAN BACKGROUND BEHIND TRANSFORMATION OF POLISH ENERGY SECTOR

PNP law since 1990

The Russian aggression on Ukraine has made everybody aware of how important it is for the EU states to ensure their energy security. The energy security of Poland keeps increasing, but actions aimed to transform the energy sector should be intensified even more. The transformation of the Polish energy sector is based strongly on co-operation with Scandinavian countries.

Energy from the Baltic Sea as a cornerstone of the transformation

A special component of the newly shaped Polish energy mix will be the energy from the Baltic Sea, i.e. offshore wind farms. They will be one of core sources of renewable energy. The Energy Policy of Poland until 2040, which was adopted last year, expects that installed capacity of offshore wind farms will reach 5.9 GW in total by 2030, and 11 GW by the end of a following decade. Such projects fit a strategy of distributed energy generation, which is considerably more difficult to be seized by military, and zero-emission energy generation, which should make Europe independent of conventional energy sources originating outside of the EU. Offshore wind farms mean also development of Polish seaports and Polish entrepreneurs, transfer of know-how, and enormous increase in the number of jobs, especially in the northern area of Poland. The estimates based on the Danish experience let us assume that every single one of GW of capacity installed in offshore wind farms will result in **7 thousand new jobs created on the Polish labour market**. Tender competitions are already being held for a port in Gdańsk intended for assembling offshore installations, and the port is yet another stimulus to develop the entire maritime economy.

Legal frameworks for new energy-generating installations have been set forth in the Act on Promotion of Energy Generation in Offshore Wind Farms, which came into force on 18 February 2021. These regulations, although still being quite new, have defined in detail a process of investing into offshore wind farms. The Act contains regulations concerning terms and conditions for granting support to investors, preparing and carrying out construction projects of such farms, and connecting them to a transmission grid. We already know the details of first projects in that field. So far, public aid has been granted by decision of the President of the Energy Regulatory Office. The projects that had been sufficiently advanced to successfully complete the procedure and to start generating energy within the next 7 years have been the result of international co-operation. A Scandinavian input is clearly visible in the projects jointly carried out by the PGE Energy Group and the Danish entity Ørsted, and the Polish company Polenergia co-operating with the Norwegian company Equinor. Auctions to be organised by the President of the Energy Regulatory Office in 2025 and 2027 will be the next stage of support for offshore energy sector. If the energy possible to be contracted is not fully sold at these two auctions, it will be possible for the President of the Energy Regulatory Office to announce further auctions. During that stage of construction of Polish offshore wind farms, Ørsted from Denmark will again be actively operating, this time with the Polish partner ZE PAK, a company listed on the Stock Exchange and the biggest private producer of energy in Poland. Investments have also been declared by the company named Copenhagen Infrastructure Partners.

> The Energy Policy of Poland until 2040, which was adopted last year, expects that installed capacity of offshore wind farms will reach 5.9 GW in total by 2030, and 11 GW by the end of a following decade.

Scandinavian and Polish entrepreneurs should also participate, at several stages, in the supply chain of materials and services necessary to successfully complete offshore projects.

To say that Scandinavian power companies participate in the above projects is, however, a simplification. Scandinavian and Polish entrepreneurs should also participate, at several stages, in the supply chain of materials and services necessary to successfully complete those projects. Not too long from now, the Polish shores will be turned into a gigantic construction site. The first five projects alone mean that over 500 huge wind turbines will be erected. That's why Danish potentates, such as Vestas, the turbine manufacturer, or NKT, the submarine cables manufacturer, should take an active part in this immense transformation.

Challenges for onshore wind energy sector

Is the wind energy sector ever to come back onshore? It is a paradoxical question, obviously. On the one hand, a reliable auction scheme ensured that wind parks have been constructed one after another in dozens of places in Poland in recent years. On the other hand, the Wind Power Plants Act of 2016 became a stumbling block to investors in onshore farms, by making it practically impossible to obtain a new building permit. The main principle of the Act has been a notorious rule 10H, which prohibits to erect both residential buildings and wind turbines if the distance between them is shorter than 10-times the total height of the turbine. However, the protection of village residents from the wind energy sector under this Act is superficial. As mentioned above, wind parks keep to be erected anyway because their respective building permits had been issued before the regulations came into force. In turn, it is prohibited to erect new residential buildings in large areas surrounding wind power installations. **In the 2nd quarter of 2022, the Polish Parliament is to receive a draft Act that provides for a local zoning plan to take precedence over the rule 10H.** It will be possible for a local zoning plan to determine other distance between a wind power plant and a residential building, bigger than a forecasted area affected by the wind power plant, however the distance will not be able to be less than 500 metres. The final distance from residential buildings will be verified and determined during the procedure of granting an environmental decision for a given project, based on a detailed report on environmental impact. More liberal rules concerning the distance will, however, be connected with additional obligations with regard to consultations with commune residents held during public discussions. We should all keep our fingers crossed for the legislation process!

Natural gas from Scandinavia

At the time when the focus is on events happening in Ukraine, Scandinavian-Polish co-operation aimed to diversify sources of natural gas imported to Poland is becoming prominent. The Baltic Pipe is no doubt a project of strategic importance to Poland. The gas will be supplied to Poland thanks to a new gas supply corridor created on the European market. Both preparatory and construction works have been co-funded by the EU. The entire project is to be commissioned by the end of this year, and transportation capacity to be reached within the same period is 10 billion cubic metres of gas per annum. The new project should reduce CO2 emission in Poland and, by increase of gas supply to the market, should also contribute to gas price reduction. Denmark will serve not only as a transit country because a contract on purchase of Danish gas has already been concluded as well. Major companies are parties to the contract: Ørsted on the Danish side, and PGNiG on the Polish side. **Approx. 6.4 billion cubic metres of gas will be supplied by Denmark to Poland between 2023 and 2028.**

Irrespective of the success of the Baltic-Pipe pipeline, Polish entities operate actively in Scandinavia and develop their business on the Norwegian shelf. The state-owned power company PGNiG holds shares in 62 concessions in Norway. Gas extraction from the continental shelf in the North Sea is one of priorities of the Polish company, which values reliability and safety of extraction activities in that Nordic country.

Wind turbines in Munkendal, Sweden
photo: Per Pixel Petersson/imagebank.sweden.se

Nuclear power sector – Finnish experience

Nuclear power should also be the cornerstone of zero-emission economy. In February 2022, the European Union adopted the draft new taxonomy that recognises the role of nuclear power – in addition to that of gas – in the transformation of energy sector. It means that it will be possible to obtain EU funds for investment project in these sources. According to the latest assumptions, the first nuclear power plant in Poland is to be constructed in a seaside commune Choczewo. The document mentioned above, i.e. the Energy Policy of Poland until 2040, assumes that **the first power unit of the Polish nuclear power plant, with a capacity of approx. 1-1.6 GW, will be commissioned in 2033**. Further power units will be commissioned every two-three years, and the entire nuclear program assumes the construction of 6 power units with a capacity up to 9 GW. The costs will be enormous, and the final figure, financial scheme and suppliers of technology are still unknown.

Although the planned deadlines seem to be far off, if they are to be met, the project should be worked out right now in terms of financing and, even more importantly, in terms of regulations of law. The Polish law is based on international regulations concerning nuclear power sector. They regulate not only the process of preparations for construction of a power plant and the construction process itself, but also operation of a power plant and its decommissioning. The atomic law defines the conditions that have to be met so that a consent to starting a construction process and to setting a power plant in motion can be obtained, the rules of management of nuclear materials, radioactive waste and spent fuel, the authorities competent for nuclear safety and radiation protection, the rule of civil liability for nuclear damage, the rules of fulfilling international obligations, the EU obligations inclusive, with regard to nuclear safety, ionizing radiation protection, and safeguarding of nuclear materials and control of nuclear technologies. Preparatory works and construction of a nuclear power plant are subject to the Act on Preparation and Execution of Nuclear Facilities and Accompanying Projects dated 29 June 2011. The Act defines the rules as well as terms and conditions of preparing and executing projects consisting in nuclear power facilities and accompanying projects by authorities competent in that respect.

As for the very process of construction of a nuclear power plant, we may learn from successes and experience of our neighbours, the Finns. In December 2021, a reactor was set in motion in the power plant Olkiluoto, which is located on the west coast of Finland. It is the third reactor set in motion in that power plant, and the fifth in Finland. Electricity production started on 12 March 2022. It is a third generation reactor (EPR) designed to improve safety and reduce costs. We can and must draw on extensive experience, both in terms of the technological as well as legal and economic aspects, derived from that project.

Connection linking the Polish energy sector with Sweden aiding both parties

Poland is a part of the European power system. SwePol Link is one of the connection linking us with neighbouring countries. It is a submarine HVDC cable connecting Poland and Sweden, which was put into operation in 2000, with a transmission capacity of 600 MW. Connections of that type ensure stockpiles for proper operation and balancing of both the Swedish and Polish power systems. The connection with Sweden, or other countries, has its market-wise value and time and time again allows to reduce the price of electricity by using cheaper energy generated at neighbour's sources. The energy security is however of paramount importance. With the kaleidoscopic events of 2021, the situation was changing rapidly. A changeable weather, repairs to units of Polish coal-fired power plants and the closing of the Swedish nuclear reactor Ringhals caused that not only Poland was aided by the Swedes, but also our neighbours imported electricity from Poland.

The Polish energy sector has been changing and will keep changing in a highly dynamic manner. All the hints suggest that the transformation will be brought about with Scandinavian partners' co-operation. The experience and resources of all Scandinavian countries, being with no exception our close neighbours and, on top of it, the countries with a wide range of energy sources, will be invaluable. ■

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ENERGY TRANSITION – THE DEFINING CHALLENGE AND OPPORTUNITY OF OUR TIME

Without energy, the world would simply stop. But the energy system must change. Does a future exist where we can ensure enough energy for everyone, while also being good stewards of our planet? At Equinor, we believe that the answer is yes! By 2050, we aim to become a net-zero company, delivering the energy the world needs without contributing to global warming.

photo: Jan Arne Wold / Equinor

Climate change means that we must change the way the world produces and consumes energy, to eliminate harm to our society and the natural environment. We must transition away from fossil energy sources to renewable ones, and greenhouse gas emissions must be slashed. The question we ask ourselves in Equinor is: "What will it take to bring about a successful energy transition for the world, and what role can Equinor play?"

The job that has to be done is bigger than any one company, any single industry or any one country on its own. This is an endeavor that is described as the defining challenge of our time: "How do we ensure enough energy for everyone, while also solving the climate challenge?"

Today, nearly 80 percent of the energy the world uses comes from fossil sources. This cannot continue. At the same time, we know that the world will have to support many more human beings in the future, and we want to make sure that as few of us as possible live in poverty. Such a vision means a world that will demand even more energy than today. In other words, while we work to replace more and more fossil energy with renewables, we will also have to produce more energy overall. That means a complete change-over of the entire energy system on which our society is built – in the space of just a few decades. And it's going to take global cooperation on a scale the world has probably never seen, across industries, borders and political divisions.

> In order for a complete change-over of the entire energy system to be successful, a global cooperation on a scale the world has probably never seen is needed – across industries, borders and political divisions.

These three areas are closely linked and mutually reinforcing. We will use our offshore expertise to develop new low-carbon solutions. Renewable energy will help cut emissions offshore. And profit generated from oil and gas activity will be used to invest in renewable projects.

Accelerating growth in renewables

In Equinor we're transforming our company to support and accelerate the energy transition and ensure a competitive and resilient business model in line with the Paris Agreement. It means decarbonising oil and gas production, growing within wind and solar, and developing low-carbon solutions such as hydrogen and CCS on an industrial scale.

The transition to a low-carbon society requires solid growth in renewable energy. Equinor's production of renewable energy will increase tenfold over the next five years. We plan to reach an installed net renewables capacity of 12-16 GW by 2030. Two-thirds of this capacity will be within offshore wind.

Offshore wind farm Sheringham Shoal, UK. photo: Jose Vega Lozano / Equinor

Large scale answer: offshore wind farms

The next decisive phase in the global transition to low carbon and renewable energy is happening now, with offshore wind at the centre of the revolution. For the green shift to succeed, what's needed is sheer scale: industrial and financial strength, and production capacity at a global level.

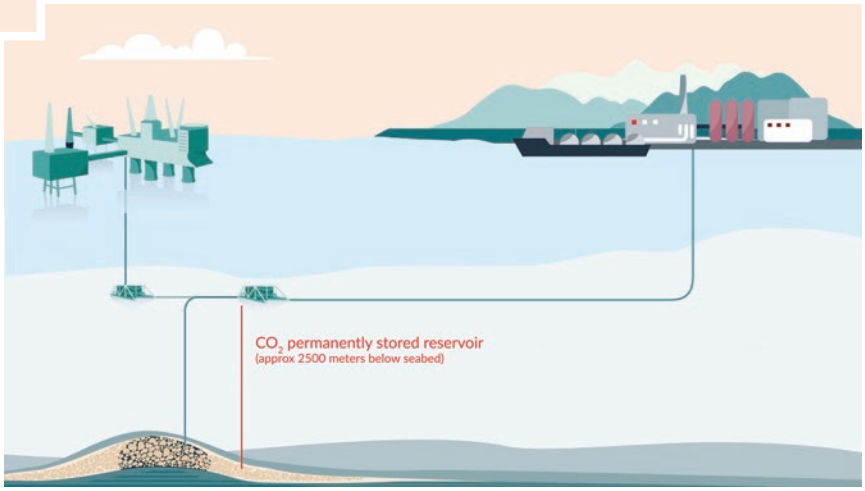
The European Commission presented in November 2020 the EU Offshore Renewable Energy Strategy which will shape the development of offshore wind in Europe for the next 30 years. The strategy will enable all European sea basins to benefit from offshore wind and aims at promoting cross-border cooperation in key basins, like the North Sea and Baltic Sea. Estimations show that by 2030 Europe will have more than 60 GW of installed capacity from offshore wind and by 2050 it can grow up to 300 GW. According to Wind Europe, Europe's offshore capacity is sufficiently large enough to supply the electricity demand in Europe which will only continue to grow within the upcoming years. Through larger wind turbines, better design and streamlined operations, costs of this renewable energy source are decreasing, while efficiency is increasing. To reach the targets foreseen by the EU, speed is of essence. In order to scale up, it is important to have concrete ambitions for grid development, regulatory framework, and financial means to enable renewable energy deployment. Over one million new jobs could be created throughout Europe in the offshore wind sector, which proves great potential for innovative job markets that comes with the new industry.

Poland is particularly well positioned to benefit from offshore wind as one of the strategic solutions allowing for the energy transition. The potential for Baltic Sea wind power generation is expected to reach more than 93GW by 2050, with Poland's itself offshore wind potential capacity estimated for 30 GW. By 2030, with the first phase of offshore wind development in Poland, 5,9GW of capacity will be developed, answering significantly for the local energy demand. Ambitious targets to deliver 11 GW capacity by 2040 can be delivered through another round of offshore wind sea-bed licensing – a big number of projects are set to be executed in parallel, which requires close cooperation and joint efforts of various industry players as global demand in supply chain and bottle-necks in permitting frameworks are seen as potential challenges for the whole sector. Support from the EU can fast track the decarbonization by retiring the coal fleet and replace it with offshore wind. This will substantially contribute to the decarbonization of regional energy markets. Poland has also great potential for onshore renewables – with fast growing photovoltaics sources and onshore wind soon to be re-open for scale development.

Carbon capture and storage – building on decades of offshore operations to reduce emissions

How do we stop CO_2 reaching the atmosphere and exacerbating global warming? One solution that will be increasingly important to develop is capturing and storing carbon underground — quite literally putting it back where it came from. Carbon capture, utilisation and storage, or CCS/CCUS, is an important emissions reduction technology that can be applied across the energy system. CCS is one of the measures that the UN Intergovernmental Panel on Climate Change recommends to keep global warming to 1.5 degrees Celsius. The International Energy Agency states that we will need to store billions of tonnes of CO_2 every year if we are to reduce global warming. CCS will be crucial for decarbonising industries such as cement and steel where production itself results in large CO_2 emissions, as well as other industries.

The potential for Baltic Sea wind power generation is expected to reach more than 93GW by 2050, with Poland's itself offshore wind potential capacity estimated for 30 GW.



Leveraging R&D and innovation capabilities will be key to developing new energy solutions at an acceptable cost. CCS involves three major steps: capturing CO_2 at the source, compressing it for transportation and then injecting it deep into a rock formation at a carefully selected and safe site, where it is permanently stored. Capture step is the separation of CO_2 from other gases produced at large industrial process facilities such as coal and natural-gas-fired power plants, steel mills, cement plants and refineries. Once separated, the CO_2 is compressed and transported via pipelines, trucks, ships or other methods to a suitable site for geological storage. Upon reaching the destination, CO_2 is injected into deep underground rock formations, usually at depths of one kilometer or more.

Together with Shell and Total, Equinor is developing infrastructure on the Norwegian Continental Shelf for transport and storage of CO_2 from various onshore industries. The project, called Northern Lights, involves transporting liquified CO_2 by pipeline to permanent offshore subsea storage. The Northern Lights project is part of the Norwegian full-scale CCS project. The full-scale project includes capture of CO_2 from industrial capture sources in the Oslo fjord region (cement and waste-to-energy) and shipping of liquid CO_2 from these industrial capture sites to an onshore terminal on the Norwegian west coast. From there, the liquified CO_2 will be transported by pipeline to a storage location subsea offshore in the North Sea, for permanent storage. The solution being considered will have an initial storage capacity of around 1.5 million tonnes of CO_2 per year. Once the CO_2 is captured onshore, it will be transported by ships, injected and permanently stored 1,000-2,000 meters below the seabed. This set-up is a unique solution and enables accommodating large CO_2 volumes from across Europe that would otherwise have been emitted. Northern Lights has already its Polish links - a pilot carbon capture and storage by Heidelberg Cement at its Górażdże cement plant in Poland has been set-up under the project ACCSESS. The cement plant part in Poland will test an enzyme-based capture method using waste heat at the plant and the consortium will also look at how the captured CO_2 can then be transported to the Northern Lights storage facility in Norway including the regulatory aspects of cross-border CO_2 transport.

To get there. Together.

Equinor is actively involved in supporting Poland in the energy transition. Local industry and companies can benefit strongly from development supply chain in growing renewables sector. Strong partnerships, transfer of competence and technology as well as good cooperation between business and administration will allow to answer the defining challenge of our time, to catch the opportunity and achieve goals together. ■

photo: Tom Jur / unsplash

SCANDINAVIAN IT SOLUTIONS IN THE PROCESS OF CREATING A FLEXIBLE AND GREEN ENERGY MARKET

KMD
An NEC Company

Flexibility is currently one of the most common words in the context of the energy market. The transformation of the market towards increased share of energy produced from renewable sources causes a much greater variability of supply in energy production, because sources such as wind turbines or solar panels, are dependent on inherently less predictable weather factors. On the other hand, we can observe a greater variability in energy demand resulting from the growing share of electricity consumers striving for optimal use of energy and with new electricity demanding units such as electric vehicles. This places completely new requirements in terms of challenges related to maintaining balance in the distribution network and its stability, as well as in relation to IT systems used by companies and institutions operating on this market.

The much greater volatility of supply and demand in the energy market means that classic tools such as historical data and long-term forecasts based on this data are no longer sufficient to balance electricity production and demand and thus maintain grid stability. Operators and institutions operating in the energy market need to know on an ongoing basis how production and energy demand are changing, they must be able to exchange this type of information between different roles in the market in real-time.

Role of data in planning green transformation

For this reason, it is not only energy that flows through the modern distribution network. There are also **increasing volumes of data flowing between devices and systems in the network along with the energy**. The Act on the Amendment of the Energy Law adopted in 2021 by the Polish house of representatives (pol. "Sejm") assumes that in the next 8 years more than 80% of over 13 million energy consumers in Poland are to have their meters replaced with smart models, meaning those which, in addition to measuring energy consumption, can automatically send these measurements to IT systems managing the grid. The days when the collector manually made meter readings on a monthly or yearly basis are gone. It is now becoming a standard for smart meters to take readings and send them every hour or every 15 minutes. From the point of view of IT systems, this means that they must handle over 10,000 times larger volumes of data than so far (about several thousand terabytes of data per year in the case of full implementation of smart meters in Poland).

Real-time consumption and production data provide the knowledge needed to build business models that support the flexibility on the energy supply and consumption side. By combining data from multiple sources, e.g. meteorological data, it is possible to forecast the expected levels of production from renewable sources such as solar panels or wind turbines better and more accurately. Based on the expected production levels, models can be built to promote and incentivize consumer behavior that ensures more efficient use of energy generated from such sources and a better balance between production and consumption levels, e.g., in a daily cycle. The basis of such an activity may be a flexible billing model that incentivizes charging electric cars and other high-demanding units such as heat pumps at certain times in the daily cycle when the load on the network

In the next 8 years more than 80% of over 13 million energy consumers in Poland are to have their meters replaced with smart models

generated by the other consuming devices is lower.

A new variable – multidirectional energy flow

Another big change in electricity distribution grids is the direction of energy flow. Currently, anyone can be a producer of electricity, e.g. by installing photovoltaic panels in their home. Energy, therefore, no longer flows in a one-way way: from large power plants through transmission networks and local distribution grids to the end-users. Consumers can be energy producers at the same time and in the event of overproduction of energy exceeding their own current demands, they can sell energy to the grid. In this type of model, the flow of energy in the grid becomes multidirectional, which adds another level of complexity from the point of view of managing the stability of the grid, but also from the perspective of IT systems used, for example, for billing and settlements or managing devices connected to the grid.

The complexity of the modern distribution grid is significantly larger than it was a few years ago. Grid operators need modern solutions to manage the growing inventory of connected devices such as smart meters, solar panels, wind turbines and the communication channels used by these devices.

By combining data from multiple sources, e.g. meteorological data, it is possible to forecast the expected levels of production from renewable sources such as solar panels or wind turbines better and more accurately

Installations, certification, and service processes of this type of equipment require from IT systems very flexible models of inventory management of the devices connected to the grid and a much higher degree of process automation, so that the operator can effectively manage, develop, and maintain the increasingly complex ecosystem of the distribution grid.

KMD Elements – a modern solution supporting flexible energy market

KMD has been providing IT solutions for the energy market for over 40 years, cooperating with over 180 companies and institutions from the electricity, gas, heating, and water distribution market. Having such a wide range of experience, we have a direct insight into the challenges faced by our customers in connection with the dynamically progressing transformation of the energy sector. In the solutions we offer, we take a step forward into the future and, using the latest technology, we build solutions in such a way that they are easily expandable and scalable and that they provide a sufficient level of flexibility to also meet those challenges that energy companies will face in the upcoming years.

A great example of such a solution is KMD Elements, a modern system for flexible billing and settlements, customer management, and inventory management of devices connected to the grid. KMD Elements has been designed and developed specifically for the energy market as a cloud solution adapted to process very large volumes of data from smart meters that generate high-resolution time series data. This system was built as an open platform composed of independent components that can be easily extended with additional functionalities and integrated with customer systems via a standard APIs ("application programming interface").

The key functional modules of this solution are:

- advanced calculation formulas engine – allows you to build very flexible billing models, e.g. based on price models differentiated depending on the hours in the daily cycle, thus providing support for a better balance of production and energy demand in the network
- process management center, e.g. customer support, operation and servicing of devices connected to the grid, installation of new devices – KMD Elements puts great emphasis on the process automation, thus significantly simplifying the tasks of grid operators related to the growing complexity of the grid, management of connected devices, energy flows, billing and settlements
- customer service and communication with the customer – allows to service customers through various communication channels based on data and business events - addresses the needs of modern customers who, in addition to ensuring continuity of services, expect in-depth insight into their energy consumption patterns and want more flexible billing models tailored to their needs

The high level of flexibility of KMD Elements solution makes it adaptable to the increasing complexity in the energy market and helps to keep a step ahead of future needs ■

SECURITY OF GAS SUPPLY AND CLIMATE PROTECTION. ACTIVITIES OF GAZ- SYSTEM

Regional dimension of the Baltic Pipe Project

The Baltic Pipe gas pipeline is one of the key infrastructure projects of GAZ-SYSTEM, which bolsters Poland's energy security and at the same time is in line with the EU concept of the BEMIP corridor (*Baltic Energy Market Interconnection Plan*).

The parallel objective of building the gas corridor spanning the Norwegian continental shelf and Poland is to provide the entire region with infrastructure access to new sources of fuel. The project will improve the performance of the regional market, ensure sustainable development in Central and Eastern Europe and the Baltic region, and contribute to the implementation of the European Union's climate and energy policy.

Our strategy – security of supply

By the end of 2022, GAZ-SYSTEM will have completed three strategic infrastructure projects: Baltic Pipe as well as Poland-Lithuania and Poland-Slovakia gas interconnectors, whose primary objective is to provide full diversification of natural gas supplies to Poland.

From the perspective of natural gas imports, diversification means the development of transmission infrastructure so as to ensure full independence of natural gas supplies to Poland from the political decisions of its unpredictable neighbour state – Russia.

GAZ-SYSTEM's strategy is coordinated with the multi-directional activities of Polish gas suppliers, consistently strengthening their presence both on the global LNG markets and on the Norwegian continental shelf, which is crucial for the supply of hydrocarbons across Europe.

Today's geopolitical situation clearly reveals the importance of independence from a single direction of supply. Therefore, a diversification strategy for supply directions of energy commodities needs to be introduced all over Europe, similar to the one which has been implemented for many years by GAZ-SYSTEM.

The development program of Polish natural gas transmission infrastructure implemented by GAZ-SYSTEM extends beyond exclusively Polish context. With the investments of the Northern Gateway - Baltic Pipe, LNG terminal in Świnoujście and the planned FSRU terminal in the Gulf of Gdańsk, as well as the new interconnectors with Lithuania and Slovakia, we will be able to bolster energy independence of the entire region of Central and Eastern Europe, including the Baltic States.

Baltic Pipe: physical connection between Poland and Denmark already constructed

Installation of the 275-kilometre long offshore section of Baltic Pipe pipeline across the Baltic Sea is now complete. Testing and commissioning of the new transmission infrastructure is currently underway, and the project team is focusing on preparation for the

operation of the pipeline in cooperation with the Danish project partner, ENERGINET.

The work on the onshore part of the Baltic Pipe in Poland is also nearing completion – both the line sections and gas compressor stations will soon be successively incorporated in the existing national transmission infrastructure.

The first gaseous fuel from the new source will be delivered to Poland on 1 October 2022.

Throughout the fourth quarter of 2022, the pipeline will be operating at partial capacity, and full capacity in the direction from Norway through Denmark to Poland, i.e. 10 bcm per year, will be available from 1 January 2023.

Our strategy – climate protection

The benefits of GAZ-SYSTEM's ambitious diversification strategy for Poland will also have a significant impact on climate and environment. It will trigger a fundamental change in power and heating sector in Poland which is still primarily based on coal (approx. 70%). In combination with the development of wind energy, natural gas supplied from new sources through Baltic Pipe will guarantee a solid provision of energy allowing coal consumption to be significantly reduced. This will translate into both cleaner air and better health for Poles, as well as a significant reduction in CO_2 emissions in Poland.

KEY FINDINGS OF THE CLIMATE REPORT

25,000 human lives can be saved annually

The Baltic Pipe Project may reduce the emissions of fine particulate matter by 54%, which will be possible thanks to the replacement of heating of buildings with coal, fuel oil and wood with electric heating utilising heat pumps.

The reduction of CO_2 emissions will reach 70M tons annually

Thanks to the use of gas in combination with wind energy in 60/40 ratio, the reduction of carbon dioxide emissions will contribute to 58% of the achievement of the Poland's goal for 2030, consisting in the reduction of the carbon dioxide emissions by 120M tons.

The energy security will be improved

The Baltic Pipe Project was classified by the European Union as a Project of Common Interest, and it will interconnect Poland with the Norwegian gas fields, thus reinforcing the European internal energy market.

The energy transition is a multi-faceted and long-lasting process, as evidenced by the wide range of measures covered by the European Commission's package of recent legislative proposals (EU Green Deal). Currently, the main technically accessible renewable energy sources (RES), i.e. wind and solar, are strongly dependent on weather conditions prevailing at a given time of the year; therefore, additional mechanism to ensure energy system stability is required.

For energy transition to succeed, some solutions to stabilise the system at times when wind and solar power are not available are required. Here, natural gas is a technologically advantageous option owing to its approx. 60% lower carbon footprint compared with that of coal, and the fact that it allows additional capacity to be rapidly commissioned as needed to stabilise the energy system. Until technologies allowing for effective storage of surplus electricity from RES are designed and developed on a scale adequate to the needs of the country's energy system, Poland's energy transition will not be feasible without natural gas. This is why the strategic investment program implemented by GAZ-SYSTEM is so important for climate protection in Poland.

From the EU legislation perspective, the implementation of Baltic Pipe clearly confirms the complementarity of this project with main postulates set forth in the assumptions of the EU climate and energy policy: strengthening competition, integration of natural gas markets, increasing security of supply and effective implementation of sustainable development principles. All elements of the Baltic Pipe project have been included by the European Commission in the subsequent lists of Projects of Common Interest (PCI - in 2013, 2015, 2017, 2020 and 2022). Consequently, from the EC perspective, the implementation of the Baltic Pipe project benefits not only Poland and Denmark, i.e. the countries directly involved in the process, but also other EU Member States.

Russia's invasion of Ukraine demonstrates the significance of secure supply of energy commodities and a stable, predictable source of energy for European states which does not jeopardize peace and global order.

Since the beginning of implementation of three strategic investment projects: the currently expanded President Lech Kaczyński's LNG Terminal in Świnoujście, Baltic Pipe pipeline, as well as the new floating storage and regasification unit (FSRU) in Gdańsk - independence from gas supplies from the east is and remains the ultimate geopolitical objective for Poland and GAZ-SYSTEM's strategy.

SKANSKA ACCELERATES ON THE ROAD TO CLIMATE NEUTRALITY

Skanska Group is the first construction company in the world whose Climate Goal has been recognized and confirmed by the Science-Based Target Initiative as being in line with the Paris Agreement. The goal is to reduce the company's carbon footprint by 50% (for Scope 3) and 70% (for Scope 1 and 2) by 2030 and become climate neutral by 2045.

Monitoring platform for Skanska Residential Unit

Skanska Residential Development Poland keeps track of its progress towards the group's Climate Goal through systematic reporting of the organization's carbon footprint. A digital analytics platform developed in 2021 allows to monitor all CO2 emissions. In one place, information is collected on indicators from each area of the company's activity, both those related to the daily functioning of the business, such as energy consumption in offices, heating of office buildings, CO2 emissions related to business trips and travel, energy consumption on construction sites and energy efficiency indicators for housing projects.

Market-shaping solutions and technologies

Current projects are equipped with photovoltaic panels; "smart home" solutions focusing on energy and water saving have become a standard (Appartme by Skanska - a residential automation system that in its basic model allows for quick and convenient switching off of lighting, heating and power supply in the entire apartment, smart heating systems, e.g. Danfoss Eco); anti-smog ventilators equipped with filters that blocking dust and allergens; triple-glazed windows that help to maintain proper temperature inside the buildings during the heating season; large glazing that allows residents to stay in close "contact" with nature surrounding the building.

In the near future

Currently, the introduction of solutions that have so far been associated mainly with commercial buildings to residential buildings is being analyzed. These include recuperation systems that allow heat energy to be recovered from ventilation, heat pumps, and gray water with energy recovery from wastewater. These technologies are being analyzed for newly designed projects.

Green certification

Meeting the Climate Goal is a top priority for Skanska Residential. Its main goal is to maximize the energy efficiency of every building that is designed and delivered to the customers. This is one of the reasons why each Skanska Residential Development Poland investment is certified in the BREEAM system (last year company obtained six certificates for its investments), and the certification level for new projects is consistently increased (for current projects the level is at least GOOD).

SDGs

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CASE STUDIES

In this part of the publication we have collected 12 examples of activities that Scandinavian companies undertake in the field of energy and energy efficiency, which showcase how broad is the spectrum of business activity aimed at green transformation. We believe that this is just the beginning and possibilities are endless. Cooperation is an integral part of business activities and often apart from commercial and operational effects it brings much more – complementing competences, exchange of knowledge, and as a result – added value for the entire economy and society that the company would not achieve by acting on its own.

photo: Arne Reidar Mortensen / Equinor

EQUINOR

BALTIC SEA OFFSHORE WIND ENERGY. ON A WAY TO ZERO-EMISSION ECONOMY

Cooperation with Polenergia

CASE STUDY

Equinor is a global broad energy company with ambition to play a leading role in the energy transition. One of the largest offshore wind energy developers in the world, building clusters of offshore wind farms in the North Sea, the US East Coast and the Baltic Sea. Since 2018, Equinor together with Polenergia have been developing in Poland one of the biggest offshore wind farm projects in the Baltic Sea with a total capacity of 3 GW. From 2021, through Wento with 1,6GW pipeline of photovoltaics projects, Equinor also invests in onshore renewables on the Polish market.

Project background

Equinor has over 15 years of experience in implementing offshore wind energy projects and is one of the global industry leaders. Baltic Sea, we build offshore wind clusters in Europe in the Baltic and in the North Sea region, in the USA and Asia. Our projects in operations already supply more than one million European homes with renewable offshore wind energy from farms in the UK and Germany. Equinor currently operates the Sheringham Shoal, Dudgeon and Hywind Scotland projects in UK, which is considered the most developed offshore market. Other groundbreaking projects are in advanced development, like Dogger Bank, which will be the world's largest offshore wind farm with a capacity of 3,6 GW and farms off the coast of New York - Empire Wind and Beacon Wind - with capacity totaling 3.3 GW.

Nearly 70% of electricity produced in Poland comes from coal. The shift from fossil fuels to renewable sources is a response to the challenges of climate change, but it's also an opportunity to improve energy independence and security for the country.

Implementation

Offshore wind energy is one of the pillars for global energy transition. It can supply a significant part of the domestic energy demand while creating opportunities for innovation growth and industrial strength development. Offshore wind farm projects developed by Equinor together with Polenergia in Poland will have a total capacity of 3 GW. Clean energy produced by these farms will provide clean energy for about four million households. To develop the projects, Equinor builds on vast experience in offshore wind farm constructions and 50 years of ocean engineering and project management expertise. International cooperation allows for bringing to Poland the most efficient and advanced technologies. Turbines installed in the projects will reach 15 GW capacity, which means that one rotation can power a Polish house for up to four days, and 10 minutes of its operation at full capacity will provide sufficient energy for the entire year of such household needs.

Development of offshore wind farms with their efficiency and lower cost of energy production will play a key role in the energy transition. MFW Bałtyk I, MFW Bałtyk II and MFW Bałtyk III wind farms built by Equinor and Polenergia will also contribute to attracting innovations that will serve the national and regional economy. Around one hundred highly qualified experts can find employment for many years just in Łeba, where the operational and maintenance base of the farms will be located. Development of the entire offshore wind energy sector in Poland will bring up to 70,000 new jobs.

Offshore wind energy is a global market. Through dynamic development of this new sector, Poland has gained a chance to include domestic companies in the global supply chain. Equinor to serve the Polish portfolio engages in cooperation with local companies and through international partnership wants to support Polish industry in building competences allowing local firms to participate in offshore wind farms projects also in other markets.

EFFECTS AND BENEFITS

- Creation of MFW Bałtyk I, MFW Bałtyk II and MFW Bałtyk III wind farms with the total power of 3GW
- 10 minutes of turbine operation at full capacity = sufficient energy for the entire year for one household
- Clean energy, which will improve energy security and satisfy the energy needs of 4 million Polish households
- Increasing innovation and development of the industry
- 100 new workplaces in Łeba area only for the experts from the sector
- Including Polish companies in the global supply chain

SDGs

photo: IKEA

IKEA

IKEA INVESTMENTS IN RENEWABLE ENERGY IN POLAND

CASE STUDY

IKEA's vision is to create a better everyday life for the many people. We offer functional and well-designed home furnishings that combine quality and affordability. We operate in accordance with sustainable development, implementing the People & Planet Positive strategy.

Project background

IKEA has the ambition to become Climate Positive by 2030 as a brand. A crucial element supporting this goal are investments in renewable energy sources (RES). Last year, IKEA global leaders announced that they would support the transition to renewable energy by investing an additional €4 billion globally. To achieve our ambitious sustainability goals, we are looking for new and environmentally friendly solutions across the entire spectrum of our business. Investments in RES are essential for our whole value chain in Poland.

Implementation

In February 2022, IKEA Retail was included in the ranking of Poland's largest investors in wind energy. In the Cleaner Energy ranking, IKEA Retail ranked 9th. The company have invested over EUR 250 million in RES in Poland since 2011. Since 2016, with 6 wind farms consisting of 80 turbines, we have produced more than 450GWh of electricity per year. IKEA in Poland has the second largest RES portfolio at IKEA in the world, right after the Amercian market. Thanks to this, the company produces more energy in Poland than it's consuming in its stores, warehouses, and distribution centers.

IKEA invests not only in wind farms but also develops photovoltaic installations on the roofs of IKEA stores, factories, and distribution centers, e.g. in Poznań (50kWp), Targówek (2x50kWp), Krakow (2x50kWp). New installations in Wrocław (2x50kWp), Bydgoszcz (600kWp) and Lublin (500kWp) are on the way. Companies in IKEA supply chain are also developing their plans to invest in RES, as this is one of the conditions for future cooperation with IKEA. One of the examples is the investment planned by the IKEA Industry factory in Zbąszynek in a photovoltaic farm - 52,000 solar panels, giving over 19 MWp of power. It will be one of the largest solar installations for company use, located right next to the factory.

For years, IKEA has also encouraged its customers to use renewable energy for their own needs. In 2017 IKEA together with a partner has introduced the possibility of installing turnkey photovoltaic panels. IKEA is currently working with E.ON because its experience, solutions, and guarantees meet IKEA's quality and safety requirements.

EFFECTS AND BENEFITS

- EUR 250 mln invested in RES since 2011
- Since 2016 more energy from RES is produced by Ingka Group than consumed
- Contributing to the energy transformation by influencing companies in the supply chain

SDGs

photo: KMD

KMD

GREEN ENERGY TRANSFORMATION THROUGH ADVANCED ENERGY SUBSIDIES

Cooperation of KMD with the Danish Energy Agency (Energistyrelsen)

CASE STUDY

KMD Poland is a foreign branch of the Danish KMD Group. The company specializes in implementing key IT solutions and processes in such areas as energy, insurance, R&D, finance and, HR. Its key projects are implemented in the public sector in Denmark and in Scandinavian countries, contributing to the digital transformation of their societies, public institutions as well as private sector entities.

Project background

The decarbonization and transformation of the energy market towards a higher share of electricity production from renewable sources requires a catalyst in the form of subsidies from public institutions regulating the market. This is necessary to achieve the right dynamics of this transition and a scale at which the generation of energy largely from renewable sources, such as solar panels, wind turbines or biogas, becomes cost-effective by itself for purely economic and business reasons and as such does not require further subsidies. For this reason, the IT systems supporting these types of support programs must support very flexible and progressive billing models with a high level of complexity.

Implementation

Polish KMD branch, in cooperation with the Danish Energy Agency (Energistyrelsen), has been supporting the subsidy program implemented in Denmark for companies and individuals producing energy from renewable sources for many years. At the end of 2021, KMD implemented the new KMD Elements solution for the Danish Energy Agency – a modern cloud system enabling the creation and operation of advanced and very flexible billing and settlement processes based on consumption/production data from smart meters (meters that take real-time readings and can send the results of these readings in the form of high-resolution time series data to IT systems such as KMD Elements).

Subsidies for the generation of energy from renewable sources, such as those serviced by KMD Elements in Denmark, are settled in a number of different models depending on the type of the energy source, the level of production, the scale of activity, and current market prices of energy. In addition, in the case of production for own purposes (as for example in the case of domestic solar panels), the billing model must take into account the difference between the energy produced for own consumption and its overproduction put into the grid. Typical billing models supported by systems such as KMD Elements, ranging from the simplest to the more advanced, include:

- Fixed amounts of subsidies settled on an annual basis
- Subsidies in the form of an amount added to the current market price of energy. Such a subsidy may be granted with a cap, the amount of subsidy being reduced if the market price reaches a predetermined level and disappearing completely if the price ceiling is reached.
- Subsidies through a fixed settlement price – the amount of the subsidy varies in relation to the market price because it is calculated by subtracting the current market price of electricity from the fixed settlement price that the manufacturer has secured in the contract.
- In the case of large producers, such as operators of large offshore wind turbine farms, subsidies may take the form of "contract for exchange rate differences". This means that producers have to sell electricity themselves on the market. The subsidy shall be granted according to the difference between the current market price and the offer price.

KMD Elements also supports the so-called flexible billing models, e.g. those where balancing of production and consumption for the purposes of subsidy settlements takes place on an hourly basis (or any other close to real time resolution). This is possible because the system can process high-resolution consumption and production data at a very large scale.

EFFECTS AND BENEFITS

Thanks to subsidy schemes such as the one currently operated by KMD Elements, from 1990 to 2020 the share of renewables in Denmark's total electricity production increased from 7.1% to 41.5%. Subsidies for energy generated from renewable sources settled by KMD Elements in 2022 will reach the amount of 8.000 million Danish kroner though highly dependent of the fluctuant electricity prices.

SDGs

ENEFIT

ONE OF THE FIRST CORPORATE PPAs (POWER PURCHASE AGREEMENT) WITH A PHYSICAL SUPPLY ON THE POLISH MARKET

Cooperation with Orange Polska

CASE STUDY

Eesti Energia, which owns **Enefit Sp. z o. o.** operating in Poland, is an Estonian state-owned energy company whose ambition is to support customers in planning and implementing the green vision by offering a convenient and sustainable range of energy solutions. The company is the leading wind energy producer in the Baltics and one of the few liquid fuel producers in Europe.

Background

Enefit, operating in Poland, is part of the Eesti Energia Group, which has developed a long-term strategy to achieve carbon neutrality by 2045 at the latest. It envisages the cessation of electricity production from oil shale by 2030 and a transition to exclusively renewable electricity production. To achieve these goals, the Group's company Enefit Green is developing its portfolio of investments in renewable energy sources in the Baltic countries.

In Poland, the firm currently operates 19 solar power plants with a total capacity of just over 18 MW and generating approximately 19 GWh of electricity per year. Currently, a new 8,8 MW photovoltaic power plant is under construction and the company is also planning to implement another 40 MW project that will significantly increase renewable energy generation capacity in Poland.

Implementation

The ambition of Enefit in Poland is to support business partners in reducing their negative impact on the environment and switching to green energy in transport or industrial processes.

The tool that allows to achieve these goals is the Corporate PPA, under which the customer enters into a long-term contract for the purchase of energy directly from the generator of a specific renewable source. This form of contracting is a forward-looking solution that allows for further development of RES and generates benefits for all parties involved. Large corporations gain access to green energy at a good price and with a guarantee of origin, while the owner of a photovoltaic installation is guaranteed security of the collection and a long-term contract for financing the source.

An example of such cooperation is a three--year contract between Enefit and Orange Polska. This is the first Corporate PPA on the Polish market, which ensures energy supply to nearly 18,000 distributed load points, where 50 GWh of energy demand is supplied directly from wind farms in Jarocin and Krotoszyn. Their combined installed capacity of 15 MW enables mobile users to transfer 265 petabytes of data. As of 2021, Enefit supplies 510 GWh of energy obtained from the energy market and directly from contracting RES to Orange Polska's delivery points.

The green turn, in which the whole Group is actively involved, is based on, among other things, the cooperation of entities from many different market sectors. This makes it possible to create and implement solutions (such as Corporate PPA) that help meet the commitments to becoming a zero - emission and taking care of the planet.

EFFECTS AND BENEFITS

- Increasing the total capacity of energy from RES through own investments
- Energy supply from RES to nearly 18,000 distributed load points
- 510 GWh of energy obtained from the energy market and directly from contracting RES to Orange Polska's delivery points

SDGs

ERICSSON

MODERN NETWORKS REDUCING CO_2 EMISSIONS

Cooperation with Lodz University of Technology and Lodz Special Economic Zone

CASE STUDY

Ericsson is a global company founded in 1876 in Stockholm. In Poland started operations in 1904. Ericsson enables communications service providers to capture the full value of connectivity. The company is a pioneer and active promoter of the 5G solutions. Ericsson Poland has 2200 employees with strong representation in R&D, services and sales.

Background

ICT technologies can be one of the most powerful tools on the world to deal with the climate crisis. The ICT sector is responsible for 1.4% of global carbon dioxide emissions, but has the potential for a 15% reduction in other sectors such as energy, industry and transport.

Service providers and telecommunications operators are trying to reduce energy consumption in order to contribute to the reduction of carbon dioxide emissions. If properly used, it has the potential to reduce global emissions by up to 15% by 2030, including through: network modernization, renewable energy sources, intelligent local infrastructure, energy saving software, industry digitalization and smart cities.

Implementation

The radio access network (RAN) is responsible for a significant part of energy consumption in cellular networks. Improving the energy efficiency of the radio network was an important factor when agreeing the 5G NR standard. Its design creates new opportunities to drastically reduce the energy consumption of the network compared to previous generations. It also has much greater capacity and is able to generate lower loads with more network traffic. This, combined with the ability for deeper and longer sleep periods, has the potential to significantly reduce the energy consumption of 5G NR products - ultimately contributing to an overall reduction in grid power consumption.

Ericsson, together with its partners – Lodz University of Technology and Lodz Special Economic Zone, improves new generation solutions and conducts research and tests in order to achieve significant energy savings.

5G Lab at the headquarters of the Lodz SEZ was created as a response to the needs of startups. Companies that create innovations based on 5G within the program created by Lodz SEZ called "S5 - 5G Technology Accelerator" needed a place to conduct tests before their solutions will be permanently used in the factories of investors and business partners of the Zone. Ericsson experts designed and delivered the devices needed to run the internal network. They also provide individual knowledge transfer, not only to the specialists of the Lodz SEZ, but also to business partners and startups cooperating with the Lodz SEZ. It is a business support but most of all technological for industrial applications of 5G technology.

Moreover, thanks to the efforts of Polish engineers from the Ericsson research and development center in Lodz and Kraków, it is possible to significantly reduce energy consumption. The work of programmers results in new mobile communications patents, market standards are set, which become the applicable technical regulations for the telecommunications industry.

Energy saving functions are already available through the Radio Access Network. Adding a machine learning component will bring further savings. Intelligent energy management functions such as micro sleep Tx (MSTx) can reduce energy consumption by radio devices by up to 15% while maintaining the same comfort of use. 5G software has energy savings in its DNA. Its advanced features will continue to expand and network performance will increase over time.

EFFECTS AND BENEFITS

- Reduction of CO2 emissions, also by indirectly affecting other sectors of the economy
- Greater energy efficiency
- Knowledge transfer and business support within the ecosystem of cooperation developing 5G networks

SDGs

FORTUM

FORTUM CHP PLANT IN ZABRZE

CASE STUDY

Fortum is a European energy company with activities in more than 40 countries. We provide our customers with electricity, gas, heating and cooling as well as smart solutions to improve resource efficiency. Together with our subsidiary Uniper, we are the third largest producer of CO_2-free electricity in Europe.

Background

The construction of the CHP plant in Zabrze is Fortum's largest project in Poland to date. The previous installation, commissioned in 1897 as a power plant, since the 1970s has been operating as a combined heat and power plant, and since 2011 it has been part of Fortum. The official commissioning of the new heat and power plant took place in 2018. The investment cost PLN 870 million.

Implementation

The CHP plant is a unique installation, not only due to the fact that RDF, i.e. refuse derived fuel, is for the first time fired in a CHP plant in our country. Its fuel flexibility is also what makes it exceptional. The CHP plant can be powered by three different fuels – apart from RDF and coal, the plant can also use biomass. The proportion of individual types of fuel can be changed, depending on their prices and availability, which ensures safe operation of the plant for the next several dozen years to the benefit of local residents and the natural environment.

This plant operates in cogeneration, i.e. it simultaneously generates heat and electricity. Heat is supplied to residents and enterprises in Zabrze and Bytom, and electricity to the power grid. The capacity of the new plant is 225 MW in fuel (thermal capacity: 145 MW, electric capacity: 75 MW). The expected annual heat production is 730 GWh and electricity production 550 GWh.

The investment included also other projects. It was necessary to build a 10 kilometres long pipe connecting the new CHP Zabrze with the existing district heating infrastructure in Bytom. The project was important to the local community therefore it enjoyed big interest and full cooperation of local authorities. A special team was appointed at the investment stage which supported Fortum in carrying out all procedures and processes related with formalities.

Thanks to the use of high-efficiency technology of energy generation from renewable fuels, it has a positive impact on air quality in the Upper Silesia region and contributes to the implementation of the climate package goals. The state-of-the-art turbine generator set allows for the production of electricity and heat in one technological process, i.e. in cogeneration. This ensures the efficient use of primary fuel and increases the efficiency of the plant. However, the plant first of all uses refuse derived fuel, thank to which waste does not end up in landfills.

EFFECTS AND BENEFITS

- Improvement of air quality and reduction of low-stack emission in cities thanks to replacing production of heat in domestic coal-fired boilers with the cogeneration of electricity and heat in modern combined heat and power plant
- Reducing the content of nitrogen oxides in the exhaust gases by almost a half (47%), sulphur oxides by 76%, and dust by 86%
- Modernization of old, worn-out installations
- Reduction of the amount of waste not suitable for further recycling deposited in landfills.

SDGs

NETTO

NETTO POLAND BETS ON GREEN ENERGY

CASE STUDY

Netto is a Danish retail network, in Poland for 26 years with approx. 650 shops, 5 distribution centres and 9,000 employees. Netto shops are located near housing estates. The assortment includes mostly products from Polish suppliers. Besides Poland, the network is present also in Denmark and Germany.

Background

Netto is a socially responsible company and as such it has ambitious sustainability goals that require reduction of energy consumption thus leading to much needed reduction in carbon footprint.The energy transformation is the next step in this endeavor, which has so far been implemented in various areas including replacing store lighting, using solutions based on recycled raw material, and utilizing packaging pooling in the supply chain.

Implementation

Within the next three years, Netto Polska will replace gas boilers in nearly 400 shops with alternative heating sources such as heat pumps. Simultaneously, new energy-saving chilled counters will be installed in nearly 300 outlets, while new cold stores and cooling systems doors will be assembled in all venues. Moreover, PV panels will be installed on the roofs on 200+ shops and part of the distribution centres. Replacement of gas boilers will have ended in 2024. New refrigeration solutions will have been implemented by 2026 and PV panels will have been installed by 2028.

Salling Group, the owner of Netto, will invest half a billion PLN in the energy transformation of its stores and distribution centers in Poland.

The goal is to improve the daily lives of its customers, which is why the company reinvests the profits generated to offer society something in return. The investment in reducing electricity consumption translates in a real way into increasing Netto's positive impact on the environment by reducing the carbon footprint generated. This is important in the short and long term, for current and future generations.

EFFECTS AND BENEFITS

- Increasing energy efficiency
- meeting climate targets and reducing carbon footprint
- Limiting the use of politically dependent resources
- Serving as a positive example on the market

SDGs

ØRSTED

FROM BLACK TO GREEN ENERGY – ØRSTED SUPPORTS THE POLISH ENERGY SECTOR TRANSFORMATION

Cooperation with PGE Baltica and ZE PAK

CASE STUDY

Ørsted is a global leader in offshore wind with 30 years of experience. The company develops, constructs, and operates offshore and onshore wind farms, solar farms, renewable hydrogen and green fuels facilities, and bioenergy plants. The Ørsted vision is a world that runs entirely on green energy.

Background

Ørsted, previously known as DONG Energy, has undertaken a green transformation in the last decade. In the late 2000s Ørsted was one of the most coal-intensive energy companies in Europe. But we took a strategic decision to become a green energy company, and we developed a business model that is both environmentally and financially sustainable. Today, we are the world's most sustainable energy company, and a global leader in the transition to green energy. The only energy utility in the world, until now, which have conducted full green transformation.

To drive our strategical change, we exited our fossil fuel businesses, while developing the renewable energy portfolio. Our major highlight is the invention and commercialisation of the innovative technology for clean energy production – the offshore wind. Ørsted built the first ever offshore wind farm Vindeby, in 1991 and commenced, the world's largest Hornsea One in 2021. Through those 30 years we have become the global leader of offshore wind. The Ørsted transformation can be also seen in key metrics. Between 2007 and 2020, our carbon emissions have decreased 86%. At the same time, our operating profit has almost doubled, and the share of that profit coming from renewables has increased to 98%. As one of a very few companies in the world Ørsted managed to separate its economic growth from climate footprint and our operations will be climate neutral by 2025.

Implementation

Now, we want to empower others to make substantial changes as well, and together build a world that runs entirely on green energy. In Poland, which is a strategically important market for Ørsted, we joined forces with PGE Baltica closing in 2021 the joint venture agreement for the development, construction, and operation of the biggest offshore wind farm currently developed at the Baltic Sea Offshore Wind Farm Baltica (2,5GW). In 2022 we took yet another bold step into the Polish market entering the partnership with ZE PAK, one of the Poland's energy transition leaders. Partners have signed an agreement to jointly apply for new seabed leases in the Polish zone of the Baltic Sea.

By sharing its experience, Ørsted inspires to work together to build a more sustainable future for all of us. That is why is actively involved in Poland in the transformation of the energy sector so that it uses renewable resources to a greater extent than before.

In Poland, which is a strategically important market for Ørsted, we joined forces with PGE Baltica closing in 2021 the joint venture agreement for the development, construction, and operation of the biggest offshore wind farm currently developed at the Baltic Sea Offshore Wind Farm Baltica (2,5GW). In 2022 we took yet another bold step into the Polish market entering the partnership with ZE PAK, one of the Poland's energy transition leaders. Partners have signed an agreement to jointly apply for new seabed leases in the Polish zone of the Baltic Sea.

Joint ventures with PGE Baltica on Offshore Wind Farm Baltica and ZE PAK for new seabed leases will contribute significantly to Poland's green energy transition, accelerate the development of the local supply chain and spur economic activity for many years to come. Offshore Wind Farm Baltica will be Poland's largest and one of the first offshore wind projects in the country. With a total capacity of 2.5 GW, the two phases of the offshore wind farms are expected to come into operation in 2026 and 2027, respectively. Together, they will produce enough renewable electricity to cover the annual power consumption of nearly four million Polish homes.

Furthermore, the ZE PAK- Ørsted joint venture, if successful in the second stage of the Polish offshore wind development will provide affordable and clean wind energy to millions of Polish homes and companies in the spirit of just transition. As part of its commitments if successful in the administration procedure partners will establish regional Fund for the Just Transition of Eastern Greater Poland with a budget of nearly PLN 50 million (EUR 10 million) to guarantee social security in a region particularly exposed to the economic and social effects of coal phase-out.

The Polish Government's target of awarding 11 GW by 2027 is an ideal starting point for transforming Poland's energy system and creating a new industrial hub for offshore wind in the Baltic Sea Region. Ørsted is proud to be part of this change to be implemented in the spirit of just transition with such renowned Polish partners.

EFFECTS AND BENEFITS

- The largest offshore wind farm in the Polish part of the Baltic Sea with a total capacity of 2.5 GW, the individual stages of which will be commissioned in 2026 and 2027
- Electricity from renewable sources sufficient to cover the annual energy consumption of nearly four million Polish homes
- Energy production from the Offshore Wind Farm Baltica will avoid emissions of up to 8 million tons of CO_2 per year
- Strengthening the energy security of Europe and Poland

SDGs

OX2

A PILOT TRAINING PROGRAM FOR THE PURPOSE OF THE WIND ENERGY SECTOR FOR THE EMPLOYEES LEAVING THE MINING SECTOR

Cooperation with Windhunter Academy in agreement with Spółka Restrukturyzacji Kopalń (SRK)

CASE STUDY

OX2 develops and constructs windfarms and solar PV farms. OX2 also offers management of wind- and solar farms after completion. OX2's project development portfolio consists of in-house developed as well as acquired wind and solar projects in various phases of development. OX2 is operating on nine markets in Europe.

Background

OX2 takes active measures to support the energy transformation and to develop renewable energy. Building a truly sustainable future is one of challenges of our time.

The development of the wind energy sector is an important element in shaping the energy mix of our country. It strengthens the independence and the energy security of Poland and the development of the broadly understood energy sector in the country. OX2 aims to participate in the energy transformation understood not only as a change in a way of obtaining the energy sources, but also a change on the labor market.

Implementation

Silesia is the most industrialized region in Poland and is currently facing a major restructuring challenge. At the same time, the wind energy sector may provide an opportunity for people leaving the mining industry to retrain and find new employment.

This is why OX2 together with a partner – the Windhunter Academy and in agreement with Spółka Restrukturyzacji Kopalń (SRK) have prepared a pilot training program for the purpose of the wind energy sector, for the employees of the mining sector leaving the mining industry. The Polish Wind Energy Association granted the patronage over the project. This is a remarkable program that aims to build bridges between our sectors and brings us closer to the common goal which is the energy independence.

Initially, the training program will be carried out among 16 miners – employees of Spółka Restrukturyzacji Kopalń. The program will include a series of classes in the field of, among others, working at heights, fire safety and working at sea. Trained miners will gain skills in the area of operating and servicing hydraulic and electric systems in a wind turbine, they will also learn the rules of its installation. Professional qualification certificates obtained by the graduates of the program will entitle them to work both at onshore wind farms and in offshore wind energy projects that are being developed in Poland.

The training project is an important moment for the energy sector. It shows that the necessary energy transformation and the change in the energy mix, not only do not exclude the employees of conventional energy, but are open to their skills and experience. Employees interested in leaving the mining sector are and will be searched by the companies operating in the wind energy sector.

EFFECTS AND BENEFITS

- Assistance in retraining for employees from the mining sector
- Building future human resources for the renewable energy sector
- Support for the energy transformation towards sustainable future

SDGs

RUUKKI

SUSTAINABLE OPERATIONS AT RUUKKI

CASE STUDY

Ruukki manufactures steel-based products for walls and roofs of industrial, commercial and private buildings. Our offer includes sandwich panels, steel façade claddings, steel roofs and rainwater systems that help to make the world a safer, more sustainable and smarter place to live and work. In Poland, Ruukki has two production facilities – in Oborniki Wlkp. and in Żyrardów.

Background

The area where Ruukki can have the greatest impact through its products and constraints put on operational activities is carbon footprint. In 2026, Ruukki will be the first company to offer selected roofing and steel -based construction components made of fossil--free steel. For these products, the total carbon dioxide emissions will be reduced by approximately 85%. An important part of Ruukki's sustainability strategy is related to own operations in Ruukki's plant in Oborniki where steel-based construction components are manufactured.

Implementation

Actions aiming at the reduction of CO_2 emissions include many aspects of production and logistics processes. A major change in energy supply took place in 2020 when Ruukki started to purchase electrical energy coming in 100% from renewable sources. It allows to reduce CO_2 emissions in Oborniki by 4095 t/ year. A switch to green energy is supported by photovoltaic system that is currently being installed and will further contribute to energy efficiency. Energy and emission savings are also generated by LED lighting systems used in offices and in factory, and by changes reducing diesel use in the production area. The company has a clear annual goal to reduce energy consumption by 5% comparing to the previous year.

Ruukki's sustainability strategy provides for 25% reduction of carbon dioxide emissions in own operations by 2026. Looking at the rate and advancement of changes implemented in Ruukki's plant in Oborniki, the company estimates to reach its strategic goals earlier, planning next steps at the same time.

Another scope of sustainability actions refers to production waste management that also has a significant impact on energy efficiency and emission levels. In Oborniki, the company manufactures sandwich panels and the reduction of waste coming from their production is an ongoing process with specific annual targets. It is supported by automation solutions such as press containers that were implemented to allow for the more effective storage of generated wool dust and by more than 60% reduce the need of such waste transportation and related carbon footprint. This year, in H2, Ruukki will commission a new production line for sandwich panels with mineral wool core. Advanced energy-efficient solutions and line automation will contribute to further reduction of wool dust waste – by about 4.000m^3/year.

Energy and energy efficiency efforts are also in focus of Ruukki's product strategy, which is developed to answer the growing needs of sustainable construction. As one of the first producers in the market, the company introduced and continuously develops a portfolio of energy-efficient sandwich panels Ruukki Energy, which allow saving up to 30% of heating and cooling energy in buildings. All things considered, sustainable operations at Ruukki support the company's strategy "Towards carbon--neutral buildings".

EFFECTS AND BENEFITS

- Reducing the CO_2 emissions of the manufacturing plant in Oborniki by 4095 t/year thanks to switching to green energy sources
- Reducing the amount of production waste and the need for its transport
- Participation in the green transformation of the construction industry by offering carbon-neutral products

SDGs

YIT DEVELOPMENT

CONNECTING HENRYKÓW TO THE WARSAW MUNICIPAL HEATING NETWORK

Cooperation with Veolia Energia Warszawa

CASE STUDY

YIT is the largest Finnish and a significant North European development and construction company. For 110 years, it has been creating better living environments for its customers: functional homes for sustainable living, future-proof public and commercial buildings and infrastructure for smoother flow of people, businesses and society. YIT employs 7,000 professionals in ten countries: Finland, Russia, Sweden, Norway, Estonia, Latvia, Lithuania, the Czech Republic, Slovakia and Poland.

Background

Aroma Park is a residential project under which YIT restores one of the most important historic points in the north of Warsaw – Henryk Bienenthal's yeast factory at 10 Klasyków Street. The name "Henryków" derives from the name of the owner of the yeast distillery - entrepreneur Henryk Bienenthal built the plant in 1902-1904. Connecting the estate to the heating network was an important element of the entire investment.

Implementation

In 2020, YIT built 864 metres of district heating pipeline from 72/74 Mehoffera Street to 10 Klasyków Street in the Henryków housing estate in Warsaw. Thanks to this investment, the Aroma Park housing estate, executed by YIT, among others, has been connected to the municipal heating network.

The system heat provided by the heat pipeline built by YIT is also used by residents and employees of other multi-family and large-scale buildings in Henryków. Switching to district heating allowed to reduce so-called low emissions and emissions of PM10 and PM2,5 dust, sulphur and nitrogen compounds, polycyclic aromatic hydrocarbons and CO_2 to the atmosphere, which contributed to improvement of air quality in Białołęka. The YIT project has thus benefited the local community while reducing emissions of harmful substances in Warsaw.

In Poland's capital city, district heat is produced in cogeneration - an efficient process in which heat and electricity are generated simultaneously. As a result, fuel combustion is reduced by as much as 30% compared to producing heat and electricity separately, which translates into lower CO_2 emissions into the atmosphere. At the same time, the combustion of fuel in the heat and power plant takes place at a higher temperature and the flue gases are subjected to advanced filtration. The modern heat pipe system reduces the losses associated with the transmission of hot water and allows more users to be connected.

According to the agreement between YIT and Veolia Energia Warszawa, Veolia has bought the district heating network completed by YIT. Thanks to that, it was possible to expand the network in the area and connect other multi-family and large buildings to it too.

It is worth mentioning that on the premises of Aroma Park investment YIT conducted another pro-ecological action - replanting trees. Such initiatives are an important part of the company's sustainable development strategy. During one week, a total of 21 trees were moved from the plot belonging to YIT to another location, without having to cut them down. The operation was carried out using specialised equipment, including a crane that could lift any tree, even those weighing 30 tonnes with a large root ball without destroying it, allowing it to continue growing and developing in its new location.

EFFECTS AND BENEFITS

- Connection to the municipal heating network operating in energy-saving cogeneration
- Reduction of CO_2 and harmful dust emissions to the atmosphere
- Improving air quality in Białołęka for its residents

SDGs

VASTINT

ENERGY-SAVING SOLUTIONS IN VASTINT BUILDINGS BASED ON SEA WATER AND SOLAR ENERGY

CASE STUDY

Vastint Poland is part of the Vastint Group, an international organization that has been operating on the European real estate market for over 30 years. The pillars of the company's activity are real estate portfolio management and the development of office, residential, and hotel projects that provide a comfortable and sustainable environment for living, working, and relaxing. The company is a member of the Polish Green Building Council (PLGBC), where it actively supports the initiatives of this organization and participates in promoting sustainable construction.

Project background

To meet the need to reduce greenhouse gas emissions, Vastint is working to improve the overall energy efficiency of the properties it manages by implementing innovative solutions that reduce electricity consumption. Two of the most interesting initiatives in this area are Sea Cooling — the sea water cooling system operating in the Waterfront investment in Gdynia — and the installation of photovoltaic panels on the roofs of Business Garden Warsaw buildings.

Implementation

Due to the location and the specific solutions of the installation inside the Waterfront buildings in Gdynia, Vastint decided to improve the applied solutions and equipped the buildings with a sea water cooling system — Sea Cooling.

The air-conditioning system is based on chilled beams, working on low parameters of chilled water, approximately 15-16°C. As a result, cooling is possible for a significant part of the year without the need to run chillers.

Sea water as a cooling medium is pumped inside the building, where, through a system of titanium cooling exchangers (titanium due to the aggressive nature of sea water), the chilled water circuit in the building is cooled and the heat is transferred from the system to the sea. When the temperature of the water in the sea is higher than 16oC, building automation activates the chillers that lower the temperature of the chilled water in the system to the optimal parameters. In this case, the seawater only pre-cools the water in the internal chilled water circuit and extracts heat from the building. The installation works at low pressure parameters (just over 1 bar) and, despite the fact that it works automatically, it has an additional security system that allows connection via a bypass, for example, in the case of maintenance or a blockage in one of the sea water inlets by possible contamination in the sea.

The investment in photovoltaic panels also ensured the reduction of electricity consumption from conventional sources. Photovoltaic panels with a total capacity of 77.18 kWp have been installed on the roofs of two buildings in the Business Garden Warsaw office complex. A lightweight translucent structure was used that retained the entire biologically active surface of the green roof. Inverters of the world-renowned SolarEdge brand and modular JA Solar panels were used, which do not shut down the entire installation from energy production even in the event of failure of one of the modules. The energy produced is entirely used for the maintenance of buildings.

In both cases, active work to improve the use of electricity is beneficial both from the point of view of the economic competitiveness of buildings and reduces the environmental footprint of their use.

EFFECTS AND BENEFITS

Due to the Sea Cooling installation:

- Reduces the consumption of noble gases harmful to the atmosphere and eliminates glycol from the installation
- Raises energy efficiency and the economy of the cooling system
- Increases the comfort and efficiency of work due to the absence of extreme cold and cold drafts, thanks to higher water temperature compared to traditional installations

Due to the PV panels:

- Generates real savings in building operating costs by reducing the amount of electricity needed to satisfy cooling requirements
- Reduced CO2 emissions into the atmosphere in 2021 by 75,155.69 kg. Assuming that a mature tree absorbs 5 kg of CO2 per year, this is equivalent to planting 15,031 such trees

SDGs

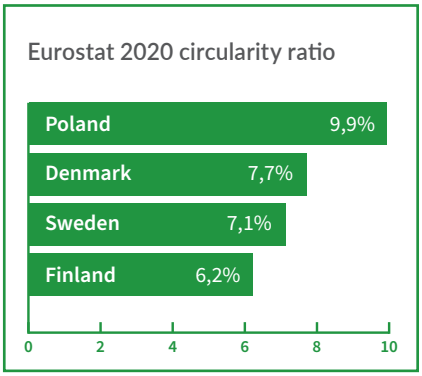
CIRCULAR ECONOMY & ENVIRONMENT

Water treatment plant in Sweden, photo: Per Pixel Petersson/imagebank.sweden.se

CIRCULAR ECONOMY – A RESPONSE TO THE MARKET AND CONSUMER EXPECTATIONS

STENA RECYCLING

The environmental responsibility has become a vital part in operation activities of global companies. To meet the needs of markets and ecologically-conscious consumers, an increasing number of companies take actions in line with the rules of the circular economy. Also the experts have become aware of the utmost significant of the circular economy development. As per the trend map published by infuture.institute, the circular economy is indeed a leading environmental trend, and its prevalence is expected to continue in the coming years.



Source: ec.europa.eu/eurostat

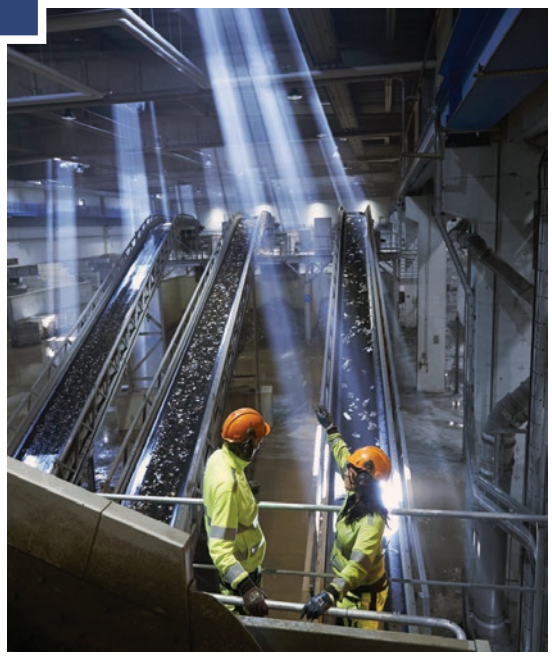
Implementing rules of the circular economy is also one of the key initiatives within the Sustainable Development Goals (SDGs) included in the UN Agenda 2030. As many as 5 out of 17 goals focus on development based on re-use of materials, which is the very foundation of the circular economy.

Combination of mega-trends, such as depleting natural resources, climate changes, and growing production, consumption, and volume of waste, practically prohibit a stable economic growth. That's why, a transformation towards the circular economy is a must. At the same time, the Eurostat circularity ratio in the EU member states, i.e. a proportion of materials recovered and returned to the economy to the domestic use of materials, amounts to 12.8%, and continues to grow, but very slowly.

3XR: Reduce, Reuse, Recycle

Some 100 billion tons of new materials are sourced globally every year. The circular economy requires that such materials are used as long as pos-

By 2050, circular economy may cut industrial emissions in EU by 56%.



sible and can be constantly reused as resources to produce new goods.

The circular economy is founded on the waste hierarchy referred to in the EU Directive 2008/98/EC. Three top levels of that hierarchy are key to increase the circularity level: reduce the amount of waste, reuse, and recycle. Intensified use of recycled materials in manufacturing process, designing products that are repairable, reusable, and recyclable are all examples of actions that allow manufacturers to reduce their impact on climate. As per the European Commission's estimates, 12% of recourses in EU is derived from recovered and recycled materials. At the same time, the authors of "The Circular Economy – A Powerful Force for Climate Mitigation" report point to the fact that by 2050, the circular economy may cut industrial emissions in EU by 56%.

Growth of new markets for circular materials

The 3xR hierarchy – provides an enormous potential for development of recycled materials market, and an ever-growing number of companies make effort to achieve climate neutrality. Among them, there are many large corporations whose decisions strongly affect others. For instance, the Volvo Cars' declaration to use 25% of recycled materials in their vehicles by 2050 inspired a number of subcontractors, including recyclers.

The companies are willing to reduce their carbon footprint on every stage of the product lifetime: during the designing process, production, usage, re-usage, and recycling. This is an entirely new perspective. While in the past the focus was entirely on the product features, it has shifted to consider its impact on the climate in the entire value chain. Over 300 representatives of companies participating in the "From waste to products" event organised by Stena Recycling in spring 2021 were asked about their activities regarding use of recycled materials in their products. Slightly over the half admitted not to use any recycled materials or use less than 50% of recycled materials. Only 16.1% declared that their products contain more than 50% of recovered raw materials. At the same time, 39.2% of respondents believed that within the next three years more than half of materials used in their products will be recycled. That is a sign of a substantial increase.

Using recycled materials is important to decrease the manufacturer's carbon dioxide emissions. Choosing circular materials in the production process is becoming a vital value of the brand and plays a significant role in building competitive advantage. More and more companies are aware of that fact and therefore that sector has been dynamically growing. Moreover, the companies see that recycling their products can help the market grow, and result also in an increased availability of recycled products that they need.

Consumers' view on circular products

The companies want to design products with their recycling in mind, and develop solutions to sort and mange waste in order to make recycled materials more accessible. They also can't overlook growing requirements of the consumers who expect the products they purchase to contain recycled materials.

The results of the survey held by Stena Recycling in January 2022 in five

8 out of 10 consumers consider it important or very important for the producers to manufacture their products using recycled materials

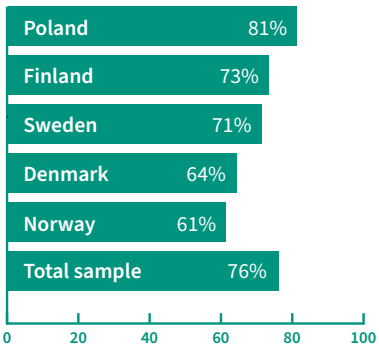


Chart 1

8 out of 10 respondents claim that their purchase decision is to a large extend influenced by the fact that the product is durable, i.e. it can be repaired and reused

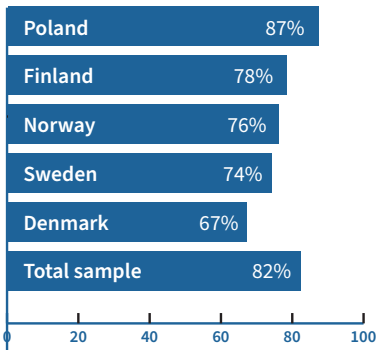


Chart 2

Consumers are willing to pay the same (■) or more (■) for products made of recycled materials and that are recyclable

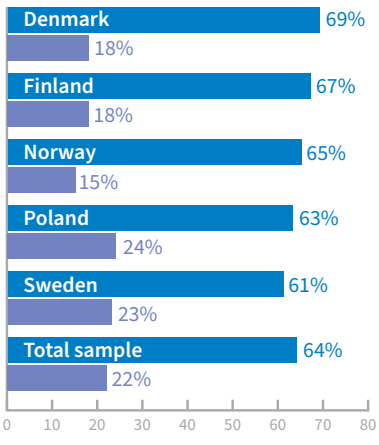


Chart 3

markets (Sweden, Norway, Denmark, Finland, and Poland) indicate that 8 out of 10 consumers find it important or very important for the manufacturers to use recycled materials in their products. That results translate into 30 million consumers in the five surveyed markets (Chart 1).

At the same time, the purchase decisions are determined by quality and durability of products – 87% of Polish respondents considered it important that the product could be repaired or reused. The Scandinavians follow the same line of thinking (Chart 2).

It's worth noting that consumers are willing to pay the same (64%) or more (22%) for products made of recycled materials and that are recyclable (Chart 3).

When analyzing the results by countries, it becomes evident that there are much more people in Poland and Finland who believe that it is the business environment that should drive the development. Whereas, in Sweden and Norway, the respondents believe it is politicians and consumers that play a major role.

Quality and scale

Plastic is indeed a tremendous problem of the modern world. It is worth noting, however, that – when properly used – plastic materials have a potential to reduce adverse impact on the climate, for instance by reducing carbon dioxide emissions. An example: using plastics in the vehicle manufacturing helps decrease their weights, and thus leads to reducing harmful emissions. Many experts highlight that we will continue to see a significant increase in application of plastic in manufacturing processes and growing consumption level in that area.

Plastic materials probably won't disappear from the market altogether, but we need to make them more circular to find a better justification for using them.

To meet such challenges, Stena Recycling has invested in technologies that enable processing and recirculation of plastic materials. Recently, a brand new LDPE foil processing installation has been launched in the Stena Recycling Center in Wschowa. That material that is frequently used in the packaging sector is delivered to the centre in Wschowa where is gets processed to high-quality granulate that is then used to re-manufacture foil.

At Stena Recycling, we continue to test new processes and solutions to process a variety of materials. Solutions of this kind are currently being introduced in Sweden and Poland. Moreover, it is worth noting that global growth in electrification poses a number of challenges too. Considering an increased number of electric vehicles, tools and manufactured devices, efforts should be taken immediately to put in place appropriate process to manage and process old electric batteries and accumulators. Such parts include cobalt, lithium, and other raw materials whose global reserves are scarce. Therefore, access to such materials should be secured and their production should be maintained. At the time being, a number of components of batteries can already be recycled, yet the above mentioned valuable and rare materials can be recovered also to a limited extent. That presents a serious challenge to producers of electronic devices and recyclers globally. That is why, the company is now building its largest European battery processing plant in Stena Nordic Recycling Center in Halmstad, Sweden. The investment has just received SEK 70 million in funding from the Swedish Energy Agency.

Meanwhile, a lot of actions need to take place simultaneously. No one is going to invest in a well-functioning large-scale recycling process, if it is not certain that there will be parties interested in purchasing recycled material. And no one wants to buy recycled plastic materials, if they are not sure that its supply is stable and the very material offers appropriate quality at proper price. That is why the information on collaboration between large enterprises that announce increased use of recycled materials is so promising. As at September 2019, more than 100 companies and organisations from EU declared to use at least 10 million recycled plastic by 2025. Such an initiative may result in a 150% growth in the EU market. And that is a true breakthrough. ■

Stena Recycling has invested in technologies that enable processing and recirculation of plastic materials. Recently, a brand new LDPE foil processing installation has been launched in the Stena Recycling Center in Wschowa.

THE CIRCULAR LIFE CYCLE OF IKEA FURNITURE – PEOPLE & PLANET POSITIVE

Research shows that today, as many as 78 percent of Poles say that the planet's current condition requires immediate action to prevent its degradation and climate change. In the light of this global problem, at IKEA, we want to inspire businesses and our customers to make more sustainable choices. Currently, we offer products, solutions, and knowledge for the many people to enable them to live a more sustainable everyday life by respecting our planet's resources.

Positive change starts at home

As IKEA, we are determined to keep changing for the better and inspiring people to live more sustainable lives at home. Our People & Planet Positive strategy expresses this and has guided our operations for the last 10 years. Our approach is reflected in an important company commitment – by 2030, IKEA will become a fully circular and climate positive business, based on green energy and renewable or recycled raw materials in our products. We want to continue to grow sustainably, with care for people, the climate, and our planet's resources, focusing on four essential pillars: creating better homes, better lives, a better planet, and a better company.

By 2021, up to 73 percent of the materials used in IKEA products will be renewable (56%) or recycled (17%). In addition, we have evaluated more than 9,500 products in our current range to determine to what extent they meet our principles. As a result, we created maps with product development pathways that outline the steps needed to ensure that by 2030 all products are created in line with the principles of a circular economy. Today, 5,700 of our products are marked with a green visual sign as more sustainable, which means they are People & Planet Positive (PPP), and they accounted for an impressive 33.4% of sales at the end of the financial year 2021.

Circular design – choosing recycled materials

For many years, IKEA has been committed to making it easier than ever to find affordable and environmentally friendly furniture for our home. Our range includes many products made from recycled or renewable materials. Already, 90 percent of the polyester in IKEA textile products is recycled. We are working on foam for sofas and mattresses made from recycled plastic, and partnering with a recycling company to reduce foam contamination from old mattresses.

> By 2021, up to 73 percent of the materials used in IKEA products will be renewable (56 percent) or recycled (17 percent).

> By 2030, IKEA will become a fully circular and climate positive business, based on green energy and renewable or recycled raw materials in our products.

Another very important resource for IKEA is wood. We work with the Forest Stewardship Council® (FSC®) to take care of the world's forests through responsible forestry and make sure they always remain accessible for everyone.

Many years ago, we decided to apply the highest industry standards to improve responsible forest management worldwide. In 2020, we have achieved our goal by ensuring that our wood comes from more sustainable sources, which now includes FSC® certified or recycled wood.

[1] Report „Ziemianie Atakują 2020"

Another material that IKEA has decided to source more sustainably is cotton. Since 2015, it has been fully obtained from more sustainable sources, which means water savings of up to 50%, with a 30 percent reduction in pesticides and fertilizers during the production process.

At IKEA, we now offer many products – including furniture – that are made entirely from recycled materials, such as KUNGSBACKA kitchen fronts made from recycled virgin plastic (PET) bottles, KRISTRUP doormats made from 90 percent PET bottles, TÅNUM carpets made from cotton waste from textile production and TOFTLUND carpets that look like sheepskin but are in fact made from PET bottles.

As a milestone, IKEA stopped selling single-use products made of plastic, such as ice and food bags or drink straws, in 2020. The materials for single-use products used in our restaurants and bistros, i.e., straws, cutlery, cups, and plates, now come from renewable sources such as corn, sugar beets, and sugar cane. In line with our commitment to positively impact both people and the planet, IKEA will also phase out plastic from its product packaging. This process will happen gradually, starting with all new products by 2025 and ending with the current range by 2028.

At IKEA, we also strive to minimise the amount of waste produced and manage it to maximize its life cycle. One project that fits this approach is the reuse of transparent polyethylene film. The film is recycled and then used as material for SKRUTT desk pads. This project is carried out in collaboration with one of IKEA's product suppliers. In addition to responding to environmental needs, we build partnerships within the supply chain, developing circular solutions together with other stakeholders.

Extending the furniture life-cycle

Creating new products from recycled materials is just one of many necessary steps. Let's not forget that recycling is the final stage of the closed-loop economy. Firstly, it is important to reduce waste, even if it is made from recycled materials, and ensure that products have needed durability and lifespan. That is why IKEA designs products that can be reused, repaired, resold or recycled as a final measure.

As a milestone, IKEA stopped selling single-use products made of plastic, such as ice and food bags or drink straws, in 2020.

IKEA's focus in circular furniture design is modular and standardized, so our products are easy to disassemble and reassemble. Designing for standardization and adaptation ensures that products can be reused and renewed through maintenance and repair services. Standardized parts also allow them to be reused to repair our different products.

Another circular solution is easily adapting furniture to changing needs and new living conditions (for example, furniture that grows with children or modular sofas). To enable repairs and extend the lifespan of our products, we make spare parts available to customers – more than 18 million were delivered in 2021.

Buy Back & Resell

We also focus on developing services and solutions for our customers that make it easier and safer for them to acquire, use, and enjoy the furniture and exchange it sustainably and circularly. Not only whole pieces of furniture but also components and materials from unneeded or unwanted furniture must be put back into circulation. The movement to give away and sell unwanted furniture, in particular, is gaining momentum and making it easier to make more sustainable choices. That

Kungsbacka kitchen, photo: IKEA

SKRUTT desk pad made from recycled polyethylene film, photo: IKEA

is why IKEA launched its “Buy Back & Resell” service in November 2021. Used IKEA furniture, no older than five years, can be brought to the store and resold at the Customer Service Department. Before their visit, customers can use our website to get a quote for their furniture. Subsequently, it is inspected by the Customer Service Department to ensure it matches the quote they have received earlier. Our clients receive a refund card for purchases made in a physical store or on IKEA.pl, and used products go to the circular hub section, where they can be bought at a bargain price. This way, furniture that our customers no longer need can find a new home and a second life conveniently and quickly.

Moreover, in previous years IKEA Retail in Poland “offered” customers a unique collection called "PRZYDA SIĘ" (YOU’LL NEED IT) consisting of things that we already have at home, often unused, hidden, for example, in the depths of a closet or a basement. The “PRZYDA SIĘ” project also included a series of tips from IKEA showing what to do to give a second life to forgotten items or take care of your favourite ones. And in the “Na dłużej” (FOR LONGER) campaign, we emphasized that taking care of what you already own is the fundamental way to make it last longer. Simple tips on-prolonging the life of our furniture and accessories were presented in a specially prepared collection of graphics.

The success of the circular economy is all about acting together

At IKEA, we know that big things can grow on small acts, both performed by businesses and each of us. Changing our habits, fixing, renovating, recycling, using more sustainable products, and re are the simple things that make a difference in the world around us. We know that the circular economy is not something we can achieve alone. We can make a real, lasting, and significant impact by acting together with our customers and the entire value chain. ■

In November 2021 IKEA launched its “Buy Back & Resell” service. Used IKEA furniture, no older than five years, can be brought to the store and resold at the Customer Service Department.

THE ROLE OF AN EFFECTIVE DEPOSIT RETURN SYSTEM IN A GREEN ECONOMY

NORWEGIAN EXPERIENCE

TOMRA

Every year, huge amounts of raw materials that can be recycled end up in landfills, incinerators or the environment. It is as much as 86% of plastic packaging in the world[1]. Effective implementation of the deposit return system is one of the three necessary elements leading to the decrease of impact of plastic waste on the environment.

Scientists have calculated that plastic waste is leaking into the oceans at a rate of one garbage truck per minute and predict that by 2050 there will be more plastic than fish in the oceans. And the polluted ocean environment has a drastic impact on every part of our lives. It turns out that only 9% of man-made plastics have been recycled. Many representatives of the waste management industry are working to improve this situation. They agree that we need systems that ensure high levels of waste collection with the best quality raw material that can be recycled.

TOMRA, with over 50 years of presence on the world's largest markets, is also communicating key conclusions regarding recycling needs. Above all, there is a need to further develop technologies and programs, and implement a holistic approach involving proven waste management practices for collection, sorting and recycling. These include:

- a deposit return system (DRS) covering at least PET bottles and beverage cans,
- separate collection of bio-waste, paper, textiles, glass, and electrical and electronic equipment, and
- sorting mixed waste[2].

Why a deposit return system?

It is one of the most effective solutions and part of a comprehensive approach to waste management and circular economy. Under these systems, customers who purchase a drink in a covered packaging pay a small deposit which is returned to them when they return the disposable container to a collection point for recycling. The experience of countries with deposit return systems confirms that the average level of collection of waste included in the system is very high, approx. 90%, and the vast majority of the collected products are subject to the recovery of high-quality secondary raw material.

Due to the growing legal requirements in the field of packaging waste, more and more countries are considering introducing it. With the currently available technology and the packaging waste collection systems operating in Europe, it seems that achieving the new, more ambitious collection targets set out in the EU directive to reduce the impact of certain plastic products on the environment can only be achieved with the use of DRS. The introduction of the system therefore seems inevitable. In this case, the present question is: how to create an effective DRS? It may be helpful to look at the most effective solutions of this type in the world - the systems currently operating in the Scandinavian countries. They have been operating there for several decades, achieve very high collection rates, and their similarity suggests that they can be a solution for effectively managing beverage packaging.

[1] "New Plastics Economy: Rethinking the Future of Plastics", World Economic Forum. January, 2016.
[2] Available: Holistic Resource Systems - A Free White Paper by TOMRA Circular Economy, 2021.

The best practices on the market, i.e. the deposit return system in Norway

An excellent example of the success of this tool is the Norwegian DRS for disposable beverage packaging that has been in place since 1999. In 2020, Norway achieved a return rate of 92%. In this way, the system there has become one of the 10 most effective in the world. The Norwegian system is unique in that it has been implemented voluntarily by the beverage production and retail sectors. Scandinavians have introduced an ecological tax on used beverage packaging that will not be collected (the lower the collection rate, the higher the ecological tax)[3].

> In 2020, Norway achieved a return rate of 92%. In this way, the system there has become one of the 10 most effective in the world.

When the analysis showed that the deposit return system is the most effective way to collect as much packaging as possible on the market, the aforementioned industries founded Infinitum[4], a non-profit company whose goal is to collect and recycle beverage packaging by managing the deposit system. The fund is wholly owned by the beverage producers' associations and the retailers' associations.

The created system is efficient. It clearly defines the types of raw materials, beverages and packaging sizes, as well as the value of the deposit to motivate the consumer. In the case of Norway, the deposit return system takes plastic bottles and metal cans for water, carbonated drinks, still drinks, fruit and vegetable juices and alcoholic drinks.

The omission of specific categories of beverages or packaging could mean that millions of recyclable cans or bottles will be wasted and end up in forests, meadows and rivers or landfill. A good example is the addition of a metal (mainly aluminum) can, the most valuable of the packaging raw materials, to the DRS. In Poland, at the current collection level, we still lose about 800-900 million cans per year. After the introduction of such a solution, this number would drop by at least half.

Its another important feature is the convenience for the consumer - the package return path must be easy and the deposit must be fully refunded. The Norwegian deposit return system introduces this rule in a very clear way, indicating that each point of sale of beverages covered by the system is also obliged to collect their packaging. As a result, Norway offers 15,000 return points, which is one return point per 355 people. Only 23% of return points use devices for returning deposit packaging, but it is these points that collect as much as 93% of returned packaging.

The third element is extended producer responsibility as a means of financing the system. The Norwegian system is based on the activities of Infinitum, which is financed by ROP fees, revenues from the sale of raw materials and amounts of uncollected deposits. Unused deposits and the proceeds from the sale of raw materials are sufficient to cover almost all costs of the Norwegian deposit return system: 49% of the system costs are covered by uncollected deposits, 35% by the sale of raw materials, and 8% by other revenues (mainly interest). Infinitum sets ROP fees for each producer based on the recycling cost and material value of each packaging raw material, implementing eco-design in packaging to obtain the best quality secondary raw material. In the case of aluminum soda cans, the generated income streams are so high that producers do not incur any additional ROP charges.

> Only 23% of return points use devices for returning deposit packaging, but it is these points that collect as much as 93% of returned packaging

The fourth, equally important element is system integrity, including communication with consumers. The Norwegian Infinitum is responsible for reporting data on the system's performance, controlling the information provided, and conducting public education campaigns on DRS. In 2019, the Institute achieved a return rate of 89%, and then assessed the possibility of increasing the rate of return to the level of the assumed performance target. The analysis showed that generation Y (the so-called "millennials") was one of the groups least willing to participate in the deposit return system. In order to attract more participants from this demographic group, Infinitum undertook new marketing activities. In 2020, the collection rate under the system was already at 92%.

The result is a solution that helps the environment, visibly reducing the pollution of public space and nature around us. At the same time, it allows meeting the collection and recycling targets of plastic bottles imposed by EU law, and creates significant and stable flows of high-quality raw material. In addition, it aids the development of the recycling industry and facilitates the process of closing the beverage packaging loop system.

[3] This tax is very high, i.e. EUR 10,000 for 1 ton of plastic bottles and EUR 35,000 for 1 ton of metal cans.
[4] Producers (infinitum.no).

IT'S OUR NATURE!

SDGS-ORIENTED PARTNERSHIPS AS A PART OF NEW SUSTAINABILITY STRATEGY OF THE VELUX GROUP

The VELUX Group has operated in line with the Sustainable Development Goals from day one. Business has entered a decade of action and accelerated the implementation of solutions that help meet global challenges, including also climate change and devastation of natural environment, as per the UN Sustainable Development Goals (SDGs). With as little as 10 years to fulfil the goal-related promises, the VELUX Group has decided to make a bold move and draft a new strategy aimed to achieve zero emission level and capture the company's historical carbon footprint.

WWF and the VELUX Group collaboration

The VELUX Group has joined SBTi (Science Based Targets Initiative) and undertaken to observe the most ambitious goal of the Paris Agreement – i.e. to maintain a 1.5°C temperature rise, and by 2030, the company intends to become Carbon-Neutral and reduce by half its CO_2 emission in the entire supply chain. As a result,

> The new climate goal by the VELUX Group is based on achieving a zero emission level by 2030, and moreover – capture the company's historical carbon footprint in collaboration with WWF.

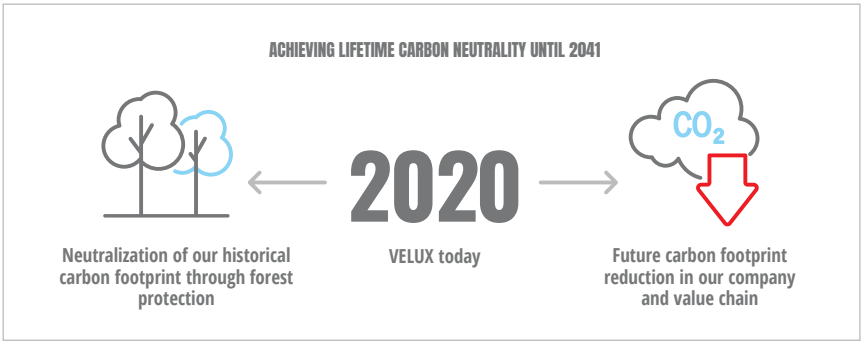
the VELUX Group's historical footprint – 5.6m tones of CO_2, considering the surplus of 25%, (scope 1 and 2), emitted since the company's foundation in 1941 - will be neutralized as a result of operations of five projects aimed at recovery and protection of forest prepared and pursued by WWF. As part of their long-lasting collaboration, WWF and the VELUX Group will effectively pursue the goals based on joint efforts to protect and restore forests globally.

The projects' objectives are to protect biodiversity and wildlife for future generations.

The first official project to protect forests in Uganda was launched recently with the financial backing of the VELUX Group. The forest revitalization project operating under the name "Natural Forest Regeneration for Enhanced Carbon Stocks in the Albertine Rift (FRECAR)" is managed by WWF-Uganda, in cooperation with the National Forestry Authority of Uganda. In March 2021, a formal memorandum of understanding was signed, and the project received a full endorsement of the government of Uganda. The project that covers the surface of some 34,000 hectares is supposed to decrease the domestic CO_2 emission by approximately one million tones. All results produced by the project financed by the VELUX Group - both when it comes to reduction of CO2 emission and its removal from the atmosphere - should help the Ugandan authorities in achievement of its national determined contribution (NDC).

Green transformation of business

The VELUX Group has also committed to drastically reduce CO2 emissions in its operations and value chain, in line with the scientific evidence and the Paris Agreement that specifies the most ambitious solution to stop global warming at the level of 1.5°C. By 2030, we will become CO_2-netural and we will achieve that by accelerating in-



vestments in energy-efficient solutions in our production plants, transferring to renewable energy, and purchase of 100% renewable energy, as well as a change in the method of identifying and purchasing materials used in our products.

In January 2021, the VELUX Group started its collaboration with Schneider Electric with regards to sourcing 100% of its energy from renewable sources by 2023 and thus meeting the RE100 commitment. Already in September, the agreement was extended to include drafting a global zero carbon emission program in all VELUX Group manufacturing facilities. It will help effectively reduce energy consumption and increase the share and significance of renewable energy sources.

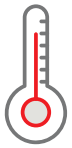
The three-year partnership includes all manufacturing plants of the VELUX Group. Schneider Electric, recognized in February 2021 as the most sustainable global organization by the Corporate Knights' Global Index 100, will prepare the global decarbonization program that will include the following components:

- assessment of all manufacturing plants of the VELUX Group that will result in drafting and implementation of an action plan aimed at zero CO2 emission level;
- support of the "Energy Excellence" program by the VELUX Group, as per ISO50001; improvement of activities with regards to energy efficiency; transition towards local, renewable energy sources and incremental withdrawal from fossil fuels;
- implementation of a global monitoring system via EcoStruxure™ Resource Advisor Schneider Electric platform to measure and analyze energy consumption.

The VELUX Group will implement the pilot activities aimed at zero emission level in its two energy-intensive plants which account for some 25 percent of the entire energy consumption: JTJ Sonneborn Industrie GmbH in Germany and NM Polska Sp. z o.o. in Poland. A number of investments are planned in these facilities that will have a major impact on the process of transitioning to renewable and efficient thermal energy sources by installing, among others, green energy-powered heat pumps and further use of the FSC/PEFC-certified wood residues produced on-site. The VELUX Group will also invest in the local photovoltaic power plants and continues to improve energy efficiency of its manufacturing facilities by optimization of power supply systems, manufacturing processes, and energy management.

A roadmap for the company and its clients

The VELUX Sustainability Strategy 2030 will be our roadmap for the next decade. It will be the beginning of a large-scale transformation in how we operate and market our products and solutions. We will take care of our immediate environment and take new, sustainable actions across the entire company that will include the production process, supply chain, products, and personnel. All these efforts will not only be our, but our suppliers', too. By 2030, we will commit to reduce by half the CO2 emission of our products, decrease by 30% our business air travels, switch to zero-emission cars, and cut by half the volume of non-utilized waste per a single window we produce. We will protect our interest and wellbeing of our staff, by promoting diverse, inclusive, safe, and healthy work environment. We will do so, because sustainable development constitutes a significant part of our values and legacy, we know how to act, and - which is not less important - we believe that the world we live in deserves to be treated better.



1,5°C

VELUX Group joining the Science Based Targets initative

2041

Achieving Lifetime Carbon Neutrality for VELUX Group 100th Anniversary

THE TOO GOOD TO GO OFFICE: A DESIGN IN THE SPIRIT OF LESS WASTE AND CIRCULAR ECONOMY

COOPERATION OF ECOPHON, TOO GOOD TO GO AND WORKPLACE

Ecophon
SAINT-GOBAIN

40% of all waste generated in the world comes from the construction industry, which is responsible for emission of a similar percentage of all greenhouse gases. Environmental certifications that incentivise reduction of the environmental impact are mostly conducted for buildings and almost never for interiors. However, it is the finishing materials and fittings that are most frequently replaced and discarded. This challenge was tackled by a Danish start-up, the creator of the Too Good To Go app, which saves food from being wasted, when they planned their office in Warsaw.

The objective was to select, design and organize the office space so as to reduce waste, cause the least possible burden to the environment while at the same time providing the team with the best possible working conditions.

The design process was entrusted to the Workplace research & design studio from Warsaw. Ecophon, a Swedish manufacturer of solutions to shape interior acoustics, selected and delivered sound absorbing ceilings and wall panels with lowered environmental impact.

Less Waste design idea

Offices designed using the Less Waste idea are based on universal solutions and durable materials whose service life has already been closed, or will be within the next five years. The primary choice includes products already in use and such functional and material solutions that will extend the lifecycle of the office design while causing the least possible burden to the environment.

The selection criteria are therefore: circularity (the preferred products are those already in use that can be re-used or those that can be recycled), universality, durability, low carbon footprint and... usability. Every element should have an important function.

Office location and the functional layout

The company rented two floors in one of the atmospheric tenement buildings in the Piękna Street in the southern part of the Warsaw city centre (Śródmieście Południowe). The choice was motivated by the unique character of this place, multiple municipal transport options and the fact that the floors rented had already been used as offices.

Minimum interference with the existing layout was intended in order to avoid demolitions. Work stations for 40 people were designed on 600 m^2, together with a large surplus space to accommodate the company's dynamic growth as well as cosy meeting rooms and a variety of social areas. The latter were very important from the company's point of view because of the persons who only used to work remotely before. For this reason the office design included kitchens with a communal table or a large room for exercise and relaxation.

Employee wellbeing

Owing to the natural environment, the intention was to limit the layout elements to the minimum without compromising the employees' wellbeing and comfort. High rooms in the building combined with enormous windows created a unique atmosphere and let in a lot of light but also had a drawback – poor acoustics. The interiors gave a lot of aftersound, with the sound bouncing off the hard surfaces of the walls and ceilings, magnifying the noise. It was necessary to improve the office acoustics so that the teams could collaborate effectively and talk and hear what they needed to hear.

Better acoustics with a lower environmental footprint

Shaping the office acoustics was entrusted to Ecophon due to their experiences and effective solutions offered that had a smaller impact on the environment. Over 50% of the raw material used to manufacture Ecophon ceilings and panels comes from post-consumer recycling. Research and changes in the manufacture and distribution technology made it possible to reduce the carbon footprint of the solutions considerably for their entire lifecycle. The company is also implementing a programme consisting in collection and re-processing of redundant products.

Offices, their design and planned fittings were thoroughly analysed in order to determine which acoustic solutions and where were necessary to make sure that the teams would be comfortable. The final layout and colour schemes were selected by the designers. Ecophon acoustic panels on the walls and the ceiling were effective in reducing the sound range in the open space offices and made talking in the conference rooms more comfortable.

Results

In the spirit of less waste, the majority (about 80%) of the panels used had already been used before in other offices or came from test assemblies. What made it possible was the durability and flexibility of the acoustic systems, as well as the open-minded approach of the client and the designers. The panels were transformed: the modular tiles became free-hanging islands and large-format wall panels were divided into small squares resembling colourful post-its. Also the carpeting, most of the furniture and even plants were given a second life.

In practice, that meant a nearly total reduction of consumption of natural resources, emission of greenhouse gases and waste generation compared to a standard office design.

The resulting comfortable space accounted for the needs of the employees and the organisation. Without unnecessary ornaments, with respect for the natural environment. The less waste idea, which is Too Good To Go's daily mission, has fully come to life here. ■

About the partners of the project

Ecophon Saint-Gobain: Our presence in this project is not accidental. We have been working to reduce the environmental impact and to close the lifecycle of our products for several years. As a result, our acoustic ceilings and wall panels have such features as a lower carbon footprint than similar solutions offered on the market and a consistently high share of recycled raw material. We are implementing SoundCircularity™, which is a service consisting in **collection and reprocessing of our products**. Our objective is to make the service available in most European markets by 2025. We believe that **transparency of actions** and information is crucial to sustainable growth and conscious choice. This is why we provide everyone with documentation on our manufacturing standards and with our reliable Environmental Product Declarations. We believe in our huge responsibility as manufacturers because designers rely on what we provide! We must shoulder this burden and actually act – and provide credible evidence that we do. **We undertook** to reduce by 2030 direct emissions by 33% compared to 2017. We want to reduce our emission level in every possible way in all areas of our business, before we compensate for it with our CO_2 emission allocation.

Too Good To Go is a social impact company driving a movement against food waste. Our app is the world's largest B2C marketplace for surplus food. The app connects users with businesses that have surplus food, so that this food can be enjoyed instead of wasted. The app launched in Denmark in 2016 and has since gained over 50 million users in 17 countries, including the US and Canada, and is the largest platform of its kind in the world. Too Good To Go's mission is to inspire people to fight food waste and to make a more sustainable lifestyle by influencing four dimensions: households, businesses, education and politics.

Workplace is a research & design studio specialized in shaping tailor-made work environments. We are a diverse team focused on connecting research, strategy, technology and architecture. Our holistic process is built around understanding the needs of people and business objectives. Since 2012 over 70 international clients enjoyed our creative and open-minded approach. We create future-proof spaces based on in-depth diagnosis and data-driven design. We believe that the workplace experience should work for all – employees, communities and our planet.

CASE STUDIES

In this part of the chapter we have collected several case studies related to activities of Scandinavian companies in the area of circular economy and environment.

According to the study „The Circular Voice" carried out by Stena Recycling in January 2022, it is business that has the greatest responsibility to increase the use of recycled materials (as indicated by 33% of respondents)[1]. Going further, circular economy is not only increasing the use of products from recovered raw materials, but also wise management of resources in general, including renewable ones such as water. The following examples show how big is the space to improve processes and implement innovations in this area. The goal is to live in harmony with nature, which we need even working at the office every day, and to minimize the impact of human activity on the environment.

[1] "The Circular Voice" www.stenarecycling.pl

photo: Stena Recycling

STENA RECYCLING

STENA CIRCULAR ECONOMY AWARD

Partnership aimed at promoting the idea of Circular Economy

CASE STUDY

Stena Recycling has been operating in Poland for 21 years. During this time the company has transformed hundreds of tons of waste from companies into valuable raw materials, thus saving natural resources. Stena Recycling is a leader of comprehensive solutions in the field of waste management, recycling and environmental services using the best Scandinavian practices.

Project background

When Stena Recycling initiated the Stena Circular Economy Award in 2017, there was not much information about the circular economy idea in Poland. At that time, together with partners, Stena Recycling organized first conferences on this area. The company noticed that circular economy exists in the awareness of some local governments, but it was getting through to business very slowly.

Stena Recycling conducted a consumer survey in 2021, which revealed that 80% of respondents believe products should be reusable, while 70% do not know of any recycling or refurbishment sites. This indicates a continuous social need for education and promotion of solutions towards a circular economy.

Implementation

The aim of the Stena Circular Economy Award competition is to promote companies that implement circular economy solutions and to activate other companies and scientific entities to apply good practices in this area. Stena Recycling wants to accelerate Poland's transformation towards a circular economy.

There are three categories in the competition: the first for entrepreneurs who have implemented circular economy practices; the second for entrepreneurs who take action to promote the idea of circular economy; and the third for students who propose ways to implement circular economy principles. The competition is organized by Stena Recycling. The invited members of competition jury are representatives of experts , representatives of universities, media and organizations that promote circular economy and other supporting the circular transformation. In the previous editions, we awarded such companies as Orange Polska, Koko World, Carrefour and Swapp!, North.pl, Ergo Hestia and Ikea Retail.

The effectiveness of the competition is measured by the communication conducted to over 300 companies and 50 universities from all over Poland and the media effects. During the five editions, 896 publications appeared in local and national media. Through these publications, information on circular economy has reached over a million people, which is the first step towards building awareness. A total of 188 applications were received in all editions of the competition including 133 from companies and 55 from students.

The competition raises awareness of the circular economy among two groups: companies and students but also among society in general. In addition, the value of the competition is to inspire the transformation towards a circular economy. For Stena Recycling as a waste management company this is particularly important. Environmental awareness affects companies' approach to materials used in production as well as the quality of waste management. Changing business attitudes can benefit the recycling industry and the environment.

EFFECTS AND BENEFITS

- Constant communication with more than 300 companies, 50 universities related to circular economy
- 896 publications in local and national media
- Inspiring and educating towards circular transformation

SDGs

photo: Tomra

TOMRA

INSTALLATION FOR SORTING OF PACKAGING WASTE AND SELECTIVELY COLLECTED PAPER

Cooperation with EKOMBUD

CASE STUDY

TOMRA Sorting sp. o.o. based in Poland is a part of Norwegian TOMRA Group and have been conducting its activity for over 10 years. TOMRA provides technology of near infrared (NIR) sensors for waste sorting applications. We extract high purity fractions from waste streams, high valuable resources that can be brought back in the industrial loop and further re-used.

Project background

The circular economy legislative package aims to set ambitious recycling targets. Already in 2025, at least 55% of the mass of waste generated in households should be prepared for reuse and recycled. In Poland, on the one hand, there is an increasing amount of waste collected selectively, and on the other - insufficient processing capacity of the existing installation network. The quality requirements of the recycling industry are also growing. One of the projects that Tomra is conducting which guarantees the formation of a stable stream of high-quality raw material for recycling is cooperation with EKOMBUD.

Implementation

The project is realised in cooperation with EKOMBUD Sp. z o.o. It relates to the recycling of plastics and construction of an installation for sorting packaging waste and selectively collected paper, using the automation of the process of sorting plastics and paper. The technology is a part of the equipment of a waste processing plant, the aim of which is to maximize the amount of sorted material fractions and their quality.

Depending on the type of waste sent to the installation, as a result of the use of automatic sorting with the use of optical separators, 6 types of plastics and mixed paper are separated. However, when performing additional logistics operations, this installation can be used to sort the next 4 plastic fractions. As a result, up to ten high-purity material fractions for recycling are to be recovered in total.

Implementation of such solutions brings numerous benefits. Apart from direct ones, such as increase in quality and recyclability of raw material obtained from waste sorting, there are also indirect benefits such as achieving appropriate recycling goals on local level and the avoidance of penalties associated with non-fulfilment of hese obligations. Therefore, it provides protection against price raise for the local community. Other visible advantage is increased competitiveness among waste industry operators.

This project is part of the business segment of the TOMRA Sorting group aimed at promoting Circular Economy solutions which has been developed for several years already. One of the areas of its development is undertaking a number of activities in cooperation on many levels (including industry), which brings waste management in the world closer to the implementation of ambitious assumptions of the circular economy.

EFFECTS AND BENEFITS

- increase in quality and recyclability of raw material obtained from waste sorting
- separation of a greater amount (by weight) of recyclable materials
- achieving the required recycling levels for subsequent years
- increased competitiveness

SDGs

photo: Velux

VELUX GROUP

NEW PLASTIC-FREE ROOF WINDOW PACKAGING

CASE STUDY

For the past 80 years, **The VELUX Group** has created better living environments for people around the world; making the most of daylight and fresh air through the roof. Our product programme includes roof windows and modular skylights, decorative blinds, sun screening products and roller shutters, as well as installation and smart home solutions. These products help to ensure a healthy and sustainable indoor climate, for work and learning, for play and pleasure. We work globally – with sales and manufacturing operations in more than 40 countries and around 11,500 employees worldwide.

Project background

Globally 300 million tonnes of plastic waste is produced every year, and 60% of plastic produced since 1950 has ended up in landfill or the natural environment[1].Single-use plastics make up almost half of all plastic waste, and if they land the wrong place, they are proven to have a negative impact on land and marine animals[2].Reducing the use of single-use plastic is critical as plastic production requires an enormous amount of energy and resources. This in turn causes carbon emissions and contributes to global warming[3]. Therefore, the company has made a commitment to eliminate plastic from the packaging of its products.

[1] United Nations Environment Programme: https://www.unep.org/interactive/beat-plastic-pollution/
[2] Single-Use Plastics 101 (2020), NRDC. [online] 09 April. Available at: https://www.nrdc.org/stories/single-use-plastics-101 [Accessed 25 Feb. 2021].
[3] Reducing Plastic Waste – why is it important? (2018), Environmental Monitoring Solutions, [online] 18 May. Available at: https://www.em-solutions.co.uk/insights/reducing-plastic-waste-why-is-it-important/ [Accessed 25 Feb. 2021].

Implementation

As many as 90 percent of sloped VELUX roof window packaging is now plastic-free and instead made of paper-based single material. Te new packaging is used for all its most popular sloped roof windows and is now fully recyclable, because it consists of Forest Stewardship Council (FSC) certified cardboard.

The introduction of the practice required close cooperation with packaging suppliers in order to develop the best solutions. Numerous tests have been undertaken in the warehouse to test the quality of the new packaging material, i.e. transportation test, vibration test, stacking test, handling test and humidity tests. It was the 1-to-1 replacement of EPS blocks for cardboard. Processes at factory level will require very little adaptation as the cardboard is made to fit the size and shape of the old EPS blocks.

This means easier recycling and less sorting and separation of packaging waste for our customers.

Our „Zero Plastic" ambition will reduce disposal costs for installers compared to the EPS plastic component. The waste fee of cardboard is 2-3 times lower than the fee of EPS plastic component. Installers will no longer have to undertake the time-consuming task of separating cardboard from EPS and other plastic components. Instead, they will be able to discard everything into the cardboard waste fraction instead of sort and discard into multiple waste fractions. The use of a single material will facilitate the process of recycling. Cardboard recycling is more matured compared to recycling of EPS. Expanded polystyrene (EPS) can be difficult to dispose of given that it is often bulky. By removing the EPS in our roof window packaging we hope this will reduce the burden on landfill sites as part of the overall challenge plastics represent.

EFFECTS AND BENEFITS

- reduction of single-use plastics by 900 tonnes per year (estimations based on 2021 data)
- reduction of roof window packaging carbon footprint by approximately 13%
- easier recycling and segregation of packaging
- lowering environmental impact by reducing plastic in landfills

SDGs

4NATURE SYSTEM

THE IMPACT OF GREENERY ON EMPLOYEES AND THE WORK ENVIRONMENT

Common project with Skanska

CASE STUDY

4Nature System is a Polish proptech that brings nature, including vertical walls and furniture with live plants, to offices, commercial spaces and homes. All supported by IoT (Internet of Things). The innovative 4Nature System technology automatically controls the irrigation of plants, energy efficient lighting and humidity around. Therefore, plant maintenance is kept to a minimum. The company is the winner of the Good Design 2018 competition in the Best Designed Service category and won a distinction in the Innovative Company category of the Innovator of Mazovia 2021 competition.

Background

Biophilic design is a trend in architecture, which is based on introducing natural elements into interiors (residential, office and other) – including plants in pots and vertical green walls, through natural lighting, materials and fabrics, to patterns and motifs referring to the natural world. Surrounding oneself with such elements allows to regain lost balance and recreate natural conditions for work, study and everyday life.

The aim of the cooperation with companies, including Skanska, was to demonstrate the influence of plants presence in the form of furniture with vertical greenery on the environmental conditions in offices and on the subjective assessment of these conditions by employees.

Implementation

The research was conducted in 10 commercial offices located in Warsaw and Katowice, including the Skanska office. It included measurements of physical parameters of the indoor environment with a focus on indoor air quality, thermal conditions and lighting, as well as questionnaire surveys.

For the purposes of the research, independent green mobile partitions were constructed and placed in different configurations and numbers in the surveyed offices. The green furniture stood in each office for a period of 8 weeks. The average number of plants per m2 of surveyed spaces was 2.3 pieces. The average number of plants per employee in the surveyed spaces was 15.5.

The introduction of green vertical furniture increased indoor air humidity level, which is particularly important in winter. The indoor air quality in the studied rooms, assessed by the concentration of particulates, was good and very good - the presence of plants does not negatively affect indoor air quality.

It was observed that during the period when the test green walls stood in the tested workspaces, the respondents were significantly more satisfied with the room temperature than without the presence of plants. Significantly, after the test green partitions were taken away, the percentage of those satisfied fell below the satisfaction level of the period before the test started. Air quality in the period prior to the insertion of the green furniture was rated positively by 46% of respondents, while during the study, satisfaction increased to 79%. After the plants were taken away, satisfaction dropped to only 26%.

It should be noted that prior to the insertion of the plants a large number of responses (60%) indicated that the air in the office was too dry, while during the presence of the test furniture the percentage of those rating the air humidity: "just right" increased significantly to over 70%. After taking away the test green furniture, respondents rated the air 80% as too dry, which strongly suggests that the perception of indoor humidity is highly dependent on the presence of plants. The number of people satisfied with their office before the insertion of the plants was 52%, while it rose to 77% during the survey. After taking the plants away, it dropped to as low as 28%. This suggests that the fact that the plants were taken away from the office caused employees to perceive their work spaces worse.

The results of the study prove that including plants in the design of offices, warehouses and commercial spaces allows for comprehensive care for the well-being of employees.

EFFECTS AND BENEFITS

- Better aesthetics of the office 94% of people rated it positively with plants included
- positive impact of plants on work comfort, assessed by 86% of respondents
- improved air quality according to 84% of respondents
- improved well-being (84% respondents)
- positive impact on work efficiency indicated by 62% of respondents

SDGs

FAGERHULT

A SUSTAINABLE APPROACH TO RESOURCES IN FAGERHULT PRODUCTS

CASE STUDY

Fagerhult creates premium lighting solutions that enhance human well-being. With sustainability and connectivity at heart, we focus on office, education, retail, healthcare and outdoor applications. The Fagerhult brand includes both the product company Fagerhults Belysning AB and 13 sales companies across Europe.

Background

Using virgin material or fossil substances is not a long-term solution. We therefore need a new approach to the flow of resources and devices in the manufacturing industries. Therefore at Fagerhult the goal in product design is that all products should contain at least 80% of renewable or recycled materials and all lighting solutions will have integrated lighting controls until 2030. Choosing innovative materials can significantly reduce the environmental impact. Therefore, in 2021, we launched an innovative luminaire in an entirely new material for the industry, Solid Board.

Implementation

A new luminaire Multilume Re:Think can be recycled several times within its life cycle . More than 90% of the luminaire can be processed into new materials, and the rest into energy, i.e. heating for households. The luminaire body itself, made of Swedish natural fiber and recycled materials, is 100% recyclable. The uminaire body is equal to the packaging - no plastic parts or non-recyclable packaging, only recyclable corrugated cardboard remains after installation. The instruction manual is printed directly on the back of the luminaire, so that it is always available for any future reference.

Implemented changes also have a positive effect on the logistics of the product. By replacing the material in the luminaire body, from metal to cardboard, we have reduced the weight of the entire luminaire by 32%. It is not just the weight that is lower, shipping volumes have also decreased by 30%.

EFFECTS AND BENEFITS

- Reducing the climate impact from the luminaire body by 81%
- printing the instruction manual on the luminaire saves 400 000 sheets of A4 paper a year
- 90% of the luminaire can be receycled

SDGs

ISS POLAND

PREDICTIVE MAINTENANCE AND WATER CONSERVATION

CASE STUDY

ISS, a leading workplace experience and facility management company, provides placemaking solutions that contribute to better business performance and makes life easier, more productive and enjoyable – delivered to high standards by people who care. ISS employs 350,000 placemakers.

Background

Predictive maintenance, based on advanced IoT (Internet of Things) data analytics, is an innovative approach to managing infrastructure that supports the manufacturing process with the goal of instantly catching any anomalies and minimizing the risk of failure occurring. This is an opportunity to realistically reduce costs associated with unexpected downtime, as well as conserve natural resources, including water.

An example of a solution that ISS has implemented at one of its customers' manufacturing sites is the installation of water meters using the aforementioned IoT-based analytics.

Implementation

Before implementation, the local team on site used to read water meters and manually log the results once a day. In this case, water was an important element in the production process, more specifically in the washing process. Therefore, its consumption had to be continuously monitored. As part of the optimization, water consumption logs were digitized entirely. The purpose of implementing the digital meters was to have permanent access to the information and to be able to control the consumption in real time. Additionally, in order to improve the process, water consumption was also checked outside working hours when the production line was not running, to identify any uncontrolled leaks.

Further, an expansion of the installation is planned to include leakage control; when a leak is identified, the algorithm will send a notification and also, without technicians' involvement, close the valve to the water supply. Another element to support utility systems' quality control will be the introduction of water pressure and temperature measurements in the production process. This will guarantee all parameters are properly adjusted.

IoT – advanced analytics and predictive maintenance – are innovative solutions that result in reduced costs associated with equipment failure and forced downtime. Continuous monitoring of production equipment is a real benefit for any company, also in the area of sustainability. The direct benefits include:

- Greater efficiency achieved through modern technology – innovation through the use of IoT solutions, it is a transformation of the old model of planned maintenance into effective predictive maintenance.
- Reduced risk of machine failure and elimination of unscheduled downtime – IoT sensors continuously monitor the operation of all production line equipment. They collect data, analyse individual parameters, and when they detect anomalies, they send an alert.
- Extended lifespan of production machinery – preventing failure and correcting malfunctions before they cause damage and force downtime on the production line results in an extended lifespan for machinery.
- Reduced environmental impact by optimizing utility consumption – reduced water waste through ongoing monitoring and immediate identification of leaks.

EFFECTS AND BENEFITS

- water savings amounting to 4.7% of total water consumption; which is equal to almost 6,300,000 litres of water per year
- optimalization of the production proccess through permanent access to data regarding costs, water consumption and discharged wastewater
- counteracting the waste of water and limiting the negative impact on the environment

SDGs

STORA ENSO

NEW INVESTMENTS IN LINES FOR RECYCLING CARDBOARD PACKAGING

Cooperation with Tetra Pak

CASE STUDY

Stora Enso

Part of the global bioeconomy, Stora Enso is a leading provider of renewable products in packaging, biomaterials, wooden construction and paper, and one of the largest private forest owners in the world. We believe that everything that is made from fossil-based materials today can be made from a tree tomorrow. Stora Enso has approximately 22,000 employees and our sales in 2021 were EUR 10.2 billion.

Packaging Materials

The Packaging Materials division aims to lead the development of circular packaging, providing premium packaging materials based on virgin and recycled fiber. Addressing the needs of today's eco-conscious consumers, Stora Enso helps customers replace fossil-based materials with low-carbon, renewable and recyclable alternatives for their food and drink, pharmaceutical or transport packaging. A wide selection of barrier coatings enables design optimisation for various demanding packaging end-uses.

Background

Stora Enso's plants in Poland are an example of the circular economy, a sustainable approach to the use of environmental resources. Recently, the company joined forces with Tetra Pak to triple the beverage recycling capacity in Poland.

Implementation

As part of their collaboration, Stora Enso will build a large-scale carton recycling line at its production site in Ostrołęka. Stora Enso will allocate €17 million for a new pulping line that will recover cellulose fibres, while Tetra Pak and Plastigram will invest a total of €12.1 million to build an separate local recycling line that will recover and recycle polymers and aluminum using patented separation technology. Both lines will operate from the beginning of 2023. The entire investment will amount to €29.1 million.

The used beverage carton will come from the sorting plant of waste intended for recycling. It will be collected by a network of suppliers located throughout Poland. For this type of packaging, the so-called positive segregation is carried out, i.e. selection from the stream of only packaging that meets the technical criteria. At the plant in Ostrołęka, only cellulose fiber will be recovered, which will be used for paper production. The recovered polyethylene and aluminum will be used to create different kinds of products, like pellets and foils. None of the streams will be subject to the combustion process. Creating a solution that allows full reuse of used packaging, which is the basis of the circular economy, is the basic assumption in the implementation of this project.

The multimaterials packaging recycling project fits perfectly into Stora Enso's purpose to "Do good for people and the planet". The project is an extension of the existing activity in the field of obtaining materials for recycling.

EFFECTS AND BENEFITS

- tripling the annual recycling capacity of used beverage cartons in Poland from 25,000 to 75,000 tonnes
- participation in the development of the circular economy at the national level

SDGs

VASTINT

THE ABOVE-AVERAGE SHARE OF BIOLOGICALLY ACTIVE AREA IN BUSINESS GARDEN WARSAW

CASE STUDY

Vastint Poland is part of the Vastint Group, an international organization that has been operating on the European real estate market for over 30 years. The pillars of the company's activity are real estate portfolio management and the development of office, residential, and hotel projects that provide a comfortable and sustainable environment for living, working, and relaxing. The company is a member of the Polish Green Building Council (PLGBC), where it actively supports the initiatives of this organization and participates in promoting sustainable construction.

Project background

The concept of the architecture encouraging users toward frequent and direct contact with green-ery and water, as well as the goal of providing comfortable and attractive usable spaces were the starting points in the design of the Business Garden Warsaw complex. As a result, the office build-ings were constructed within a garden that covers most of the six--hectare plot. The whole creates a friendly space, protected from the hustle and bustle of the city, and used by the tenants of the complex as a meeting place, for outdoor events, and for relaxation.

The garden design employs solutions and materials compliant with the LEED Platinum certification requirements.

Implementation

The proportion of biologically active surfaces in the Business Garden Warsaw is 60%, including the gardens and green roofs.

By limiting the number of above-ground parking spaces, almost the entire available area of the plot is occupied by a public park, varied in terms of form and function. Its layout has a landscape charac-ter and is a composition of trees, shrubs, ornamental grasses, and perennials as well as a network of walkways, water reservoirs, and garden furnishings and structural elements.

What draws attention after entering the garden is the diversity of vegetation and the variations in terrain in the form of hills and water reservoirs, from which some buildings seem to emerge. The interior of the garden is humanized by the deployment of garden elements such as gravel-paved paths, wooden decks, benches, and angular walls framing the banks of the pools.

Native and adapted species were selected as plants, shrubs, and trees in the garden, planted so as to create a polyculture promoting local biodiversity via the variety of habitats within the garden.

The roofs of buildings were also greened wherever possible. This is an example of the fifth façade increasing the aesthetic value of the buildings of the complex, but above all, a solution that miti-gates the "heat island" effect. The maintenance of extensive vegetation does not require artificial irrigation, as rainwater and the moisture in the air are sufficient. This solution not only increases the biologically active surface and slows down the outflow of rainwater, but also creates a specific mi-croclimate and reduces the effect of heating the interior thanks to the insulating function.

Significant emphasis was placed in the garden design on the proper management of rainwater. The water does not flood the walkways within the complex but, as in a meadow, it soaks into the soil. It is absorbed by plants, and any excess is diverted to closed tanks receiving water intended for wa-tering the garden, for example, and to open basins that appear as dry ponds, an additional garden feature.

Business Garden Warsaw received the first prize in the first edition of the Project: Przestrzeń (Space) competition, inaugurated this year by the Minister of the Environment. The complex was recognized in the category of commercial projects for its well-thought-out landscape architecture design that enhances the aesthetic value of the city space.

EFFECTS AND BENEFITS

- Increasing public green areas for employees and local residents
- Improving work comfort thanks to the possibility of communing with nature
- Mitigating the "heat island" effect in the city
- Reducing the outflow of rainwater from the area by over 60%
- Protecting biodiversity by planting meadow vegetation and creating habitats for bees (apiary) and other insects (insect hotel)

SDGs

ABOUT SPCC

The Scandinavian-Polish Chamber of Commerce (SPCC) is an association created by business people and entrepreneurs associated with Scandinavia. SPCC's head office is located in Warsaw, but the organization is active in the whole country. Since the beginning of 2015, SPCC has its regional office in Gdynia. Additionally the Chamber has its representatives in Szczecin and is also active in Wroclaw and Poznan.

Currently, SPCC brings together over **400 members** and is one of the largest bilateral chambers in Poland. Membership in the Chamber gives plenty of networking opportunities with an elite group of high-performing managers of Nordic companies and is also a good way of finding inspiration for everyone who would like to expand their business.

www.spcc.pl

SPCC Patrons