Interreg
North Sea Region
2imprezs
European Regional Development Fund

EUROPEAN UNION

2IMPREZS

Layman's Report

November 2021

Contents

Introduction

Most schools in the North Sea Region (NSR) were built in more careless times—they have a high and increasingly more costly energy consumption not in line with today's CO_2 reduction emission policies. Over four years, the Interreg North Sea Region 2IMPREZS project has set out to improve this reality by fostering both behavioural and technical energy efficient saving measures in existing schools, reducing energy consumption and thus reducing CO_2 emissions.

The Interreg NSR 2IMPREZS project is a tried-and-true method of reducing energy consumption in school buildings, thus lowering carbon emissions, across the five participating North Sea Region countries of Belgium, The Netherlands, Germany, Denmark and the UK. From 2017 to 2021, the 2IMPREZS project stimulated change in the current climate crisis and resulting energy transition by fostering both behavioural and technical efficient energy saving measures in existing schools, reducing energy consumption and thus reducing CO_2 emissions. The 2IMPREZS project tackles the whole spectrum of energy efficiency measures—the behavioural, the technical and the financial approaches—instead of focusing on one specific field. The proven comprehensive transnational strategy aimed to achieve 30% energy savings in 141 schools in the North Sea Region, representing an emission reduction of 7320 tonnes of CO_2. On numerous occasions, 2IMPREZS has had top-level European exposure, having won the Interact Project Slam 2019 at the European Week of Regions and Cities in addition to the North Sea Region Video Contest in 2020, and has made an impact within the Interreg NSR Pro

The main project result is an estimated carbon reduction of 6281 tonnes of CO_2 in 125 schools involved in the project; however, the replicability of the 2IMPREZS concept as well as an 18-month funded project extension will allow the goal of 141+ 2IMPREZS schools to be easily achieved. The main output of the project is a transnational, replicable joint energy saving programme, involving an estimated 55,000 pupils during the project lifetime, and tested in different NSR school environments and conditions, which supports the 2030 Framework for climate and energy, 2030 Energy Strategy, and ultimately 2050 net-zero goals.

2IMPREZS Partnership

Intermunicipal Organisation for the Campine Region, IOK

IOK is lead partner in the project and responsible for project management. On the regional level, IOK coordinates the 2IMPREZS Energy Challenges in 24 primary and secondary schools located in the Campine Region, which is part of the province of Antwerp (Flanders). In all schools both a technical and educational trajectory are launched. IOK coordinates the technical trajectory, whereas the educational trajectory is coordinated by supporting partners, MOS and Provincial Institute for Environment Education (PIME), and local partners, Djapo and Thomas More.

atene KOM GmbH

As the project Communication Manager, atene KOM supports the partners in their local and regional communication activities, in addition to regularly communicating the project activities and findings in the North Sea Region and beyond. On a national level, atene KOM promotes the Energy Challenges through the regional educational authority, energy efficiency and educational networks in Lower Saxony.

Energy Challenges Foundation

The specific role of the Energy Challenges Foundation in the project is to support all schools in conducting the (Dutch) Energy Challenges campaign. Energy Challenges also enables the implementation of strong networks amongst school staff – one specifically for educational staff and one for technical staff and stimulate cross-over communication so that teachers and pupils are involved in the energy-saving investments of their schools.

House of Science (HoS)

House of Science (HoS) is an independent partnership where members sit equally on the partnership board. HoS implements the 2IMPREZS Energy Challenges in a Danish context. House of Science also has the main role of overseeing the energy awareness survey to track the increase of pupils' awareness/knowledge related to energy, sustainability and CO_2 consumption from the start of the project until the official project-end.

Province of Antwerp

The Province of Antwerp's role in 2IMPREZS is primarily supporting 15 Flemish schools both technically and educationally, for a minimum of one school year, in the rollout of the 2IMPREZS Energy Challenges in Belgium. Providing technical materials for small measures (e.g., loggers, radiator foil, LED lights) and educational tools (e.g., energy suitcases with didactic materials) is included in this support. Its department of Sustainable Environment and Nature Policy (DMN) is responsible for the technical aspect of the project, and the Provincial Institute for Environment Education (PIME) has taken the lead in implementing the educational Energy Challenges programme in the 2IMPREZS schools. The MOS team (regional sub-partner) guides and consults schools and teachers, both in primary and secondary schools, in their quest to further develop their school and educate their pupils.

University of Southern Denmark, Mads Clausen Institute (SDU MCI)

It is the role of the Mads Clausen Institute (MCI), the University of Southern Denmark (SDU) to develop the Interactive Energy Optimization and Decision Model (IEODM). The IEODM is being developed to actively involve school children and high school students in the decision-making processes at schools and to provide data which will assist decision-makers in choosing to make positive investments in energy.

Southend-on-Sea Borough Council

Southend Borough Council (SBC) leads the work based around developing a 2IMPREZS business model that will enable schools across the North Sea Region to understand

how they can finance energy efficiency and renewable energy projects on school buildings. SBC also has supported in the testing and implementation of the 2IMPREZS Energy Challenges in 20 British schools.

Djapo vzw

Djapo is a local partner in the project. Djapo, together with MOS and PIME, is responsible for the educational trajectory in the participating schools in the Campine Region, which is part of the province of Antwerp in Flanders, Belgium.

Thomas More Kempen vzw

Thomas More is a local partner in the project, working with secondary schools participating in the Campine Region, which is part of the province of Antwerp in Flanders, Belgium. Thomas More organises workshops for secondary school students surrounding the regulation of the heating installation and use datalogging to analyse the efficiency of the current operation of the heating installations.

Adapting the Transnational Energy Challenges

The Netherlands – The "original" Energy Challenges

The Energy Challenges project showcases to students their own influence on the schools' energy bills and how they can affect these energy costs by changing their behaviour. The students are challenged to, as the metaphorical "owner" of the energy bill, reducing the energy bill through optimising energy consumption at school. Just by changing their behaviour, pupils find that they can already save 15% in energy consumption and subsequent energy costs. Additional energy savings can be made possible through technical changes to the school building itself.

The Energy Challenges campaign season starts with a slamming kick-off in January and ends with a festive finale in June. During the kick-off event, all schools that participate in Energy Challenges come together to officially launch the race to save the most energy. The teams of Energizers have the opportunity to present themselves in a video and participate in workshops on energy-related subjects. At the start of each annual campaign, the pupils – called Energizers – receive a large poster on which they can earn a maximum of eight stars for their achievements. Each star is associated with specific goals of the campaign, challenging the pupils to come up with original and creative actions to achieve their goals and earn their stars. The annual Energy Challenges finale is the most highly anticipated aspect of the entire campaign. At the regional finales, a local well-known local rap group performs, and the pupils race to complete a wide variety of energy-related games and activities – including obstacle courses –

with the opportunity to win fun prizes. The winners of the Energy Challenges campaign itself (i.e., "Most innovative campaign", "Most energy saved", etc.) are announced, and winners are rewarded with amazing prizes – including a grand prize field trip for the entire Energy Challenges team.

Energy Challenges NL within the context of 2IMPREZS

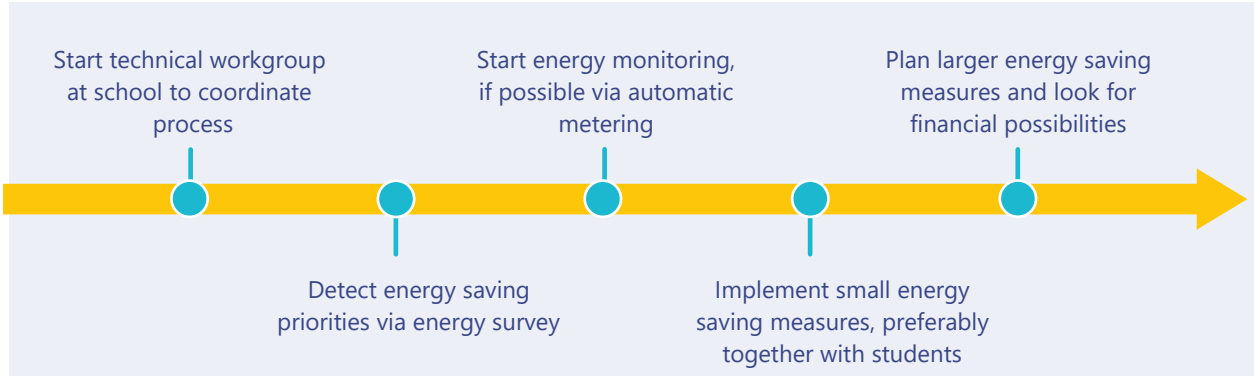
Energy Challenges is seen as the basis for 2IMPREZS at the European level. The International Energy Challenges in the Netherlands utilises the regular star poster with eight assignments. For example, the schools participating in the international competition can also participate in the local Energy Challenges. The international component has been incorporated into five additional assignments. For each completed assignment, students earn a share of the International Star by demonstrating the transnational aspect of the 2IMPREZS Energy Challenges.

Belgium

Key learnings

⇒ Regular meetings with stakeholders make it so the behavioural and technical measures could be implemented in a timely fashion.

⇒ To develop a technical trajectory, IOK oversees the completion of an energy survey in order to establish a clear idea of energy usage and the major energy consumers at schools. The technical workgroup of each school then uses this info as a starting point for elaborating small-scale energy saving measures and planning larger measures (e.g., installation of roof insulation, renewal of heating installation, installation of solar panels, etc.). IOK can then provide tailor-made support, such as: identifying (financial) opportunities, providing/explaining technical information, drawing up tender specifications and (guidance in) carrying out measures.



Technical trajectory:
The different steps of the 2IMPREZS Energy Challenges trajectory in schools in Belgian schools

⇒ By launching a two-year campaign in every school within the IOK region, IOK intends to increase the warranty on a long-term project impact. Early on in the project, Flemish partners decided to step away from the competition approach and focus more on a long-term cooperation with the schools. Instead of a high-intensity campaign of just a few months, schools in the IOK region can work around energy-saving throughout two entire school years. In this way, schools have more freedom in their educational approach (i.e., a year-long theme, a mascot, a different focus every month) and more time to plan and implement their small-scale technical changes.

⇒ The Dutch Energy Challenges stars for every achievement was substituted with a framework of using "steppingstones", developed by the Belgian 2IMPREZS educational partners to guide the schools towards their energy-saving goals. These steppingstones allow for schools to visualise the project in their school and continue to work on it after the project's duration.

⇒ From the technical point of view, a general approach is complicated due to changes between private and public schools. Both private and public schools have a low budget and a high need of investments. That makes that both are strongly dependent on Flemish subsidies, the private schools even more so than the public schools. Significant energy-saving measures are therefore less likely to be approved in the short term. These schools would benefit more from small-scale measures, so that the energy saving can already start for them pending the approval of more budget.

⇒ Because many participating schools don't pay their own energy bills, they don't always feel responsible for high energy consumption. IOK attempted to solve this problem by making agreements with the school management or umbrella organisations to essentially reward students for their efforts to save energy. For example, if students reach their 15% energy savings goal, they are rewarded with a field trip at the end of the school year.

The steppingstones are based on the "stars" originally developed within the Dutch Energy Challenges

Germany

Key Learnings

⇒ In newly renovated schools, it is often not possible to influence energy consumption by switching off the lighting, as the classroom lighting is switched off by sensors the moment the last pupil leaves the classroom. Nonetheless, pupils conducted various measurements within their modern school buildings, locating a major malfunction in the central lighting computer to be fixed.

⇒ Successful schools put a lot of effort into their communication activities, disseminating their findings and learnings every two weeks in one big gathering to all pupils at the school (over 300 pupils) to give everybody the chance to join them on their carbon reduction mission.

⇒ One small primary school has developed a rotating system of the Energy Challenges working group to give all pupils the opportunity to participate in the project. This rotating system was invented to adjust the Energy Challenges to the German context.

⇒ German schools do not react to the offer of participating in the Energy Challenges if they are approached by multipliers such as school boards or authorities. The most time-consuming yet effective way to convince German schools to participate in the Energy Challenges is to approach as many individual school rectors as possible in order to identify schools that have available resources.

⇒ Lower Saxony's legislation prohibits the use of all digital tools whose servers are not located on German soil, which excludes most digital communication tools from everyday school life in Lower Saxony. Finding a common platform for communication — especially in the context of transnational communication and knowledge exchange during the pandemic — was a challenge not only in Germany, but also in each of the partner regions. A short-term solution used in German schools was communicating via WhatsApp, or by sharing YouTube videos.

Energy Eater Workshop, hosted by atene KOM staff, at the kick-off of the German regional 2020 2IMPREZS Energy Challenges, shortly before the start of the Covid-19 pandemic in Europe

United Kingdom

Key Learnings

⇒ From the outset, Southend Borough Council had planned to ensure that Energy Challenges UK could be delivered through an online platform, which would provide participating schools with free learning materials, lesson plans, video content and challenges even after the official project end. This was decided so Southend Borough Council could continue to deliver the project beyond the lifetime of EU funding, e.g., a sustainable digital platform reduces future delivery costs by ensuring that everything is monitored and managed online as opposed to having to put people into schools to educate them about energy efficiency and climate change.

⇒ Southend Borough Council is looking to help schools cut their carbon emissions through enabling lasting energy efficiency programmes to educate their pupils about environmental issues. However, one main factor in this is that Southend Borough Council is engaging schools around how energy projects can help improve the educational environment for their pupils and teachers; for example, new LED lights can improve lighting throughout the school, while new boiler controls can help better regulate temperature. Both contribute to improved concentration from the pupils.

⇒ Delivering school energy-saving programmes seems to be easier in the UK in comparison to other North Sea Region member states due to access to a government-funded programme called Salix Finance. Through Salix Finance, UK schools can apply for an interest-free loan to pay for energy efficiency projects (including renewable energy technology such as solar PV, ground source heat pumps, etc.), which is then paid back through the energy savings that the installation delivers. It is a key recommendation of the British 2IMPREZS partners that other member states should adopt this approach to support their own national carbon reduction targets.

Denmark

Key Learnings

⇒ Most notably, the Energy Challenges have been adjusted into a Danish context by working with both energy consumption awareness and reduction of CO_2 not just in primary schools, but in day care centres and high schools, in the municipality of Sønderborg. HoS has supported eight day care centres by developing pedagogical activities centred on resource consumption and how to optimise that consumption.

⇒ The energy consumption of the buildings of the day cares are monitored by the municipality; however, the pupils are instead introduced to energy-saving behaviour. House of Science recommends introducing the concept of energy awareness already in day cares – HoS calls this method "from ABC to PhD", essentially meaning that energy awareness can be adopted by all age groups, from toddlers to doctorate students.

⇒ During the second year of participation for the day cares, House of Science upgrades the "inspiration toolboxes" provided to the day care centres. Each inspiration toolbox has a specific theme related to climate change mitigation and energy savings.

⇒ What proved to be successful for HoS was when HoS engaged "youth ambassadors", who in cooperation with a person with experience in the school-world are to recruit participants and support the participants in the process of reducing CO_2 emissions at school. It is important ensure all participants have the necessary information, teaching materials, spreadsheets for energy savings, etc. in their quests to reduce energy consumption at school.

Danish 2IMPREZS pupils and their teacher measure how many kWh old electric devices use at school

⇒ In Sønderborg, the monitoring of energy occurs at the municipality's central department, hence the students/pupils are limited in their possibility to change at the local level. To solve this issue, the pupils at each participating school have been put in contact with the groundsmen of the schools, which are a part of the central department. This is to secure that the energy-related data and ideas for changes identified by the pupils find their way to the person who can actually implement the technical changes.

⇒ The Mads Clausen Institute developed four workshops aimed at high schools as part of the 2IMPREZS project in cooperation with local high school, Sønderborg Statsskole. Each of the workshops were comprised of a combination of lectures, hands-on experiments, investigations into the school's energy consumption, calculations and, at the end, a school assignment involving a paper where the high school students account for what they have learned and reflect on new possible energy-saving investments for the school. The four workshops are part of a best-practice model of how to increase the awareness about energy and energy consumption amongst young people in high school.

Lessons Learned from Key Performance Indicator (KPI) Data Collection

In general, some trends can be seen across the 2IMPREZS partner countries through the data analysis conducted within the project. For one, although they are located in the warmest climate region (lowest number of degree days), UK Southend schools require much more energy for heating their buildings, compared to other regions (kWh/m^2). But because the number of pupils per m^2 in UK Southend schools is much higher compared to other regions, the heating energy demand per pupil in UK Southend schools is below average. The same conclusion can be drawn, looking at the electricity consumption of schools: UK Southend schools have the highest consumption per m^2, but a below average consumption per user. Additionally, in all the participating schools, only 22% had solar panels installed. So there still is huge potential for renewable energy production in schools within the North Sea Region.

Belgium

In Belgium, most schools already have a method of regular – either monthly or annual – energy monitoring made available to schools. In those schools lacking this regular energy monitoring, the Belgian 2IMPREZS partners tried to set up monthly or automated energy monitoring at the start of our project. Some schools only have sporadic energy bills available. A few schools did not manage to gather any reliable energy data at all. Most energy data was collected via an available digital platform, www.energieID.be. In Belgium, the energy data is owned by the school, by the school umbrella organisation, or by the municipality or province.
During the data collection throughout 2IMPREZS, there have been many obstacles met by the Belgian partners. Often, those responsible for energy monitoring at schools do not really understand what

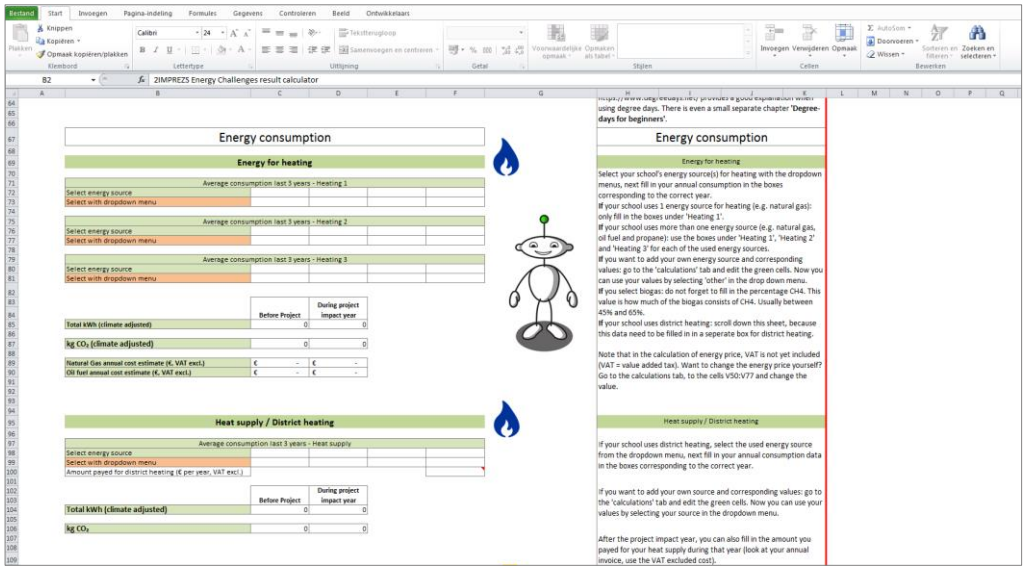
exactly the meter readings are communicating. As a result, data sets are often incomplete and/or incorrect. Additionally, the recent rollout of digital energy meters and the installation of solar panels at schools also resulted in many users no longer knowing how to correctly read or interpret the meter readings. Automating the energy meters (i.e., via automatic meter reading, or AMR) often creates a conflict with the firewall or internet security of the school, so that the meters cannot be read. Additionally, due to the Covid-19 crisis, contacting schools became very difficult. Visiting a given school to set up adequate energy monitoring sometimes became impossible.

There have also been obstacles during the processing of energy data in Belgium throughout the project. The data analysis often reveals that incorrect data is present. Correct interpretation is also a challenge, because not only does the climate differ from year to year, but also changes in the use of the buildings make it difficult to interpret impact on the data. Due to the Covid-19 crisis, the energy consumption in schools has changed drastically (e.g., classrooms were ventilated and heated at the same time, resulting in a lot of energy losses). As a result, accurately measuring the project impact through data analysis of the energy monitoring was not possible since 2020.

Establishing a more accurate system of energy monitoring has proven to be a very challenging and time-consuming endeavour. The 2IMPREZS Belgian partners made efforts to install automatic meter reading (AMR), and to train those responsible at school through tailor-made support and information sessions for schools.

The Covid-19 crisis may have made it impossible to measure the positive impact of behavioural changes at schools; however, the impact of implemented technical energy saving measures can be estimated with the help of the impact calculations from the 2IMPREZS energy audits.

To help partners track their results, the 2IMPREZS Energy Challenges Result Calculator was developed – a template to measure project results used by each of the partners. Partners must fill in the template for all participating schools after the first and, when applicable, second year the school participates in the project. In this way, IOK can calculate if the 30% reduction goal at schools has been achieved.



The 2IMPREZS Energy Challenges Result Calculator helps partners calculate energy and carbon reduction

Germany

With regard to the data collection of energy consumption parameters at schools, it is important to note in the German context that the energy data of the schools is not managed by the schools themselves but by the municipalities. In Germany, schools are part of the municipalities' budget, so the data must be requested from the municipalities.

Regarding similarities and differences to other partners and the uptake of the Energy Challenges in their regions, it has been demonstrated that German (Lower Saxony) schools consider the aspect of energy consumption to be important but do not have insight into the energy consumption of their own school, as this data is available through the school board, the city administration or the public utilities. These conditions have proven to be a challenge when collecting KPI data, as the task of requesting this data from the authorities is beyond the competence of the students and usually requires several requests and mediations to reach the responsible person from whom to extract the vital KPI/energy data. It also apparent that the KPI data is held by different authorities in the case of most German schools.

The main hurdles in terms of energy data collection in Germany were that the municipalities are very restrictive with these data and that a confirmation of the participation and a release of the data by the school management of the Energy Challenges schools had to be made first. In some cases, the data was only provided after repeated questions and pressure. Additionally, not all schools were equipped to provide digital data information — this of course is something that is very necessary and could be seen as a technical measure, as some schools have implemented such after the Energy Challenges were conducted at their schools. The reason for this was that at a relatively small cost, much information could be provided and easily accessed by school staff and not by a third party who was representing them. Further, there was very little engagement, if any, between the school(s) and the municipality prior to the 2IMPREZS Energy Challenges, making it more difficult to establish rapport and receive data in a timely fashion.

The German 2IMPREZS partner addressed obstacles pertaining to data collection and interpretation by attempting to make direct contact to a single focal point in charge of energy data. However, this was not always possible, hence there was significant delay in receiving the necessary data.

The Netherlands

In The Netherlands, foundations are the owner of the school building where the energy bills are sent and paid. The Dutch 2IMPREZS partner began collecting data for their KPIs as soon as a school decided to participate in the 2IMPREZS project. With the signed agreement, the schools agreed to supply the project with a copy of their energy bills for the past three years.

This provides for reference years, or a baseline in energy monitoring:

Measuring energy consumption at school

Energy for heating				
Average consumption last 3 years – Heating 1				
Select energy source	**2017**	**2018**	**2019**	**2020**
Natural gas (m^3)	**9787**	**10394**	**8804**	**8304**

A comprehensive energy scan is conducted at the beginning of the project at all participating 2IMPREZS schools. The energy scan provides the school with a picture of how much CO_2 could be saved with structural changes in additional to small daily adaptions in behaviour.

To monitor the impact of the Energy Challenges, the Energy Challenges Foundation utilises an online energy monitoring tool, called the Energy Manager Online (EMO). This digital tool provides the user with a daily insight on his or her energy consumption and eventual savings. A technical Energy Challenges specialist arranges that the meter components are set up with the correct smart meters. These meters can measure usage of gas, electricity, solar panels and water. On a daily basis, the tool provides the user with the ability to monitor such energy data per school, which also translate into costs of energy usage.

Additionally, the technical specialist and the Raging Reporters – members of the Energy Challenges staff who visit the individual schools at least once a month for monitoring purposes and to offer support – explain the energy scan to the pupils and how they this tool to see the effects of their campaign on a daily basis.

The only obstacle the Dutch 2IMPREZS partner encountered in terms of energy data collection and processing is that when they required data to monitor KPIs, the energy bills must be sent at a set date. However, the majority of schools have smart meters installed, meaning the Dutch partners can see the data digitally and in real-time.

United Kingdom

In comparison to the other 2IMPREZS partner countries, in the UK, some of the energy data belongs to the local council as a large proportion of schools are buying energy via the council framework. Some

schools, however, had to be contacted directly with clear instructions to extract energy date – they then either contacted their supplier with the given instructions or prepared the data themselves.
The main obstacles reached in terms of energy data collection and processing within the 2IMPREZS Energy Challenges in the UK were caused by lack of response from the schools themselves. In some cases, intensive efforts had been made to receive any energy data at all. To overcome this, the British 2IMPREZS partners followed up with schools through calls, emails, and additional chasers – though this method was still not fully successful.

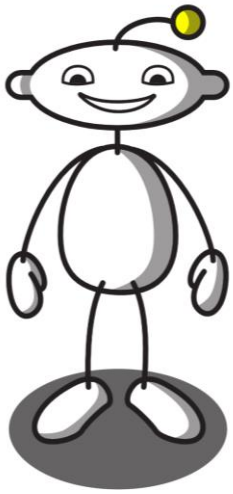
Denmark

Meanwhile in Denmark, the 2IMPREZS partners obtained energy data for measuring KPIs by the use of "Energykey". Energykey collects data via a Building Automation System (BAS), which monitors and controls the entire building mass and electrical installations in the Municipality of Sønderborg. Danish 2IMPREZS partner, House of Science, worked closely together with Energykey experts within the municipality to obtain adequate energy data. Furthermore, House of Science hired a consultant for collecting, analysing and presenting data relevant for 2IMPREZS. The Municipality of Sønderborg owns data via their municipal "Energysystem".

As stated above, Energykey obtains data from the entire "building mass". However, in some cases the system is limited. As an example, a land register or the address of a school in the BAS system contains data for all public services within the specific address. Hence collecting data for one 2IMPREZS school resulted in data which could not be differentiated between e.g., the sports hall, the swimming hall, and the rest of the school.

In terms of during processing of energy data in Denmark, 2IMPREZS partners also experienced some obstacles. Raw data from the BAS does not specify where a reduction in energy consumption took place. Two questions therefore arose: Did an energy reduction happen due to technical or behavioural changes? And did the changes occur during the public use of the schools' facilities outside the school hours; for example, by public associations? Furthermore, data in Energykey is not accessible until earliest October the following year, making it very difficult to calculate results in a timely manner.

Learnings from the Interactive Energy Optimization Model (IEODM)



2IMPREZS partner, the Mads Clausen Institute at the University of Southern Denmark, have developed the online interactive web solution of E.Wattson to help pupils identify the current energy situation of their classrooms (i.e., energy consumed, CO_2 emissions released, etc.) and then evaluate a set of scenarios in which their energy consumption could be decreased. E.Wattson is designed to lead the students through various scenarios to prompt them to, for example, choose alternative energy sources—e.g., in terms of lightning, to replace older lightbulbs with LED—and clearly demonstrate how much the school will save in terms of energy (kWh) and costs if the investment in a technical change of the school building is made. The students can choose to conduct one or more calculations and, in various ways, show how much energy is saved (in kWh) with the investment. Other features of the interactive web tool are the Business Model and Make Decision scenarios.
With the Business Model scenario, students map out and unfold the entire business structure of a green business investment for the school, and thus also uncover and circumvent any financial and non-financial barriers to the idea. The Make Decision scenario takes the process one step further by empowering the students, through different tools, to present their green business idea to school decision-makers in an ideal way.

The E.Wattson sensor box measures the temperature, humidity and CO_2 level of the classroom

Further, as part of the E.Wattson solution, the MCI has developed a sensor box to assist students in monitoring the indoor climate of their classrooms. The sensor box tracks the temperature, humidity and CO_2 level of the classroom. When left running over a longer course, e.g., an entire day, it is possible for the users to see how their behaviour affects the indoor climate (e.g., opening windows and not turning down the heaters, etc.).

To create a fun and reflective learning experience, the mascot, E.Wattson – The Energy Detective, guides and assists classes through the exercises on the digital platform. In the process, students are induced to reflect on their own behaviour in their interaction with energy-consuming devices. The E.Wattson web solution appeals to the user to change behaviour in terms of energy consumption through nudging questions and a mascot – an animated character.

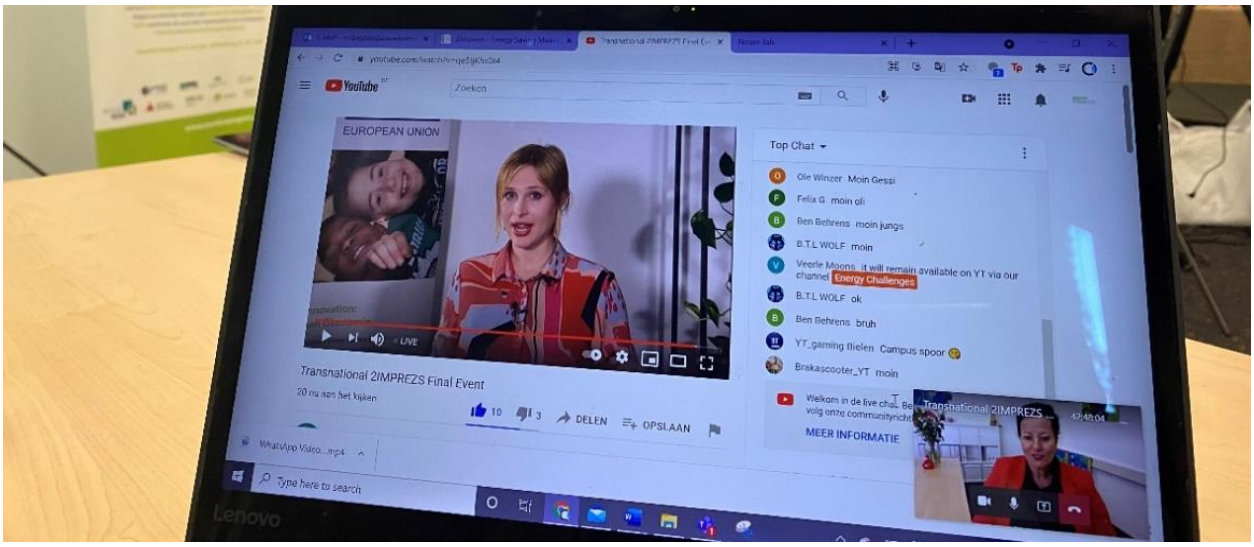
The first version of E.Wattson tool sent to the 2IMPREZS schools in April 2021

However, various obstacles and subsequent delays had set back the rollout of the Interactive Energy Optimization Decision Making Model (IEODM), or E.Wattson – The Energy Detective, within the 2IMPREZS schools. Due to various internal setbacks at the MCI in Denmark, the E.Wattson was not developed according to schedule and thus impacted the monitoring and testing of the E.Wattson across the 2IMPREZS schools as originally laid out in the project application. The first version of the E.Wattson kit, which included the sensor boxes and the solar cell kits, was sent to project partners in April 2021, already midway through the final year of the 2IMPREZS Energy Challenges; yet, it became known that school firewalls block communication between PCs and the sensor boxes, and the boxes had to be called back by the MCI and re-programmed. As a consequence, the finalised version of E.Wattson was only able to be implemented in classrooms in October 2021. This has made it impossible to directly measure the effect of E.Wattson in the 2IMPREZS pilot schools in terms of project monitoring, or to make any further improvements to the E.Wattson tool based on the schools' feedback – a main learning from the development and implementation of the 2IMPREZS IEODM, therefore, is to allow for adequate time for testing and monitoring in addition to development, which could very well be set back due to internal hindrances and outside forces.

This being said, E.Wattson shall remain with the 2IMPREZS pilot schools even beyond the project lifetime, allowing pupils who were not able to participate in the original transnational 2IMPREZS energy-saving programme to continue to reap the benefits of the 2IMPREZS project even after the project has officially ended, i.e., through additional energy savings and carbon reduction by use of the tool, which will continue to be available on the SDU web server. Specifically, the SDU MCI will continue to promote E.Wattson workshops through its continued school outreach efforts and through collaboration with the House of Science. Meanwhile in Belgium, E.Wattson has been integrated into their "energy suitcases" initiative, an energy learning energy "toolbox" rolled out in schools initially via 2IMPREZS. When successful, E.Wattson generates a multiplier effect of 2IMPREZS energy savings, building capacity and ensuring the longevity of 2IMPREZS's low carbon impact for years to come.

The Transnational 2IMPREZS Online Event

As a final celebration of the energy savings of the Energizers across Europe, the Transnational 2IMPREZS Energy Challenges Online Event was held on 27 May 2021 for two hours. The transnational event involved around 750 students and their teachers and/or other stakeholders in attendance, as well as a digital, interactive programme centred on energy saving and sustainability in and by schools.



Madeline Langlois, Project Manager at atene KOM GmbH, presented the virtual programme live from the atene KOM Stellwerk event space in Berlin

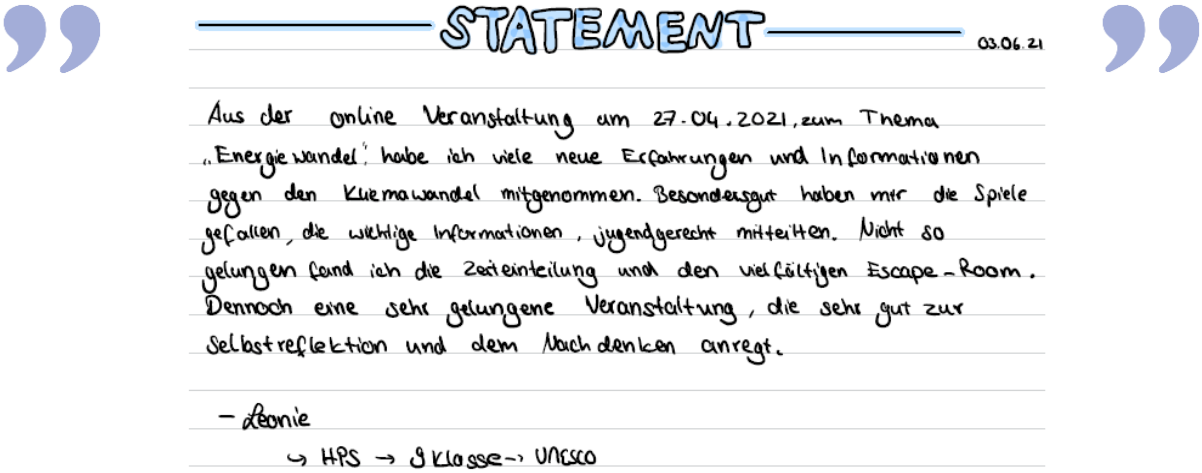
During the Transnational 2IMPREZS Online Event, pupils ranging from 10-15 years old not only learned more about the results achieved through the Energy Challenges programme – they also got to work themselves through interactive offline activities, the winners of which having been announced in the second half of the live event and sent exciting prizes. The young people tested their knowledge during the Kahoot! quiz, took on the challenge of solving clues in the virtual 2IMPREZS Escape Room, and gauged just how sustainable their behaviour is with the 2IMPREZS "Dare to Confess" game. The three winning videos of the 2IMPREZS Video Competition – the "Energys" of Windroos in the Netherlands, the "AMIGOS" of Sjabi in Pjurs, Belgium, and "Team Energiesparmodus" of Buxtehude, Germany – were premiered to kick-off the event, followed by an inspiring speech from a polar researcher and climate change activist.

Through short videos streamed throughout the live event, students, teachers, and other 2IMPREZS stakeholders – including local/regional politicians – were invited to explore the digital interactive platforms and tools developed within the 2IMPREZS project: the 2IMPREZS Interactive Fact Sheets and E.Wattson - The Energy Detective (IEODM) were both designed to visual their energy savings over the years and to help them save energy well beyond the project end. Finally, the surprise guest speaker, Frans Timmermans, Executive Vice President of the EU Commission, congratulated the 2IMPREZS pupils in an effort to inspire them to take climate action now for a sustainable and liveable net-zero future. In short, the 2IMPREZS project presented a diverse, interactive programme, despite the ongoing Covid-19 pandemic, aimed to inspire and celebrate the 2IMPREZS Energizers.

Frans Timmermans, Executive Vice President of the European Commission, addressed the 2IMPREZS pupils during the Transnational 2IMPREZS Online Event

Other learnings from the event came from data provided by the pupils participating in the various interactive, online/offline activities as a part of the transnational event. For example, in the "Dare to Confess", which was held jointly online and offline, pupils "dared" to confess their energy consuming behaviours in an effort to highlight where future energy savings could occur in everyday life. Out of the five participating partner countries, the UK assessed themselves to be the least environmentally conscious, whereas pupils in Holland and Belgium claimed to be "very environmentally conscious". Additionally, most pupils in the UK bring their lunch in a lunch box on a daily basis, whereas pupils in Holland and Belgium tend to bring their lunches to school in a plastic bag. Every partner country admitted that they prefer to wear a glamourous new outfit, rather than purchase or receive an outfit second-hand.

Finally, learn how to better host engaging, interactive, digital energy-saving events and programmes for young people in the future, the partnership requested feedback from the pupils and teachers following the transnational event. In general, the pupils reported that they enjoyed exchanging information with other pupils on a transnational level, especially by the means of sharing videos demonstrating their energy saving tips (with subtitles). Some pupils found that too much time was allocated to the educational activities, in particular the virtual Escape Room – which may be attributed to the relatively wide gap in age of the participants – and this should be taken into account when hosting future events. Another main concern of the participants was the lack of time dedicated to interactive Q&A sessions, through which pupils could ask specific questions related to energy-saving topics and projects on a transnational scale; i.e., more time dedicated to the live exchange of ideas.


STATEMENT

03.06.21

Aus der online Veranstaltung am 27.04.2021, zum Thema „Energiewandel" habe ich viele neue Erfahrungen und Informationen gegen den Klimawandel mitgenommen. Besonders gut haben mir die Spiele gefallen, die wichtige Informationen, jugendgerecht mitteilten. Nicht so gelungen fand ich die Zeiteinteilung und den vielfältigen Escape-Room. Dennoch eine sehr gelungene Veranstaltung, die sehr gut zur Selbstreflektion und dem Nachdenken anregt.

– Leonie

↳ HPS → 9 Klasse → UNESCO

Conclusion

The Interreg NSR 2IMPREZS project is a tried-and-true method of reducing energy consumption in school buildings, thus lowering carbon emissions, across the five participating North Sea Region countries of Belgium, The Netherlands, Germany, Denmark and the UK. From 2017 to 2021, the 2IMPREZS project stimulated change in the current climate crisis and resulting energy transition by fostering both behavioural and technical efficient energy saving measures in existing schools, reducing energy consumption and thus reducing CO2 emissions. The proven comprehensive transnational strategy achieved significant energy savings in hundreds of schools in the North Sea Region, representing an emission reduction of at least 6281 tonnes of CO_2. On numerous occasions, 2IMPREZS has had top-level European exposure, having taken home the grand prize of the Interact Project Slam 2019 at the European Week of Regions and Cities, as well as winning the North Sea Region Video Contest in 2020, and has made an impact within the Interreg NSR Programme and beyond.

The Interreg NSR 2IMPREZS project has proven that there is an incredible need and demand for a transnational energy-saving programme that can not only help schools save energy, but also money. However, a main conclusion of this report is that although successful through its outcomes and results, 2IMPREZS has been pursued thus far in very much a traditional fashion – with a lot of room for improvement and more opportunities to build capacity. As highlighted by the ongoing Covid-19 pandemic, combined with the general increasing trend towards digitalisation, in the last year it has become incredibly important to promote intelligence-sharing in order to benefit not just the economy, but also the environment. It has become evident that the future of the 2IMPREZS Energy Challenges and their impact could be improved through the development of a digital programme – "2IMPREZS 4.0".

Through a successful expression of interest application, 2IMPREZS has been awarded additional European funds to effectively digitise the 2IMPREZS Energy Challenges in an extension of the project, or 2IMPREZS 4.0. The extended project takes place in the context of the Covid-19 crisis in parallel with the climate crisis and the energy transition in the background and focuses on the digital technology that students – as well as their teachers and relatives, by extension – across the North Sea Region have engaged with over the course of the global pandemic. 2IMPREZS 4.0 aims to go beyond the fantastic baseline created by 2IMPREZS, using 4.0 technologies, and extending into a new NSR region (Sweden). By doing so, 2IMPREZS 4.0 will help accelerate net zero-related objectives more easily, as well as boost regional policies and reach more of the target audience as a consequence. 2IMPREZS 4.0 demonstrates value for funding through the Interreg North Sea Region (NSR) programme and shall be described concisely, demonstrating the key benefits and impacts. Over the course of eighteen months, 2IMPREZS 4.0 shall support additional schools across five NSR countries (BE, DE, NL, SE, UK) in their energy transitions through a digital, dynamic, wholistic "Energy Challenges" programme.

Already developed within the 2IMPREZS project were the Interactive Fact Sheets (IFS), the interactive digital tool that allows pupils, teachers and parents to track the results of their energy-saving efforts across the NSR. The IFS platform also offers digital resources such as energy-saving or energy-related activities and games, as well as background information on the 2IMPREZS Energy Challenges — this digital tool also supported in the rollout of the digital 2IMPREZS Energy Challenges campaigns taking place in light of the Covid-19 pandemic and hosted the digital Transnational 2IMPREZS Final Event in May 2021. The IFS demonstrates that the 2IMPREZS Energy Challenges can be replicable across various countries and cultures. But in order to assure a sustainable future for the transnational energy saving programme, 2IMPREZS 4.0 needs to go beyond this traditional approach and enter into the digital arena.

Through the experiences of adapting the 2IMPREZS Energy Challenges campaign into a rudimentary digital format in light of the Covid-19 global pandemic, in parallel with increasing demand from teachers and pupils to produce engaging digital content even before the pandemic, it is clear that there must be an acceleration of the uptake of sustainable digital tools in the realm of education. This is not just a Covid-19 response – this is a fundamental demand of the current and next generation of learners, also considering the ongoing climate crisis and resulting energy transition. The next generation of learners require a deep immersive educational experience, incorporating modes of technology enhanced learning (TEL), such as Augmented Reality/Virtual Reality (AR/VR), to elevate the Energy Challenges programme from good to excellent, cumulating in greater CO_2 reduction.

Through 2IMPREZS 4.0, improvement and development of digital tools and 4.0 technologies, such as AR/VR, that shall bring 2IMPREZS into the 21st century, creating further energy reduction in schools and their estates. By integrating 4.0 methodologies as well as a more comprehensive approach to energy reduction into the existing 2IMPREZS programme, the digital, dynamic, immersive 2IMPREZS 4.0 Energy Challenges programme shall provide further reductions of energy/carbon use not only in schools but also—by association—in the students' homes, ultimately evolving towards net-zero lifestyles and a climate-neutral 2050. The extended capacity, reach and effectiveness of 2IMPREZS 4.0 opens up a whole new realm of possibilities for carbon emission reduction in the North Sea Region and beyond.

Madeline Langlois

atene KOM GmbH
November 2021