Interreg
North Sea Region
2imprezs
European Regional Development Fund

EUROPEAN UNION

ENERGY CHALLENGES

SLIM MET ENERGIE OP SCHOOL

2IMPREZS

THE MANUAL

Energy challenges

November 2021

Index

1 Introduction

In 5 countries and more to come, the “Energy Challenges” are already being received enthusiastically! Many schools in Germany, the UK, Belgium, Denmark and the Netherlands have very successfully implemented Energy Challenges in their curriculum.

The aim of this manual is to inform schools and teachers so that they can independently start a project at their own school. Many issues that organisers have to deal with will be mentioned in this manual.

Chapters 5 and 6 of this manual outline the inspiring Dutch approach. Schools in the Netherlands can call on an enthusiastic Energy Challenges team https://www.energychallenges.nl/https://www.energychallenges.nl/) for professional guidance in the roll-out of the Energy Challenges. For schools from other countries, we have collected area-specific information in chapter 7.

This manual accompanies the Energy Challenges website www.energychallenges.eu, where all information and campaign materials are accessible. The Dutch website can be found at: www.energychallenges.nl. Here you can also find a lot of information, an overview of the workshops etc.

2 How behavioural change in students can lead to 15% energy savings?

The Energy Challenges methodology ensures that pupils themselves discover how they can contribute to reducing energy consumption. The combination of insight into the technology and doing their own research into the possibilities of saving energy makes them more aware of their behaviour and makes them deal different with their energy consumption. After all, if you realise what a digiboard (in Flanders: smartboard) costs in electricity per hour, you can calculate what it costs in electricity per year. Then it is easy to calculate the costs for all the hours that the digiboard is on, but not in use. With this insight, you will usually see the behaviour change as a result.

The involvement of young people when it comes to the energy transition is enormous and still growing. Energy Challenges wants to train 1 million climate innovators in the coming years and feels responsible for our planet together with those students. After all, there is no such thing as Planet B.

The results of the Energy Challenges show that 15% energy saving is achievable through behavioural change: behavioural change through awareness. This is why the combination with knowledge about energy-saving techniques is so important. Discovering the energy characteristics of the school at the start of the project is essential for this.

3 Background

Schools spend millions on energy each year. In the Netherlands, this is about €700 million. Saving 15% can therefore yield up to €100 million! In most schools, savings of 10 to 20% can be achieved without major renovations or investments. In times of savings and budgets, cost reduction is crucial. Besides technical modifications, the most important factor for saving energy is the behaviour of pupils and teachers towards wasting energy.

4 Good school examples on the 'Interactive Fact-sheet' website

In all countries where Energy Challenges campaigns are held, the schools' results are visible on the website: www.energychallenges.eu. However, the first year of publication is the school year 2020-2021, a year in which the schools have to deal with cornameasures. Therefore, the presented results are very different from previous school years.

All participating schools can be found very easily via a Google-maps map. Click on one of the schools and automatically a nice visualisation of the achieved results of participation appears below the map. It is also possible to generate a pdf document.

5 Energy challenges

Energy Challenges is a project where technique and behaviour come together and where young people can make the difference. Young people (10-15 years old) from primary and secondary schools are challenged to campaign, in their own way, for energy savings and sustainability in their school and surroundings. In a playful manner, the teams of 'Energisers' get to know the wonderful world of energy, technology and sustainability and discover their talents.

They will go on their own investigations in the school, make an energy scan and look at all the energy aspects of their school building. Together with the engineers of the Energy Challenges they look at possible technical possibilities to make their building more sustainable. They make considerations based on investments and returns, etc. This integral assessment is very important. After all, the most obvious measures are not always the best ones. Insight into the investment in relation to CO2 savings is important in order to tackle the right issues.

5.1 Objectives of the energy challenges

1. Pupils become the 'owner of the school's energy bill' and will promote energy saving at their school through assignments

2. With a combination of behaviour and technology, we make the students:

a. More enthusiastic and wiser about energy and technology;

b. More aware of energy consumption and the impact on the planet;

c. Enthusiastic about saving energy in the school building and at home.

This should ultimately lead to social acceptance of the usefulness and importance of the energy transition and to greater interest in these themes, making the energy sector an interesting career choice. Energy Challenges is thus contributing to the energy transition in the short and long term. Energy Challenges pays attention to the technological aspects of energy (saving), but also to the social aspects, such as energy-conscious behaviour. These two components complement each other.

In this way, the pupils develop skills to be able to make sustainable choices later on.

5.2 Technology

The first important step is to have good energy accounting of the school or to set it up (monitoring). This way, you know how much energy was consumed in the past months / years and how much energy is currently being used. Such energy accounting can be fully automated by means of a smart meter. It is absolutely recommended to have such a smart meter installed. The installation takes place immediately at the start of Energy Challenges at your school. Experience shows that these preparations have to start as soon as possible because several factors depend on the project running smoothly. The installation of the smart meter is a lengthy process and the retrieval of old energy consumption figures and bills can also take up a lot of time. If possible, these preparations start in the summer holidays with a lead time until September and it is best to contact the school management and/or the school building administrator. If the installation of a smart meter is not possible, a manual recording of the analogue meter can be done. This requires a little more effort and discipline but is perfectly doable.

Once the smart (or digital) meters have been installed and the old energy consumption figures and bills have been retrieved and entered into the monitoring system, monitoring can begin. Students, teachers, directors, managers and facility managers: everyone at the school can log in to the monitoring system and see what the energy consumption (electricity/gas/water) is at that moment and what the effect of their actions is. Energy Challenges has its 'own' digital monitoring system which is also easy for the pupils to use.

In consultation with the school, a technical team can visit the school at an agreed time for a heat or energy scan. Together with the pupils, an inventory is made of the building, the electrical installations and the energy installations. Based on the Quick Scan and the monitoring

by the technical team, a tailor-made recommendation is made with findings for the school so that simple quick-wins can be implemented quickly. (See "Energy challenges")

5.3 Campaign - changing behaviour

The second part of the Energy Challenges is to create your own campaign. A small group (10-15 pupils), or a whole class of pupils per school, gets to work on this: these pupils are the Energisers (or energy hunters or energy doctors) who signal first aid for wasting energy. Based on eight different assignments, the Energisers will try to involve as many people as possible in their efforts to save energy. This way, the Energisers can make school users aware of their behaviour. The Energisers will make a plan, make videos, take action and monitor the energy savings.

The schools can compete among themselves (per region) to see who can run the most creative campaign. The kick-off of the campaign is the Kick-off, which can best be organised in January. The teams can earn stars, each representing a task. At the end of the school year (e.g. in May/June) all teams present their campaign during the grand Finale.

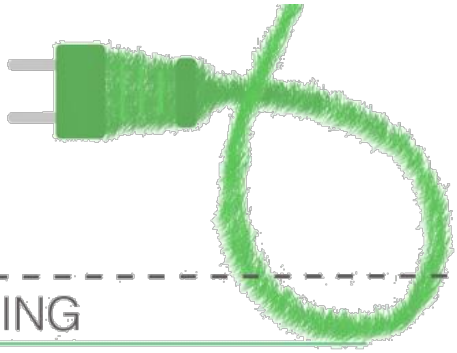
5.3.1 The eight assignments and the criteria

The assignments for which stars can be obtained are carried out by the Energisers as much as possible; the teachers, together with the school building administrators, only play a facilitating role.

ENERGY CHALLENGES

SLIM MET ENERGIE OP SCHOOL

DE STERREN



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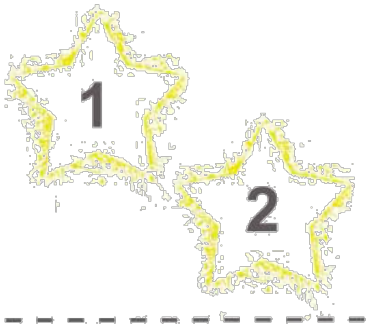


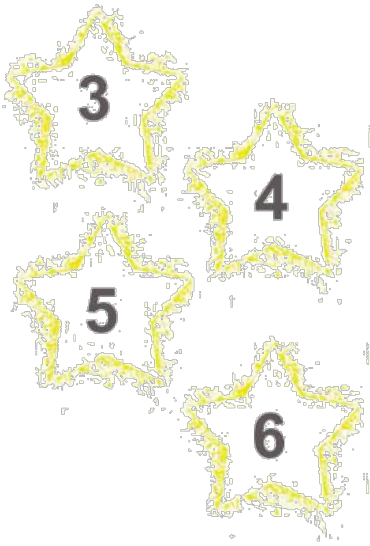
Identiteit

- Bedenk een teamnaam
- Maak een teamlogo
- Maak een introductiefilmpje met jullie team

Plan van aanpak

Omschrijf jullie plan: wat gaan jullie doen om ster 3 t/m 8 te halen? Wie en wat heb je hiervoor nodig? Omschrijf het in jullie plan van aanpak!

CAMPAGNE



Bespaar

Welke maatregelen zet je in om energie te besparen? Zijn de besparingen meetbaar en zichtbaar op de monitoringsappartuur?

Bereik

Hoe bereik je zoveel mogelijk mensen en zorg je ervoor dat zij mee willen werken in jullie campagne? Social media, video's en vlogs, posters, flyers etc. Creativiteit en orginaliteit worden extra beloond!

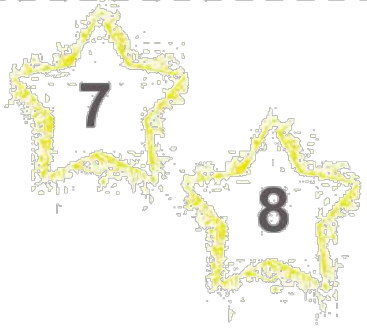
Betrekken van ouders en organisaties

Hoe betrek je jouw ouders en andere organisaties in jullie campagne? Door sponsoring en andere bijdragen groeien de mogelijkheden! Wie niet waagt wie niet wint!

Presentatie

Maak een mooie presentatie van jullie acties in de campagne en presenteer deze tijdens een bezoek van de Razende Reporter!

AFSLUITING

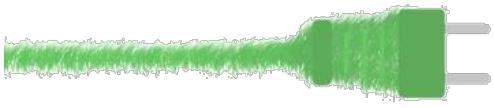


Event

Organiseer een event voor jouw school en/of ouders en omwonenden. Zorg dat zij ook energie gaan besparen!

Effect na campagne

Heeft jullie campagne effect na de finale? Laat zien dat de acties die jullie ondernomen hebben ook effect blijven hebben in het volgende schooljaar.



www.energychallenges.nl

When the Energisers have completed assignments, the Raging Reporter decides whether to award a star or not. To motivate the Energisers, he/she will do this during the months of the campaign. Based on the allocation of the stars and the assessment of the assignments, possibly by an expert jury, the prizes are awarded in the final.

The assignments will be evaluated according to the following criteria:

- Presentation
- Creativity and originality
- Argumentation & substantiation
- Using people from outside the team
- Energy saving
- Missions

5.3.2 Teacher meetings

To give the teachers the opportunity to exchange their experiences, tips and questions during the project, the coordinating teacher will organise a start-up meeting together with the Raging Reporter. This meeting will be held mid-November/December, so that the teachers can think about the implementation early in the project together. During the meeting, the following issues will be discussed:

- Getting to know the Challenge Team and each other's ideas for implementation and set-up
- Agree who is the coordinating teacher within the school, he or she will take care of the internal coordination
- Objectives and methods of the Energy Challenges

  Exchange of information
- Instruction on supervision (technology and screens)

5.3.4 Campaign materials

Various Energy Challenges campaign materials are available to the schools. These include a teacher's guide, a star poster, and stars to indicate the progress of the campaign on the poster. Many materials can also be found on the Energy Challenges website.

6 Setting up Energy Challenges at your school

6.1 Phase 1: preparation

This period can also be used to make a 'plan' for the Energy Challenges at school. Contacts can be made with parties who can contribute to the project (municipality, parents' association, energy company, the installation company, etc.). This can be a contribution in financial or material resources or in expertise support, such as the house or maintenance installer who can give a tour of the technical area of the school, or a local politician (alderman/principal) or mayor who comes to enthuse the pupils and point out the importance of saving energy. To make a good plan, various materials and examples are available. These can be found in several languages on the website of Energy Challenges or can be requested from the Energy Challenges Foundation. Of course, this plan (or preparation) can make the necessary links with the 17 SDG - Sustainable Development Goals of the United Nations (UN) (*https://www.sdgs.be/nl/sdgs/4-kwaliteitsonderwijs*).

Among others:

- Presentation
- Promotional video Energy challenges
- Bumpers Energy Challenges (short promotional videos in English and Dutch)
- Infographic

6.2 Phase 2: Technology

Technology is an important part of the Energy Challenges: monitoring provides a clear insight into what the school's consumption is and what effects the actions have on that consumption. The technology can be divided into three different phases. Monitoring and analysing these phases is a continuous process throughout the year.

6.2.1 Technology phase 1 (March to August)

This phase consists of collecting all energy bills (invoices), requesting new meters (if needed), requesting monitoring, entering the school's data into the monitoring and the Quick Scan. Ideally, this phase should start as soon as possible and can start when the school's decision to participate is final. Therefore, this phase runs synchronously with the preparation phase of the Energy Challenges.

6.2.2 Technology phase 2 (September to November)

In this phase, the technical and constructional inventory takes place and, based on advice, minor interventions are carried out prior to the winter period (= heating season).

6.2.3 Technology phase 3 (December to April)

In this phase, the energy scan (or possibly a heat scan together with the Energisers) is carried out, the desired savings are determined and customised advice is presented. Energy Challenges has developed an energy scavenger hunt that can be used to have the pupils visualise the premises.

6.3 Phase 3: The campaign (January-June)

The campaign is the crucial phase: the period in which the Energisers of the participating schools actively start working on the Energy Challenges. The actual campaign takes place between January and June, but also involves a lot of preparation and after-care.

6.3.1 Campaign phase 1: The campaign (January to May)

This phase is all about the campaign. The Kick-off takes place, the campaign runs at the schools. The teachers' guide their pupils in carrying out the 8 assignments (obtaining the stars). Meanwhile, the preparations for the grand Finale in June starts. An example of a possible working method and implementation of the core objectives is described in the teachers' manual, which is attached in the appendices and which is already being used in the Netherlands.

6.3.2 Campaign phase 2: The final and closing (May - June)

This phase is dominated by the grand Finale and the conclusion of the Challenge year. The final takes place in June. Each school can choose its own programme for the final. It is important that the pupils not only share their results with other pupils and teachers, but also with (grand)parents and well-known (media) figures or politicians. The school can make it a very big event or keep it small. The school can choose to rank the students' achievements and possibly award prizes for the most original campaign.

It is important that the results of energy saving are made visible clearly, so pupils can see what their efforts have achieved. For this purpose, the results of the energy monitoring and the IFS website can be used. Nice graphs are available to present the results at a glance. This is followed by a final evaluation and follow-up. The findings can be included in the project plan for the next school year.

7 The regional approach?

7.1 Flanders (Belgium)

Schools in Flanders can voluntarily take part in an Energy Challenge (EC) and can decide on the details themselves. This guide gives some suggestions on how to reduce the energy and water consumption at school together with teachers, pupils, school management and school building administrators.

The provincial MOS mentors (see *https://www.mosvlaanderen.be/over-mos/wie-zijn-wij*) are the most appropriate contact points for principals and teachers to get support in starting up this or a similar project on energy saving at school. The MOS supervisors of the province of Antwerp have already built up several years of experience in Energy Challenges and have also developed supporting educational material (e.g. the energy boxes, the stepping stones). In addition, since 2018, the province of Antwerp has set up a separate 'school building managers' network that meets every 4 to 6 months to share their knowledge and experience on energy saving in schools. If necessary, support can also be given from the province(s). And perhaps you can also turn to Fluvius and your school umbrella organisation or your regional development intermunicipal organisation for additional support.

EnergyChallenges@Flanders

Tailor-made route guidance for the school

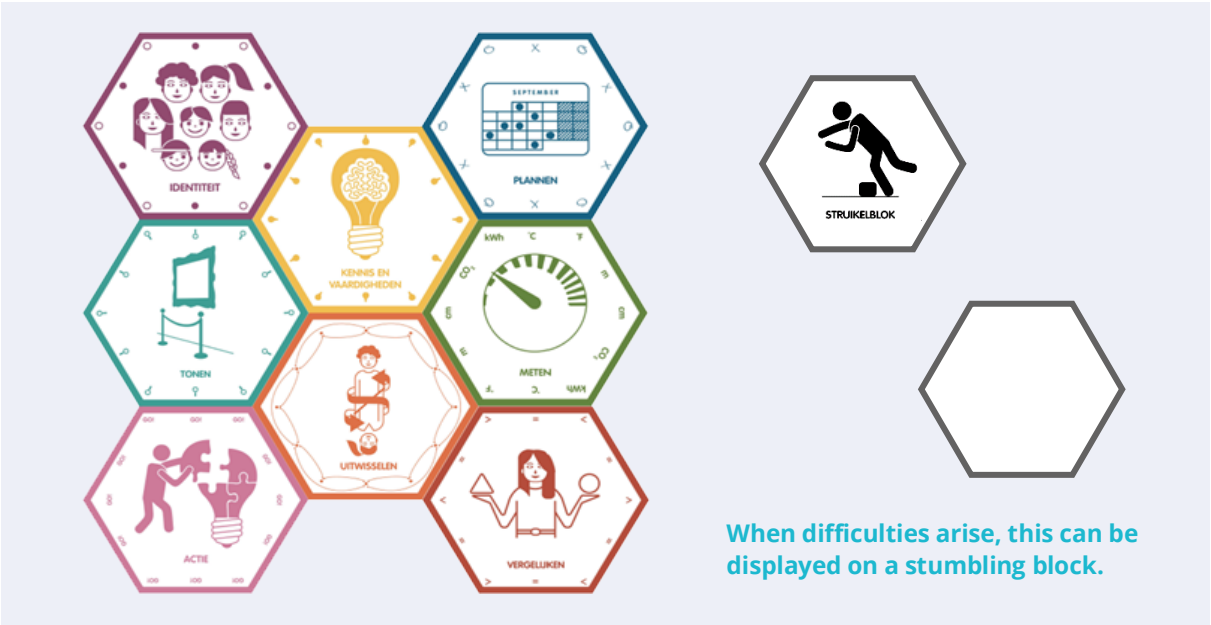
The MOS facilitators work tailor-made for the school. After the management has signed the declaration of commitment, the school counsellor starts working with a working group of teachers, staff and if possible also pupils, to work together on a vision (Why does our school participate in Energy Challenges?), the formulation of objectives and the drawing up of a plan of approach. The facilitator guides the school in the educational offer (teaching packages/materials, lessons, workshops for pupils and excursions (visit to a company, centre, another school, ...).

8 stepping stones for Energy Challenges:

Each school goes through its own process based on 8 topics (identity, knowledge and skills, planning, measuring, comparing, sharing, showing and action) in the form of stepping stones. There is no hierarchy and the topics will be covered several times. Blank stepping stones are also provided, which can be filled in by the schools themselves with photos, articles, drawings, etc. to make the 8 stepping stones concrete.

The facilitator gives on average 4 workshops to the teachers to start this process.

When difficulties arise, this can be displayed on a stumbling block. The facilitators set the school on the road by using the stepping stones during the workshops. In this way, each school gets its own dynamic representation of the process they are going through.



When difficulties arise, this can be displayed on a stumbling block.

Lending material

Pupils, with the support of teachers and technical staff, can carry out an energy audit of the school building.

Primary schools can borrow an energy suitcase for this and secondary schools an energy back-pack.

These materials come with an extensive manual and are supported by attractive tutorials tailored to the students.

https://www.mosvlaanderen.be/themas/energie

Information and inspiration

https://www.mosvlaanderen.be/aan-de-slag?f%5B0%5D=pas_6%3A9

Formations

In addition to the guidance in the schools themselves, various https://www.mosvlaanderen.be/aan-de-slag?f%5B0%5D=pas_6%3A8 are organised per school year in which teachers, staff and/or pupils who are interested can participate. Possible topics include 'getting started with the energy box', 'getting started with the energy audit', 'what is climate change', 'water-side adjustment of the heating', etc.

7.2 Denmark

Inspired by both the actions in 2Imprezs and "The Green School" the municipality, HoS and ProjectZERO has started the ZEROSchool program.

The goal is to involve the 17 public schools in the municipality to become more sustainable school. That involves actions on both environmental and climate topics like: The use of an kind of resources, focus on CO 2emission due to the use of energy, water, food, transportation, the handling of waste etc.

The plan is to support a certification on all schools so the school obtains a ZERO-flag/poster etc. In addition, that the pupils and employees involved are rewarded for their effort.

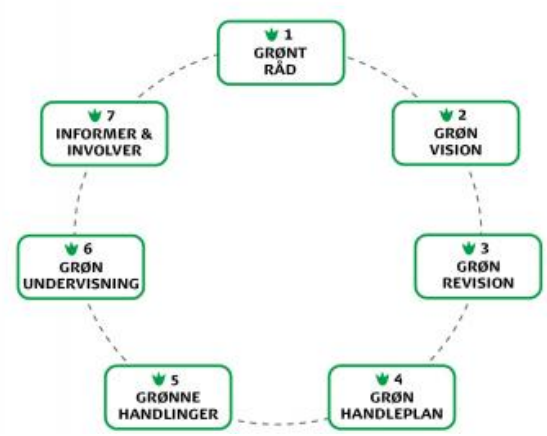
In Denmark you have the NGO company "Friluftsrådet ". They host the programme: "Grøn Skole" - "Green School" as one of the best initiatives to make schools more sustainable. https://groenskole.dk/

The purpose is to educate young people in sustainable development and give them the action skills to make a difference.

Is has several initiatives that helps teachers step by step perform actions on the environment and climate. There is a certification of the school and the year by year actions are rewarded with "the Green Flag". Something the schools want.

There are 7 steps to obtain the Green Flag:

- Establish a Green Council
- Write a green vision.
- Make the status
- Write an action plan
- Initiate green actions
- Green topics in lessons
- Inform and involve



The school receives "the green flag as a symbol that this year's efforts, which have been reported and assessed and is internationally certified.

7.3 Germany

Within the 2IMPREZS project, atene KOM GmbH has established a broad network relevant to 2IMPREZS, including energy efficiency agencies, schools and municipalities. Atene KOM provides expert support for the capacity building activities within the partner network and the network(s) targeting the schools, energy efficiency agencies and municipalities. On a national level, atene KOM has been promoting the Energy Challenges through the regional educational authority, energy efficiency and educational networks in Lower Saxony. To invite schools in Lower Saxony to participate in the Energy Challenges, atene KOM has addressed a great number of Lower Saxony schools and communicated the concept as well as the benefits of the Energy Challenges and the Interreg North Sea Region 2IMPREZS project to decision makers on local, regional, national and European levels. The schools that have joined the Energy Challenges have been guided through the whole process of the Energy Challenges, which has been adapted also to the German context to ensure further uptake and thus scalability of the Energy Challenges methodology in a national context. This included a detailed preparation of the decision makers, an initial preparation meeting for the first schools to join as well as a kick-off meeting to launch the Energy Challenges. To conclude the Energy Challenges cam-

paigns in Germany, a final event to celebrate the significant results of the Energizers was organised. To ensure the schools remained focused on their energy reduction targets rather than logistics, atene KOM coordinated all components of the events - from transportation, speakers, workshops, equipment, catering, etc. During the Energy Challenges, atene KOM was regularly in touch with the Lower Saxony schools to receive updates from the Energizers (pupils) and to assist them in individual details related to their energy saving efforts.

Atene KOM also supports the 2IMPREZS schools and its partners in exchanging experiences. This exchange is achieved through school-to-school knowledge exchange and the integration of atene KOM partners into the Energy Challenges activities to drive capacity of 2IMPREZS. This knowledge transfer and exchange of experiences also addresses building managers on a local level, incorporating their feedback to further improve the German Energy Challenges approach.

On the regional level, atene KOM coordinates the 2IMPREZS Energy Challenges in 9 schools located in the Lower Saxony Region of Germany. Atene KOM coordinates both the technical trajectory and educational trajectory of the joint energy saving programme in Lower Saxony .

Regular meetings and check-ins are held between atene KOM and all participating schools. These meetings with school management, teachers and students outline the 2IMPREZS Energy Challenges programme tailored to a given school. Every school varies in their demographics of the pupils, building features, and so on, so a tailor-made approach is vital to the successful roll-out of the 2IMPREZS Energy Challenges.

The German 2019 Energy Challenges brought together 100+ pupils ranging from ages 6 to 15. Pictured above are the German Energizers at the regional 2019 Energy Challenges final in Buxtehude, Germany

The technical trajectory starts with energy surveys and the gathering of energy data to create a baseline with which to measure energy savings through the 2IMPREZS Energy Challenges. After the gathering of this initial data, small-scale energy saving measures can be identified. Whenever possible, atene KOM offers tailor-made support in identifying financial, energy-saving opportunities, providing technical information, and offering guidance in carrying out specific measures. Atene KOM also ensures that the pupil's efforts are effectively communicated amongst relevant target audiences or stakeholders of the 2IMPREZS project.

To support in the roll-out of the German 2IMPREZS Energy Challenges, atene KOM organises engaging kick-off events and finals for the pupils. At these regional events, The Energizers from all participating German convene to exchange experiences, learn from energy-oriented workshops and celebrate their energy-saving efforts at school.

To illustrate, atene KOM held the national German 2IMPREZS Finale in July 2019 in order to wrap up the 2018-2019 2IMPREZS campaign in Lower Saxony. The German pilot schools for the 2IMPREZS project - Grundschule Eversen, IGS Achim and Halepaghen-Schule Buxtehude - convened in the large auditorium of the IGS Achim to celebrate their successes during the 2018-2019 2IMPREZS energy-saving campaign, which was initially launched at the Rotenburg Rathaus City Hall in February 2019.

As with the German 2IMPREZS kick-off event, the 3N Kompetenzzentrum of Lower Saxony (Energy Awareness Agency of Niedersachsen) was in attendance to provide hands-on activities and trainings in the wonderful world of energy. Following the opening remarks, the excited pupils from each school held their creative presentations-ranging from choreographed dance to well-organised poster boards-to explain all they have done in their schools to save energy throughout the campaign, plus any challenges to learn from in the future. After the lunch break, the winners of the challenges were announced: although it was a tight race, Grund-schule Eversen (primary school) went home with the grand prize!

After the hands-on aspect of the fun-filled finale came to a close, the visiting pupils gathered their Energy Eaters and hopped on their buses for home. It was a very energetic day focused on the ever-increasing importance of lowering energy consumption and thus carbon emis-sions throughout the North Sea Region and beyond.

The 3N Kompetenzzentrum of Lower Saxony (Energy Awareness Agency of Niedersachsen) provided hands-on energy activities at the German kick-off and final events

How have the Energy Challenges been adjusted to the German context?

To adjust the Energy Challenges to the German context, various aspects such as legislation, individual regulations in schools and the requirements of the school authorities must be taken in account.

For example, to adjust the Energy Challenges to the frame of a German grammar school, the Energy Challenges0062nges have been implemented as an election course in the Halepaghen Schule (HPS) in Buxtehude. Currently, 1200 pupils attend the HPS. The elective course through which the Energy Challenges have been implemented meets once a week (every Thursday) during the first two lessons of the day. The group consists of pupils from four different ninth-grade classes. Because of their relatively limited interactions, the Energizers at the HPS face more significant obstacles, mainly in terms of the speed of delivering results, than the other German 2IMPREZS schools.

Nevertheless, the pupils are highly motivated and were able to develop a variety of solutions to face such obstacles. One way of dealing with such obstacles was to split the HPS Energy Challenges group into smaller groups of two to three pupils and shift a large amount of the work into their free time. Through this, the HPS Energizers could proceed at the same pace as the other German 2IMPREZS schools. The students of the Halepaghen School were also confronted with the situation that they wanted to introduce a school-wide Veggie Day in their school cafeteria, during which only vegetarian dishes was offered. Here, the students encountered considerable resistance from the parents who cooked for the students in the school cafeteria. The parents showed little to no interest in offer only veggie options on this day due to relatively conservative and outdated ideas about nutrition. For this reason, the students themselves decided to collect vegetarian recipes suitable for school cafeterias, in order to reduce the effort for their parents and to make it easier for the older generation to accept such a change. In addition, the students conducted a survey amongst their classmates at HPS to see if the other students, although not participating in the Energy Challenges themselves, would also be interested in a Veggie Day. The students were able to confirm their interest through the survey and the entire student body was united behind them. After several negotiations, the students finally managed to change the thinking patterns of the parents and introduced the Veggie Day to the HPS. As a further step, the Energizers arranged for a vegan cooking training for the parents at the school cafeteria, and a vegan blogger was invited to the school. This success demonstrated to the students that they can achieve their goals despite high hurdles through perseverance and persuasion.

The HPS Energizers have also extended the context of energy saving to the area of resource conservation. By installing a drinking fountain in the school building and introducing an insulated glass bottle branded with the school logo, the pupils planned to drastically reduce the

number of plastic bottles at school. The measures taken by HPS show that the Energizers at this school do not limit the topic of energy saving at their school to the aspects of electricity, heat and water, but go far beyond this point. This is also due to the fact that many schools like the Halepaghen School have undergone intensive renovation work in recent years. For example, 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. Also, the lightbulbs have been changed to LED technology in most German schools. Another issue the Energizers at the Halepaghen School addressed is the break hall window front - the insulation of the window front is not up to date, which the pupils experienced most dramatically in the large break hall. Even if the heating is turned to full power, the temperature in the break hall is only a few degrees above zero when the temperatures drop below -10°C outside in winter. This was the starting point to reach out to the Hoschule21 to initiate cooperation on more complex topics, like developing a solution for insulating their break hall window front. The aim of the cooperation with the Hochschule21 was to develop low-tech and cheap solutions to improve the situation. Specifically, this aspect shows the long-term approach of the HPS Energizers. This long-term project plan did not match the time frame of the Energy Challenges, but the Energy Challenges inspired these interactions.

Unfortunately, it turned out that the schedules of the Hoschule21 and the school did not match to the timeframe the election course which was the base of the Energy Challenges at the school. Furthermore, a hired professional came to the conclusion that there would not be cheap solutions for the insulation to match the very high standards in school buildings. Therefore, the idea of collaboration with Hochschule21 was dropped. Nevertheless, this idea shows that they focused on the best suitable solution rather than developing solutions which fit to the Energy Challenges timeframe. Accordingly, the pupils of Halepaghen School have taken the path of addressing the topic of sustainability and energy saving in principle and, for example, determining how high the energy consumption and CO 2emissions of certain products are in order to reduce the CO 2impact of their everyday lives. Finally, the HPs Energizers invited younger pupils from a nearby primary school to teach them about sustainability.

A similar approach was taken at the IGS Achim. The IGS Achim is a modern school where most technical processes within the school building, such as light and heating, are automated. Therefore, the pupils began the Energy Challenges with educational aspects to gain a better understanding of their goals. This led the pupils to conduct various measurements within their school building. As a result, they located a major malfunction in the central lighting computer to be fixed. They also located corridors in the school building that were significantly overheated. As one highlight, the IGS Achim put a lot of effort into their communication activities. They communicated 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.

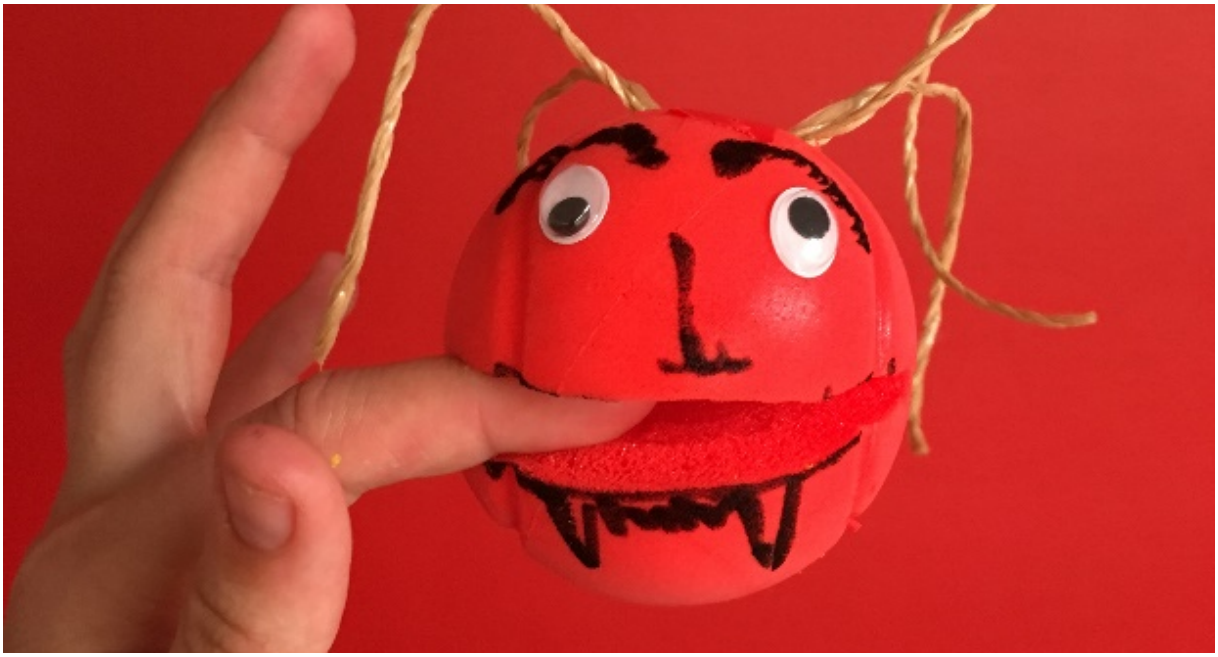
The Oberschule Soltau focused mainly on the aspect of transportation to lower carbon emissions and developed a school biking project. They developed a system of how to fund bicycles to be used for school excursions, or even to be borrowed by pupils for their daily commuting. They also developed a concept for a school workshop where the bikes can be repaired and maintained. Currently, this project is on hold due to Covid-19 but will be picked up by the pupils once they get back to school.

The Energizers at the IGS Rotenburg Wümme expanded upon the behavioural improvements outlined by the Energy Challenges through upcycling. The pupils made use of what was once considered rubbish to teach themselves about the opportunities of giving such rubbish a second life; i.e., circular economy. Furthermore, the pupils implemented a Veggie Day and informed other students about where the veggies come from (i.e., carbon footprint). They also focused on the aspect of transportation to reduce the number of pupils brought to school by car. They are the only school to actively use ac the "Energy Eaters" (inspired by the Belgian Energizers), which they learned to know during the German 2IMPREZS kick-off event. As a communication activity, they planned to get in close exchange with the Stadtschule Rotenburg Wümme before Covid-19 disrupted this activity.

Lanterns made of upcycled Tetra Paks by students at the as an initiative within the IGS Rotenburg Wümme school as a part of the 2020 German 2IMPREZS Energy Challenges campaign.

The Stadtschule Rotenburg Wümme is a primary school, and just like the Grundschule Eversen, they chose a more playful approach to the Energy Challenges. The pupils focused on the topic of basic energy saving education as the school educates pupils from almost 30 nationalities and very different backgrounds. They implemented ''Energy Sheriffs'', which remind the other pupils of the energy conserving ''rules'' they set up at the beginning of the Energy Challenges campaign.

The Grundschule Eversen (''Primary School Eversen'') is one of the outstanding German 2IMPREZS schools. Also, one of the first pilot schools, having participated in the 2019 2IMPREZS Energy Challenges. The Grundschule Eversen is also located in the Lower Saxony region of Germany. The current school building dates back to 1950, but the Grundschule Eversen has been located at the current location since 1884. As the school only consists of approximately 60 pupils and seven teachers, the entire school participates in the Energy Challenges, which includes all four classes/grade levels. The Grundschule Eversen has developed a rotating system of the Energy Challenges work 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, which was also very well received by the parents of the pupils. Grundschule Eversen has been an excellent German 2IMPREZS pilot school, with their inclusive and playful approach to saving energy serving as inspiration to other participating schools. On top of energy-saving behavioural changes that have been enacted by the pupils, the primary school has had their lighting system switched to LED, as this wasn't the case in this school building before 2IMPREZS. Another request has been made to the city to install solar photovoltaic (PV), or solar panels, on the roof of the school building to reduce Grundschule Eversen's carbon impact even further. The pupils of the Grundschule Eversen Energy Challenges have also participated in a political demonstration for young people to stand up for their right to live in a sustainable future. They shared their Energy Challenges activities with the demonstration visitors and handed out information about their energy-saving actions.



When adapting the Energy Challenges to the German context, a very high level of competition with other projects could be observed. It is evident that schools continuously receive project offers on various topics such as nutrition, anti-racism, non-violent schools, energy saving, sports etc. Thus, a developed yet flexible programme should be offered to ensure participation from the school.

According to this, 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 locate schools that have available resources. Many schools are struggling with a high illness/absence rate of teachers or a fundamental shortage of teachers in general. As a result, these schools refuse nearly all additional offers that do not serve the core tasks of the school. The competition with other projects is therefore all the fiercer at schools which have free resources. In the case of Rotenburg Wümme, the support of the mayor of the city had the most significant positive effect. After several phone calls from the mayor himself, two schools that had little interest in participating in the Energy Challenges initially were persuaded to participate. However, the situation in Rotenburg Wümme is a special situation, as the 2IMPREZS Energy Challenges kick-off and finale was able to be held in Rotenburg Wümme at the City Hall. Rotenburg Wümme was chosen for the kick-offs and finals as it is centrally located between the participating schools and therefore transport costs and emissions could be reduced. During a search for a suitable location, the city of Rotenburg Wümme was asked to provide the City Hall as an event venue, which was accepted by the mayor of the city. Through this, the mayor was won over as an advocate for the Energy Challenges.

In regard to 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 structure of the Halepaghen School is representative. The data about the electricity and water consumption of the school is to be requested from the school authority, as well as the total area of the school building, the number of students, staff and teachers is to be requested from the school itself, the data on the energy consumed through heating is to be requested from the public utility company, which only provides these data if a written approval by the city is given. Normally, the Stadtwerke Buxtehude charge a fee for this information, but in the case of the Energy Challenges, the information was provided free of charge.

In the case of the Oberschule Soltau, this authority structure provided no KPI data. The Soltau secondary school is currently being renovated and rebuilt, as it has been in recent years, while the school is still in operation. The school authorities refused to provide the KPI data because all parameters such as floor space, insulation, heating, lighting, etc. are constantly changing and therefore no representative data can be provided to measure the effect of the energy consumption. According to the school authority, the Soltau Secondary School should first have obtained permission from the school authority to participate in the Energy Challenges.

Put simply, German schools are subject to many regulations. The experience gained over the period of the Energy Challenges is that schools with increasing size and rising school level adhere more strictly to the rules. The Halepaghen School therefore adheres exactly to all legal requirements in order not to make itself vulnerable to attacks by parents, while the Grundschule Eversen can react very flexibly. This is probably also due to the much closer and more personal contact between parents and students at the Grundschule Eversen as the school does have 50 pupils, The Halepaghen School has 1200 pupils. Rules are therefore interpreted more flexibly at smaller schools and primary schools. This can be seen for example in the use of tools such as Skype or WhatsApp or smartphones.

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. The Halepaghen School adheres to this rule, while smaller schools do not strictly interpret this rule, or the teachers have used their personal laptops for video conferencing with the Energizers.

The Halepaghen School does work with eTwinning in an Erasmus project but did make rather poor experiences with this tool as it seems to be too stiff and limited in functionalities to match their requirements also it wasn't possible for them to organise stable online conferences with larger groups.

The Halepaghen School is using the IServ school server to communicate digitally with their pupils also the IGS Achim and the IGS Rotenburg Wümme as well as the Oberschule Soltau are using this server on a daily basis. However, video conferences are not stable on IServ.

In the context of Covid-19, this situation has proved to be another obstacle to communication with the energizers. During the school closures, atene KOM has agreed with each school on individual measures to stay in contact with the students, these measures in the one-way transmission of information without asking for information to keep the topic of energy saving and the Energy Challenges awake in the minds of the students.

As mentioned, the Stadtschule Rotenburg unites about 30 nationalities under its school roof. Many of the pupils have a migration background and the parents have a very diverse educational background. Some of the parents do not have any IT knowledge and are not able to open e-mails and do not have a printer to print out teaching materials at home. The students concerned do come to the school to get printed materials handed out to them. Eversen Primary School has also taken the same approach to print out all school materials during the Corona crisis and hand them out to the parents in envelopes. In order to work around this time-consuming process, the chairperson of the Parents' Council has used her personal WhatsApp account to manage an Energy Challenges energiser group and thus a digital tool that is familiar to many parents and students. However, it has been shown that some students even fail to open a training YouTube video via YouTube. Nevertheless, this was a channel of communication developed to stay in touch with the Energy Pupils of the Stadtschule Rotenburg and to provide them with educational videos and interesting information related to the Energy Challenges.

Energy Eater Workshop, hosted by atene KOM staff, at the kick-off of the German regional 2020 2IMPREZS Energy Challenges.

7.4 The Netherlands

In the Netherlands, there is the Energy Challenges Foundation. It takes care of the implementation of the campaign at the schools. In the spring, the foundation recruits schools that want to participate in the upcoming school year. The foundation takes care of the energy scan and the presentation of the recommendations and delivers a report. In addition, the foundation organises a joint kick-off meeting and a finale with a regional cluster of schools. All workshops during these events are organised by the foundation.

Teachers are assisted step-by-step by the foundation's education specialists in designing the campaign and implementing it in the school curriculum. Raging Reporters enthuse the students and hand out stars when phases of the campaigns are completed.

Schools pay a small contribution to the campaign, the rest is financed by municipalities, provincial authorities and the private sector. The EU is also contributing to the campaign by financially supporting the schools in the NSR (North Sea Region) in the implementation of the campaign.

5.3.3 Kick-off and Final

The dates for the Kick-off and the Finals are determined during the set-up of the annual planning. It is essential that the events are planned and coordinated before the summer holidays preceding the year of participation so that these dates can be fixed in the school's annual calendar.

During the Kick-off, the Energisers get to know the project. They introduce themselves to each other through a short video (1st assignment) and do a few workshops. Each school can decide for itself how to structure the Kick-off. Sometimes a presenter and a DJ are hired and often an aftermovie is made for the website. The content is up to the school.

After the Kick-off, the Energy Challenges will finally start and the Energisers will start the remaining 7 tasks.

The campaign officially ends during the finale. All Energizers of the school come together again to show what they have done in the past months behind their own stall at the Energy Market. During the campaign, the teachers (and maybe a jury) have taken a good look at what has been done and can judge the efforts. The teachers/judges assess the results presented by the Energisers.

Schools can also choose to jointly organise a Kick-off and/or a Final. It is fun and inspiring to work on the Energy Challenges together with other schools and to see how other schools deal with the Energy Challenges.

7.5 United Kingdom

During the dissemination of 2imprezs in the UK, Southend Borough Council have worked with the inspirational Young People's Trust for the Environment to design and deliver Energy Challenges UK to engage primary schools on a range of environmental topics, whilst helping participating schools identify cost (and carbon) savings on their energy bills.

Participating schools were all provided with completely free learning materials in the form of lesson plans, assemblies, activity sheets and video content. The materials set a series of challenges for pupils who were put in charge of finding solutions and helping their school enhance its environmental performance.

The learning materials have all been created by the Young People's Trust for the Environment, a charity that has been engaging primary schools on environmental topics since 1982.

Schools were given their very own profile page on the Energy Challenges UK online platform, where they could keep track of their progress, whilst sharing all the amazing activities that the pupils were doing to help protect our planet's environment. Schools that completed the challenges were entered into competitions to win prizes for their school.

8 Appendix

8.1 Teacher's guide

See next page.

ENERGY CHALLENGES

SLIM MET ENERGIE OP SCHOOL

nterreg
orth Sea Region
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EUROPEAN UNION

TEACHER'S GUIDE

1. Energy Challenges: an adult campaign for young people!

The Energy Challenges is the campaign where behaviour and technology come together and young people make the difference. Young people in primary and secondary education are challenged to campaign in their own way for energy savings and sustainability at school and in their immediate surroundings. In a playful manner, the teams of 'Energisers' get to know the wonderful world of energy, technology and sustainability and discover their talent!

1.1 Contest

Besides campaigning at their own school, teams can also compete against teams from other schools. The teams from the different schools meet each other at the start of the campaign during the Kick-off and at the end of the campaign during the Grande Finale. During the campaign, the youngsters can follow each other's activities via the website, Facebook or Instagram.

1.2 The campaign

With this campaign, Energy Challenges encourages young people to develop energy-conscious behaviour and become enthusiastic about the topic of energy. The strength of the campaign lies in the game components and in the monitoring, which makes energy consumption and saving measures visible. But above all, of course, the power lies in the activities carried out by the pupils themselves: they go out and do the research, and run the project all by themselves!

1.3 The teachers

For the teachers, the challenge during this project lies in 'letting go of the students'. The students themselves become the owners of the project. As a teacher, you facilitate by providing space, time and attention. Enthuse the students, stimulate their own creativity and motivate them to discover things for themselves. The role of the teacher becomes more (process) guiding and not steering.

2. Behaviour and technology

Energy Challenges brings behaviour and technology together. Attention is paid both to the technical aspects of energy (saving) and to the social aspects such as energy-conscious behaviour. These two components complement each other.

2.1 Technology

When a school decides to participate in Energy Challenges, the monitoring of the building is made ready with the help of Energy Manager Online (EMO)! Based on energy invoices from previous years, the normal consumption of the school is determined and put into the monitoring.

Everyone in the school can use the monitoring, but it is especially important for the Energizers. They can see the energy consumption of the school and especially what effect the actions and measures taken have on consumption. In the monitoring there is a target line (tailored per school). The Energizers will try to get and keep the consumption below this line! The use and 'reading' of the monitor is explained at the beginning of the campaign by means of a manual and a video. All this can be found on the website.

2.2 Campaign

The second part of Energy Challenges is to create your own campaign. From January onwards the Energizers will work on this and after the Kick-off Energy Challenges will officially start! During the campaign the Energizers will try to involve as many others in and around the school as possible in their actions to save energy. The Energizers will make a plan of action. The Energizers will make movies, hold actions, get creative, maybe organise an event, but above all they will pay attention to energy saving! This is done on the basis of the eight stars (assignments). The assignments leave a lot of room for creativity and personal input. In this context, 'own input' emphatically refers to the input of the young people themselves. The teachers guide and support the young people.

2.3 Finals

At the end of the school year Energy Challenges ends with the Finals. During the Finale, each team presents its results to the jury and the prize winners are announced. The jury looks at the number of stars obtained, but especially at what the Energizers have done to obtain them. The jury pays particular attention to;

3. Presentation: What does it look like?
4. Creativity and originality

5. Argumentation and substantiation
6. Fanbase": active followers and supporters
7. Effectiveness (saving)

3. The role of the teacher

The teachers have a facilitating role. The Energizers search for ideas, knowledge and information themselves as much as possible. Experience shows that children from the age of 9 can already find out why and how to use energy consciously!

In a familiar environment, the Energizers will discover and experience how energy is intertwined with everything we do every day. By involving others, the Energizers learn to present, organise and cooperate. They also learn to deal with energy concepts such as electricity and heat, energy costs and the origin of energy. In addition, they learn what consumes the most energy in their school and what can be done about it. For older pupils, the monitoring contains a wealth of information that can be used to further analyse energy consumption, and they can content the assignments at their own level.

The project uses the competition and assignments to stimulate the pupils to get started. There is no curriculum! The facilitating role of the teacher can consist of, for example:

- Scheduling a (fixed) moment for Energy Challenges in the weekly planning;
- Supporting brainstorming sessions and consultations;
- Providing structure in time and division of tasks;
- Keeping the monitoring visible via the IWB;
- Informing colleagues and parents;
- Facilitating activities and the campaign resources.

4. Key objectives and skills (NL)

The assignments of the Energy Challenges are very varied and touch on different subject areas. By taking part in this project, you will in any case already be meeting the core objectives and 21st-century skills listed below. The more extensively you approach the project, the more goals you can hit.

Dutch

- **Core objective 2**
  The pupils learn to express themselves in form and content when giving and requesting information, reporting, giving explanations, instructing and when discussing.
  - » Steps 4 and 5
- **Core objective 5**
  The pupils learn to write texts according to content and form with various functions, such as informing, instructing, convincing or providing pleasure.
  - » Steps 2, 4 and 5

Arithmetic and mathematics:

- **Core objective 23 (Mathematics)**
  The pupils learn to use mathematics language.
  (Maths language and denotation, e.g. reading graphs and measuring instruments)
  - » Steps 3

Orientation to self and the world:

- **Core objective 35 (People and society)**
  The pupils learn to behave in a socially responsible manner, as traffic participants and
  as consumers.
  - » Steps 5 and 7
- **Core objective 39 (People and society)**
  The pupils learn to handle the environment with care.
  - » All steps
- **Core objective 42 (Nature and technology)**
  The pupils learn to investigate materials and physical phenomena, such as light, sound, electricity, force, magnetism and temperature.
  - » Step 3

- The pupils learn about the global spatial distribution of population concentrations and religions, of climates, energy sources and natural landscapes such as volcanoes, deserts, tropical rainforests, high mountains and rivers.
  - » Step 3

Artistic orientation:

- **Core objective 54**
  The pupils learn to use images, music, language, play and movement to express their feelings and experiences and to communicate with them.
  - » Step 1, 4 and 6

21 e-century skills:

- **Digital literacy**
  - » ICT basic skills / Step 1, 3 and 4
  - » Information skills / Step 1, 6
  - » Media literacy / Step 4
- **Critical thinking**
  - » Step 3
- **Creative thinking and acting**
  - » Step 3
- **Problem-solving thinking and acting**
  - » Step 3
- **Communicate**
  - » Step 1, 4, 5, 6, 7
- **Cooperate**
  - » All steps


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