Best practices in energy efficiency education
in schools across Europe
chosen from the U4energy school competition

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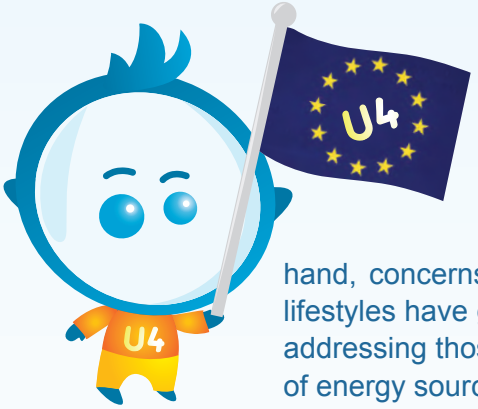
INTRODUCTION

The energy education of young people is a vital and strategic component of bringing about long-term change in European citizens' behaviour towards a smart and efficient use of energy resources. It provides an important contribution to achieving key European policy objectives on preventing climate change and building a future with sustainable, secure and affordable energy. With its Europe 2020 strategy the European Union has set itself ambitious targets: to cut Europe's annual primary energy consumption by 20%; to increase the energy produced from renewable sources to 20%; and to cut greenhouse gas emissions by 20%.



Young people are important to trigger behavioural changes in society towards the efficient use of energy. On the one hand, they have become more active energy users during the last decades. The use of communication devices, entertainment equipment and motorised vehicles has particularly increased among this age group. On the other hand, concerns about the environmental impact of our energy-intensive lifestyles have grown, and young people are keen to actively contribute to addressing those challenges which go hand in hand with the wasteful use of energy sources.

The Europe-wide school competition U4energy was launched by the European Commission in 2010 in the framework of the EU Intelligent Energy Europe programme. Its two main objectives were: to encourage students, teachers and heads of schools up to the end of secondary education to take action and demonstrate the best energy efficiency measures, teaching actions and school campaigns; and to capture all those good practices and help spread them across Europe in order to enable other schools to follow the lead.

As a result, more than 620 schools from 29 European countries participated in U4energy and submitted over 1,000 activities that have been carried out by school management, teachers and students during the two school years of 2010/11 and 2011/12.

This publication features the European winners of the competition in the categories of:

A – Best energy efficiency measures at school

B- Best teaching actions on efficient energy use

C- Best school campaign on energy efficiency

D – Best practice beyond U4energy from other national competitions

The good practice examples in this publication demonstrate that using energy smartly has today become part of everyday life in many schools across Europe. They illustrate that significant energy savings of 10% can be easily achieved with no- or low-cost measures implemented by students, as the example of the Secondary School Aliste in Spain proves. The entries also show a lot of inspiring ideas on how to combine sustainable energy education with real life skills, for example by using a multi-disciplinary approach in the case of the Institute of Higher Education Alessandrini-Marino in Italy with the Energy Work Bike or by supporting students to set up a local energy agency advising real clients on intelligent energy solutions as was done by the Upper Secondary School Louis Aragon in France. The value of school campaigns on energy efficiency has clearly gone beyond awareness-raising and has built the capacity of students in terms of communication and technical skills that are useful for all areas of life, as the winning entry from Secondary School Munderfing in Austria reveals.

All examples published in this booklet, but also those which are available online in the 'Gallery of entries' on www.u4energy.eu act as an encouragement to other schools, teachers and students to replicate good practices and take up the challenge to achieve a sustainable energy Europe.

The Editors

ACKNOWLEDGEMENTS

The European Commission and the U4energy team would like to extend their warm thanks to the members of the European Grand Jury who generously contributed their time and enthusiasm to select in both competition years (2010-11 and 2011-12) the award-winning projects featured in this booklet.

Chair of the Grand Jury - 2011 and 2012:

Silvia Adriana Ţicău, Member of the European Parliament, Vice-chair of the Committee on Transport and Tourism and Substitute of the Committee on Industry, Research and Energy

Grand Jury Members:

- Jason Anderson, Head of European Climate and Energy Policy, WWF – Jury 2011 and 2012
- Anne Gilleran, Senior Adviser, European Schoolnet – Jury 2011
- Àgueda Gras-Velázquez, Science Programme Manager, European Schoolnet – Jury 2012
- Bernard C. Holland, International Eco-Schools Coordinator, Foundation for Environmental Education (FFE) – Jury 2011
- Erica Hope, Senior Policy Officer (Energy Saving), Coalition for Energy Savings - Climate Action Network Europe (CAN-E) - Jury 2011 and 2012
- Pirjo-Liisa Koskimäki, Adviser, Renewables, Research and Innovation, Energy Efficiency, European Commission, DG ENER – Jury 2011 and 2012
- Pirita Lindholm, Head of Office, Climate Alliance Brussels – Jury 2012
- Reiner Mathar, Ministry of Education, Hessen, Germany and President, Environment and School Initiatives (ENSI) – Jury 2012

"We don't inherit the Earth from our parents. We borrow it from our children".

Antoine de Saint-Exupéry

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Category A

Best energy efficiency measures

Target Group:

School management, staff, with teachers and pupils ideally supported by their local authorities

Schools were encouraged to show their best efforts to save energy through the adoption of energy efficiency measures in combination with pedagogical activities for teachers and students. The objective was to have students understand better the use of energy efficiency technologies and to enhance energy savings through behavioural change. Energy efficiency measures and equipment are sometimes not very visible when they are part of large-scale building refurbishments; however, schools can easily take advantage of this opportunity in everyday school life to develop teaching activities around those measures.

In practice, schools often started by conducting an energy audit of the school building to identify possible energy-saving measures. These measures were then diligently implemented throughout the school year and their impact monitored on an ongoing basis through collective efforts from the whole school community: the school management, the staff and the students. Students were often directly involved in those actions, from daily meter reading and switching off lights and appliances at the end of the school day to replacing old light bulbs with energy-efficient ones and calculating the savings achieved. Through their involvement students built their capacity and gained a number of important skills.

The ultimate proof of the success of this approach was to have parents reporting back to school that they were being lectured by their children about energy wastage, thus showing clearly that the students' involvement was turning them into positive change agents in their community.

Best energy efficiency measures

Primary School Stjepana Radića Brestovec Orehovički, Croatia

In Brief

Core team

14 pupils (age: 11-14) and 4 teachers.

Impact and actions

30 percent drop in the school's heating costs over 6 months, saving of € 3400 and lower CO_2 emissions.

Much more energy responsible behaviour among both students and school staff.

Energy and cost efficiency calculations around the renovation of the old school building and a campaign to foster pupil behavioural change.

What triggered success

The investment from school funds and the local community for the renovation was key.

The support of fellow teachers who covered the energy topic from different angles in their classes also made a difference.

Teacher's word

"Work slowly and patiently. For lasting impact, the community, notably parents, should also be educated. To really understand the process, pupils should go on a trip to see energy in production."

Pupils in Croatia get their calculators out during school building renovation

Information technology teacher Renato Cafuk and his team of 'Young Energetics' were inspired to enter U4energy by the transformation of their old school building, which, despite being small, consumed a lot of energy. "Teachers and pupils talked a lot about this problem," said Renato. "We entered into discussions with the local authority and were able to secure funds for a major renovation. This triggered a whole set of energy efficiency calculations in my class."

"This is so much more interesting than I thought it would be."

Carlo, age 11.

Renato's pupils met once a week to quantify the potential and actual impact of their school's roof replacement, the laying of thermal isolation on the school attic, the replacement of old wooden windows and doors with new plastic ones and the renovation of the school facade with eight-centimetre-thick thermal isolator.

The class also embarked on an energy consumption awareness-raising campaign to change pupil habits and further drive down energy wastage. The heating temperature of the building was lowered by three degrees, presentations on efficient energy use were given in different classes and all of the school's teachers and pupils were asked to be more careful with lighting, PC and projector use. The local authority and parents were briefed regularly on the pupils' efforts and colourful stickers and posters were placed throughout the school building to remind everyone that a concerted effort needed to be made.

Renato's pupils were tested weekly on their calculations and became so good at doing them that he had to make his tests significantly harder. "One child, in particular, really had me working hard to come up with difficult questions," said Renato.

"It is hard to teach children to be energy-efficient because their habits are well entrenched and their behaviour can be different at home from in school. This is why it is important to involve parents."

Renato Cafuk, teacher.

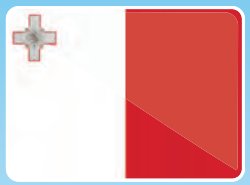
Has there been a lasting behavioural change? “Everyone in the school is much more energy responsible. Pupils and teachers wear warmer clothing when chilly instead of just upping the radiator temperature and I see a big difference in the level of light brightness and PC use in classrooms,” says Renato.

Other activities included a visit to a hydro power station, situated along the Drava river on the border with Hungary, which “really brought the concept of energy to life” and complimentary lessons on energy given by fellow teachers.

“Energy should be covered more fully in Croatia’s curriculum because it is the future and we must care about the future,” concludes Renato on his learning from this practical U4energy campaign.

“Working with enthusiastic students and teachers, getting support from the local authority and involving committed parents made this project possible. It is a very impressive combination of renovation, campaigning and calculations, which at the end show quantifiable results on energy and financial savings, and CO_2 reduction.”

Pirita Lindholm, Head of Office,
Climate Alliance Brussels and Member of the European Grand Jury



Primary School St Francis Cospicua, Malta

In Brief

Core team

A whole-school approach: 490 pupils (age: 5-11), 40 teachers and 930 parents.

Impact and actions

20 percent drop in energy consumption made visible to pupils through an auditing campaign.

Pupils paying more attention to the curriculum because of the energy theme.

Solar panels, guest speakers, out of school excursions including the visit of a waste disposal centre, games, songs, research projects, crafts, school greenhouse, external pupil presentations, lobbying, TV and radio appearances, battery recycling and a paper-saving campaign.

What triggered success

A passionate leader and a participative approach.

The idea of participating in U4energy was introduced to all staff members on the first day of the school year and then at the pupil committee meeting. Class representatives and teachers often reviewed the project fortnightly. It was a whole-school approach with students and teachers coming together as a team.

Teacher's word

"I know the message has sunk in because when we have VIP visits and Parent Days, the pupils relate their learning without hesitation."

Meter readers in Malta make a measurable difference

Sister Claudia Zammit's personal energy and warmth is palpable down a telephone line so it's little wonder that she has enthused St Francis' 490 pupils with her zeal for energy conservation. What is really impressive is the depth of such enthusiasm. Controlling environmental impact is no passing fad at St Francis. The school has made a habit of it and, as a result, has a habit of winning national and international awards.

"I liked doing the checklist because we were saving the environment and reducing CO_2. I was a 'detector' and when at times things weren't switched off, we'd remind the teachers and they'd be more careful."

Amy, age 9.

A great number of activities have been undertaken at St Francis, all of them within a framework of energy assessment and measurement that has enabled pupils to see the impact of their actions in concrete terms. English lesson reading, comprehension and conversation was centered on the topic while in maths classes, the children calculated energy consumption rates from the energy audit readings. The music teacher also got the children singing songs on the theme of water conservation. In addition to giving a sense to classroom actions, this framework provided a baseline of data for continuous improvement.

Pupils, under supervision by the head of school and the project coordinator, joined rotating teams of 'auditors' and 'detectors' whose role was to read the water and electricity meters twice daily and patrol the school with a checklist: turning off lights, looking for leaky taps or projectors and PCs left on. The pupils used a similar checklist for home auditing.

"Through their excellent competition entries to U4energy both in 2011 and in 2012, pupils and teachers from St. Francis Primary showed not only their continuous and growing commitment to taking concrete measures to improve energy efficiency in school, at home and in the community, but also their ability to communicate and to share with the public the benefits of these measures."

Silvia Adriana Ţicău, Member of the European Parliament and Chair of the European Grand Jury

Solar water heaters were introduced in the school, as were energy-saving light bulbs and led-LCD monitors. These contributed to a 20 percent drop in energy consumption made visible to pupils through the auditing.

"In Malta, the national syllabus is vast and we are being asked to cover all of it for the benchmark exam. Running the project required good time planning and material preparation at home. It was a huge commitment for us but well worth it given the results. The comments we've had from parents, the Mayor and the Minister for Rural Affairs have encouraged us to continue," said an assured Sister Zammit.

St Francis Primary was featured on Euronews on 21 June 2012 as part of the educational programme Learning World as a best practice example of sustainability education:
www.euronews.com/2012/06/21/green-is-the-colour/

"I even got told by a little girl aged 7 to switch off my unused computer," recalls Sister Zammit fondly.

Grouping of Schools
Castelo Branco, Portugal

In Brief

Core team

A whole-school approach: 1,000 pupils (age: 3- 15), 100 teachers and 40 school staff.

Impact and actions

15 percent drop in energy consumption.

Comprehensive involvement of pupils and staff from energy "patrols" to the school band.

Solar panels inaugurated by the local Mayor, parent guest speakers, community outreach events including the distribution of flyers and banners, and "Walking/Biking to School Days".

What triggered success

Involving parents was essential to keep momentum going. And linking with environmental associations is highly recommended.

Getting the school director onboard was key to driving enthusiasm across the whole school. A range of activities in the classroom, outside the classroom and school, and school visits (from the Mayor and from parents) were instrumental in keeping pupils interested.

Teacher's word

"I really enjoy the street campaigns with the Percussion Band and the contact with people. We literally make so much noise that people can't help noticing us. The community responds very positively. I think it's important to go beyond the school walls to convey the message that our planet is a wonderful place to live but we have to take care of it."

On patrol with the energy brigade in Portugal

Imagine a world in which youngsters are at the front line in the fight to save the planet's resources. Where schools are regularly patrolled by brigades of pupils, on the lookout for energy or water waste. A world in which young people take to the streets to tell the world about the need for renewable energy, and bang the drum for sustainability. Sounds like a pipe dream? Well, the staff and pupils of the Grouping of Schools from Castelo Branco, in eastern Portugal, are turning dreams into reality with their Environmentally-Friendly School project that has so far touched the lives of 1,000 students, staff, parents and the local community.

Led by geography teacher Manuela Costa and a team of committed colleagues, the project kicked off in 2010 when solar panels were installed right across the school. Today, water, electricity and waste "brigades", made up of mixed groups of children from different year groups, patrol the school and report back to staff on their findings. Everyone in the school has their chance to participate. And energy consumption at the school has dropped by a stunning 15 percent as a result.

"I am really proud of what my school has achieved. If we don't protect our environment, we won't have one."

Carolina, age 13.

It's hard to contain such enthusiasm within school walls. Which is why last year, pupils and staff took their project to the community, with "Walking/Biking to School Days" and a range of awareness-building campaigns. Most arresting, perhaps, is the school percussion band who quite literally beat the drum for renewable energy, replete with banners and flyers, around the city streets. The Town Mayor is so impressed that he has visited the school to congratulate them personally on their efforts and to inaugurate the solar panels.

Parents have a key role too, and many have come in to talk about energy consumption in their workplaces. And such is the zeal of these pupils, that mums and dads have reported being "lobbied" at home by children as young as three.

For Manuela, dedication like this begins in the classroom: “The key is to teach children from a very young age about renewable energy and the need to use it rationally.“

“In class we talk about solar energy a lot. The school has a solar oven, and the children find it fascinating.”

Making sustainability part of regular class experience, across the curriculum, is fundamental. We also arrange regular visits to factories and power plants, which really motivates the children. They take it so seriously that we have a sort of role reversal here: ”with pupils nagging the teachers about conservation,” she laughs.

“We have produced a thousand environmental caretakers!”

To raise the cash to kit the school out with solar panels, this school entered two national competitions: making a “Tetrapak tree” and presenting a project to “Rock in Rio –Solar Schools.”

Secondary School Aliste Alcañices, Spain

In Brief

Core team

11 pupils (age: 16-18) and a teacher with support from other teaching staff for DIY repair work, translations, recycling and company outreach.

Impact and actions

10 percent drop in electricity consumption, saving € 495 and 889kg CO_2; 6 percent drop in heating consumption, saving € 417 and 1214kg CO_2; € 912 saved for a total expenditure of € 86.

Installation of reflective panels made from tin foil behind radiators; foam reinforcement to insulate windows; recycling and awareness-raising among students and teachers; more energy-efficient use of the school premises.

What triggered success

A great school atmosphere and team spirit.

Teacher's word

"When money is tight, imagination is a powerful resource. Passion and motivation are also winning ingredients."

Low-cost solutions and a committed school team cut energy spending and CO_2 emissions in rural Spain

Economics teacher José María Mezquita took an original approach to his U4energy project by positioning it within the context of Spain's current economic crisis and the unfavorable impact this has on school budgets. He wanted to raise his pupils' awareness of the need for energy efficiency but also to improve their understanding of economics in real terms. Using U4energy, he conveyed, in a very practical way, the idea that resources are not limitless and he helped his students create economic models using real data gathered through their own energy measurements.

First the class set about identifying the likely causes of energy loss in their school building in order to pinpoint effective solutions. Attempts to raise funds through the local council and private sponsors had failed so, with a budget of under €100, the class focused their approach on low-cost materials and behavioural change.

"The first concept in economics is that you have limited resources. The class had to learn about different heating sources so we looked at documentaries on renewable energies and had many talks about the topic,"

José María Mezquita, teacher.

"This winning school demonstrates that energy-saving measures can be simple and inexpensive but very effective. They saved a remarkable ten times the money they invested, while cutting electricity and heat use significantly and raising awareness inside and outside the school."

Jason Anderson, Head of European Climate and Energy Policy, WWF and Member of the European Grand Jury

They found that the school's window blinds were poorly attached to the ceiling resulting in heat loss and sealed and insulated them with polyurethane foam. They also found cold and warm areas in the same building and developed clever solutions using tin foil to boost the performance of the radiators and project heat further into the school.

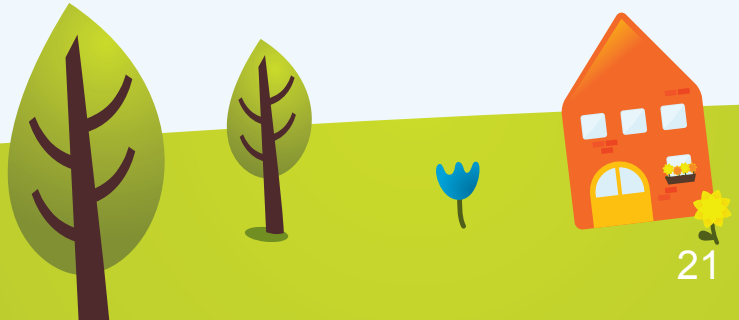
Over the course of seven months, the class used measuring tools to map out the building's heating conditions, identifying the warmest and coolest zones. To change pupil behavior, they created a colourful booklet offering energy-saving tips and stressing the senselessness of energy wastage. Recycling campaigns helped the pupils act on their learning and hundreds of ink cartridges and batteries were collected and recycled, plastic and paper sorted.

As you would expect from an economics class, the project had a clear mission and strong metrics that point to a huge return on investment. € 912 were saved for a total expenditure of just € 86. Electricity consumption went down ten percent while the cost of heating was cut by six percent.

Much of this success is also down to a dedicated team of staff. There are 180 pupils and 25 teachers at Alcanices, a small rural town. “We are like a family at the school,’ relates José. Indeed, while the class worked during school hours, José, his headmaster and colleagues worked after hours spraying foam mousse into window cavities and removing and re-installing radiators after insulation. José recalls his headmaster leaving the school on one occasion covered in foam.

> “For every euro invested in this project, we have generated a profit of more than € 10. It pays to invest in efficiency!”
>
> Jose María Mezquita, teacher.

Recognition through the U4energy awards has given the staff and pupils at Aliste Secondary School renewed impetus and they are currently working on a second plan of energy wastage attack. New, more energy-efficient PCs, energy-efficient bulbs, light dimers, aluminum heat reflectors, radiator regulators, faucet aerators and a biomass pellet boiler are all on José María’s list. “The project is not over, it is just the beginning,” says José.



Category B

Best teaching actions on efficient energy use

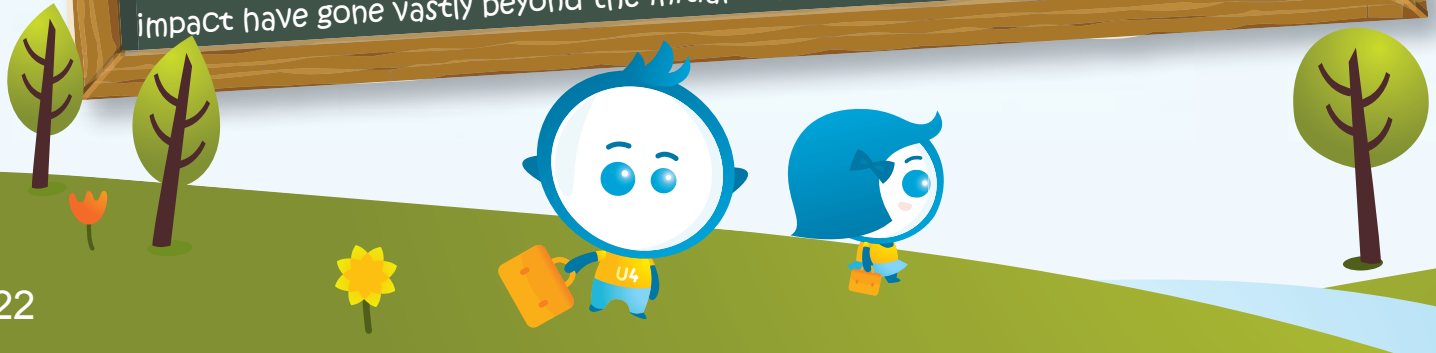
Target Group:

Teachers

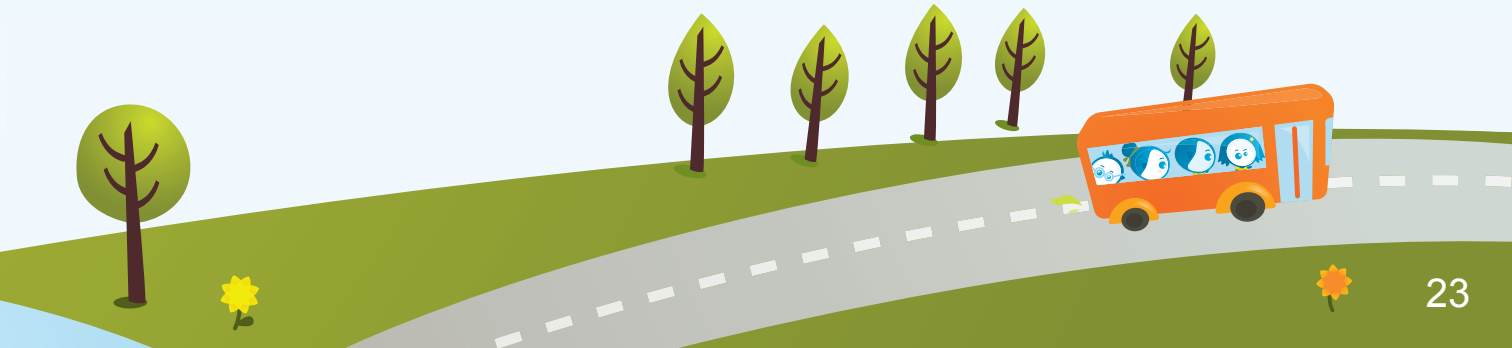
Teachers across Europe were challenged to build a lesson plan around the topic of energy efficiency. The aim of this competition category was to identify and share successful pedagogical practices related to teaching energy efficiency that could be easily replicated across different cultural and geographical settings. Interdisciplinary approaches were also encouraged.

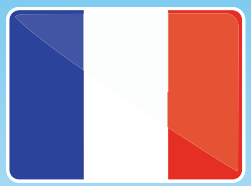
In most European countries, energy efficiency is not part of the curriculum, or at best only touched upon in science classes such as physics. U4energy provided a special teaching opportunity and encouraged teachers to link energy efficiency to standard school subjects and to develop in this way core competences clearly prescribed in school curricula.

Hundreds of teachers across Europe rose to this challenge and submitted a lesson plan where they embedded energy efficiency into a wide range of subjects, including design, music, religion, sports and mathematics. U4energy gave rise to some fascinating pedagogical initiatives ranging from the development of patented kinetic bicycles for the daily production of energy to a show flat showcasing the dos and don'ts of energy usage to local citizens. As shown in the next few pages, the lesson plans created by teachers often turned into fully-fledged class or school projects whose ambition and impact have gone vastly beyond the initial teachers' ideas.



Best teaching actions on efficient energy use





Upper Secondary School
Louis Aragon
Givors, France

In Brief

Core team

18 pupils (age: 16-17) and a teacher supported by the school's English teacher.

Impact and actions

Pupils created their own environment agency which they called Aléa. Aléa's 'employees':

- persuaded their local authority to give their school € 15,000 to purchase and test new energy-saving devices;
- partnered to help develop and promote an eco-apartment on their local housing estate;
- ran a "big pullover day" saving their school €100 in heating;
- teamed up with a school in Romania, exchanging in English via Skype and a blog.

Project content was also integrated into their English lessons.

What triggered success

The fact that pupils felt implicated. Having students work on a subject that touches their lives really motivates them.

Teacher's word

"Let the kids have their own ideas. In France, the teacher often teaches from the top down. You must 'let go' and allow pupils to take you places. It works. Children have amazing creative ability."

Empowered and enterprising pupils create their own Local Energy Authority in France

"We must raise greater awareness of these themes but we must do this, not by making people feel guilty, but through empowerment. The pupils in the project understood this. When the property developer presented the eco-apartment project to us, the kids who lived on the housing estate questioned the approach, pointing at the low level of insulation in the original buildings and the responsibility of constructors to make homes energy-efficient."

Fabien Tora, teacher.

"L'énergie, c'est la classe", the name of this U4energy project, is a play on words meaning both energy comes from the entire class and energy is cool, and this project is just that. Technology teacher Fabien Tora's pupils became company employees, creating Aléa, a local energy authority, offering energy assessment, technological improvement, behavioural change and consumption management to real clients.

Fabien's students (all boys) conducted their project during their 'technology and renewable energy' baccalaureate under a new sub-section called 'energy and environment'. A new, more flexible, teaching structure enabled them to embark on Aléa and apply their ideas as a team within and outside the school in a way most of them had never done before.

Aléa has all the elements of a typical company. An accounts team produced sophisticated financial models illustrating daily, weekly and monthly energy consumption while the technology team worked on the assessment and installation of energy-saving solutions. Prototypes of eco-houses were created as well as experiments using heat detectors and energy meters to illustrate the energy-saving impact of devices such as thermo track buttons. There was a quality control department, a communications team who generated media coverage and raised funds for charity through a low heating 'big pullover day' and an HR department that held energy awareness meetings called 'philosophy cafés' for other classes. Aléa had a logo, a slogan and a mission and worked in tandem with external partners. French energy company EdF gave the boys advice on energy auditing while local property developer, Alliade Habitat, involved

> "The opportunity to create an energy agency and take responsibility for real-life, concrete projects was clearly a massive inspiration to the students, with impressive results. I wouldn't be at all surprised if this project had just created a whole class of future energy auditors, managers and efficiency engineers!"
>
> Erica Hope, Senior Policy Officer (Energy Saving), Coalition for Energy Savings - Climate Action Network Europe (CAN-E) and Member of the European Grand Jury

them in the design of an eco-apartment which they used as a model to help local housing estate residents reduce their energy bills. The local authority Rhône-Alpes was so impressed with the quality of the team's work that it gave the class € 15,000 to spend on state-of-the-art energy-saving solutions. The school (through Aléa) is now monitoring the effectiveness of these technologies over time and is a test case for their future development.

Explaining their work in English was something the Aléa team recognised as essential in business so they corresponded in English virtually with peers running an equivalent project in a Romanian school and astutely worked with their English teacher to convey energy awareness concepts.

"There was a point in the lessons where the pupils were better at communicating their subject than me. It is rare to see such interest. Some of them came to school in suits for their presentations and brought photographs of Aléa's work. They showed real pride in each other's achievements," relates Nathalie Dourlot, English teacher.

"My group worked on the school's energy consumption. It was a very different type of pedagogy that gave us a sense of our value. We worked with people in positions of influence and companies. It opened a door to the world around us."

Maxime, age 17.

A penultimate part of the project was a presentation in front of politicians at the prestigious Rhône-Alpes General Assembly. Here the committed team was able to demonstrate their confidence, subject matter expertise and the scale of their accomplishments.

In year 2012-13, 20 pupils have opted for the "Technology and Renewable Energy" baccalaureate taught by Fabien, including three girls. The Aléa experience has been the talk of the school and has inspired, it seems, not only more pupils, but more girls, to consider sustainable development as a future career path.

Lower Secondary School
Angelo Brofferio
Asti, Italy

In Brief

Core team

30 pupils (age: 13-14), a teacher and her daughter.

Impact and actions

Pupils talking now about the use of renewable energy as an obvious thing to do and as a natural part of thinking about the future.

Building of virtual energy-efficient buildings and dwellings using design software SketchUp.

What triggered success

Using the right language. Technology is the most important means of communication for young people.

A relaxed, happy atmosphere encouraged good teamwork.

Creating a challenge. It is important that there is a creative moment when the pupils can be free to express themselves.

Teacher's word

"Computers are the language of my pupils and the SketchUp software is like a computer game."

Students design their own virtual energy-efficient buildings in Italy

Maths and science teacher Cinzia Chelo is no newcomer to school competitions and international projects. She was a finalist in the Medea (ICT) Awards in 2011 and she is also the recipient of an Italian government technology grant, named progetto cl@ssi 2.0, enabling her pupils to have easy access to the latest technologies for education.

"The buildings were very creative and original. They were built by 13-year-olds so they weren't the standard type of construction I'm used to."

Martina, daughter of the teacher leading the U4energy project

What is new, is her decision with U4energy to involve her 26-year-old daughter, Martina, in her project. Martina is an architect for Florence-based firm, Archea. She uses all sorts of IT applications for graphics and design in her work and was spotted at home by her mother using a free Internet software application called SketchUp which allows you to create clever 3D buildings of all shapes and sizes.

Together the mother and daughter team decided to teach Cinzia's pupils to build ecological buildings and dwellings using SketchUp. "The great thing about SketchUp is that it has a library of components you can use. It was amazing to see how the pupils animated their different buildings with the elements they found in the library," said Martina.

Cinzia's pupils constructed a whole range of virtual buildings to illustrate different types of renewable energy. There was a 'solar-powered pizzeria', a 'farm of crazy cows' running on biogas, a 'disco bike' with a dance floor and gym creating kinetic energy, and a 'house of tricks' that illustrated the less costly ways to make a building environmently-friendly such as installing double glazing and recycling rain water.

"It is really important that kids start to reflect about sustainability, because it concerns the future of everyone on earth. This project was a great experience. Using SketchUp made the lessons funnier and stimulating; even the less studious of us participated and learned."

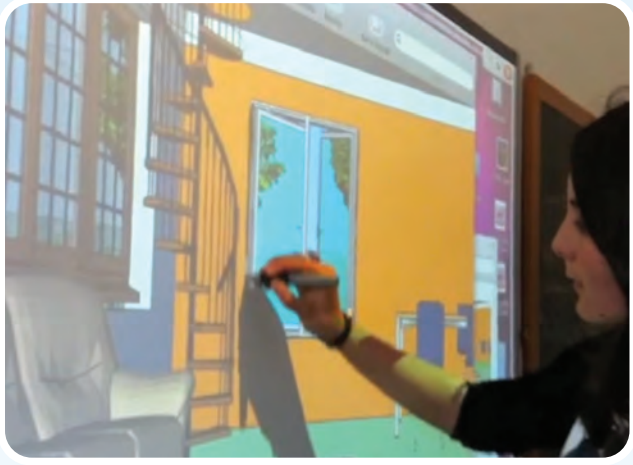
Emma and Rebecca, age 15.

To kick the project off Martina had to come to school to show the class how to use the software. They already knew other free software tools such as Cmap, to build conceptual maps, iMovie and Movie Maker for editing videos, and GarageBand and Audacity for editing audio files. They worked together in teams of 6-7 students and used the interactive white board to show their work to their schoolmates and others teachers. The renewable energy project was a component of their end of year school exam.

“The pupils were clearly very motivated by both the energy efficiency theme and the software applications,” recalls Martina. “We worked with them on this in 2010 and they did the exam in 2011. For U4energy, we contacted them via Facebook and asked them to revisit the project in 2012 developing it further and creating an e-book, YouTube movies and a podcast. They all came back onto the project in 2012 even though they had switched schools. ”

Renewable energy is covered in the Italian curriculum for physical science so this project slotted into Cinzia’s class work fairly easily. By leveraging ICT within the project she was able to trigger her pupils’ imagination about energy and expand their technology skills. The SketchUp application also lent itself to the teaching of geometry.

“The real challenge wasn’t the energy theme or the technology,” says Cinzia, “it was in making the pupils the central players and facilitating their enjoyment of the subject. They demonstrated their enthusiasm by coming back to work together in 2012”.



Institute of Higher Education Alessandrini-Marino Teramo, Italy

In Brief

Core team

Pupils (age: 17 – 18) and teachers.

Impact and actions

Collaboration and involvement from pupils at the school in taking the key concepts beyond the classroom and exploring their practical application.

Creation of four prototype energy-producing bikes. Two patents and school field trips to Congo where the project will be implemented at twin institution Butembo Mission. Strong ties forged with the Congolese school.

A range of pedagogical, environmental and societal issues touched.

What triggered success

Encouraging a strong sense of competition amongst the students to succeed helped drive enthusiasm. The involvement of parents and the local community also kept interest and momentum going.

Teacher's word

"Whilst it is in line with the curriculum and the school rules, this is a project that our students made their own and which has touched lives beyond our school."

Pedal power: the Italian "Energy Work Bike" puts sustainable mobility on the world map

For Almerindo Capuani, mobilising students to think about sustainability, energy sources and emerging societies, means, quite literally, mobilising them. Thanks to Almerindo, colleagues and students at the Alessandrini-Marino Institute have taken a very novel approach to breaking the cycles of energy waste and poverty: they have invented a bicycle that generates power.

The Energy Work Bike project is an undertaking so inventive, so dynamic and so multi-faceted, that it defies simple definition. Part electrical engineering, part technology, part design and part philanthropy, this extraordinary scheme has seen students develop four prototypes of energy-producing bikes that can variously charge a mobile phone, sharpen work tools, power a laptop or harness the sun's rays and convert them into electricity.

Two patents and a fully-fledged business plan later, the whizz kids from Teramo have travelled to the Butembo Mission in the Democratic Republic of Congo, where they met with monks and youngsters eager to find out how to replicate the bikes for energy and potentially for employment.

For Almerindo, the benefits and rewards of this project touch a wide range of pedagogical, environmental and societal objectives; goals that for him and his colleagues were quite clear, if ambitious, from the start: "We wanted to address a range of diverse and complex elements when we began working on this. Inside the classroom, we focused on integrating different subjects and disciplines from automatic electric systems to engineering."

"Overcoming the logistic and practical problems of getting students to events outside of school was a challenge. And handling money received as donations needs to be well organised."

Almerindo Capuani, teacher.

"At the same time, we wanted to encourage pupils to address real-life issues that affect us as citizens: urban pollution, sustainability and world poverty. The pupils were also keen to play their part in making a difference: the energy produced is small, and does not solve any problems in Italy; but in Butembo and in developing countries, it can become the solution to many needs."

Almerindo adds, "our work was driven by light-hearted competition amongst the students, flea-market finds which parents helped us to buy, and above all by the natural enthusiasm – not just of the students, but of their families and the local community."

> *"I felt that this invention had the potential to change the everyday lives of people in remote and poor communities, using tools they can easily access."*
>
> Bernard Charles Holland, FEE Eco-Schools International Coordinator and Member of the European Grand Jury.

Key to the success of the project was recycling materials to create the bikes, which added to the sustainability of the model and kept costs down.

The local Mayor of Colonnella was so impressed by the vim and dedication of the school, that he approved a grant of € 5,000, which will finance three years of teaching at a school of crafts, currently under construction at Butembo, where more bikes will be produced. And across the province of Teramo, the Italian Energy Work Bike continues to create waves: the regional energy board, ARAEN, recently entered the project in a local competition and the prize money was used to create an "energy island."

The environment as a topic is now integrated into all school disciplines in technical education in the province and "learning-doing" as a concept is built into all lab activities. And with results as spectacular as those of the Energy Work Bike, sustainable energy is poised to remain on the map in Teramo.

Primary School Manuel Bartolomé Cossio Madrid, Spain

In Brief

Core team

80 pupils (age: 11- 12) and 4 teachers.

Impact and actions

A full audit of the school's energy consumption carried out by pupils, an energy fair presenting the findings of specialist renewable energy research groups to peers, a school radio programme broadcasting material on energy conservation, and an inter-disciplinary approach that saw a mesh of maths, science, creative and expressive skills deployed by students across the project lifecycle.

What triggered success

Mixing up age groups helped promote responsibility, and giving each child a different role was key.

The school recommends starting small, with a niche or a small project that will work in the larger curriculum.

Teacher's word

"I was delighted to see that students coming into fifth grade this year were eager to participate in the project and have found it very easy, thanks to their peers who started last year. The responsible use of resources is an issue that they care about deeply."

Tuning into energy efficiency in Spain

Most people would agree that broadcasting your message loud and clear is a good starting point if you want to influence attitudes and change behaviour.

And broadcasting has become something of a specialism for the staff and pupils of Madrid's Primary School Manuel Bartolomé Cossio.

The UUE radio programme, part of the school's Efficient Use of Energy project, first hit local airwaves in 2011, with pupil-led interviews, debates, podcasts and even a funky "Energy Rap" song. And response from the community of Aluche, one of the city's largest districts, suggests the message is getting through.

"The main thing is to create opportunities that promote teamwork – amongst pupils and staff."

Mario Lobato García, teacher.

Support from local authorities was key to getting things moving. The Madrid Town Hall encourages and supports these types of activities through the Educar hoy por un Madrid más Sostenible initiative. The Madrid Town Hall provided the project team with the initial materials as they were planning the project.

Creating a radio programme might seem like a goal in itself. However it is only one element in an ambitious project, led by Mario Lobato García and a dedicated team of teachers, to make sustainable energy a key focus of daily life at the school.

The project kicked off several months before the programme was first aired, with a full audit of the school's energy consumption. In groups of statisticians, journalists, inspectors and auditors, children from fifth and sixth grades conducted research to identify bad habits (from leaving lights on to opening windows in winter) and brainstorm solutions.

This work paved the way for a dedicated school energy fair on different sources of energy, such as solar and marine energy. Specialist groups delivered multi-media presentations, supported by colourful 3D models, to an enthusiastic audience of pupils and parents.

“Delivering the project across three phases meant that we’ve been able to keep momentum and interest going right across the year, and we’ve touched different areas in terms of curriculum. As well as maths and science, pupils are practising research, writing, presentation and technical skills with elements like the radio programme.”

The environment is not a formal subject within the Spanish curriculum, however Mario and colleagues have found that teamwork and imagination can go a long way to build energy conservation into day-to-day learning and drive lasting changes in behaviour: “Our experience has shown us that pupils enjoy the responsibility and the feeling of belonging that these activities generate. Each child that has gone through the project has become a subject expert, and a spokesperson for a better use of energy.”

Category C

Best school campaign on energy efficiency

Target Group:

Pupils guided by a teacher

Students were challenged to design and implement an effective awareness-raising campaign to promote energy efficiency. Under the guidance of their teacher, students were expected to define objectives, develop an action plan and implement it while evaluating their success on an ongoing basis. Campaigns were not only supposed to raise awareness of the importance of energy efficiency within the school, but were also meant to inspire the wider community to adopt more energy-efficient behaviours, thus making the school the hub for social change.

This competition category intended to provide the greatest amount of creative freedom to students and encourage active and responsible citizenship. U4energy demonstrated that the young generation is an effective vehicle to lead change and take initiative for a sustainable future.

Thousands of students across Europe embraced the challenge, and did so with a great diversity of approaches. Encouraged to spread the word as far and wide as possible, some went to great lengths to convince their mayor to switch to green energy and to take the floor in Parliament. Some went on TV or spoke on radio shows, and some paraded proudly onto local markets or town centers to encourage local citizens to make the right decisions. And some others composed and wrote their own eco songs.

Best school campaign on energy efficiency

Secondary School Munderfing Munderfing, Austria

In Brief

Core team

47 pupils (age: 14) and a teacher.

Impact and actions

Increased awareness of different energies and their impacts. In particular, pupils' appreciation of environmentally positive actions such as the use of switchable connection plug boards.

Self-reliance and communication skills developed through peer-to-peer worshops for primary and kindergarten pupils and the keeping of a project diary and portfolio by each student.

Workshops included experiments such as testing solar-powered scooters, light bulbs lit by pedaling a bike and water-powered models.

What triggered success

A participative approach. It was an explicit wish of students to conduct a project. The teacher built on the opportunity this presented to delve into the energy efficiency theme.

Teacher's word

"The use of teaching methods that encourage self-reliance increased social and communication competencies and gave pupils the possibility to contribute their own ideas."

Students teaching students about energy efficiency in Austria

Agnes Wiesinger is a physics teacher with a flair for developing independent thought and action with her pupils. "For about two years I regularly attended an excellent course on ways to develop my pupils' self-reliance. It covered methods to help children work independently and techniques for ensuring that group work is carried out by everyone and not dominated by one child." Agnes applied this learning in her teaching of energy efficiency and also in the methodology she employed to encourage her pupils to share their findings and learning with others.

"I have learned something! I am glad that you know about this very important, sensitive issue, which will be critical for your generation. As your parents, we will strive to do our part to protect the environment."

Feedback from a parent written in her child's project portfolio.

"I know now that I can save energy."

"At the end (of the workshop), a girl came to me and said that I was her new friend. That was very sweet. This day was wonderful."

"This is something I would do over and over again."

Pupil quotes.

"Watching my pupils work with the younger children was a high point of this project. The primary and kindergarten children were really delighted to be taught by their older schoolmates," said Agnes. Indeed, her class was skilled at tailoring their message. During rehearsals, it was suggested that some of the older pupils pretend to be from a primary or kindergarten class to make the exercise seem real. They refused, pointing to their first hand experience with younger siblings. "I was very surprised, but they pitched their projects at the right level brilliantly," recalls Agnes.

Pupils also kept colourful project diaries, which gave them further means to express their vivid imaginations and creativity and record their new learning.

Fortunately for Agnes, instruction on energy sources and energy saving is part of Austria's national curriculum. However, the amount of time devoted to it is short and textbook coverage of the topic quite limited. So, the class conducted a lot of project work out of hours. This posed no problem for either the enthusiastic pupils or their parents. Agnes was also well supported by her headmaster who juggled the school timetable in her favour.

"Seeing that young students take the initiative to develop educational materials for younger students on how to use energy more efficiently in everyday life and then go and roll out those educational materials in kindergartens was really impressive. This showed me that the young generation is prepared to take responsibility for our future!"

Reiner Mathar, Ministry of Education, Hessen, Germany; President, Environment and School Initiatives (ENSI); and Member of the European Grand Jury

Were there any challenges? "Just the occasional stress of pulling many different things together at once. But that's teaching," smiles Agnes.

Primary School Đuro Ester Koprivnica, Croatia

In Brief

Core team

90 pupils (age: 8-14) and 8 teachers.

Impact and actions

765 pupils engaged, street marches, local Mayor lobbied, TV and radio appearances, private sector sponsorship, creation of a book for local libraries, tree-planting, and presentations to other schools.

What triggered success

The freedom given to pupils to develop their own messages and the means to communicate them proved instrumental.

Pupils were encouraged to be teachers, spreading a behavioural change that impacted their parents, family and friends.

Teacher's word

"I'm glad this activity was started in the first place because we must all act to change our habits and behaviour. I have had the opportunity to contribute to an important issue."

Sandwich boards, charters and national TV create a ripple effect in Croatia

Impressive community outreach sums up Đuro Ester's school campaign. Teachers of different disciplines, pupils of various ages, the private sector, media, the general public, parents, the town hall and a local utility company were all part of this colourful activity.

Pupils took to Koprivnica's streets wearing bright sandwich boards promoting energy conservation. Leaflets explaining how we waste and how we can save energy were drawn up and passed out to the school's 765 pupils, their parents and beyond. Even the local Mayor didn't escape some lobbying. He was presented publically with a charter for improving the town. And the message is still resonating through visits to interested schools across Croatia.

"I save energy now and ride my bike much more than before. My parents ride their bikes much more too!"

Lana, age 11.

"This week, some of our pupils presented their work to a community of schools in Zagreb. Teachers are asking me for detailed project information so I'm convinced that there is a ripple effect", says Tomislava Kraljić, English and French teacher at Đuro Ester and U4energy project leader within the school.

"Finding time and developing a system to co-ordinate different activities across multiple classes with different lesson plans was especially hard at the outset."

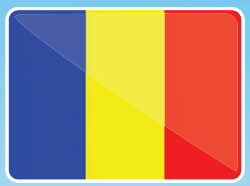
Tomislava Kraljić, teacher.

"The Mayor's office for the town of Koprivnica told us about U4energy and we discussed the idea at the teachers' council meeting. Colleagues started to suggest different approaches for exploring the subject with their classes. The biology teacher came up with the idea of educational leaflets and bookmarks with instructions on how to use energy in our homes, while the Croatian language teacher led the journalist group that wrote the text for the children's book 'Eco Adventure'. Another Croatian language teacher developed a film group, creating an educational film about energy-saving," continues Tomislava.

Đuro Ester also connected to world events. Over the course of the project, a dreadful tsunami hit the coast of Japan causing the Fukushima nuclear plant to leak. This gave rise to classroom discussions on the pros and cons of nuclear energy and the planting on the school grounds of a Japanese cherry tree donated by utility company Komunalac.

The environment is addressed across a number of disciplines in Croatian schools, but it isn't a subject in its own right. Tomislava's experience with U4energy has led her to support the creation of a curriculum dedicated to environmental awareness and energy conservation.

The storyline and imagery for a book, now available at the school and town libraries, was created in collaboration with the Regional Energy Agency North while national TV and local radio appearances drove energy conservation messages, crafted by the pupils, to the masses.



Secondary School Octavian Goga Sibiu, Romania

In Brief

Core team

67 pupils (age: 14-19) and 3 teachers.

Impact and actions

1,500 participants campaigned on their bikes, setup an art exhibition, and tackled environmental issues tied to teaching on ethics.

What triggered success

Organisation and planning were key as well as the adoption of a strong thematic framework.

Motivated and engaged pupils and a supportive deputy head were also instrumental.

Teacher's word

"At some point I forgot about the possibility of winning prizes. I just simply wanted to achieve something unique with my students and I really enjoyed the can-do spirit we all shared."

Pupils take the environment lifecycle literally in Romania

The streets of Sibiu will have been awash with green when 1,500 pupils clad in emerald-coloured recycled t-shirts took to them on their bicycles, for the green march. This was one of many attention-grabbing actions initiated by the pupils of Octavian Goga secondary school to pass on the message that "small actions matter" when it comes to saving energy.

An art exhibition on the theme of environmental awareness, a 'Green Week' involving pupil surveys, posters and leafleting, national media outreach and the creation of models from recycled materials, inspired by the film WALL-E, were all part of Octavian Goga's creative campaign.

"After being a part of this, I really, truly believe young people can make a difference."

Iulia, age 19.

Viorica Marcu, the religious education teacher who drove the project, sought to use U4energy not just to achieve environmental goals, but also to encourage teamwork and show her pupils the power of collective action. She tied the concept of environmental responsibility to teaching on ethics covered within the syllabus of her classes. Is it right to damage our world? How do the actions of one person impact many?

"It was moving to see how seriously the smallest pupils took the project, encouraging their parents to switch off lights and devices and to opt for more sustainable light bulbs. It really proves that we should start with the smallest. These children will grow up with a different ideology; they will be better citizens," says Viorica, clearly touched.


=10x

Primary School Šmartno pri Slovenj Gradcu Šmartno, Slovenia

In Brief

Core team

14 pupils (age: 8-14) and 5 teachers.

Impact and actions

300 pupils and their parents who came to school on foot, a rap song that made national TV and radio news, and an engineered school power cut that brought home the value of energy.

What triggered success

Motivated children who took the lead.

Teamwork was very important. The teacher who took part volunteered.

Teacher's word

"I learned that pupils are really willing to participate if you listen to them. The children didn't like our initial ideas for the project. Using music was their idea, and I believe this was the main reason for their overwhelming involvement."

A "Green School is the Rule" rap for elementary school pupils in Slovenia

Joy was the energy source fueling project leader Petra Turk and the The Hand me the Energy team at Primary School Šmartno pri Slovenj Gradcu in Slovenia, a 200-year-old institution that has been a participant in European Commission environmental projects for 14 years. "The pupils had a great time and it shows in the work they did," said Petra.

The Hand me the Energy project had three strands. The first and most visible strand was a catchy rap song devised and performed by the pupils. It struck a chord with staff at four national TV stations that interviewed teachers and pupils and broadcast the rappers performing. It also got several plays on national radio. "Myself and my colleague, Sonja, became a U4energy media crew with this project," chuckles Petra.

"I'm not sure this will impact my career choice but it will have a lasting impact on my daily behaviour."

Neza, age 15.

"My parents have become more ecological as a result of my experience."

Jacob, age 12.

For the second activity named, "A Day Without a Car", 300 pupils were invited to come to class on foot, by bike or on roller skates. Parents and teachers left their cars at home and the school car park was transformed into a games area.

Eko Rap

Green school – this is the rule!
Let's turn off the engines and turn on our heart
This will be the better start

Chorus for the schools "Eko Rap" song, broadcast on national media and performed by the group to the right.

"No Electricity" was the theme of the third campaign element. A 24-hour power cut, instigated by the teachers during the month of December, left all of the school's pupils without heating, computers and hot meals. Classes were taught by natural light. "This proved to be quite an education for the children", said Petra. Pupils were encouraged to try the exercise at home with one boy applying it to the letter. "His father wrote to us", laughs Petra, "to protest about the scolding he got from his boss for allowing his son to cut the power during conference calls and web meetings".

"We are really aware of the environment problem in Slovenian schools, but there are still things we should do beyond thinking about the issue. The challenge is to move from talking to action."

Petra Turk, teacher.

Secondary School Isidra de Guzmán Alcalá de Henares, Spain

In Brief

Core team

20 pupils (age: 16-17) and a teacher.

Impact and actions

School survey to understand students' actual energy use and habits and development of communication messages on this basis.

Creation of a website and wiki and development of a digital game mimicking the format of a popular TV show and providing questions and answers on energy efficiency and responsible behaviour.

What triggered success

The pupils really took the project to heart and felt empowered as they taught their peers and parents.

The fact the project focuses on practical work over theory was also a bonus. Pupils spent a lot of time studying concepts that are abstract and distant.

Teacher's word

"Be brave and do this project because the results are great. The project will take on a life of its own if you place your trust in the pupils."

“Act! It is your responsibility,” say pupils in Spain

‘Do you sort your waste for recycling?’ was the first question pupils at Secondary School Isidra de Guzmán asked their peers in a school survey. No one said ‘yes’ and 81% said ‘no’. This gave the class a sense of the grandeur of the task before them as they embarked on their U4energy communication campaign to make their peers more energy-aware. What they also found out was that half of those surveyed did have some understanding of the importance of water conservation, the need for this seeming more obvious and connected to their daily lives. When it came to energy conservation the majority “did not believe their behaviour to be important”.

The team concluded that the pupils at their school ‘know how to do it, but do not feel the need to do it’. Communications stemmed from there and after defining their messages and developing their strategy, the class began organising lively workshops, interesting exhibitions, contests, panels, a fun digital game and an informative website. They also joined external campaigns such as ‘Lights for Learning’ and ‘Earth Hour’, worked their Facebook contacts and championed programmes for the recycling of old equipment and clothes. School peers, parents and friends were all targeted by communications on the need to save non-renewable energy and explore alternatives.

An empowering part of the project for the class was a visit to the local city hall where they attended a session on how to deliver workshops. The class learned about adapting their message to their audience and as a result, dressed up as mother nature for a set of “rucksack days” with younger pupils at the school.

Lack of funding sometimes made implementation a challenge, admits Maria Consuelo Marazuela Zapata, the lead teacher, but they managed to find solutions. For example, a great idea for an energy awareness photo exhibition proved too expensive to produce so they did it virtually.

“Educating our youth to change their attitudes takes time. It is not a task to be achieved with a specific action or a class activity. It requires a conscious, systematic, planned, continuously evaluated and re-evaluated focus.”

Maria Consuelo Marazuela Zapata, teacher.

Consuelo and her class conducted their work during religious education where respect for the environment and human rights are part of the Spanish curriculum. “But there is never enough time for this type of subject,” ponders Consuelo. “Our teenagers have social and political concerns about improving their environment. The main obstacle to involving them in these activities is lack of time and the fact the many of them don’t know how to take action. That’s why it is important that activities like U4energy exist.”

Category D

Best practice beyond U4energy

Target Group:

Coordinators and winners of national publicly-funded competitions promoting energy efficiency in schools

The aim of this additional competition category was to establish synergies between the European U4energy competition and related national, publicly-supported initiatives with the same mission of promoting energy efficiency in schools.

Coordinators of similar competitions at national level were invited to submit an application on behalf of their initiative and their national winner to be jointly recognised as best practice at European level. Various approaches and strategies were used across Europe to educate students about energy efficiency and ultimately, the results of this category should inspire other European countries to follow suit and establish their own national or regional energy efficiency competition in schools.

The four case studies outlined in the next few pages feature both key aspects of national competitions and the achievements of their own national winner within the framework of that national competition. As in other competition categories, diversity is quite striking, both in terms of financial investment and governance structure of the national competitions and in terms of scale and focus of the winning projects.

Best practice beyond U4energy

Ecole Zéro-Watt competition,Belgium

an initiative of the Wallonia region

National laureate

Primary School Saint Jean-Baptiste, Huppaye

Ecole Zero-Watt is a multi-stakeholder partnership between the regional government of Wallonia, the media company Sud-Presse, an association specialised in energy consumption and a group of private sector sponsors. 2012 was the first year of the competition and the winning schools were those whose energy consumption dropped most radically over a 3-month period. Learn more about a clever model that leverages an ecosystem of influential players in the field of sustainable development.

Target group

Pupils aged 5-12 attending kindergarten or primary school. “Teachers at this stage have more flexibility than their peers at secondary level over the topics addressed in class. At later schooling stages, the pedagogical requirements of the national curriculum allow for little free time,” explains Jacques Claessens, facilitator for energy education at the regional government of Wallonia.

Competition process

Stage 1: competition details were published in 5 newspapers. The regional government of Wallonia also distributed newspapers to all eligible schools in Wallonia.

Stage 2: interested schools submitted their application and addressed a letter of motivation to Sud-Presse.

Stage 3: selected schools, 37 in 2012, were sent material explaining the competition methodology and different methods of energy-saving.

Stage 4: an energy advisor visited the schools 4 times (half a day each visit) to:

- meet the group of adults within the school who were responsible for the project;
- conduct a participative audit of the school’s energy consumption (pupils did the auditing);
- establish an action plan;
- assess energy reduction after 6 weeks and again after 3 months.

Stage 5: 5 winning schools were selected based on their energy reduction score.

Marketing tactics

The collaboration with the media group ensured plenty of visibility with the general public for both the competition and energy-saving methods.

Judging and Prizes

The 5 schools with the largest energy savings won. The average electricity saving across all of this year's contestants was 19 percent with 7 schools surpassing 30 percent.
The 5 winning schools received energy-efficient equipment from industry sponsors.

Cost

€ 70,000 for the publicity agreement with Sud-Presse (this included the competition and other energy-saving communications), € 25,000 for the energy advisor's school visits.

Organiser's word

"We leveraged the strengths of each partner. Rather than asking people to take on additional tasks, we focused on asking them to integrate energy saving into their regular scope of activity and expertise. We also asked each school to put into place an 'eco team' to ensure that teachers were not alone in implementing the project. Pupils were involved in the auditing process because you are generally motivated when you do something yourself. If a school director provides pupils with the energy consumption data, they won't feel the same sense of ownership. Finally, the involvement of Sud-Presse was a persuasive factor for involving private sector sponsors."

Jacques Claessens, Facilitator for energy education, Regional government of Wallonia.

Stay tuned for details on the next competition at
www.educ-energie.ulg.ac.be

Primary School Saint Jean-Baptiste Huppaye, Belgium

In Brief

Core team

25 pupils (age: 11-12), 3 teachers and a headmistress.

Impact and actions

40 percent reduction in electricity consumption over 3 months and strong behavioural impact.

Pupils in 6th grade were responsible for auditing and consumption control (eg. reduced use of neon lights, installation of better electricity plugs, behavioural change tactics). They visited each class in the school periodically to explain pupil to pupil their findings and improvement targets.

What triggered success

Everyone felt implicated. It was not just a one class project but a block activity.

Teacher's word

"The competition didn't take a lot of effort to implement. It was quite a natural thing to do and could be applied across any type of pedagogy."

Belgian pupils help their school achieve a staggering 40 percent drop in electricity consumption

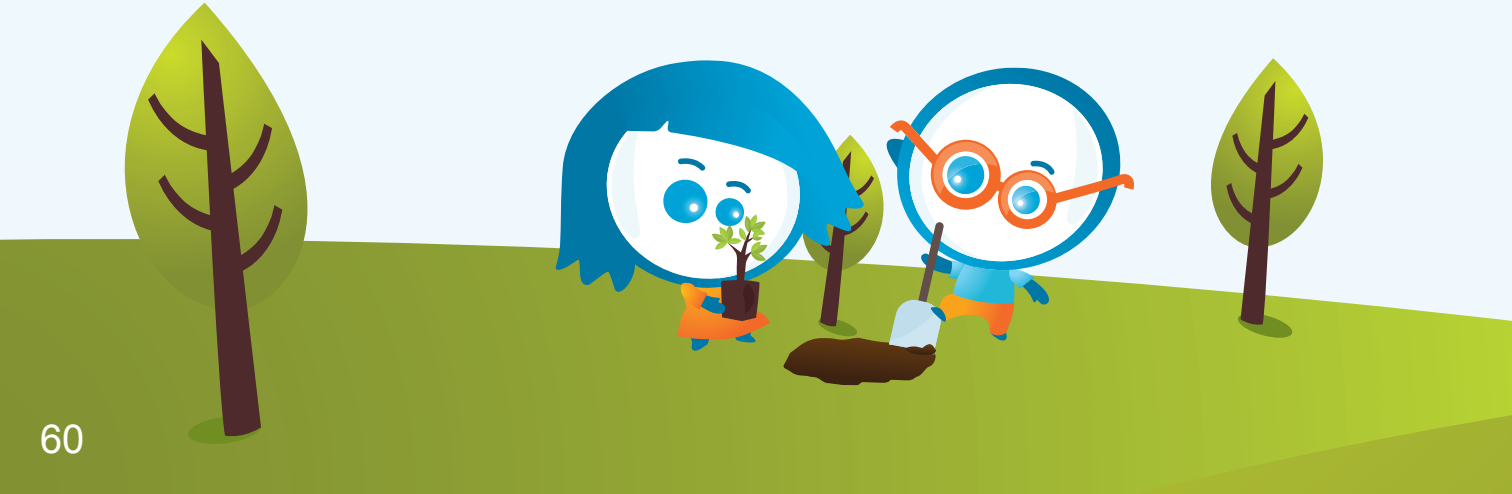
“Pupils got so motivated about saving energy that they started scolding their parents for leaving on lights,” reported Nathalie Jadot, headmistress at Primary School Saint Jean-Baptiste, when U4energy contacted her about her school’s winning entry to the Zéro-Watt competition instigated by the regional government of Wallonia. The school embarked on the competition because Nathalie and her colleagues believe that teaching children good energy-saving behaviour at a young age is key to their future well-being. “The competition was a source of much exchange and reflection for us because of its pedagogical relevance but also because it had personal importance for the whole school team,’ relates Nathalie.

By auditing their building’s energy consumption using wattmeters, thermometers and luxmeters supplied by Zéro Watt, and by applying the sound advice their competition energy advisor offered, pupils were able to achieve a massive 40 percent reduction in electricity consumption over just 3 months. Key to such success was the continuous encouragement given to peer-to-peer communication within the school. A core group of 25 very motivated pupils ensured that all 250 school goers understood that controlling the school’s rate of electricity consumption was a collective cause. “It became a game for them,” says Nathalie. A game with earnest goals and spectacular results.

While the team was serious about its objectives, it was light-hearted in their implementation. “One teacher was sceptical about the value of reducing the intensity of our neon lighting,” says Nathalie, “so we changed her classroom lights on the sly and she never spotted the difference!”

“Each pupil in our class had a job to do and mine was to switch off the computer and photocopier.”

Luca, age 11.



And the transformation in pupil behaviour has endured. At the end of a working day, Nathalie now finds all of the school's lights and machines turned off whereas before, she often had the tedious task of shutting equipment down before going home. Schools are empty 75% of the time, yet between 20 and 25% of their electricity consumption takes place during the weekend and night.

As a result of winning Zéro-Watt, Saint Jean-Baptiste School is now well equipped in photovoltaic panels to capture solar energy and Velux windows that enable pupils to work by natural light. It is also on the verge of changing the LED tubes in its neon lighting thanks to discount vouchers supplied by a competition sponsor.

SPARE competition, Bulgaria

an initiative of the Norwegian Society for the Conservation of Nature

National laureate

Secondary School of Economics Georgi S. Rakovski, Varna

SPARE (School Project for Application of Resources and Energy) is an international school project run by the Norwegian Society for the Conservation of Nature since 1996. Through SPARE, pupils learn how to use energy and resources efficiently. 150,000 pupils in several thousand schools in, so far, 17 countries work with the SPARE educational programme. The educational activities in each country are coordinated by national NGOs.

Every educational year, SPARE runs national and international competitions on best works from schools on environment, energy and climate. A Bulgarian teacher won in the teacher's category of the 2011-12 international SPARE competition so U4energy spoke to Todor Todorov, SPARE Bulgaria coordinator, about Bulgaria's national competition.

Target group

Pupils aged 7-17.

Competition process

The competition runs in two stages: national and international.

Bulgaria's national competition has been running for four years and around 100 schools entered it in 2011-12. Five winners are selected for the international competition.

At the national level, pupils can enter 3 competition categories: practical, theoretical, and public education and outreach while a fourth category is reserved for teachers.

- For the 'practical' category, pupils must build an energy-efficient solution and demonstrate its effectiveness;
- In the 'theoretical' category they are encouraged provide ideas for energy efficiency describing how their submission helps to lower greenhouse gas emissions;
- The 'public education and outreach' category focuses on tactics for raising energy awareness;
- The 'teacher' category invites teachers to submit suggestions for practical classes on energy efficiency and environmental awareness.

Typically Bulgaria's competition is launched in the September-October timeframe and runs until March. Most schools involved with SPARE run extracurricular eco-clubs which children can join on a voluntary basis. Eco-club members often submit competition entries.

Marketing tactics

The Bulgarian Ministry of Education sent a letter to every Bulgarian school announcing their support for SPARE Bulgaria and its activities.

Teachers who are part of the Bulgarian SPARE network are informed about the competition through newsletters and SPARE training events.

Judging and Prizes

The national jury comprises Bulgarian national energy experts, representatives from the Ministries of Education and the Environment and Todor, the national co-ordinator. The International Jury varies each year to include representatives from the countries within SPARE's network.

The main prize at national level is the ability to enter the international competition. T-shirts and some renewable energy teaching tools are provided but these are primarily symbolic.

International winners receive a certificate and € 400 worth of special materials such as laptops or cameras.

Organiser's word

"We run the competition on a small budget but we find that lack of money often really drives innovation. SPARE is the only organisation of its kind in Bulgaria and because what we offer is very practical in nature, it is popular. Bulgarian education is, in general, highly theoretical,"

Todor Todorov, SPARE Bulgaria coordinator.

Stay tuned for details on the next competition at
www.spareworld.org

Secondary School of Economics Georgi S. Rakovski Varna, Bulgaria

In Brief

Core team

An 'eco-club' of 15-20 pupils (age: 16-17) and a teacher.

Impact and actions

Close to 300 percent drop in electricity consumption over a year, saving € 2100. Pupil and, in some cases, family behaviour changed.

Actions included fundraising, the installation of energy-saving devices, campaigns to change pupil behaviours and external presentations.

What triggered success

Enthusiasm was very useful for building the project.

Support and collaboration with parents, grandparents, SPARE- Bulgaria, WWF, ERSTE foundation, U4energy and the school administration was also invaluable as was persistence. The school has been working on energy efficiency for a number of years.

Teacher's word

"It is very important for the teacher leading the project to involve, and have the support of, other members of the school team."

Bulgarian pupils tackle the size of their footprint

"Our school building is 108 years old," says Nelly Vicheva, biology teacher at Secondary School of Economics Rakovski, "and through our SPARE competition entry we wanted to explore cost-effective ways to reduce its energy consumption." Neli and the pupils in the school eco-club she runs after hours took a step-by-step approach to tackling the size of their school's carbon footprint.

First, they solicited advice from an external expert on the largest consumers of energy and the best means of cutting down their consumption. This helped define priorities and pinpoint the right solutions.

"Some people in our school and parents didn't like to change their behaviour as for them it is more comfortable to do nothing for the environment instead of going out of their comfort zone. It was challenging to work in this situation."

Nelly Vicheva, teacher.

Their next step was to tackle the issue of funds. So, the pupils embarked on fundraising actions such as paper and plastics collection and solicited donations from school authorities and parents. This enabled the eco-club to replace incandescent lamps with energy-efficient ones, set up motion sensor lighting and devices that turn off unused lights. They also installed software to switch off PCs automatically.

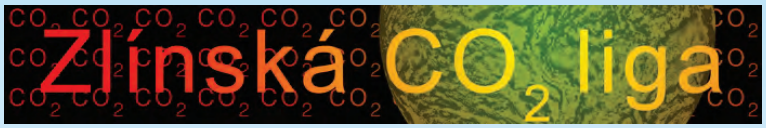
"Stand-by devices waste 10 percent energy in a household," explains Neli, "if all of Europe didn't use stand-by, 10 percent energy would be saved and the environment would be cleaner."

Step three focused on changing the behaviour of fellow pupils and their families. The team developed leaflets, a video and posters to encourage everyone in the school to do their bit. They also presented their work to other schools at a national eco fair to further extend their message and learn from others.

“I have a colleague whose son was in the project and she tells me he is now switching off lamps in every room,” relates Nelly, “and one of my students has changed the light bulbs in his home and applied a motion sensor in the WC.”

The result of this entire effort is a staggering cut-down in electricity consumption by three in the school and a net saving of € 2100 over a year, proving that, even in an old building, a concerted effort can pay off.

“Energy efficiency isn’t part of our national curriculum and I believe it should be and not just in Bulgaria, but in all schools worldwide. We all need to understand the practical ways through which we can reduce unnecessary wastage,” concludes Nelly.



CO_2 League competition, Czech Republic

an initiative of the Veronica Ecological Institute

National laureate

Primary School Czech and Slovak Brotherhood, Bystrice

The Veronica Ecological Institute is the professional work site of the Czech Union for Nature and Conservation Foundation. The institute has existed for 25 years and began running its CO_2 League competition with schools on the eastern side of the Czech Republic four years ago.

Target group

Age 11-15 and age 15-19.

The competition has two separate strands addressing each age category.

Competition process

In each age category, teams are invited to carry out four tasks over the course of the school year.

A task is set every two months and at the end of the task period, teams submit a summary of their work and the results they achieved.

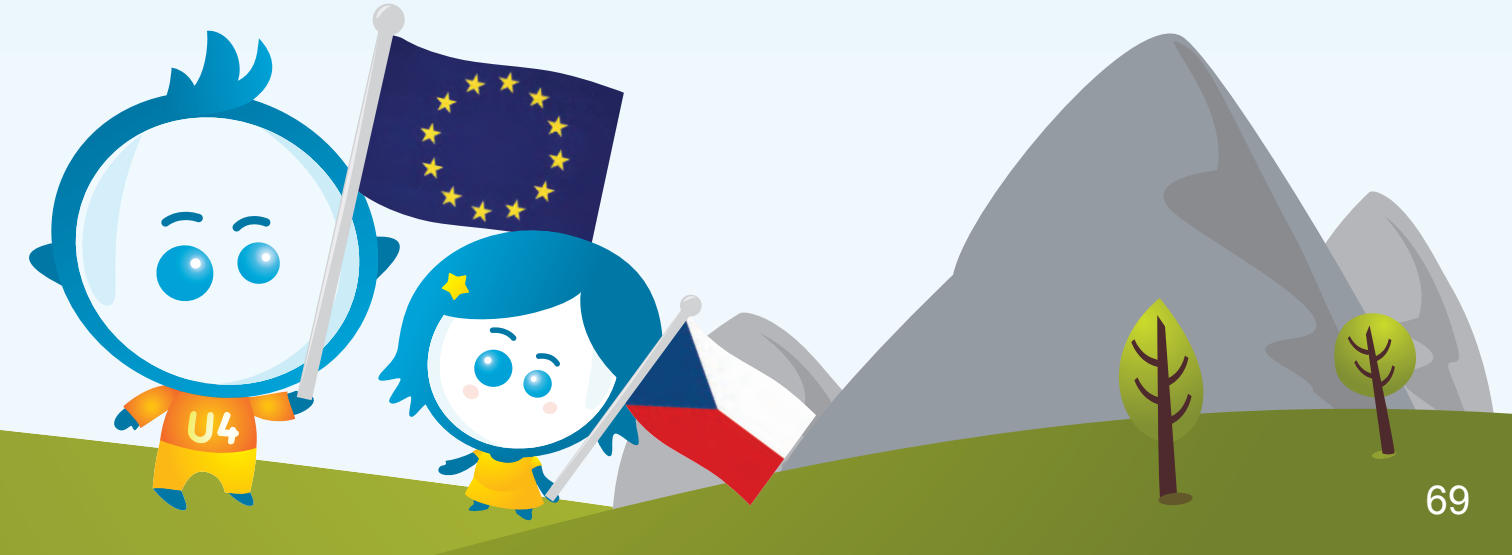
25 teams competed in 2011 with 19 completing all four competition tasks.

Marketing tactics

An email promotion campaign targeted every school in the eastern region of the Czech Republic.

Local newspaper and website coverage was secured.

Strong repeat interest was visible from schools involved in the competition in previous years.



Judging

Two judges awarded points for each task in the competition process. 50 points were awarded for task completion and extra points were given for quality, interactivity and originality.

Cost

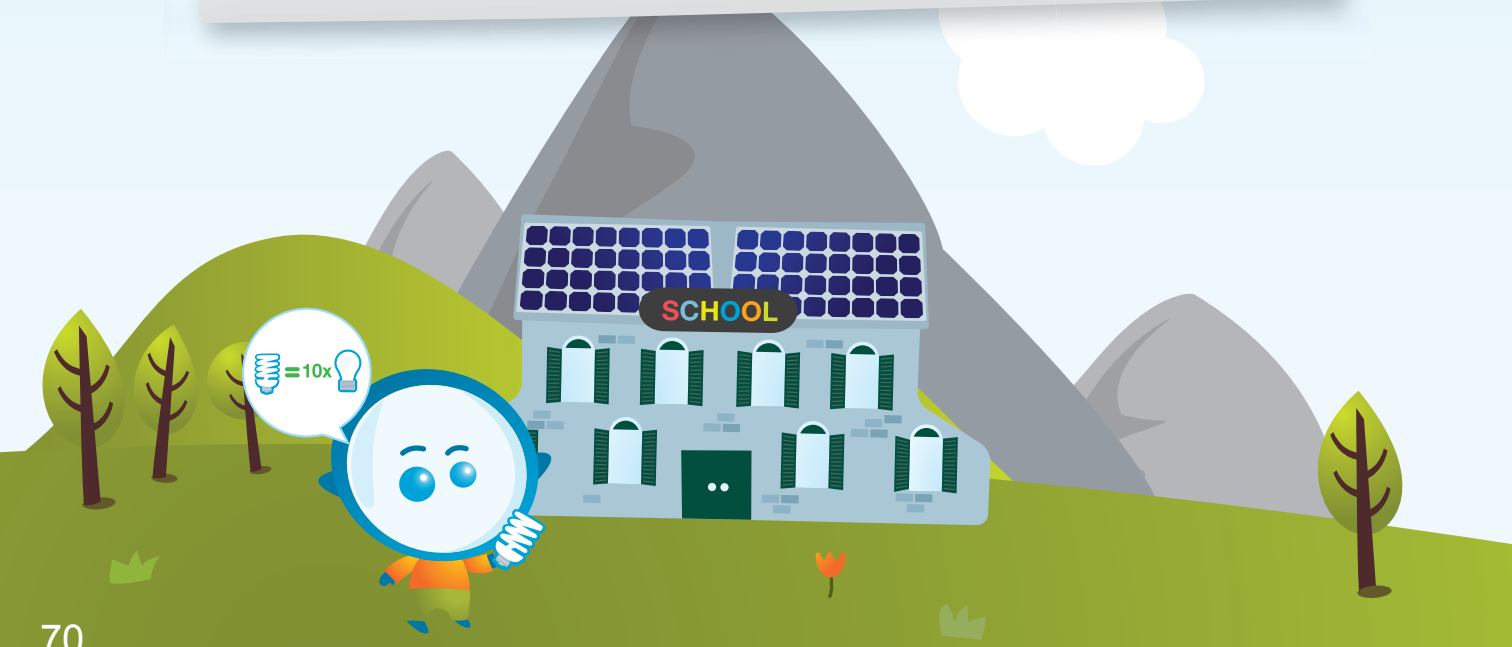
Approximately € 3,600

Organiser's word

"We focused on peer-to-peer communication in the last school year and had some really great submissions although for some, the competition was too demanding. It's extra-curricular so pupils and teachers sometimes struggle to find the time. Next year we plan to make the tasks a little simpler to overcome this,"

Katerina Struharova, Project manager assistant, Veronica Ecological Institute

Stay tuned for details on the next competition at
www.hostetin.veronica.cz



Primary School
Czech and Slovak Brotherhood
Bystrice, Czech Republic

In Brief

Core team

10 pupils (age: 8-15) and 1 teacher.

Impact and actions

Replacement by pupils of LED light bulbs and old electrical devices, lobbying of school management about overheated rooms and a school-wide communication campaign with stickers, posters and school radio announcements encouraging environment-conscious behaviour.

Eco lessons, special events involving parents and the general public, eco notice board, song, quizzes and an eco fairy tale.

Participation in 'Earth hour' with before and after questionnaires to assess the impact of their actions.

What triggered success

Pupils thought out the component parts of the competition very well. There was a positive attitude and a willingness to meet in their free time to cover some of the time-consuming aspects.

Teacher's word

"A very important reason of the project´s sustainability was its structure. We combined a bottom-up approach (all of the project choices were initiated by the pupils themselves) with regular cooperation with the school management."

Fairy tales and Earth Hour keep energy awareness front of mind in the Czech Republic

Peer-to-peer communication was the theme of CO_2 League's competition in 2011-12 and Jitka Vašinová's class from Bystrice on the far east side of the Czech Republic, not far from Crakow in Poland, built this theme into their organisational make-up. "The project team consisted of pupils from different classes and age groups, which was an important step that made the project actual for the whole school community," relates Jitka, who in her normal working hours is a chemistry teacher. The pupils in her after hours 'ecological practice' class came from all the classes in the school and were aged 8 to 15. The type of activities they undertook reflected their age and their work resonated well with their classroom peers.

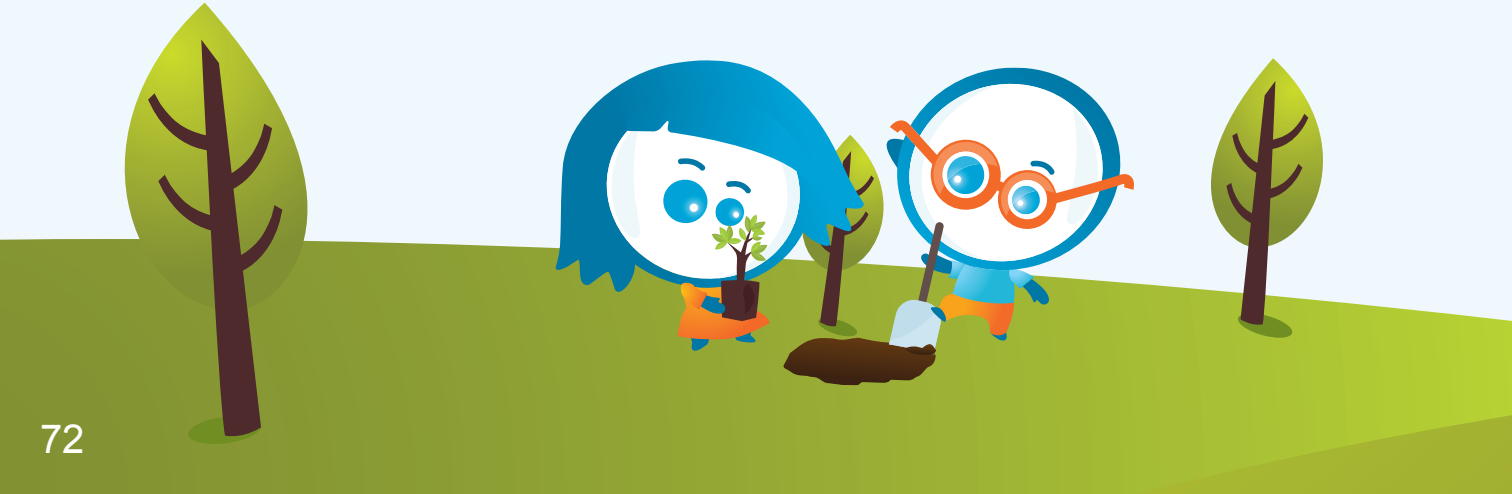
An eco fairy tale, puzzles and a song based on a famous Czech Christmas carol appealed to younger pupils while posters, school radio announcements and questionnaire-gathering captured the imagination of older age groups.

One of the most interesting aspects of the team's work is the before and after questionnaire. Prior to carrying out their campaign, the pupils surveyed their targets about their energy use and habits. The same survey was repeated at the end of the project and they were able to see improved behaviour across five question areas. More people were using ecological forms of transport, walking was more popular, in winter they aired their rooms, plastic bag use was down and they were stopping the water when they cleaned their teeth.

"One of the team's activities was a survey of the general public which took place in the middle of winter. Below freezing temperatures meant the girls involved found it really hard to find people out walking on the streets yet they stuck at it, coming back completely frozen but with completed interviews".

Jitka Vašinová, teacher.

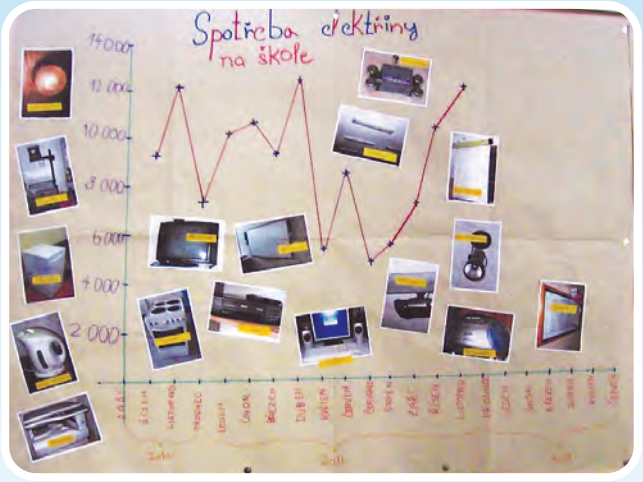
"The group gained both new energy-saving knowledge and soft skills," says Jitka. "They learned how to measure energy consumption and how to lower it and how to present their findings and opinions both to the school management and their friends. Through working with peers, they found out that some measurements were at first difficult for other people to follow and had to be explained again and again."

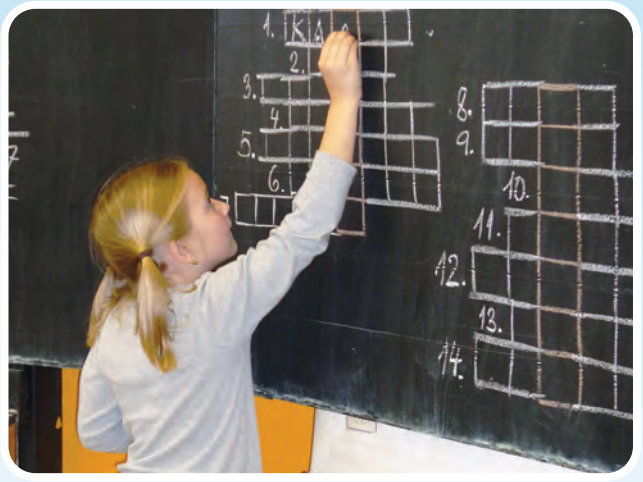


The team managed to involve a large number of people in their activities and proof of their reach is the fact that residents living in their village and neighbouring villages followed ‘Earth Hour’ at their request.

Being part of ‘Earth Hour’, a task set by the CO_2 League, helped to convey to the team the global importance of their actions. “They felt that what they had done was really important”, smiles Jitka.

Was the project difficult to implement? It was challenging to cover all the content and to come up with activities that weren’t only extra curricular but would fit within normal classes. Jitka’s school, however, is adept at doing this. It was awarded the title of ‘Eco School’ in 2006. ”Respecting the environment and educating pupils about sustainable energy has become a part of our DNA,” says Jitka.





One Good Idea competition, Ireland

an initiative of the Sustainable Energy Authority of Ireland

National laureate

Presentation Secondary School, Thurles

'One Good Idea' is a great idea that has turned into an inspirational achievement. In 2011-12, its fourth year, the Sustainable Energy Authority of Ireland's (SEAI) national post-primary competition on energy and climate change attracted a record breaking 296 applications from an impressive 10 percent of eligible Irish schools. Here is how they did it.

Target group

All post-primary schools.

In Ireland, pupils aged 14-16 can take a 'transition year' during which they explore career avenues and take on projects that help them determine future choices. 'One Good Idea' is popular with this year group as well as with students from other years studying Science, Geography and CSPE (civic, social and political education).

Competition process

Stage 1: teams of pupils submit project proposals to the SEAI. Of the 300 or so submissions in for the 2011-12 academic year, 100 were selected for stage 2.

Stage 2: mentors from the SEAI meet the competing teams at their school to explain the competition process and offer research advice. Mentors remain a virtual contact for teams throughout their project preparation. Submitted projects are judged by a panel of SEAI employees and 20 are selected for stage 3.

Stage 3: the 20 selected teams meet for a day of final judging. In 2012 this meeting took place at Ireland's prominent Dublin Castle. Each team set up a stand and presented their work to a set of judges. The winning project is selected on the day amid much media furore.

Marketing tactics

A comprehensive country-wide mailing was carried out to all post-primary CSPE, geography and science teachers announcing the competition.

Extensive media outreach was orchestrated to extend the competition message to more teachers and parents.

Judging and Prizes

11 carefully selected judges help to give the project visibility and recognition. In 2012, these included the Head of Communications at the SEAI, the Head of Transition Year Education at the Ministry of Education, representatives from the Ministry for the Environment who also sponsor the project, from Ireland's Council on Curriculum Assessment and from the Dublin Science Gallery.

Multimedia vouchers were a big pupil motivator according to teachers. The school received a cheque for € 1000 to be spent on something related to environmental sustainability.

Cost

€ 160,000 in the 2011/2012 academic year

Organiser's word

"We have learned a lot over the years and have adapted the competition in accordance. In 2011-12 we focused on 100 schools in the second round and provided mentorship through a mix of physical visits and virtual support. It worked well and we got higher quality applications as a result. The key to success is to listen to the teachers and devise a campaign that suits them,"

Aoife Cannon, Education Programme Executive, Sustainable Energy Authority of Ireland.

Stay tuned for details on the next competition at
www.seai.ie/onegoodidea

Presentation Secondary School Thurles, Ireland

In Brief

Core team

6 pupils (age: 15-16) and a teacher.

Impact and actions

Business consulting to local businesses about their energy consumption, encouraging the use of alternative fuels. Installation of light sensors, better windows and a new boiler in the school.

Savings reported by organisations that the team advised:

- The Anner Hotel saves € 45,000 a year and the Hayes Hotel € 35,000.
- Rockwell College is saving in the region of 20 percent (€ 13,000) per annum in heating costs.

Low energy day that reduced the school's energy consumption by 40% that day.

'Energy awareness night' with parents and community members: electric car supplied by Renault for test drives and a fashion show with dresses made from recycled materials.

'Plug out, get out' campaign encouraging people to switch off their devices and go for a run.

What triggered success

Girls worked in a team, leveraging their Facebook pages to widen their reach. They were in their transition year and had time to focus on the project.

The prizes were also a strong 'carrot'; they all wanted an iPod Touch.

Teacher's word

"Make sure the pupils fully understand what is expected and are committed. Each team member needs to take responsibility for an aspect of the project. Encourage them to get out and about beyond the classroom."

Six girls in Ireland stand up for the environment with lasting impact on local businesses and the community

You feel a strong energy vibe when reading the 'Generation Green' competition submission from Presentation Secondary School. Olivia O'Brien, science teacher, and the six girls who submitted the project let their ideas run free. "We noticed that a local supermarket had installed solar panels and bought an electric van for deliveries so we decided to approach them about their energy consumption. It snowballed from there," says Olivia. The girls began researching alternative energy types and approached other local businesses about cost-effective, energy-efficient solutions.

A local fuel merchant was among one of the many business leaders who listened to the girls' arguments. He is now selling eco-briquettes made from elephant grass alongside traditional solutions such as coal and gas. "The interaction with the world outside of school gave the girls a lot of confidence. It taught them how to approach and interact with adults, encouraged investigative thinking and it improved their time management and IT skills," adds Olivia.

A highlight of the project was an 'energy awareness night'. Dressed in glamorous dresses made from foil, recycled fabrics and other sustainable materials the girls' fashion show drew a large crowd. As did the electric car that the team persuaded Renault to lend for test driving.

"Many jobs will be created in the sustainability sector. This project really encourages pupils to think about further studies and careers in the area of the environment,"

Olivia O'Brien, teacher.

So impressive was interest in the electric car and Olivia's support for her pupils' project, that the Electricity Supply Board gave Olivia an electric car for her personal use. This has provided her students, colleagues and others with an opportunity to test drive an e-car and learn more about them.

"Time management was a challenge," admits Olivia, "especially keeping track of the various sub-projects". She was supported, however, by her colleagues. The physical education teacher helped the girls organise the 'Plug out, get out' run while the art teacher helped create recycled outfits for the fashion show. Even the school principal went about researching a woodchip boiler, under the girls' counsel.

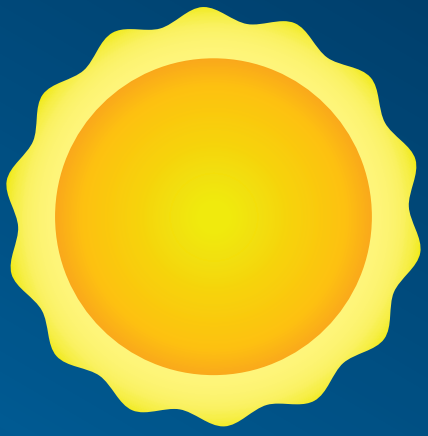
It seems Ireland may have the edge on many European countries when it comes to energy awareness at school. Over 3,600 primary, secondary and special schools in Ireland (>88% of all Irish schools) are currently participating in a programme called Green-Schools, part of the international Eco-schools project funded by the United Nations. 2,573 Irish schools have been awarded the prestigious Green Flag which symbolises a multi-faceted focus on the environment.

U4energy is an initiative of the European Commission and funded through the Intelligent Energy - Europe programme. Please visit the initiative on **www.u4energy.eu** for all good practice examples submitted to the competition.

To liaise with any of the schools featured in this booklet, please feel free to contact the U4energy team at **u4energy@eun.org**.

Intelligent Energy – Europe (IEE) finances projects improving energy sustainability. Launched in 2003 by the European Commission, the programme is part of a broad push to create an energy-intelligent future for us all. It supports EU energy efficiency and renewable energy policies, with a view to reaching the EU 2020 targets. The programme is managed on behalf of the European Commission by the Executive Agency for Competitiveness and Innovation (EACI).
Find out more about our projects and visit us on **http://ec.europa.eu/energy/intelligent/**.

You can also find more material on sustainable energy education, e.g. games, lesson plans, learning activities, bright ideas and other resources on ManagEnergy's Education Corner on **http://learn-energy.net/education/index.htm**.



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