Energyducation competition

Student work booklet

The Energyducation competition is an educational program for vocational students in Europe. In this program you will develop your own innovative ideas around the topic Smart Energy Management in vocational education schools and have the opportunity to exchange your ideas and thoughts with other young professionals in Europe.

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About the competition

Congratulations – you are the first to participate in this new project for vocational students in Europe! You and other students in Germany, the Basque country, Sweden, Switzerland and the Netherlands, are creating and presenting products/solutions for Smart Energy Management.
In addition, you will take part in the international competition, where you can win a Study visit to Germany together with your teammates. In addition, your idea will be presented online on www.energyducation.eu. All participants receive a diploma for your resume. **Good luck!**

Timetable

January – March 2020	Work on projects Student Skype exchanges
10. April 2020	Hand-in deadline
May 2020	Jury choses best projects and winners are announced
8.-13. June 2020	Study visit to Germany

Hand-in

For your project, you need to hand in a digital version of your **sustainable business model** (see page 9-10) and a **short video presentation** of the idea (see page 12).

Competition criteria

An international jury will rate your ideas on the following **criteria** and reward the best ideas:

Innovation	The project solves the task given in an innovative or original way.
	The product or solution is designed in a user friendly and appealing way
Energy saving	The product or solution saves a significant amount of energy. The project gives an estimate on the amount.
	The cost/invest for the benefit (energy saving, user friendliness and environmental impact) is justifiable.
Environmental impact	Through the product/solution the given school saves greenhouse gas emissions. The project gives an estimate on the amount of emissions saved.
	The project outlines how the product/solution benefits the environment.
Product/system design	The product or solution fits the task given.
	The business model is well thought through, all fields are filled in and the estimates given are realistic.
Presentation	The project is presented in a clear, understandable and appealing fashion.
	The students explained the important points in their short video to convince the school to use their project/solution (aim, idea, benefit for school).

Exchange Guide

Student exchange sessions

The competition is international and you have the chance to exchange ideas and receive feedback from other students. Each team has a **tandem project team in another country**, who you will meet online three times via Skype and maybe on the study visit to Germany!

Tandem meeting 1

Get to know each other and compare the findings of canvas one and the problem statement, discuss potential points to put focus on.

Get to know each other:
Introduce yourselves and tell your tandem team a little about you. Where do you live, what profession are you training for, what are your favorite hobbies.

- Play the game of **two truths and one lie**: Each person says three statements about themselves; two must be true and one a lie. Now the other group has to guess, which one is the lie and which are true.
- Afterwards talk about your findings from the House in the wind Canvas and the problem statement: **Which aspects are most interesting for your profession? Do you already have an idea what you want to improve**?

Tandem meeting 2

In this meeting, you present the first outline of the project (idea, how it saves energy, how it serves the environment …). You should also give feedback to the other group.

After listening to the other groups' idea, ask yourself the following questions and give feedback:

- **What did I not understand yet?**
- **What could the other group think about to improve their idea?**

After the meeting talk with your teammates about the feedback and questions you got from the other team: **How can you address these problems/questions?**

_____
_____
_____
_____

Tandem meeting 3

Present the final project to your tandem group. If you have your video already, you can show it to them by sharing your screen. Give and receive last feedback, give tips for the presentation in class.

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_____
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_____

Problem statement for the competition

The text below describes a hypothetical school building. For your project, analyse the situation and develop a creative solution for the energy management of the building.

General description

Imagine a five story, flat-roofed school building (basement, ground floor, floors 1, 2 and 3). There are training workshops and labs in the basement, a cafeteria on the ground floor and classrooms on the remaining floors. The building is equipped with glass windows, which open manually. There are manually adjustable shutters (by crank) for every window. The school has an electrically powered ventilation system as well as an oil heating system. Conventional radiators with thermostatic radiator valves heat the individual rooms. One hundred percent of the electricity is retrieved from the power grid. The school building's lighting system is entirely controlled by conventional light switches. **If you need any other information about the building, costs and usage, feel free to make assumptions.**

Energy use in the building

There are no building automation systems used yet, all thermostats are set to the same temperature resulting in cooler classrooms and hot laboratories, as the machines produce a considerable amount of heat as well. This can be quite uncomfortable and leads the students to make manual temperature adjustments on the radiators or opening windows to let the heat escape, leaving the ventilation system useless.

Potential improvements

The school aims to make better use of their resources, be more energy efficient and ecological. They are open to any products and systemic innovations that aim to address that goal. The school uses a lot of money for energy, which they rather use on energy efficient innovations.
This is the basis for your innovative ideas: **Find the school's weak points in energy usage and find a creative solution or product to tackle one or multiple of these problems.** To achieve that you can work through the following steps and worksheets:

Problem analysis

1. Read the text above carefully and mark passages that contain important information about energy use and management. Study the table on the next page, too.
2. Formulate in one sentence, what the school's main problem is.
3. Analyse the problem in the *House in the Wind* Canvas.

Idea generation

1. Choose one weak point of the school and brainstorm potential ideas for products and system changes that would benefit the school.
2. Pick your three favourite ideas and compare them in the *Evaluate project ideas* canvas.

Sustainable Business Model

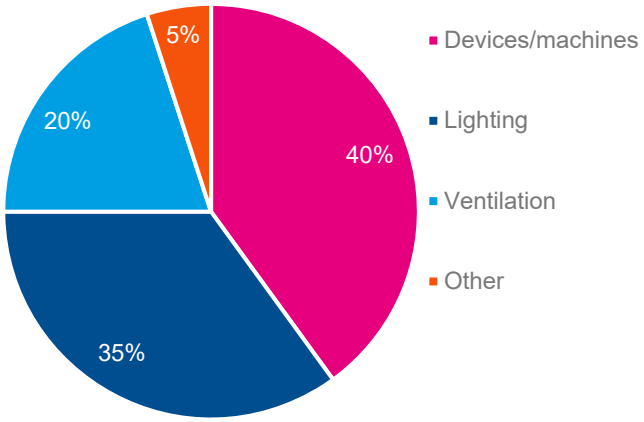
1. Take your best idea and develop a sustainable business model for it.
2. Think about how you will present your idea and create a video storyboard.

Energy consumption of the school

Building date	1975 (Partly renovated 1990)
School days	190/year
Number of students / staff	350
Number of floors	5
Ground layout	40m x 50m
Room height	3m
Windows	1m x 1.7m (width x height)
Number of windows	19 x 24 on each floor (excl. basement)
Ventilation System	Electrically powered
Lamp type	Raster lamp (120 cm) 36W Neon
Average illuminance	335 lx
Average area per raster lamp	10 m^2
Yearly power consumption	80 kWh/m^2
Heating oil consumption (for oil-fired heating)	15 L/m^2
Daily water consumption	15* L/person (15% warm water) (5l Washing hands, 2x9l flushing toilet, 1l drinking water)
Yearly carbon footprint due to power consumption	9.6 kg/m^2
Yearly carbon footprint due to heating oil consumption	42 kg/m^2
Yearly carbon footprint due to warm water consumption	12.8 kg/person

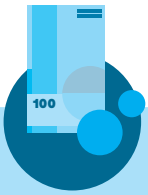
Electricity consumption

On the pie chart on the right, you see the percentage of electricity consumption by user. Only devices using electricity are included (no water or heating).



Impact on the environment

Prob
state



Economic influences

Technologies

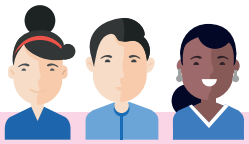
Laws

Existing alternatives

lem
ment

Needs of consumers

Interest groups



Societal and political influences

Project idea

Describe your project idea with a few bullet points

Energy use

How does your idea lower the energy use of the school? How much energy can be saved?

Sustainability

How does your idea lower emissions or impact the environment positively?

Innovation

How is your idea new or orginal? What could you add to make your approach innovative?

Benefits

Does the school benefit further by using your idea and how? e.g. financially beneficial, simpler use

Presentation

How can you present this idea, so that it is understandable for a wide audience?

Enterprise side

Product/project

What is the product/the project?

Customer value

What is the product's/ project's value for the paying customer?

Enterprise

Who implements the idea?

Sustainability value

What is the product's/ project's value for the society and the environment? To which extent?

Implementation

What is needed for the successful implementation of the idea?

Costs

Which costs accrue for the production/implementation (for the enterprise)?

Finances

Marketing/sales

How do the customers/sponsors get interested in the product/project?

Funding

How is the product/project financed?

Application area

Where is the product applied or the project implemented, respectively?

Customer/sponsor side

Revenues

Which are the revenues for the enterprise?

Video Storyboard

For your own project, you are required to make a video presentation.

- The video should be maximum **90s long** or shorter. You are free to choose how you produce your video (film yourselves presenting the project, use an animated PPT-presentation, etc.).
- **The only requirement is that the video has to be English and needs a verbal explanation** (either voice-over in the background or you film yourselves presenting).

First, create a **storyboard** for your presentation video. Think about the target audience as well as what you learned from the "How to present" lesson.
You need to present your idea in a **clear, understandable fashion**. Include **all relevant information** to convince the school on your idea (aim, idea, benefit for school and the environment etc.).

Then produce your video: You can use any software you like, if you need help, search for **tutorials** online on how to produce short videos.

Time (total 90s)	Message (i.e. idea, product description, benefits, slogan ...)	How? (Graphics/ person talking to the camera/ doing a voice-over/ animated PPT etc.)