



Energyducation competition Teacher support material

These materials serve as a guide for teachers implementing the Energyducation competition in their classes.

The Energyducation competition is an educational program for vocational students in Europe. Students develop their own innovative ideas around the topic Smart Energy Management in vocational education schools and have the opportunity to exchange their 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! Teachers and students in Germany, the Basque country, Sweden, Switzerland and the Netherlands, are working on creating and presenting products/solutions for Smart Energy Management. All in the name of international student and teacher exchange this program and the student hand-in are in English, however, feel free to speak your own language in the individual lessons. **Thank you for participating!**

Lesson checklist

Before you start the lessons please make sure, you thought about or fulfilled the following steps:

1. Let all participating students sign the **data policy statement** and send a scan to melanie.graf@myclimate.org or per mail to Foundation myclimate.
2. Study the **teacher guide** and the **students' materials** and prepare the “**preparations beforehand**” points.
3. Fill out the **lesson plan** Excel-sheet for your lessons. Plan the **international meetings** together with your **tandem teacher**.
4. If you like, you and your tandem teacher can organise a “**Snack exchange**”. For this, the students send each other a snack package with snacks from their own country. They should arrive before the first exchange meeting. The students try the snacks and talk about it in the first exchange meeting. Please only send things that don't go bad in the mail.
5. Book the **computers** at your school or inform the students to take a laptop computer for lesson 3 and the international meetings. Make sure you have **internet access** for these lessons.
6. Try out the activities and links you want to use for your lessons (mainly lesson 1-3).
7. Print out the student materials:
 - **Student booklet**: one per group or student as an **A4-booklet** (so the double-page canvases are A3 format). If you cannot print A4-booklets, print the canvases separately on A3 paper.
 - **Worksheets** for certain lessons and **guidance materials** as you see fit.
8. **Implement the competition with your students!**

After the lessons

After the student groups hand in their project materials, evaluate them with the evaluation sheet. Then, **upload all student hand-ins to the mycbox share** in your country folder. Please label the files like this: GroupNumber_DocumentName_TeacherSurname (i.e. Group1_Video_Graf).

Also upload **your evaluation excel sheet** and comment, which **three projects** you thought were best and why. An independent jury will choose the best projects from the given materials, but as you supervised the competition in class, your input can be very helpful.

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Competition educational goals

Educational Goals	Knowledge and skills acquired or used
1. Motivate students in vocational education to work on projects through an international competition	<ul style="list-style-type: none"> • Learn the process of project work or apply project skills to new topic • Learn team working skills
2. Learn business and presentation skills while solving an energy problem using smart energy solutions in an innovative and creative way	<ul style="list-style-type: none"> • Learn to construct a business model for a product or system solution connected to their profession • Develop innovative and realistic ideas for smart energy management • Present project ideas in a professional way
3. Enable international exchange between VET students	<ul style="list-style-type: none"> • Enable international exchange between young professionals • Broaden the horizon of students • Give students an insight in different work environments • Improve English skills and get motivated to use them in a professional setting

Lesson overview

Lesson	Duration	Materials
1. Sustainability: Ecological, economic and social implications of energy use part 1	45 min	PPT Presentation Lesson plan with additional Information, videos, links
2. Sustainability: Ecological, economic and social implications of energy use part 2	45 min	PPT Presentation Lesson plan with additional Information, videos, links
3. Introduction competition	45 min	PPT Presentation Student project booklet
4. Introduction into project work optional, individual for each school	Individual	Introduce project work according to your school's guidelines, if project work was not yet introduced. For students who worked on projects before, a refresh of the project work steps could be useful.
5. How to present a project or product optional	45 min	Lesson plan Work sheet
6. International exchange meeting 1: Get to know tandem team	45 min	Guideline for talking topics in student booklet Lesson checklist in teacher guide
7. International exchange meeting 2: Present concept to tandem team	45 min	Guideline for talking topics in student booklet Lesson checklist in teacher guide
8. International exchange meeting 3: Present final project to tandem team	45 min	Guideline for talking topics in student booklet Lesson checklist in teacher guide
9.-14. Individual project work lessons or as homework assignment	6-8 x 45 min	Student booklet: Assignment outline document Canvases to structure and support idea development Hand-in template for business model Explanatory material in teacher guide
15. Present project in class	15 min per group	Evaluation criteria Lesson plan

Teaching materials

The table below lists all of the teaching materials provided to implement the competition in school. We advise to look through the materials in the order listed.

Documents	Content
Teacher guide Energyducation competition	Teacher information and checklists Lesson plans 1-17 Support materials
Student booklet Energyducation competition	Competition information Competition problem statement Project development materials (canvases, video storyboard) International exchange guide
Lesson plan for teachers (Excel)	Table to plan the competition with your tandem teacher
Powerpoint presentations: L1-2 Ecological sustainability and energy efficiency L3 Energyducation competition	Teacher inputs for lessons 1-2 and 3 Ecological sustainability Competition concept
Support materials: Guidances canvases 1-3	Explanation on use of canvases for project development Can be printed for students or explained by the teachers
Additional materials: L1 Puzzle “Energy sources and consumption” L5 Worksheet “How to present”	Materials that can be used in the lessons
L17 Evaluation projects (Excel)	This matrix helps you evaluate the projects

Lesson 1 and 2 – Sustainability

Learning content:

- The students know about the causes of climate change and its impact
- The students learn to assess their own footprint and how to reduce emissions
- The students learn the importance of energy efficiency and renewable energy for ecological sustainability

Materials:

- PPT-Presentation «Ecological sustainability and energy efficiency»
- Puzzle «Energy sources and consumption»

Timetable Lesson 1 and 2 (2x45 min) see next page

Time	Content/Programm	Method	Materials / Media
00:00 (15')	Introduction Pictionary	Plenum	PP-Presentation „Sustainability“ (Slide 1-6)
00:15 (35')	Climate change 5' (Optional: Greenhouse gas effect 5') Climate scenarios 15' Sources of greenhouse gases 10' Video carbon emissions NYC 5'	Teacher input	PP-Presentation (S. 7-40)
00:50 (25')	<i>Choose 2-3 of the following activities to do with your students. If you have more than two lessons time for ecology, feel free to do more of the activities. Explanations to the activities are in the notes of the PP-presentation</i>		PP-Presentation Slides
(5-10')	Topic renewable and non-renewable energy: Puzzle „Energy sources and consumption“	Small groups	Puzzle „Energy sources and consumption“ / (Solution S. 42-43)
(10-20')	Topic ecological footprint: Calculate Footprint (time depends on calculator in different countries) myclimate.org calculator is 10' but quite superficial (Try out other calculators beforehand)	Individual	Online tool (Smart phone or computer needed)
(5-10')	Review footprint (only if you calculated footprint)	Plenum	Explanation on slides (S. 44-45)
(10')	Possibilities to reduce energy consumption Discussion of results	Small groups Plenum	PP-Presentation (S. 46-48)
(5')	Quiz on energy efficiency	Plenum	PP-Presentation (S. 49-53)
01:15 (10')	Energy game (www.future-energy-game.ch)	Individual or small groups	Online tool (Smart phone or computer needed) (S.54 PPT)
01:25 (5')	Short discussion on potential for Smart Energy Management on the environment	Plenum	PP-Presentation (S. 54-56)
01:30	End of lesson 1 and 2		

Additional links lesson 1-2

If you have additional time or like to go into depth about the causes of climate change and sustainability here are some interesting links you can let the students look at.

Time	Topic	Link
(10')	Causes of climate change Let the students study the Bloomberg graphs about the causes of global warming. Small groups or individual work Language: English	https://www.bloomberg.com/graphics/2015-whats-warming-the-world/
(10')	Passive house video Let the students watch the video on passive house construction Plenum or small groups Language: English	https://www.youtube.com/watch?v=Hz6qomFM_dw
(10')	Sustainable Development Goals Let the students explore the UN sustainable development goals on the website. They should find the goals that are connected to energy efficiency and renewable energy. (Mainly Goal 7, 11 and 13)	https://sustainabledevelopment.un.org/?menu=1300
(10')	SDG TED talk Advanced students that understand English well could also watch the TED talk about the question if the Sustainable Development Goals can be met by 2030	https://www.youtube.com/watch?v=o08ykAqLO_xk

Lesson 3 – Introduction competition

Learning content:

- The students know how the competition works and what they will have to hand in
- The students know the timeline of their own class
- The students know about Skype and how to use the tool

Materials:

- Presentation “Energyducation competition”
- Teacher guide for Skype exchanges
- Student booklet

Preparations beforehand:

- ☐ Add the information for slides 12, 22 and 23 for your own class
➔ Your classes timetables and groups
- ☐ Register yourself on skype and put your address in slide 24
- ☐ Ensure that every group has a computer or laptop and an internet connection for the lesson
- ☐ If you are unsure with Skype here is a tutorial: <https://edu.gcfglobal.org/en/skype-2016/>

Timetable Lesson 1 (45 min)

Time	Content/Program	Method	Materials / Media
00:00 (5')	Introduction to the competition Introductory slides	Teacher input	PP-Presentation „Energyducation competition “ (S.1-4)
00:05 (20')	What is it about? Who is involved? How does it work?	Teacher input	PP-Presentation (S.5-19)
00:25 (5')	Introduction to the individual program for students Form groups and hand out student booklet	Teacher input	PP-Presentation (S.20- 21) Student booklet
00:30 (10')	Skype registration Test Skype in groups	In project groups	PP-Presentation (S.22)
00:40 (5')	Questions about competition	Plenum	
00:45	End of lesson		

Lesson 4 – Introduction project work

Information:

This is an optional lesson: Many of your students will already have worked on projects and be familiar with the principals. Then you can skip this lesson or use it to freshen up their knowledge.

If you have not yet worked on projects with your students, you can use the topic to introduce them to it. However, as different schools use different approaches to projects work, we do not provide a lesson template. Instead we recommend you to **use your schools own approach to project work**.

Learning content:

- The students know the basics of project work and project management
- The students understand the basics of teamwork and how to divide the work
- The students know what steps to take when working on a project

Preparations beforehand:

- ☐ Prepare your introduction or refresher lesson for student project work
- ☐ See which parts are relevant for more hypothetical projects such as the competition projects (i.e. analysis, planning, decision process, reflection, giving/receiving feedback)
- ☐ See if the project development with the canvases fits the project steps you use
 - E.g. “House in the wind”-Canvas: Analysis of the situation, research
 - Idea development Canvas: Decision process, planning
 - Sustainable business model Canvas: Planning, conceptualisation

Lesson 5 – How to present

Information:

This is an optional lesson. The aim is to let the students practice short presentations like project pitches in front of stakeholders. If your students need to develop presentation skills in their curriculum, this lesson can be very useful.

For classes with English in their curriculum, students can also hold these presentations in English. It could be useful to practice business vocabulary in English class parallel to the program.

Learning content:

- The students learn to identify the interests of different stakeholders.
- The students know how to adapt presentation content to different audience interests and can improve their presentation based on the feedback from the audience.
- The students know the advantages and disadvantages of various presentation media.

Materials:

- Worksheet „Energyducation - How to present ideas“

Timetable Lesson 5 (45 min)

Time	Content	Method	Materials
00:00 (5')	Introduction The teacher gives a brief overview over the lesson Read the Introduction and clarify any questions	Plenum	Worksheet “Energyducation - How to present ideas” Part One
00:05 (15')	Group formation and work through step 1 Form four groups (no more than 4 people, in larger classes make more groups). The groups work through the worksheet from the beginning until they completed the “step 1” section. By the end of this section, each group chooses one of the four target audiences that they want to address	Groups	Worksheet: Step 1
00:20 (25')	Setting the content and present The Students work through the steps 2 – 4. Each group presents their result to ONE other group, meaning that: the groups “banks/sponsors” and “general public” present their result to each other – the groups “building owners” and “power grid operators” present their result to each other. The groups will provide constructive feedback to each other.	Groups	Worksheet “Energyducation - How to present ideas”
00:45	End of the lesson		

Lessons 6 to 16 – Project development

Information:

This is an overview schedule for lessons 6 -16. These lessons consist of guided but **independent teamwork**. The students work through three canvases, in order to analyze the competition problem statement from multiple perspectives, find and evaluate different project ideas and develop a product or system solution in form of a sustainable business model. They will also produce a short video on their product or system solution to present their idea. Furthermore, the students will attend three meetings (via skype) with their respective partner groups in their tandem class.

Learning content:

- The students learn to analyze problems from multiple perspectives and develop their own innovative solutions for it.
- The students learn to present their ideas in English to their target audience with a modern medium

Materials:

- Student booklet Energyducation
- Canvases: “House in the wind”, “Project idea evaluation”, “Sustainable business model”
- Guidance materials to the canvases
- Excel-file: Lesson plan for teachers

Preparation beforehand:

It is very important, that the teachers arrange and coordinate the three appointments with their respective tandem class. We therefore recommend setting the meetings in the following succession.

- ☐ Fill out the **lesson plan** for teachers and coordinate the three tandem meetings with your tandem teacher
- ☐ Pair up your teams and make sure the teams have the skype addresses of their tandems before the meetings
- ☐ Make sure the students have suitable equipment (computers or tablets and internet access) for the exchange meetings
- ☐ Study the student materials for the exchange meetings as well as the project materials so that you can explain it to the students if they have difficulty understanding
- ☐ If necessary prepare a list with key vocabulary *English – your language* to hand out

Lesson plan 6-16 (45min each):

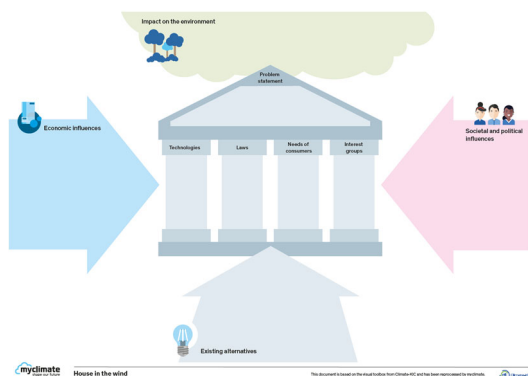
Lesson 6	Read the problem statement and work through canvas one "House in the wind".
Lesson 7	<p>Tandem meeting 1: Get to know each other and compare the findings of canvas one and the problem statement, discuss potential points to put focus on.</p> <p><i>The aim of the first meeting is to get to know the students from the tandem group and outline their collaboration throughout the competition. It is thus optimal to arrange the meeting after the students studied the problem statement and in the beginning of the project development process. However, you can also set the meeting at the very beginning if it is not possible.</i></p>
Lesson 8	Brainstorming session: Find multiple ideas and begin to work with canvas two "Evaluate your project ideas".
Lesson 9-10	Choose one idea from canvas 2, begin with canvas 3 "Sustainable Business model" and prepare a brief summary of your "idea so far" for tandem meeting 2.
Lesson 11	<p>Tandem meeting 2: present the first outline of the project (idea, how it saves energy, how it serves the environment ...); give/receive feedback to/from the respective partner group.</p> <p><i>The second meeting should take place when the students already have a brief outline of their project in order to receive constructive feedback and implement it.</i></p>
Lesson 12	Implement feedback, finalize project idea with canvas three
Lesson 13	Produce the presentation video (planning the detailed storyboard and shooting or animated PPT and voice-over)
Lesson 14	<p>Tandem meeting 3: Present the final project idea to the respective partner group. Give and receive last feedback, give tips for in class presentation.</p> <p><i>The last meeting is dedicated for presenting their final project to each other. It can take place anytime between meeting 2 and before the presentations in class.</i></p>
Lesson 15-16	Finalize the hand-ins for the competition (90s video, sustainable business model canvas, short description of approx. 250 words) for submission.

Guide Canvas 1 - House in the wind

Goal of this step

The goal of this step is to sort the facts regarding the subject and thus gaining an overview of the starting position. With this step, you will make a first division between facts, which describe the problem itself, facts, which cause the problem, and those, which could change the starting position.

Description of the canvas



The roof describes the current problem and the cloud its effects on the environment. The pillars, which carry the roof, symbolise the direct causes of the problem. The arrows around the house stand for the larger influences, which have an effect on the problem and its direct surroundings.

Procedure

1. Describe the problem as precisely as possible. What exactly is the problem? For whom or what is it a problem? How large is the problem? Summarize the facts regarding the topic.
2. Fill in the other fields (no matter in what order)
 - Pillars: List the technologies, laws, consumer needs and interest groups (incl. their position/opinion), which are connected with the problem. You find the corresponding information in your documents regarding the topic or if need be in the internet.
 - Arrows: Note here, which larger influences from the economy (e.g. costs and prices), society (e.g. cultural aspects) or politics (e.g. laws or political positions) come to your mind. In addition, list existing solution approaches (products, projects, firms, laws, local initiatives, etc.). You can base this on your own knowledge and sources in the internet.
 - Cloud: Describe as precisely as possible (ideally with numbers), which effects the problem has on different parts of the environment. Link your knowledge of the topic with your knowledge on the environment.

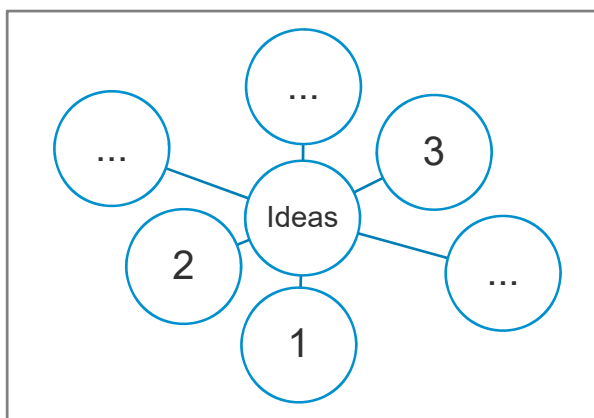
Guide C2 - Project idea evaluation

As a second step, you will use an evaluation canvas that allows the comparison of ideas on their strengths and challenges in six different dimensions.

Procedure

First, you need to gather multiple general ideas through a **brainstorming session** with your group. Write down anything that comes to your mind as a project idea. In a second step, discuss which three ideas you like the most.

Now you **evaluate the three chosen ideas** with the canvas. Fill in all the six boxes for one project idea at a time, as this helps to better focus on the individual idea.



Project idea	Energy use	Sustainability	Innovation	Benefits	Presentation
1					
2					
3					

myclimate ENERGY EDUCATION Evaluate your project ideas

Aspect	Description
Project idea	Describe your project idea as detailed as possible with bullet points.
Energy use	Calculate how much energy can be saved if you would be able to implement your idea. Be as precise as possible.
Sustainability	How does your project have a positive effect on society and the environment? If you can, calculate how much of the emissions the idea could reduce.
Innovation	Is your idea new? Has a similar project already been implemented somewhere before? Do some research in order to answer the question. Is your idea particularly well suited to the problem?
Benefits	Apart from saving energy, how does the school benefit from your idea (is the lighting better for concentrating, is there a financial benefit, is it easier to use etc.?)
Presentation	How well can you present the idea to an audience (would it be too technical or is there an appealing way to present the project?) Think about the school headmaster, financial advisor and building technician as your audience.

Selection

After you filled in every box in the canvas, compare all the three ideas in each category and select your favorite idea. You will continue with the selected idea for the rest of the competition.

Guide C3 Sustainable Business Model

The Sustainability Business Model canvas allows you to gain a good outline of your project/product considering different points of view: It summarizes the most important aspects of your project/idea on one single page. Successful businesses create these models commonly for their products (see for example [Airbnb business model](#)). As well as a summary, it is very helpful to identify the strengths and challenges of your project related to the different environments. The boxes in the canvas represent all the important parts of a business. As you will submit this canvas into the international competition, please fill it in in English.

Procedure

Work yourself through each box of the *Sustainability Business Model canvas* and try to find the most important aspects. In a second step, go through each box again and complete missing aspects. It is very important that you try to put yourself into the position of the stakeholders (e.g. customers, the producer etc.) for each box. The following description of each box helps you to understand which information is required in every box. After filling in every box with all the information, try to summarize your findings and evaluate the most challenging, as well as the strongest aspect of your project.

Aspect	Description
Product/project	What is your product/project (what do you sell to the costumer)?
Enterprise	Who implements the project? Who is responsible for the different parts of the implementation?
Implementation	What resources do you need for implementation (employees, corporate partners, etc.)? Necessary legal documents/official approvals?
Costs	What is your financial input to implement the project? How much for what (employee wages, development costs, etc.)?
Revenues	What are the revenues of the project? How much income comes from the different parts of the project?
Costumer value	Benefits for the costumer compared to other products on the market? Why is the project/product beneficiary to the costumer?
Sustainability value	How is the project beneficiary in the means of environment, society and economy? Why is the project sustainable?
Marketing/sales	How do you promote the project? How do you gain the interest of sponsors and costumers?
Funding	How do you finance the project? Do you need external funding (Banks, Sponsors, etc.)?
Application area	In which region/environment do you implement your project (single costumers, only in a limited area, word wide, etc.)?

Before you hand in the Sustainable Business Model canvas, show it to an uninvolved person, for example friends or family. Do they understand the model without you explaining it? If it is not understandable, add descriptions where needed.

Lesson 17 – Project presentation

Learning content:

- The students present their project and learn to answer questions about it.
- The students learn to ask critical questions and make constructive observations.

Materials:

- Excel-sheet «Evaluation projects»

Preparations beforehand:

Gather all videos and additional materials the students want to present on one computer and test them beforehand. Like that, you do not lose time during the lesson with copying of the videos.

If you have six groups or more, you need an additional lesson for the presentations. Calculate 5-7 minutes per group plus 10 minutes for introduction and further procedure of the project.

If you have very few groups per lesson, you can extend the discussions or ask the groups to extend their presentation.

They could elaborate on more aspects of the business model or they could report on the feedback their partner group gave in their Skype meeting.

After the lessons

After the student groups hand in their project materials, evaluate them with the evaluation sheet. Then, **upload all student hand-ins to the mycbox share** in your country folder.

Please label the files like this:

GroupNumber_DocumentName_TeacherSurname (e.g. Group1_Video_Graf).

Also upload **your evaluation excel sheet** and comment, which **three projects** you thought were best and why. An independent jury will choose the best projects from the given materials, but as you supervised the competition in class, your input can be very helpful.

Timetable Lesson 17 (45 min)

Time	Content/Programm	Method	Materials / Media
00:00 (5')	Introduction The teacher introduces the students to how the lesson will be conducted.	Teacher input -	
00:05 (35')	Each project group presents their project. <ul style="list-style-type: none"> - Show video (90s) - The students have 2 more minutes to elaborate - They have to be sure to mention the following points (in video or presentation): <p> Idea: How the product/system works Aim: Which resources are lowered Benefits: e.g. financial, simpler use etc. Sustainability: Environmental benefit </p> <p>After the presentation, the other students should ask questions about the project and can give constructive feedback.</p> <p>During the presentations the teacher rates each group on their presentation of the project (Excel: Evaluation project)</p> <p>If you like you can also let the students rate the other presentation on:</p> <ul style="list-style-type: none"> - How innovative the idea is - How convincing and appealing the video was <p>Calculate 5-7 minutes per group</p>	Student presentations	Show videos with beamer Excel-sheet: Evaluation projects
00:40 (5')	The teacher tells the students how the project will continue (see timetable) and reminds all groups to hand in the project materials (video and business model canvas) digitally to the teacher. End of lesson	Teacher input	

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