



Renewable Sources in Use

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Students

Groups: 3 classes (68 students)
Age: 17
Language: English and Hungarian (Physics in Hungarian)
Level: intermediate



Prior knowledge

Basic knowledge is required in

- using ICT tools
- analysing and making diagrams
- types of energy and measuring energy

Aims

- to raise students' awareness of environmental issues
- to sensitise students for social problems
- to inspire critical thinking and problem solving
- to receive a better understanding on the world surrounding them through Physics
- to develop different skills (digital, communication and collaboration skills)
- to teach students how to gather information from provided sources, how to analyse their experiences
- to stimulate students' interest in science matters



Methods and techniques

- searching for new information self-autonomously
 - worksheets - leading students step by step
 - making presentations
 - using e-learning materials
 - working in pairs / in groups
 - making online surveys, evaluating results
 - data analysing and making diagrams
 - acting out role-plays
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- using smartphones / tablets
 - padlet - to create dashboards for mindmapping
 - Microsoft Office (Word, Power Point, Excel)
 - Prezi
 - kahoot - to test students' knowledge

Procedure

To warm up:

- Why is it important to talk about this topic? (discussion about global issues)
- mindmapping: drawing spider diagrams, planning logos
- wordbuilding: matching the phrases with their descriptions

General information about renewable sources – students' presentations and essay writing

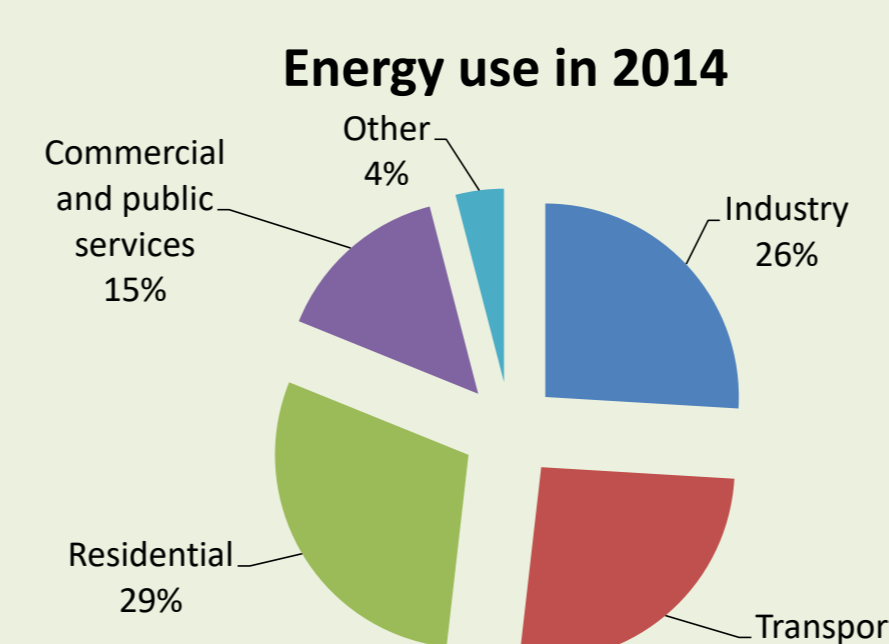
(sustainability, energy generation, potential of different renewable energy sources, pros and cons of their use, storage problems, suitable area required, environmental impacts)

comparison :

renewable sources in Hungary, in Europe and all over the world

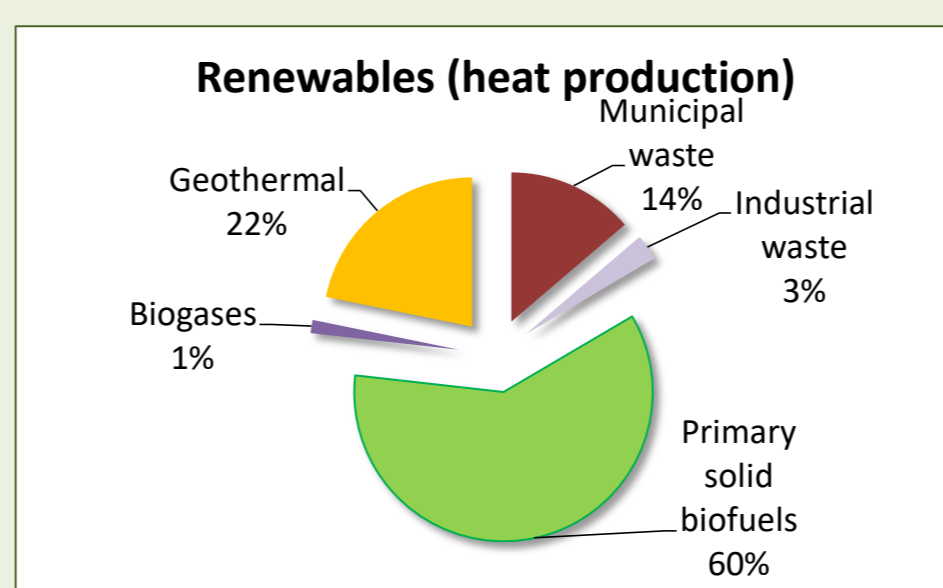
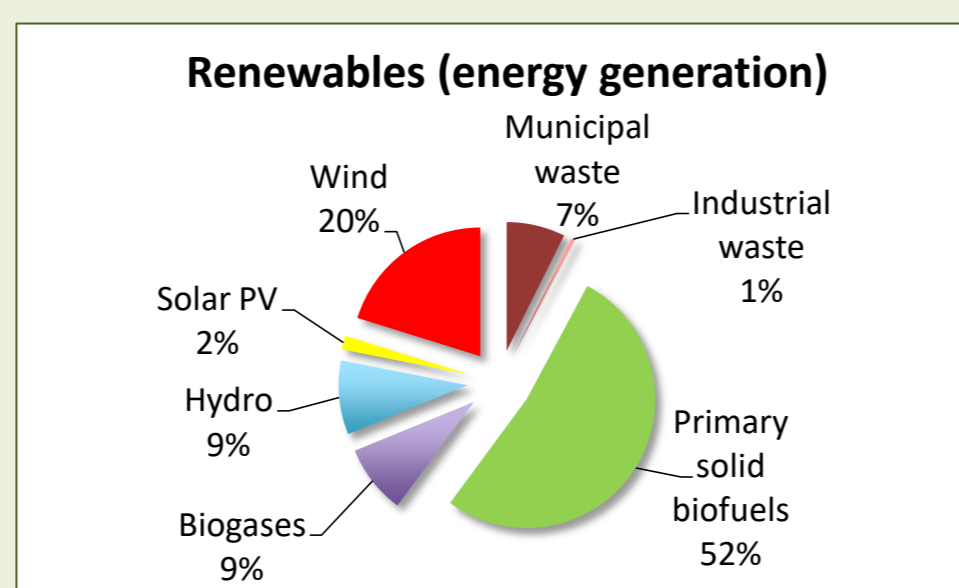
Energy use in kWh/day/person (2014) in Hungary:

- Residential : 14.35 kWh/d/p
 - Industry : 12.704 kWh/d/p
 - Transport : 12.662 kWh/d/p
 - Commercial and public services : 7.27 kWh/d/p
- (Data source: www.iea.org.)



Currently used renewable energy sources (2014):

- primary solid biofuels : 4.487 kWh/d/p
- geothermal: 0.416 kWh/d/p
- biogases: 0.245 kWh/d/p
- wind: 0.1824 kWh/d/p

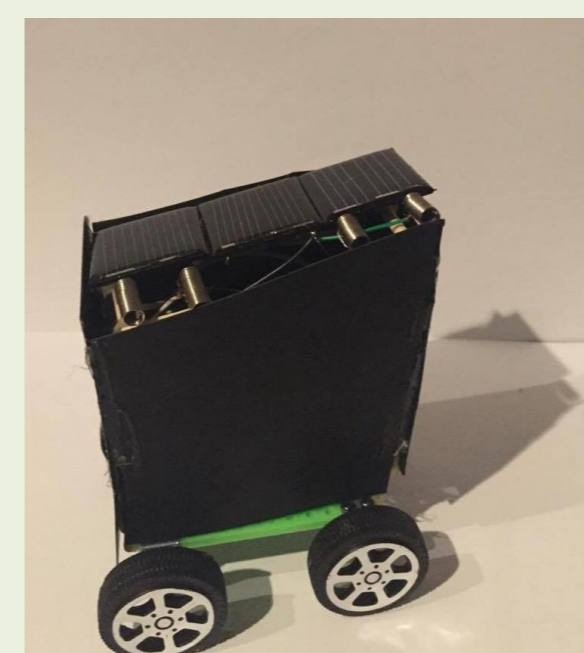
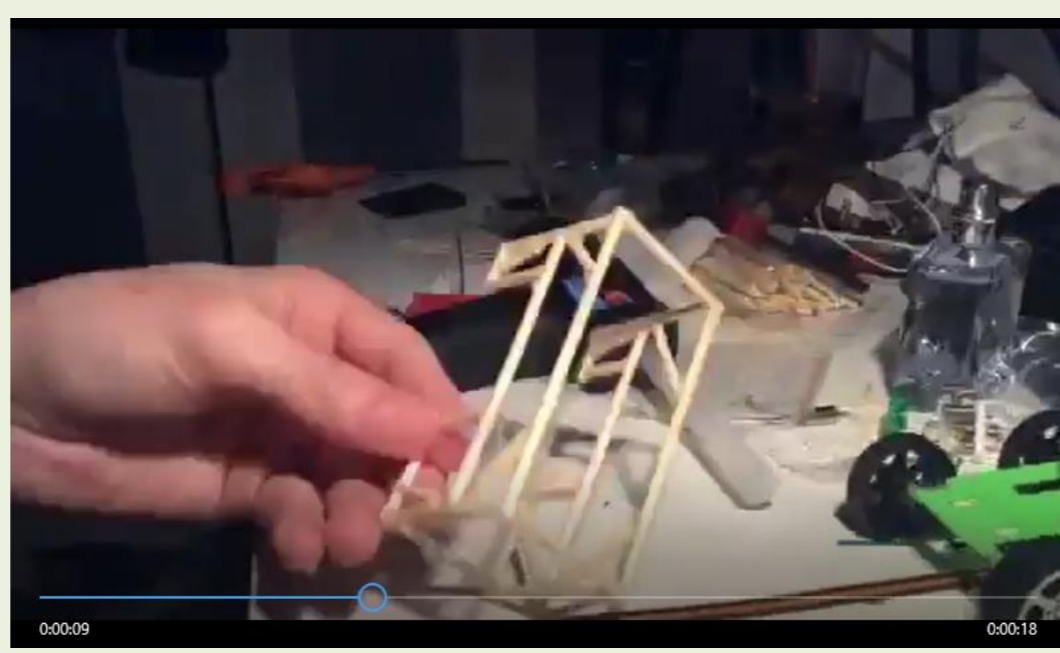


Role plays

Be a researcher! - Being a member of a researchers' team design a tender for developing a type of renewable sources in your chosen country. Give an explanation as well.
(material: country cards with relevant basic information)

Be an inventor! - Planning and describing a new invention that works with a type of renewable energy source.
(optional: creating it)

A small car was made which works with a solar module.



Good practice in Hungary

Introducing different effective methods already in use in Hungary according to the students' inquiry based materials:

- Geothermal energy use in the Zoo in Budapest
- "Village in a high-rise block"- using solar energy in the 3rd district of Budapest

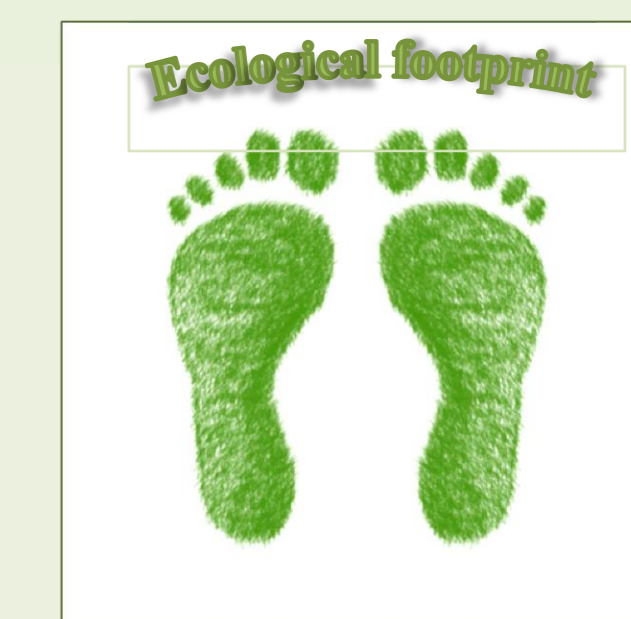
Having students make individual research work and presentations according to some predefined criteria and share the results with rest of the class.

Future plans

Programme is to be continued. We would like to add more and more new students to the project and look for new partners internationally to share ideas and think together what we can do to protect the place where we live, our planet.

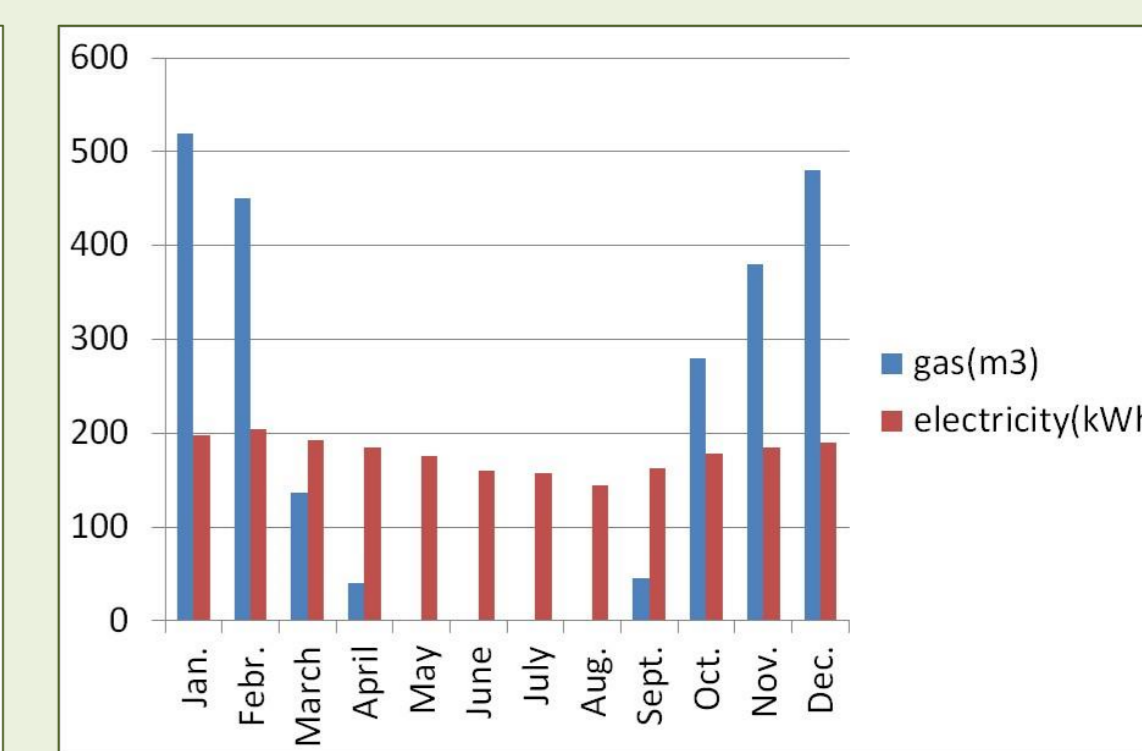
Ecological footprint

- facts about environmental problems
- definition and the five categories of ecological footprint
- comparing and contrasting developed and developing countries
- calculating the students' ecological footprints of their own and comparing the results to the average value in Europe and all over the world
- making online survey - summarising and analysing the results
- aspects we didn't take into consideration during the calculation
- "Together for a Better World"- making suggestions for reducing our ecological footprint.



Design your "green" house

Planning a house which works with PV system according to analysing the family's total energy demand and its monthly and daily fluctuation, the sunny hours and the irradiance in Hungary.



Making calculations how many modules are needed to supply the family demand and determine the payback period for appliances.

To have fun

Organising an excursion in the nearby forest with some stops where some tasks were required to be solved to check the students' knowledge.

Results

- a wide range of the participants' skills were developed

Some changes in students' attitude:

- taking more responsibility in everyday life
- increase in awareness of social problems
- higher motivation

