



Case study G

Basic data

Title of Research Teaching Unit	Renewable sources of energy
Unit created by	Da Vinci School, Prague (CZ)
Based on Concept	Descriptive statistics
Concept created by	BORG Deutsch Wagram
Date of teaching	21/11/2023
Number of students in class	7
Number of migrant students	0

1. Unit Description of Research Teaching Unit

Title	Energy sources in the European Union
Teaching unit concept	Descriptive statistics (Wien 3)
Age of students/grade	16 and more
Length of the unit	90 minutes
Mathematical topic	Statistics
Prerequisite knowledge	<ul style="list-style-type: none">• Percentages• Basic concepts of statistics (average, modus, median, variance, standard deviation)• Use of a spreadsheet (not necessary)
Materials needed	<ul style="list-style-type: none">• Worksheet• Access to the Internet• Calculator or spreadsheet
Objectives	<ul style="list-style-type: none">• To learn basic facts about European production of electricity• To think and discuss about energy, its sources, production and consumption• To read and create graphs• To calculate some basic characteristics of a population
Notes on work with migrant students	<ul style="list-style-type: none">• Vocabulary difficult for migrant student – use of a dictionary or a translator needed

Energy sources in the European Union

In the European Union, renewable energy sources account for the largest share of electricity generation, followed by fossil fuels and nuclear power. The percentage of renewables and other forms of energy used to generate electricity varies from one EU country to another. In 2022, 2 641 TWh (terawatt hours) of electricity was generated in the EU, of which 39.4% came from renewable energy sources. Fossil fuels accounted for 38.6% of electricity generation and nuclear electricity accounted for more than 21.9%. (<https://www.consilium.europa.eu/cs/infographics/how-is-eu-electricity-produced-and-sold/>)

Task 1.

- How much of the electricity generated in the EU in 2022 came from fossil fuels, how much from renewables and how much from nuclear?
- 78.8 TWh of electricity will be generated in the Czech Republic in 2022. (https://cs.wikipedia.org/wiki/Energetika_v_%C4%8Cesku).
 - Calculate the percentage share of the Czech Republic in the total electricity production in the EU in 2022.
 - What amount of renewable electricity would the Czech Republic need to produce to be among 10 countries with the largest share of renewable electricity sources?

Task 2. On the European Council website (see QR code) there is a graph showing net electricity generation by fuel type. Write the order of each energy source (from most used to least used) and create a bar chart showing the order of each energy source. You can draw the graph by hand or on a computer.



Task 3. In 2022, nuclear power plants were operating in 13 EU member states.

- From the graph on the website mentioned above, list the percentage of nuclear energy in the total consumption of the countries.

SWE	FIN	ROM	GER	ESP	NED	SLO	BEL	FRA	SVK	HUN	BUL	CZE

- Calculate the average, modus and median of the given values.
- Calculate the variance and standard deviation of the given values.
- Describe in words the statistical population.

Task 4. Discuss electricity production in the EU together. How do you see the current situation? What plan for the future would you suggest and why?

2. Interview Analysis

The teacher teaching this unit is the head of the Da Vinci School on the outskirts of Prague. He has very rich experience of 20 years of teaching mathematics and is also involved in research in didactic of mathematics. The teacher received no pre-service training in work with migrant pupils and no in-service teacher training in the issue before the last 12 months. However, he attended in-service teacher training conference in Prague at Charles University organized within the frame of the M4M project.

Da Vinci school, where the lesson was conducted, is a private school. The story of the da Vinci school began to be written sometime in 2007 in the head of Jitka Rudolfová (Lukešová). Although she studied economics, she was interested in different educational directions, especially alternative approaches to education. Her own children were the motive and inspiration for her. In 2009, the search finally resulted in the establishment of their own, somewhat different, kindergarten. After a year of operation, the kindergarten in Prague's Hostivař managed to obtain accreditation for a new primary school. The founders agreed together that they wanted to create a school that would provide children with enough space to develop their talents respecting their natural needs. The school in Dolní Břežany was in 2010, when a kindergarten, primary and lower secondary school were opened. The school was named after the outstanding Renaissance artist Leonardo da Vinci, who inspired the founders with how he was able to apply and fully develop his talents in a wide range of scientific fields and arts. Later upper secondary school was added with first graduates in 2019. The good name of the school and the excellent conditions for education are confirmed by the fact that the capacity of the kindergarten and primary school is almost full, there is a significant increase in interest in studying at the upper secondary school, where many graduates of the da Vinci primary school also enrol.

The teacher has experience of teaching migrant pupils and he believes the greatest obstacles in these classrooms are language, vocabulary and motivation of the pupils. Yet, he sees that migrant pupils bring new impulses to the classroom and make the whole group more sensitive to cultural issue as well as respect other cultures more. Having migrant pupils in the classroom made the teacher increase initial support for migrant pupils, making sure they are able to follow and join in.

The lesson was conducted with seven students. None of them had migrant background. The age range of students was 18 to 19. a small group of three pupils of whom one was migrant (who had lived in the country for more than a year). The lesson plan was used as presented in the project with no modifications.

The objectives of the lessons were to revise basic concepts of statistics, reading and interpretation of graphs. The teacher also included work with IT (google tabs).

The activity was well-received by the students who were active and fulfilled all the tasks. The assigned problems were open, which allowed each of the students to work at their own pace.

The cross-curricular character of the activity is its plus, it is linked to environmental studies and physics (energy).

3. Improvement Suggestions

There are small mistakes in the created documented that needed to be corrected before it was used. Otherwise, the material works really well.