General information

Topic: electricity from renewable energy - solar energy
Main resource used for the lesson: video https://www.youtube.com/watch?v=h6_MsneSmP8
Teaching objectives: how to explain how a technical system works, using specific vocabulary and expressions.
Previous specific knowledge: none

Organization of the lesson

Introduction (5’)
We ask the students what the previous lesson was about.
We explain that the lesson will be about solar energy.

Short test (5’)
We ask the students to guess the word associated to one of the definitions discovered last week (one question, one term, one minute).

Function and main components of a PV power plant (10’)
We give the students’ document to the students.

1st listening of the video:
We ask the pupils to answer to the question “What is the function of a PV power plant”

2nd listening of the video:
We ask the students to indentify the main components of a PV power plant.

Function of the main components of an hydro power plant (10’)
We ask the students to make simple sentences to describe the function of the main parts of a PV power plant
- 1: the PV panels are made of PV cells and convert solar energy into electricity
- 3: inverter converts direct current into alternating current
Composition and operation of a PV panel (10')

We ask the students how a PV cell works, according to the video: "the cells contain a semi-conducting material that release electrons when photons crash into it" (0'42" to 0'50")

We ask the student to explain why a PV panel is made of several cells: to obtain a high voltage and an high current (explained in another way in the video 2'07")

We ask the students to explain why the voltage of the electricity has to be boosted before being sent to the power lines: to limit the energy loses in the power lines (link to P=UI and P=RI² with DC current)

Other useful terms and expressions (5')

We give some other useful terms and expressions from the video, such as:

- a roof
- an array
- to release
- a wire
- to remain
- currently

Audio comprehension (10' - if time left)

We listen to the video (without the image) and ask the students to fill in the blank

Solar power plants generate electricity using sunlight, a free and abundant renewable energy source. Photovoltaic panels are the basic building blocks of solar power plants. They can be installed on the roof of a home or grouped into vast arrays. Each panel consists of several solar cells less than a millimetre thick. These cells contain a semi-conducting material that releases electrons when photons, the particles that make up light waves, crash into it.

Conclusion (5')

We explain what is expected for the next lesson: the students are asked to learn the definitions discovered during the lesson using an online quiz. There will be a test on another video next week.

Documents to be printed and used

- Short test
- Students' document

Other resources

Script of the video

Solar power plants generate electricity using sunlight, a free and abundant renewable energy source. Photovoltaic panels are the basic building blocks of solar power plants. They can be installed on the roof of a home or grouped into vast arrays. Each panel consists of several solar cells less than a millimetre thick. These cells contain a semi-conducting material that releases electrons when photons, the particles that make up light waves, crash into it. Extremely fine metal wires carry electrons to the negative terminal of the cell. Then they follow an external circuit that leads to the cell positive terminal. The resulting flow of electrons is the source of the electric current. The current passes from cell to cell, panel to panel, combining with the current from all other cells along the way and flowing into the inverter. The inverter transforms the direct current into an alternating current which feeds into a substation that boosts its voltage. to between 225,000 and 400,000 Volts. Thus modified, the current is easy to transmit over the power grid's high voltage lines. Regular maintenance and inspection ensure that solar plants remain fully operational. Solar power production does not generate greenhouse gases. The generation of electricity from solar plants depends on the sun shining. So, currently, no European country is entirely reliant on solar power.
Quiz

Link: https://quizlet.com/_3ro671

- renewable able to be renewed
- an inverter a device that converts direct current into alternating current
- a roof the outside, upper covering of a building
- an array a regular or systematic arrangement
- to release to free from anything that restrains
- a wire a length of such material used as a conductor of electricity
- to remain to continue in the same state
- currently at the present time
<table>
<thead>
<tr>
<th>Your name: __________________________</th>
<th>Your name: __________________________</th>
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</thead>
<tbody>
<tr>
<td>Write the word corresponding to the following definition:</td>
<td>Write the word corresponding to the following definition:</td>
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<tr>
<td>&quot;the arm of a propeller or other similar rotary mechanism, as an electric fan or turbine&quot;</td>
<td>&quot;a set of gears with its casing&quot;</td>
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<td>_________________________________</td>
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<td>Your name: __________________________</td>
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<tr>
<td>Write the word corresponding to the following definition:</td>
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<tr>
<td>&quot;at a distance from the shore&quot;</td>
<td>&quot;to (cause to) rotate&quot;</td>
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<tr>
<td>Write the word corresponding to the following definition:</td>
<td>Write the word corresponding to the following definition:</td>
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<tr>
<td>&quot;to achieve, arrive at, or gain through effort&quot;</td>
<td>&quot;to have the front toward&quot;</td>
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<td>Your name: __________________________</td>
</tr>
<tr>
<td>Write the word corresponding to the following definition:</td>
<td>Write the word corresponding to the following definition:</td>
</tr>
<tr>
<td>&quot;to cause to move by force&quot;</td>
<td>&quot;to suspend the operation of (something)&quot;</td>
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<tr>
<td>Write the word corresponding to the following definition:</td>
<td>Write the word corresponding to the following definition:</td>
</tr>
<tr>
<td>&quot;to watch closely for purposes of control or surveillance&quot;</td>
<td>&quot;to put trust in&quot;</td>
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General information

Topic: electricity from renewable energy - Photovoltaic (PV) power plant

Learning objectives: learning how to explain how a technical system works, using strict vocabulary and expressions.

Take notes during the lesson:

Global function and main components of a PV power plant

Listen to the video.

Give the global function of a PV power plant:
_____________________________________________________________________________________

Identify the main components on a PV power plant:

1 _______________________________________
2 _______________________________________
3 _______________________________________

Function of the main components of an hydro power plant

Make simple sentences to describe the function of the main parts of a PV power plant (parts #1 and 3)

• 1: _______________________________________
   _______________________________________
   _______________________________________
   _______________________________________

• 3: _______________________________________
   _______________________________________
   _______________________________________
   _______________________________________
   _______________________________________

Composition and operation of a PV panel

According to the video and your own knowledge:

Explain how a PV cell works:
_____________________________________________________________________________________

Explain why a PV panel is made of several cells:
_____________________________________________________________________________________

Explain why the voltage of the electricity has to be boosted before being sent to the power lines:
_____________________________________________________________________________________
Other useful terms and expressions
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
Audio comprehension
Listen to the video (without the image) and fill in the blank
Solar power plants generate ________________ using ________________, a free and abundant
__________________________________. Photovoltaic panels are the basic building blocks of solar power
plants. They can be installed on the __________ of a home or ____________ into vast ____________.
Each panel consists of several ______________ less than a millimetre thick. These ________
contain a _______________________________ that releases _________________ when
______________________, the particles that make up light waves, _________________ into it.

Homework
Learn the vocabulary using the online quiz https://quizlet.com/_3ro671
Note down these terms and definitions below:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________