UNIT 8
ALTERNATIVE ENERGY SOURCES

Vocabulary:

- **Alternative energy sources**

Grammar and functions:

- **Hypothesising: conditional clauses**
- **Integrated practice of grammar structures and rhetorical functions**

VIDEO: 5 GREEN ENERGIES

http://www.ehow.com/video_4952000_five-forms-green-energy.html?cp=1&pid=1&wa%5Fvrid=1f0b9827%2Ded80%2D4723%2Dac8d%2D265bc84b95b6&wa%5Fvlsrc=continuous

1. **Have all of them the same age?** They have not all been around for the same length of time.
2. **What is the age of Geothermal energy?** It has been there since the earth began
3. **Where is it?** under ground, it's in the hot rocks below ground.
4. **What can be the depth of these rocks?** as much as a kilometer down**.**
5. **How can we fracture these rocks?** by exploding dynamite
6. **What can we do then?** pump water down and pump the water back up, and when it comesback up it's hot.
7. **Which kind of energy is the most important one today?** biomass**,**
8. **What is it?** plants**.**
9. **Where do plants get their energy from**? the sun using the chlorophyll, the green substance in the leaves.
10. **What does biomass do?** It absorbs energy from the sun**,**
11. **How can we reuse that energy?** by turning it into biodiesel
12. **It can be used to replace what?** the fuel produced from oil and therefore conserve oil.
13. **Where does Hydro energy come from?** It is energy from the sun**.**
14. **What happens to the water in rivers?** the water evaporates due to the sun's energy, it then precipitates into rain and falls into the rivers**,**
15. **How can we produce electricity?** we build dams, put it in turbines and we end up with electric power.
16. **Where is there always wind?.** near the coast due to the changing temperature of the sea and the land
17. **What can those winds be used for?** drive wind turbines**.**
18. **What are the components?** large propellers on a tall tower and at the top of the tower are turbines, and turbines produce electricity**.**
19. **What is solar energy based on?** silicon technology**.**
20. **How does it work?** When we shine light onto a piece of silicon chip it produces a small electric current, if you put enough of them together you get a lot of energy.
21. **What is the problem? This is quite an expensive form of reusable energy .**
22. **What is its main use?** Initially in devices which have to be carried around, like on your calculator you only need a small amount of energy**.**

ENERGY

READING: THE ENERGY CRISIS

Paragraph I

If present trends continue (1), the world will face a major crisis (2) by the end of this century: insufficient cheap, convenient energy (3). Since (4) without such energy industrial production will fall, agricultural output will drop, transport will be restricted, and standards of living in developed countries will plummet (5)

1.Which do you think those present trends are?
2.Why will there be a major crisis"?
3.What will the consequences of present trends be?
4.Since means .....
5.Find two words in this paragraph that are synonyms.

Paragraph II (Complete the gaps with appropriate words)

At present (6), almost all our energy comes **FROM** fossil fuels (7), i.e. (8), oil, **COAL** and natural gas. The Earth's reserves of fossil fuels have **BEEN** formed **BY/FROM** organic matter subjected **TO** enormous heat and pressure for millions of years (9). But such reserves are finite (10). Because power demand is increasing very rapidly (11), fossil fuels will **run out** (12) within a relatively short time. We can estimate the amount of recoverable fuel under the surface of the Earth (13), and we know the rate **at WHICH** it is **BEING** extracted (14). Fairly (15) simple calculations can therefore determine **THE/ITS** remaining life (16). If present trends continue, gas and oil reserves will **BE** exhausted by the middle of the 21st **CENTURY**. Similar estimates (17) about coal reserves suggest a projected supply (18) of 200-250 years. Of course, long before **THESE** fuels are exhausted, demand will greatly exceed supply (19)

Paragraph II. Fill in the blanks with a suitable preposition.

6. Give a synonym.-**NOWADAYS, AT THE MOMENT, THESE DAYS, TODAY, currently**
7. Why are they called fossil fuels? **BECAUSE THEY ARE FOUND IN NATURE**
8. What does i.e. mean? --- **THAT IS (e.g. --- FOR EXAMPLE**)
9. Which two conditions were necessary to form fossil fuels? Where do they come from? **HEAT AND PRESSURE** --- **ORGANIC MATTER (EARTH**)
10. Explain the sentence: BUT SUCH RESERVES ARE FINITE it means that **these resources can be exhausted/run out**
11. Why do you think power demand is increasing rapidly? **Because we need more and more energy every day. Because of the increase of population in the world**
12. EXHAUSTED: explain the meaning of this verb --- **to run out, to finish, used up**
13. Explain the sentence: "WE CAN ESTIMATE... SURFACE OF THE EARTH" **We can calculate/account for how much recyclable/reusable fuel exists in the earth**
14. Explain the sentence: "**WE KNOW THE RATE..... EXTRACTED**" **We are aware of/conscious about how fast the resources are being used…**
15. FAIRLY: Give a synonym **quite**
16. ITS REMAINING LIFE: the remaining life of what? Explain this sentence (*give the reference of ITS)*

Recoverable fuel

17.What will happen by the middle of the 21st century? Why?
Some fossil fuels will be exhausted because we are using them too much, too fast…
18. What is the meaning of "PROJECTED SUPPLIES"? **Foreseen needs**
19. Demand for what? Supply of what? **The demand for fuels, the supply of fossil fuels.**

Now provide the nouns for the following words.

FIND NOUNS FOR THESE VERBS IN THE TEXT

PRODUCE	PRESS	ESTIMATE	SUPPLY

FIND ADJECTIVES FOR THESE VERBS IN THE TEXT

RECOVER	PROJECT	SUFFICE	REMAIN

NOUNS
PRODUCE- Production-producer
CONSUME- Consumer-consumption
PRESS- Pressure-press
WASTE - Waste
CALCULATE – Calculations, calculus
PREPARE - Preparation
SUPPLY- Supply
DEMAND - Demand
ESTIMATE- estimate

ADJECTIVES
RECOVER – ing -able
PROJECT – ing -ed
SUFFICE - sufficient
REMAIN – remaining

CONDITIONALS

The conditional tense says that an action is reliant on something else.
There are **four basic conditionals** in English.

- Zero Conditional
- First Conditional
- Second Conditional
- Third Conditional
- There are some more conditionals formed by mixing some of these four.

Zero Conditional: Certainty

The Zero conditional is used for things that are always true as long as the condition is met. **if + present simple, + present simple**

IF	Condition	Result	Situation
	present simple	**present simple**	
If	you **heat** water to 100 degrees celsius,	it **boils**.	**fact- universal**
	present simple	**present simple**	
If	I **drink** coffee,	I **get** a headache.	**fact- personal**

First Conditional: A real possibility in the future

A First Conditional sentence is for future actions dependent on the result of another future action or event, where there is a reasonable possibility of the conditions for the action being satisfied:

if + present simple, will+ base form

IF	Condition	Result	Possibility
	present simple	**will+ base form**	
If	she gets good grades,	she **will** go to university.	If the condition is met, then she **definitely** will go
If	he gets good grades,	he **may** go to university.	He is **not sure** about going to university.
If	he gets good grades,	he **can** go to university.	It is **possible**.
If	she gets good grades,	she **could** go to university.	It is **possible**, but **not** that **likely**.

Second Conditional: Imaginary Present or Unlikely Future

The Second Conditional can be used to talk about imaginary present situations, where we are imagining something different from what is really the case. We can also use it to talk about things in the future that are unlikely to happen, as the condition is unlikely to be met:

if + past simple, + would + base form

IF	Condition	Result	Possibility
	past simple	**WOULD + base verb**	
If	I **had** the time,	I **would learn** Italian.	**Imposible:** I don't have the time, so I'm not going to learn Italian.
If	I **won** the lottery	I **would travel** around the world.	**Unlikely**:There's a very small chance of winning the lottery, so the trip is unlikely

Third Conditional: Imaginary Past

The third conditional is used when we are talking about the past and imagining something different from what actually happened, that means for imaginary past actions, where the conditions for the action WERE NOT satisfied:

if + past perfect, + would have + past participle

IF	Condition	Result	Certainty
	past perfect	**WOULD HAVE+ past participle**	
If	I **had known**,	I **would have helped**.	Although this didn't happen, the speaker is **sure** about the result.
If	I **had known**,	I **could have helped**.	Although this didn't happen, the result is only a **possibility.**

Mixed Conditionals

Third Second Mixed Conditionals

For imaginary present actions or situations that are not possible because the necessary conditions were not met in the past:

if + past perfect, + would + base form

- If you had taken the course, you would know about it. (The conditions were not met because the person did not do the course and as a result does not know about it now.)

Second Third Mixed Conditionals

To avoid the illogicality of saying 'If I had been you', which means that I was not you on that occasion, but could be in the future, which is, of course, impossible.

if + past simple, + would have + past participle

- If I could speak English, I wouldn't have needed to get the letter translated. (This means that I couldn't speak English then when I needed the translator and still can't)

Conditionals: Time and Probability Table

Probability	Conditional	Example	Time
Certain	zero conditional	If you heat water to 100 degrees celsius, it boils	any time
Likely	first conditional	If it rains, I will stay in.	future
Unlikely	second conditional	If I won the lottery, I would retire.	future
Impossible	second conditional	If I had the money, I would lend it to you	present
Impossible	third conditional	If I had seen him, I would have given him the message.	past

http://www.englishlanguageguide.com/english/grammar/conditionals.asp

OTHER CONDITIONAL EXPRESSIONS

UNLESS + PRESENT = IF + Vb in the negative
PROVIDED (THAT) = IF and only IF
IN CASE (THAT) = In the event (that)
AS LONG AS = on the condition (that)
WHEN can also have a conditional meaning (used in first conditional)

EXERCISES

A. Write the correct verb tense according to the type of conditional clause given.

1- If we (NOT WASTE) **HAD NOT WASTED** the fossil fuels, they (LAST) **WOULD HAVE LASTED** longer (III)

2- We (CAN DEVELOP) **COULD/WOULD DEVELOP** other alternative sources if we (SPEND) **SPENT** more money on research (II)

3- If a cold object (PUT) **IS PUT** in contact with a warm one, the temperature of the latter (DECREASE) **DECREASES** (I)

4- Unless you learn how to use the program, you (NOT FINISH) **WILL NOT FINISH** your project (I).

5- If nuclear power (NOT BE) **WERE NOT** so dangerous, everybody (AGREE) **WOULD AGREE** to install nuclear power plants (II).

6- If we (DEVELOP) **HAD DEVELOPED** other alternative sources, fossil fuels (NOT RUN OUT) **WOULD NOT HAVE RUN OUT** so rapidly (III).

7- If a reactor only (LAST) **LASTS** 25 years, in a few years we (HAVE) **WILL HAVE** hundreds of them stored all over the world. (I)

8- If we (NOT EMPLOY) **DID NOT EMPLOY** fossil fuels in the production of electricity, these materials (CAN USE) **COULD BE USED** to manufacture other valuable things (II)

9- If there (TO BE) **WERE** a nuclear accident, lots of radioactivity (REMAIN) **WOULD REMAIN** in the atmosphere for a long time (II)

10- If two magnets (BRING) **ARE BROUGHT** together, like charges (REPEL) **(WILL) REPEL** each other. (I)

B. Join these pairs of sentences by using a conditional structure.

1- We cannot dispose of the toxic waste. We have not got safe containers. **If we had (got) safe containers we could dispose of the toxic waste**

2- Release the button. Then the recording time will be set. **If/when you release the button, the recording time will be set**

3- Very few people use public transport. It is impossible to park your car in the city center. **If more people used public transport you could park your car in the city center**

4- You didn´t pass your exam because you didn´t study hard enough. **If you had studied harder/more, you would have passed your exam**

5- The limit of temperature is 1,000ºC. Above this the boiler explodes. **If the temperature increases above/exceeds 1,000ºC, the boiler will explode/explodes**

LISTENING: ALTERNATIVE ENERGY SOURCES

1. **We can develop alternative sources of power**
2. **Unless we try *we'll never succeed***
3. **Instead of burning fossil fuels, *we should look for* more economic sources of energy**
4. **Because electricity can be produced from any source of energy**
5. **If we didn't waste so much energy…**
6. **You can save more by conservation, than you can produce for the same money**
7. **Wind energy, solar energy, wave power, hydro power, hydroelectric schemes, tidal power, our fossil fuels will run out**
8. **Other countries are spending much more *than us* money on research**
9. **… energy from the sun, the waves and the winds lasts forever**
10. **Unless we start working on cleaner, safer sources of energy**

TRANSLATION: WHAT IS RENEWABLE ENERGY?

WHAT IS RENEWABLE ENERGY?

All countries currently rely heavily **ON COAL, OIL AND NATURAL GAS (IN ORDER/SO AS) TO OBTAIN/GET THEIR ENERGY** (*en el carbón, el petróleo y el gas natural para obtener su energía*). **FOSSIL FUELS** (*Los combustibles fósiles*) are non renewable, i.e., they are finite resources that will eventually run out. **ON THE CONTRARY/UNLIKELY/BY CONTRAST,** (*Por el contrario*), renewable energy sources **-LIKE/SUCH AS WIND/aeolic AND SOLAR POWER** (*como la energía eólica y la solar*)- will never end. **MOST RENEWABLE ENERGY** *(La mayor parte de la energía renovable*) comes either directly or indirectly **FROM THE SUN** (del sol).

Solar energy **CAN DIRECTLY BE USED FOR HEATING/TO HEAT** (*se puede usar directamente para calentar*) homes and other buildings, for **GENERATING/PRODUCING ELECTRICITY/POWER** (generar electricidad), and for other industrial uses.

The sun's heat also drives the winds, **WHOSE ENERGY/THE ENERGY OF WHICH CAN BE CAPTURED/COLLECTED BY (MEANS OF/USING) WIND TURBINES** (*cuya energía se puede capturar por medio de turbinas eólicas*).

The sun's heat also **MAKES WATER EVAPORATE** (*hace que el agua se evapore*). When **IT RAINS** *(llueve*), the water is collected in dams and transformed **INTO ELECTRICITY** (*en electricidad*) in hydroelectric plants. Sunlight **ALSO MAKES PLANTS GROW/MAKES PLANTS GROW TOO/AS WELL** (*también hace que las plantas crezcan*).

THE ORGANIC MATTER WHICH FORMS/THAT FORMS/FORMING THOSE PLANTS IS KNOWN AS BIOMASS (*La materia orgánica que forma esas plantas se conoce como biomasa*). Biomass can be used to produce electricity, **FUELS FOR TRANSPORT** (*combustibles para el transporte*) or chemical products.

HYDROGEN IS ALSO/CAN ALSO BE FOUND (*El hidrógeno también se encuentra*) in many

organic compounds, **AS WELL AS/LIKE IN WATER** *(así como en el agua*). **IT IS THE MOST ABUNDANT ELEMENT ON EARTH** (*Es el elemento más abundante*) on Earth. But **IT DOES NOT OCCUR NATURALLY AS A GAS** (*no ocurre naturalmente como gas*). It is always combined with other elements, **LIKE/SUCH AS OXYGEN** (*como el oxígeno*), to make water. Once separated **FROM** (*de*) another element, **IT CAN BE BURNT AS A FUEL** *(se puede quemar como combustible*) or converted **INTO ELECTRICITY** (*en electricidad*).
Not all **RENEWABLE ENERGY SOURCES COME FROM THE SUN** (*las fuentes de energía renovables vienen del sol*). Geothermal energy taps the Earth's internal heat for electric power production, and the **HEATING AND COOLING** (*calentamiento y enfriamiento*) of buildings. And the energy of the tides comes from the gravitational pull of the moon on the Earth.
BESIDES/AS WELL AS/IN ADDITION TO (*Además de*) tidal energy, there is the energy of the ocean's waves, **WHICH ARE DRIVEN BY TIDES AND WINDS** (*que son movidas (DRIVE) por las mareas y los vientos*). The sun also warms the surface of the ocean **MORE THAN ITS DEPTHS** (*más que sus profundidades*), creating **DIFFERENCE IN TEMPERATURE/TEMPERATURE DIFFERENCE** (*una diferencia de temperatura*) that can be used **AS AN ENERGY SOURCE** (*como fuente de energía*). All these forms of ocean energy can be used to produce electricity. **IF ALL THESE ENERGIES WERE MORE COMMONLY/OFTEN/FREQUENTLY/WIDELY USED** (*Si todas estas energías se usasen más)* our dependence on fossil fuels would decrease significantly.

GRAMMAR REVISION: SOLAR ENERGY

Complete this text with appropriate expressions.

Today over 90% of our energy comes **FROM** fossil **FUELS,** that is, **OIL**, **COAL** and natural gas. But coal and oil are not only fuels; **THEY** are also important raw materials **FOR** our chemical **INDUSTRIES**. People think we should limit their use **AS** fuels, otherwise the world´s supplies will soon run **OUT.** Much research is **BEING** done on the practical use of the sun **FOR** heating buildings. Solar energy is transmitted from the sun, **THROUGH** space, to the earth **AS** electromagnetic radiation. It must **BE** converted **INTO** heat before **IT** can be used. Various types of solar energy collectors or absorbers are used to convert the sun´s radiation **INTO** heat**.** In a building where a solar system has **BEEN** installed, **IT** provides water as well **AS** space heating. This solar system, based **ON** water-heating, works **LIKE** this. Each of the collectors, placed **ON** the roof, consists **OF** a fibreglass tray **WHICH/THAT** holds a number of copper tubes under a special glass cover. The tubes are fixed **TO** a blackened surface **THAT/WHICH** absorbs energy from the sun. The sun's rays passing **THROUGH** the glass, **HEAT** the water **IN** the tubes.

Now reorder these sentences according to the text

4- The purpose of any solar system is to collect solar radiation and convert it into useful thermal energy

6- It consists of a number of absorbers or collectors

3- These are made of plates of fiber with copper tubes inside
8- They heat water flowing through the copper tubes
9- The tubes are connected to a metal surface
2- This surface is black in order to absorb more energy
10: The system works as follows: the sun rays pass through the glass
5- When the water is heated it produces steam
1- and the steam is used to move a turbine, which turns a generator
7- This device then transforms heat into electricity

SOLUTION
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LISTENING: SOLAR ENERGY

QUESTIONS

1. What is solar energy? **power derived from the sun**
2. What is the potential problem with fossil fuels? **they will eventually be exhausted**
3. One method is the solar furnace, which consists of **a huge parabollic mirror (that focuses the sun's heat onto a small area)**.....
4. What is the temperature that can be produced by this method? **more than 7,232ºf (4,000ºc)**
5. What can the heat be used for? **to raise steam and generate electricity or for scientific research**
6. How many mirrors does the new power station in the former Soviet Union have? **1,300 moving mirrors (covering an area of 5 acres – 2 hectares)**
7. How much electricity can it produce? **2½ million kilowatt-hours of electricity (annually)**

Solar energy is used increasingly **FOR DOMESTIC HEATING**. Heat is collected **BY EXPOSING A LARGE DARKENED METAL PLATE**, covered with one or more **LAYERS OF GLASS**, to the sun. **WATER OR AIR IS PASSED THROUGH TUBES** attached to the plate and either circulated through the building **OR STORED**. Hot water is stored in **INSULATED TANKS**. Hot air is passed through a tank full of rocks, which hold the heat **UNTIL IT IS REQUIRED** to warm up air for circulation around the house.

Sunlight **CAN ALSO BE CONVERTED DIRECTLY INTO ELECTRICITY** in a solar **CELL**, and there is research into the possibility of using sunlight to produce **CHEMICAL ENERGY** by the same sort of reaction **AS PHOTOSYNTHESIS IN PLANTS**

WRITING

Decide on the best order for the following sentences so as to form a complete and logical paragraph. Write the number on the line at the left and discuss your decision with a classmate.

7_____ Hydroelectric power plants producing electrical energy have been built on rivers in many parts of the world.

1_____ Water power refers to energy obtained from flowing or falling water used to run machinery or create electrical power.

8_____ The largest U.S. hydroelectric power plant is the Grand Coulee on the Columbia River in Washington.

5_____ Water power was very important during the Industrial Revolution, when it was used to operate factory machines.

2_____ Water has been used to drive devices since ancient times, beginning with the invention of the water wheel.

6_____ The most important modern use of water power is the generating of electricity.

4_____ Water was first used to power grinding stones that ground grains.

3_____ Streaming water flowing over the blades of a wheel caused the wheel to rotate, setting in motion other mechanisms - thus creating the energy that drove the mechanisms.

Source: *Webster's International Encyclopedia*, 1994:1164.

GRAMMAR REVISION

In the following passage one word has been omitted from each line. Mark with a / where the omitted word should be placed and add the word that has been left out. When you have finished, translate the paragraph into Spanish.

SOLUTION

Currently some 50% of the carbon dioxide (CO2) released **(IN)** the UK is the result of the energy consumed in buildings. If reductions in CO2 levels are to be achieved, **(IT)** is important **(THAT)**the amount of CO2 released from energy used in buildings is reduced significantly. Upgrading the energy performance of existing building stock is **(AN)** extremely important objective and considerable effort should **(BE)** made to achieve this. However, as much new building is **(TAKING)** place and many of these buildings will have considerable lifetimes, it **(IS)** very important that these new buildings be constructed with minimal impact. Fortunately it is easier **(TO)** improve the energy performance of new buildings and improvements can often also be made for a much lower cost if they are taken **(INTO)** account early enough in the design process.

Now reorder these sentences according to the text

1. And the steam is used to move a turbine, which turns a generator
2. This surface is black in order to absorb more energy
3. These are made of plates of fibre with copper tubes inside
4. The purpose of any solar system is to collect solar radiation and convert it into useful thermal energy

5. When the water is heated it produces steam
6. It consists of a number of absorbers or collectors
7. This device then transforms heat into electricity
8. They heat water flowing through the copper tubes
9. The tubes are connected to a metal surface
10. The system works as follows: the sun rays pass through the glass

WRITING

DEADLINE: Exam DATE 22nd December.

ALTERNATIVE ENERGY SOURCES

Write an essay (200 words) talking about **ALTERNATIVE ENERGY SOURCES,** their **advantages** and **disadvantages** *(suggested topics: wind power, solar energy, geothermal energy, wave power, biomass)*

Include the following expressions and **UNDERLINE THEM**

OTHERWISE	DESPITE	RESULT (VERB)
OWING	UNLESS	CAUSE (+VB)
UNLIKELY	RATHER	AVOID (+VB)
SHORT REL. CLAUSE		

VIDEO: RENEWABLE ENERGY BY 2020

- Old mills= mechanical from renewable sources
- Modern mills= electricity
- Wind mills transform wind into e- (production = combines needs of D & H)
- Hydraulic= e- (small plants & big dams)= energy potential of a head of water is converted into e-
- Geothermal = heat from the depths of the earth to priduce heat or e-
- Solar energy= heat /e-. Solar heat panels on roof=s = cover hot water needs for sanitary purposes + domestic heating (2006= 20 million m2)
- Biomass= vegetal, animal or urban waste. Most important renewable energy. Combustion of wOod for domestic heating. Industry & towns= cogenerate heat or e-. Produced by fermentation of waste. (Heat & e-). Purified = biofuel. Liquid biofuels, biodiesel, bioethanol

11. **We can develop alternative sources of power**
12. **Unless we try *we'll never succeed***
13. **Instead of burning fossil fuels, *we should look for* more economic sources of energy**
14. **Because electricity can be produced from any source of energy**

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