Further Education Course Energy English

Extract: Renewables 1
Wind and Solar Energy
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She is an active participant in the following professional groups:

- IATEFL (International Association of Teachers of English as a Foreign Language) and the two sub-groups BESIG (Business English Special Interest Group) and ESP-SIG (English for Special Purposes Special Interest Group)
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1 General Information

This is an extract of Unit 3 – Renewables 1 from the further education course “Energy English”. It will give you a first impression of what the online course looks like inside. Unlike our other courses, there are no lecture notes as a paper text in this course. All course material is provided online and will be accessible via our learning platform, the virtual classroom. Furthermore, many of the exercises are designed for online use and will be corrected automatically. There are also some exercises to be sent in, which will be corrected individually by the tutor, such as audio files or written texts.

Please note that this extract is the print version of an online course – we’re showing you screenshots of some of the course material. We hope you like your first look inside and would be pleased to welcome you in our next course of ‘Energy English’!

Yours sincerely,

Beschka Siehl
(course coordinator)
2 Renewables 1: Wind And Solar Energy

2.1 Introduction

Read the following text about renewables first.

Renewable energy originates from resources that are practically inexhaustible in relation to human needs. For instance, the sun, as the source of solar and most other forms of renewable energy, will continue to shine for some billions of years. Strictly speaking, however, the term “renewable” is not correct, as energy can neither be consumed nor renewed: according to the law of the conservation of energy, the total energy of a closed system remains constant. Using renewable energy therefore means partly redirecting natural energy flows to make them usable for human purposes.

Fossil fuel reserves like coal, petroleum and natural gas are limited in their future availability. Moreover, their use makes many European countries dependent on imports. They are also associated with significant CO₂ emissions and thus contributes to global warming. An increase in the use of renewable energy as a proportion of total energy use is therefore planned in Europe and worldwide.
Renewable energy, also referred to as sustainable energy, saves resources and protects the climate. However, some forms of it are not available for energy generation on a steady basis, but are instead subject to considerable fluctuations depending on the time of day, season and region: the sun does not always shine, nor does the wind always blow. Only renewable biomass and geothermal energy can be used to supply base load power, i.e. to ensure continuous supply.

In the future, renewable energy will contribute significantly to the energy mix. It will be important to combine those forms of renewable energy that fluctuate in availability, like solar and wind power, with resources capable of supplying base load power. So-called "hybrid power plants", which make use of various energy resources, might be a feasible solution. Such power plants may work with solar thermal energy during the day and with geothermal energy during the night. It may also be possible to combine this with biomass power.

### 2.2 Word Fields 1

*One word does not fit with the other three. Decide and click on the word. Consult a dictionary if necessary:*

1. inexhaustible, endless, boundless, limited
2. save, consume, use, deplete
3. constant, sustained, changing, persistent
4. gas, petroleum, biomass, oil
5. resource, reservoir, stockpile, outlay
6. distribute, contribute, supply, furnish
7. proportion, size, percentage, part
8. different, various, diverse, homogeneous
9. diminish, expand, increase, enlarge
10. sustain, perpetual, remit, prolong

*Figure 2: Screenshot exercise „Word Fields 1“*
2.3 Vocabulary 1

Complete the following sentences using words or collocations from the list.

1. CO₂ contribute to global warming.
2. In the future, renewable energy will contribute to the country's ________.
3. A term sometimes used for sustainable energy is ________.
4. Some forms of energy such as the wind blowing or the sun shining are ________ to high fluctuations.
5. The term ________ refers to the constant load needed by a system to cover minimum needs.
6. The text states that only ________ or geothermal energy can be used to supply the base load.
7. ________ power plants make use of various energy forms.
8. According to the laws of energy, in a ________ system energy is neither produced nor lost.
9. Neither ________ nor ________ energy is constant enough to provide for the baseload.
10. The main or sole use of ________ makes many countries dependent upon the import of energy sources.

Submit | Show correct answers (100% of the possible score must be achieved)

Figure 3: Screenshot exercise „Vocabulary 1“
2.4 Renewables – Facts And Figures

Study the charts which illustrate the use of renewables in the European Union 27 in 1990, 2000 and 2010. The unit used is TWh (Tera Watt hours).

(Source: European Energy Commission, Energy Statistics)

Figure 4: Use of renewables in the European Union 1990, 2000 and 2010
2.5 Vocabulary 2: Languages Of Change And Dates

Based on the information provided in the charts, complete the below sentences by selecting the correct word from the two words in brackets.

![Figure 5: Screenshot exercise „Vocabulary 2“](image)

2.6 Speaking Exercise

Prepare a five minute discussion of the three charts in which you compare them using the language of change (see Grammar Section).

Preparation and execution time 30-40 minutes.

[At this point, the online version of the course provides a voice recorder]
2.7 TED Talk: The Missing Link To Renewable Energy

The production of renewable energy is always bound to the possibility of storage. This was discussed in Unit 1 Chapter 4.

*Listen to the TED talk given by Donald Sadoway in which he discusses the missing link to renewable energy. Try to first listen with subtitles and, if needed print out the transcript and read along.*


If required, download the transcript from: TED Talk_Donald_Sadoway.pdf
Listening Comprehension

Now listen to the text again and decide if the following statements are true or false:

1. Electricity demand must not be in constant balance with electricity supply.
   - True  ○  False  ○

2. According to Sadoway, a giant battery could help solve the problem of intermittency.
   - True  ○  False  ○

3. The battery was invented about 200 years ago in Pavia by Alessandro Volta.
   - True  ○  False  ○

4. A side effect of the invention was that it showed that professors could be useful for something - an unknown thought at that time.
   - True  ○  False  ○

5. Presently there is no battery available which meets the performance requirements of the grids: uncommonly high power, long service lifetime and super-high cost.
   - True  ○  False  ○

6. To make a battery cheap it needs to be made of raw earth materials.
   - True  ○  False  ○

7. A second criterion is that the manufacturing techniques should be as simple as possible to reduce costs.
   - True  ○  False  ○

8. The battery first invented by Sadoway is all liquid.
   - True  ○  False  ○

9. The first battery produced by this Sadoway’s research has the capacity of one watt hour cell.
   - True  ○  False  ○

10. The latest battery mentioned in the talk is 14 inches in diameter and has a capacity of one kilovatt-hour.
    - True  ○  False  ○

11. A two million watt hours battery is envisioned which would supply the needs of approx. 20% American households.
    - True  ○  False  ○

12. Sadoway ignored some of the conventional wisdom used in inventing.
    - True  ○  False  ○

13. He also believes that mentoring is a possibility to minimize human potential.
    - True  ○  False  ○

Figure 7: Screenshot exercise „Listening Comprehension“
Vocabulary 3

Match the following words with their respective explanations or synonyms.

Figure 8: Screenshot exercise „Vocabulary 3“

Vocabulary 4

Match the following words with their respective explanations or synonyms.

Figure 9: Screenshot exercise „Vocabulary 4“
Vocabulary 5

Use the words from the list to fill the gaps. The grammatical form of the word must fit the blank.

1. The investors of the wind park project want a ______ approach to be used, including state-of-the-art ______ so that the project can develop at a quick pace from the ______ stage.

2. Wind parks and solar plants produce electricity with ______ ______.

3. The ______ helps produce the ______ metal needed ______ the production.

4. There is an ______ ______ of renewable sources that can be used ______ the Earth.

5. The various components of the ______ ______ must be ______ in order to function.

6. The owners of the plant were ______ ______ ______ to follow the regulations of the government.

7. The utility company has to ______ ______ the cooling towers in order to comply with the regulators’ ______ ______.

8. Simultaneously, the roof of the plant must be ______ ______.

9. The licensing process has been long and ______ ______.

10. The head engineer always thought differently than the others - his ______ ______ ______ has often gotten him into trouble.

Figure 10: Screenshot exercise „Vocabulary 5“
2.8 Renewable Energy

The following text discusses renewable energy.

*Read it and look up any new or unfamiliar words in a dictionary.*

Renewable energy flows involve natural phenomena such as sunlight, wind, tides, plant growth, and geothermal heat, as the International Energy Agency explains:

Renewable energy is derived from natural processes that are replenished constantly. In its various forms, it derives directly from the sun, or from heat generated deep within the earth. Included in the definition is electricity and heat generated from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels as well as hydrogen derived from renewable resources.

![Wind Energy Plant 2](image)

Figure 11: Wind Energy Plant 2

Renewable energy resources and significant opportunities for energy efficiency exist over wide geographical areas, in contrast to other energy sources, which are concentrated in a limited number of countries. Rapid deployment of renewable energy and energy efficiency and technological diversification of energy sources would result in significant energy security and economic benefits.
Renewable energy replaces conventional fuels in four distinct areas: electricity generation, hot water/space heating, motor fuels, and rural (off-grid) energy services:

- **Power generation.** Renewable energy provides 19% of electricity generation worldwide. Renewable power generators are spread across many countries, and wind power alone already provides a significant share of electricity in some areas: for example, 14% in the U.S. state of Iowa, 40% in the northern German state of Schleswig-Holstein, and 20% in Denmark. Some countries get most of their power from renewables, including Iceland and Paraguay (100%), Norway (98%), Brazil (86%), Austria (62%), New Zealand (65%), and Sweden (54%).

- **Heating.** Solar hot water makes an important contribution to renewable heat in many countries, most notably in China, which now has 70% of the global total (180 GWh). Most of these systems are installed on multi-family apartment buildings and meet a portion of the hot water needs of an estimated 50–60 million households in China. Worldwide, total installed solar water heating systems meet a portion of the water heating needs of over 70 million households. The use of biomass for heating continues to grow as well. In Sweden, national use of biomass energy has surpassed that of oil. Direct geothermal for heating is also growing rapidly.

- **Transport fuels.** Renewable biofuels have contributed to a significant decline in oil consumption in the United States since 2006. The 93 billion liters of biofuels produced worldwide in 2009 displaced the equivalent of an estimated 68 billion liters of gasoline, equal to about 5% of world gasoline production.

In international public opinion surveys there is strong support for promoting renewable sources such as solar power and wind power, requiring utilities to use more renewable energy (even if this increases the cost), and providing tax incentives to encourage the development and use of such technologies. There is substantial optimism that renewable energy investments will pay off economically in the long term.

Adapted from: Wikipedia
Reading Comprehension 1

1. Renewable energy ______ 19% of electricity generation worldwide.
   - provides
   - produces
   - gives

2. In Iowa, a state in the USA, 14% and in Schleswig-Holstein, in Northern Germany, 40% of the electricity ______ from wind.
   - comes
   - came
   - comes

3. The amount of energy supplied by renewable sources is ___ in Norway than in Sweden.
   - high
   - higher
   - Higher

   - by
   - from
   - since

5. Renewable energy ______ conventional fuels in many areas.
   - replaces
   - revives
   - rejuvenates

Figure 12: Screenshot exercise „Reading Comprehension 1“
Grammar 1: Word Forms

The text contains many common terms used in energy in different forms.

*Please complete the following table.*

![Table Image]

Figure 13: Screenshot exercise „Grammar 1: Word Forms“
Grammar 2

Place the correct form of the word in the blank. The infinitive stem is provided in brackets.

3. Geothermal energy comes from heat deep within the Earth. [generate]
4. Rapid [deploy] of renewable energy could result in higher energy security.
5. Renewable energy is a [replace] for conventional fuels in several areas.
6. The use of renewable biofuels [reduce] to a significant reduction of oil.
7. Surveys show that there is strong public support for [require] utilities to use more renewable energy.
8. The government sometimes [provide] tax incentives to encourage the use of renewable energy.
9. Many [invest] have spent money on buying shares of renewable energy companies.

Submit | Show correct answers (70% of the possible score must be achieved)

Figure 14: Screenshot exercise „Grammar 2“
Grammar 3: Prepositions

If necessary, review the rules for prepositions in the grammar sheets before completing this exercise.

[At this point, the online version of the course provides two grammar sheets]
Grammar 4: Regular And Irregular Verbs

Decide if the following verbs are regular or irregular and give the past and past participle in the blank provided:

![Screenshot exercise „Grammar 4: Regular And Irregular Verbs”](image)