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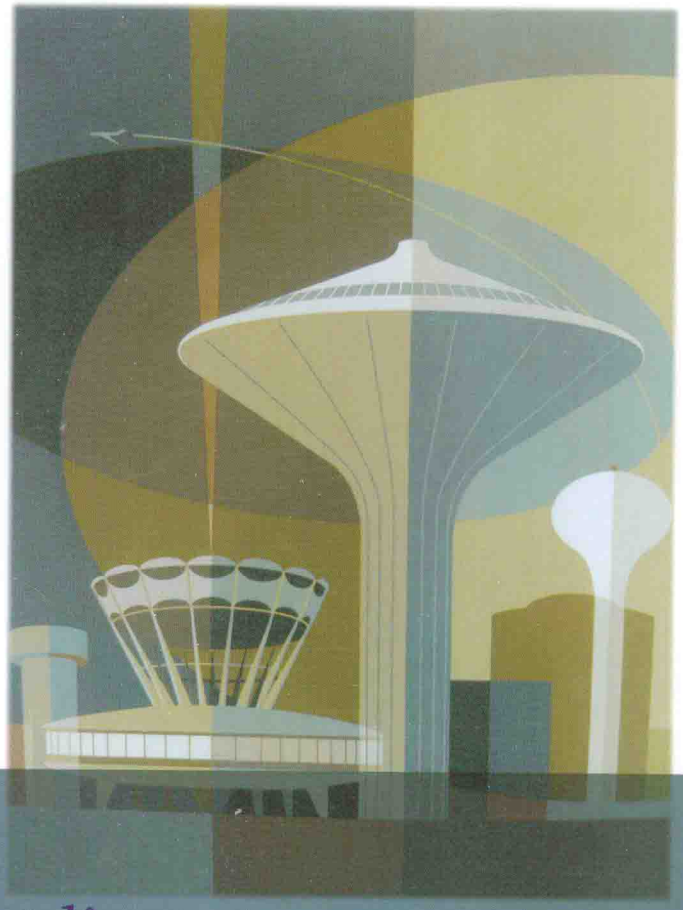

College English Reading

大学英语阅读教程 能源篇

段成 郑欢◎主 编

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大学英语阅读教程

（能源篇）

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前　言

随着国际化进程的日益加快，为适应我国能源领域对外交流与合作的迫切需要，提高能源相关专业大学生及科技工作者的专业英语水平与实用能力，我们组织编写了这本《大学英语阅读教程（能源篇）》。教程内容主要以能源领域相关知识为主，涵盖了各种主要能源类型，如，化石能源、核能、可再生能源、新能源等。参考、引用文献主要源于国际主流科技期刊的能源文章或著作，资料详实可靠。编者精心编著，力求内容完整、层次清晰、结构合理、重点突出、文章长度和难易度适中，以使全书从总体上体现连续性、系统性、完整性和实用性。通过“读”、“练”有机结合，既注重以内容为基础，帮助学生掌握和积累能源领域相关英语词汇和语篇知识，又重视语言阅读策略和应用能力的培养。

本教程可作为能源相关专业本科和研究生英语阅读教材，也可供能源领域专业技术人员培训、学习时参考。全书共16课，每课围绕一个能源主题，包括Part I和Part II两个部分。Part I为一篇主旨文章，包含New Words和阅读思考题，文章后编有Reading Comprehension Check和Reading Afterthoughts供学习者检测阅读效果；Part II是一篇与该课主题相关的快速阅读文章，其后设置有形式多样的问题用以检测读者快速阅读效果。为利于教学和自学，书后附有课后练习题参考答案。

本书在北京大学出版社领导及专家的指导下，由成都理工大学外国语学院《大学英语阅读教程（能源篇）》编写团队共同完成。段成教授和郑欢教授担任本教程主编，负责该教程的总体设计、内容编排和最后审定。参与教程具体编写工作的教师有阎黎明、潘延芳等16位教师。在编著过程中承蒙能源领域专家闫长辉教授和外语界同仁的热诚协助，在此表示诚挚的谢意。

编著这样一本内容完整、系统的大学英语阅读教程，是一件很有意义的工作，但也是一项颇为复杂艰巨的工程。为此，我们付出了辛勤的努力，但限于编者水平，书中难免存在差错或不当之处，敬请专家、读者批评指正。

编　者

2014年5月

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Energy

Lesson Tips

能源(能量)是什么？它用什么单位来度量？它具有什么特性？能源可分为哪些类别？每一类别的能源是如何界定和产生的？现代生活方式需要越来越多的能源消耗作为支撑，如果现有的化石燃料难以满足世界的能源需求，我们将如何去开发什么样的可再生清洁能源？能源需求如何影响我们的日常生活甚至世界的和平发展？对上述问题，本文将一一解答。

PART I READING: MEANING NEGOTIATION

Read the following text. The reading notes on the right margin may be of help to you in your reading process. If you prefer reading the text straight through without referring to these notes, just ignore them. Or you may want to turn to them for better reading comprehension in your re-readings.

Introduction to Energy

[1] The word energy is derived from a Greek word "energos," which means activity. Energy is a characteristic of the system which describes the ability of the system to perform some work. According to the international system of units, in honor of the English physicist James Prescott Joule (1818—1889), a unit of measure for energy is called the **joule** (J). One important feature of energy is that energy can neither arise nor **perish**, and therefore the amount of energy in a closed system is always constant. This energy feature is called the energy preservation law, which was first set in the 19th century. All

What is energy from your understanding?

joule: 焦耳(能量和功的单位)

perish: 毁灭，消失

kinetic: 运动的；活跃的
potential energy: 势能
elasticity: 弹力，弹性
electromagnetic: 电磁的

known natural processes and phenomena can be explained with several forms of energy according to the following definitions: **kinetic** energy, **potential energy**, thermal energy, gravity, **elasticity**, **electromagnetic** energy, chemical energy, nuclear energy and mass.

[2] Below are some of these energy forms explained in more details.

[3] Potential energy. It is defined as the work that is done against the given force by changing the position of the observed object in relation to a reference position. The name "potential energy" comes from the assumption that this energy can be easily converted to useful work. This is not quite correct for all systems, but helps the understanding of the potential energy theory. The two most obvious types of potential energy are gravitational potential energy and elastic potential energy. Gravitational potential energy is the energy associated with gravitational force and works between any two objects that have mass. It is proportional to the mass of objects, and inversely proportional to the distance between objects. Elastic potential energy is the potential energy of some elastic object, such as springs, **catapults**, etc. It occurs as a consequence of forces that are trying to move an object back to the original position; these are in most cases electromagnetic forces in atoms and **molecules** that form the object. The best example of exploiting gravitational potential energy are large hydroelectric power plants where the potential energy of water is converted into kinetic energy, which then drives **turbines** to generate electricity.

catapult: 弹弩；发射机
molecule: 分子
turbine: 涡轮；涡轮机

[4] Kinetic energy. Kinetic energy or energy of the movement is the energy required to **accelerate** a certain object to a certain speed or energy of the object at a certain speed in relation to a reference object. According to classical mechanics kinetic energy is proportional to the mass of the object and the square speed of the object. At speeds that are comparable to the speed of light, kinetic energy can no longer be calculated using equations that apply to regular classical mechanics. Energy of the object that is moving at speeds comparable to the speed of light can be calculated using Lorentz's **transformations** under which an object that is moving at the speed

accelerate: 加速
transformation: 转换；转化；变形

of light should have an infinite energy, so it is therefore impossible to accelerate an object to the speed of light. Example of exploiting the kinetic energy is converting wind energy into electricity in windmills.

[5] Thermal energy. It is the energy of random movement of microscopic particles that form the object. Thermal energy of the object increases with temperature. Thermal energy is transferred from one object to another because of differences in temperature. Heat is transferred in three basic ways: **conduction**, radiation and **convection**. Heat conduction is the spontaneous transition of thermal energy through matter from warmer to colder parts. Convection is the flow of gases where warmer liquid flows towards the colder liquid transferring the heat to the environment. Warmer body radiates stronger electromagnetic radiation, because the warmer the body is, the more energy there is, and **vibration** of electric charge is also increased. This radiation heat can be transferred from one body to another. Thermal energy can be used directly for heating or indirectly to obtain other forms of energy. For instance, the thermal energy stored within the Earth — **geothermal** energy — can be used to generate electricity.

conduction：传导

convection：对流；传送

vibration：振动

What's the difference between conduction and convection?

geothermal：地热的；地温的

Coulomb force field：库仑力场

repulse：驱逐；拒绝

[6] Electricity. It is a form of potential energy in the **Coulomb force field** in which the particles of the same charge are **repulsed**, and particles of the opposite charge are attracted. Electrical energy is undoubtedly the most important form of energy used by humanity since it is relatively easy to transport and most importantly — it can be easily converted into other useful forms of energy such as kinetic and thermal energy. Electricity is currently produced mostly from fossil fuels (mainly from coal). Since fossil fuels have a negative impact on the environment and in limited quantities, there is an increased need to use alternative methods of power generation such as the exploitation of solar energy, water energy, geothermal energy, wind energy and other renewable energy sources.

Are there any other forms of fossil fuels? Please list them out.

[7] Chemical energy. It can be defined as the work that is done by electrical forces during rearrangement of the electrical charges — protons and electrons — in chemical processes. If the chemical energy of the system decreases in the chemical reaction, this means

that the difference is emitted in the environment in the form of light or heat, and if the chemical energy increases, this means that the system has taken from the environment a certain amount of energy, usually in the form of light or heat. Fire is, for instance, a form of shifting the chemical energy into heat and light, and can occur only if three basic conditions for a chain reaction are met: the presence of sufficient amounts of oxygen, presence of the burning materials and presence of sufficient amount of heat. Examples of exploiting the chemical energy are fossil fuels. When burning fossil fuels release heat that is then through the pressure converted into kinetic energy, or is used for heating some liquid for the purpose of **vaporization** of this liquid and to obtain kinetic energy. Coal-fired power plants are examples of converting chemical energy into electricity.

vaporization：蒸发；喷雾（器）

[8] Nuclear energy. It is the energy that is produced by the processes of nuclear **fusion** or nuclear **fission**. Nuclear fusion is the joining of two or more light atoms into one heavier with the release of certain amounts of energy in the form of various radiations. Nuclear fission also involves releasing specific amounts of energy in the form of various radiations, but this energy is the result from splitting the heavy atoms into two or more lighter atoms. In both these processes the mass before the reaction is always bigger than the mass after the reaction, and the difference in masses is converted into energy according to Einstein's formula $E=mc^2$. Solar energy is a consequence of constant nuclear fusion that takes place in the center of the star, and then in the form of radiation that comes to the surface and is afterwards radiated to space. Researches that could mean better exploit of nuclear fusion on earth are still at an early stage, in the form of the **ITER** project, but for now there is no indication that nuclear fusion could be heavily exploited in years to come. On the other hand, nuclear fission is a simple enough process that is widely used in nuclear reactors to generate electricity.

fusion：聚变
fission：裂变

What is nuclear fusion and what is nuclear fission?

ITER：国际热核实验反应堆（abbr. for International Thermonuclear Experimental Reactor）

[9] The modern lifestyle involves much greater use of energy in order to achieve greater efficiency and comfort, so the energy use is increasing each day. Currently, world energy needs are mostly satisfied by using the fossil fuels that are harmful to environment,

and in the future these fuels will have to be replaced with cleaner energy sources, mostly in the form of renewable energy or nuclear energy. As you can see from this article, currently available energy is more than enough to cover all possible future energy needs. All that needs to be done is to find ways of clean and safe exploitation of various energy sources, of course, with the gradual reduction of the oil **lobby** influence, which is making life difficult for all energy sources that aren't under their control.

Is nuclear energy really safe and clean? Why?

lobby：游说议员

[10]Energy needs are constantly growing affecting everyday life in much of the modern world and this has turned energy into one of the main strategic resources in developed countries. If we take a look at history books, we can see how various wars have occurred due to lack of water, lack of food, different religious reasons or because of a desire for **territory** expansions. Recently wars have also been started for the purpose of maintaining stable energy supply by occupying areas filled with different energy sources. The best example is the occupation of oil rich Iraq by the US military forces in order to control the oil supply. This occupation, together with ever-increasing energetic needs of developing countries has caused a **substantial** increase in price of oil products which are later reflected indirectly in the increased prices of nearly all products. Renewable energy sources are likely to become the primary sources of energy in years to come, making wars for energy something that can be found only in history books, which could make the world much more peace-loving.

territory：领土；领域；范围

substantial：大量的；实质的

(1476 words)

Abridged from : http://www.our-energy.com/energy.html

A Reading Comprehension Check

Choose the best answer from the options given or fill in the blanks wherever required.

1. Which of the following is an important feature of energy?

A) Energy arises from different sources.

B) Energy will perish at last.

C) Energy will keep constant all the way.

2. How many different types of energy does the passage cover in details after the 2nd paragraph?

A) 5.

B) 6.

C) 7.

3. According to the author, what kind of energy is produced when the catapults are used?

A) Gravitational energy.

B) Potential energy.

C) Elastic energy.

4. Example of exploiting the _____ is converting wind energy into electricity in windmills.

5. Heat _____ is the spontaneous transition of thermal energy through matter from warmer to colder parts. _____ is the flow of gases where warmer liquid flows towards the colder liquid transferring the heat to the environment.

6. Coal-fired power plants are example of converting _____ into electricity.

7. Although there is no indication that _____ could be heavily exploited in years to come, on the other hand, _____ is a simple enough process that is widely used in nuclear reactors to generate electricity.

8. Energy needs are constantly growing affecting everyday life in much of the modern world and this has turned energy into one of the main _____ in developed countries.

B Reading Afterthoughts

Think of the following questions. If possible, discuss them with your classmates and the instructor.

1. In modern times, the world is sure to witness the day when we are short of energy, so what kinds of clean and renewable energy resources should we try to find to meet our needs? Explain your view on this issue.

2. The passage mentioned the example of "the occupation of oil rich Iraq by the US military forces in order to control the oil supply." Can you give some similar examples of this kind in the world?

PART II FAST READING

General Energy Facts

Time taken: _____minutes

Energy is most often used in the context of energy resources, their development, consumption, depletion, and conservation. Since economic activities such as manufacturing and transportation can be intensive, energy efficiency, energy dependence, energy security and price are key concerns.

Renewable energy sources are solar energy, wind energy, geothermal energy, hydropower, bio-energy (bio-ethanol, bio-diesel), and ocean energy (tidal power, wave energy, Ocean Thermal Energy Conversion—OTEC). Renewable energy sources are often marked as sustainable energy sources.

Non-renewable energy sources are fossil fuels (oil, coal, natural gas) and nuclear energy. Fossil fuels are the main energy source in today's world. Non-renewable energy sources are often marked as non-sustainable energy sources.

We use energy to do everything we do, from making a jump shot to baking our favorite cookies to sending astronauts into space — energy is there, making sure we have the power to do it all.

Food is stored energy. It is stored as a chemical with potential energy. When your body uses that stored energy to do work, it becomes kinetic energy.

In physics, the law of conservation of energy states that the total amount of energy in any isolated system remains constant but cannot be recreated, although it may change forms.

According to law of conservation of energy, energy can neither be created (produced) nor destroyed itself. It can only be transformed. So, whenever one measures the total energy of a system of particles whose interactions do not depend explicitly on time, it is found that the total energy of the system always remains constant.

In physics and engineering, energy transformation or energy conversion, is any process of transforming one form of energy to another. Usually we transform unusable energy into usable with a range of different machines, such as cars, heaters, and so on.

Sustainable energy is such provision of energy that it meets the needs of the present without compromising the ability of future generations to meet their needs. Sustainable energy has two key components: renewable energy and energy efficiency. By some other definitions, sustainable energy is energy which is replenishable within a human lifetime and causes no long-term damage to the environment.

Alternative energy is typically defined as coming from sources that do not deplete natural

resources or harm the environment. Typical examples of alternative energy are wind power and solar power.

Ordinary fossil fuel power plants convert between 36% and 48% of the fuel's energy into electricity, with the remainder being lost as waste heat.

Energy storage is the storing of some form of energy that can be drawn upon at a later time to perform some useful operation. A device that stores energy is sometimes called an accumulator. Hydroelectric dams are one type of energy accumulator. Batteries are also energy accumulators.

Energy security has become essential to the functioning of modern economies. Because of that, almost all wars in recent decades are mostly wars for control over energy sources.

(*484 words*)

Abridged from: http://interestingenergyfacts.blogspot.ca/2008/09/general-energy-facts.html

Without referring back to the passage, finish the following tasks.

I. Fill in the blanks or make the best choice with the information you obtained from the reading.

1. According to the author, renewable energy sources include solar energy, wind energy, _____, hydropower, bio-energy and _____.
2. Non-renewable energy sources are _____ (oil, coal, natural gas) and nuclear energy.
3. According to the law of conservation of energy, the total amount of energy in any isolated system remains constant but cannot be _____, although it may change forms.
4. Which of the following is alternative energy?

   A) Non-renewable energy.

   B) Sustainable energy.

   C) Wind power and solar power.

II. Decide whether the following statements are true (T), or false (F).

1. Energy storage means storing of some kind of energy that can be used at a later time to perform some useful operation. (T / F)
2. All wars in human history are mostly wars for control over energy sources. (T / F)

Lesson 2
Fossil Fuels

Lesson Tips

化石燃料是指煤炭、石油、天然气等埋藏在地下和海洋下的不可再生的燃料资源。到目前为止，世界各国所用的能源绝大多数都来自化石燃料，它们几乎影响着人类生活的方方面面。然而，在自然界中经历了几百万年逐渐形成的化石燃料，却可能在几百年内被人类全部耗尽。那么，化石燃料究竟是怎样形成的？它们有什么缺点和优点？本文将带您一起探索和思考这些问题。

PART I READING: MEANING NEGOTIATION

Read the following text. The reading notes on the right margin may be of help to you in your reading process. If you prefer reading the text straight through without referring to these notes, just ignore them. Or you may want to turn to them for better reading comprehension in your re-readings.

What Are Fossil Fuels?

[1] Fossil fuels are sources of energy that have developed within the Earth over millions of years. Because fossil fuels — oil, natural gas, and coal — take so long to form, they are considered nonrenewable. Learn more about these fuels, including the pros and cons of using them.

Fossil Fuels

[2] What comes to your mind when you think of fuel? You might think of gasoline for your car, or maybe food, which is fuel for

What is fuel in your eyes?

your body, possibly firewood, which may provide heat for your home. **The bottom line** is that fuel is an absolutely necessary part of everyone's daily life. And deep within our Earth, there are stores of fuel that our world has become totally dependent on. They are called fossil fuels, and in this lesson, we will explore how they came about and how they affect our lives.

the bottom line: 要点，基本论点

[3] You have undoubtedly heard of fuels such as coal, oil and natural gas. These are the three main types of fossil fuels. You rely on fossil fuels every day for such tasks as fueling your car and heating your home. And, it's very likely that the electricity in your home comes from a power plant that uses fossil fuels. But did you know that these fuels were once plant and animal life? That's right; fossil fuels are actually the **accumulated remains** of living **organisms** that were buried millions of years ago. In fact, it may help you to recall this term by remembering that a "fossil" is a naturally preserved **remnant** of a living thing from long ago. Let's take a closer look at these energy-rich substances and how they were created.

accumulate: 积累
remains: 残骸
organism: 生物，有机体
remnant: 残余，剩余

Fossil Fuel Creation

How did fossil fuels come about?

[4] As we mentioned, the story of fossil fuels began millions of years ago, even before the **dinosaurs** first appeared on Earth. At that time, there were tiny plants and animals living in the oceans of the world. As these plants and animals died, they would sink down and settle on the ocean floor. This **organic** matter was eventually covered by **layers** of sand, rock and mud that later turned into **sedimentary rock**.

dinosaur: 恐龙
organic: 有机物的，生物的
layer: 层
sedimentary rock: 沉积岩

[5] As these layers of rock grew thicker and thicker, the organic matter ended up being placed under a great amount of pressure. Over the millions of years that passed, this high pressure transformed the partially **decomposed** plant and animal matter into the major energy source that we know as oil and natural gas.

decomposed: 已分解的，已腐烂的

[6] Coal is formed through the same type of process. However, coal originates mainly from dead tree and plant matter. Millions of years ago, **leafy** plants and trees died and sank into **swamps** and **bogs**

leafy: 多叶的
swamp: 沼泽，湿地
bog: 沼泽

soupy: 汤的
stew: 混合物
peat: 泥煤，泥炭
sediment: 沉积物
squeeze out: 挤出

that covered much of the Earth. This created a **soupy** plant-filled **stew** called **peat**. The peat became buried under layers of **sediment**, and water was **squeezed out**. Over the course of millions of years, compounds within the peat were subjected to heat and pressure, which transformed them into the carbon-rich substance we know as coal.

Fossil Fuel as Energy

carbon dioxide: 二氧化碳

[7] Fossil fuels are a great source of energy because they originate from living things. We know that plants and trees use sunlight to make food from **carbon dioxide** and water, using the process called photosynthesis. This is an easy term to recall when you remember that the prefix "photo" is Greek for light, and the suffix "synthesis" means to make, so photosynthesis is using the energy of sunlight to make food. This energy from the sun gets stored in the plants and is transferred to any animal that eats the plants.

decay: 腐烂

[8] Now keep in mind, the dead plant and animal matter that made up these fossil fuels didn't have much time to **decay**. They sank into the water and were buried with much of their substance **intact**. This allowed the energy within them to remain as they were transformed.

intact: 完整，完好

compress: 压缩
visualize: 设想
raw: 生的，未煮的
spinach: 菠菜
dense: 稠密的
mush: 糊状物
nutrient: 营养物

[9] You can imagine how concentrated the energy is within fossil fuels. The plant and animal matter has sunk into the water and has been greatly **compressed**. To try and **visualize** this, picture a bag of **raw spinach**. It takes up quite a bit of space, just like a plant would. Now put the spinach into a pot with a little bit of water, and cook it up. Suddenly your pan only has a couple of inches of spinach at the bottom, all compressed into a **dense** layer of **mush**. All of the **nutrients** in the spinach leaves are now concentrated, just like the energy in fossil fuels.

Advantages of Fossil Fuels

Could you list some advantages of fossil fuels?

accessible: 可使用的；可见到的

[10] There are many advantages of fossil fuels. Even though they are consumed in mass amounts, they are still abundant and **accessible**. Fossil fuels provide a large amount of concentrated energy for a relatively low cost. Their abundance allows power plants