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电力新能源英语

English for Electric Power of Alternative Energy Sources

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Preface
前　言

由于全球资源供应日趋紧张，新能源特别是可再生能源的开发和利用正成为各国蓬勃发展的绿色新兴产业。电力在能源中具有特殊的地位。作为一次能源的主要用户、二次能源的主角——电力工业希望用清洁、可再生的水能、太阳能、风能、生物质能、地热能等发电来取代非再生能源煤电、油电和气电。据估计，到2050年，新能源发电将占电力市场30%～50%。在此领域中，我国的国际交流日益增加，大量的英语资料有待阅读与消化，迫切需要电力能源专业的相关人员熟悉英语专业词汇、具有相应的英语阅读能力，因为在新能源开发和电网建设等方面，欧美等西方国家有许多值得借鉴的经验。例如，我国2009年5月由国家电网公布、作为我国国家战略一部分的“智能电网”建设计划，其核心词“智能电网”正是从美国的“Smart Grid”翻译而来。另外，随着电力能源工业进入了以大机组、大电厂、大电网、超高压、自动化为主干的新时期，国外的新技术、新装备直接进入了电站、电厂等电力能源生产第一线。我国电力新能源工业的迅速发展急需一大批既懂专业，又懂英语的现代化电力新能源科技人才。

懂英语，不仅是懂英语语言本身，更重要的是懂得如何在自己的专业领域实际运用好英语。无论是工作在电力能源系统的员

工,还是尚在电力能源院校求学的学生,如果能掌握一定的能源、电力英语专业词汇及阅读技巧,能用英语了解新能源和电力生产过程,熟悉电力能源工业常见的英语文献,必将能在对外交流中领先他人一步。

为了帮助从事电力能源工作的英语爱好者及电力能源院校的学生学好能源、电力专业英语,编者编写了《电力新能源英语》一书。全书由15个单元组成。每个单元分为课文、阅读技巧和补充阅读材料3个部分。课文和阅读技巧部分都有相应的练习。

全书30篇阅读材料包括新能源、电力工业最新发展动态、电力生产概况、新能源发电技术等内容。通过这部分的学习,一方面可以了解新能源知识及电力生产过程,另一方面可以熟悉掌握常见能源和电力英语词汇及基本语言结构。

"阅读技巧"部分的内容旨在帮助读者将英语语言知识具体运用到语言使用的实际中去,前10个单元的十大阅读技巧概括了能源、电力科技英语中最常见、实用的语言分析理解技能,"快速链接参考"为阅读分析进一步提供必要的语言知识参考材料;后5个单元的"阅读技巧综合实练"为综合分析阅读材料提供实战机会。

本书所选英文素材参考了国内外20世纪末和21世纪初出版的书籍、报刊、杂志和网络上的文章,由于渠道繁多,不便一一列举,在此向各位原作者致谢。

本书编者既是英语语言教学工作者,同时又曾在电厂生产、教育培训等岗位工作多年;但即便如此,本书也难免出现不尽如人意之处,敬请广大读者批评指正。

编 者

2009年8月

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Unit 1

Text

Renewable Energy
可再生能源

Renewable energy is energy generated from natural resources—such as sunlight, wind, rain, tides and geothermal heat—which are renewable (naturally *replenished*). In 2006, about 18% of global final energy consumption came from renewables, with 13% coming from traditional *biomass*, such as wood-burning. Hydroelectricity was the next largest renewable source, providing 3% of global energy consumption and 15% of global electricity generation.

Wind power is growing at the rate of 30% annually, with a worldwide installed capacity of 121,000 *megawatts* (MW) in 2008, and is widely used in European countries and the United States. The annual manufacturing output of the *photovoltaic* industry reached 6,900MW in 2008, and photovoltaic (PV) power stations are popular in Germany and Spain. Solar thermal power stations operate in the USA and Spain, and the largest of these is the 354MW SEGS power plant in the Mojave Desert. The world's largest *geothermal* power installation is The *Geysers* in California, with a *rated* capacity of 750MW. Brazil has one of the largest renewable energy programs in the world, involving production of *ethanol* fuel from *sugar cane*, and ethanol now provides 18% of the country's automotive fuel. Ethanol fu-

el is also widely available in the USA.

While most renewable energy projects and production is large-scale, renewable technologies are also suited to small off-grid applications, sometimes in rural and remote areas, where energy is often crucial in human development. Kenya has the world's highest household solar ownership rate with roughly 30,000 small (20 – 100 watt) solar power systems sold per year.

Some renewable energy technologies are criticized for being *intermittent* or *unsightly*, yet the renewable energy market continues to grow. Climate change concerns *coupled with* high oil prices, peak oil and increasing government support are driving increasing renewable energy *legislation*, *incentives* and *commercialization*. New government spending, regulation, and policies should help the industry weather the 2009 economic crisis better than many other sectors.

The majority of renewable energy technologies are powered by the sun. The Earth-Atmosphere system is in *equilibrium* such that heat radiation into space is equal to incoming solar radiation, the resulting level of energy within the Earth-Atmosphere system can roughly be described as the Earth's "climate". The *hydrosphere* (water) absorbs a major fraction of the incoming radiation. Most radiation is absorbed at low *latitudes* around the equator, but this energy is *dissipated* around the globe in the form of winds and ocean currents. Wave motion may play a role in the process of transferring mechanical energy between the atmosphere and the ocean through wind stress. Solar energy is also responsible for the distribution of *precipitation* which is tapped by hydroelectric projects, and for the growth of plants used to create *bio-fuels*.

Renewable energy flows involve natural phenomena such as sunlight, wind, tides 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 bio-fuels and *hydrogen* derived from renewable resources. "Each of these sources has unique characteristics which influence how and where they are used.

When we talk about renewable energy, we always associate it with the generation of electric power. As a matter of fact, the greatest use of renewable energy does lie in this respect. Electric power is being generated worldwide by means of water, sunlight, wind and other energy resources that are *inexhaustible*. At the end of 2008, for example, wind power produced some 1.3% of global electricity consumption. Wind power accounts for approximately 19% of electricity use in Denmark, 9% in Spain and Portugal, and 6% in Germany and the Republic of Ireland. So far as solar energy is concerned, since 2004 there has been renewed interest in solar thermal power stations and two plants were completed during 2006/2007: the 64MW Nevada Solar One and the 11MW PS10 solar power tower in Spain. Three 50MW *trough* plants were under construction in Spain at the end of 2007 with 10 additional 50MW plants planned. In the United States, utilities in California and Florida have announced plans (or contracted for) at least eight new projects totaling more than 2,000MW. In 2009, the largest photovoltaic (PV) power plants in the world are the Parque Fotovoltaico Olmedilla de Alarcon (Spain, 60MW), the Moura photovoltaic power station (Portugal, 46MW), and the Waldpolenz Solar Park (Germany, 40MW).

Renewable energy can be particularly suitable for developing countries. In rural and remote areas, transmission and distribution of energy generated from *fossil fuels* can be difficult and expensive. Producing renewable energy locally can offer a viable alternative.

Renewable energy projects in many developing countries have demonstrated that renewable energy can directly contribute to poverty *alleviation* by providing the energy needed for creating businesses and employment.

Renewable energy technologies can also make indirect contributions to alleviating poverty by providing energy for cooking, space heating, and lighting. Renewable energy can also contribute to education, by providing electricity to schools.

At present, renewable energy sources supply about 18% of current energy use in the world and so there is much potential that could be exploited in the future. We have every reason to believe that renewable energy will be used more widely, especially in the area of electric power generation.

Vocabulary

(1) replenish 再填装满
(2) biomass (单位面积或体积内)生物的数量,生物质
(3) photovoltaic 光电的
(4) megawatt (MW) 百万瓦特(电学)
(5) geothermal 地热的
(6) geysers 间歇泉
(7) rated 额定的
(8) ethanol 乙醇
(9) sugar cane 甘蔗
(10) intermittent 间隙的,断断续续的
(11) unsightly 难看的
(12) couple with 外加,加上
(13) legislation 立法
(14) incentive 刺激,动机
(15) commercialization 商业化,商品化
(16) equilibrium 平衡,均衡
(17) hydrosphere 水界,水圈
(18) latitude 纬度
(19) dissipate 消散
(20) precipitation 降水,降水量
(21) biofuel 生物燃料(指曾经为活质的燃料,如煤)

(22) hydrogen 氢
(23) inexhaustible 无穷无尽的,永不枯竭的
(24) trough 水槽
(25) fossil fuels 矿物燃料
(26) alleviation 缓和

Answer the following questions according to the text.

(1) What can we learn from the text about the renewable energy development worldwide?
(2) What factors contribute to the development of renewable energy?
(3) What's the function of wave motion?
(4) What's the definition of renewable energy according to the International Energy Agency?
(5) Why is renewable energy more suitable for developing countries?

Reading Skills (1)

Sentence of Definition in English
英语定义句的识别

在科技文章中常常需要给事物下定义,正确识别英语中的定义句,对于理解所读的内容是十分重要的。需要说明的是,这里所谓的"定义"不是严格意义上的对事物定性的"定义",而是对事物的归类及某种属性的描述。一般来说,英语中的定义句有完全定义句和准定义句两种。

完全定义句可以用下面的基本公式来表示。

被定义的事物 + is + 事物归类 + 限制性定语

例如下列选自课文的关于"renewable energy"的定义句。

Renewable energy is energy *generated from natural resources—such as*

sunlight, wind, rain, tides and geothermal heat—which are renewable (naturally replenished).

又如下面的句子。

(1) The electric power substation is an assembly of equipment *in an electric power system through which electrical energy is passed for transmission, distribution, interconnection, transformation or conversion.*

(2) The transformer is a device *that transfers electric energy from one alternating-current circuit to one or more other circuits, either increasing (stepping up) or reducing (stepping down) the voltage.*

斜体部分是限制性定语。对定义句来说,限制性定语越多,定义就越严密。

准定义句的形式很多,基本形式如下。

被定义事物 + is used / designed / intended / meant for ... / to do ...(表示用途)

例如下面的句子。

(1) The disconnecting switch is used to break the circuit so as to guarantee safety-repairing work.

(2) Air-core transformers are designed to transfer radio-frequency currents—i. e., the currents used for radio transmission.

这样的句子尽管没有用定义句的格式,但也表示出了某事物的主要用途,可以看作是准定义句。

正确识别和理解定义句的前提与关键是正确识别英语中的后置定语。

《快速链接参考》

在语序上,英语与汉语的最大不同在于:英语有大量的后置定语,在有关电力这样的科技英语阅读中更是如此。后置定语的存在,不仅使句子变长,而且使句子变复杂,如下列句子。

At any instant, the magnitude of the voltage is proportional to the rate *at which the magnetic field* ***encircled by the coil*** *is changing with time*—i. e., the rate *at which the magnetic field is passing the two sides*

of the coil.

句中的斜体部分就是后置定语。有时,后置定语中又套着低一层次的后置定语,使句子结构更为复杂,如上句中的黑斜部分。因此,识别后置定语是科技英语阅读的一个重要技巧。

一般来说,科技英语中的后置定语主要有下列 4 种:(1)介词短语、(2)不定式短语、(3)分词短语和、(4)定语从句。

介词短语、不定式短语、现在分词短语比较容易识别。

过去分词短语则要注意区别过去时态的谓语动词,如:This kind of technology developed very quickly in their country is now being adopted by many other nations. / This kind of technology developed very quickly in their country but now many other nations have caught up. 前句中的 developed very quickly in their country 是后置定语,修饰 this kind of technology,后句中的 developed very quickly in their country 则是过去时的谓语动词。

识别定语从句的关键是熟悉定语从句的连接词,另外注意科技英语中常用的一类定语从句是"介词 + which"引导的定语从句,如上面例句中的 at which. . . 。

Analyze the following sentences by using the reading skills learned in this text.

(1) The stator of the elementary generator consists of a cylindrical ring made of iron to provide an easy path for the magnetic flux.

(2) Electric power refers to energy generated through the conversion of other forms of energy, such as mechanical, thermal, or chemical energy.

(3) Electric power is the product of current and voltage.

(4) A direct-current (DC) generator is a rotating machine that supplies an electrical output with unidirectional voltage and current.

(5) As an energy source, coal is an abundant natural resource that can be used as a source of energy, as a chemical feedstock from which numerous synthetic compounds (e. g. , dyes, oils, waxes, pharmaceuti-

cals, and pesticides) can be derived, and in the production of coke for metallurgical processes.

Supplementary Reading Material (1)

Smart Grid
智能电网

The current electricity transmission and distribution system—or "grid"—is in critical need of an upgrade. It is old, *balkanized* and too limited in its reach. The current grid is a series of independently operating regional grids—it can't meet the needs of a nation whose economy would benefit substantially from the system *optimization* that comes with national interconnection. Its limitations and *vulnerability* to failure are also reported to cost the nation $80 billion to $188 billion per year in losses due to grid-related power *outages* and power quality issues. And most critical to clean energy development, areas rich in renewable resources like solar, wind and geothermal are currently not well-served and thus have no "highway" available to move power outputs to the markets where that power is needed.

The Solution: Modernize and expand the *infrastructure* for moving electricity from where it is generated to where it is needed through a unified national smart grid. Make that grid "smart" so that it can monitor and balance the load, accommodate distributed energy from local areas and, in the near future, capitalize on a massive national fleet of clean plug-in cars. This new grid *encompasses* both the long-distance, *high-voltage* transmission lines and the lower voltage distribution systems that connect the power to customers.

The Benefits: Updating our grid with advanced transmission will save