新编

上卷

电力英语教程

A New Course of English for Electric Power

Vol.1

上海电力学院外语系组编

電子工業出版社
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A New Course of English for Electric Power

Vol. 1

上海电力学院外语系组编

总主编　杨大亮

主　编　(按分册顺序)

庄起敏

王治琴

吴远恒

主　审　唐　俭　吴远恒

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前　言

改革开放以来，在我国的工业门类中，电力工业发展最为迅速。各大电网已覆盖全国城市和大部分农村，我国的发电装机容量和发电量均居世界第二位。我国电力工业已进入以大机组、大电厂、大电网、超高压、自动化为主干的新时期。

然而，随着我国经济的不断发展和人民生活水平的提高，尤其是中国加入 WTO 后，国内电力供应日趋紧张。现有的发电装机容量和发电量已不能适应现代化建设的需要，急需登上一个新的台阶。而电力工业的崛起将依赖于一大批素质高，业务强，懂英语的电力科技人才。

那么电力行业对技术人才的英语水平有何种要求？显然英语 4 级、6 级证书并不能说明持证者应用英语的实际水平。我们认为懂英语就是要能用英语进行听说读写译全方位的活动。懂英语就是要能在商务谈判、学术交流中与外国同行用英语进行自由的交谈，探讨电厂建设、电力生产、传输、销售等各个方面的问题。懂英语就是能用规范的英语撰写论文、报告、信函。显然目前的培养模式和英语教材已无法适应新型的电力科技人才的培养。为此我们必须开始新一轮的教改。我们的目的是彻底改变电力学院毕业生的外语素质，使他们在未来能充分利用自己在外语方面的优势，在电力人才市场占有一席之地。

具有 60 年校史的上海电力学院是培养电力科技工作者和电力系统急需人才的摇篮。为培养造就更多的能与国际电力水平接轨的复合型人才，我们组织了英语专家学者，精心编写了一套覆盖听说读写译 5 个方面、涵盖电力行业方方面面的新编电力英语教程。

丛书特色：“新编电力英语教程”深入浅出、内容丰富、涉猎广泛、题材多样。融科学性、趣味性和实用性为一体，以新、大、全为特色。突出了基本功的培养。丛书共分 3 卷，每卷由 3 个分册组成，各册内容分别为：

上卷(1~3 册)

(第 1 册)电力英语阅读；(第 2 册)电力英语口语；(第 3 册)电力英语听力(1)

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(第 7 册)电力科技英语；(第 8 册)电力市场英语；(第 9 册)电力英语翻译

读者对象：“新编电力英语教程”的阅读对象为电力院校的大学生以及从事电力工作的英语爱好者。广大读者通过阅读学习本丛书可以开阔视野，获取信息，增长知识。“新编电力英语教程”是广大学生和电力英语爱好者的良师益友。

参编人员：本丛书由上海电力学院外语系组编，参加本丛书的编写人员是一个具有丰富教学经验、较强科研能力的群体，包括教授 3 名、副教授 8 名、博士 1 名，讲师 12 名，英美留学人员 6 名。部分教师在全国电力系统及上海市享有一定的知名度和影响，教学、科研成果丰硕。

本书的总主编杨大亮，各分册主编、副主编的名字分别在各分册中，唐俭和吴远恒是

上卷的主审，魏永红和庄起敏是中卷的主审，庄起敏和吴远恒是下卷的主审。此外参加本书的编者还有姚明广、李光、赵刚、李丹、杨凤茹、郭智慧、缪莹等同志，他们承担本书编写前期大量的资料收集、筛选、编译和校对工作。

在编写过程中，我们参阅了国内外出版的大量有关资料和信息，主要参考文献目录附于书末。在此，谨表诚挚的谢意。

由于编者水平有限，疏忽之处实属难免，恳请学界同仁和读者批评指正。

我们的 E-mail 地址是：mgyao2003@163.com。

编　者

2004 年 7 月于上海

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新编电力英语教程(第1册)

电力英语阅读

English Readings in Electric Power

主　编　庄起敏

副主编　(按姓氏笔画)

付　宁

余晞耀

周　鲲

编 写 说 明

《电力英语阅读》是新编电力英语教程的分册之一，供有一定英语基础的读者学习电力英语之用。读者通过阅读本书，可以熟悉电力英语词汇、了解电力英语的基本内容。

本册书共40个单元，包括了从电与其早期发展、电能、电力工程与电子工程到电的生产、主要电力设备及其运用等各个方面。选材力求贴近电力英语实际。通读全书，能熟悉常用的电力词汇及其表达形式。

为了帮助读者在阅读的过程中提高电力英语阅读能力，每个单元都有“阅读技巧”(Reading Skills)栏目，从词汇、句型、结构、语法等不同角度介绍电力英语的特点，提炼阅读技巧。

作为检验阅读结果的手段，每单元配备了一定量的练习。练习的编写也力求实用，以理解内容与必要的记忆为主要出发点，而不是纯语言性的练习。

考虑到电力英语在内容上专业性较强，为了调节阅读气氛，每单元还配有“轻松阅读”(Relax Yourself)栏目，主要内容为小幽默、谚语和格言等。

本书编者既是英语语言教学工作者，同时也曾经在电厂工作多年，但即便如此，本书也难免出现不尽如人意之处，谨请读者批评指正。

我们的联系地址：上海市杨浦区平凉路2103号

邮编：200090

联系电话：(021)65430410-438(姚明广)

Part one

Unit 1 Electricity and Its Early Development

电与其早期发展

Before Reading

Reading Skills 主谓结构的识别

一般来说，英语的主谓次序与汉语相同：主语在前，谓语在后。但是，由于英语的主语和谓语之间常常可以插入定语和状语，有时，这些定语或状语由从句担任；因此，正确找出主句的主谓结构有时就比较困难。例如下面从本节文章中选出的句子，斜体部分的句子主谓结构就比较难识别：

The 20th century has witnessed a big expansion of electrical power generation and distribution. The general pattern has been toward ever-larger units of production, using steam from coal or oil-fired boilers. *Economies of scale and the greater physical efficiency achieved as higher steam temperatures and pressures were attained both reinforced this tendency.*

在大多数情况下，主语较容易确定。上句的主语不难发现，是 Economies of scale and the greater physical efficiency。但识别主谓结构的关键是找谓语动词。从例句中可以找到 achieved，were attained 和 reinforced 三个动词。由于 achieve 是及物动词，后接 as...，没有宾语，显然不是谓语，只是过去分词做 efficiency 的后置定语；as 是连接词，后接从句，因此，were attained 是 as 从句的谓语；由此可见：主句的谓语应该是 reinforced，both 提示主语有两个，即：Economies of scale and the greater physical efficiency。

Exercise

在下面的文章中划出所有主谓结构。

Warm-up Questions

(1) Electricity is used everywhere in our life. But what is actually electricity? Can you give a brief definition of it?

(2) When do you know the principles of generating electricity were established?

(3) What is the general tendency of the development of electrical industry?

Find answers in the following reading passage.

While Reading

Electricity and Its Early Development

Electricity is a *phenomenon* associated with stationary or moving *electric charges.* Electric charge is a fundamental property of matter and is borne by elementary particles. In electricity the particle involved is the *electron*, which carries a charge *designated, by convention, as negative.* Thus, the various *manifestations* of electricity are the result of the accumulation or motion of

numbers of electrons.

All the principles of generating electricity had been worked out in the 19th century, but *by its end* these had only just begun to produce electricity on a large scale. The 20th century has witnessed a big expansion of electrical power generation and distribution. The general pattern has been toward ever-larger units of production, using steam from *coal- or oil-fired boilers. Economies of scale* and the greater physical efficiency achieved as higher steam temperatures and pressures were attained both reinforced this tendency. U.S. experience indicates the trend: in the first decade of the century a generating unit with a capacity of 25,000 kilowatts with pressures up to 200-300 pounds per square inch at 400-500 F (about 200-265 C) was considered large, but by 1930 the largest unit was 208,000 kilowatts, with pressures of 1,200 pounds per square inch at a temperature of 725 F, while the amount of fuel necessary to produce a kilowatt-hour of electricity and the price to the consumer had fallen dramatically.

As the market for electricity increased, so did the distance over which it was *transmitted*, and the efficiency of transmission required higher and higher voltages. The small *direct-current generators* of early urban power systems were abandoned in favour of alternating-current systems, which could be adapted more readily to high voltages. Transmission over a line of 155 miles (250 kilometres) was established in California in 1908 at 110,000 volts; Hoover Dam in the 1930s used a line of 300 miles (480 kilometres) at 287,000 volts. The latter case may serve as a reminder that *hydroelectric power*, using a fall of water to drive *water turbines*, has been developed to generate electricity where the climate and *topography* make it possible to combine production with convenient transmission to a market. Remarkable levels of efficiency have been achieved in modern plants. One important consequence of the ever-expanding consumption of electricity in the industrialized countries has been the linking of local systems to provide vast *power grids,* or pools, within which power can be shifted easily to meet changing local needs for current.

Notes

electric charge　电荷
electron　电子
designated, by convention, as negative　根据习惯成为负电(习惯上称作)
by convention　根据习惯
units of production　生产机组
coal- or oil-fired boilers　燃煤或燃油锅炉
economies of scale　规模经济
direct-current generator　直流发电机
hydroelectric power　水电
water turbine　水轮机
power grids　电网

Relax Yourself

An uneducated young man began walking around with a pen inserted in his shirt pocket. Many people assumed that he was a man of some knowledge. The young man was delighted and decided to insert a second pen in his shirt pocket. Before long, people began to comment, "This guy must be a college student or an editor." Upon hearing this, the young man became even happier. He immediately added three more pens. Afterwards, people started to gaze at him with looks of confusion, some saying, "He probably just works in a pen repair shop."

After Reading

1. Now I know

(1) Electricity is a phenomenon associated with stationary or moving ____.

(2) In electricity the particle involved is the _____.

(3) The electron carries a ____ charge.

(4) The various features of electricity are the result of the accumulation or motion of____.

(5) All the principles of generating electricity had been worked out in the ____ century.

(6) The general tendency of the development of electrical industry in the 20th century has been toward____, using steam from____.

(7) This tendency is possible as a result of ____ and _____.

(8) The efficiency of electric power transmission requires ____ voltages.

(9) Hydroelectric power needs a fall of ____ to drive water turbines.

(10) To shift electric power to meet changing local needs for electricity, we need a ____.

2. Now let me try to remember

(1) designated as (2) by convention (3) economies of scale (4) manifestation

(5) phenomenon (6) 电荷 (7) 生产机组 (8) 水电 (9) 直流发电机 (10) 电网

Key to Exercises

1. Now I know

(1) electric charges (2) electron (3) negative (4) numbers of electrons (5) 19th

(6) ever-larger units of production, coal- or oil-fired boilers

(7) economies of scale, the greater physical efficiency achieved as higher steam temperatures and pressures were attained

(8) higher and higher (9) water (10) power grid

2. Now let me try to remember

(1) 被称为 (2)根据习惯 (3) 规模经济 (4) 表现 (5) 现象 (6)electric charge

(7) a unit of production (8) hydroelectric power (9) direct-current generator

(10) power grid

Unit 2 Electric Power

电能

Before Reading

Reading Skills 正确理解 until 引导的时间状语

until 引导的时间状语常理解为“直到……”，但有时却可能造成误解，请看下面的例句：

Until recently this kind of transformers were still used extensively in medium-sized power plants.

如果理解成“直到最近这种变压器还广泛用于中型发电厂”那就完全错了。上面这句话的正确意思应该是“直到最近这种变压器才较少地用于中型发电厂”。

之所以理解发生偏差，是因为机械地将 unitl 引导的时间状语对等理解为“直到……”。其实，until 的确切意思是：used to say that something stops happening or someone stops doing something at a particular time，也就是说：until 表示“某种动作或状态持续到它所表示的时间这一刻为止”。这就是为什么“not... until...”要理解成“直到……才……”，因为否定的状态持续到 until 这一刻变成了“肯定”。Nuclear energy was not used until recently. 直到最近核能才得到利用。

Exercise

下面含有 until 时间状语的句子选自本节文章，你能正确理解吗？

(1) If the current is direct, electrons progress always in the same direction through the device receiving power until it is stopped.

(2) But not until January 1882 did the first public power station employing an electric generator begin operation in London.

(3) Until the 1930s hydroelectric-power plants equipped with water-turbine generating units produced the largest percentage of electric energy because they were less expensive to operate than thermal-power plants using steam-turbine units.

Warm-up Questions

(1) Which comes first, electric power, mechanical energy or thermal energy?

(2) What is the main difference between the direct current and the alternating current?

(3) When and where do you know the first public power station employing an electric generator began operation?

(4) When and where was the first practical AC generator built in the world?

(5) Why is alternating current used much more widely than direct current?

(6) What are the two primary sources for driving generators?

(7) Why is high-voltage needed to transmit electric power?

Find answers in the following reading passage.

While Reading

Electric Power

Electric power refers to energy generated through the conversion of other forms of energy, such as mechanical, thermal, or chemical energy. Electric energy is *unrivaled* for many uses, *as for* lighting, computer operation, *motive power*, and entertainment applications. For other uses it is competitive, as for many industrial heating applications, cooking, space heating, and *railway traction.*

Electric power is *the product of current and voltage.* A given value of power can be produced by endless combinations of current and voltage values. If the current is direct, electrons progress always in the same direction through the device receiving power until it is stopped. If the current is alternating, electrons move back and forth in the device and in the wires connected to it. For many applications either type of current is suitable, but alternating current (ac) is customarily used because of the greater efficiency with which it can be generated and distributed. A direct current(dc)is required for certain industrial applications, such as *electroplating* and *electrometallurgical* processes.

The wide-scale production and distribution of electric power was made possible by the development of the electric generator, a device that operates on the basis of *the induction principle formulated* in 1831 by the English scientist Michael Faraday and the American scientist Joseph Henry *independently of one another.* But not until January 1882 did the first public power station employing an electric generator begin operation in London. A second such station opened later that same year in New York City. Both used dc systems, which proved inefficient for long-distance power transmission. By the early 1890s the first practical ac generator was built at the Lauffen power station in Germany, and service to Frankfurt am Main was *initiated* in 1891.

There are two primary sources for driving generators--*hydro and thermal.* Hydroelectric power is derived from generators turned by falling water. Most other electric energy is obtained from generators driven by steam produced either by a nuclear reactor or by burning *fossil fuels*--namely, coal, oil, and natural gas. Until the 1930s hydroelectric-power plants equipped with water-turbine generating units produced the largest percentage of electric energy because they were less expensive to operate than thermal-power plants using *steam-turbine units.* Since that time, however, major technological advances have reduced the cost of thermal-power generation *to the extent that* it has become more *prevalent* than hydroelectric-power production, which, by 1990, *constituted* only 18 percent of global electricity output. Thermal plants using nuclear energy or *gas turbines* to run *steam-electric units* are among these *technological innovations. Alternative* electric energy sources include *magnetohydrodynamic (MHD) generators, nuclear fusion reactors, solar batteries, wind turbines, and geothermal-power stations.*

Electric energy generated at a central power station is transmitted to *bulk delivery points, or substations,* from which it is distributed to consumers. Transmission is accomplished by an extensive network of *high-voltage power lines, including overhead wires, underground and submarine cables, and microwave systems.* Voltages higher than those produced by power plant

generators are required when transferring alternating current over long distances, in order to reduce power losses that result from the resistance of transmission lines. *Step-up transformers* are employed at the generating station to increase the transmission voltage. At the substations other transformers step down the voltage to levels suitable for distribution systems.

Notes

railway traction　机车牵引
the product of current and voltage　电流与电压的乘积
electroplating　电镀的
electrometallurgical　电冶金的
the induction principle　电磁感应
independently of one another　相互独立地
fossil fuel　矿物燃料
steam-turbine unit　蒸汽机组
steam-electric unit　汽轮发电机组
magnetohydrodynamic(MHD)generators　磁流体发电机
nuclear fusion reactor　核反应堆
solar battery　太阳能电池
wind turbine　风轮机
geothermal-power station　地热发电站
bulk delivery points, or substations　集中供电点，即变电所
high-voltage power lines　高压输电线
microwave system　微波系统
step-up transformers　升压变压器

Relax Yourself

A nearsighted man lost his hat in a strong wind. He began to run after it, but every time he almost caught up with it, it turned away from him. A woman came out of a house nearby and shouted, "Hi, what are you doing?" The man answered that he was trying to get his hat back. "Your hat?" replied the woman. "Your hat is over there by my house. That's our little black hen you've been running after all the time!"

After Reading

1. Now I know

(1) Electric power refers to energy generated through the conversion of other forms of energy, such as_____ , _____ or _____.
(2) Electric power is the product of ____ and ____.
(3) If the current is direct, electrons progress always in the ___ direction through the device receiving power until it is stopped.
(4) If the current is alternating, electrons move ____ in the device and in the wires