

高等学校教材

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English for Electrical Engineering

# 电力专业英语

电力部高等专科教学委员会英语课程协作组 组织编写  
沈阳电力高等专科学校 刘 然 主编

中国电力出版社

电力专业英语

English for Electrical Engineering

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## 内 容 提 要

《电力专业英语》是为满足电力系统高等学校专业英语教学的需要而编写的专业英语教材。全书分为上篇和下篇,每篇各有十五个单元,每单元侧重一个专业。本书内容涉及到发电、供电、继电、汽机、锅炉、热控、通信、电测、计算机、核能、水电、管理等十几个专业。因而,这是一本电力系统各专业通用的教材。

本书不仅适用于电力系统专科学校专业英语阅读课程,也可以作为电力系统本科院校专业英语教材。

本书配有教师手册。

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# 《电力专业英语》

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# 前 言

《电力专业英语》是供电力系统高等专科学校使用的专业英语教材,教学对象是在大学里修读完基础英语课程的学生。为保持英语教学的连续性,使学生在校期间英语学习不断线,英语水平得到不断提高,我们编写了这本《电力专业英语》教材。

在编写教材过程中,我们注意将专业知识的学习和英语的学习有机地结合起来,在复习基础英语知识的基础上,侧重了专业英语阅读和翻译技巧的训练。本教材中的文章全部选自英语原文资料,既有专业基础知识,又体现了最新的技术发展动向。此教材突出的特点是面向电力系统十几个专业,其目的是拓宽学生的知识面,使学生对相关的专业有所了解。此教材的另一个特点是在课文的后面编有系统的翻译技巧及阅读理解练习。本书分为上篇和下篇。上篇和下篇各有十五个单元,每单元侧重一个专业。上篇为教师课堂精讲文章,下篇为学生课后阅读文章,上篇与下篇各单元的内容相互呼应。此教材授课时数为60学时,每单元(包括上篇和下篇)4学时。各校可根据自己的专业英语课时计划,选择与本专业有关的文章安排教学。为便于教师课堂授课,我们在《教师手册》中编写了上篇十五个单元的课后练习答案和课文参考译文。下篇十五个单元的课文参考译文附在此教材的后面,以便于学生自学。

此教材是在电力部高等专科学校教学委员会英语课程协作组成员的共同努力下完成的。沈阳电力高等专科学校刘然编写了第1单元并负责全书的统稿、定稿工作;南京电力高等专科学校俞晓箭编写了第2、3单元;郑州电力高等专科学校孟丽君编写了第4、5单元;沈阳电力高等专科学校金品卓编写了第6单元;沈阳电力高等专科学校曹艳春编写了第7单元;西安电力高等专科学校刘俊琦编写了第8、9单元;北京电力高等专科学校包兰宇编写了第10、11单元;重庆电力高等专科学校林晓琴编写了第12单元及总词汇表和短语表;太原电力高等专科学校郑仰成编写了第13、15单元;长春水利电力高等专科学校景志华编写了第14单元和全书的翻译技巧部分;沈阳电力高等专科学校关哲编写了电力英语缩略语部分。

在编写此书的过程中,我们参考了国内外有关电力专业英文资料。书中的英语部分由太原电力高等专科学校外籍教师 Peter B. McLaren 先生、Sharon L. Calladine 女士以及对外经济贸易大学单其昌教授进行了审校,电力系统专科学校的许多专业教师为此书的编写提供了大量帮助,编者在此表示衷心的感谢。

本教材是一次新的尝试,疏漏之处在所难免,衷心欢迎广大师生批评指正。

编 者

1998年4月

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# Unit One

## Text

### The Production of Electrical Energy

Although our concern in this book is with the electrical aspects of power systems, it is important to know what basic energy sources can be used to produce electrical energy on a large scale. Electrical energy sources can be broken down into two broad categories, thermal and non-thermal. A brief discussion of varying alternatives follows below.

#### **Thermal Sources**

**Coal.** Substantial reserves and the development of the necessary technology mean that coal is and will continue to be a major energy source. Presently coal represents about 45% of total electrical energy sources.

**Oil and Natural Gas.** In the 1950s and 1960s there was a trend toward greater utilization of these fuels because of their superior combustion properties. However, the cost, scarcity, and competition from petroleum products indicate that while these fuels will remain important for electrical energy production, their percentage share of total energy supply will decrease.

**Nuclear Fission from Uranium.** Since the 1950s fission reactors have been used commercially for the production of electrical power. Uranium resources in the U. S. are slightly less than oil and gas reserves. Serious problems relating to environmental impact have accentuated social concern and some legal and regulatory constraints have been placed upon the development of this resource. A prudent growth in the comparative importance of this source is expected, along with a legitimate and proper concern for the environment.

**Solar.** It is possible to collect solar energy directly and concentrate it on steam boilers. The major problems are the diffuse nature, which requires large areas for collection, and the unreliability of atmospheric conditions. At present there are no commercial installations. This source is particularly attractive as no "fuel" is required and because of its non-polluting characteristics.

**Nuclear Fusion.** Certain types of nuclear reaction are possible, where certain light nuclear particles can be combined, or fused, into heavier particles. Such reactions produce pure energy. The most attractive feature here is that common elements such as hydrogen isotopes can be used as fuel, making this source essentially inexhaustible. The difficulty is that a sustained fusion reaction requires production of extremely high temperatures and particle con-

centrations for a sufficiently long time. The technical problems associated with this are formidable and most experts will not predict commercial installation until well into the next century.

**Geothermal.** Heat from the earth's interior and subsurface water combine to produce natural steam, which can be used for electricity production. Total reserves are estimated at up to about half of the total gas and oil reserves. Expectations are that this resource will continue to be developed, but that it will only make a minor contribution to the total energy supply.

**Biomass.** Synthetic gas can be produced from organic material grown expressly for this purpose. Currently the amount of electrical energy produced from this source is negligible, and is not expected to be very significant in the future.

**Garbage and Sewage.** There are combustible components in garbage that can be used as fuel; these components are separated from noncombustible items and mixed with coal. Sewer gasses are also combustible. In certain situations utilization of these fuels may prove to be economical; however, such installations should be viewed as supplementary, and would contribute only a small fraction of the total energy supply.

#### **Nonthermal Sources**

**Hydro.** Hydroelectric power has been an economical and pollution free source of energy. It currently stands at about 12% of the total energy supply. It has the advantage of being immediately (within seconds at least) available, whereas thermal sources meet demand at a much slower rate. Hydroelectric sources are constrained by navigational requirements and actual or predicted rainfall.

**Tidal.** There are a few sites around the world where it proves economical to convert the change in potential energy caused by tide levels into an electrical form. The percentage of total energy supply output is quite small, and expected to remain so.

**Wind.** Wind can be used to drive turbines that in turn drive electricity generators, because wind is intermittent, such a system must include energy storage devices, such as batteries, or supply loads that are tolerant of unpredictable source interruptions. As isolated electric power supplies, such systems are now commercially available in sizes up to about 50 kW. Research on much larger units is currently under way; presently, wind energy is negligible as a fraction of the total energy output.

**Wave.** There have been several experimental machines designed to convert kinetic wave energy into electricity. None as of now appears to have been feasible for large-scale economic electrical energy production.

## **New Words**

1. thermal ['θɜ:məl] *a.* 热的,热量的;由热造成的
2. nonthermal ['nɒn'θɜ:məl] *a.* 非热的

3. utilization [ˌjuːtɪlaɪ'zeɪʃən] *n.* 利用
4. combustion [kəm'bʌstʃən] *n.* 燃烧
5. scarcity ['skeəriəsi] *n.* 缺乏; 萧条
6. fission ['fɪʃən] *n.* 分裂; 裂变
7. uranium [ˌjuə'reɪnjəm] *n.* 铀
8. impact ['ɪmpækt] *n.* 影响; 效果; 冲击
9. accentuate [æk'sentʃueɪt] *vt.* 强调; 增强
10. regulatory ['regjʊlətəri] *a.* 规章的; 受规章限制的
11. prudent ['pruːdənt] *a.* 谨慎的; 慎重的
12. concurrent [kən'kʌrənt] *a.* 共有的; 合作的; 一致的
13. legitimate [lɪ'dʒɪtɪmɪt] *a.* 合法的; 合理的; 正统的
14. diffuse [dɪ'fjuːs] *a.* 扩散的; 漫射的; 向各个方向移动的
15. installation [ɪnstə'leɪʃən] *n.* 安装; 设备; 设施
16. fusion ['fjuːʒən] *n.* 熔化; 合成; 聚变
17. fuse [fjuːz] *vt. vi.* 熔化; 熔合
18. isotope ['aɪsəʊtəʊp] *n.* 同位素
19. formidable [ˈfɔːmɪdəbl] *a.* 难对付的; 难克服的
20. geothermal [dʒi(:)əʊ'θɜːməl] *a.* 地热的; 地温的
21. subsurface ['sʌb'sɜːfɪs] *a.* 表面下的
22. biomass ['baɪəʊmæs] *n.* 生物量
23. expressly [ɪks'presli] *ad.* 明显地, 明确地; 特意地
24. negligible ['neglɪdʒəbl] *a.* 可以忽略的, 微不足道的 *neglect*
25. garbage ['gɑːbɪdʒ] *n.* 垃圾; 废料
26. sewage ['sju(:)ɪdʒ] *n.* 污水, 污物
27. combustible [kəm'bʌstəbl] *a.* 易燃的; 可燃的
28. noncombustible [ˈnɒnkəm'bʌstəbl] *a.* 不易燃烧的
29. sewer [sjuə] *n.* 阴沟, 排水管
30. supplementary [sʌpli'mentəri] *a.* 补充的, 增加的
31. hydro. ['haɪdrəu] *a.* = hydroelectric 水力发电的
32. constrained [kən'streɪnd] *a.* 被强迫的; 被约束的
33. tidal ['taɪdl] *a.* 潮汐的
34. inherently [ɪn'hɪərəntli] *a.* 内在的; 固有的; 生来的
35. intermittent [ˌɪntə(:)'mɪtənt] *a.* 间歇的; 周期性的
36. tolerant ['tɒlərənt] *a.* 忍受的, 容忍的
37. kinetic [kaɪ'netɪk] *a.* 动力学的; 运动的; 活跃的; 有力的

## Phrases and Expressions

1. a trend toward 有……的趋势

2. superior combustion properties 较好的燃烧性能
3. commercial installations 商业设施
4. particle concentrations 粒子聚集
5. subsurface water 地下水
6. synthetic gas 合成气体
7. organic material 有机材料
8. be separated from 从……中分离出来
9. navigation requirement 水上航运要求
10. as of now 到现在为止

## Skills of Translation

### 词义的选择

一般说来,在科技英语的翻译过程中要遵循“忠实原文、通俗易懂”的原则。首先要熟悉背景,理解原文,并注意用恰当的汉语确切地表达原文的意思。最后要校对、复核和定稿。

英语中一词多义的现象比较普遍。翻译时,要在许多不同的词义中选出一个最确切的词义,才能使译文正确。词义选择一般从以下几个方面入手:

#### 一、根据词类选择词义

Microprocessors monitor tyre wear and brake power on cars. ( *v.* 检查, 检测)  
微机检测汽车轮胎的耐用性和制动力。

The patient was connected to a television wave monitor. ( *n.* 监视器)  
病人的情况曾通过波形监视器监视。

#### 二、根据上下文选择词义

The country's industry has developed quickly in the last decade.  
过去十年里我国工业迅猛发展。

To develop the instrument, many experts were invited.  
在研制这种仪器时请了许多专家。

#### 三、根据专业选择词义

Power can be transmitted over a long distance.  
电力能输送到很远的距离。

Friction causes a loss of power in the machine.  
摩擦会引起机器功率的损耗。

China will not be the first to use nuclear weapons although considered one of the nuclear powers.

尽管中国被看作是核大国之一,但中国决不会首先使用核武器。

#### 四、根据搭配选择词义

high beam 远距离光束

high brass 优质黄铜

high current 强电流

high explosive 烈性炸药

high gear 高速齿轮

high seas 公海

high summer 盛夏

high steel 硬钢

## Exercises

I. Answer the following questions briefly according to the text:

1. Which kind of turbine is used most commonly?

\_\_\_\_\_

2. Which is the most important electrical energy source, gas, oil or coal? Why?

\_\_\_\_\_

3. What's the advantage of solar energy?

\_\_\_\_\_

4. What factors have an effect on the use of hydroelectric power?

\_\_\_\_\_

5. What does this passage mainly present?

\_\_\_\_\_

II. Decide whether the following statements are True (T) or False (F) according to the text:

1. \_\_\_\_\_ There are two main categories of electrical power sources, thermal and non-thermal.

2. \_\_\_\_\_ The amount of oil and gas used as electrical power energy sources will increase.

3. \_\_\_\_\_ Solar power has been widely used to produce electricity.

4. \_\_\_\_\_ Up to now, we haven't got commercial installations using nuclear fusion as fuel.

5. \_\_\_\_\_ We can use the noncombustible materials in garbage as fuel.

6. \_\_\_\_\_ Some scientists are developing larger power units to use wind.

III. Translate the following expressions into Chinese or English:

1. the electrical power system

\_\_\_\_\_

2. \_\_\_\_\_

计算机系统



3. a hydraulic turbine	_____
4. _____	汽轮机
5. mechanical power	_____
6. _____	化学能
7. petroleum products	_____
8. _____	石油设备
9. collect solar energy	_____
10. _____	集邮
11. light nuclear particles	_____
12. _____	重核粒子
13. nuclear reactions	_____
14. _____	核武器
15. synthetic gas	_____
16. _____	合成纤维
17. potential energy	_____
18. _____	潜在的资源
19. a thermal power station	_____
20. _____	热量单位

IV. Fill in the following blanks with the words given. There are extra items.

impact utilization combustible negligible installation a trend toward(s)  
 scarcity thermal fuse be separated from formidable garbage

1. The street is covered with old tins and other forms of \_\_\_\_\_.
2. Where is the heating \_\_\_\_\_ in this factory?
3. Lead will \_\_\_\_\_ at a lower temperature than some other metals.
4. He made a great \_\_\_\_\_ on literature and art in his time.
5. There is \_\_\_\_\_ wearing dark color shirts this summer.
6. Petroleum is highly \_\_\_\_\_, so don't smoke while you're handling it.
7. Theory should by no means \_\_\_\_\_ practice.
8. There was a \_\_\_\_\_ amount of rain last year.
9. There are more \_\_\_\_\_ power stations than hydroelectric stations.
10. The examination paper contained several \_\_\_\_\_ questions.

V. Put the following sentences into English.

1. 到目前为止,煤仍然是生产电能的一种重要原料。(as of now)

\_\_\_\_\_

\_\_\_\_\_

2. 一些有机材料可以用来生产合成气体。(organic materials)

\_\_\_\_\_

\_\_\_\_\_