普通高等教育 “十五” 规划教材

PUTONG GAODENG JIAOYU SHIWU GUIHUA JIAOCAI

电力专业英语（第二版）

English for Electric Engineering

刘然 包兰宇 景志华 编著

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内 容 提 要

本书为普通高等教育“十五”规划教材，是为满足高等学校专业英语教学的需要而编写的专业英语教材。全书共有12个单元，每个单元侧重一个专业。本书内容涉及到发电、供电、继电保护、汽轮机、锅炉、热控、通信、核能、水电等十几个专业。因而，这是一本电力系统各专业通用的教材。

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序

由中国电力教育协会组织的普通高等教育“十五”规划教材，经过各方的努力与协作，现在陆续出版发行了。这些教材既是有关高等院校教学改革成果的体现，也是各位专家教授丰富的教学经验的结晶。这些教材的出版，必将对培养和造就我国21世纪高级专门人才发挥十分重要的作用。

自1978年以来，原水利电力部、原能源部、原电力工业部相继规划了一至四轮统编教材，共计出版了各类教材1000余种。这些教材在改革开放以来的社会主义经济建设中，为深化教育教学改革，全面推进素质教育，为培养一批批优秀的专业人才，提供了重要保证。原全国高等学校电力、热动、水电类专业教学指导委员会在此间的教材建设工作中，发挥了极其重要的历史性作用。

特别需要指出的是，“九五”期间出版的很多高等学校教材，经过多年的教学实践检验，现在已经成为广泛使用的精品教材。这批教材的出版，对于高等教育教材建设起到了很好的指导和推动作用。同时，我们也应该看到，现用教材中有不少内容陈旧，未能反映当前科技发展的最新成果，不能满足按新的专业目录修订的教学计划和课程设置的需要，而且一些课程的教材可供选择的品种太少。此外，随着电力体制的改革和电力工业的快速发展，对于高级专门人才的需求格局和素质要求也发生了很大变化，新的学科门类也在不断发展。所有这些，都要求我们的高等教育教材建设必须与时俱进，开拓创新，要求我们尽快出版一批内容新、体系新、方法新、手段新，在内容质量上、出版质量上有突破的高水平教材。

根据教育部《关于“十五”期间普通高等教育教材建设与改革的意见》的精神，“十五”期间普通高等教育教材建设的工作任务就是通过多层次的教材建设，逐步建立起多学科、多类型、多层次、多品种系列配套的教材体系。为此，中国电力教育协会在充分发挥各有关高校学科优势的基础上，组织制订了反映电力行业特点的“十五”教材规划。“十五”规划教材包括修订教材和新编教材。对于原能源部、电力工业部组织原全国高等学校电力、热动、水电类专业教学指导委员会编写出版的第一至四轮全国统编教材、“九五”国家重点教材和其他已出版的各类教材，根据教学需要进行修订。对于新编教材，要求体现电力及相关行业发展对人才素质的要求，反映相关专业科技发展的最新成就和教学内容、课程体系的改革成果，在教材内容和编写体系的选择上不仅要有本学科（专业）的特色，而且注意体现素质教育和创新能力与实践能力的培养，为学生知识、能力、素质协调发展创造条件。考虑到各校办学特色和培养目标不同，同一门课程可以有多本

BBM 03/08

教材供选择使用。上述教材经中国电力教育协会电气工程学科教学委员会、能源动力工程学科教学委员会、电力经济管理学科教学委员会的有关专家评审，推荐作为高等学校教材。

在“十五”教材规划的组织实施过程中，得到了教育部、国家经贸委、国家电力公司、中国电力企业联合会、有关高等院校和广大教师的大力支持，在此一并表示衷心的感谢。

教材建设是一项长期而艰巨的任务，不可能一蹴而就，需要不断完善。因此，在教材的使用过程中，请大家随时提出宝贵的意见和建议，以便今后修订或增补。(联系方式：100761 北京市宣武区白广路二条1号综合楼9层　中国电力教育协会教材建设办公室 010-63416222)

中国电力教育协会

二〇〇二年八月

第二版修订说明

《电力专业英语》（第一版）自1999年正式出版以来，许多高等院校将其作为电力专业英语教材。在本书使用过程中，广大师生对该书的内容和编写体例等都给予了充分肯定，同时也提出了一些有益的建议。根据这些建议，并结合目前各校电力专业英语教学的实际情况，我们对此书进行了修订。

本书修订后的特点是：从结构上看，将原来的上篇、下篇合为一体，由15个单元修订为12个单元。每个单元由A、B、C三篇文章组成，A篇文章后编有练习题，此部分可作为教师课堂教学精讲文章；B篇和C篇文章可作为课后阅读文章，让学生进行自学。本书末附有每篇文章的参考译文和练习答案。从内容上看，第一版中有关计算机、电子元件和管理方面的内容在第二版中没有出现，原因是这些内容在其他英语教材中都有充分体现。

本书的修订工作由沈阳工程学院刘然教授、北京交通大学包兰宇副教授、长春工程学院景志华教授完成。

编　者

2003年12月

第一版前言

《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

Contents

Unit One

Passage A

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 concentrations 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. Cerrently 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 course 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 energyinto electricity. None as of now appears to have been feasible for large-scale economic electrical energyproduction.

New Words

1. thermal ['θə:məl] *a.* 热的，热量的；由热造成的
2. nonthermal ['nɔn'θə:məl] *a.* 非热的
3. utilization [ˌju:tilai'zeiʃən] *n.* 利用
4. combustion [kəm'bʌstʃən] *n.* 燃烧
5. scarcity ['skɛəsiti] *n.* 缺乏；萧条
6. fission ['fiʃən] *n.* 分裂；裂变
7. uranium [juə'reinjəm] *n.* 铀
8. impact ['impækt] *n.* 影响；效果；冲击
9. accentuate [æk'sentjueit] *vt.* 强调；增强
10. regulatory ['regjulətəri] *a.* 规章的；受规章限制的
11. prudent ['pru:dənt] *a.* 谨慎的；慎重的
12. concurrent [kən'kʌrənt] *a.* 共有的；合作的；一致的
13. legitimate [li'dʒitimit] *a.* 合法的；合理的；正统的
14. diffuse [di'fju:s] *a.* 扩散的；漫射的；向各个方向移动的
15. installation [instɔ:'leiʃən] *n.* 安装；设备；设施
16. fusion ['fju:ʒən] *n.* 熔化；合成；聚变
17. fuse [fju:z] *vt. vi.* 熔化；熔合
18. isotope ['aisəutəup] *n.* 同位素
19. formidable ['fɔ: midəbl] *a.* 难对付的；难克服的
20. geothermal [dʒi (:) əu'θə:məl] *a.* 地热的；地温的
21. subsurface ['sʌb'sə:fis] *a.* 表面下的
22. biomass ['baiəumæs] *n.* 生物量
23. expressly [iks'presli] *ad.* 明显地，明确地；特意地
24. negligible ['neglidʒəbl] *a.* 可以忽略的，微不足道的
25. garbage ['ga:bidʒ] *n.* 垃圾；废料
26. sewage ['sju (:) idʒ] *n.* 污水，污物
27. combustible [kəm'bʌstəbl] *a.* 易燃的；可燃的
28. noncombustible ['nɔnkəm'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. ['haidrəu] *a*. = hydroelectric 水力发电的
32. constrained [kən'streind] *a*. 被强迫的；被约束的
33. tidal ['taidl] *a*. 潮汐的
34. inherently [in'hiərəntli] *a*. 内在的；固有的；生来的
35. intermittent [ˌintə (:) 'mitent] *a*. 间歇的；周期性的
36. tolerant ['tɔlərənt] *a*. 忍受的，容忍的
37. kinetic [kai'netik] *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. 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.

Ⅱ. 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

Ⅲ. 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.

Ⅳ. 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)

3. 我们可以将垃圾中的可燃成分与煤混合来发电。(mix … with)

4. 水力发电的优点之一就是没有污染。(nonpolluting characteristic)

5. 利用石油和天然气发电的状况将会改变。(utilization)

Passage B

A Brief History of the Power Industry (1)

Prior to 1800 the study of electrical and magnetic phenomena had been of interest to only a few scientists. William Gibbert, C. A. De Coulomb, Benjamin Franklin, and a few others made significant contributions to the meager store of piecemeal knowledge about electricity. But at that time no applications were known, and studies were motivated only by intellectual curiosity. People illuminated their homes with candles, whale oil lamps, and kerosene lamps, and motive power was supplied mostly by people and draft animals.

From about 1800 to 1810 commercial illuminating gas companies were formed, first in Europe and shortly thereafter in the Untied States. The tallow candle and kerosene interests, sensing vigorous competition from this young industry, actively opposed gas lighting, describing it as a health menace and emphasizing its explosive potential. However, the basic advantage of more light at lower cost could not be suppressed