# 中国能源发展报告

《中国能源发展报告》编辑委员会 编著

CHINA'S ENERGY DEVELOPMENT REPORT

## 中国能源发展报告(2003)

《中国能源发展报告》编辑委员会 编著

#### 图书在版编目(CIP)数据

中国能源发展报告 . 2003/阎长乐,赵志林主编 . - 北京:中国计量出版社,2003.12 ISBN 7-5026-1907-0

I. 中··· Ⅱ. ①阎··· ②赵··· Ⅲ. 能源经济 - 研究报告 - 中国 - 2003 Ⅳ. F426. 2 中国版本图书馆 CIP 数据核字(2003)第 111509 号

> 中国计量出版社出版 北京和平里西街里 2 号 邮政编码 100013 电话 (010)64275360 E-mail jlftsb@ 263. net. cn 煤炭工业出版社印刷厂印刷 新华书店北京发行所发行 版权所有 不得翻印

> > \*

880 mm×1130 mm 16 开本 印张 24 字数 800 千字 2003 年 12 月第 1 版 2003 年 12 月第 1 次印刷

\*

印数 1—5 000 定价:200.00元

#### 《中国能源发展报告》(2003)编委会

顾 **问** 王春正 魏礼群 柴松岳 黄毅诚 王显政 赵希正 范维唐 濮洪九 闫三忠 徐寿波

总编辑 王家诚

主编 阎长乐 赵志林

编 委 (以姓氏笔画为序)

王 源 王广德 乌荣康 付建华 付树林 叶荣泗 孙嘉平 刘玉华 刘学实 许崇信李克荣 吴 吟 严绪朝 陈庆禄 何炳光 贺定超 黄 毅 彭建勋 戴彦德

撰稿人(以姓氏笔画为序)

王家诚 中 炼 孙嘉平 朱 超 庄 幸 刘立力 吴玉娴 张遂安 林 伦 赵志林 赵雪峰 姜润宇 阎长乐 徐华清 高 澜

资料整理 曹亚东 高 瀬

英文翻译 朱 超

责任编辑 黄洁 朱超

支持单位 中国煤炭工业协会

中国电力企业联合会

中国石油企业管理协会

组织策划 北京市场经济开发研究院

### 前言

新世纪头三年,中国能源生产总量和能源消费总量双双创造了历史最高记录,能源发展有力地保证和促进了国民经济的快速增长。与此同时,诸如能源供应总量不足、石油供应紧缺、环境污染严重、能源利用效率低下等中国能源发展中的根本问题依然存在。

在综合分析能源发展的基本情况、存在的主要问题、面临的国内外环境,并根据全面建设小康社会对能源发展的要求,从能源在经济社会发展中的战略地位出发,《中国能源发展报告》(2003)提出了中国能源发展的基本思路:坚持"开发与节约并重,把节约放在首位"的能源发展总方针,采取各种有效措施合理利用和节约能源,不断提高能源利用效率,特别是煤炭的清洁和优质利用;以电力为中心,以煤炭为基础,煤电一体化发展,尤其发展以利用洁净煤为基础的电力工业,保护生态环境,促进能源、经济与环境协调发展;以加入世贸组织为契机,抓住机遇,充分利用国内国际两个市场、两种资源,立足国内,面向国际,努力走出一条生产规模稳步扩张、经济效益良好、市场竞争能力和对外开放程度不断提高的产业发展之路;以市场需求为导向,以全面创新为动力,以安全供应为基础,以经济效益为中心,以全方位调整和优化能源结构为主线,重点解决石油供不应求的结构性矛盾。

《中国能源发展报告》(2003)与前版相比,调整增加了许多新内容。比如:第三

章,以中国的主要能源——煤炭、石油(原油、成品油和天然气)和电力为对象,从能源价格状况回顾、能源价格改革的主要措施及其意义、能源价格改革的目标和方法三个层次系统论述和分析了中国的能源价格与政策。第五章,从体制、机构、信息化建设等方面提出了加强能源产业战略管理的基本思路。另外,考虑到煤层气可能是最理想也是最现实的优质的化石能源接替资源,煤层气资源的勘探开发和利用工作越来越受到中央政府的重视,并将"开发煤层气资源"写入《中华人民共和国国民经济和社会发展第十个五年计划纲要》,《中国能源发展报告》首次将其单列一章(第十章),从产业发展现状、面临的机遇与挑战、发展战略与目标、战略重点与政策措施等方面对煤层气产业的发展进行了系统地描述和分析。

第 4 次出版的《中国能源发展报告》(2003)一如既往地得到了各有关部门领导、专家、企业家及学界同仁的支持和帮助,再次向他们致以崇高的敬意。同时也向长期支持、关注《中国能源发展报告》的社会各界人士表示衷心的感谢。

我们将努力以详实的内容、丰富的资料、准确的数据、鲜明的观点,把《中国能源发展报告》塑造成高水平、高质量、具有权威性的中国能源发展蓝皮书。 为使以后的工作做得更好,希望您提出宝贵的批评和建议,也期待更多的专家给予斧正。

《中国能源发展报告》编辑委员会 2003年12月

#### 综合 🖴

#### 1 第一章 总论

中国新世纪头一个五年计划的开局良好,能源生产总量和能源消费总量双双创造了历史最高记录,有力地保证和促进了国民经济的快速增长。但是中国能源发展中的基本矛盾,如总量不足、石油紧缺、环境污染严重、以及利用效率较低等,依然存在。报告提出,从中国实际出发,今后时期中国能源产业发展要"以电力为中心,以煤炭为基础,煤电一体化发展"。由此,中国能源产业的发展将会呈现新的结构形态。在能源结构和电源结构方面,报告提出,必须加快核电发展,特别是在东部沿海地区发展核电,对稳定电力供应、优化能源结构、保护生态环境都有重要的战略意义。为了缓解石油供应短缺的能源结构性矛盾,中国石油发展在采取各种有效措施增加储量和稳定产量的同时,必须高度重视石油节约和石油替代、尽力减少石油消费量。

- 2 一、坚持"开发与节约并重"的能源发展战略
- 5 二、煤电一体化发展是能源产业发展的核心
- 16 三、加快核电发展是优化能源结构的必然选择
- 25 四、采取石油替代战略,解决石油供不应求的矛盾

#### 31 第二章 能源供需与结构调整

中国"十五"头两年,能源生产呈现强势增长局面的主要原因是,经济持续增长和结构合理调整。一次能源消费增长中煤炭消费增长速度较高,中国将继续保持以煤为主的能源消费结构特征。石油消费量继续增长,但速度有所减缓,致使石油消费量在能源消费结构中的比例有所减少。从安全稳定供油的角度考虑,中国已经把石油战略储备问题提到议事日程。中国经济发展中,能源的支撑力度依然是开发与节约并重。能源节约的成果继续来自经济结构的调整和节能技术进步,对保持能源供需平衡和最大限度地满足经济发展需求继续起着重要的作用。

- 32 一、能源生产增长的原因
- 36 二、能源供需平衡的特点

中

录

40 三、能源发展中的矛盾和问题依然存在

42 四、"十五"能源计划需要调整

47 五、2020 年能源发展展望

#### 49 第三章 能源价格与政策

能源价格是能源产业发展中一个十分重要的问题。能源价格对能源的供给和需求有着很强的调节作用。确定科学的能源价格管理体制,建立合理的能源价格体系,能够有效地调节能源供求各方面的利益关系,平衡能源供给和需求,提高能源资源的利用效率,对保障国家的能源安全,促进国民经济持续、稳定的发展产生积极的作用。本章以中国的主要能源——煤炭、石油(原油、成品油和天然气)和电力为对象,从三个层次论述和分析能源的价格:一是回顾改革前能源价格状况,二是分析能源价格改革的主要措施及其意义,三是分析和研究能源价格改革的目标和方法。

49 一、能源价格的历史回廊

58 二、能源价格改革

87 三、能源价格改革的目标和政策选择

#### 93 第四章 能源与环境

长期以来,中国以煤为主的能源结构和粗放型的能源生产和消费方式使能源发展与环境保护之间的矛盾日益尖锐。煤炭生产过程造成的环境污染和生态破坏问题已经成为制约中国煤炭工业可持续发展的重要因素。近年,中国二氧化碳排放量已位居世界第二位。随着中国民用汽车拥有量的迅速上升,机动车消耗的燃料数量也大大增长,汽车尾气也已成为中国城市大气污染又一重要原因。展望未来,随着能源消费的进一步增长和人们对环境质量要求的日趋提高,中国能源发展与环境保护之间的矛盾将进一步加剧。

93 一、能源环境状况

101 二、"十五"后三年面临的主要问题及对策

104 三、全面建设小康社会目标对能源环境的基本要求

#### 109 第五章 能源管理

中国

能

源发

展报

告

源产业,实现能源可持续发展。报告建议,新组建的国家发展和改革委员会能源局主要职能应是国家总体能源战略管理,要抓的中心工作就是在不断寻求能源、经济与环境的动态平衡中促进中国能源可持续发展。报告还建议,为了适应能源可持续发展的需要,中国应该尽快建立全国统一、上下协调的能源信息网络体系,便于及时准确的能源信息交流,这也是加强能源战略管理的重要内容。

- 109 一、能源管理体制改革
- 110 二、能源综合管理机构
- 111 二 加强能源产业战略管理
- 114 四、能源产业信息化建设

#### 行业量

#### 119 第六章 煤 炭

长期以来,煤炭在中国一次能源生产和消费结构的比例都在70%左右,值得注意的是,从2000—2002年,煤炭在中国一次能源生产和消费结构的比例分别略有上升和保持稳定。在全面建设小康社会的进程中,中国能源需求将有较大幅度的增长,以煤为主的能源供应和消费格局将不会改变。随着洁净煤技术的不断发展和应用,煤炭将逐渐成为高效和洁净利用的能源。

国际化、现代化和可持续发展将成为中国煤炭工业的振兴之路。煤电一体化和以煤气化 为核心的多联产能源系统的发展将为中国煤炭工业的发展注入新的活力。

- 119 一、煤炭工业发展现状
- 127 二、煤炭市场现状和展望
- 138 二、煤炭关井压产政策
- 142 四、煤炭工业发展展望及发展战略

#### 149 第七章 电 力

电力工业是能源工业的重要组成部分。电力是实现国民经济现代化和生活进步的主要物质基础、电力工业的发展程度已成为衡量一个国家经济和社会发达程度的重要标志。

国民经济要发展,电力工业必须先行。为了适应全面建设小康社会的用电需求,21世纪的中国电力工业正在迎接着新的挑战,在改革与发展方面不断前进。

#### 149 一、电力工业发展的新成就

#### 目

录

156 二、电力改革的重大进展

162 三、"西电东送"和全国联网

166 四、电力工业发展展望

#### 173 第八章 石 油

石油是关系国计民生和国家经济安全的重要战略物资,是中国实现全面建设小康社会、进而实现现代化建设第三步战略目标的重要保障。面向新世纪、新形势,石油工业的发展,必须从中华民族的长远发展和国家经济安全考虑,坚持实施可持续发展战略。要立足国内、开拓国际、油气并举、厉行节约、建立储备、维护安全。

173 一、石油工业的现状与问题

183 二、石油工业面临的形势与任务

188 三、石油工业发展的战略重点

191 四、石油工业发展的保障措施与政策

#### 197 第九章 天然气

天然气是优质清洁能源和化工原料,开发利用天然气对改善中国能源结构、保护生态环境具有十分重要的意义。近几年来,中国在天然气供应、消费和管网建设等方面都呈蓬勃发展之势,天然气在能源消费结构中的比例,已由 2000 年的 2.5% 增加到 2002 年的 2.7%,增加 0.2 个百分点。

197 一、发展现状与问题

205 二、资源潜力与需求预测

207 三、发展战略与重点

#### 213 第十章 煤层气

由于石油供应紧缺,因此寻找新的油气替代资源迫在眉睫。煤层气可能是最理想也是最现实的优质的化石能源接替资源。中国政府非常重视煤层气资源的勘探开发和利用工作,出台了一系列的扶持政策,并将"开发煤层气资源"写入《中华人民共和国国民经济和社会发展第十个五年计划纲要》。

213 一、煤层气产业发展现状

216 二、煤层气产业面临的机遇与挑战

219 三、煤层气产业发展战略与目标

220 四、战略重点与政策措施

#### 225 第十一章 新能源和可再生能源

发展新能源和可再生能源是解决我国农村特别是边远地区供电问题、促进农村小康建设的迫切需要,是优化我国能源结构、减少环境污染和可持续发展的战略举措。我国新能源和可再生能源正处于推进产业化的重要阶段。今后 20 年,新能源和可再生能源发展的目标是提高转换效率,降低生产成本,增大在能源结构中的比例。为了促进我国新能源和可再生能源规模化发展,我国政府应加大政策支持力度,建立以市场为基础的经济激励机制,加强法律法规建设,实现发展目标。对国内已成熟的技术要实现大规模、现代化生产,形成比较完善的生产体系和服务体系,为我国的全面小康社会建设和环境建设做出贡献。

225 一、基本概念

226 二、开发利用现状

237 三、发展中的问题和障碍

242 四、发展前景与目标

250 五、政策和措施建议

#### 企业 🛎

#### 259 第十二章 大型煤炭企业

259 一、神华集团有限责任公司

260 二、中国中媒能源集团公司(原中煤进出口集团公司)

263 三、兖矿集团有限公司

264 四、山西焦煤集团有限责任公司

266 五、大同煤矿集团公司

277 六、淮南矿业(集团)有限责任公司

285 七、淮北矿业(集团)有限责任公司

291 八、铁法煤业(集团)有限责任公司

298 九、义马煤业(集团)有限责任公司

中

国能

#### 录

#### \_307 第十三章 大型电力企业

- 307 一、国家电网公司
- 311 二、中国南方电网有限责任公司
- 312 三、中国华能集团公司
- 315 四、中国国电集团公司
- 318 五、中国电力投资集团公司
- 322 六、中国华电集团公司
- 325 七、中国大唐集团公司

#### 329 第十四章 大型石油、石化企业

- 329 一、中国石油集团公司 稳步迈向跨国集团
- 331 二、中国石化集团公司 巩固发展保持增势
- 334 三、中国海洋石油总公司 国际化提速

#### 337 中国能源发展大事记 (2002 年 1 月-2003 年 8 月)

#### 355 参考文献

# CHINA'S ENERGY DEVELOPMENT REPORT

#### COMPREHENSIVE SECTION

#### CHAPTER 1 EXECUTIVE SUMMARY /1

The first five year plan in the 21st century in China has a good start, both total energy production and consumption has broken the history record, which strongly ensures and promotes the rapid growth of national economy. However, the basic contradiction during China's energy development, such as insufficient total supply, shortage of oil, serious environmental pollution and low energy efficiency etc. still exists. Based on the actual situation in China, the report puts forward the strategy for China's energy development, which is "with electricity as center, with coal as base, and achieving the integrated development of electricity and coal". Therefore, The development of China's energy industry will form a new structure pattern. Regarding the energy structure and electric source structure, the report points out that the development of nuclear power should be speeded up, especially in eastern coastal areas, the development of nuclear power will be of strategic meaning in stabilizing power supply, optimizing energy structure and protecting ecological environment. For the purpose of alleviating the energy structural contradiction in short oil supply, while taking effective measures to increase oil reserves and stabilize oil production, the development of oil industry should pay more attention to the oil saving and replacement, and reduce oil consumption as far as possible.

- 1.1 Sticking to development strategy of "equal emphasis should be attached on development and saving" /2
- 1.2 The integrated development of coal and electricity is the core of energy industry development /5
- 1.3 Speeding up the development of nuclear power is an inevitable option in optimizing energy structure /16
- 1.4 Taking oil replacement strategy to solve the contradiction in short oil supply /25

#### CHAPTER 2 ENERGY SUPPLY, DEMAND AND STRUCTURE ADJUSTMENT /31

In the first two years of the 10th five-year plan period, the rapid growth of energy production was mainly contributed by sustainable economic growth and rational structure adjustment. Compared with energy production, the growth of energy consumption was clearly lower than that of energy production, which resulted in the situation that the energy supply and demand contradiction was gently alleviated. The growth rate of coal consumption ranked first among primary energy consumption, China will continue to remain the energy consumption structure dominated by coal. Oil consumption will continue to increase, but the growth rate will slow, which may result in a reduction of oil share in energy consumption structure. Taking safe and stable oil supply into consideration, China has put the strategic oil storage on the agenda. During the development of China economy, the energy policy is to attach equal importance on development and saving. The achievements of energy saving will be continuously contributed by economic structure adjustment and technical progress in energy saving, which will continue to play an important role in ensuring the balance of energy supply and demand and meeting the demand of economic

demand to the maximum extent.

- 2.1 Causes behind Energy Production Growth /32
- 2. 2 Characteristics of the Balance of Energy Supply and Demand /36
- 2.3 The Contradiction and issues during Energy Development Still Exist /40
- 2.4 The 10th Five Year Energy plan Needs to Be Adjusted /42
- 2.5 Outlook for Energy Development through 2020 /47

#### CHAPTER A SECTION OF THE SECTION

Energy price is an important issue in energy industry development. Energy price is of strong adjusting role to energy supply and demand. Establishment of scientific energy price regulation system and rational energy price system can effectively adjust the interest relation among energy suppliers and users, balance the energy supply and demand, increase energy efficiency, it will play an active role in ensuring State energy security, promoting the sustainable, stable development of national economy. The chapter will take China's main energy-coal, oil (crude oil, product oil and natural gas) and electricity as research objects, demonstrates and analyzes energy price by three levels: one is to review the energy price before reform; the second is to analyze the main measures of energy price reform and their significance; the third is to analyze and study the target and direction of energy price reform.

- 3.1 Review of Energy Price /49
- 3. 2 Energy Price Reform /58
- 3.3 Target and Policy options for Energy Price Reform /87

#### (大) 11 (A) 11 (A) (A)

For a long time, coal dominated energy structure and rough energy production and consumption patterns have be intensifying the contradiction between energy development and environmental protection. Environmental pollution and ecological damage caused by coal mining has become an important factor restricting the sustainable development of China's coal industry. In recent years, China's carbon dioxide emission has ranked the second in the world. With the rapid increase of private cars in China, the fuel for vehicles will increase greatly, vehicle exhaust has also become another important factor of urban air pollution, Looking into the future, with the further increase of energy consumption and increasing demand for high environmental quality, the contradiction between China's energy development and environmental protection will be further intensified.

- 4. 1 Introduction to Energy and environment /93
- 4.2 Main issues and Measures for the Last Three Years during the 10th Five Year /101
- 4. 3 The Basic Requirement of All-around Well-off Society Target to the Energy and Environment

  /104

#### CHAPTER 5 ENERGY MANAGEMENT / 109

China's energy cannot develop without energy management, the strategic management should be especially enhanced, with strategic theory, it can instruct the management of energy industry, achieve sustainable development. The report suggests the main function of the newly established Energy Bureau under the State Development and Reform Commission should be strategic management of national total energy, the main tasks of the Bureau should be to promote the sustainable energy development while continuously seeking the dynamic balance among energy, economy and environment. The report also recommends that for the purpose of meeting the requirement of sustainable energy development, a nation-wide unified and co-ordinated energy information network should be established as soon as possible, so as to facilitate timely and accurate energy information exchange, it also constitutes a main part of enhancing energy strategic management.

- 5. 1 Institutional Reform of Energy Management /109
- 5. 2 Comprehensive Energy Management Organization /110
- 5.3 Enhancing Strategic Management of Energy Industry /111
- 5.4 Building of Information-based Energy Industry /114

#### INDUSTRY SECTION

#### CHAPTER 6 COAL 2419

For a long time. The coal share in China's primary energy production and consumption has remained around 70%, it should be noted that the proportion of coal in primary energy production and consumption during 2000—2002 showed a slight increase and kept stable respectively. During the process to build an all-around well-off society, energy demand in China will increase a lot, and coal dominated energy supply and consumption will remain unchanged. With the development and application of clean coal technology, coal will gradually become the efficient and clean energy.

Globalization, modernization and sustainable development will be the way to the rejuvenation of China's coal industry. Integration of coal and electricity and multi-generation energy system with coal gasification as core will provide new vitality to the development of China's coal industry.

- 6. 1 Current status of Coal Industry Development /119
- 6. 2 Current Status and Outlook of Coal Market /127
- 6.3 Policy of Mine Closure and Production Control /138
- 6. 4 Outlook and Development Strategy for Coal Industry /142

#### CHAPTER 7 ELECTRICITY 149

Power industry is main part of energy industry. Electricity is the main physical base to achieve national

economic modernization and living progress, the development of power industry has become an important mark to measure the economic and social development of a country.

The power industry should develop ahead of the development of national economy. In order to meet the electricity demand by the building of all-around well-off society, China's power industry in the 21st century is facing new challenge, and will continuously advance in terms of reform and development.

- 7. 1 New Achievements of Power Industry Development /149
- 7. 2 Major Progress of Power Industry Reform /156
- 7.3 "Transmitting Electricity From West to East" and National Grid Interconnection /162
- 7.4 Outlook for Power Industry Development /166

#### CHAPTER 8 OIL /173

Oil is an important strategic material with regard to national economy, people's livelihood and the national economic security; it is the important guarantee in building all-around well-off society and achieving the third strategic target of modernization building. Facing the new century and new situation, the development of oil industry should be considered with the long-tern development of Chinese nationality and national economy security, sticking to sustainable development strategy. In general, the strategy of oil industry development should be: relying on domestic oil, developing overseas oil resources, paying equal attention to oil and gas, sticking to saving, establishing oil storage, and maintaining supply safety.

- 8. 1 Current Status and Problems of Oil Industry /173
- 8. 2 Situation and Task facing Oil Industry /183
- 8. 3 Strategic Focus of Oil Industry Development /188
- 8. 4 Support Measures and Policies of Oil Industry Development /191

#### CHAPTER 9 NATURAL GAS / 197

Natural gas is a quality clean energy and chemical raw material, natural gas development and use is of important meaning in improving China's energy structure and protecting ecological environment. Over recent years, rapid progress has been made in natural gas supply, natural gas consumption and gas pipelines construction, the proportion of national gas in energy consumption has been increased from 2.5% in 2000 to 2.7% in 2002, increasing by 0.2%.

- 9. 1 Development Status and Problems /197
- 9. 2 Resources Potential and Demand Prediction /205
- 9.3 Development Strategies and Focus /207

#### CHAPTER 10 COALBED METHANE /213

Due to short oil supply, it is urgently needed to seek new alternative resources instead of oil and natural gas. Coalbed methane can be one of most idea and realistic alternative fossil fuel. Chinese government attaches importance to the exploration and development of coalbed methane resources, has issued a series of support policies, and has included the "developing coalbed methane resources" in the "Outline for the 10th five-year plan for national economy and social development of the People's Republic of China".

- 10. 1 Development Status of Coalbed Methane Industry /213
- 10.2 Opportunities and Challenges facing Coalbed Methane Industry /216
- 10.3 Development Strategy and Target of Coalbed Methane Industry /219
- 10. 4 Development Focus and Policy Measures /220

#### CHAPTER 11 NEW AND RENEWABLE ENERGY / 225

Development of new and renewable energy is urgently needed in solving the problem with power supply in China's rural areas, especially remote areas, and promoting the building of rural well-off society, new and renewable energy development is the strategic measure in optimizing China's energy structure, reducing environmental pollution and achieving sustainable development. New and renewable energy in China is being at the important stage to industrialization. In the next 20years, the development target of new and renewable energy is: increasing energy conversion efficiency; reducing production costs; increasing its proportion in energy structure. In order to promote large-scale development of new and renewable energy in China, Chinese government should enhance policy support, establish market oriented economic incentive, strengthen the building of laws and regulations, achieve development target. The mature domestic technology should achieve large scale and modern production, forming a perfect production system and service system, making contribution to the building all-around well-off society and the environmental construction.

- 11.1 Basic Concept /225
- 11.2 Development and Use Status /226
- 11.3 Issues and Barriers during Development /237
- 11. 4 Development Potential and Target /242
- 11.5 Recommendations for Policy and Measures /250

#### ENTERPRISE SECTION

#### CHAPTER 12 COAL ENTERPRISES /259

- 12.1 Shenhua Group /259
- 12. 2 China Coal Energy Group /260