

# 中国节能：理念、措施、成就与合作

## Energy Conservation in China: Philosophy, Measures, Achievements & Cooperation



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# 绿色增长是中国可持续发展的 必然选择

**Green growth – China's only choice  
for sustainability**

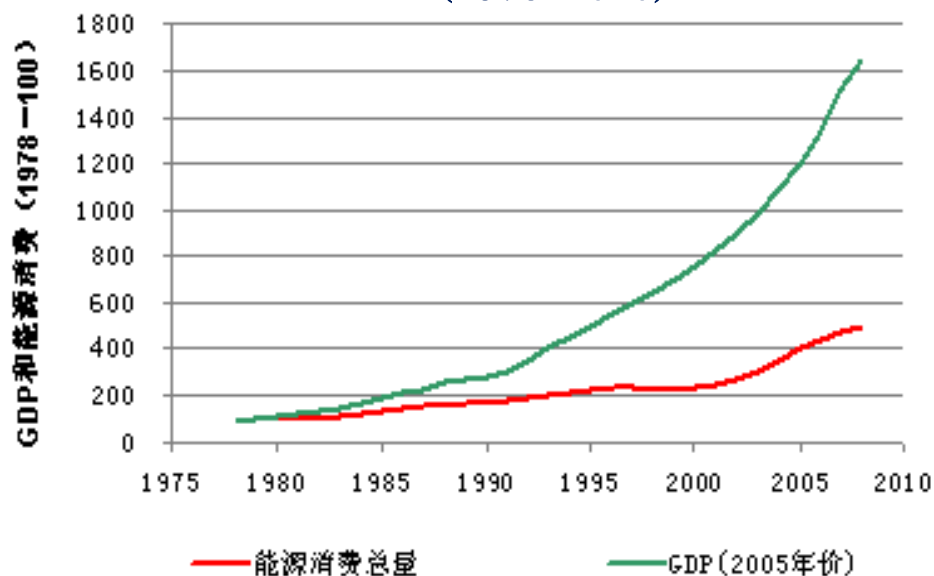
# 中国经济快速发展伴随着能源消费的快速增长

**Fast economic growth is supported by fast energy consumption.**

- 中国实行改革开放以来，经济保持较快增长。与之相应，能源消费亦随之不断增加，能源供给的压力不断加大。

**Ever since China's Reform & opening-up, behind China's fast and continuous economic growth lies her growing need of energy consumption, which placed higher and higher pressure on energy supply.**

**GDP and Energy Consumption in China  
(1978-2010)**



·电力方面，2011年中国电力装机10.5亿千瓦，年发电量约4.7万亿千瓦时，比1981年增长了15倍。

·In 2011, China's installed capacity of electricity reached 1.05 billion kw/h with annual electricity generation totaling at 4.7 trillion kw/h, 15 times of that of 1981.

·2000年中国出口煤炭9000多万吨；2009年以来，中国年自产原煤超过30亿吨，同时净进口1亿多吨。

·In 2000, Chin's coal export totaled over 90 million tonnes. Since 2009, China's produced 3 billion tonnes of coal with net import of 100 million tonnes.

# 中国的能源供给难以满足持续快速增长的需求

- 中国人均资源占有率相对较低。

国际公认的工业化过程中不可缺少的45种矿产资源，中国人均占有量不到世界平均水平的一半，已有11种出现一定程度的短缺；中国石油、天然气的人均剩余探明可采储量只有世界平均水平的7.7%和7.1%，石油、铁、铜、铝等大宗矿产对外依存度均超过50%；即便是储量相对丰富的煤炭资源，人均占有量也只有世界平均水平的63%。

**China's per-capita possession of the 45 mineral resources which have been acknowledged to be indispensable for industrialization is less than 50% of the world average level. The per-capita proven remaining recoverable reserves of oil and gas are 7.7% and 7.1% of the world average level respectively. The per-capita possession of coal resources in China is only 63% of the world average level.**

# 绿色增长是实现可持续发展的必然选择

## Green growth – China's only choice for sustainability

- 中国既要平衡和解决不断增长的能源需求与供给相对不足这一制约经济发展的现实矛盾，加快工业化和现代化进程，同时还要积极应对气候变化，承担共同而有区别的责任，加大减排力度，促进人类可持续发展。

**On one hand, China has to strike a balance between the ever increasing demand for energy and resources and the insufficient supply in order to accelerate industrialization and modernization. On the other hand, China needs to address climate change positively, shoulder shared but differentiated responsibilities and reduce emissions to promote the sustainable development of humanity.**

# 绿色增长是实现可持续发展的必然选择

因此，中国的经济增长：

**The Realities are :**

- 再也不能通过无节制地消耗能源和资源实现快速增长；

**Fast growth can no longer be relied on excessive energy and resource consumption .**

- 再也不能通过无限量的排放实现快速增长；

**Fast growth can no longer be achieved through unstrained emission.**

- 必须转变经济发展方式，走节能减排、绿色增长、科学发展之路。

**The economic growth pattern has to be transformed to realize Scientific Development , energy conservation, emission reduction & green growth.**

2

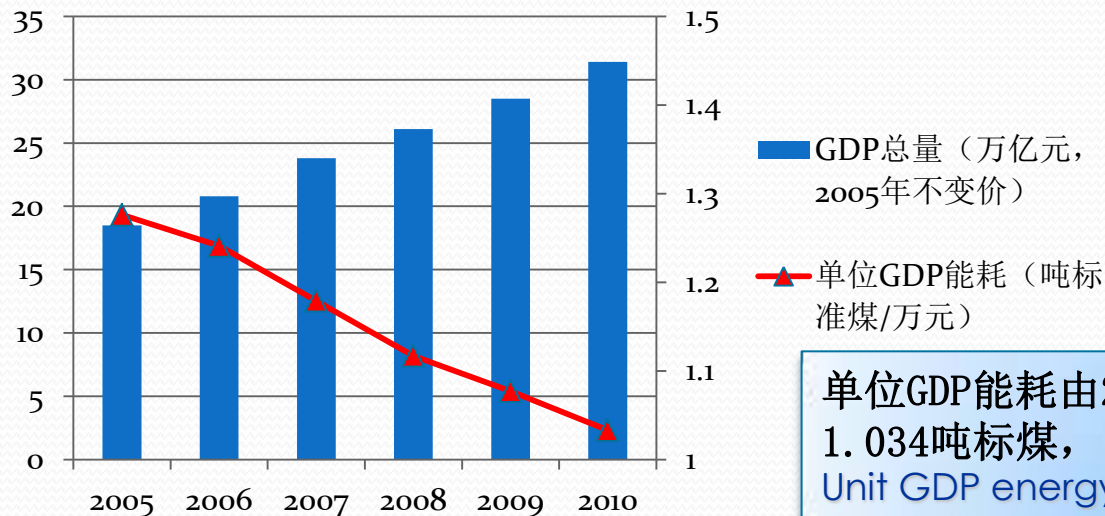
中国 “十一五” 发展实践表明：  
绿色和快速增长是可以同时实现的！

China's practices in the 11th FYP period shows :  
Green growth and fast economic growth  
can be achieved simultaneously !

# “十一五”成就：单位GDP能耗大幅下降

## 11th FYP's achieved: unit GDP energy consumption Drops!

- “十一五”期间（2006-2010年），中国把节能减排作为约束性指标，采取了一系列强有力的政策举措，强力推进节能减排。
- In the 11th FYP period, China made energy saving & emission reduction (ES & ER) binding targets, followed by a series of supporting policy measures., which played key roles in the effort of ES & ER.



经济增长与单位GDP能耗变化情况

单位GDP能耗由2005年的1.276吨标煤下降到1.034吨标煤，降低率19.1%。  
Unit GDP energy consumption was down by 19.1%, from 1.276 – 1.034 tons of standard coal.

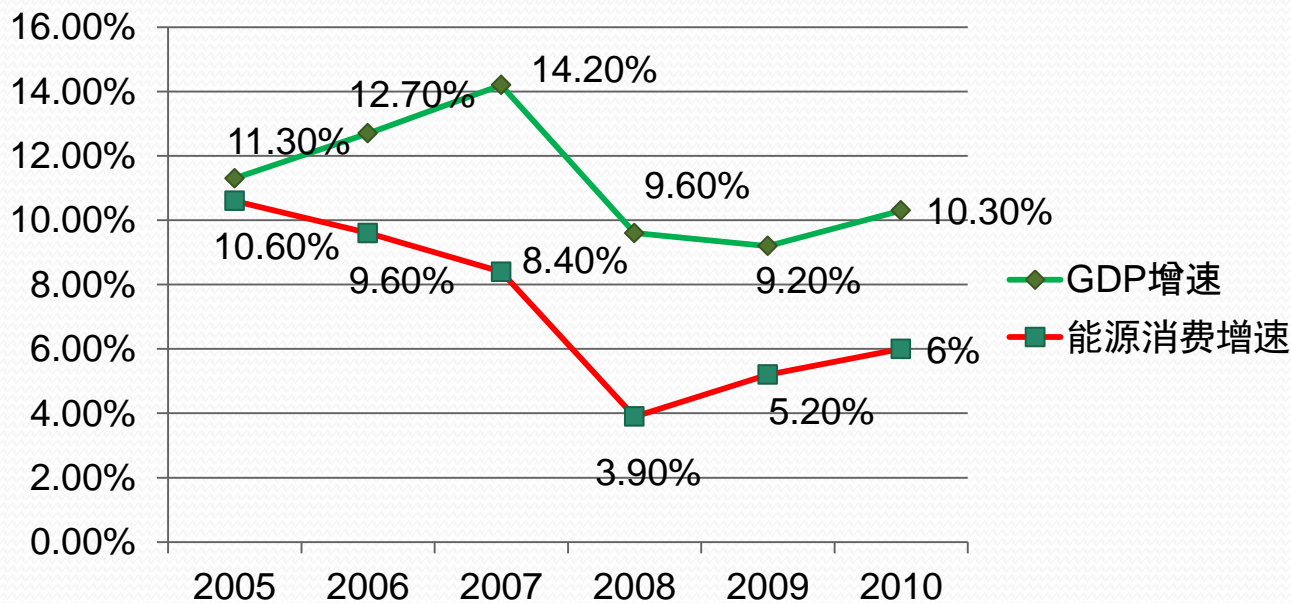
# “十一五”成就：较低能源消耗支撑了较快增长

11th FYP's achieved: slow energy consumption rate supports rapid economic growth

- 以能源消费年均6.6%的增速支撑了国民经济年均11.2%的增速。

Energy consumption rate of 6.6% supports economic growth of 11.2%.

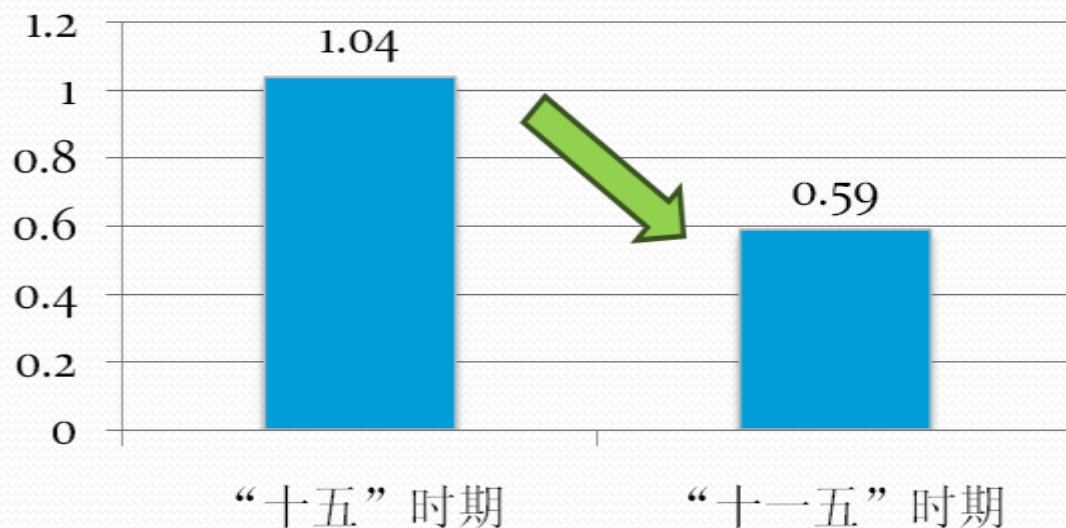
GDP vs Energy Consumption Growth Rate



# “十一五”成就：能源消费弹性显著降低

**11th FYP's achieved: energy consumption flexibility coefficient down considerably**

- 能源消费弹性系数由“十五”时期的1.04下降到“十一五”末的0.59。
- **Down from 1.04 (10th FYP period) – 0.59 (at the end of 11th FYP period)**



能源消费弹性系数变化情况

# “十一五”成就：能效水平大幅提高

## 11th FYP's achieved: Energy efficiency *Rises*.

- 2010年与2005年相比，火电供电煤耗由370克标准煤/千瓦时降到333克标准煤/千瓦时，下降了10.0%；吨钢综合能耗由694千克标准煤降到605千克标准煤，下降了12.8%。水泥综合能耗下降了24.6%；乙烯综合能耗下降了11.6%；合成氨综合能耗下降了14.3%。
- **From 2005 to 2010, coal consumption in thermal power generating has dropped from 370 to 333 g standard coal/ kwh, down by 10.0%; comprehensive energy consumption in steel per ton from 694 to 605 g standard coal, down by 12.8%; comprehensive energy consumption in cement, ethylene & synthesized ammonia production down by 24.6%, 11.6% and 14.3% respectively.**

# “十一五”成就：能源结构发生积极变化

## 11th FYP's achieved: Energy mix is optimizing

- 2010年末，非化石能源占一次能源比重达到8.3%，
  - 水电总装机规模达到2亿千瓦
  - 核电装机达到1082万千瓦
  - 风电装机容量由130万千瓦增加到4000万千瓦
  - 光伏发电装机规模由不到10万千瓦增加到60万千瓦
  - 核电在建规模、水电装机容量、风电装机容量、太阳能热水器集热面积、农村沼气用户量均居世界第一位。

By the end of 2010, **non- fossil fuels counted for 8.3% of total primary energy** with

**hydropower & nuclear power** installed capacity of 200 million & 1082 trillion kw, **wind power** installed capacity up from 1.3 to 40 million kw.

**Plus: China tops the world in:** nuclear power capacity under construction, hydropower installed capacity, coverage of solar power water heater, methane users of rural areas.

# “十一五”成就：为应对全球气候变化做出重要贡献

## **11th FYP's achieved: *benefiting world climate***

- “十一五”期间，中国通过节能和提高能效少消耗能源6.3亿吨标准煤，相当于减少二氧化碳排放14.6亿吨，为应对全球气候变化做出了重要贡献。

**Through ES & EE, China saves 630 million tons of standard coal, equivalent of CO<sub>2</sub> emission reduction, benefiting world climate.**

# **“十一五”成就：节能环保产业成为新的增长源**

**11th FYP's achieved: energy saving & environment protection industries becomes new growth areas.**

- 节能环保以及新能源产业获得了巨大的市场空间：
  - 2010年，中国节能环保产业总产值达2万亿元，从业人员2800万人。
  - 到2015年，预计节能环保产业总产值达到4.5万亿元，节能服务总产值可突破3000亿元；污水垃圾处理、脱硫脱硝投资将超过8000亿元，环境服务产值将达5000亿元。

## **Incredible market potentials:**

**In 2010, output value of ES & EP industries has reached 2 trillion RMB with 2800 employees.**

**By 2015, China's output value of ES & EP industries is expected to reach 4.5 trillion RMB. Stimulating investment worth of trillions of RMB with output value over 0.3 trillion RMB. Investment on sewage & garbage treatment will exceed 0.8 trillion RMB. Output value of environment service industries 0.5 trillion RMB.**



中国“十二五”：坚定不移促进发展转型，努力实现低碳、绿色、可持续发展

**12th FYP: Keep abreast philosophy of restructuring to realize low-carbon, green growth & sustainable development**

# “十二五”，中国的节能减排目标

## 12th FYP: ES targets in China

《“十二五”节能减排综合性工作方案》：

- 节能减排约束性目标：到2015年，全国万元GDP能耗比2010年降低16%，比2005年下降32%，下降到0.869吨标煤；全国万元GDP二氧化碳排放降低17%，“十二五”期间实现节约能源6.7亿吨标煤。

**Binding Targets of Comprehensive Work Plan of Energy Saving during the 12th FYP:**

**By 2015, energy consumption per unit of GDP will fall to 0.869 ton of standard coal, down by 16% compared to that of 2010, by 32% compared that of 2005. CO<sub>2</sub> emission per per unit of GDP will decrease by 17%.**

**670 million tons of standard coal will be saved during the 12th FYP.**

# “十二五”，中国在行动

## 12th FYP: China is in action!

### 1、经济转型发展：调整优化产业结构 Transformation of economic development: To optimize Industrial Structure

—抑制高耗能、高排放行业过快增长，提高行业准入门槛，严格节能评估审查； to curb excessive growth & cut admission of large-consuming & emitting sectors; To exam ES evaluation strictly;

—加快淘汰落后产能，并将相关任务按年度分解落实到各地区。 to fasten the phase-out of backward capacity' to allocate annual work requirements into local governments;

—调整能源结构，推动传统产业改造升级，发展服务业：到2015年，非化石能源占一次能源消费总量比重达到11.4%。服务业和战略性新兴产业增加值比重分别达到47%和8%左右。 to adjust energy mix; upgrade traditional sectors; to enlarge share of service industry. **By 2015, non-fossil fuels will make up to 11.4% of total primary energy consumption; The added value of service industries and new emerging industries will grow by 47% and 8% respectively.**

# “十二五”，中国在行动

## 12th FYP: China is in action!

- 2、强化目标责任，加强节能管理、夯实工作基础 **Target setting and duty inspection for national and local govs, to strengthen EC management, to develop EC infrastructure and capacity**
- 明确各级政府、有关部门和重点用能单位的责任,完善统计核算与监测方法; to strengthen the examination of target & duty performance, to improve statistics, checking and monitoring
  - 将固定资产投资项目节能评估审查作为控制能源消费增量和总量的重要措施。using evaluation of fixed asset investment projects as tools to control energy consumption growth and total consumption
  - 开展万家企业节能低碳行动，实现节能2.5亿吨标准煤。to implement Low-carbon action for Top 10,000 enterprises, saving 250 Mtoc.
  - 完善节能标准体系; to improve energy saving standard system.
  - 建立健全节能管理、监察、服务“三位一体”的节能管理体系; to set up and improve energy saving management system focusing on management, supervision & service

# “十二五”，中国在行动

## 12th FYP: China is in action!

### 3、实施节能重点工程-形成节能3亿吨标准煤能力。 **to implement EC key projects-ES capacity amount to 300 Mtoc.**

—节能改造工程、节能产品惠民工程、节能技术产业化示范工程、合同能源管理推广工程、节能能力建设工程。 **Energy saving renovation projects, gov's subsidies to EE products, EE technology demonstration projects, the EPC promotion projects, and capacity building projects.**

到2015年，工业锅炉、窑炉平均运行效率分别比2010年提高5%和2%，电机系统运行效率提高2-3%，余热余压发电能力达到3100万千瓦，北方采暖地区既有居住建筑供热计量和节能改造4亿平方米，夏热冬冷地区既有居住建筑节能改造5000万平方米，公共建筑节能改造6000万平方米。

**By 2015, EE of industrial boiler & furnaces will go up by 5% and 2%, motor system by 2-3% from 2010. Capacity of waste heat and pressure for power generation will total at 31 million kw/h. In the north area, heating metering & ES retrofit for existing residential building will cover 400 million m2. In cold-winter hot-summer area, ES retrofit for existing residential building will cover 50 million m2; ES retrofit for public buildings 60 million m2 .**

# “十二五”，中国在行动

## 12th FYP: China is in action!

### 4、加快节能减排技术开发和推广应用,推广节能减排市场化机制

**to speed up the energy saving and emission reduction technology development and application, and to promote market-based mechanism**

- 加快节能减排共性和关键技术研发,支持一批节能关键技术与设备产业化; ; to support the R&D and mass produce major EC technologies & equipment
- 继续发布国家重点节能技术推广目录,建立节能技术遴选、评定及推广机制; to continue publication of Promotion List of National Key ES Technologies, setting up ES technologies screening, evaluation & promotion mechanisms
- 积极引进、消化、吸收国外先进节能技术。to import, adapt to and absorb foreign advanced ES technologies
- 建立“领跑者”标准制度,推行合同能源管理,加大能效标识和节能产品认证实施力度。to set up the Top Runner standard system, expanding the EPC practices, putting more efforts on energy efficiency labeling and energy-saving product certification system.

# “十二五”，中国在行动

## 12th FYP: China is in action!

5、从财政、价格和收费、税收、金融四个方面进行政策调整，促进节能产业发展 **to adjust fiscal, pricing, charging & taxation policies**

— 如：推行政府绿色采购；推行居民用电、用水阶梯价格；调整进出口税收政策，遏制高耗能、高排放产品出口；建立银行绿色评级制度等。 **e.g. green gov. procurement, tiered pricing of residential electricity and water consumption, import-export taxation policy adjustment**

# “十二五”，中国需要 12th FYP: China needs:

“十二五”，中国面临更加艰巨的历史任务，要破解能源资源难题，在转型中实现发展，节能是重要途径，也是有效途径。这条路，即需要中国的自身努力，也离不开国际社会的支持和参与！ 12th FYP, China faces a more arduous task to crack the energy resources challenges, to achieve development in the transition, EC is an important and effective way. And China's own efforts should be joined with the support and participation of the international community!

“十一五”期间，中国节能取得积极进展，成效显著，但是要实现产业结构调整，走绿色、低碳、可持续之路，我们还需要： 11th FYP, China's EC has positive progress and remarkable results, but to achieve the adjustment of industrial structure, lead a green, low-carbon and sustainable the road, we also need to:

# “十二五”，中国需要 12th FYP: China needs:

- ◆ 分享能效政策和管理经验，学习借鉴新机制； **To be shared of energy efficiency policies and management experience, learn from the new mechanism;**
- ◆ 进行能效标准建设，提升节能工作技术基础； **To develop EE standards and codes to lay a strong technical base for EC work;**
- ◆ 发现并引进节能新技术、新产品，推广最佳实践案例； **To introduce new EC technologies, new products, and promote best practices.**

这些领域也孕育着庞大的市场空间，期盼我们共筑桥梁，推动中美能效合作。 **These areas also breed a huge market space. We hope to build a bridge with you to promote Sino-US EE cooperation.**



## 国家节能中心 致力推动中美能效合作

**NECC** – committed to push forward Sino-US cooperation

- 国家节能中心成立于2009年5月，是国家发展和改革委员会直属的事业单位。
- **National Energy Conservation Center (NECC), established in May 2009, is a public service institution directly affiliated to the National Development and Reform Commission (NDRC).**

## 中心职能 Major Functions

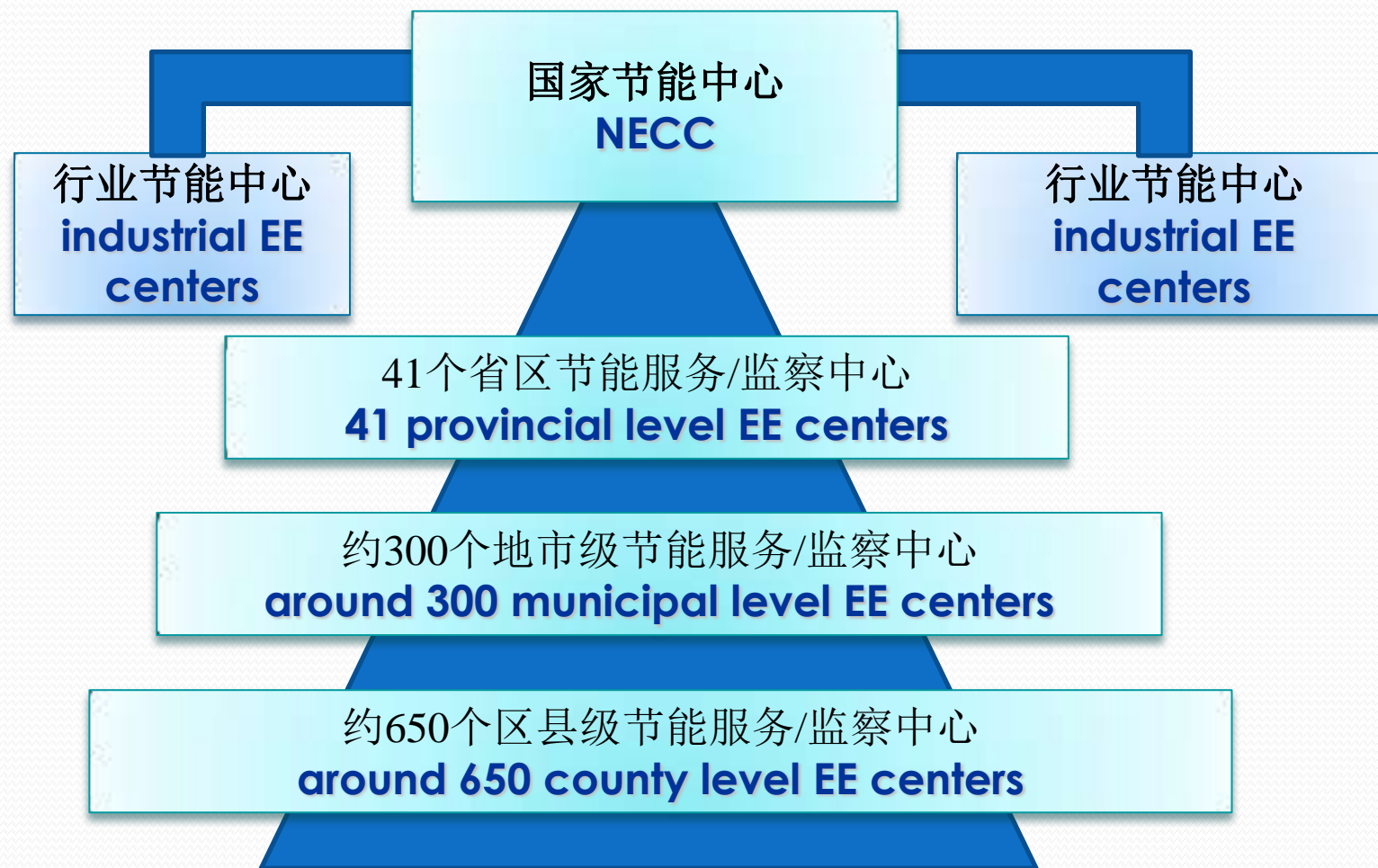
- 承担节能政策、法规、规划及管理制度等研究 to undertake research tasks in relation to energy saving policies, regulations, planning and administrative regime
- 受政府委托，承担固定资产投资项目节能评估论证及评审 as commissioned by relevant government authorities, to conduct energy saving evaluation and study of fixed asset investment projects and to put forward review opinions
- 组织开展节能技术、产品和新机制推广 to organize and carry out the promotion of energy saving technologies, products and new mechanisms
- 开展节能宣传、培训及信息传播、咨询服务 to conduct energy saving publicity, training, information communication and consulting service
- 受政府委托，承担能效标识管理 as commissioned by the relevant government authorities, to carry out the administration of the energy efficiency labeling
- 开展节能领域国际交流与合作 to conduct international exchange and cooperation in the field of energy saving

# 组织结构

## Organizational Structure



# 全国工作网络 Our national network



整个系统有近10000名工作人员，目前这个数字还在不断地增加……  
Our EE working staff is nearing 100,000 , and the No. is still going up ...

# 工作思路 Working Strategies

- 配合政府部门推进节能工作，实施好已出台的各项重大节能举措。
- 联合各地、各行业节能中心，动员社会智力资源，形成合力，共同推进节能工作。
- 通过完善政策保障机制和充分利用市场机制的拉动作用，加速推进节能新产品市场化，新技术产业化，新机制普遍化，以建立节能长效机制。

**to support gov. agencies' efforts on energy saving, bringing related measures into effect**

**to form ES synergy through working together with ECCs at all levels, of all sectors & motivating intellectual and social resources of our expert pool**

**to establish a long-effect energy saving mechanism by**

**(1)marketization of new energy saving products,**

**(2)industrialization of new technologies**

**(3)popularization of new mechanisms**

**and making full use of market's driving forces & policy safeguarding mechanism's improvement**

# 国际合作

## International Cooperation

### 合作伙伴和合作关系 Our partners:

- 世界银行 (**WB**)
- 联合国开发计划署 (**UNDP**)
- 世界自然基金会 (**WWF**)
- 国际能源署 (**IEA**)
- 能源基金会 (**EF**)
- 劳伦斯伯克利实验室
- 旧金山市政府 (**CCSF**)
- 俄罗斯能源署 (**REA**)
- 日本节能中心 (**ECCJ**)
- 韩国能源管理工团 (**KEMCO**)
- 英国标准协会 (**BSI**)
- ...

国际顾问团队：组建中

**International consulting team: still  
under construction**

## 国际合作

## International Cooperation

- 国际项目管理与实施 **International projects**
- 中国节能融资项目 **China Energy Efficiency Financing (CHEEF)**
- 亚洲能效标准和标识/认证有效建立和实施障碍消除项目 **PIESLAMP**
- 中国逐步淘汰白炽灯、加快推广节能灯“合作项目” **BRESL**
- 中国终端能效项目 **End-use Energy Efficiency project**
- 国际合作活动 **International cooperation activities**
- 企业节能低碳领导力能力建设活动 **Enterprise Energy Saving, Low-carbon Leadership Capacity Building**
- 中日节能环保综合论坛 **Sino-Japan EE & EP Forum**
- 中美能效论坛 **Sino-US EE Forum**
- 东盟—中日韩区域节能研讨会 **ASEAN + China, Japan, ROK (10+3) Workshop on Energy Saving Regional Cooperation under the 9th China-ASEAN Expo.**
- 东亚节能研讨会 **Expert Group Meeting on Energy Efficiency in Northeast Asia**
- 中挪合作工业节能技术讲座 **Sino-Norwegian Industrial Energy Saving Technologies Lecture**
- 中日能源管理师制度政策研修 **Sino-Japan Energy Manager System Policy Training**

# 合作期望

## Cooperation Outlook



交流中美能效政策研究成果，探讨制定和实施能效战略经验，重大项目管理执行经验等；



共享能效专家资源，加强人才交流和派遣，开展专题研讨、咨询等；



共同推动能效机构能力建设，重点实施人才培养；



利用各自优势资源，合作开发节能示范项目并加以推广；



搭建平台，对接工作网络，促进中美各省市/州级节能机构开展对口合作。

## 合作期望 Cooperation Outlook

1. to exchange EE policies research results, to explore how to make & implement EE measures , and to share managerial experience of major projects
2. to share resources of EE professional/expert, to exchange & dispatch personnel and to arrange workshops for discussion & consultancy
3. to develop EE instructional capacity, especially that of the professional training
4. based on individual resources, to work on joint projects' demonstration and duplication
5. to build a platform for connecting working network, encouraging Sino-US counterpart cooperation



**谢谢！ Thank you!**

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