实现“十一五”节能目标的方式与途径研究

Methods and Approaches For Achieving the Energy Conservation Targets in the 11th Five-Year Plan

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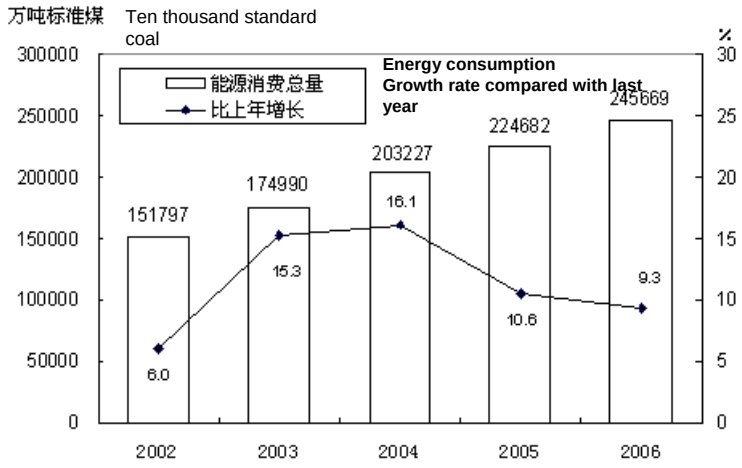
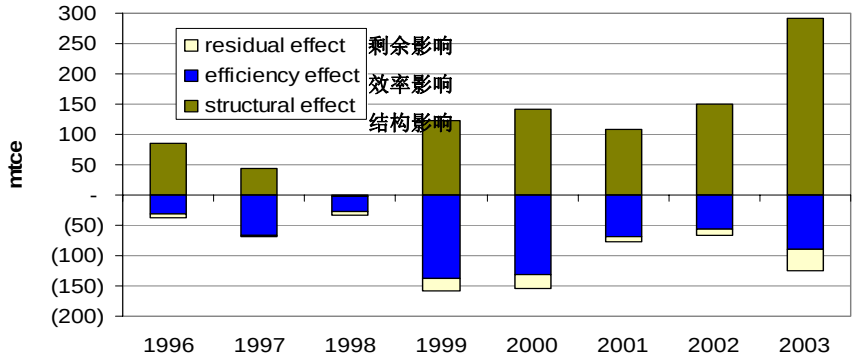
一、应充分认识实现“十一五”节能目标的艰巨性和发现问题的本质

I. Understand the Challenges in Achieving the 11th Five-Year Plan's Energy Conservation Target



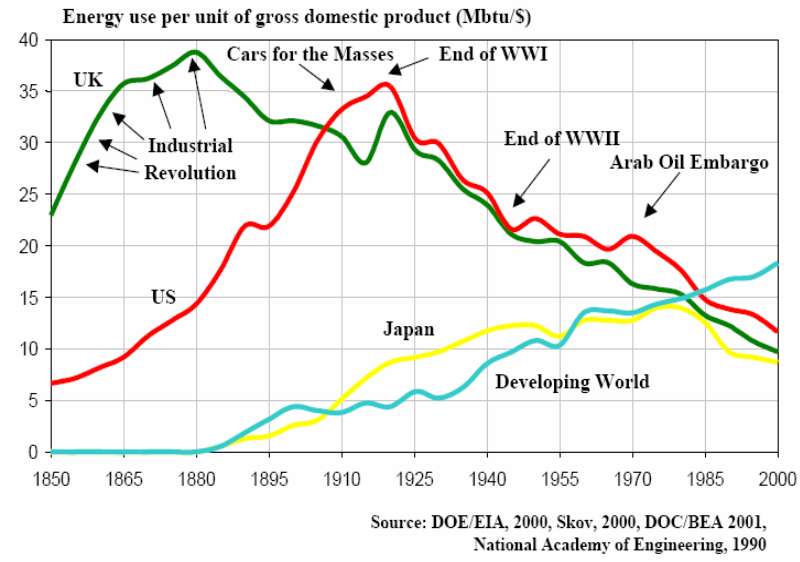
结构重型化导致单位GDP能耗增加

Increase in Energy Consumption per Unit of GDP Caused by the Structural Bias Towards Heavy Industries



技术进步对节能的贡献被产业结构重型化所掩盖。

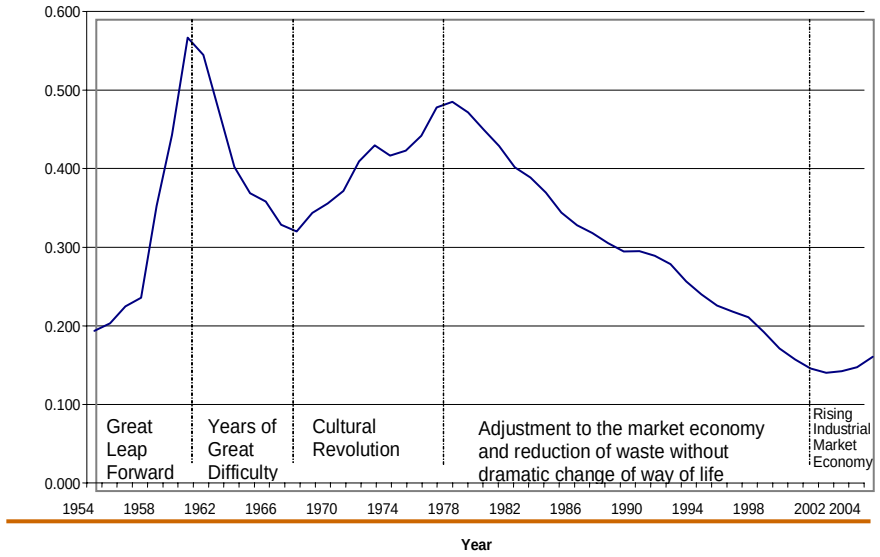
The contribution of technical progress to energy conservation is overwhelmed by the structural bias towards heavy industries.



Source: DOE/EIA, 2000, Skov, 2000, DOC/BEA 2001, National Academy of Engineering, 1990

中国的能源密度

Energy Intensity in China



经济结构：由以往的驱动节能，转变为推动能源强度的进一步增加。

技术节能：虽然总体上技术还在进步，产品能耗还在下降，但技术进步的步伐不快，不能满足实现“十一五”节能目标的需要。

体制、机制、政策和基础性工作等方面存在着系统性缺陷，行政性手段有可能衍生出其他的问题。

Economic Structure:

Transfer from driven energy-saving in the past to promotion of further improvement in energy intensity.

Technical Energy Conservation:

Although technologies are advancing and product energy consumption is declining, the pace of technology advancement is not fast enough to meet the target.

There are limitations in the system, mechanism, policies, and administrative methods.

“十五”时期20％的节能目标：

万元国内生产总值（按2005年价格计算）能耗由2005年的1.22吨标准煤下降到2010年0.98吨标准煤，单位GDP能源消耗年均下降4.4%。

2010年实现6.4亿吨标准煤的节能量（按GDP增速7.5%测算），GDP增速比规划目标每增加一个百分点，目标节能量将增加约4.7%。如果GDP增速分别达到8.5%和9.5%，目标节能量将达到6.7亿吨和7.0亿吨标准煤。

The 20% Energy Conservation Target in the 11th Five-Year Plan:

Energy consumption per 10,000 RMB in GDP (based on 2005 prices) should decrease from 1.22 ton standard coal in 2005 to 0.98 ton in 2010.

The annual decrease in energy consumption per unit GDP should be 4.4%.

In 2010, the total energy conservation should be 640 million tons standard coal (based on GDP growth rate of 7.5%).

For every 1% increase in GDP over the planned target, the target energy conservation rate will increase by 4.7%.

If GDP grows at 8.5% or 9.5%, the target energy conservation will be 670 million tons or 700 million tons, respectively.

1、三个基本原则

- 市场、法律、行政等手段多管齐下。

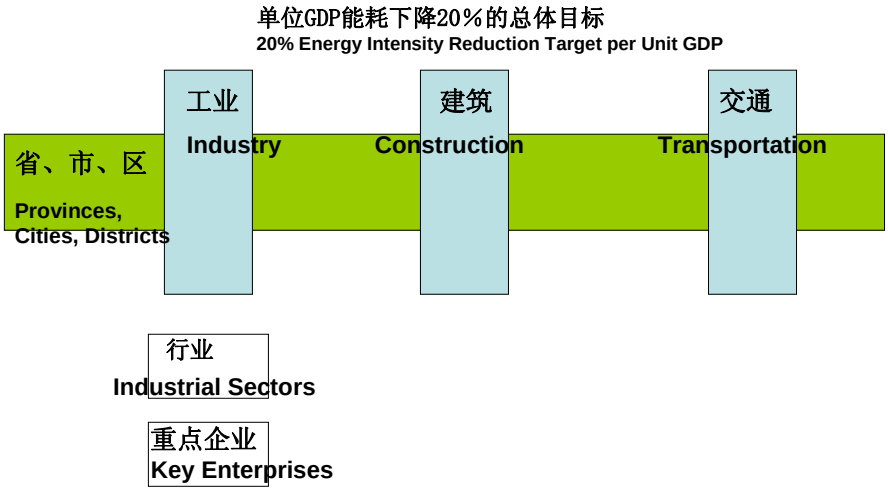
- 远近结合。既要着重解决当前的突出矛盾，更要着眼于建立长效机制。

- 上下联动。需要落实中央与地方以及中央各部门的各自责任，既要将国家的节能、环保目标落实到各级地方政府，也要避免责任的简单下移，中央政府的措施必须尽早到位。

1. Three Basic Principles

- **Employ a combination of measures, such as market, law, and administration.**
- **Combine both short and long-term interests.**
- **Work top-down and bottom-up.**

2、节能目标的两维度分解
2. Two-Dimensional Break-down of Energy Conservation Target



3、三个基本途径

- 结构节能、技术节能、制度节能；
- 近、中、长期三个途径应发挥的作用

近期：结构性因素占主导制度；

中长期：技术跨越战略，重大领域的技术创新；经济结构得到显著优化。

3. Three Basic Approaches

- Structural, technical, and, systematic energy conservation.
- Functions of the three approaches in the short, medium and long terms:

In the short term: Structural factors dominate.

In the medium and long terms: Technologies surpass strategies. Technical innovation in key areas is achieved; economic structure is dramatically optimized.

高、中、低不同经济增长情形下实现节能目标的可能性

Scenarios for Achieving the Energy Conservation Target Under High, Medium, or Low Economic Growth Rates

GDP	9.5%	8.5%	7.5%
产业结构 一:二:三	10.0:46.8:43.2	10.4:45.8:43.8 2004年为11.9:48.0:40.1	10.7:45.0:44.3
在考虑结构变化以及弱技术进步的节能状况	12.5%	13.1%	13.7%
其中技术节能以及贡献率	3.6%(28.8%)	3.5%(26.7%)	3.4%(24.8%)
GDP	9.5%	8.5%	7.5%
Industrial Structure Primary Industry:Secondary Industry:Tertiary Industry	10.0:46.8:43.2	10.4:45.8:43.8 11.9:48.0:40.1 (in 2004)	10.7:45.0:44.3
Energy Conservation (considering structural changes and phase-out of outdated technology)	12.5%	13.1%	13.7%
Technical Energy Conservation and Its Contribution Rate	3.6%(28.8%)	3.5%(26.7%)	3.4%(24.8%)

必须加大技术节能的贡献率和产品结构调整的步伐。

The contribution rate of technical energy conservation has to be increased, while the adjustment of industrial structure should be promoted.

如果考虑到加大技术进步和产品结构调整的因素，按照高增长方案。

单位GDP能耗可下降19.1%，其中结构节能的贡献为9.2个百分点，技术节能的贡献为5.9个百分点，产品结构调整（提高附加值）的贡献为4个百分点。即，产业结构与产品结构调整的贡献率为69%，技术节能的贡献率为31%。

Under high economic growth rate:

Need to advance technologies and adjust the industrial structure.

Energy use per unit GDP can be reduced by 19.1%:

Structural energy conservation will contribute 9.2%, technical conservation 5.9%, and adjustment of product structure (to improve add-on values) 4%.

The contribution rate of adjustment of industrial and product structure will be 69%, while that of technical energy conservation will be 31%.

必须从结构节能和技术节能两方面进行，而且结构节能是关键。

尽管技术节能的潜力较大，但是“十一五”时期主要的能源密集型产业所获得的技术节能量为1.4亿吨标煤，加上建筑、交通等领域的技术节能量，技术节能对实现20%的贡献率为30%左右。

结构节能的贡献率要达到70%。

Structural energy conservation and technical conservation should be carried out simultaneously, with the former being the key.

Technical energy conservation's contribution rate to the target = 30%

The amount of technical conservation gained from major energy-intensive industrial sectors during plan period will be 140 million tons standard coal.

Structural conservation contribution = 70%

经济激励手段决定了能否实现20%节能目标。

无论是“十一五”时期年均GDP增速为7.5%、8.5%还是9.5%，如果不采取适度的政府干预措施和经济激励手段，都无法实现节能目标，而且GDP增速越快，干预程度就应越大。

在GDP年均增速9.5%的情景下，也有可能完成节能目标，但需要加快技术进步的步伐，更需要加大结构调整的力度，特别是应实施燃油税、能源税等政策，要更多地利用经济和法律的手段。

Economic stimulation can decide whether the 20% conservation target can be achieved.

Meeting the target requires government intervention and economic stimulation.

Higher GDP = more intervention

Rapid and more extensive technological advancement and structural adjustment are needed to meet the target if GDP growth rate is 9.5%.

Should carry out policies such as fuel tax and energy tax; explore other economic and legal methods.

需要科学制定和落实地区的节能目标。

各地经济发展目标之和远大于国家目标，各地的能源消耗量之和也大于国家目标，值得关注。

从目前的情况看，单位GDP能耗低的地区往往是经济发达地区，考虑到地区节能目标的确定还需要与地区经济社会发展政策统筹起来，必须要建立科学的节能目标分解方法，能源统计、监察、考核体制的建立与完善是落实地区节能目标的关键。

还要进一步明确中央与地方的各自责任，中央政府要着眼解决全局性的政策问题，尽快解决目前地方政府政策手段不足的问题。

Local energy conservation targets should be set up and fulfilled scientifically.

Should take note of the fact that the sum of local economic development targets and energy consumption are greater than the national target and consumption.

Need scientific break-down of the national target according to local economic and social development.

Keys are the establishment and improvement of statistics, supervising and assessment systems for energy use.

The respective responsibilities of the central and local governments should be further clarified.

The central government should focus on overall policy issues and problems beyond local government capacity.

1 钢铁工业吨钢能耗下降取9%。
2 有色金属下降12%。
3 化学工业平均下降7.0%。
4 石油化工：取8.9%
5 建材工业：水泥生产综合能耗下降10.26%，；平板玻璃生产综合能耗下降19.23%，卫生陶瓷综合能耗下降34.28%，综合取15 %。
6 原油加工：生产自用率下降9.1%，从1.54%下降到1.4%。生产用电单耗上升5.63%，从142 kWh/t原油上升到150kWh/t原油。
7 火力发电：火电厂供电煤耗下降4.26%，输电线路损失下降13.9%，
8 纺织业：综合取8.0%。
9 轻工业（造纸）：吨纸浆综合能耗下降8.6%。

1. **Energy consumption per ton of steel production down 9%**

2. Nonferrous metal: 12%

3 Chemical industry: 7.0% on average

4. Petrochemical industry: 8.9%

5. Construction materials: Concrete 10.26%; Glass 19.23%; Sanitation ceramics 34.28%; average of 15%

6. **Crude oil processing: Production consumption rate down 9.1%, electricity consumption on production per unit up 5.63.**

7. **Power plants: net coal consumption rate down 4.26%, transmission losses down 13.9%**

8. **Textile industry: 8.0% average**

9. **Light industry (paper making): consumption per ton of paper pulp down 8.6%**

不同情景下的技术节能效果

Various Energy Saving Effects

万吨	BAU	T	P1	P2	10,000 tons	BAU	T	P1	P2
存量节能	502	17438	3328	1782	Stock tech energy savings	502	17438	3328	1782
增量节能	8930	33235	17641	12172	Increment tech energy savings	8930	33235	17641	12172
总节能量	9432	50673	20969	13955	Total energy saved	9432	50673	20969	13955

在技术节能途径中，增量节能是主要的。应尽快提高和严格实施新的准入标准，对于能源密集型产业建立起基于能效、环境、安全的新型准入制度。

在淘汰落后生产能力方面，除了行政性手段外，应利用好能源价格、财政等政策，建立有效的落后生产能力市场退出机制。

Incremental methods are key to energy savings.
New standards should be established and implemented, and must be efficient, environment-friendly, and secure.

Market exit systems should be adopted to eliminate outdated production.
Should include energy price adjustments, financial policy, and legal/political action.

对于能源密集性产品，要进一步完善强制性的能效标准制度。家用电器、照明产品、商业/工业设备共12种重点终端用能产品由于强制性能效标准的实施。所带来的节能量对“十一五”节能目标约6.36个百分点。

There should be revision of energy consumption measurements and standards for energy-intensive products.

Proposed energy savings standards for home appliances, lighting products, and commercial/industrial facilities are aimed at reducing energy consumption by 6.36%,.

通过加强环境监管促进节能。将环境监管的作用前置，使得环境真正作为经济、社会发展的决策变量；

增加排污收费标准，使得企业的环境治理成本小于污染排放的成本，建立排污交易制度；

建立强制性市场退出制度；

鼓励公众参与，健全环境诉讼制度。

Improving energy-savings and environmental management by making the environment a key part of decision-making for socioeconomic development should be a priority;

The set-up of measures to make pollution penalties greater than the sewage emissions benefits to enterprises should be reinforced;

A compulsory market exit system should be established;

Public participation should be encouraged; the environment litigation system needs to be more established

在国家层面，改革能源管理体制和完善节能管理制度，建立节能执行机构。

将节能、环保目标纳入到对地方政府的考核制度中，并建立动态节能评估制度和节能监查制度。

At the state level, we should change the natural resource management system, improve the energy-saving system, and establish institutions to execute these goals

There needs to be integration of energy-saving and environmental protection within the local testing system, and establishment of an energy-saving evaluation and supervision system

五、政策建议
V. Policy Recommendations

10、加强环境监管，实现节能减排目标。

10. China needs to enforce supervision of environmental management and implementation of emissions reduction and energy-savings.