节能的经济政策
Economic Policy for Energy Conservation

能源基金会
对话工作会议
北京 顺义
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Dialogue Partners Meeting
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2007.6.30

要节约一切资源
Conserving Resources—Not Only Energy

- 所有的稀缺资源统统都要节约。但是各种资源的相对稀缺性是不同的,由价格来表示。
- 如何节约一切资源？答案是节约钱。
- 因为钱能够买到一切东西。
- 只有在一般均衡条件下钱能够买到一切商品。

- Scarce resources should be conserved. The relative scarcity of these resources is reflected in their relative prices.
- Saving money saves resources.
- Because money can purchase resources
- Under a free market economy, money can purchase all goods.

什么是一般均衡状态
What is a Free Economy?

- 没有对买卖的限制，如凭票，凭证，限额，配额,对身份的要求。
- 价格自由浮动，不存在供不应求，也不存在供过于求。
- 企业有投资和撤资的自由。
- 信息充分，有平等的竞争。市场永远有效地工作。
- 此时钱能够度量价值。

- Free exchanges, without restrictions.
- Prices free to move according to supply and demand.
- Free entry and exit from the market.
- Free flow of information, fair competition.
- Only under these conditions does price reflect value.

什么是节能?
What is Energy Conservation?

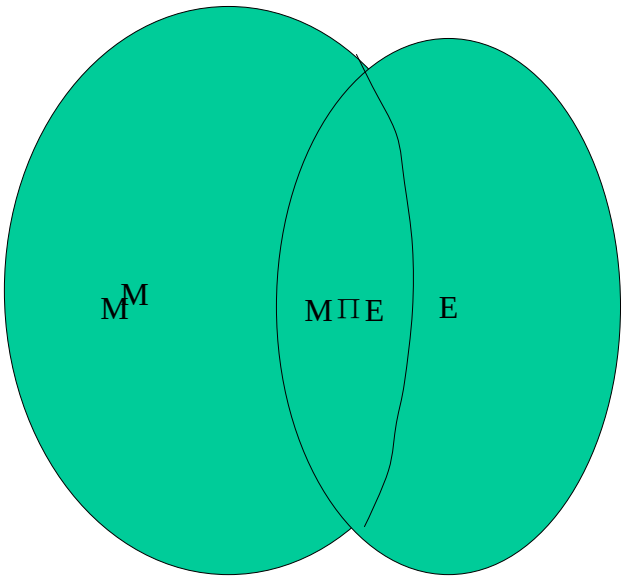
- 节能是用不太稀缺的资源代替更为稀缺的能源的过程。
- 举例说明：加强绝缘，用节能灯泡，高效发电。
- **如果赚钱的机会已经用尽，能源的相对稀缺性没有变化，就没有节能的机会。**
- 所以节能需要首先改变能源的价格

- Using more abundant resources to replace the use of scare energy resources.
- Ex: better insulation, energy conservation lamps, more efficient power generation.
- **When all measures to make money have been fully utilized, no change in relative scarcity, no opportunity to save energy.**
- Thus, we must raise energy prices first.

节能与节钱的矛盾
Conflicts Between Energy Conservation and Profit-Making

- 节能而费钱，说明没有达到资源综合的节约。
- 为什么节能法不对。因为只看到了节能而没有看到浪费其他资源。
- 我们不能要节能法，节水法，节钢法，节土地法，等等。它们彼此冲突。
- 节能是资源配置问题，不是权利和义务问题。
- 替代的深度由相对价格决定。

- If energy savings increase costs, real resource savings have not been achieved.
- The Energy Conservation Law does not bring about real resource savings -- it has produced energy savings, but not reduced costs.
- We cannot also have a Water Conservation Law, Land Conservation Law, etc. There would be inevitable conflicts between them.
- Energy conservation is a resource allocation problem, not an issue of rights and obligations.
- Energy saved depends on price differentials between energy and other resources.



我们要寻求E与M的交集
Identifying the Intersection of Sets M and E

- M 表示所有可以赚钱的项目；E 表示所有可以节能的项目
- 我们要寻找既节能又赚钱的项目并帮助它实施。
- 能源服务公司寻找通过节能来节钱的方法。
- 交钥匙工程，公司承担一切风险，分得节能所节省的成本。
- 比如：建筑物节能，节能灯泡，节能家电，太阳能热水器。

- Set M: profitable projects
  Set E: energy-saving projects.
- We need to find the the intersection between M and E, and make these projects a reality.
- Energy Service Companies (ESCOs) help save energy through cost reductions.
- ESCOs operate turn-key projects, take on risks, and share profits.
- Examples: EE buildings, lamps, appliances, solar heaters.

节能而费钱的例子
Examples of Non-Profitable Energy Conservation Measures

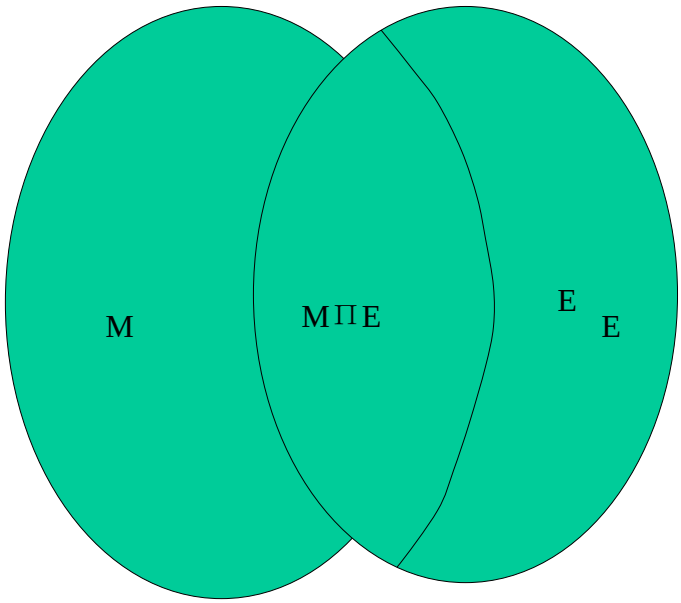
- 关闭还在赢利的小企业，损失了财富的创造。减少了GDP，减少了就业。
- 淘汰还有利润的落后工艺。强制淘汰还没有达到使用寿命，但技术落后的设备。
- 补贴电价以鼓励某种行业。以及其他能源价格的补贴。如为了鼓励种粮而降低灌溉用电的价格。
- 违反企业的意愿，处以罚款。或给企业节能奖励。政府应该思考如何最有效地使用其预算。

- Closure of profitable small businesses: loss of GDP and employment.
- Phasing-out of old equipment that can still produce profits.
- Use of power tariff subsidies to encourage production, such as for staple food.
- Government penalties or subsidies to encourage energy conservation.

能源涨价后的变化
Impact of Increased Energy Prices

- 能源涨价后M 与E的交集范围扩大，既节能又省钱的机会增加。
- 比较国际间的能源价格，我国都偏低。因为没有考虑可耗竭资源的成本。对资源征税不足。
- 不要以为价格低是好事。价格正确才能够有利于人民福利的增加。

- Larger intersection of sets M and E, meaning more opportunities to save energy.
- Energy prices in China are usually too low, relative to other countries, because the costs of non-renewable resources are not incorporated. Insufficient as tax source.
- Lower prices are not necessarily better. Prices must be accurate to increase human well-being.



考虑社会成本扩大节能范围
Energy Saving Opportunities Increase When Social Costs Are Incorporated

- 环境破坏引起的社会成本应该由造成污染的人承担。即使用能源的消费者承担。
- 如果将社会成本由私人承担，能源价格将上升。有利于节能。
- 但是社会成本是多少，需要科学地确定。过多过少都不利。但是能源价格肯定因为社会成本的存在要上升。
- 例如我国居民用电普遍都有补贴。应该取消。

- Social costs of pollution must be paid by those who produce pollution (energy consumers).
- If social costs are incorporated, energy prices will rise.
- Social costs must be determined scientifically. However, it is certain that reflection of social costs will increase energy prices.
- For example, power tariffs for households should be raised.

气候变暖将对地球上的生物构成威胁
Global Warming Will Impact All Species on Earth

- 科学观察已经肯定人类活动,特别是燃用化石能源，造成气候变暖。它的后果并不十分清楚。
- 后果可能包括：海平面上升，灾难性气候增多，生物品种减少，疾病泛滥等。
- 防止可能发生的灾难性后果，必须减少温室气体的排放。
- 一个稳妥的减排目标是2010年的排量不超过1990年的排量，2050年的排量降低到1990年的一半。

- Scientific observation indicates that global warming is a result of human activities, especially the use of fossil fuels. The precise consequences have not yet been specified.
- Possible results: rise in sea level, increase in weather-related natural disasters, species extinctions, and increases in disease.
- To prevent potential disasters, we must reduce CO_2 emissions.
- A moderate target is to reduce the emissions to 1990 levels by 2010, and to 50% of 1990 levels by 2050.

减少温室气体排放的途径
Ways to reduce GHG emissions

- 节能
- 用核能
- 用可再生能源
- 用含碳低的能源

- Energy conservation
- Nuclear energy
- Renewable energy
- Lower carbon fuels

使用可再生资源的经济学
Economics of Renewable Energy Development

- 由于地球上的资源有限。人类最终必须依靠可再生资源。
- 随着现存资源的减少，价格的上升，将出现越来越多的使用再生资源又能赚钱的机会。
- 用可再生资源代替常规能源的步伐也取决于新技术的成本能更多地降低。

- As conventional resources diminish, we must substitute with renewable resources.
- When scarcity increases, increased prices of conventional resources will create opportunities for renewables.
- The speed of replacement also depends on how quickly the costs of renewables can be reduced.

技术创新可加速可再生资源的使用

Technical Innovation Can Speed RE Deployment

- 现存的用能技术经过几十年的发展，成本已经极大地降低，成为应用可再生资源的一个障碍。
- 技术创新是降低可再生资源成本的必要途径。
- 技术创新有风险，需要政府或其他来源的经济补.

- Technological improvements have reduced costs of conventional technologies in recent decades, creating a barrier for RE.
- It is necessary to use technological innovation to reduce the cost of RE.
- Technological innovation incurs risks, so development requires financial subsidies from varied sources.

新技术的成本取决于使用的规模

Cost for New Technologies Depend on Scale of Production

- 新技术开始应用时规模一定是小的，成本是高的。
- 为了突破成本门槛，也需要政府补贴。
- 我国的新能源定价体现了补贴新技术的必要.

- Initially, new technologies are more costly, due to smaller production scale.
- Government subsidies are necessary to overcome the cost threshold.
- A price subsidy for RE is an example of support for new technologies.