Current Situation and Challenges in Energy Efficiency S&L Policy Development in China

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CONTENT

Energy Efficiency Policies in China

China Basic Energy Policy/中国的基本能源政策

- **Energy Development: Saving is prior, keeping a foothold on domestic, multi-developing, protecting environmental, technological innovation, deepening the reform, international cooperating, improving people's lifelihood**
- **Promoting the reform of energy production and energy utilization mode.**
- **Building a modern energy system of safe, stable, economic and clean.**
- **Supporting the sustainable development of economic society with the sustainable development of energy**
- **In 2015, proportion of non-fossil energy rise to 11.4%, the energy consumption and the CO2 emission per unit GDP reduce respectively by 16% and 17%, compared with 2010.**
- 坚持"节约优先、立足国内、多元发展、保护环境、科技创新、深化改革、国际合作、改善民生"的能源发展方针，推进能源生产和利用方式变革，构建安全、稳定、经济、清洁的现代能源产业体系，努力以能源的可持续发展支撑经济社会的可持续发展。

Energy Efficiency Policies in China

Many EE policies have been established and implemented:

① Energy efficiency products to the countryside/家电下乡

② Project to promote energy-efficient products for the benefit of the people/节能产品 惠民工程

③ Project of energy reconstruction/节能改造工程

④ Old for new project in household electric appliances/家电产品以旧换新

⑤ Project to extend energy performance contracting /合同能源管理推广工程

⑥ Demonstration project of energy-saving technologies/节能技术产业化示范工程

⑦ Project to establish energy-saving ability/节能能力建设工程

⑧ government procurement for energy saving products/政府采购

⑨ ……

Energy Efficiency Policies in China

Project to promote energy-efficient products for the benefit of the people/节能产品 惠民工程

1. **A energy-saving & emission reducing strategy co-issued by NDRC, Ministry of Industry and Information and Ministry of Finance/国家发改委、工信部、财政部联合发布的旨在推进节能减排的战略**
2. **Providing financial subsidies to energy efficient projects/对节能产品提供财政补贴**
3. **Now covering four kinds of products: household electric appliances, means of communications, lighting products, industrial equipments/已涵盖家用电器、交通工具、照明产品、工业设备等四大类高效节能产品**

Energy Efficiency Policies in China

Policy Effect (taking air conditioner as example)

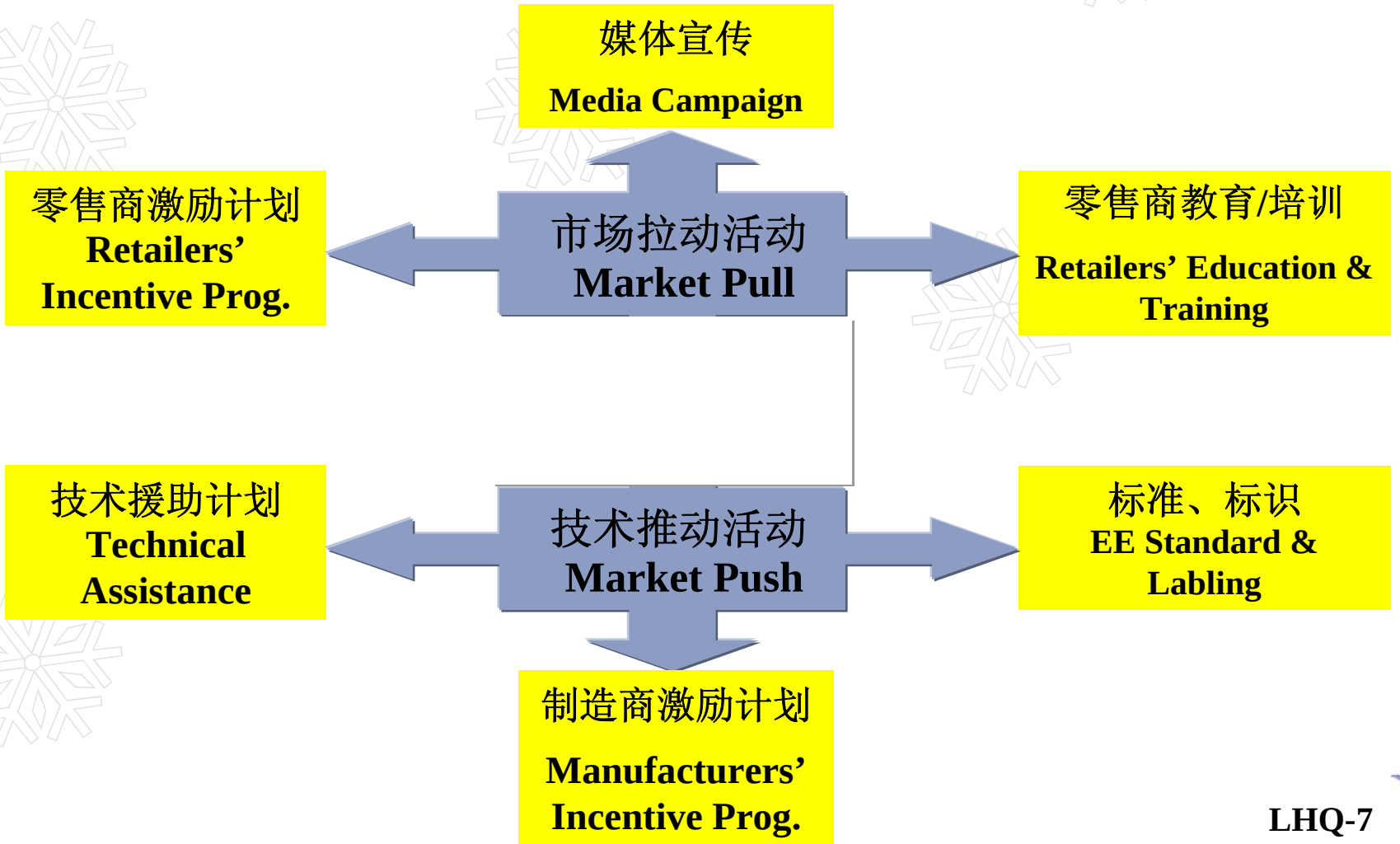
1. During the period of "11th FIVE YEAR", 11.54 billion subsidies for more than 34 million energy efficient air conditioners,
2. Energy savings of 10 billion kWh per year， 80-100 billion kWh in their life,
3. More market consumption of 70 billion RMB,
4. Market share of energy efficient products rises from 5% to 70%, the overall energy efficiency is increased by 24%,
5. The scale effect and the subsidy greatly reduce the average market price of high efficiency products, from 3000-4000 RMB to around 2000 RMB
6. Promoting the update of EE standard for air conditioners

Energy Efficiency Policies in China

PEERAC
Promoting Energy Efficient Room Air Conditioners
节能房间空调器推进项目

International Project

Promoting Energy Efficient Room Air Conditioner Project financially supported by GEF (Global Environment Facility)



Energy Efficiency Policies in China

- 16 air conditioner manufacturers and 10 air-conditioning compressor manufacturers
- Target:
  - ✓ Average Energy efficiency increases by 25%
  - ✓ CO2 emission reduction: 35,400,000Tonnes
  - ✓ Energy saving: 939,500,000 Tons (coal equivalent)

海尔空调 海尔空调 HITACHI Inspire the Next 日立 美的 Midea Hisense 海信科龙 三菱电机(广州)压缩机有限公司 MITSUBISHI ELECTRIC(GUANGZHOU)COMPRESSOR CO.,LTD. LAMDA GREE 格力 庆安制冷 QINGAN REFRIGERATION TCL The Creative Life Chunlan 精心动动力 HIGHLY 海立 三菱电机 MITSUBISHI ELECTRIC DAIKIN AUX 健康空调奥克斯 Galanz 格兰仕 长虹空调 空气品质专家 GMCC 美芝 YAIR 扬子空调 CRSS 沈阳华润三洋压缩机有限公司 China Resources(Shenyang)Sanyo Compressor Co.,Ltd. YUETU 月兔空调 CHIGO 志高空调

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Energy Efficiency STANDARDs in China

1. EE standards

- **By the end of 2011, China has issued 46 EE standards**

① **Household electric appliances**

Refrigerator, air conditioner, variable speed air conditioner, TV, fan, ……

② **Lighting appliances**

③ **Office equipments**

Computer monitor, coping machine, printer, ……

④ **Commercial equipments**

Unitary air conditioning unit, water chiller, cooled display cabinet,……

⑤ **Means of communications**

⑥ **Industrial equipments**

Motor, ventilation machine, water pump, air compressor, industrial boiler, ……

Energy Efficiency STANDARDs in China

2. EE standards for refrigeration & air conditioning products

① GB12021.2-2003/2008 家用电冰箱耗电量限定值及能源效率等级/ The maximum allowable values of the energy consumption and Energy efficiency grade for household refrigerators

② GB12021.3-2004 /2010房间空气调节器能效限定值及能源效率等级/ The minimum allowable values of the energy efficiency and Energy efficiency grades for room air conditioners

③ GB19576-2004 单元式空气调节机能效限定值及能源效率等级/The minimum allowable values of the energy efficiency and Energy efficiency grades for unitary air conditioners

④ GB19577-2004 冷水机组能效限定值及能源效率等级/The minimum allowable values of the energy efficiency and Energy efficiency grades for water chillers

⑤ GB21454-2008 多联式空调（热泵）机组能效限定值及能源效率等级/The minimum allowable values of the IPLV and Energy efficiency grades for multi-connected air-condition (heat pump) unit

⑥ GB21455-2008 /2013转速可控型房间空气调节器能效限定值及能源效率等级/The minimum allowable values of the energy efficiency and Energy efficiency grades for variable speed room air conditioners

⑦ GBXXXX-2013热泵热水器/机能效限定值及能源效率等级 / The minimum allowable values of the energy efficiency and Energy efficiency grades for heat pump water heaters

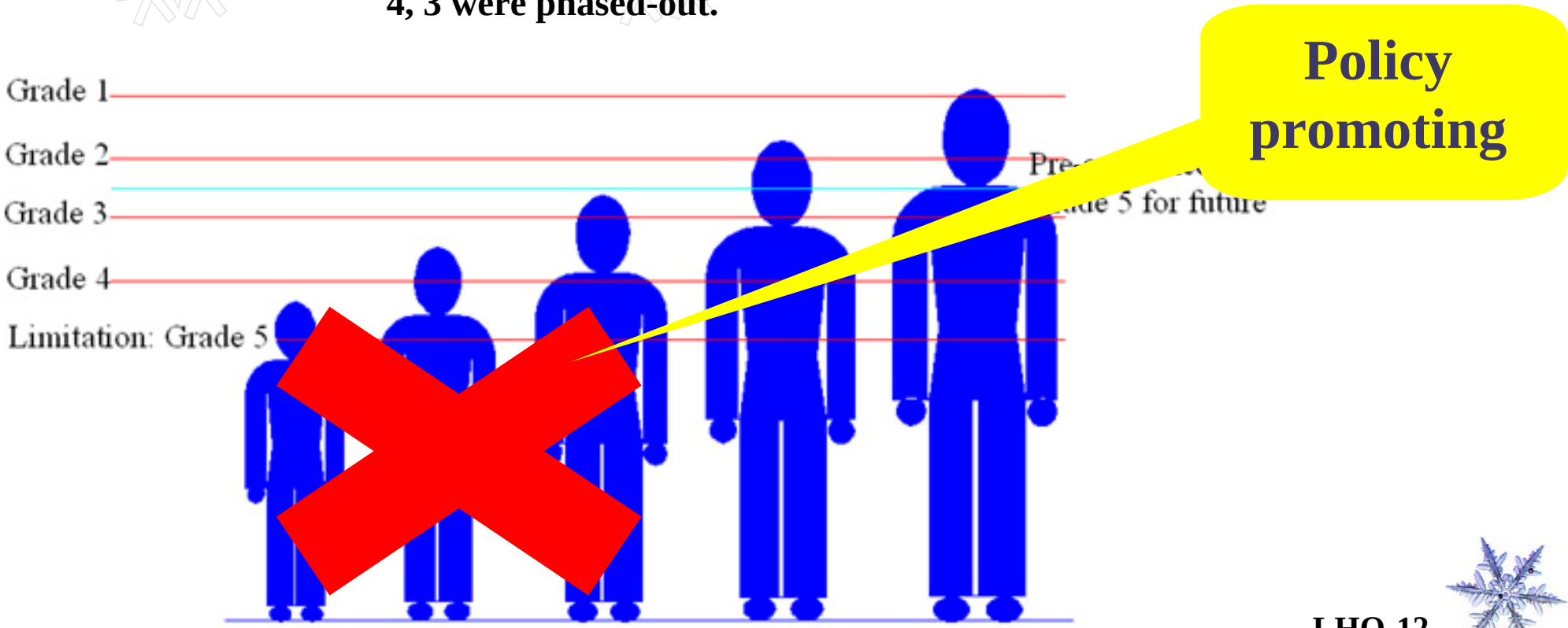
Energy Efficiency STANDARDs in China

3. Progress of EE standards

① **GB12021.3-2004 /2010 The minimum allowable values of the energy efficiency and Energy efficiency grades for room air conditioners**

I. **The minimum allowable values of the energy efficiency was greatly heightened, EER_{min}=3.2**

II. **From 2.6 in 2004 to 3.2 in 2010, three low energy efficiency grades, 5, 4, 3 were phased-out.**



Energy Efficiency STANDARDs in China

3. Progress of EE standards (Examples)

② **GB21455-2008 /2013 The minimum allowable values of the energy efficiency and Energy efficiency grades for variable speed room air conditioners**

I. **APF in 2013, instead of SEER in 2008, will be used to evaluated the energy efficiency of the product.**

II. **The energy efficiency calculation method was improved based on great deal of technical researches.**

III. **Heating operation efficiency is appraised.**

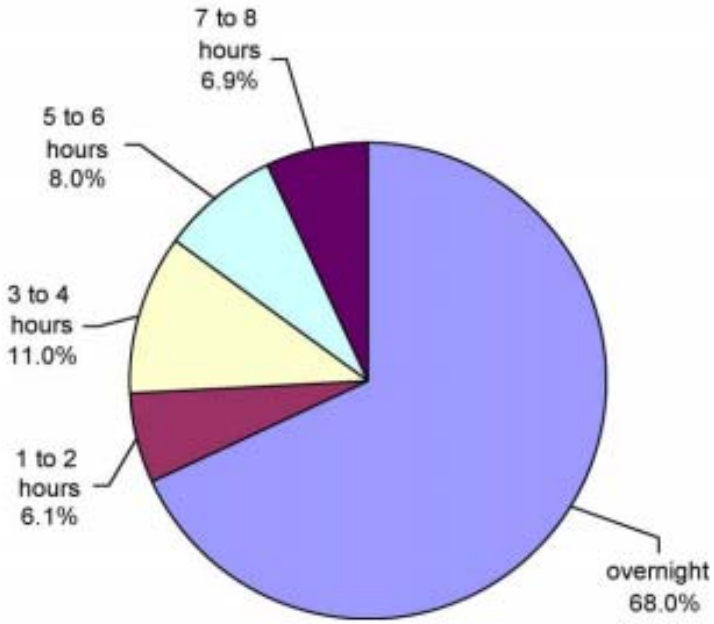
③ **Firstly issued: GBXXXX-2013The minimum allowable values of the energy efficiency and Energy efficiency grades for heat pump water heaters**

Energy Efficiency STANDARDs in China

4. Technical researches for EE standards (Examples)

APF research for variable speed room air conditioners supported by IEEJ

- RRT for constant and variable speed air conditioners
- Operation habit research of China air conditioner users



Energy Efficiency STANDARDs in China

5. Other EE standards—Operation, Management, Evaluation/Test, Design, Method. Covering products, systems, enterprises

① GB/T 15912 .1-2010制冷机组及供制冷系统节能测试 第1部分：冷库/Monitoring and Test Method for Energy Conservation of Refrigerating Systems-Part 1 Cold Storage Systems

② GB/T 26759-2011 中央空调水系统节能控制装置技术规范/The technical specification for energy-saving control device for water system of central air-conditioning

③ GB/T 17981-2007空气调节系统经济运行/Economic Operation of Air Conditioning Systems

④ GB 50189-2005 公共建筑节能设计标准/ Design Standard for Energy Efficiency of Public Buildings

⑤ GB/T 23331-2009 能源管理体系要求/Management system for energy--Requirements

⑥ GB/T 14909-2005能量系统（火用）分析技术导则/Technical guides for exergy analysis in energy system

⑦ GB/T 2587-2009 用能设备能量平衡通则/General principles for energy balance of equipment using energy

⑧ GB/T 2589-2008 综合能耗计算通则/General principles for calculation of the comprehensive energy consumption

⑨ 产品电耗定额制定和管理导则/Guide for the electricity consumption quota determination and regulation of product

⑩ GB/T 8222-2008 用电设备电能平衡通则/The principles for electricity balance of equipment

Energy Efficiency STANDARDs in China

5. Other EE standards

① GB/T 16615-1996 企业能量平衡表编制方法/Methods of drawing up energy balance table in enterprises

② GB/T 16616-1996 企业能源网络图绘制方法/Methods of drawing energy network diagram in enterprises

③ GB/T 13234-2009 企业节能量计算方法/Calculating methods of energy saved for enterprise

④ GB/T 15320-2001 节能产品评价导则/Evaluation guides of the energy conservation products

⑤ GB/T 22336-2008 企业节能标准体系编制通则/General principles of stipulation of energy conservation standard system for enterprise

⑥ GB/T 25329-2010 企业节能规划编制通则/General principles for stipulation of enterprise energy conservation plan

⑦ GB/T 6422-2009 用能设备能量测试导则/Testing guide for energy consumption of equipment

⑧ GB/T 23688-2009用能产品环境意识设计导则/Guide of eco-design for energy-using products

⑨ GB/T 24489-2009用能产品能效指标编制通则/General principles of stipulation for energy efficiency requirements of energy consuming products

⑩ GB/T 3484 -2013企业能量平衡通则/The general principles for energy balance of Industrial enterprise

Energy Efficiency STANDARDs in China

6. Energy saving of EE standards

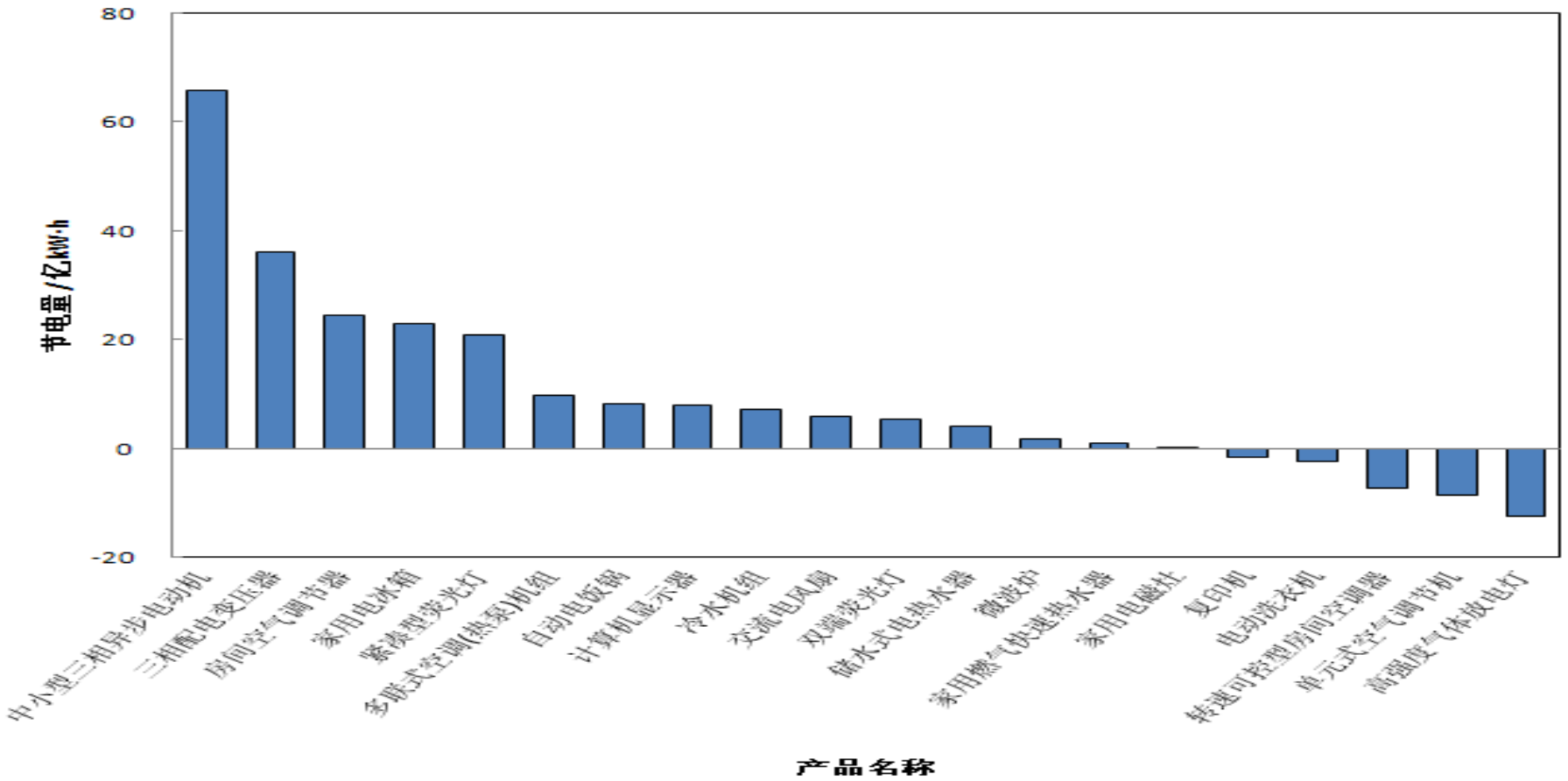
Energy consumption of typical products in 2011

Product		Total energy consumption	Total energy saving
		Billion kW·h	Billion kW·h
Household electric appliance	Household refrigerator	78.13	2.29
	Room air conditioner	249.12	2.46
	Variable speed room air conditioner	37.99	-0.73
Commercial equipment	Unitary air conditioner	353.86	-0.84
	Water chiller	67.86	0.72
	Multi-connected air-condition (heat pump) unit	38.73	0.97
Industrial equipment	Middle and small size asynchronous motor	1695.49	6.57
	3-phase distribution transformer	119.57	3.62

Energy Efficiency STANDARDs in China

6. Energy saving of EE standards

Energy savings of typical products in 2011



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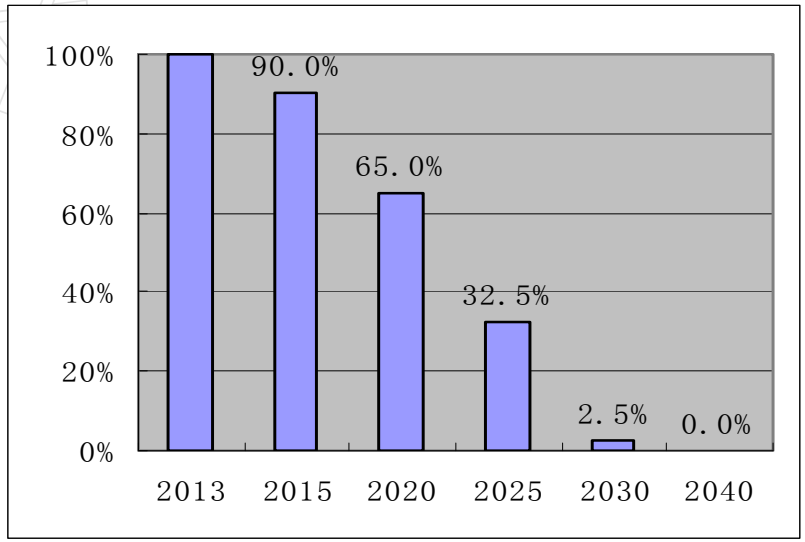
Challenges

1. HCFCs phasing-out



- **Montreal Protocol**
- **3 HPMP**
  - ① **Room air conditioner**
  - ② **Commercial refrigeration**
  - ③ **Refrigeration servicing**
- **New refrigerant choice:**
  - ① **Room air conditioner：R290、R410A**
  - ② **Commercial refrigeration：R32、CO2、NH3、R410A、R134a**
- **Implementation (Challenges)**
  - ✓ **Huge amount of production**
  - ✓ **Huge amount of investments**
  - ✓ **Flammable substitute refrigerants and safety standards**
  - ✓ **High energy efficiency**

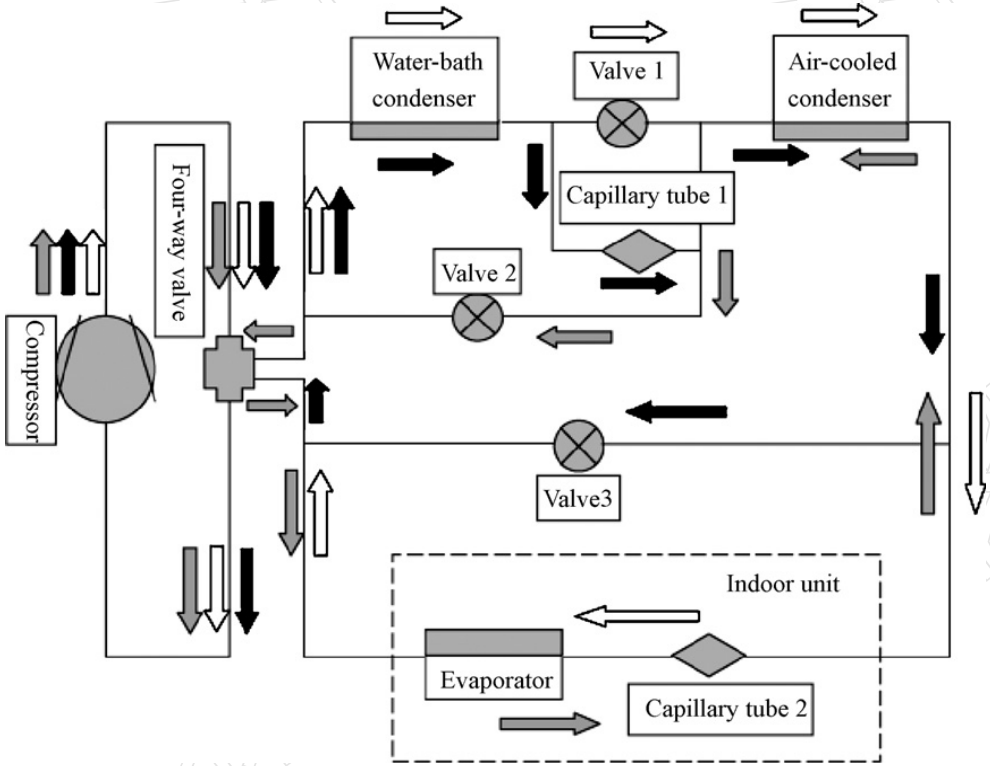
Challenges

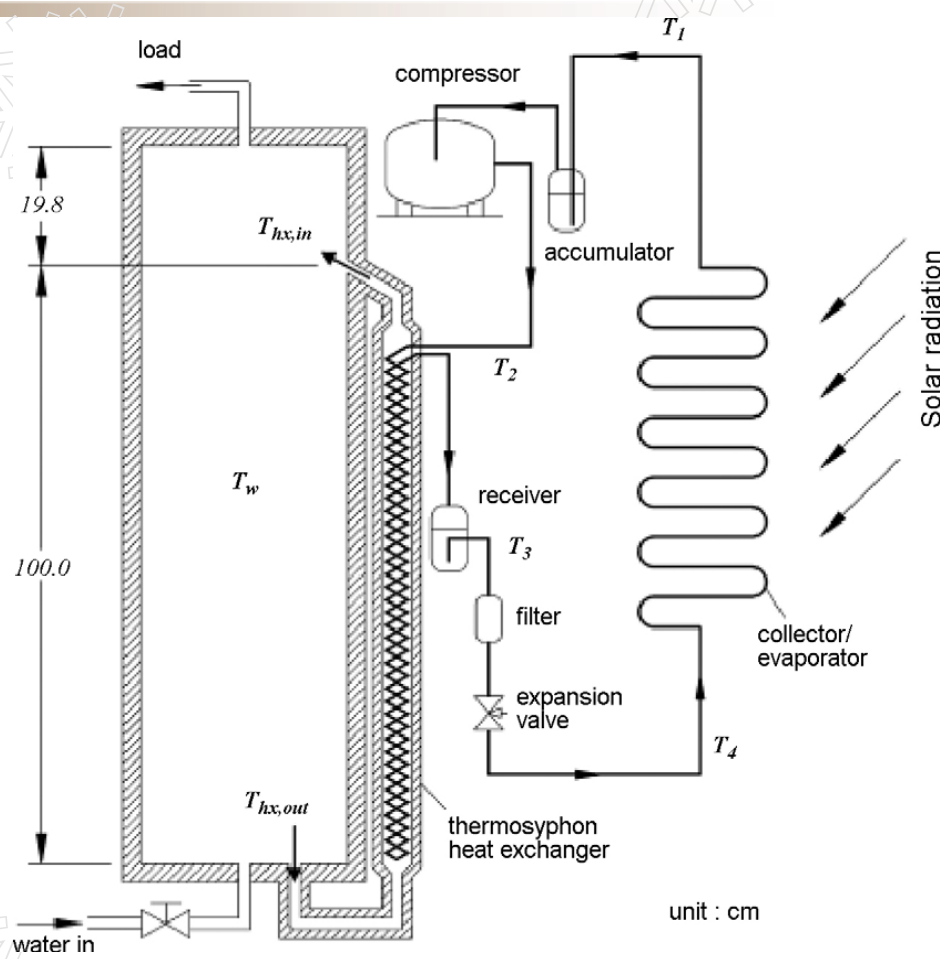
2. Change of product

① Multi-function

② Multi-energy source

③ Multi-heat source





Solar-air source heat pump

Air conditioner + Heat pump water heater

Challenges

2. Improvement of energy efficiency evaluation method

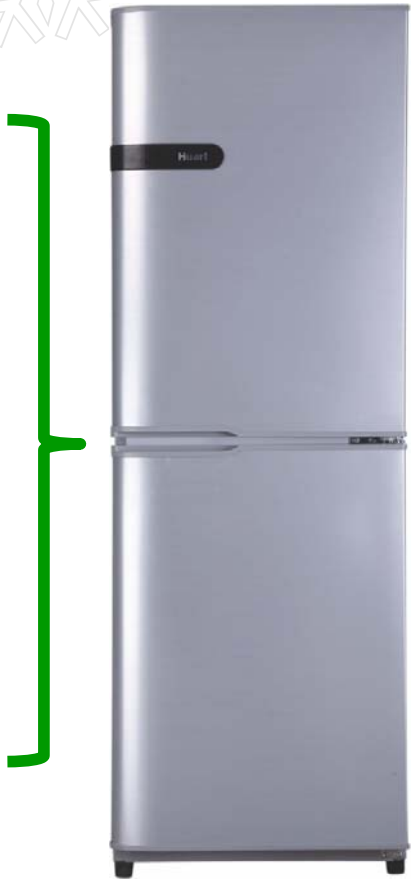
USE **TEST**

Variable Temp. ⇔ Constant Temp.

Difference between use and test

Open door ⇔ Close door

High efficient in test but may not in use
Incorrect direction to product design



Challenges

3. Endless energy saving requirement and technical limitation to the energy efficiency improvement

Example: EE standard for Room Air Conditioners

- **EERmin=3.2**
- **Difference in EE evaluation from variable speed Room Air Conditioners**
- **Difficulties in technologies and economics**

4. Market

- **Market overdrawing caused by some energy saving policies.**
- **Market sluggishness caused by global economic decline.**

5. Energy efficiencies in operation of energy-use products and systems--methodology

① **Impossible to test in lab/stable operating conditions**
② **Evaluation—too many influence factors**
③ **Weak in technical researches**

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未来

1. **EE standards for more products**

   Current working:

   ① **Air conditioning compressors**

   ② **The maximum allowable values of the energy consumption and Energy efficiency grade for water dispensers**

   ③ **商用冷柜、陈列柜/The maximum allowable values of energy performance and energy efficiency grades of commercial refrigerated cabinets**

   ④ **吸收式制冷机/absorption refrigeration machines**

   ⑤ **GB12021.2-XXXX household refrigerator**

   ⑥ **……**

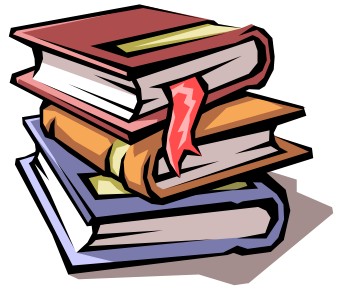
2. **Following the developing of product developments**

3. **Energy saving based on the principle of energy system, considering not only product itself not also the system that it is in**

4. **Improving the energy efficiency evaluation methods of products and energy-use systems**

谢谢、敬请赐教

Thank You!



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