U.S. Energy Efficiency Standards for Appliances, Lighting Products, and Electric Motors
美国电器、 照明产品和电动机的能效标准

China – U.S. Standards Workshop
中美标准研讨会

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Governing U.S. Legislation
相关的美国立法

- National Appliance Energy Conservation Act (**NAECA**) – 1987
  - set initial Federal Standards for Consumer Products (Household Appliances & Lighting Products)
- Energy Policy Act (**EPACT**) - 1992
  - set standards for Commercial Products (HVAC & motors)
- Authority granted to Department of Energy (**DOE**) to periodically review and revise standards, if "technically feasible & economically justified"
- Federal Trade Commission (**FTC**) responsible for related Product Labels (i.e, EnergyGuide labels)

- 《国家器具能源节约法》（NAECA）– 1987年
  - 确定消费品的初始联邦标准（家用电器和照明产品）
- 《能源政策法》（EPACT）- 1992年
  - 确定商品的标准（暖通空调系统和电动机）
- 授权能源部（DOE）在"技术上可行且经济条件允许"的情况下，定期审查并修订各种标准
- 联邦贸易委员会（FTC），负责有关的产品标签（如能源指南标签）

NAECA Covered Products
国家器具能源节约法》所涉产品

- Refrigerators & Freezers
- Water Heaters
- Space Heating Appliances
- Space Cooling Appliances
- Dishwashers
- Laundry Appliances
- Cooking Appliances
- Lamps & Ballasts
- Other Consumer Products

- 电冰箱和制冷器
- 热水器
- 室内采暖设备
- 室内制冷设备
- 洗碗机
- 洗衣设备
- 烹调器具
- 灯具和压舱物
- 其他消费品

EPACT Covered Products
《能源政策法》所涉产品

- Commercial Space Heating & Cooling Products
- Commercial Water Heating Products
- Motors ≥ 1 horsepower up to 200 hp

- 商用室内采暖制冷设备
- 商用水暖产品
- 电动机，1 马力至200马力

Covered Products
有关产品

- Several product categories are broken down into classes, allowing for different standards, depending on function/features
  - e.g., 18 Refrigerator Freezer classes (top freezer, bottom freezer, side-by-side, auto defrost, compacts, etc.)
- National standards preempt state/regional standards & provide uniform requirements to avoid patchwork of standards

- 根据职能/特性不同，一些产品类别又被分成了不同的种类，这为制定不同的标准做了一定的准备
  - 如： 电冰箱制冷器共分18种（上制冷式、下制冷式、对开门、自动解冻、压缩机等）
- 国家标准优于州/区域标准，它也提供了统一要求，避免了各种标准的修补工作

Elements of U.S. Program
美国方案的要素

- Uniform Test Procedures
- Minimum Efficiency Performance Standards (MEPS) or Prescriptive Requirements
- EnergyGuide Labels or Fact Sheets
- Federal Preemption
- Compliance & Enforcement
- Voluntary Programs

- 统一测试流程
- 最低能源效率标准（MEPS）或说明性要求
- 能源指南标签或数据概览
- 联邦优占
- 合规与执行情况
- 自发方案

Test Procedures
测试流程

- Developed by DOE in conjunction with the National Institute of Standards and Technology (NIST)
- Rely heavily on industry test methods (e.g. AHAM, NEMA, ARI)
- U.S. test procedures have been adopted by Canada and Mexico

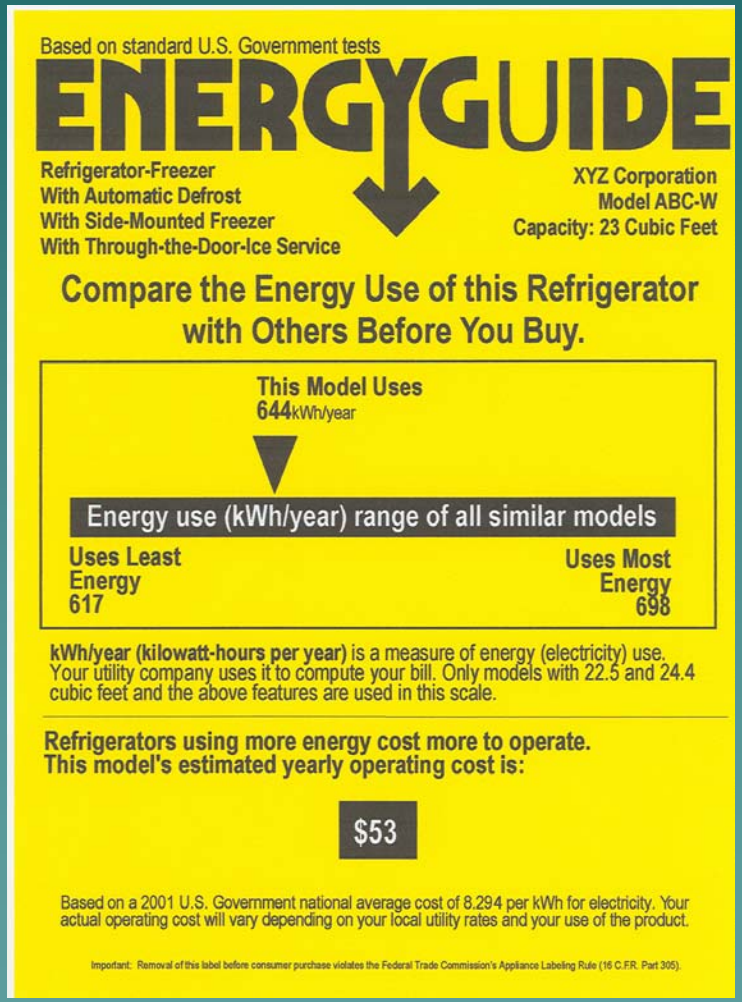
- 由能源部与国家标准与技术研究所联合制定
- 主要依赖行业测试办法（如美国家电协会、电器制造商协会、空调与制冷学会）
- 加拿大和墨西哥均已采纳美国的测试流程

Labels各种标签

- **FTC EnergyGuide** – mandatory for certain products
  - shows energy performance and/or annual operating cost per DOE procedure, and Ranges of Comparability
  - required to be on product at point of sale
- **Energy Star** – voluntary program indicating efficiency much better than MEPS
  - joint program with DOE and Environmental Protection Agency (EPA)
  - market transformation to higher efficiency products

- 联邦贸易委员会颁发的能源指南标签 – 对某些产品具有强制性
  - 显示能源部的每个程序的能源效率和/或运营成本，以及可比性范围
  - 要求标示于销售点的产品上
- 能源之星 – 自发方案，与最低能源效率标准相比，可以更好地反映效率问题
  - 与能源部和环境保护局的联合方案
  - 进行市场转型，以制造更高效的产品

EnergyGuide Label
能源指南标签



Based on standard U.S. Government tests

ENERGYGUIDE

Refrigerator-Freezer
With Automatic Defrost
With Side-Mounted Freezer
With Through-the-Door-Ice Service

XYZ Corporation
Model ABC-W
Capacity: 23 Cubic Feet

Compare the Energy Use of this Refrigerator with Others Before You Buy.

This Model Uses
644 kWh/year

Energy use (kWh/year) range of all similar models

Uses Least Energy
617

Uses Most Energy
698

kWh/year (kilowatt-hours per year) is a measure of energy (electricity) use. Your utility company uses it to compute your bill. Only models with 22.5 and 24.4 cubic feet and the above features are used in this scale.

Refrigerators using more energy cost more to operate. This model's estimated yearly operating cost is:

$53

Based on a 2001 U.S. Government national average cost of 8.294 per kWh for electricity. Your actual operating cost will vary depending on your local utility rates and your use of the product.

Important: Removal of this label before consumer purchase violates the Federal Trade Commission's Appliance Labeling Rule (16 C.F.R. Part 305).

Energy Star Label
能源之星标章

Compliance & Enforcement
合规与执行情况

- Manufacturers self-certify ratings & notify DOE
- DOE can investigate & test if ratings are suspect
- DOE can levy fines if non-compliance determined
- Industry Certification Programs & manufacturers' comparative testing make Federal enforcement rare

- 制造商可以自行验证各种等级，并通知能源部
- 如果等级有可疑，能源部可以进行调查和检测
- 如果确定存在不合规现象，能源部可以处以罚款
- 由于存在行业认证方案，而且制造商会进行比较测试，因此很少在联邦一级开展执行工作

Interested Parties
有关各方

- Manufacturers – individual companies and trade associations
- Utility Companies – protect against gas/electric fuel switching
- Consumer Groups
- Energy Efficiency Groups
- Government Agencies – DOE, FTC, EPA

- 制造商 - 单个公司与专业协会
- 公用事业公司 - 防备煤气/电能转换
- 消费群体
- 能效问题小组
- 政府机构 - 能源部、联邦贸易委员会、环境保护局

U.S. Rulemaking Process
美国的规则制定过程

- Process improvement rule of 1996 intended to make analyses more transparent and robust
- Several analyses performed:
  - Screening, Engineering, Life Cycle Cost, National Energy Savings, Manufacturers Impact, Consumer Impact, Utility Impact
- Or a "Negotiated Rulemaking" involving interested parties

- 1996年的过程改进规则旨在使所做分析更透明、更有力
- 开展的分析工作包括:
  - 筛选、工程、生命周期成本、 国家能源节约、制造商影响、消费者影响、公用事业影响
- 或是涉及有关各方的"通过协商制定规则"

U.S. Rulemaking Process (cont.)
美国的规则制定过程（续）

- Advanced Notice of Proposed Rule (ANOPR)
  - Trial standards, initial analyses
  - Public comments & Workshop
- Notice of Proposed Rule (NOPR)
  - Proposed new standard
  - Public comments & Workshop
- Final Rule – effective no sooner than 3 years after publication
  - manufacturers need lead time

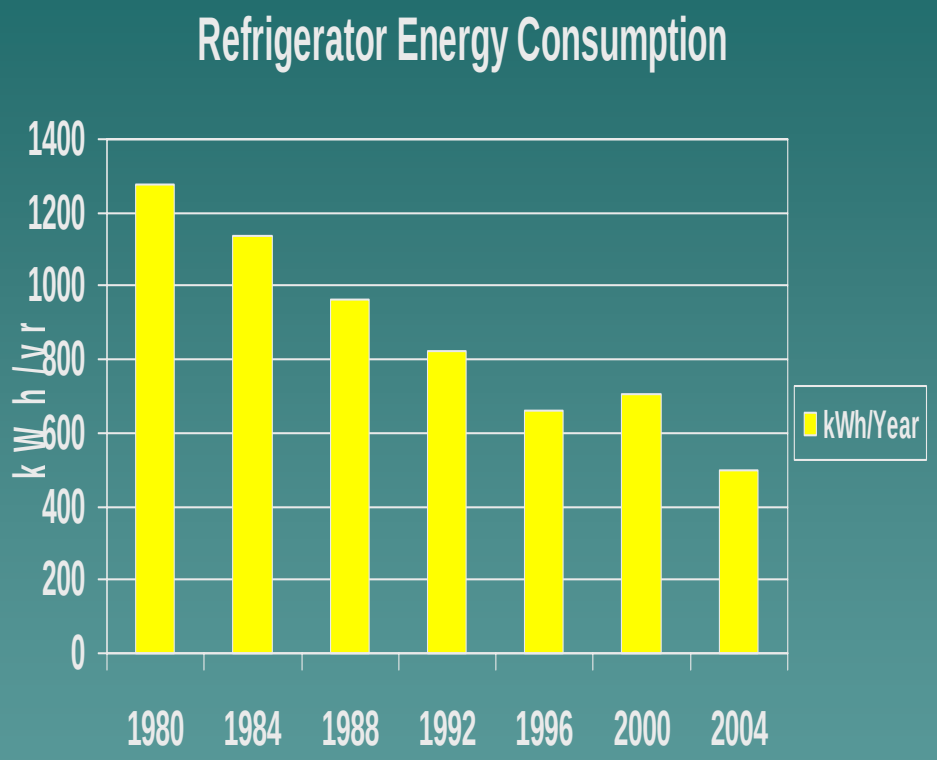
- 拟议规则提前通知（ANOPR）
  - 试行标准，初步分析
  - 公开评论与研讨会
- 拟议规则通知（NOPR）
  - 拟议的新标准
  - 公开评论与研讨会
- 最终规则——公布之日起三年后生效
  - 制造商需要前置时间

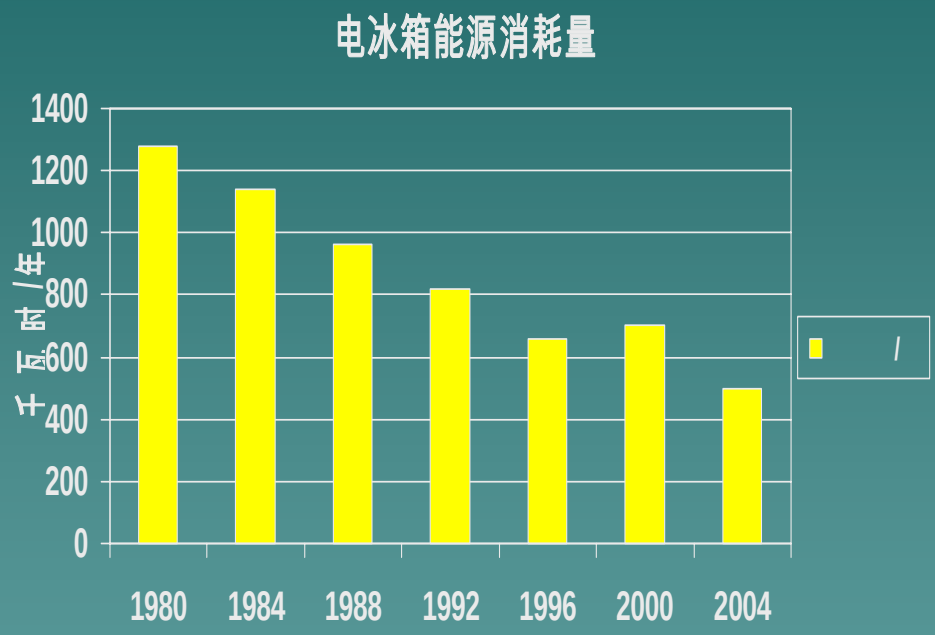
Resources Needed
所需资源

- Uniform test procedures – framework for development, revisions, or adoption
- Testing capabilities – government labs, independent labs, manufacturer labs
- Regulatory infrastructure – to develop and enforce regulations and inform interested parties
- Analytical resources – to determine costs, benefits of mandatory verses voluntary programs

- 统一测试流程——用于制定、修订或采纳的框架
- 测试能力——政府实验室、独立实验室、制造商实验室
- 规章基础——制定和执行各种法规，并通知有关各方
- 分析资源——确定强制性方案与自发方案的成本和惠益

Trends趋势





* Energy Consumption/Unit能源消耗量/单位

Shipment weighted average for all full size units

所有满负荷单位的运输加权平均值

New MEPS in 1990, 1993, & 2001 1990年、1993年和2001年的新最低能源效率标准

AHAM Data美国家电协会数据

Trends (cont.)趋势（续）

- "Low hanging fruit" (changes that are easiest to make) has been picked in U.S.
- There are practical limits (Refrigerators now use less energy than a 75 watt bulb)
- Future gains more difficult & not as cost effective (e.g. Standby Power)
- Incentives for higher efficiency products
  - tax credits, rebates, Energy Star, accelerated replacement

- 在美国，"挂在低处的果实"（最易进行的变动）已经摘完
- 存在一定的实际限制（现在的电冰箱所消耗的能源低于一只75 瓦灯泡）
- 今后获得收益更难，而且成本效率也会不如现在（如备用电源）
- 对高效产品的各种奖励
  - 税款抵减、退税、能源之星、加速置换

Conclusions/Recommendations Regarding Energy Efficiency Standards 关于能效标准的结论 / 建议

- Standards can save significant amounts of energy and be cost effective if implemented properly
- Requires significant resources
- Important to get all interested stakeholders involved in the process
- Incentives & voluntary programs can help manufacturers justify costs to produce higher efficiency products
- China should consider adopting North American Test Procedures
- Beware of cumulative burden on manufacturers who make more than one product

- 各种标准如实施得当，既可节约大量能源，又能产生成本效益
- 需要大量的资源
- 重要的是让所有利益有关者参与到进程中来
- 奖励措施和自发方案可以帮助制造商调整成本，生产更高效的产品
- 中国应当考虑采纳北美的测试流程
- 应考虑到生产不止一个产品的制造商的累积负担

Relevant Web Sites
相关网站

- FTC: http://www.ftc.gov/bcp/conline/edcams/eande/appliances/index.htm
  美国联邦贸易委员会

- DOE: http://www.eere.energy.gov/buildings/appliance_standards/
  美国能源部

- Energy Star: http://www.energystar.gov/
  能源之星