

Energy efficiency in Denmark  
- lessons learnt  
丹麦的能效教训

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# Denmark 丹麦

- Population: 5.4 million  
人口：540万
- Member of the European Union  
欧盟成员国
- Ambitious energy policy since 1972  
从1972年起开始执行强势的能源政策
- Little energy intensive industry  
少有能源密集型产业

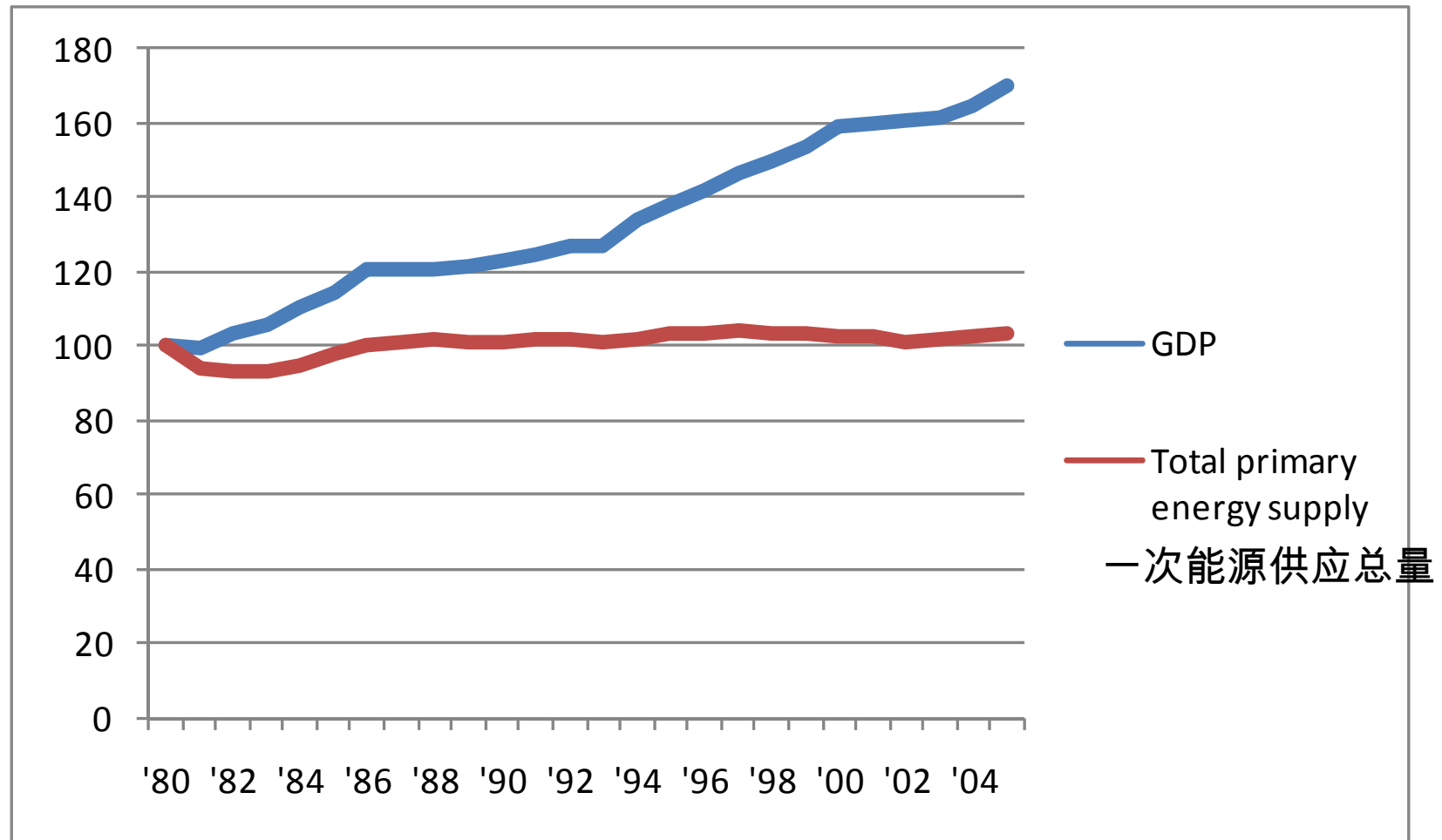


# ENERGY STATISTICS

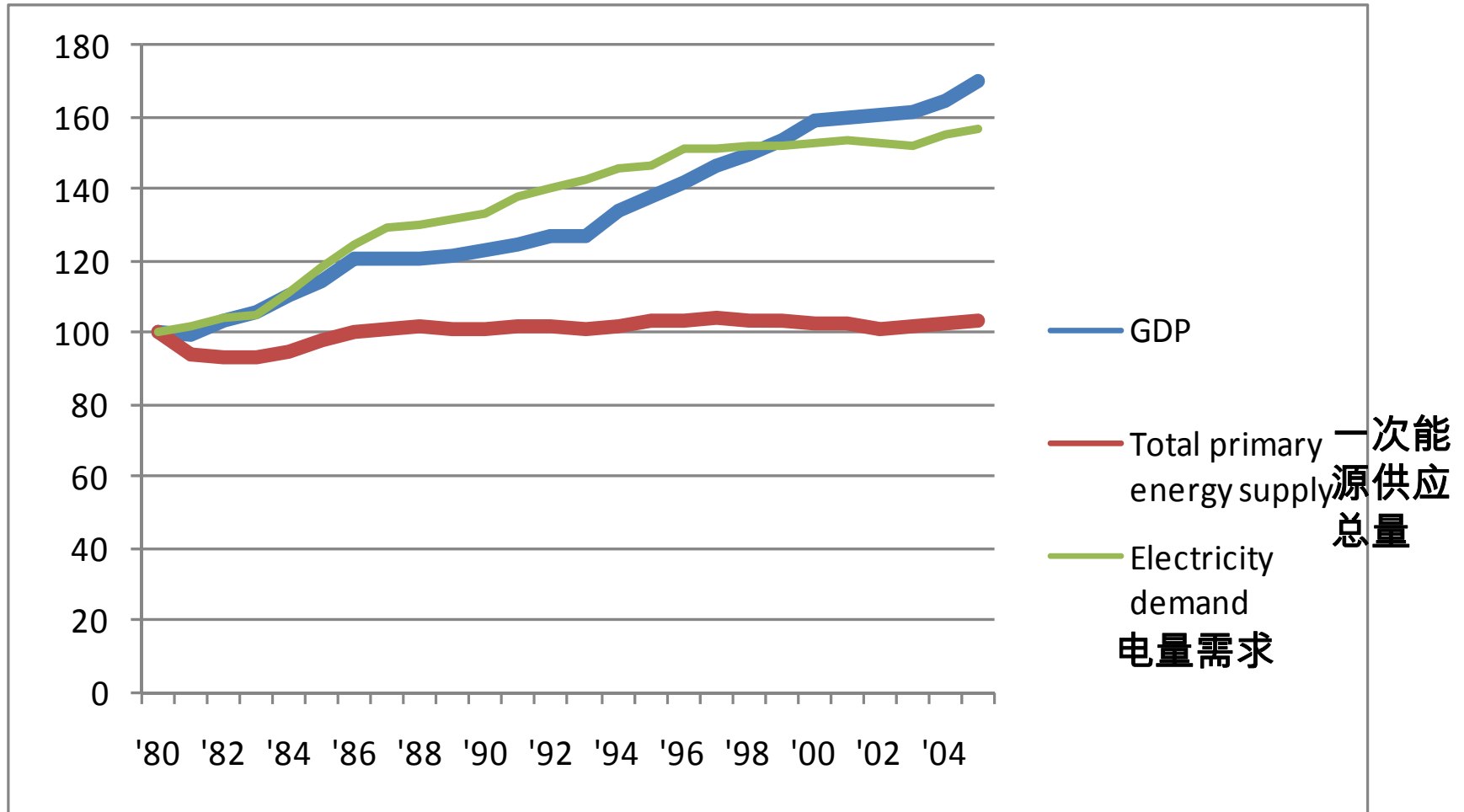
## 能源统计



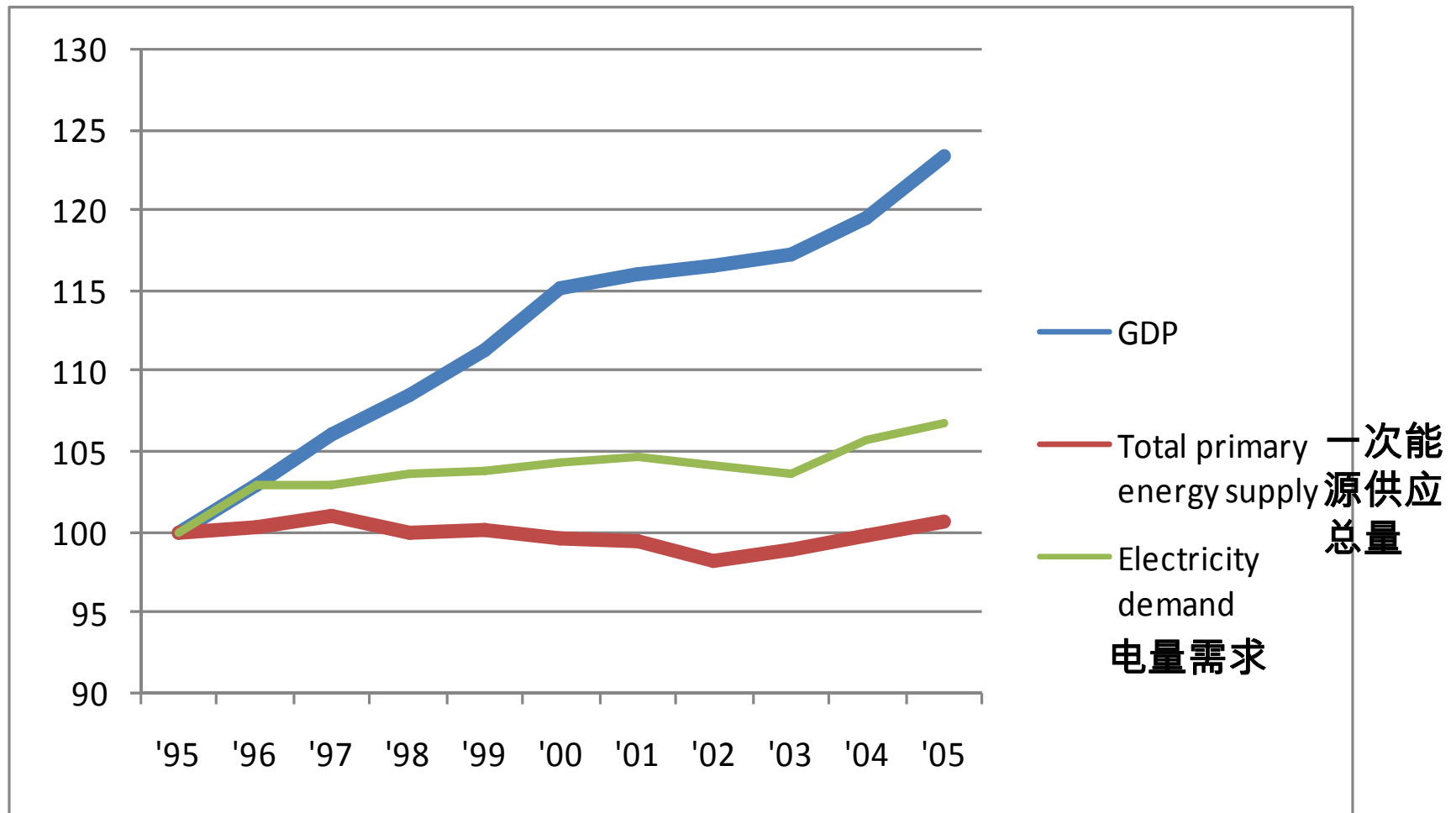
# 1980 - 2005



# 1980 - 2005



# 1995 - 2005



# Decoupling is possible!

脱钩完全有可能！

	1980- 2005	1995- 2005
Increase in economy 经济增长	+70%	+23%
Increase in primary energy consumption 一次能源消耗增长	+4%	+1%
Increase in electricity consumption 电耗增长	+57%	+7%

# Ambitious energy policy 强势的能源政策

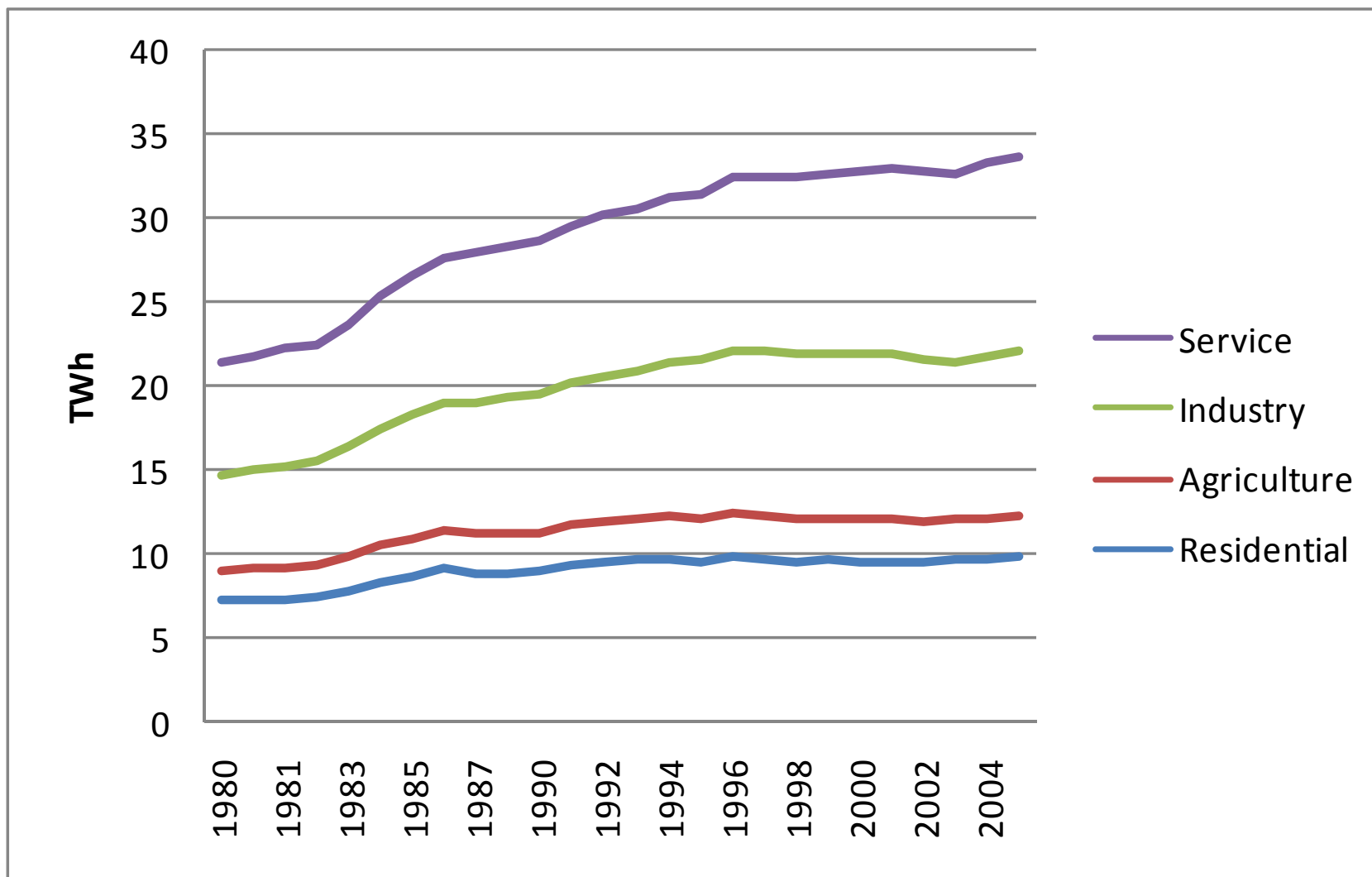
- Combined heat and power 热电联产
  - 50% of electricity 50%的电能
  - 50% of heat demand 50%的热能需求
- Wind power 风能
  - 20% electricity from wind power  
20%的电能来自风电
- Energy efficiency 能源效率



# ENERGY EFFICIENCY 能源效率



# Electricity consumption 用电量



# Energy efficiency in all sectors

## 各行业内的能源效率

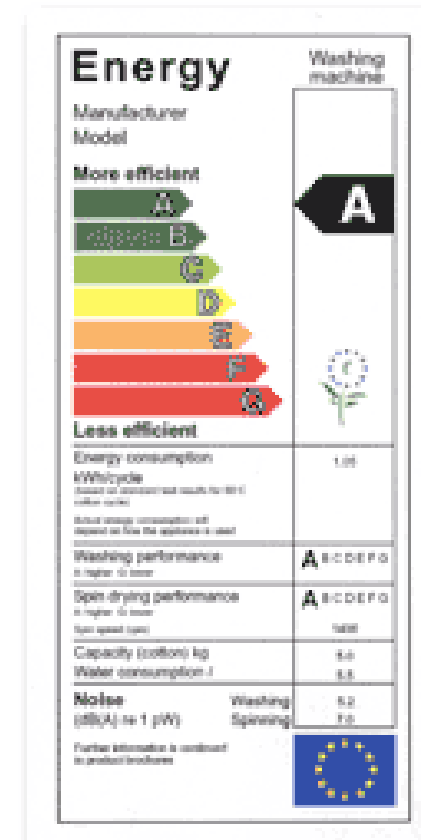
- Electricity efficiency investments are profitable  
能效投资有利可图
  - But end users pay only little attention to this 但极少吸引引起终端用户的注意
  - A regulatory push is needed 需要加强监管力度
  - Also in trade and industry  
在贸易与工业领域情况也类似
- Electricity consumption in 2005 2005年的用电量
  - Residential: 1/3 of total 民用：总量的1/3
  - Industry, service and agriculture: 2/3 of total  
工业、服务业与农业：总量的2/3

# Taxes 税收

- CO<sub>2</sub> quotas CO<sub>2</sub>配额
  - EU Emission Trading System, phase II from 2008  
欧盟排放贸易体系，从2008年起进入第二阶段
  - Affecting dispatch of power plants 影响电厂的调度
  - Increasing electricity prices 提高电价
- Market-based prices plus taxes 市场电价加上税收
  - Taxes are combined from energy, CO<sub>2</sub> and sulphur  
对能源、CO<sub>2</sub>和硫排放进行综合征税
- Dependent on sector and use 取决于部门和用户类别
  - High taxes on households 对家庭实行高税收
    - ~100% on electricity 税率~100%
  - Moderate taxes on trade and industry 对商业和工业实行温和税收
    - ~10-20% on electricity 税率~10-20%

# Minimum efficiency standards 最低能效标准

- Strict building regulation  
严格的建筑能效标准
  - Frequently updated 经常更新
  - Restriction on the use of direct electric heating 禁止电热采暖
- EU labels and minimum efficiency standards for appliances, e.g. refrigerators and freezers  
对于电器，例如电冰箱和冷冻机，实行欧盟能效标识和最低能效标准。



# Dynamic labelling: cold appliances

## 动态标识：制冷设备

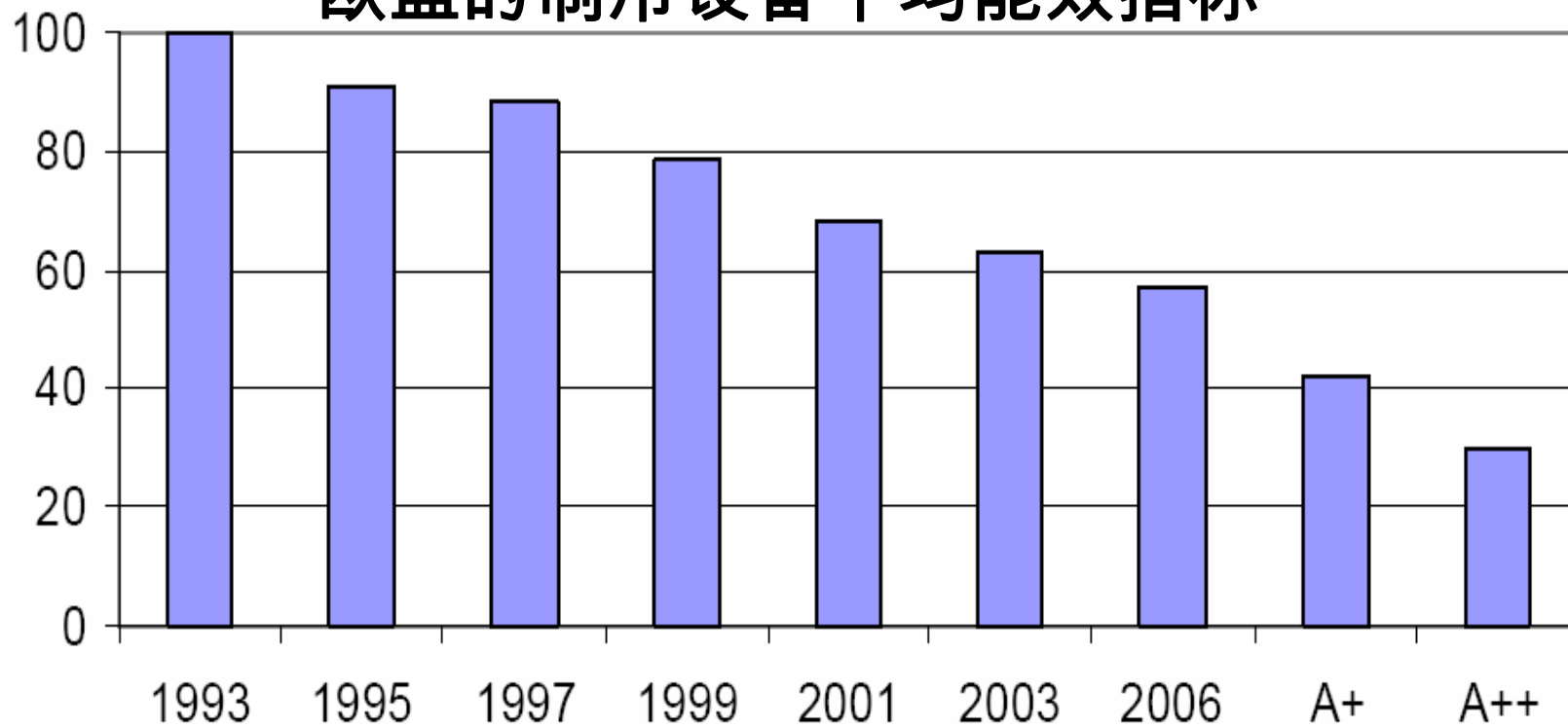
Index 指标	A++	A+	A	B	C	D	E	F	G
1994	-	-	<55	<75	<90	<100	<110	<125	>125
1997	-	-	<55	<75	<90				
2004	<30	<42	<55	<75	<90				
20xx									
20xx									

- Until now: Three steps 直到目前：三个步骤
  - Introduction of labelling A-G A-G标识的引进
  - Minimum efficiency standard: D-G not allowed for cold appliances  
最低能效标准：制冷设备不得处于D-G 范围内
  - Adding A+ and A++ 增加A+ 与A++能效等级
- 90% of sale in Denmark is Label A or better!  
在丹麦销售的90%电器达到A级或更高能效等级！

Index dependent on type and size, e.g. fridge-freezer 185/90 litres: A++ < 200 kWh/year  
指标取决于类型和规格，例如185/90 立升的冷冻冰箱：A++ < 200 kWh/年

## Average Energy Efficiency Index of cooling appliances in EU

### 欧盟的制冷设备平均能效指标



# Financing DSM activities

## 需求侧管理活动融资

- Three DSM elements added to the tariff 电价里的三个DSM因素
  - Grid companies' DSM: 0.7 €/MWh 电网公司的DSM : 0.7 €/MWh
    - All end users所有终端用户
    - Focus on trade and industry 主要针对商业和工业
  - Electricity Saving Trust: 0.8€/MWh 节能投资公司 : 0.8€/MWh
    - Only paid by households and public service 只由家庭和公共服务部门支付
    - Campaigns 系列活动
    - Online information about best buy appliances 在线查询最节能的电器信息
    - Temporary subsidies, e.g. for label A equipment 指定时间内的补贴 , 例如标识A类设备
  - Public service obligation 公共服务责任
    - Research and demonstration of energy efficiency 0.15€/MWh 能效研究和示范 : 0.15€/MWh



# Main players 主要机构

- Danish Energy Agency 丹麦能源署
  - Energy policy 能源政策
- Transmission System Operator 输电系统运营商
  - Demand response 需求响应
- Distribution System Operators 配电系统运营商
  - DSM: Energy audits in trade and industry  
DSM : 商业和工业能源审计
- Energy Savings Trust 丹麦节能投资公司
  - Campaigns, improving the market for energy efficiency  
改善能效市场的系列活动
- Shops and producers 商店与制造商
  - Selling energy efficient equipment and appliances  
销售节能设备和电器
  - Labels 标识
- End users 终端用户
  - Reacting to prices 价格反应

# CONCLUSIONS 结论



# Decoupling 脱钩

- It has been demonstrated that decoupling of economic growth and energy growth is possible

经济增长和能源增长之间实现脱钩是证明可行的

- 70% growth in economy 经济增长70%
  - 4% growth in final energy consumption 终端用能增长4%
  - 57% growth in electricity consumption 用电增长57%
- Combining a free market with ambitious energy policy framework  
将自由市场与强势的能源政策框架进行整合

# The long haul 长远战略

- A broad and steady DSM activity  
一项广泛且持续的DSM活动
  - Grid companies 电网公司
  - Electricity Saving Trust 节能投资公司
- Supported by 拥有来自以下的支持
  - Taxes, also on trade and industry  
税收，包括商业和工业的税收
  - Minimum efficiency standards 最低能效标准
  - Research and demonstration projects 研究和示范项目

# Future of Danish DSM

## 丹麦DSM的未来

- DSM activities will be evaluated in 2008  
2008年将对DSM活动进行评加
  - Earlier evaluations have indicated mixed results  
此前的评价结果已经显示出综合节能效果
- Development of DSM activities into White Certificates is considered 已考虑将DSM活动纳入白色证书
  - All actors can make savings 所有行业均可实现节能
  - Are White Certificates an efficient policy instrument for trade and industry?  
白色证书对于商业和工业是一项有效的政策工具吗？
- Increased goals for achieved energy savings  
在已取得的节能成果基础上，提出更高的节能目标

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**THANK YOU FOR YOUR  
ATTENTION! 谢谢!**