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Resources efficiency overview
资源效率概况

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Context

1. The financial and economic crises has a particularly significant impact on Small and Medium Enterprises
   金融危机对于中小企业产生特别严重的影响

2. Due to inefficient management and technologies many industries still use far more resources (energy, raw material, labor) than their production process requires
   /许多行业由于低下的管理效率和技术仍然使用比生产过程需求多得多的资源(能源,原材料,劳动力)

3. Competition leades to efficiecy improvement
   竞争能使效率提高

4. Governments support is needed to strengthen companies‘ capacity to compete
   加强企业的竞争能力,政府的支持是必要的

Definition of Resource Efficiency 资源效率定义

Cleaner Production/清洁生产

Application of a

preventive and integrated production strategy

to increase efficiency and reduce environmental risks

使用预防性和综合生产过程战略来提高效率,减少环境风险

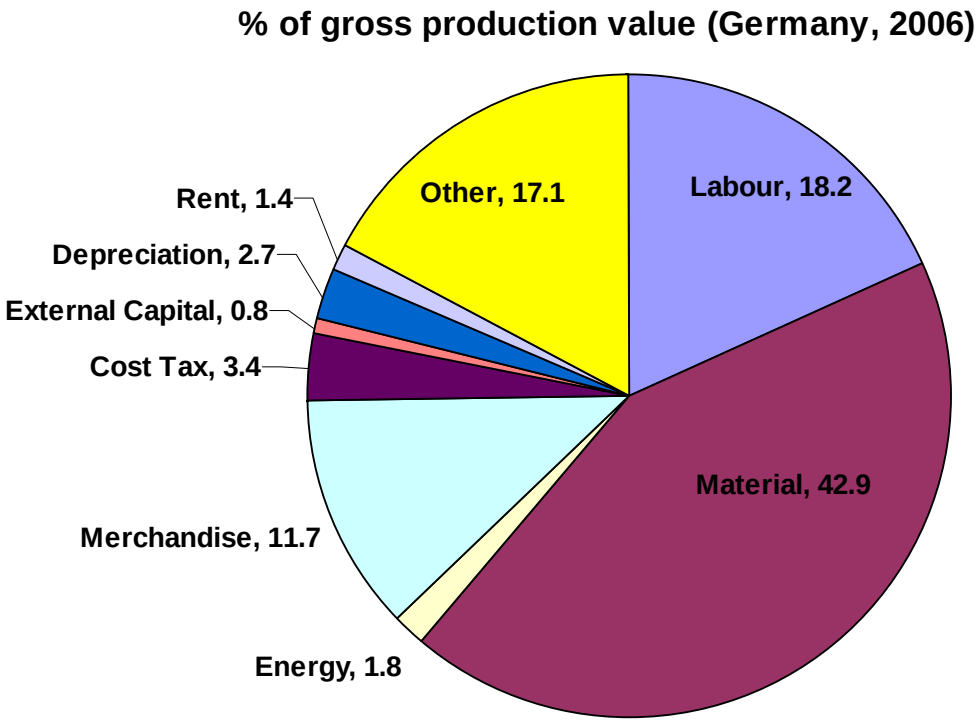
It specifically aims at/具体目标是:

1. **Production efficiency** through improved use of resources
   通过使用自然资源提高生产效率
2. **Environmental conservation** through minimization of the impact
   通过减少影响保护环境
3. **Environmental health** through reduction of risks to people
   通过减少对人们的风险确保环境健康

Resource Efficiency Keywords/资源利用效率关键

1. Reducing resources requirements (row material, energy) / 减少对资源的需求
2. Reducing pollutants emission / 减少污染物排放
3. Enhancing material recyclability / 加强回收
4. Maximizing the use of renewable resources / 最大限度使用可再生资源
5. Extending product durability / 延长产品的使用寿命

Production Cost Germany 2006 / 德国生产成本

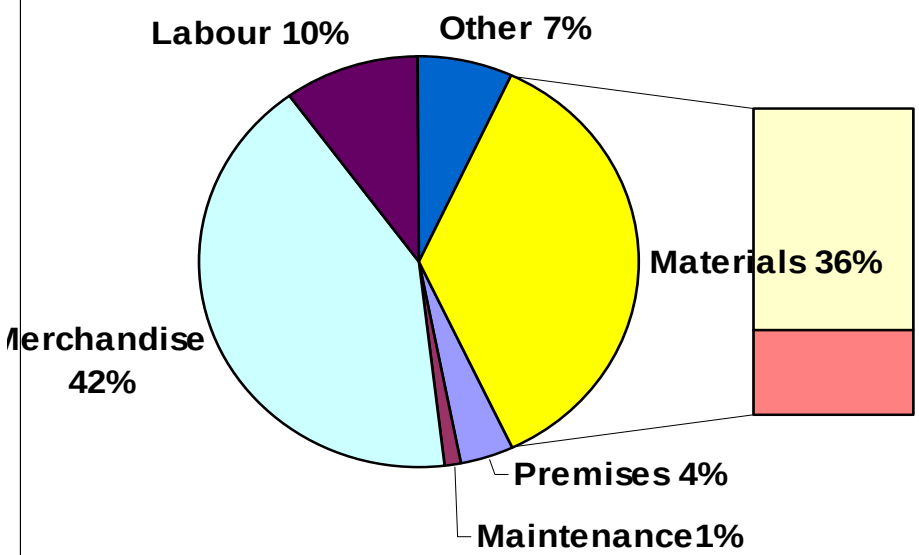


Source: Schmidt (2008): Efficiency Awareness- Prerequisite for Resource Management in Companies

Production costs for SMEs in developing countries

发展中国家中小企业生产成本

Source: Herrndorf (2006): Greening SMEs in Developing Countries



Average and Best Practice energy consumption values for Cements Plants
某水泥企业平均能源消耗值和最佳值

Source: Cement manufacturer's Association, 2003: Worrell, 2004

Process	Unit	Average	World best practice
Raw materials preparation			
Coal mill	kWh/t clinker	8	2.4
Crushing	kWh/t clinker	2	1
Raw mill	kWh/t clinker	28	27
Clinker Production			
Kiln & Cooler	kWh/t clinker	28	22
Finish Grinding			
Cement mill	kWh/t cement	30	25
Miscellaneous			
Utilities: mining & transportation	kWh/t clinker	1.6	1.5
Utilities: packing house	kWh/t cement	1.9	1.5
Utilities: misc.	kWh/t cement	2	1.5
Total Electric	kWh/t cement	95	77

Unit consumption of water (2001) Pulp and paper Industry/
造纸行业单位用水量

Unit: m^3- water/ton-pulp or paper

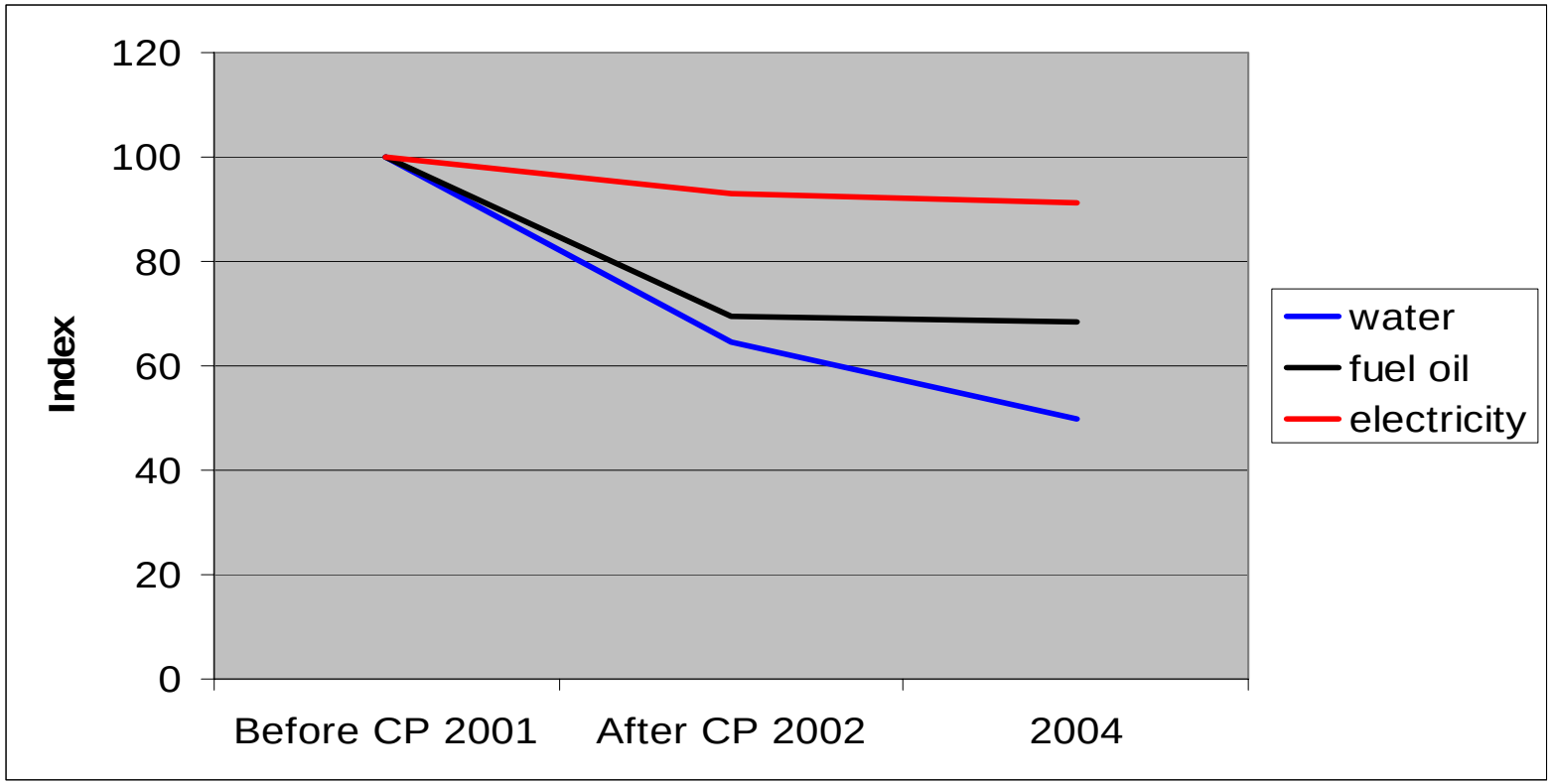
Item	Paper	Low	High	Average
Pulp	(1.6)	48.1	75.8	65.9
Packaging paper	Liner board (3)	6.9	21	10.9
	Fluting paper (7)	6.8	49.6	9.9
	Coated white board (4)	13.3	51.5	27.8
	Chip board (5)	9.6	51.5	34.1
	Kraft paper (3)	27.5	90	59.9
	Art Paper (5)	3	15.7	12.1
	Printed writing paper (6)	15.7	98.2	30.9
Household paper	(5)	16	83	32.5

Source: C.Y. Peng, 2006: Water Consumption, Quality Demanded, and Re-use of the Treated Wastewater for Paper Industry

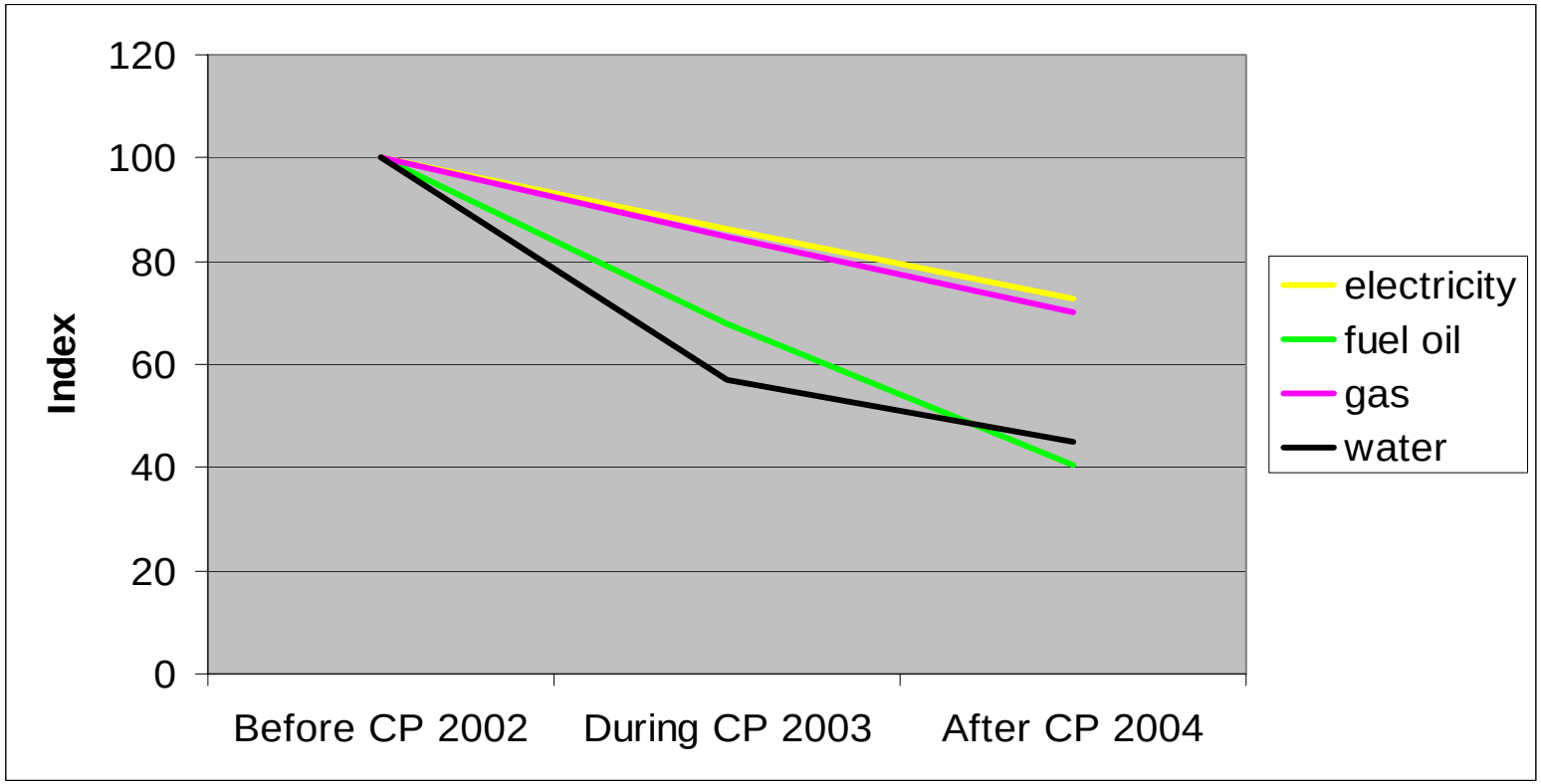
Water Consumption Industry/耗水行业

Sector	Average	Globally best
Thermal power plant (8)	80 m^3/mwh	10 m^3/mwh
Textiles (2)	200-250 m^3/tonne cotton cloth	100 m^3/tonne cotton cloth
Pulp & Paper (3-7)	• Wood based mills: 150-200 m^3/tonne • Waste paper based mills: 75-100 m^3/tonne	• Wood based mills: 50-75 m^3/tonne • Waste paper based mills: 10-25 m^3/tonne
Integrated Iron & steel (8)	80 m^3 per tonne of finished product	10m^3/tonne of finished product
Fertiliser industry	• Nitrogenous 5.0-20.0 m^3/tonne • Phosphate 1.4-2.0m^3/tonne • Complex 0.2-5.4m^3/tonne	1.5m^3/tonne

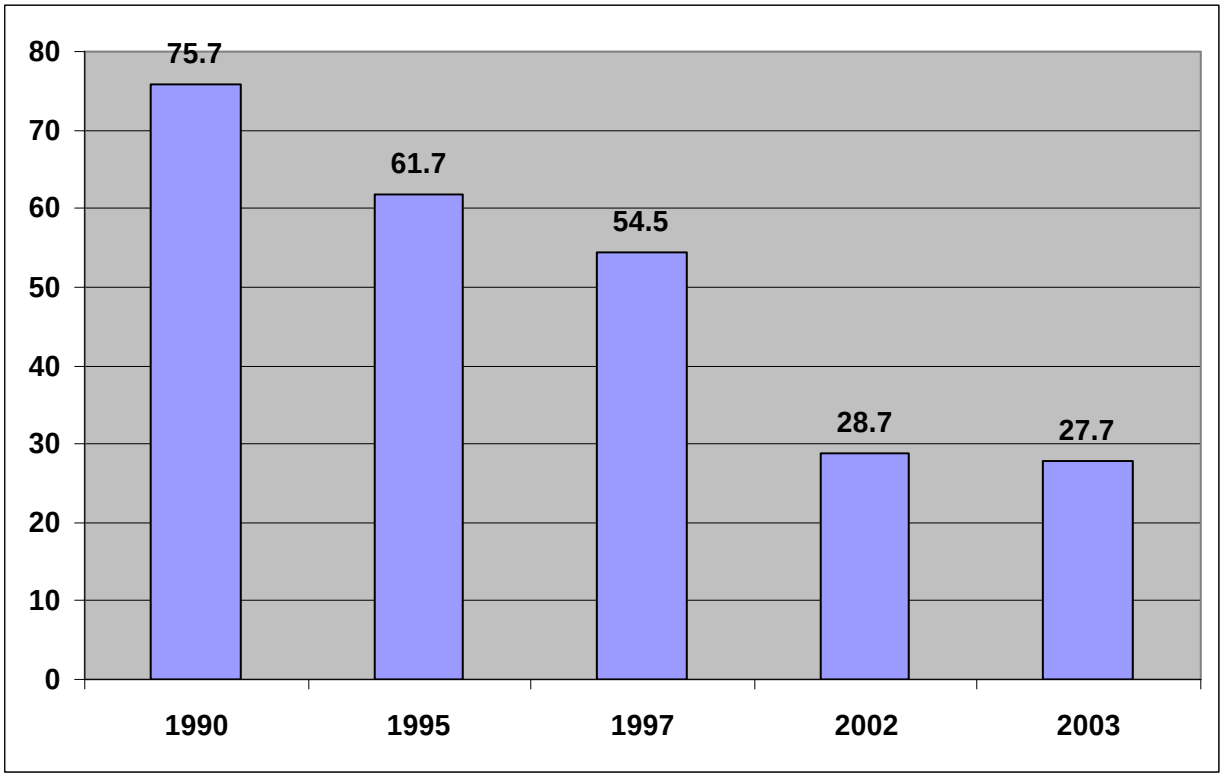
Textile Company / 纺织公司:
Resource Consumption per Output Unit / 每产出单位的能源消耗
(2001 = 100)



Metalworking company / 金属加工公司
Resource Consumption per Output Unit / 每单位产出的能源消耗
(2002 = 100)



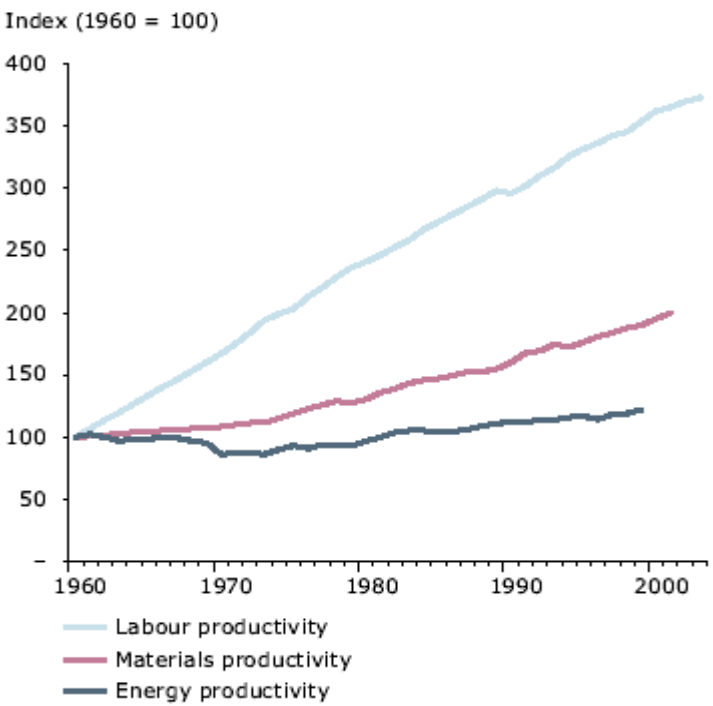
Water Consumed by Australian Paper Manufacturers
澳大利亚造纸厂的用水量
(kl per tonne of production)



Source: Australian Paper manufacturing

Something to think about....

Figure 4.2 Labour productivity, material productivity, and energy productivity, EU-15, 1960–2002



Note: Labour productivity: GDP per annual working hours (1999 USD (converted at EKS PPPs) per hour); material productivity: GDP per domestic material consumption (DMC) (EUR per kg); energy productivity: GDP per total primary energy supply (TPES) (thousand 1995 USD per toe).

Productivity increased 劳动生产率提高

1960-2000

- Labour more than 劳动力超过 270 %
- Raw materials 原材料 100 %
- Energy 能源 20 %

UNIDO

We offer our assistance in meeting the Challenge.

面对挑战, 我们愿提供援助!

Thank you!

谢谢!