



Green Industry

The background of the slide is a composite image. On the left, there is a blue-tinted globe with white grid lines. On the right, there is a photograph of an industrial plant at night, illuminated by warm orange and yellow lights. The text is overlaid on this background.

Technology- Transfer for Sustainable Industrial Development

Dr. Heinz Leuenberger
25 September 2009, Geneva, Switzerland



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Context

- **Many industries use more materials and energy than their production processes require, due to continued use of obsolete and inefficient technologies and methodologies.**
- **In general, producers and consumers have adopted patterns of production and consumption that do not take into consideration the limits of the planet's available resources and its assimilative capacity for emissions, a situation further complicated by continued population growth.**
- **Current production systems are therefore unsustainable: they do not allow today's needs to be met without jeopardizing the ability of future generations to meet theirs.**

Source: State of the world, 2008

Innovation for a Sustainable Economy, Worldwatch Institute



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Context

- **At the enterprise level, global competition and best practices are leading enterprises to establish good industrial relations, improve working conditions and develop their human resources.**
- **Pressure is also coming from major lending institutions as well as investors, which are adopting performance standards on environmental and social issues.**
- **Government procurement is another source of pressure, by increasingly requiring enterprises to meet environmental and occupational health and safety standards**

Source: State of the world, 2008
Innovation for a Sustainable Economy, Worldwatch Institute

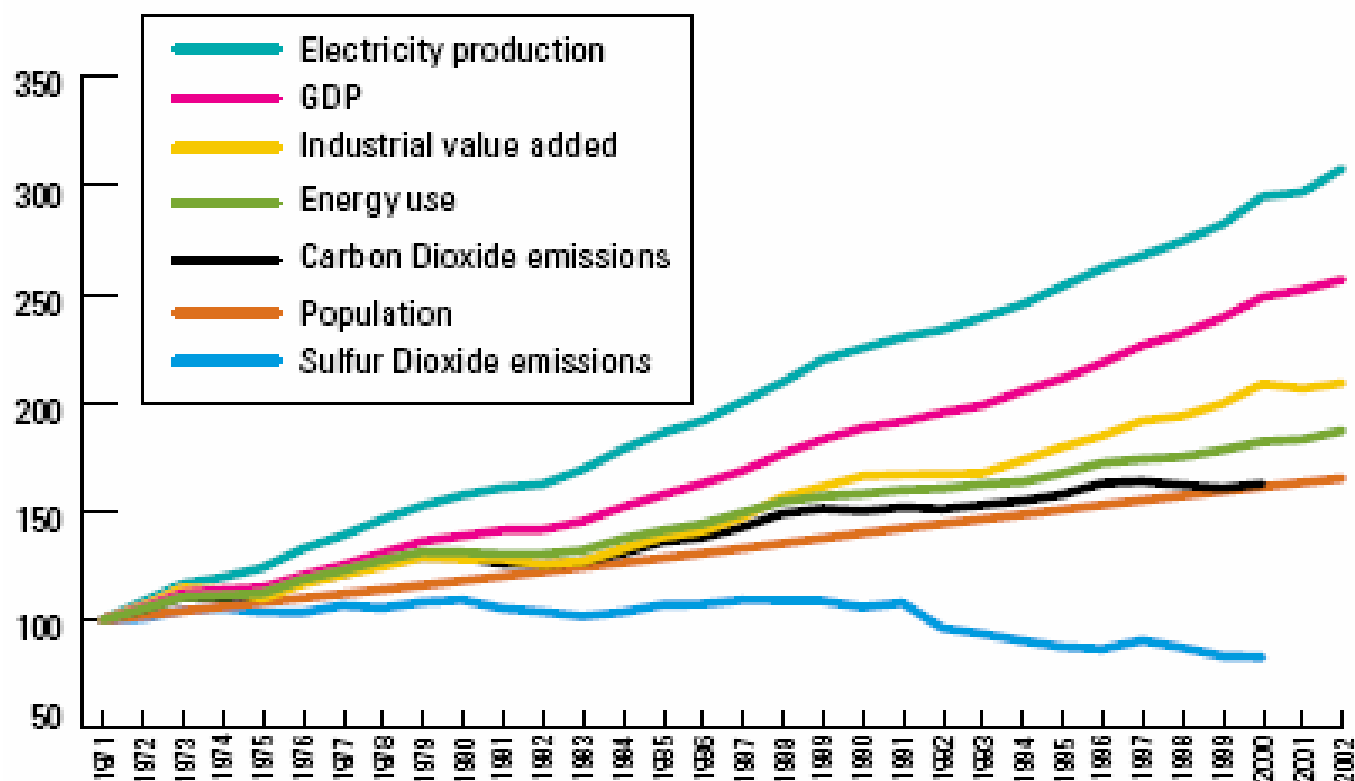


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Global Trends: Growth in economy, energy and emissions



Note: Index: 1971=100

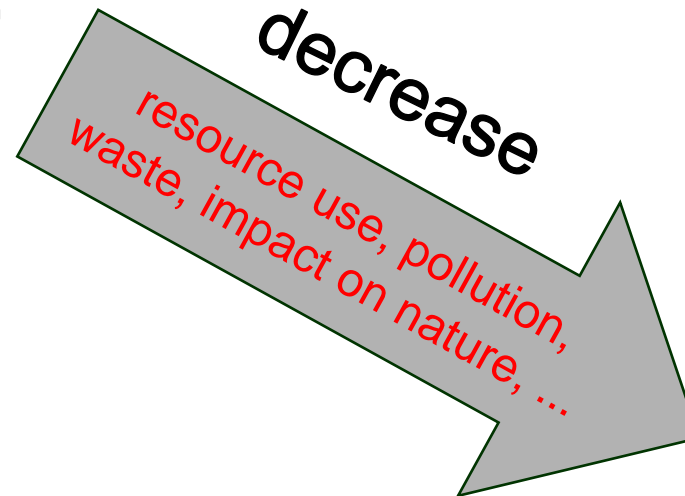
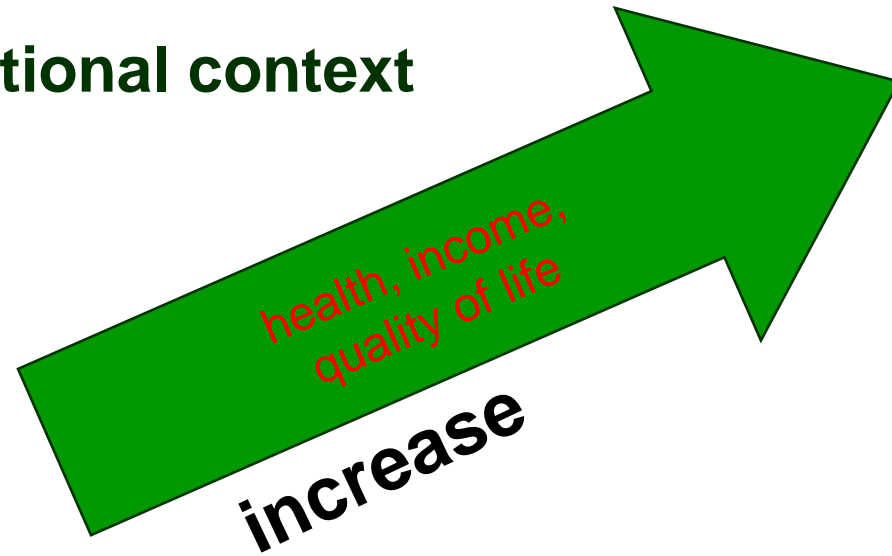
Source: UNDESA-DSD, based on data from World Bank, World Development Indicators 2005, and Stern, D., 2005.



Challenge of the international context

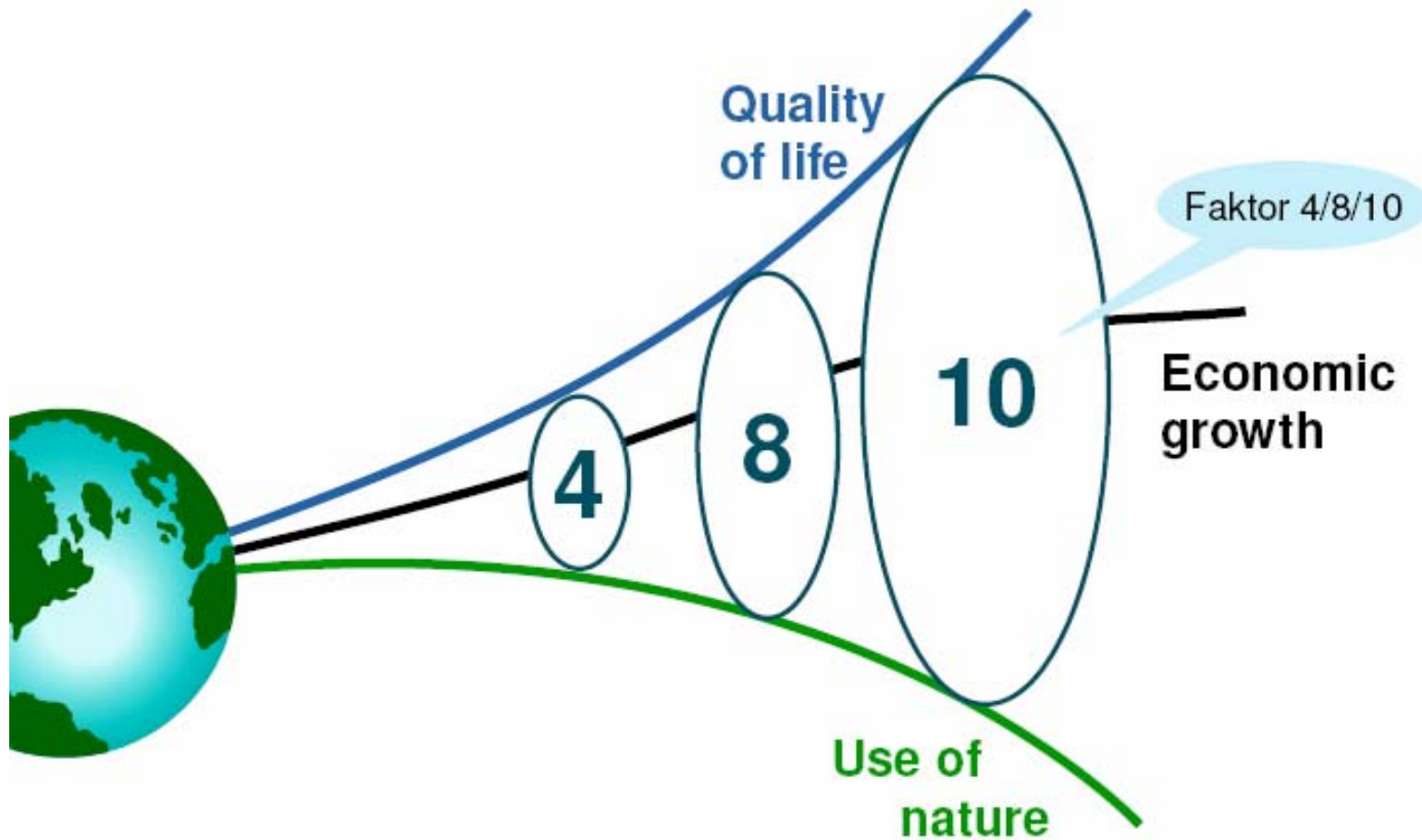
**Sustainable
Industrial
Development**

should:





Decoupling economic growth from natural resource use



Source: Wuppertal Institute Collaboration Centre on SCP, 2006



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The global challenge

- To provide more **value** with less environmental **impact**
- To **de-link** advances in welfare from the natural resource use
- To improve both **economic** and **ecological efficiency**

= **ECO-EFFICIENCY**

(Dematerialization of our society)



Unit consumption of water (2001)

Pulp and paper Industry

Unit: m³- water/ton-pulp or paper

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

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

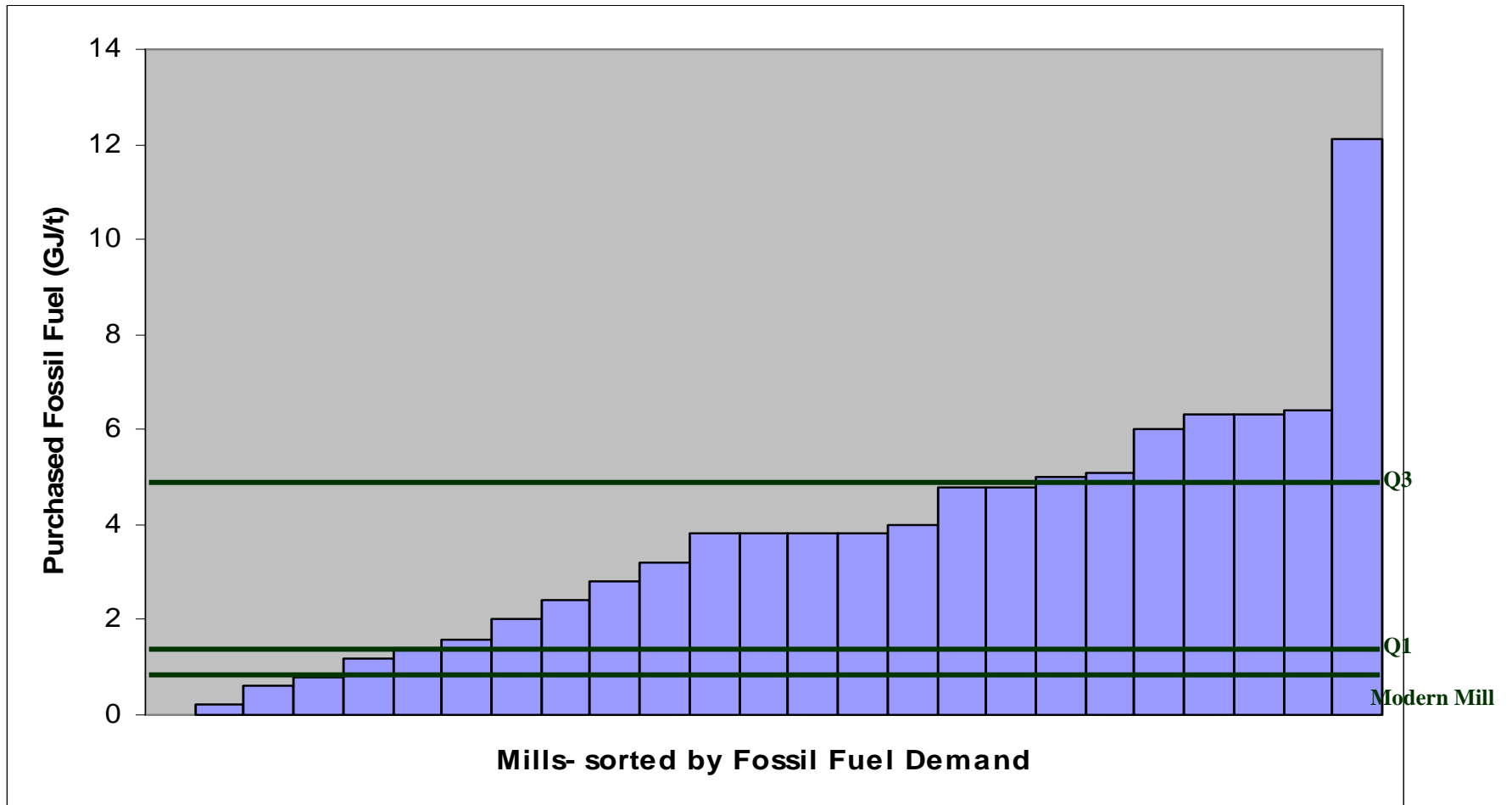


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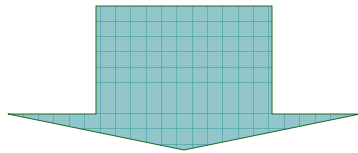
Purchased Fossil Fuel Demand- newsprint mills



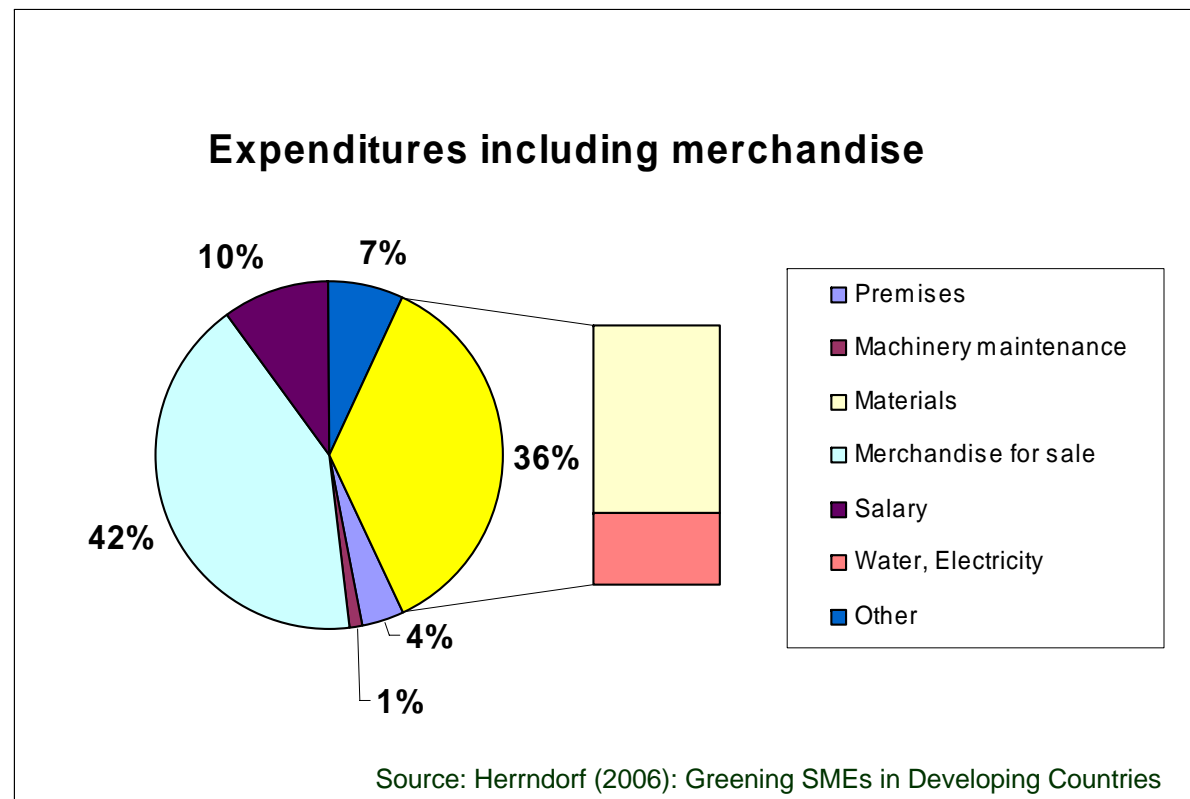


SME in developing countries

Cost structure of micro-enterprises in Mexico:
Costs of material & energy 3.6 as high as salaries paid



Resource efficiency can strengthen local enterprises





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Green Industries

- **Greening Industries** = any industry that commits itself to reducing the environmental impacts of its processes and products through resource efficiency, and is actually doing so on a continuous basis (by this definition, all types of industries can be green)
- **Green Industries** = industries in the environmental goods and services sector
 - materials recovery and recycling companies,
 - waste treaters (e.g., incineration companies), waste disposers (e.g., landfill companies), waste transporters, environmental consultants, engineering companies specializing in wastewater treatment, air pollution control, waste treatment equipment, companies manufacturing and installing renewable energy equipment, energy consultants, ENSCOs, labs specializing in environmental measurement and analysis,
 - companies that specialize in manufacturing clean or cleaner technologies.

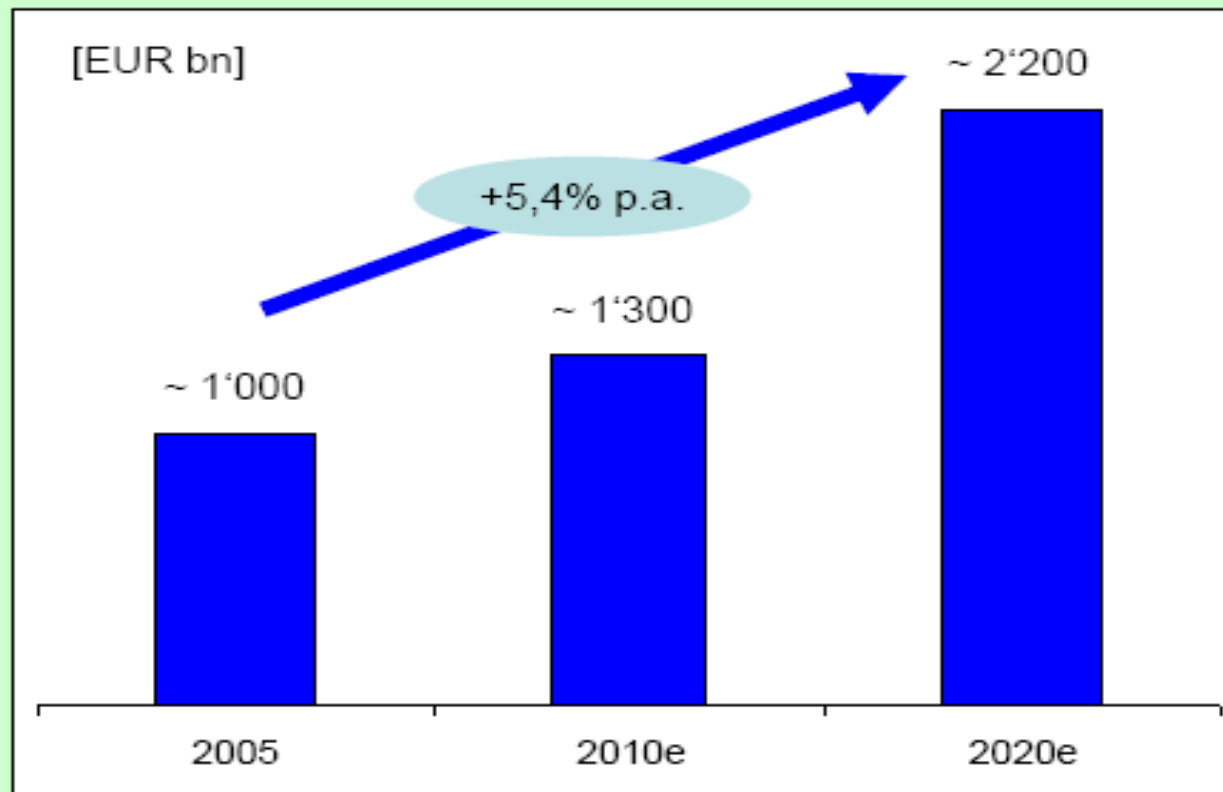


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Global market volume for environmental technologies will more than double (2005 – 2020)



New projection
based on actual
estimated figures:
EUR 3'100 bn
by 2020
(Roland Berger 2009)

Source: Roland Berger (2005)

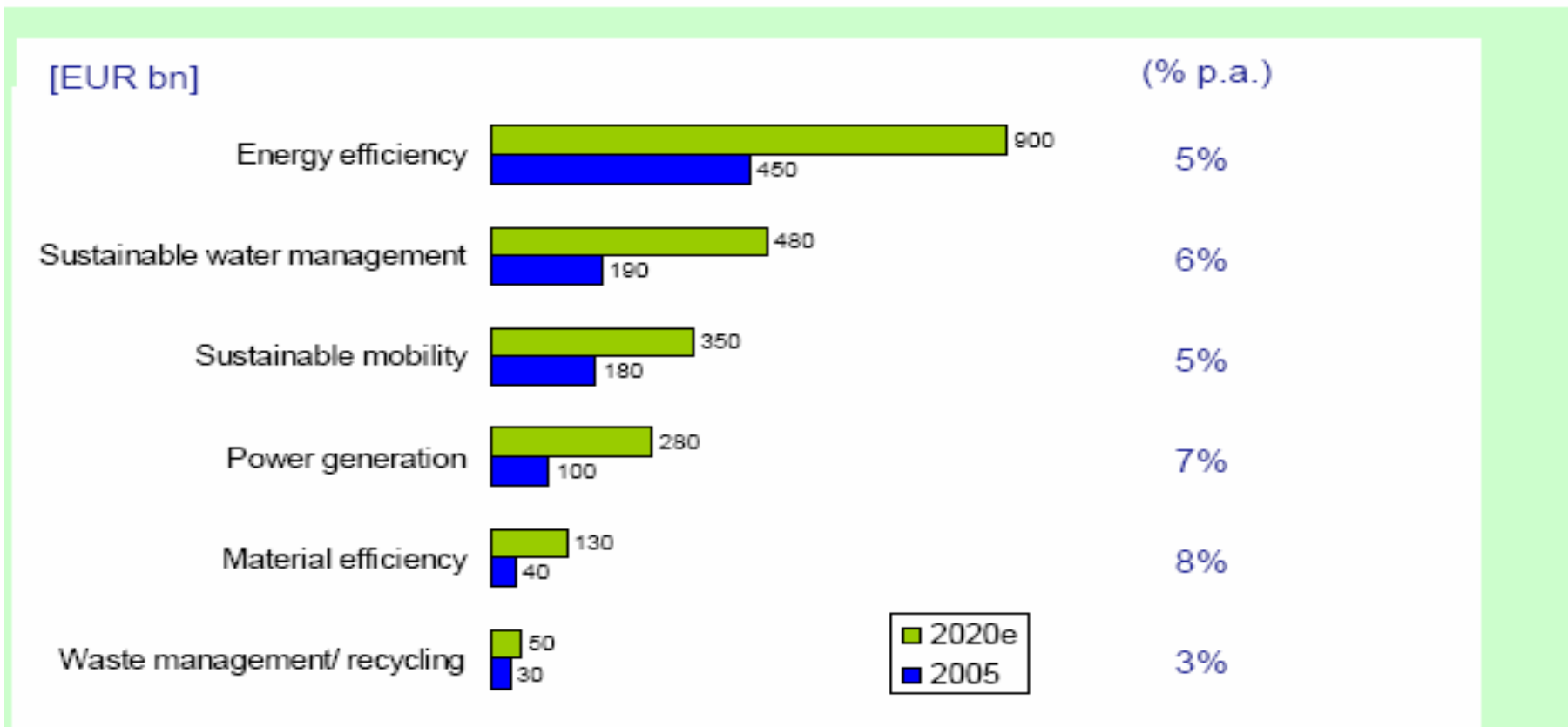


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Estimated growth of the global market volume for environmental technologies (2005 – 2020)



Source: Market studies, interviews with experts, Roland Berger



Why Green Industries?

- **Decoupling economic growth from consumption of natural resources**
 - Reduce material and energy intensity (increase eco-efficiency)
 - Reduce carbon footprint (climate change)
 - Reduce environmental pollution (air, water pollution etc.)
 - Reduce dependency on scarce materials, fossil fuels, water
- **Increase efficiency, productivity and improve competitiveness of companies**
- **Create new market opportunities for companies**
- **Create new jobs**
- **Prerequisite for sustainable growth and industrial development**



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Definition of Environmentally Sound Technologies

Environmentally sound technologies protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes.

Environmentally sound technologies in the context of pollution are „process and product technologies“ that generate low or no waste, for the prevention of pollution. They also cover „end of Pipe“ technologies for treatment of pollution.

Source: Agenda 21



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Best Available Technology

- **"best available techniques" shall mean the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole:**
 - - **"techniques" shall include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned,**
 - - **"available" techniques shall mean those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator,**
 - - **"best" shall mean most effective in achieving a high general level of protection of the environment as a whole.**



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Typology

- **Abatement Technologies**
 - Treat waste/pollutant
- **Prevention Technologies**
 - Prevent generation of waste/pollutant
 - Also Efficiency Technologies
- **Substitution Technologies**
 - Substitute renewable input
 - Also Renewable Technologies
- **Conservation Technologies**
 - Conserve ecosystems to remain healthy, productive
- **Restoration Technologies**
 - Rehabilitate deterioration from human interference
- **Adaptation Technologies**
 - Adapt to unavoidable environmental change



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Technology Transfer

- *Defined as the broad set of **processes** covering the flows of **knowledge, experience and equipment** amongst **different stakeholders**, such as governments, private sector entities, financial institutions, NGOs and research/educational institutions.*
- *The broad term ‘transfer’ encompasses diffusion of technologies and technology cooperation across and within countries. It comprises the process of learning to understand, utilise and replicate the technology, including the capacity to choose it and adapt it to local conditions*
 - IPCC Special Report 2000



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Enabling Environment

- Key interventions for national innovation system
 - Institutional infrastructure
 - Social infrastructure and participatory approaches
 - Human and institutional capacity
 - Macro-economic policy
 - Sustainable markets
 - National legal institutions
 - Codes, standards and certification
 - Equity considerations
 - Rights to productive resources
- Research and technology development

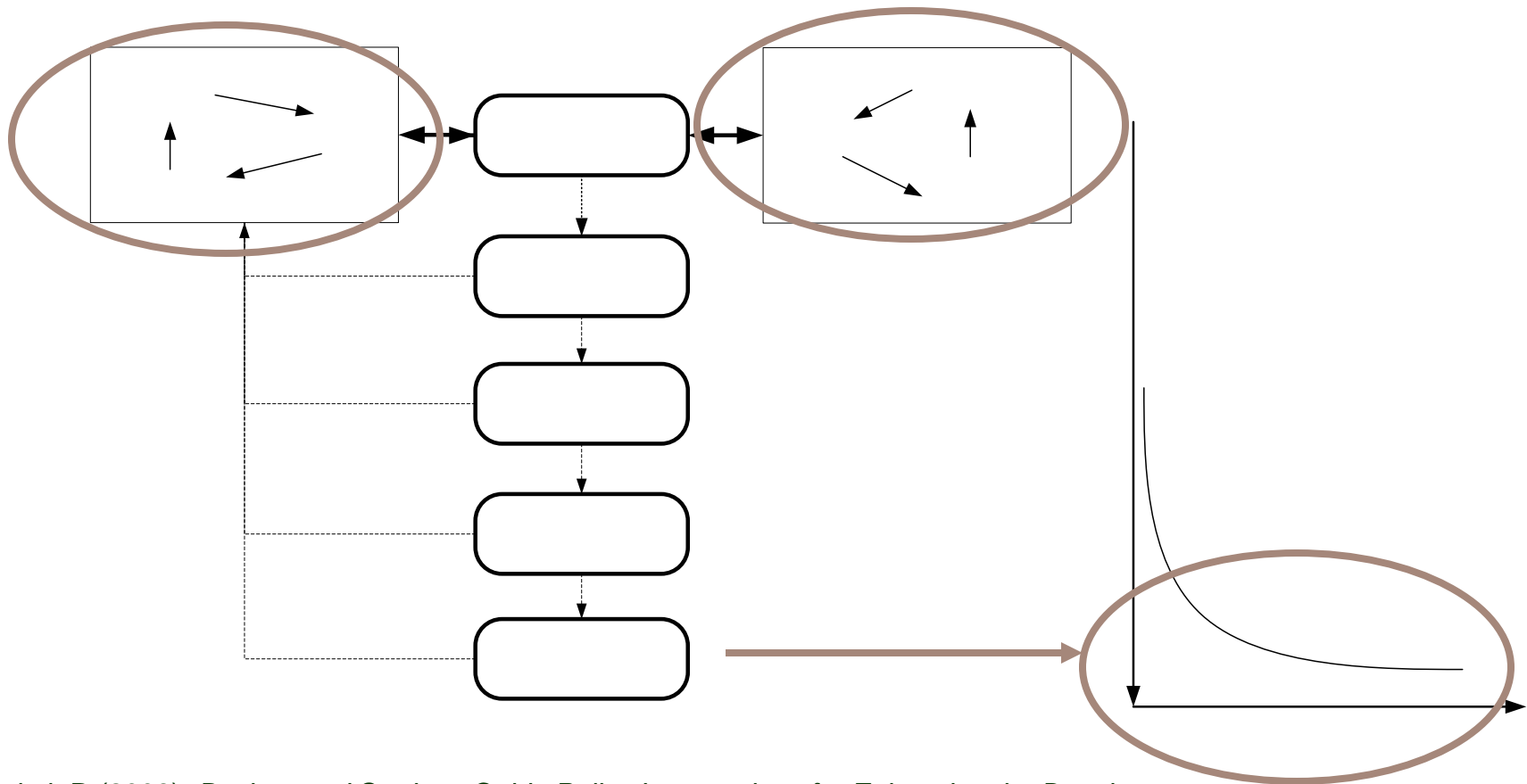


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Technology Transfer Process



Van Berkel, R (2008), *Background Study to Guide Policy Interventions for Enhancing the Development and Transfer of Publicly-Funded Environmentally Sound Technologies*, UN ESCAP, Bangkok, Thailand



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Technology Transfer, Barriers

- **Lack of technology information, dependent on supplier**
- **Insufficient human capabilities**
- **Political and economic barriers such as lack of capital, high transaction costs, lack of credits**
- **Lack of full cost pricing for energy, water, natural resources**
- **Trade and policy barriers**



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Technology Transfer, Barriers

- **Lack of understanding of local needs**
- **Business limitations such as the aversion to risk felt by some financial institutions**
- **Inadequate environmental codes and standards, weak enforcement**
- **Intellectual property rights,**



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Technology Transfer Through CP Centers

- Capacity building, information dissemination
- Strengthening of scientific and technical educational institutions in the context of clean technology needs
- Collection and assessment of specific technical, commercial, financial and legal information
- Identification of technical, financial, and legal policy and other barriers



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Technology Transfer Through CP Centers

- Technology assessment, promotion of prototypes, demonstration projects and extension services through links between manufacturers, producers and end users
- Innovative financial mechanism such as public/private sector partnerships and specialized credit facilities;
- Local and regional partnerships between different stakeholders for the transfer, evaluation and adaptation of clean technologies to local conditions



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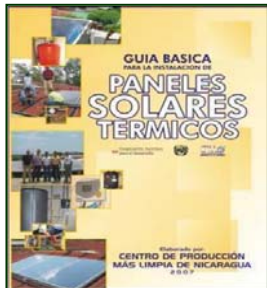


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Technology Transfer: Renewable Energy

■ Nicaragua

- Solar collectors for industrial and service sectors
 - 10 demonstration projects installed in hotels and food industry
 - Panels 6 -32m², tanks 300-2,000 lts
- Capacity building
 - Local design, assembly, installation and service
- Feasibility
 - Payback with imported components 6-10 yrs





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Objective of the Green Credit Trust Fund

The objective of the GCTF is to promote long-term investments in cleaner production technology with a positive impact on the environment and to contribute to the sustainable development of a country.



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Modalities of Green Credits

1. Green Credits will be provided by local financial institutions
2. Green Credits will range between *US \$ 25'000 and US \$ 1 million*
3. Green Credits have a maximum *maturity of 5 years*
4. The interest rate will be market based
5. Guarantees to banks
6. > 30% environment improvement → 15% is reimbursed
> 50% environment improvement → 25% is reimbursed



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Conclusions

- Technology must support decoupling economic growth from natural resource use
- Typology of Technologies
- Enabling Environment critical
- Institutions, Human resource
- Replication
- Green credit lines



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Thank You for your attention



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