

Sustainable Innovations & Resource Efficiency

Arne Remmen, ar@plan.aau.dk
Department of Development and Planning
Aalborg University
Denmark

EU's Climate Objectives

Ambitious objectives have been set up by the EU that by 2020 – a HUGE challenge

- European Union commits to *cut greenhouse gas emissions* by at least 20%
- 20% of the European energy consumption shall come from *renewable energy*
- *saving 20%* of EU's total primary energy consumption by 2020

The challenges

- Climate Change
- Global Environmental Pollution
- Many diverse sources – products
- Products and services is important causes of environmental impacts
- Much more focus on CO₂ and climate change
- Danish Government: cleaner and more energy efficient technologies is one solution – Denmark has a leading position



Danish solutions to global environmental challenges

The government's action plan for promoting eco-efficient technology

- Focusing on the global market
- Focusing on trends and new opportunities
- Focusing on enterprises and entrepreneurs

July 2007

The Danish Government

Eco-innovations – two Danish examples

- Technical Traffic Solutions (TTS) A/S
TTS – less than 20 employees
- Alpha Pro circulator pump
Grundfos – around 15.000 employees

Green Light, TTS A/S

Traffic signals using LED technology

Environmental benefits

- 2.100 kWh/year (old: 6.500 kWh/year)
- Lifespan: more than 10 years (old: 1 year)
- Less waste – recyclable materials
- If all traffic signals in the EU were replaced:
25% of the yearly energy consumption in
Denmark

Other benefits

- Improved traffic safety (more clear signal)
- Design
- No maintenance and cleaning needed



What made the success?

- Clear focus on energy and environment from the beginning
- Also focus on other benefits (e.g maintenance)
- Constant development of technology
- Main customers are municipalities, which have obligations to choose energy- and environmentally efficient alternatives (even though Green Public procurement don't always work)
- “Partnership” with a municipality (show-case)
- Branding and publicity
- Awarded the European Business Award for the

Alpha Pro, Grundfos

A-marked circulator pump

Environmental benefits

- Improved energy efficiency (pumps consume 20% of world energy consumption, and 15% of electricity consumption in an average European household)

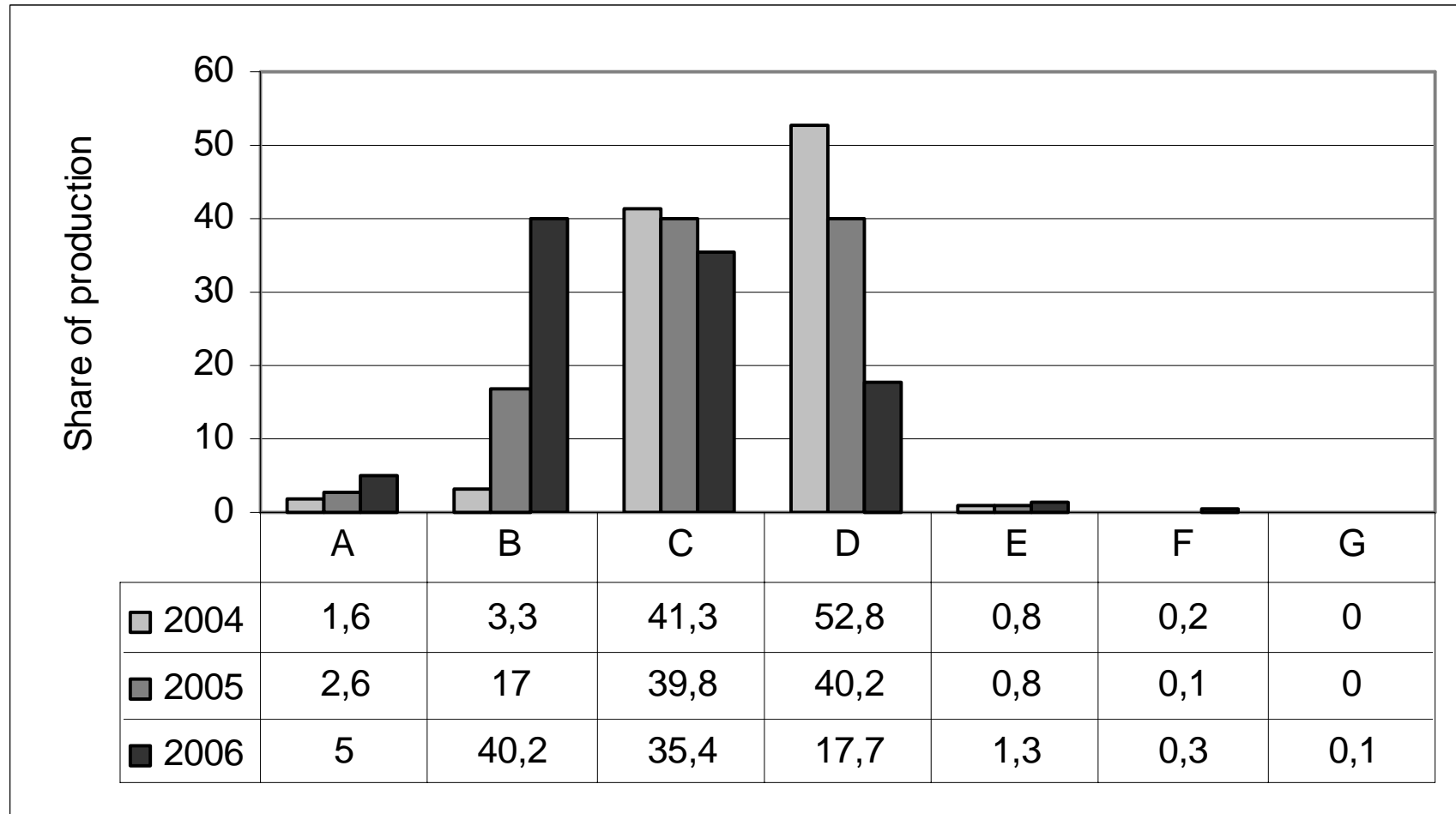
Other benefits

- Saves money in the long run
- Revolutionary technology, spin-offs
- Easy to install



Share of Circulator Pumps in Energy Classes

Europump 2007

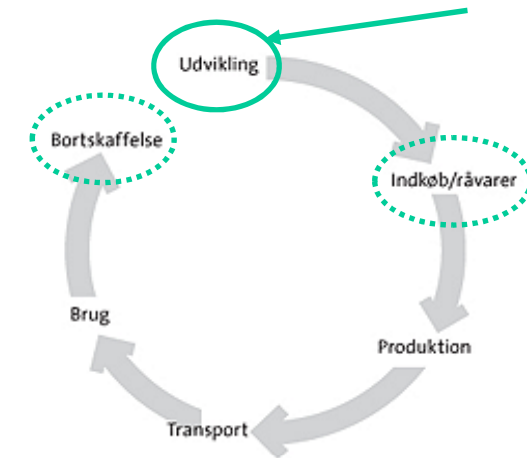


Resource efficiency of pump

Materials	UPE (Kg)	Alpha Pro (Kg)	Difference (Kg)
Cast iron	1,40	0,79	- 0,61
Sheet metal	3,70	0,32	- 3,38
Copper	1,20	0,10	- 1,10
Perma magnet	0	0,12	+0,12
Aluminium	0,95	0,22	- 0,73
Plast	0,21	0,20	- 0,01
Silicone foundry mass	0,26	0,25	- 0,01
Overall weight kg	7,72	2,00	- 5,72

Recycling profile:

- Reuse/Recovering 94%
- Incineration 4,7%
- Disposal/landfill 1,2 %



What made the success?

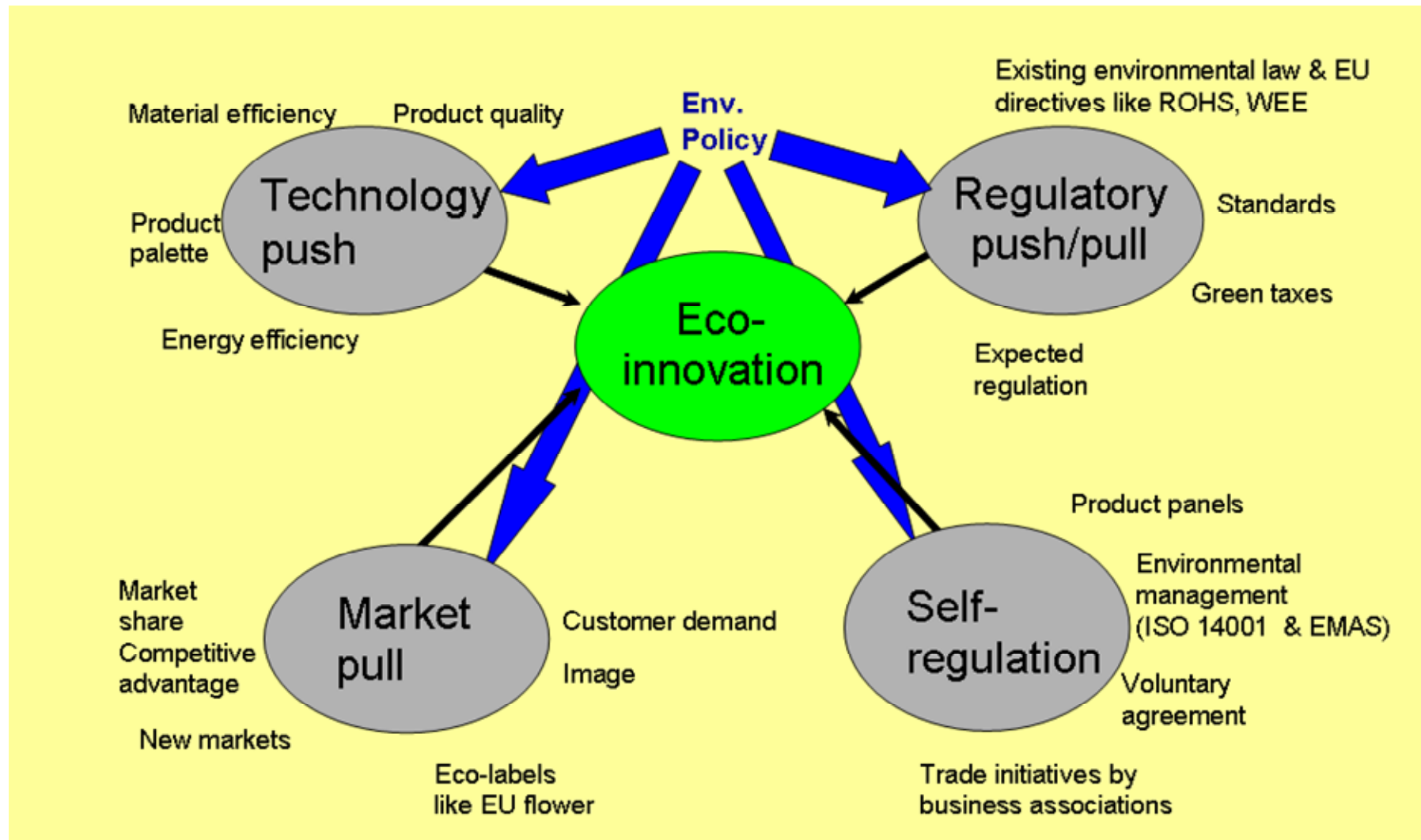
- Clear objective: create a pole position and challenge the current state of the art
- Make pumps and their energy consumption visible
- Development of Energy label in cooperation with the European Association of Pump Manufacturers – influence EU
- A time consuming process, but a priority in the company and among the board of directors
 - Began in 1992, but product was not launched until 2005
 - Actual product development process lasted only 15 months
 - Comprehensive preparatory work: development of

And marketing!

- Extensive marketing needed and product to be launched at the right time
- Not only focus on environmental benefits, also economy, operational reliability, security of supply etc.
- More than 50% of all circulator pumps sold in Denmark are now A-pumps = large market shares!



Policies for eco-innovation



Conclusions

- Energy- and resource - efficiency can be achieved, if..
- Enterprises are paying attention to :
 - Technology development / R&D
 - Own commitment /engage business associations
 - Lobbying / Partnerships
 - Market creation
 - Product performance demands / product regulations (EuP, RoHS, WEEE, etc.)
- Governments pay attention to all enabling factors / a regulatory mix instruments

Joint Actions on Climate Change
08-10 June 2009 - Aalborg - Denmark

www.jaocc.net

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How to promote sustainable innovations?

6 RE principles

- RE think rethink the product and its functions
- RE duce reduce the consumption of energy and resources
- RE cycle choose materials which can be recycled
- RE use design to make the product reusable
- RE pair make the product easy to repair
- RE place replace environmentally harmful substances with more eco-friendly alternatives

Life cycle assessments

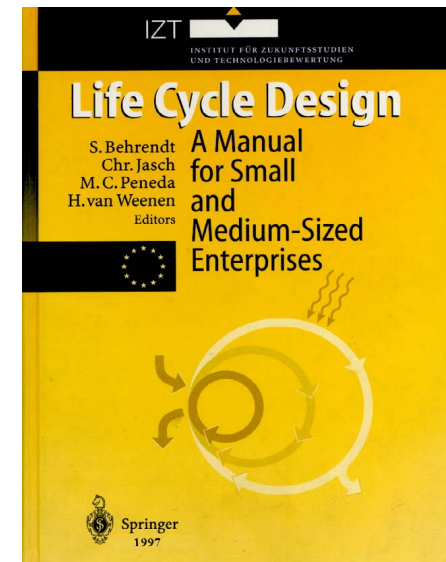
- From simple considerations to exhaustive calculations

Criteria for product performance

- Materials to used
- Targets for energy consumption

Design guidelines

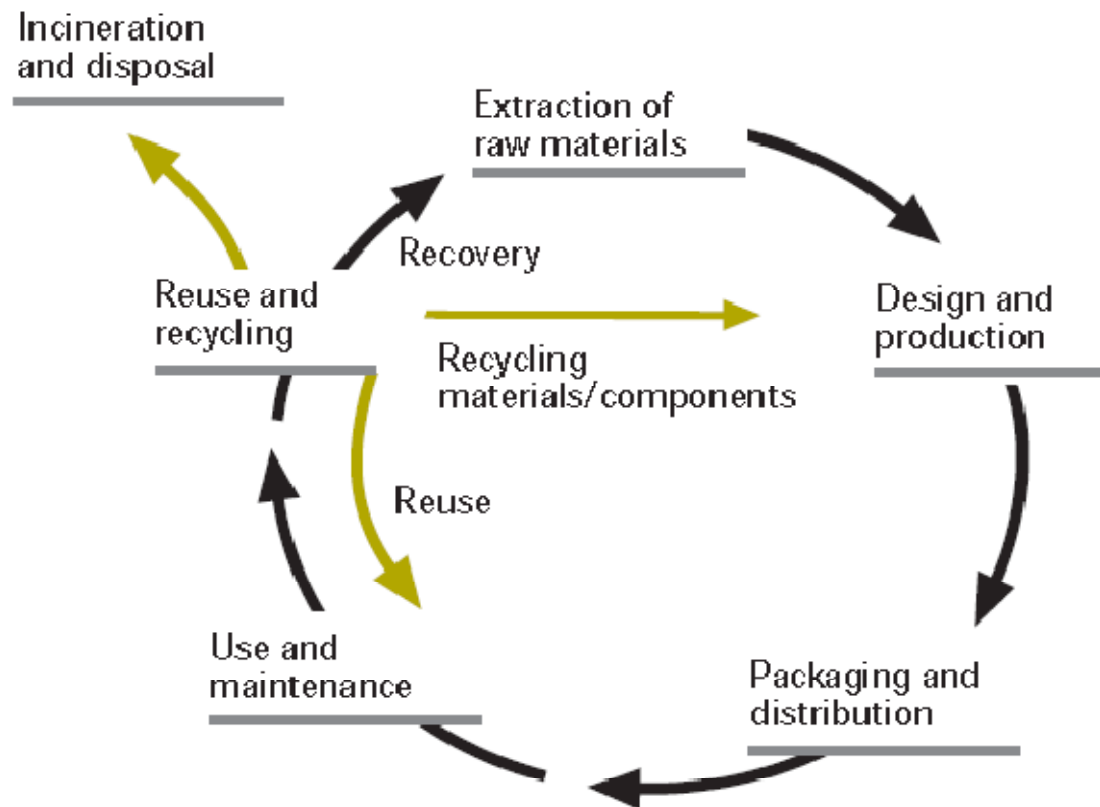
Industry initiatives - e.g. the plastics (www.plast.dk/t2w_593.asp)



IPP and new forms of Governance

- Increasing *self-regulation*, e.g. internalisation of environmental responsibility in industry via environmental management (ISO 14001), codes of conduct, sustainability reports, etc.
 - Use of *market based instruments* like eco-labels, green taxes, subsidy schemes etc.
 - Change from command-and-control regulation towards a *facilitating role* of governmental agencies
 - Support for R&D – development of environmental technologies (*technology push*)
 - *Stakeholder participation* of relevant actor groups in the formulation of new policies (consultation) as well as delegation of responsibility for policy implementation
 - *Internationalisation* of governance forms, including normative product regulation by the EU (ROHS, EuP, etc.)
- = **REGULATORY MIXES**

Life cycle perspective



Focus on the most significant environmental issues relating to a product's overall life cycle

Different types of eco-innovation

End-of-pipe solutions

- Cleaning up after the pollution – filters, cleaning of waste water
- Not prevention, and not at the source!

Cleaner technologies in production

- Making the production more efficient
- Cost reduction potentials

Cleaner products

- Reducing environmental impacts at the source
- Improving products
- Product service systems

Rethinking technological systems and consumption /Product Service Systems

- Make significantly reduction of environmental impacts

Characteristics of IPP

- Both environment and economy can benefit from public regulation and policies
- De-coupling economic growth and environmental impacts
- Integration of environmental considerations into all daily practices of industry
- Market as a driver via eco-labelling, etc.
- Technological innovation as a cornerstone
- Combining technology push, market pull and soft regulations to promote ECO-innovations
- Engaging stakeholders in networks, product panels, etc

Energy efficiency is doubled

BNP (faste priser), energiforbrug og intensitet

