

Limitation of current LCA approaches

- CALCAS seminar – September 2007

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



Objectives of CALCAS

- 1) Deepening (allocation methods, etc.)
- 2) Broadening (social LCA + LCC)
- 3) Leaping forward (from government to governance)

What happened to:

Applicability in different contexts ?

- Do we understand the different decision domains well enough?
- Is LCA the only tool around ?

PS

LCT as a conceptual understanding is very different from making a full ISO-LCA

Two Rationalities – two domains

Technical – material flows: cradle to grave

Most important environmental impacts

Documentation – scientific platform

The tool = LCA

Social – relations, interests, value

Potential product improvements

Motivation of stakeholders (enterprise and in product chain)

Different tools depending on the purpose

The Tool Pyramid

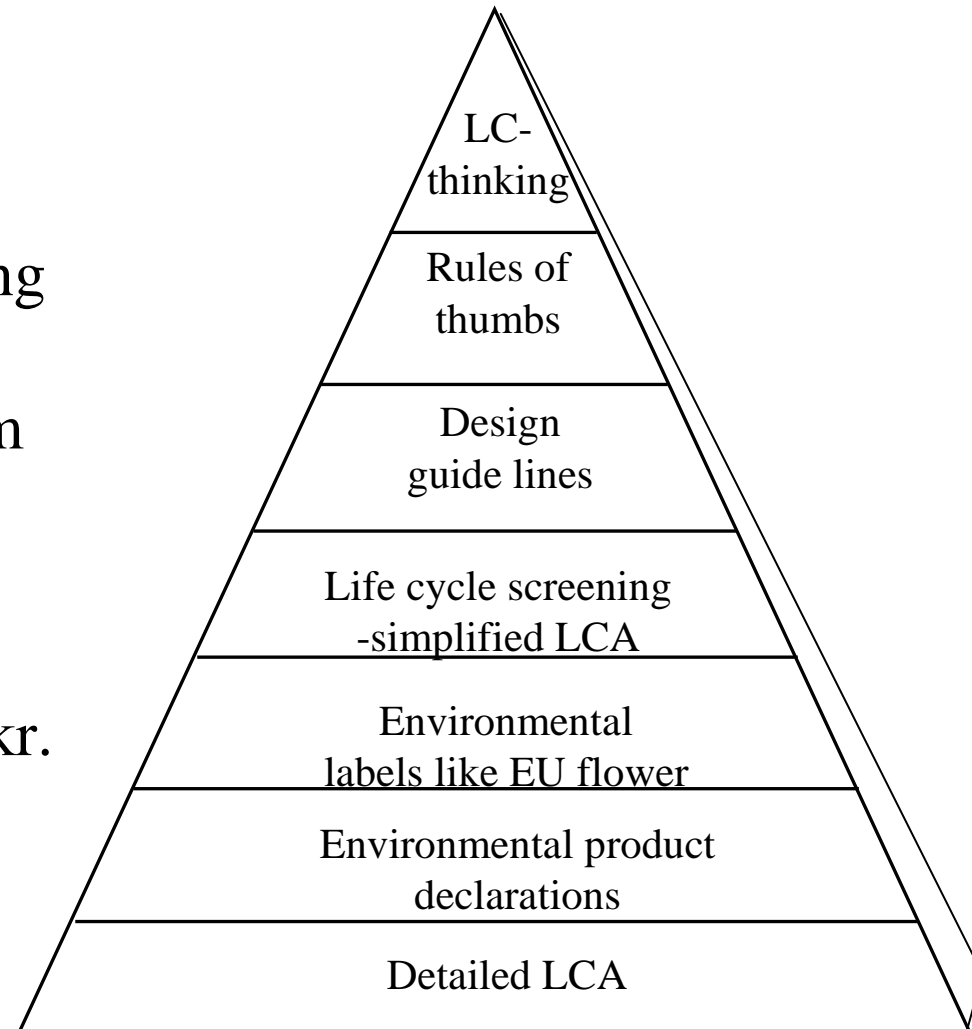
Danish EPA has a engineering tradition and has built the tool pyramid from the bottom

In the 90's EPA has used:

Life cycle thinking: 2-3mio.kr.

Simplified LCA: 15 mio. kr.

Detailed LCA: 80 mio. kr.



Assumptions behind the pyramid

- If the enterprises have the tools to assess the most important life cycle impacts of their products, *then* they will develop cleaner products
- If the consumers have the right information about environmental impacts of a product, *then* they will buy eco-labelled products.

= rational decision making model

Decision-making in SME's

Selection areas for *improvements* based on:

- Important environmental problems
- Potential for influence

		Environmental problem	
		High	Low
Influence	High	+	(+)
	Low	(+)	-

**Fokus on:
High - High**

The Tool Box – purpose specific (U. Tischner, 2001)

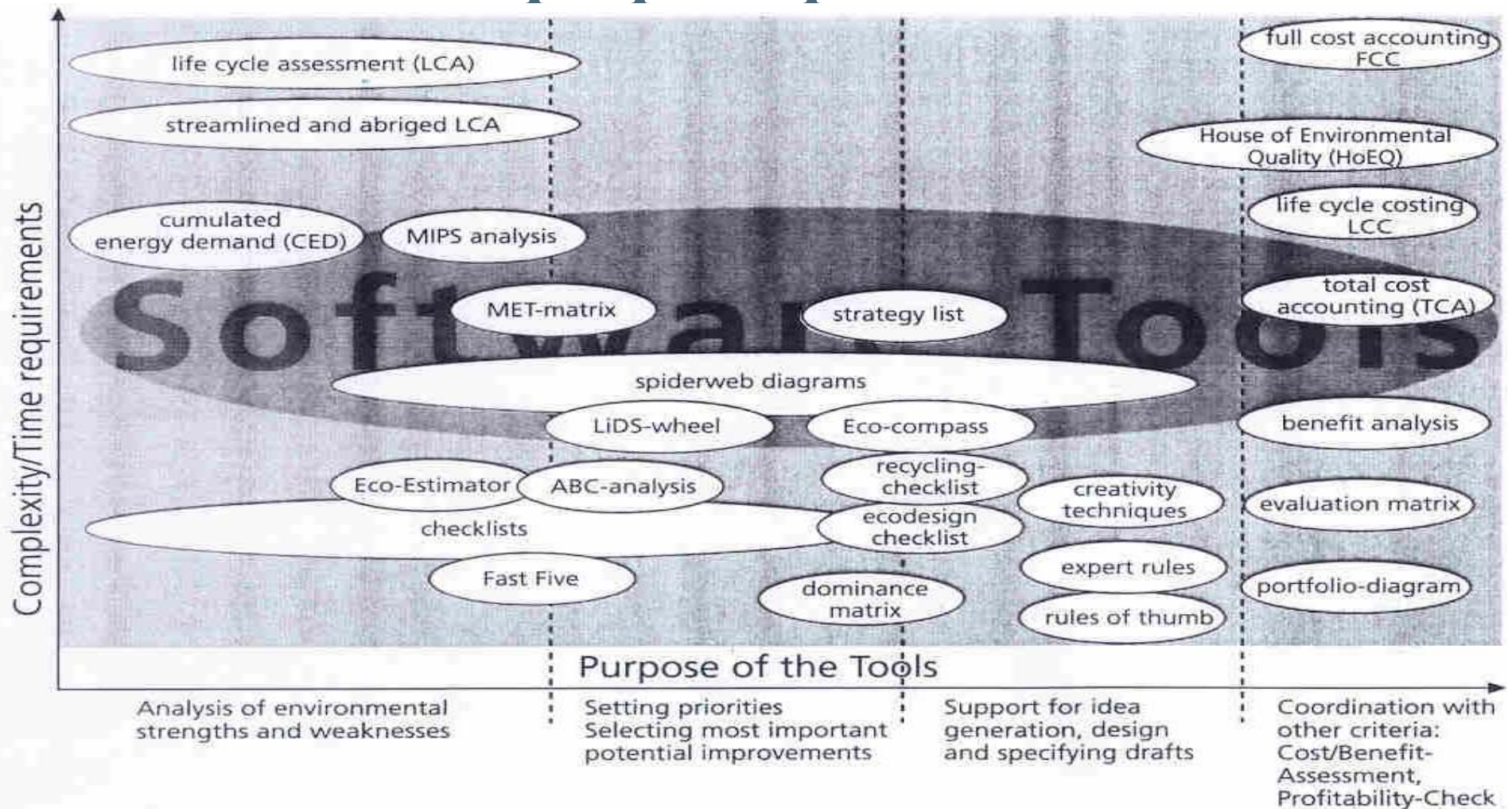


Figure 3.2 Categorisation of instruments that are useful for Ecodesign

Why Life Cycle MANAGEMENT ?

- All the man-power and money invested in development of LCA as a method and a tool has not created new competences and practical application in Danish enterprises (one exemption to the rule)!
- LCA is applied to a limited extent and mainly as documentation !
LCT is applied conceptually and in early stages
- Complicated tools and science is not on the desicion-making agenda in SME's (= Danish companies)!

LCA = most important environmental *impacts*

LCM =engagement of internal and external
stakeholders in product *improvements*

LCM – a challenge to LCA

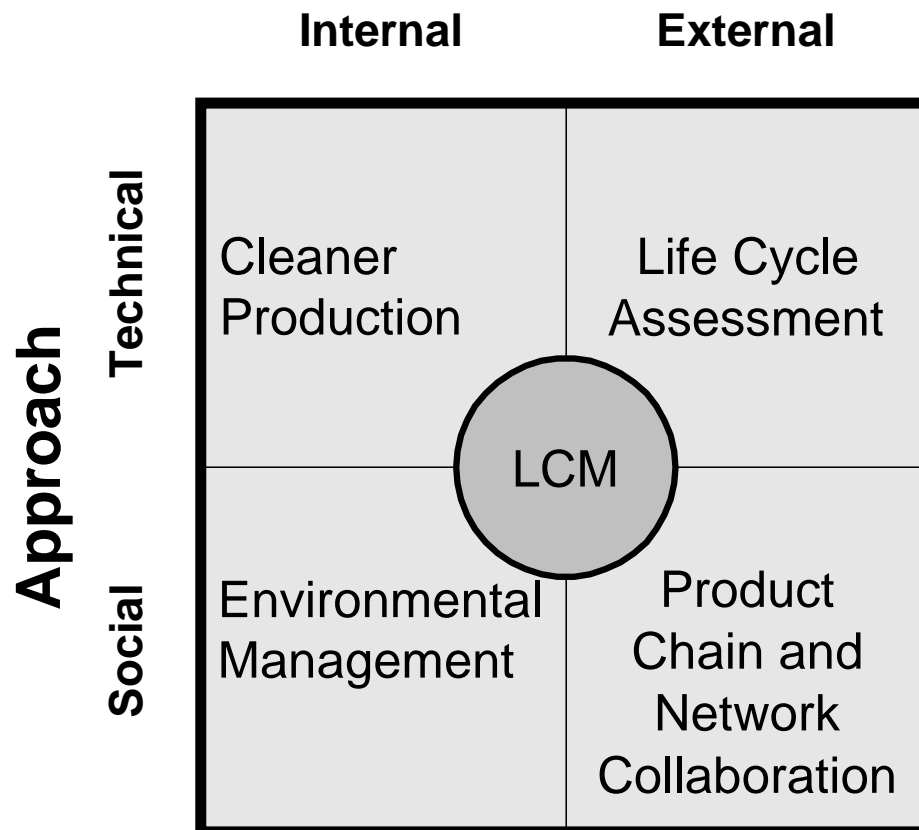
So far:

- Too much attention to assessments, scientific knowledge and experts
- Too little attention to organisation/management, product improvements, common-sense knowledge and engagement of stakeholders (communication and collaboration patterns)

LCM has to create a better balance

Life Cycle Management - LCM

Focus



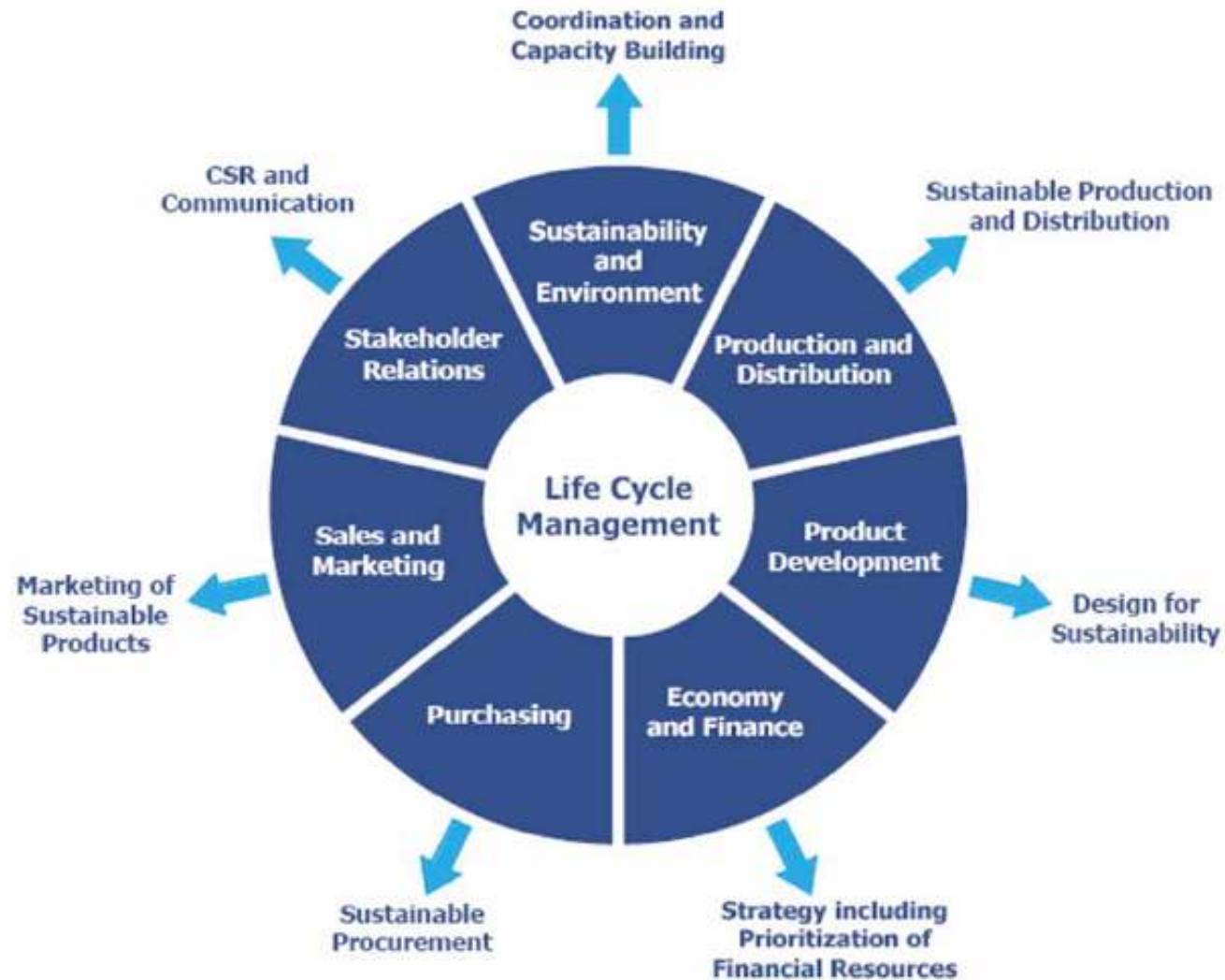
LCM: Life Cycle Management

LCM definition

- LCM is not a single tool or methodology, it is a *flexible integrated framework of concepts, techniques and procedures.*
- LCM inherently takes a life cycle approach in considering *environmental, economic, technological and social aspects of products and organizations.*
- LCM is applied on a *voluntary basis and can be adapted to the specific needs and characteristics of individual organizations.*

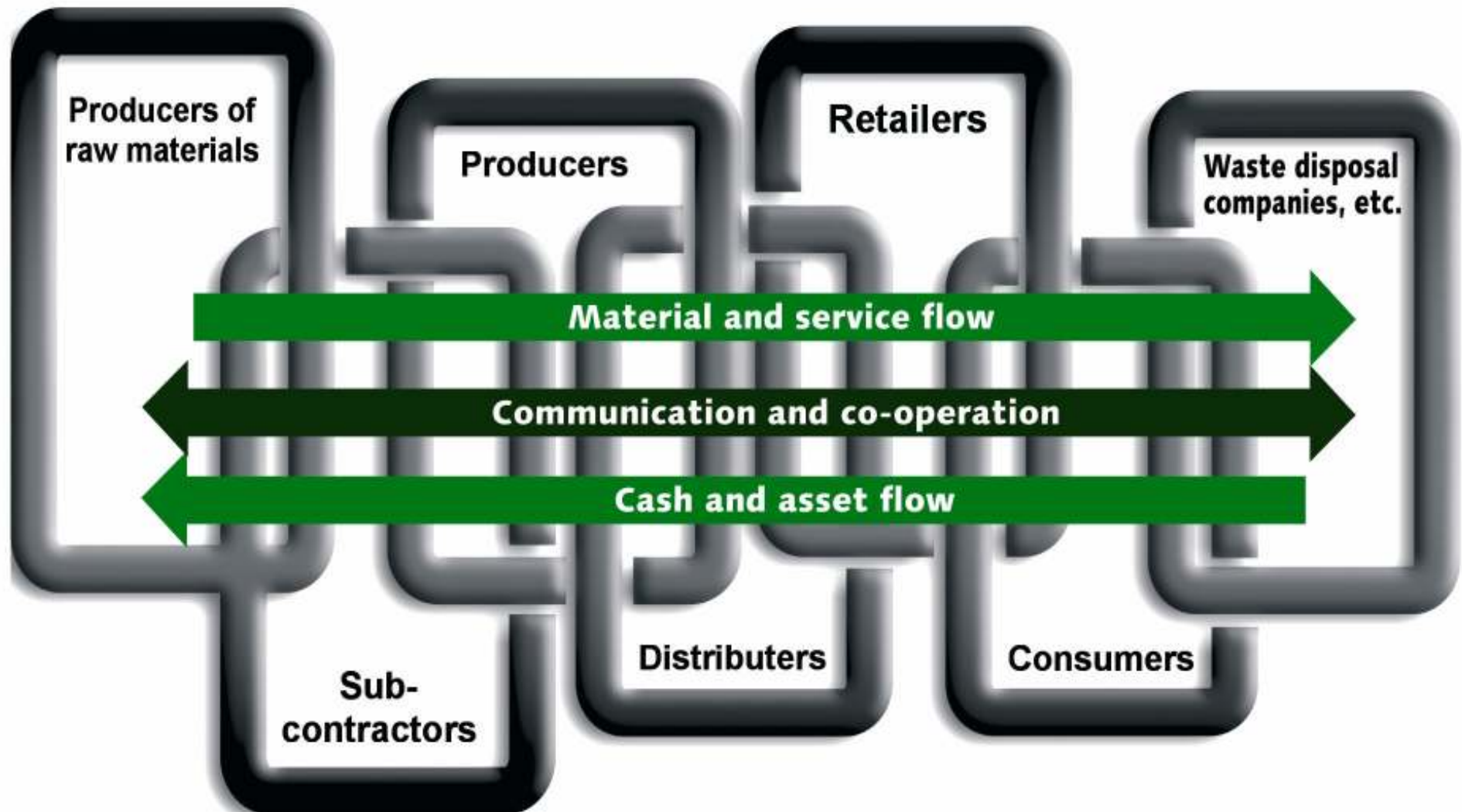
(SETAC/UNEP LCM working group, 2004).

Engage all internal stakeholders (UNEP, 2007)



(inspired by Christoffer, 1998)

Collaboration in the Product Chain



Engage External Stakeholders

Complementary knowledge is needed:

- Important impacts from cradle to grave = *material flow*
- Consumer demands to the product profile = *value flow*
- *Communication and collaboration* to secure knowledge sharing in the product chain

Preconditions for knowledge sharing and collaboration

- Exchange of information and experience
- Creating trust and credibility
- "Translations" – between disciplines
- Building bridges – brokers and boundary objects
- Strategic alliances with suppliers and retailers
- Partnerships in knowledge network
- Compliance with product regulations (RoHS, EuP, etc.)

All competences are needed

- improvements and documentation



Green marketing vs. LCA documentation

Energy label works

Organic-label works (again)

ECO-labels work:

- Detergents
- Printed products
- Tourist accomodations

When environment AND health?

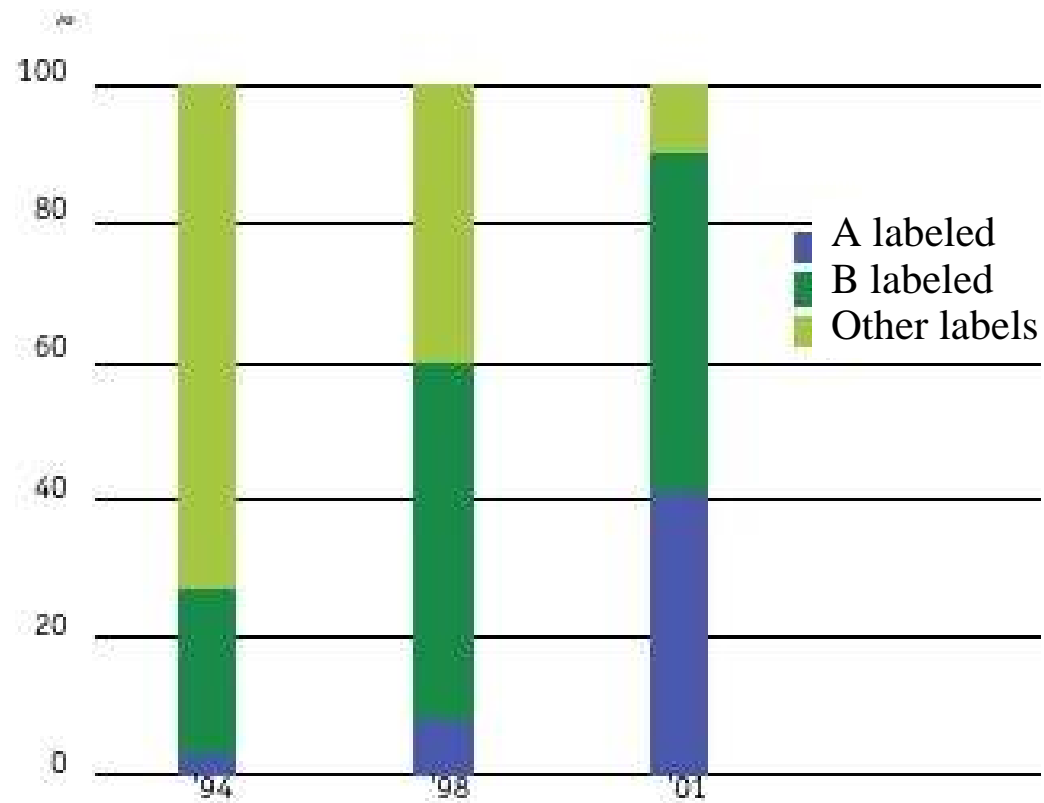
Not many flowers around !!



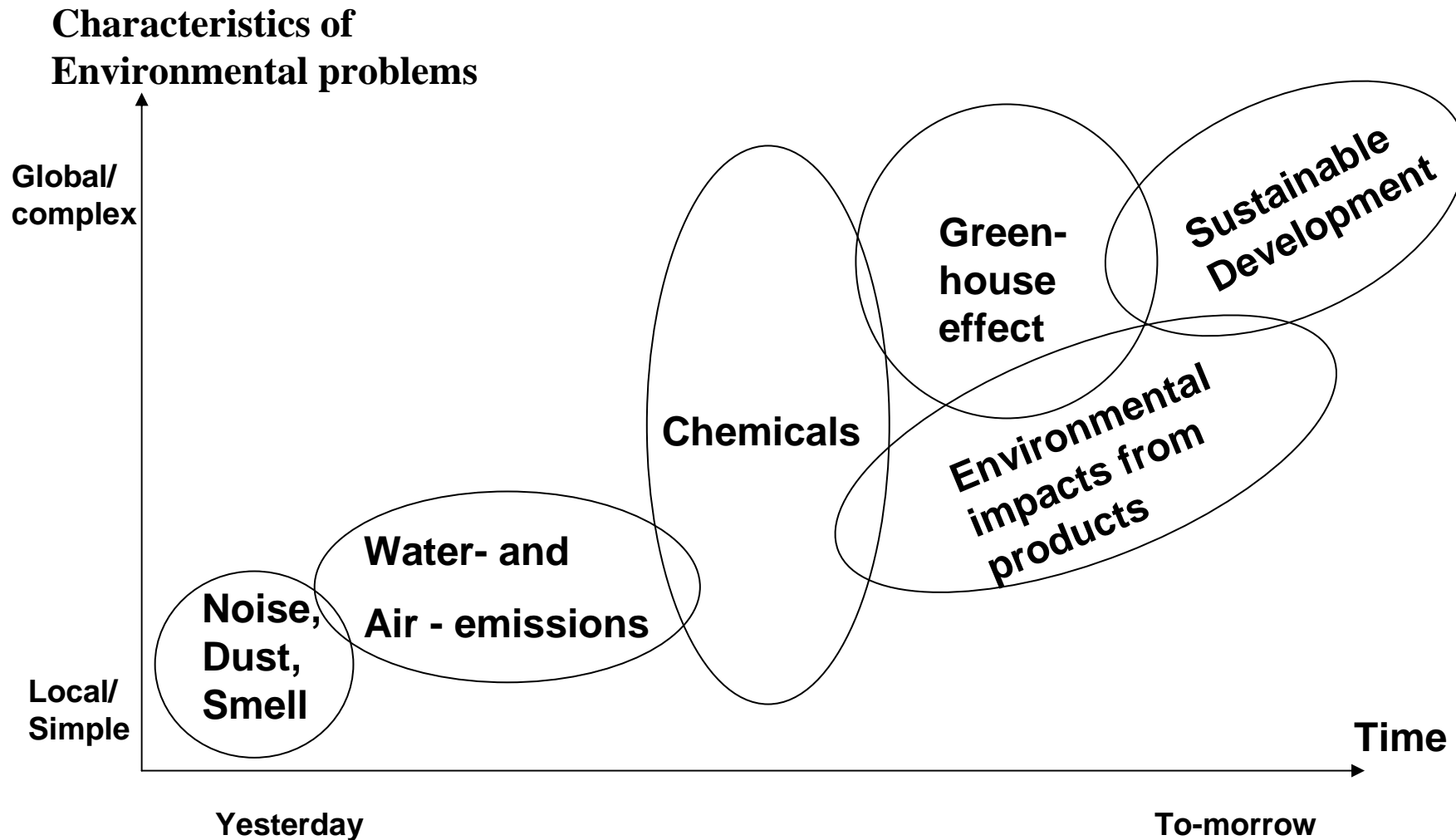
Household Appliances: Energy-labels are effective in Denmark

A- and B labelled fridges have gained a market share of 96 per cent (2002) in only eight years. The diagram shows the A and B labelled share of the total sales.

Sources: Danish Energy Agency and Dansk Hvidevare nyt 1:2003 (FEHA)



Changes in Environmental Problems

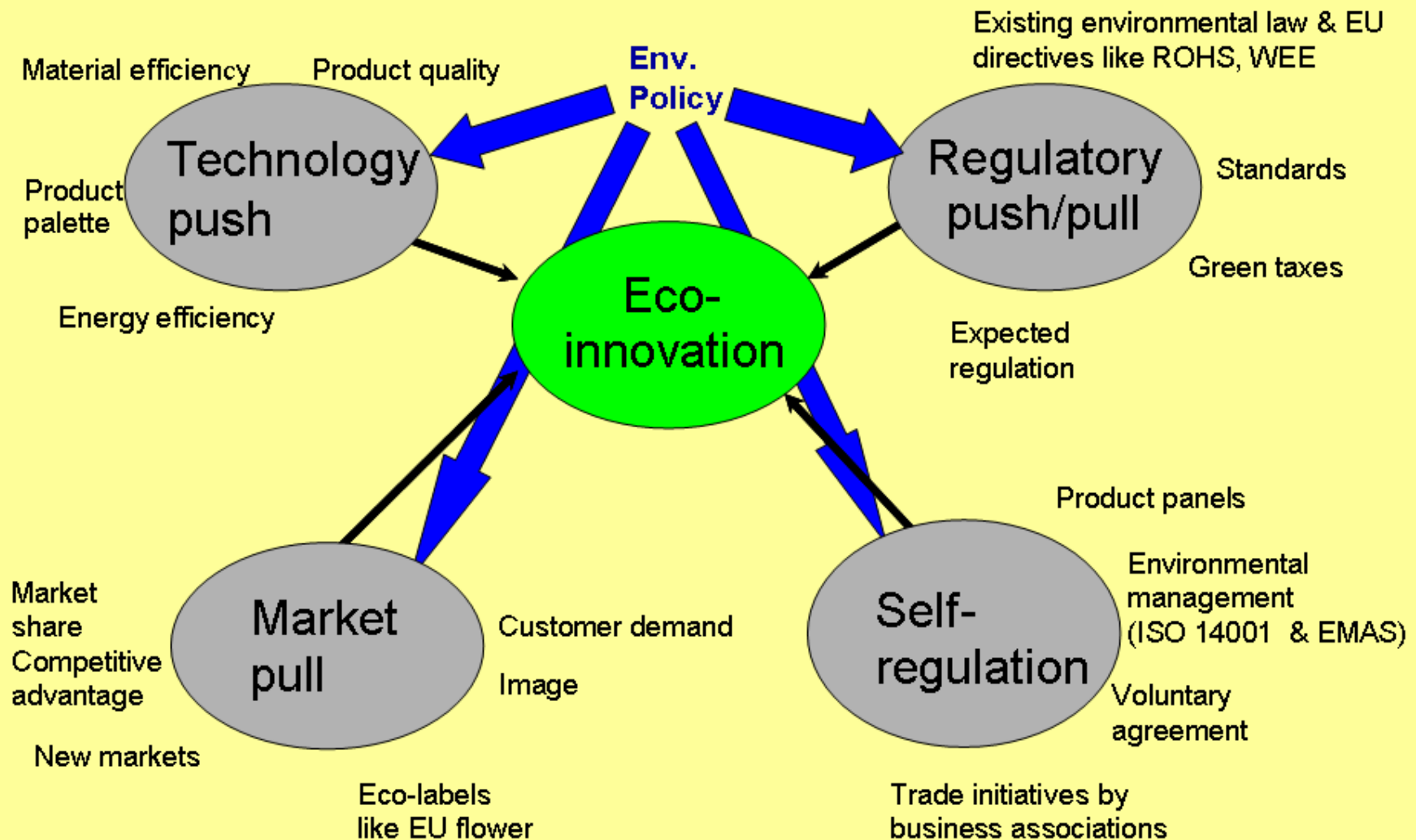


Changes in Focus

	Problems	Solutions	Actors	Incentives	Environment & Economy
Filter	Emissions	End-of-pipe	Authorities	Command-and-control	Costs
Cleaner production	Resource consumption	BAT – best available technology	Companies & authorities	Cost reductions & IPPC	Resource savings
Environmental management	Organisational conditions	Continuous improvement	Managers & employees	Stakeholder relations	Image
Cleaner products	Life cycle impacts of products	Eco-labelled products	Product chain actors	Product differentiation & IPP	Competitive advantage

Facilitating eco-innovations

Source: Cleff/Rennings 1999 & Rubrik, 2002



Governance and IPP

- 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**



Thank you
for your attention

Arne Remmen
ar@plan.aau.dk

*Department of
Development and Planning
Aalborg University
Denmark*

Danish platform for IPP

- Pollution prevention is the corner stone
- All stakeholders have a role to play
- Increased focus on self-regulation and the responsibilities of industry and other actor groups
- New instruments have been applied – especially economic and informative
- More comprehensive understanding of problems and solutions
- New forms of stakeholder participation, eg. Business associations and Product Panels

Cleaner Product Programme 1998-2003

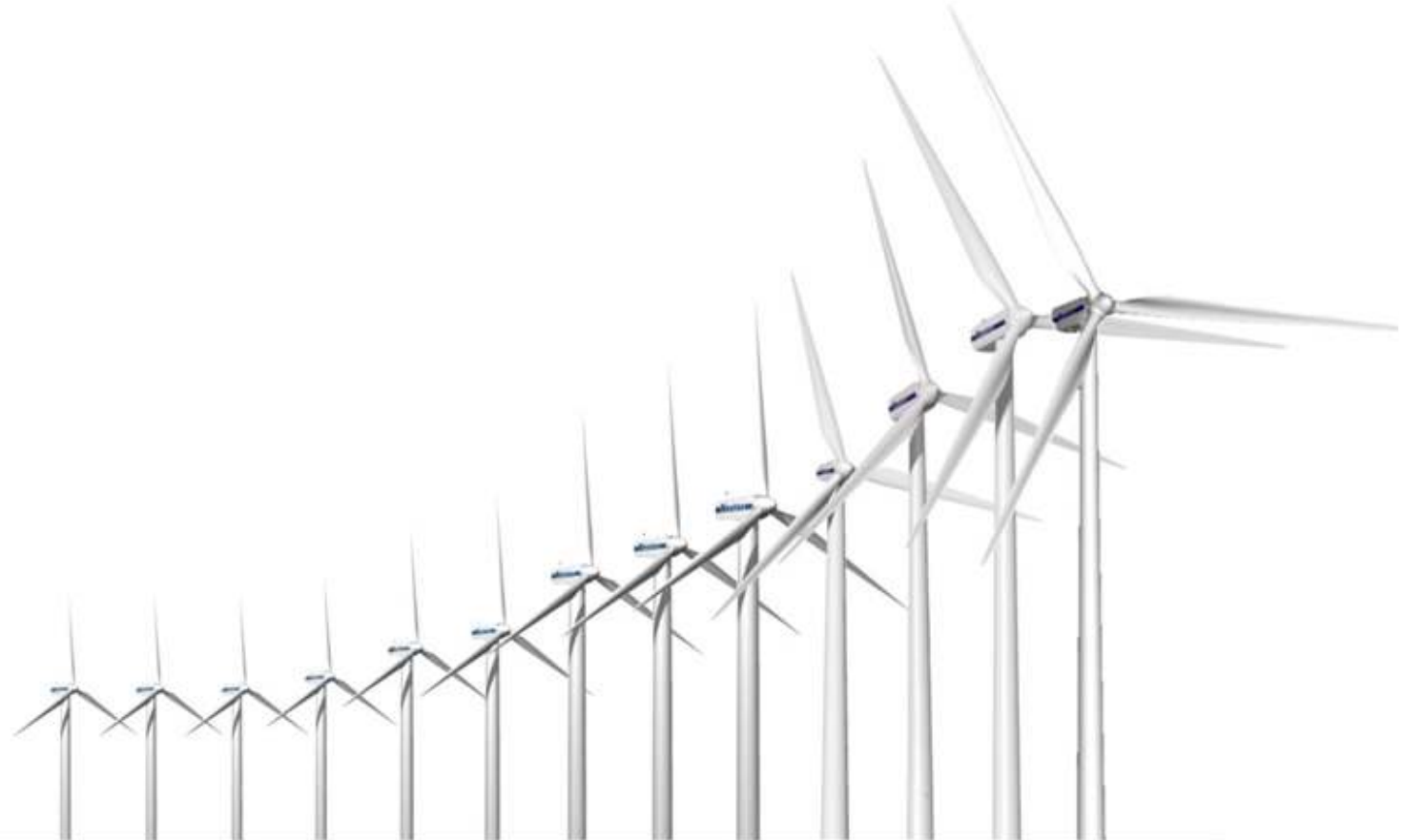
1. Environmental council for cleaner products
2. Combining elements from earlier cleaner technology programmes
3. Areas of financial support:
 - Products panels and industrial sectors
 - Development of cleaner products
 - Methods and tools
 - Market – eco-labelling, public procurement, etc.
 - Waste and recycling
 - Environmental competences in SME's

Danish Green Industrial Policy – draft 2001

Initiatives	Phase 1	Phase 2	Existing initiatives
Well-functioning Green Markets	Environmental story-telling as tool for communication	Interdisciplinary research group on green market development	Public procurements The authorities awards green firms Environmental product declarations ECO-labeling
Green Organizational Development	Center for sustainable business development	Local private / public environmental collaboration	Environmental management Green accounts
Green Innovation	Green technology development, eg. Technology foresight, ÉCO-innovations through R&D, Business development network	Environmental "lines" in vocational training / educations	Programme for cleaner products Environmental Council Product panels Stakeholder participation

TEXTILE PANEL 1999 – 2004	
Priority	<ul style="list-style-type: none"> • The EU flower on Danish textiles • Increase supply of and demand for eco-friendly textiles
Participants	<ul style="list-style-type: none"> • 20 strategic persons engaged in the textile panel • Broad participation in several working groups • Involvement of designers and design schools • Consensus on the priority between producers, retailers, authorities, business association, design schools and different NGO's
Project areas	<ul style="list-style-type: none"> • Knowledge dissemination to producers, retailers and consumers (knowledge center and web-portal) • Eco-labelling (a “flower club”) • Eco-design and integration of environment in design & fashion • Environmental marketing • Motivation of professional purchasers to use the EU flower • Dialogue and collaboration in the product chain on environment
Results	<ul style="list-style-type: none"> • 23 licenses to Danish firms to use the EU flower on their textiles • Competence center and web site on textile & environment • Focus on capacity building and knowledge dissemination • 36% of Danish consumers recognises the EU flower as an eco-label • Danish textile industry can meet future product requirements
Problems	<ul style="list-style-type: none"> • Lack of demands from consumers and professional purchasers • No marketing of the EU flower by firms on the contract market • Lack of marketing of the EU flower by retailers and fashion houses • No linkage between EMS, environmental product declarations & eco-labels • Focus on criteria development instead of marketing of the EU flower by environmental authorities, Eco-label secretariat and the EU

Development of VESTAS Wind Turbines



Product/Rotor diameter (m)	V15	V17	V19	V20	V25	V27	V39	V44	V47	V52	V66	V80	V90
Year of installation	1981	1984	1986	1987	1988	1989	1991	1995	1997	2000	1999	2000	2002
Capacity (kW)	55	75	90	100	200	225	500	600	660	850	1750	2000	3000
MWh/year	217	265	301	346	481	647	1304	1581	1947	2530	4705	6768	-

Danish Wind Turbines

- Major innovations: 500kw to 3Mw in 10 years
- Employment: 21.000 employees in DK
- Turn-over: 24 billion kr. (4 billion US\$) (2005)
- 20% of electricity consumption from wind in DK

Reasons for the succes

- Clear objectives in energy policy
- Up-scaling / learning by doing
- Cooperatively owned windmills / public support
- Test station – innovation by interactions
- Financial support (price, investment subsidy...)

Green Light Traffic Signal

LED technology (diode)

- 2.100 kw (old: 6.500kw)
- Last >10 years (old: 1year)
- Less waste and maintenance
- Improved quality
- Recyclable materials

= 5.000 kg CO₂ reduction year

If all traffic signals in EU

= energy saving 7,4 Tw pr. year

2,5% of EU's obligation in Kyoto

