

Faktor 10 utvikling – miljø- og ressurseffektive verdikjeder

Ole Jørgen Hanssen, STØ/NTNU

Introduction

- ”One of the emergent ideas in the 1990s pertinent to reducing the environmental impact of economic activities is the factor X reduction in resource use, with X being between 4 and 50.”
- ”The Factor X, as it is used in practice, may relate to a product, a service, an area of need, a sector of the economy, or the economy as a whole.”
- ”The Factor X is qualitatively similar to the concepts of dematerialization, eco-efficiency and increased natural resource productivity, but has a quantitative edge. It is located somewhere in the gray area between science and policy.”

Bærekraftig utvikling = Faktor 4/10 løsninger?

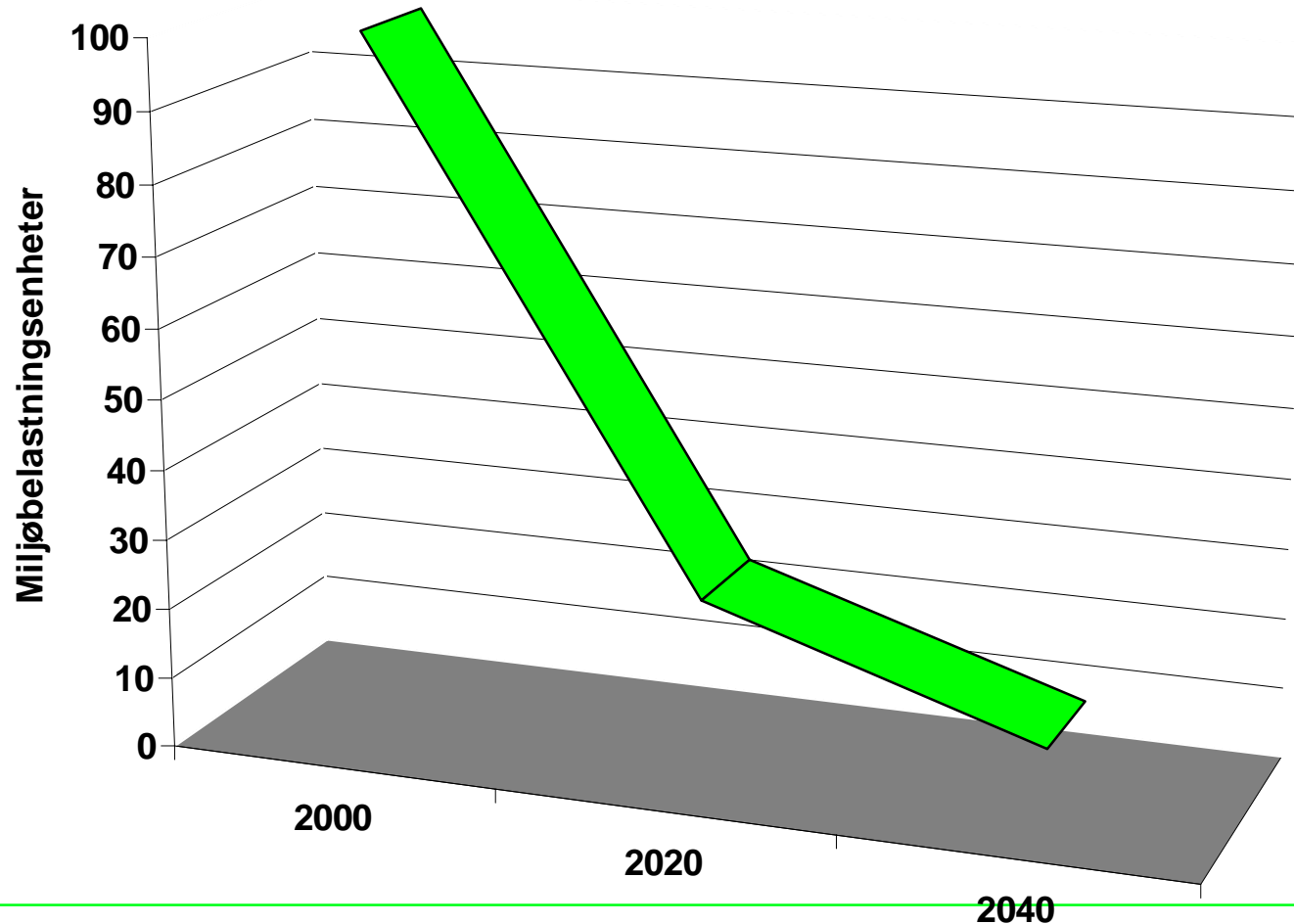
Faktor 4/10 er en måte å operasjonalisere begrepet bærekraftig utvikling

I perioden frem til 2040 vil vi ha følgende utfordringer:

- Fordobling av jordas befolkning til 12 mrd (2x)
- Samlet vekst i velferdsnivå i verden 2,5x
- Behov for reduksjon i samlet miljøbelastning med 50% (2x)
- Totalt gir dette behov for en Faktor 10 utvikling i øko-effektivitet

Faktor 4/10 utvikling i øko-effektivitet

Faktor 4/10 - krav til utvikling i øko-effektivitet



Introduction

The reception of policymakers to the factor X debate has varied greatly:

USA: The debate has been restricted to NGOs and has not become part of mainstream thinking.

Austria: Dematerialize its economy by a factor of 10.

Netherlands: Factor 4 by doubling GNP, while halving wastes.

Germany: The Bundestag proposed an integral materials control law.

EU: Factor 4 by 2025, factor 10 around 2050.

Norway: Not within the public politics of the Government

In North America, Japan and elsewhere there has been political interest in eco-efficiency, but without quantitative targets as factor X

The Debate

- A factor X of what?
- A factor X for what?
- Does X make societal sense?
- Is improvement of technology sufficient?
- How to implement factor X technology?

A Factor X of What?

”There is no agreement on the environmental impact that the factor X relates to.”

Proposals:

- Natural resource and energy productivity(factor 10 proponents)
- Transport, energy or nonfuel materials(Von Weiszäcker)
- Total Material Requirement(TMR) as indicator
- Material intensity per unit service(MIPS) as indicator
- Eco-efficiency indicator(based on LCA)
- Linking factor X to wastes

Reijnders proposes TMR and MIPS as indicators of dematerialization and LCA-based indicators for policy discussions.

A Factor X for what?

”The factor X may relate to a variety of objects ranging from individual products to the economy as a whole.”

A centrepiece in the factor x debate has been what may be called an ”average unit of economic service”

But: ”There is limited acknowledgment so far of the possibility that, given technical constraints, the factor X that can realistically be achieved for a given economic activity may vary considerably among alternatives.”

Does X Make Societal Sense?

”Taking the factor X debate seriously is mainly limited to a number of European countries.”

Supposition: Rejection of quantitative targets reflect unwillingness to go through the troubles of meeting those targets.

One may argue that there are quantitative limits to resource exploitation or adding wastes to the environment that cannot be exceeded without heavy penalties.

Is Improvement of Technology Sufficient?

But: Gains in efficiency in production may be eaten away by increased consumption.

Several participants in the debate have raised the question whether changes in technology will be enough: Pricing, affluence and taxation will also be important.

It has also been argued that institutional changes will be necessary.

How to Implement Factor X Technology?

- Social learning by example
- Government-driven technology forcing
 - Law
 - Internalize environmental costs by taxation
 - Tradable emission rights
- Institutional change

There is probably a good case for adopting a policy mix for governmental technology forcing.

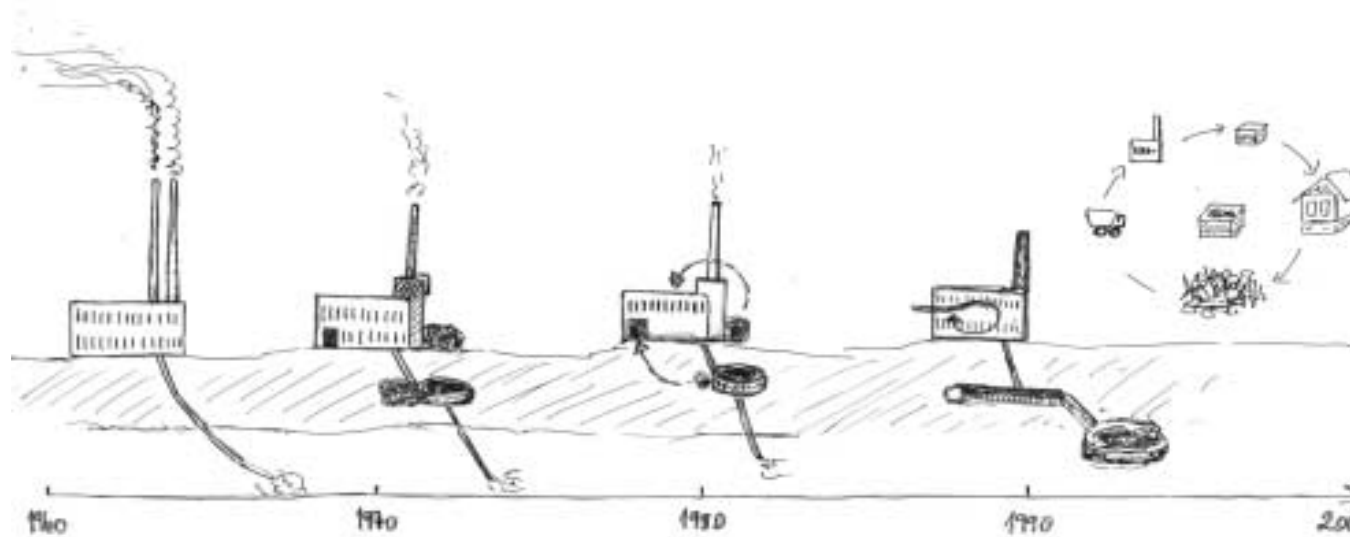
Conclusion

”Although the factor X debate seems still in its infancy and so far has had only limited societal impact, this should not detract us from its potential importance.”

There exists a need for dematerialization, or major improvements in eco-efficiency and natural resource productivity. Quantifying such improvements over time may facilitate adequate policy.

”However, major environmental benefits from the factor X debate will only materialize when there is a stronger participation of industry and government outside the limited group of European countries that have participated so far.”

The History of Environmental Strategies



Strategy 1:

Dilution

Strategy 2:

End-of-pipe
treatment

Strategy 3:

Recycling and
recovery

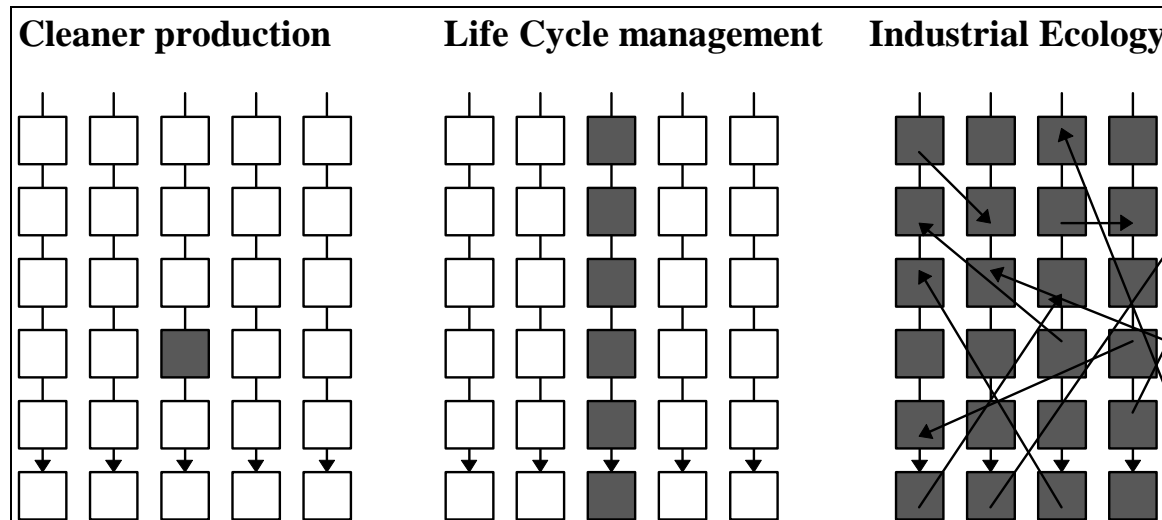
Strategy 4:

Cleaner
production

Strategy 5:

Life Cycle
Management

Industriell økologi - nettverk av verdikjeder



PRINCIPLE DIFFERENCES BETWEEN CLEANER PRODUCTION, LIFE CYCLE MANAGEMENT AND INDUSTRIAL ECOLOGY

STRATEGY	SYSTEM BOUNDARIES	METHODS AND TOOLS
Cleaner production	Single plant or part of plant	Waste minimization assessment
Sustainable Product Management	Value chain of single product	LCA and Sustainable Product Mgmt.
Industrial Ecology	Web of product value chains	?