#### Technology in Sustainable Development



Karel Mulder

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**Delft University of Technology** 

Looking back from the future to design actions now

Involve various stakeholders Start with needs, not with technology Analyze the need, what do stakeholders really want? Build consensus



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Clear future visions have a strong guiding power

#### e.g Man on the Moon

Define and clarify an attractive sustainable future It forces to specify standards and principles Alternative for traditional forecasting Fit for 'wicked problems'

Experiences: The Natural Step,

Netherlands: Sustainable

Technology Development program



http://images.ksc.nasa. gov/photos/1969/





From future vision to action by design and analysis

Organize the process carefully, the process is important,

Facilitate learning of participants

Facilitate the social embedding of the results







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### Backcasting Toolkit: 4 methods

#### **Participation and interaction**

workshops, visioning, creativity stimulation, brain storms

**Design** and scenario-methods modeling, forecasting

**Analysis**- and modeling-methods LCA, effect analysis, stakeholder analysis

Management-methods for Process-, Project-, and Network management



### Backcasting In 5 steps

- Step 1 Strategic Problem orientation Analysis
- Step 2 Prepare a vision of a desirable future *Vision*
- Step 3 Back-casting What do we need to make this come true?
- Step 4 Further elaboration D*etailing*
- Step 5 Implementation

Policy implications, organizing embedding & follow-up

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#### **Step 1 - Strategic Problem orientation**

Strategic Problem orientation

Which needs to fulfill?

- Trends and possible changes that are relevant for this need?
- What is the problem, how is this problem perceived by various groups?

What are the unsustainabilities and what are the causes? Who are the stakeholders?

What are potentially directions to seek solutions?

Methods

Actor/Stakeholder analysis, socio-technical map

Interactive methods (interviews, workshops, etc)

### **Backcasting** Example: Soy Fodder $\rightarrow$ Pigs $\rightarrow$ Meat Products

The Netherlands is importing large amounts of Soy fodder from Brazil, where it is often grown in areas that were cleared from tropical rainforest.

The soy fodder is used to feed pigs in a specific region. Pigs manure creates local ammonia contamination.



http://en.wikipedia.org/wiki /Image:Soybean.USDA.jpg



### **Backcasting** Example: Soy Fodder $\rightarrow$ Pigs $\rightarrow$ Meat Products

The pigs (or the pigs meat) is often transported to Italy. Some of the meat is afterwards returned as real 'Parma Ham'.

The proteins that are actually consumed only account for a few percent of the plant proteins in soy fodder.



Wikimedia.org





### **Backcasting** Strategic Problem Orientation

What is the need?

What are the current unsustainabilities?

Who are probable stakeholders?





**Step 2 - Prepare a vision of a desirable future** 

Prepare a desirable future

Terms of Reference?

What socio/technical options are available?

Are the unsustainabilities solved?

Which technology is needed?

How does it affect culture and structure of society?

What are important trends, and events?

Could we make the future vision even more sustainable?

Methods

Workshops Creativity stimulation, designing Consensus formation Illustrations



### Backcasting Step 3 - Back-casting

**Back-casting** 

What do we need?

Which changes are needed to make the future vision come true (technologic, cultural, organization/structure)?

Who can implement the changes.

How could the changes be made attractive for these actors?

Can stepping stones be defined?

Methods

Analysis and modeling



#### Step 4 - Further elaboration, detailing

Elaboration, analysis

A possible design of a socio-technical system

Effects of these systems for various stakeholders?

What are drivers, barriers?

What follow-up is needed (policy, research, development, publicity)?

Methods

Methods for Environmental Impact Analysis, consumer studies, economic analysis of elements of system

Technology Assessment methods (checklist, cost/benefit, etc)



### Backcasting Step 5 - Implementation

Agenda, embedding & follow-up

What should be done to guarantee successful further activity after a backcasting project has been carried out?
How to embed specific projects and proposals?
Agreements on further process and conflict resolution.

Methods

Communication Management

General

Project management, team building, communication (process) evaluation

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