

The Biobased Economy



**The Biobased Economy: biofuels,
materials and chemicals in the
post-oil era**

*Book launch Copenhagen
14 December, 2009*

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The Biobased Economy



Setup

- Aiming at sustainability
- Causal relations (or lack thereof)
- Transition processes
- Book structure
- Some examples
- Conclusion

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Biobased economy is defined as:

'Technological development that leads to a significant replacement of fossil fuels by biomass in the production of pharmaceuticals, chemicals, materials, transportation fuels, electricity and heat'

Chapter 1, p. 6

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Rationale for the book

- *accumulated* effect of biobased technologies can change the way we live
 - not just biofuels
 - not just sustainability or land use
- use of biomass in biobased economy part of a long term transition process
 - not just agriculture or transportation
 - not just producers

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Rationale for the book

→ it is not the technology what matters, but the *implementation*. There is more than one:

- driving force
- way to implement technologies
- justification or rationale
- sustainability or social assessment

→ we need to study the entire transition process: driving force, technology plus application

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Causal relations (or lack thereof)

- Biomass markets
- Biomass production processes
- Input markets
- Land and water
- Side-effects
 - (un)desirable
 - (un)known

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Transition processes

- Multiple actors
- Multiple sectors
- Multiple levels
- Feedback and interaction
- (Non-)linearity

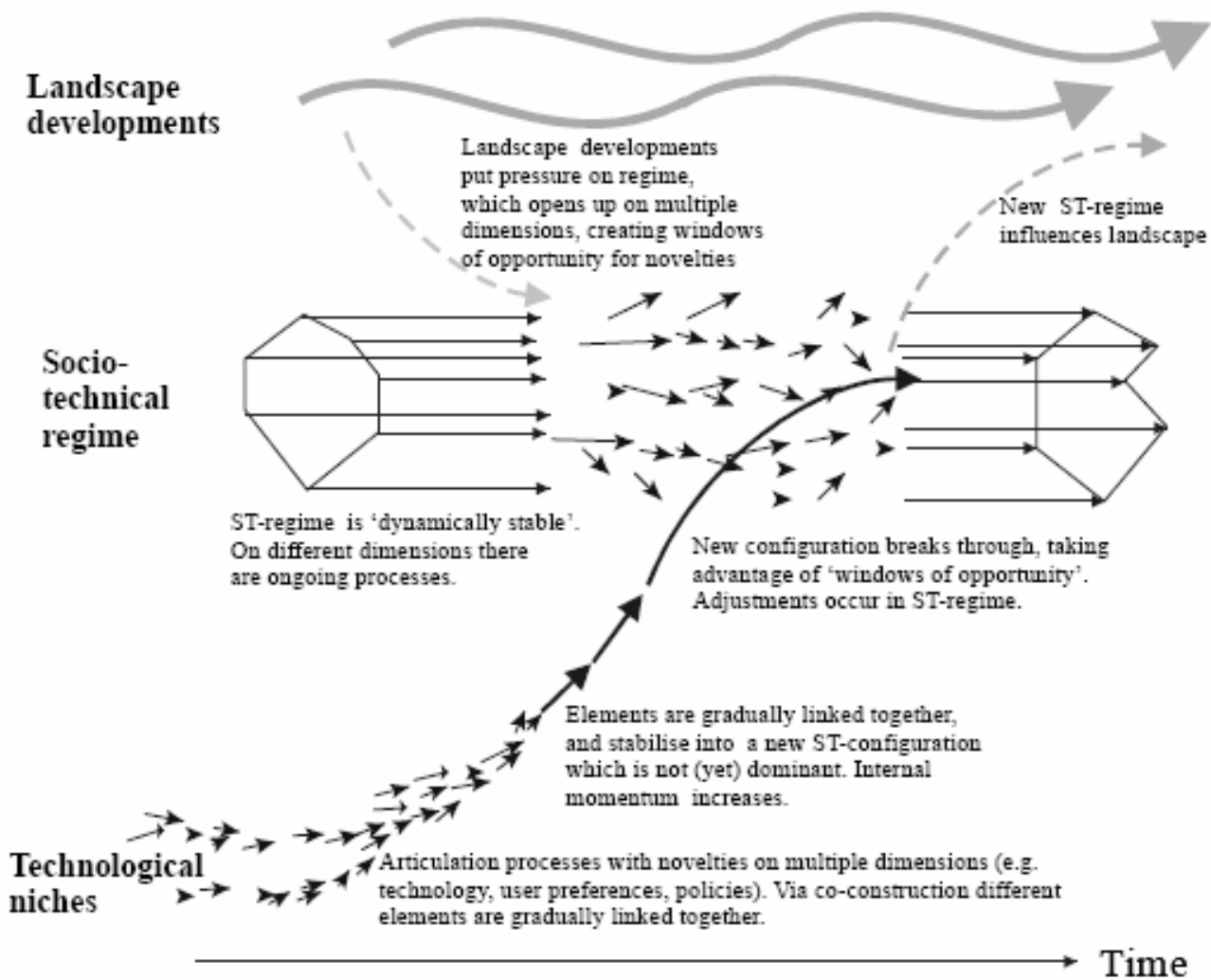


Figure 5. A dynamic multi-level perspective on system innovations (Geels, 2002b: 110)

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Book structure

→ Sections

I: Introduction

II: Technology

III: Actors

IV: Case studies

V: Synthesis

→ Editors, authors, institutions

→ Publisher: Earthscan

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Sections

- I: Introduction, Transition, Sustainability, Principles of plant production, Breeding, Availability
- II: Biorefinery, Chemical feedstocks, Biofuels, Biogas
- III: Policy, Markets, Production chains, Development, Debate
- IV: Brazil, Germany, Canada, the Netherlands
- V: Synthesis

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Example: availability and sustainability

- Principles of plant production
- Sustainability
- Breeding
- Biorefinery
- Policy, markets, debate
- Case studies

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Example: availability and sustainability

- Principles of plant production
 - C3 vs C4 pathway: rubisco enzyme
 - Potential – actual yield levels
- Sustainability
 - Historic overview of sustainability thinking
 - LCA's, energy / GHG balances
- Breeding
 - Improve yields, input use efficiency
 - Crop composition

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→ Biorefinery

Biocascading

Classification system

Biorefinery toolbox (conventional, advanced)

→ Technologies

Chemicals

Materials

Biofuels

Biogas

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→ Policy, markets, debate

Overview of (types of policies)
Production chain development
Impact of policies on markets
Role of public debate

→ Case studies

Yield and efficiency improvement Brazil
Impacts on energy / GHG balance
Potential / input delimited yields
Case studies on Brazil, Germany, Canada,
Netherlands

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Example: chemicals and materials

- In-plant production
- Breeding
- Biorefinery
- Chain development
- Case studies

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Conclusion

- First comprehensive book on biobased economy
- Technological development in context
- Markets, policy, debate
- Case studies
- Synthesis and outlook