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08-06-2017

Policies for system change: the transition to the Bioeconomy

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Background and conceptual framework: Policies for transformative change

- Focus on grand challenges (Kuhlman & Rip 2014) and system change (OECD 2015)
- Three generations of innovation policies (Schot and Steinmueller 2016)
- Policies for transformational change (Weber and Rohracher 2012)
- Policy mixes for sustainability transitions (Rogge and Reichardt 2016)
- The spatial construction of sustainability transitions, (Coenen, Benneworth, and Truffer 2012)

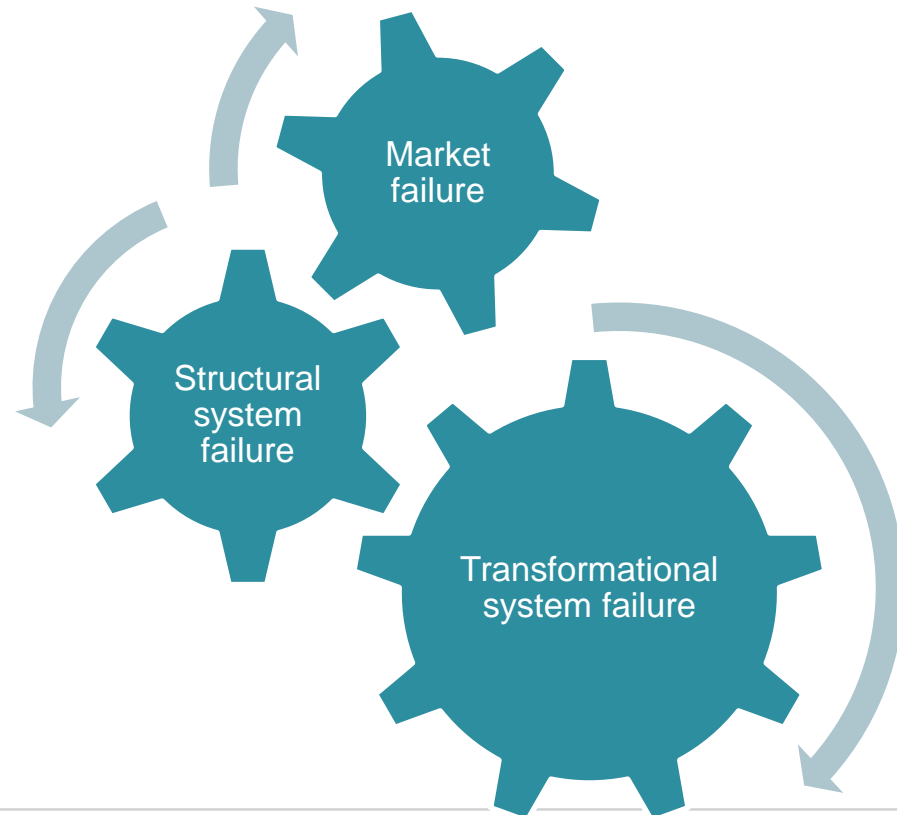
What is the transition to the bioeconomy?

“The conversion to a bio-based economy means a transition from an economy that to a large extent has been based on fossil materials to a more resource-efficient economy based on renewable raw materials”

(FORMAS The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, 2012)

Objective

- *To study how policy strategies for the bioeconomy are formulated, and how they constitute co-existing policy rationales*



Research questions

- How is policy to address the transition to a circular bioeconomy legitimized (*market failures, structural system failures or transformational system failures*)?
- How can the different policy strategies identified be interpreted as an expression of a policy mix across the three different policy rationales?
- What are the policy strategies and instruments characterizing the policy mixes across the Nordic countries?

Data & methods

- A comparative case study approach including Sweden, Denmark, Finland and Norway
- A systematic review of national bioeconomy related policy documents to identify policy objectives
- Semi-structured interviews with policy makers (focus on rationales of the policy instrument mix)



Matrix for analysing data

Policy mix	Market failures (neo-classical)	Structural system failure (innovation systems)	Transformational system failures (system innovation)
Strategy (objectives and action plans)	Underinvestment in R&D	Infrastructural failure	Directionality failure
	Negative externalities	Institutional failures	Demand articulation failure
	Over-exploitation of commons	Interaction or network failure	Policy coordination failure
		Capabilities failure	Reflexivity failure
Instruments			

Preliminary findings

Examples and quotes

Policy mix	Market failures (neo-classical)	Structural system failure (innovation systems)	Transformational system failures (system innovation)
Strategy (objectives and action plans)	Underinvestment in R&D <i>"The authorities also have a role to provide for appropriate regulations and correct for market failures" (Norway)</i>	Infrastructural failure <i>Emphasis on the importance of developing the infrastructure for collection of food waste (Sweden)</i>	Directionality failure <i>Explicit reference to the bioeconomy as a transition and circular economy as systemic change (Finland)</i>
	Negative externalities <i>"The most effective means of promoting fossil-free solutions will be to price the products that pollute" (Norway)</i>	Institutional failures <i>"The impact of institutional preconditions, laws, policies and standardisation on the innovation system and the opportunities for the development of new products and services in a bioeconomy must also be considered" (Denmark)</i>	Demand articulation failure <i>Explicit focus on sustainable public procurement to improve the competitiveness of bio-based products and influencing consumer choice. Increase public awareness targeting working life, scientists, teachers and students (Finland)</i>
	Over-exploitation of commons <i>"Health and environmentally harmful chemicals and other foreign substances can be heavily biodegradable, and will accumulate to unwanted levels if they are not taken out of circulation when resources are recycled and circulated" (Norway)</i>	Interaction or network failure (The Bioeconomy) <i>"necessitates widespread collaboration between companies, sectors, universities, colleges, research institutes and public sector organisations" (Sweden)</i>	Coordination <i>"There is potential for enhanced coordination of public support for research, development and demonstration as well as other coordination between the different ministries on prioritization of the bioeconomy" (Denmark)</i>
		Capabilities failure <i>"It will be necessary to further develop our relevant research and innovation environments, including through the interaction between land and ocean-based industries and knowledge environments, and stronger interaction with the health sector" (Norway)</i>	Reflexivity failure <i>Acknowledges the need for increasing the knowledge on how regulatory and administrative barriers hinder the transition towards a bioeconomy (Sweden)</i>

Norway

● Market failure: Strong ?

- Emphasised that externality pricing is the most effective policy instrument
- Science push
- Hands-off strategy for industry development
- No sectors prioritized

● Systems failure: Relatively strong ?

- Network failure: lock-in problems of existing bioindustries central to the argument for cross-industry synergies
- Capabilities failure: Dominant and underlying strategy document
- Actors involved in implementation are the existing/usual ones

● Transformational system failure: Weak ?

- No overall vision giving direction for long term development
- No action plan or time table for action
- Emphasis on coordination across disciplines, industry and wider societal dialogue
- Demand articulation: market creation one in four priority areas; public procurement suggested to reduce market risk

Sweden

● Market failure: Weak/Present (?)

- Research, innovation and demonstration support is generally emphasised due to underinvestment in the private sector
- Research agency acknowledges the difficulty of pricing all externalities on biological biodiversity and ecosystem services”
- But the government expresses the need for a definition of the economic value of ecosystem services to utilise the ecosystems more sustainably”

● Systems failure: Strong (?)

- R&D support is also emphasised in line with addressing capabilities failure
- Attention to the role of formal institutions (laws, policies, standardisation) but also on informal institutions, especially for food waste issues

● Transformational system failure: Present/Strong (?)

- Priority given to forestry provides a direction to the strategy
- Considerable focus on influencing consumer demand to support market creation for bio-based products and involving users in giving recommendations to and setting priorities for current and future bioeconomy research and innovation support
- Call for increased coordination between policy areas, in particular horizontally across industry sectors and along value chains
- Reflexivity: Acknowledgment that there is a need for better knowledge about administrative and regulatory barriers and how these hinder the transition to the bioeconomy

Denmark

● Market failure: Present (?)

- Attention on demonstration projects and “valley of death” issues. Overall rationale behind the need for public funding
- High priority to investments in R&D, demonstration and education

● Systems failure: Present (?)

- Institutions: Working for common standards and to ensure the sustainability in biobased products
- Networks and interaction: Emphasis on the need to connect designers in the development of products as a way to bridge the gap to consumers, this is addressed with a funding scheme

● Transformational system failure: Strong (?)

- Focus on ensuring a sustainable bioeconomy, especially in relation to biofuels
- Public procurement is also stressed as central.
- Attention to the need for long lasting public-private partnerships;
- Collaboration between engineers, chemists and designers to increase the market potential
- Establishment of a national bioeconomy panel
- Call for more horizontal and multilevel coordination between policy areas in relation to funding schemes and regulations and coordination between ministries about priorities related to the bioeconomy.
- Establish advisory groups a, boards, panels to advice the government on issues regarding circular economy, bioeconomy, resource efficiency.

Finland:

● Market failure: present/ strong?

- Increased public funding for RD&D is seen as essential for reaching the growth objectives of the strategy;
- Economic growth and employment are the two main long term targets of the strategy

● Systems failure: Strong?

- Explicit attention on the role of legislation and steering instruments for the bioeconomy in administrative branches of the ministries. It is recognised that unnecessary administrative burdens and regulations may hinder the industry from exploiting biomasses.
- Emphasis on risk financing to create new business opportunities from the bioeconomy.
- A main strategic goal of the strategy is to ensure a strong competence base in bioeconomy sectors.
- The strategy emphasises the need for strong sectoral cooperation

● Transformational failure: Strong?

- Specific long-term vision supported by targets and strategic goals; quantifiable targets are used; prioritisation of RD&D funding
- emphasis on risk financing and support for bold experimentation;
- timetable for the launch of measures
- Focus on multi-stakeholder interaction
- Explicit focus on: sustainable public procurement to improve the competitiveness of bio-based products; and influencing consumer choice
- Establishment of a bioeconomy panel for coordination and implementation of policies
- Strategy implementation to be monitored using indicators; explicit attention on developing indicators for the sustainability of the bioeconomy;
- Foresight and scenario system analysis to support policy making.

Summing up logics in the policy strategies

	<i>Market failure</i>	<i>Systems failure</i>	<i>Transformation failure</i>
NO	Strong	Present	Weak
SE	Weak	Strong	Present
DK	Present	Present	Strong
FI	Present	Strong	Strong

Preliminary conclusions

- The case study analysis serves as an empirical example and manifestation of the conceptual framework applied
- The analysis confirms relevance of the conceptual framework
- Bioeconomy policy strategies involves all three generations of innovation policies
- Policy legitimized by market failures and structural system failures may also support shifts in socio-technical regimes
- The three policy logics represents rationales of the national policy mixes and constitutes a notion of depth in the respective policy mixes

A lush green forest scene with tall trees and a grassy clearing. The text is centered in the middle of the image.

Thank you!
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