

Systems analysis for urban sustainability transitions

a joint understanding of complexity and dynamics

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Overview

- Sustainability Transitions & Transition Management
- Systems Analysis Methodology
- Case study Ghent
- Reflections and Lessons Learnt

Sustainability Transitions & Transition Management

Barriers to sustainability ambitions

- Local government is just one of the actors
 - Societal complexity implies loss of direct control and planning capacity
 - While you're making plans, society is moving in another direction
- Domain focus and institutional fragmentation
 - Incomplete and fragmented knowledge, suboptimal strategies, fragmented and segmented institutions
- Regular policy reinforces incremental improvement
 - Policies sub-optimize existing systems and often treat symptoms rather than problems. Persistent problems prevail
 - Limited or no space for alternative choices. Chosen policies deal marginally with society's dynamics. Fundamental changes in *culture, structure and practices* are needed
- Short term focus and discontinuity
 - Political cycles and dynamics influence policy agendas and priorities
 - Unclear and uncertain (long-term) benefits from current actions
 - Visions and strategy work does not always link to action

Reinventing roles

- For shifting to sustainability we need an approach that can deal with *complexity* of sustainability challenges, which...
 - are deeply embedded in societal structure
 - have multiple causes and consequences
 - involve a wide range of domains, actors and scale levels
- > Transition Management is such an approach

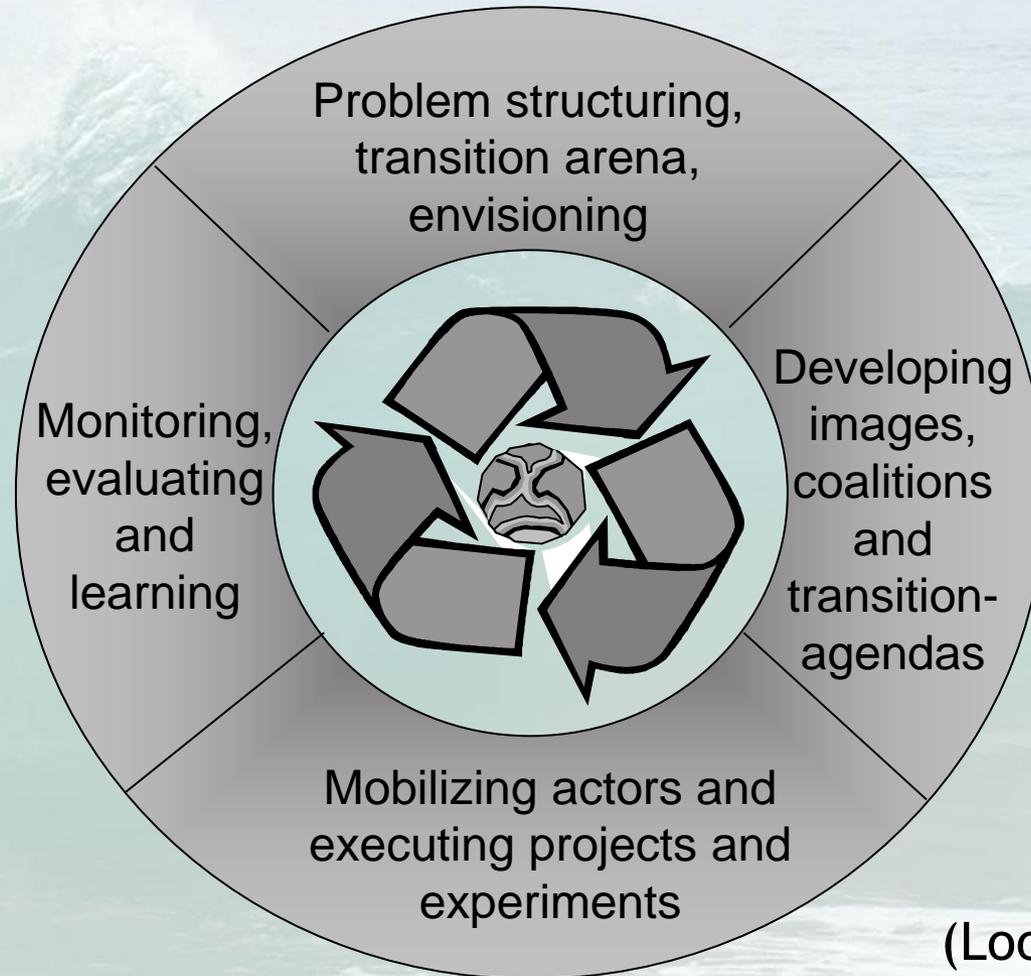
Transition Management

process guidelines

- Creating space for niches
 - starting with change-agents and frontrunners
- Learning-by-doing and doing-by-learning
 - long-term thinking as the basis for short term action
 - learning as an important aim for policy
- Systems perspective
 - multi-domain, multi-actor and multi-level (landscape/regime/niche)
- Radical systems innovation in incremental steps
 - orient governance towards system innovation besides system improvement -> change in *culture, structure and practices*
- Safe-guarding diversity and flexibility
 - keep options open, explore multiple pathways, accept uncertainty

Transition Management Cycle

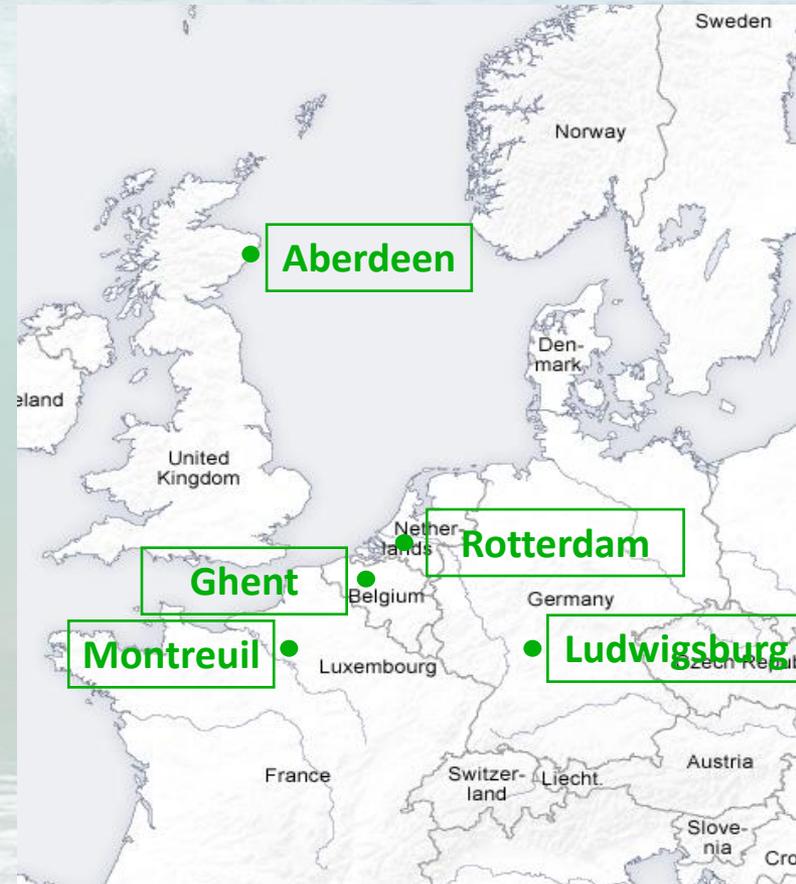
Process Structure



(Loorbach, 2007)

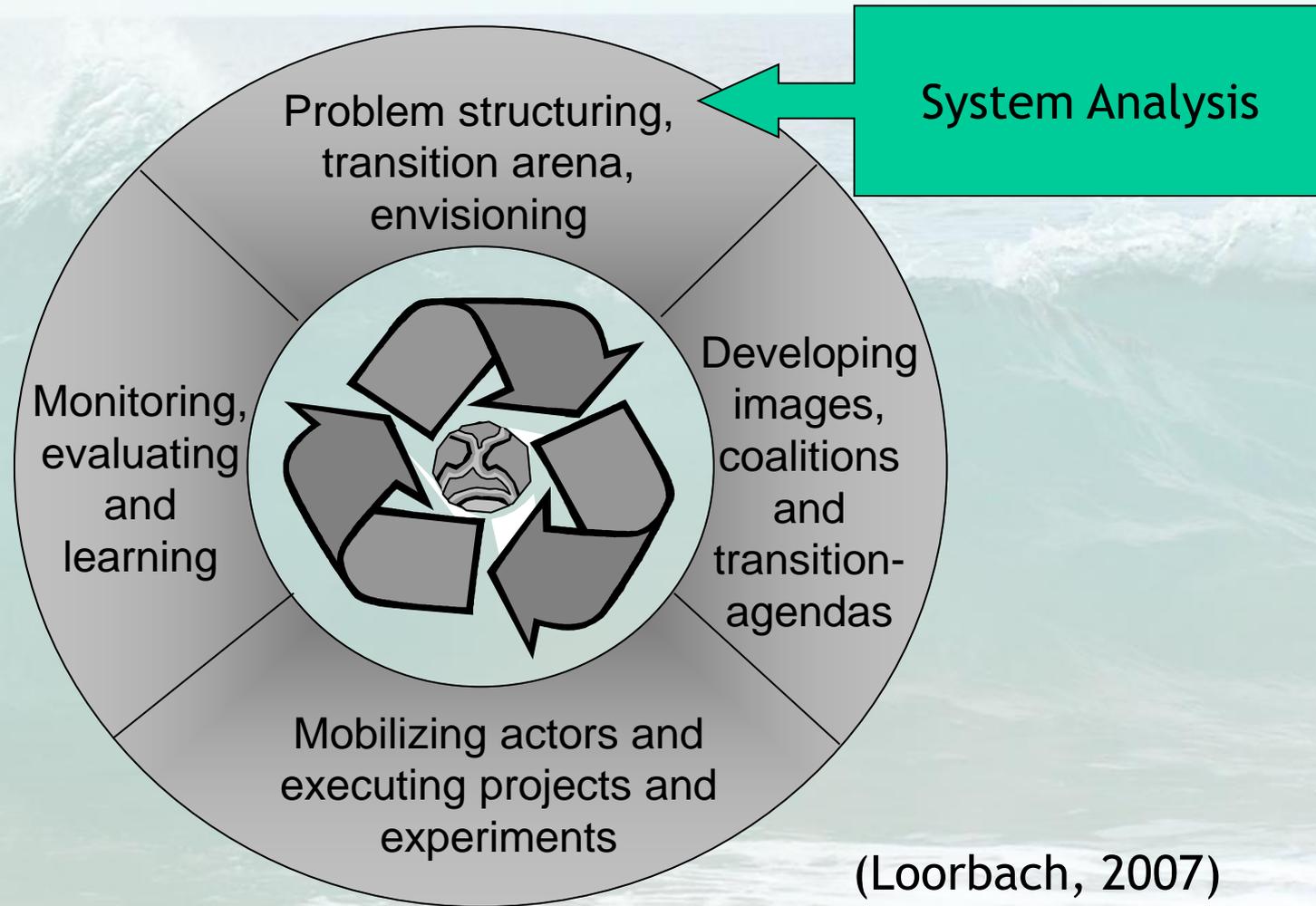
Transition Management in Urban Context

- Transition Management applied at national level in sectors and regions
- Adapted to city-specific challenges within the MUSIC project
- 5 cities search for pathways to a low carbon future



Transition Management Cycle

Process Structure



Systems Analysis Methodology

Need for a Systems Analysis Methodology

- Systems analysis needed as starting point for this holistic, participative approach
 - enabling different backgrounds working together
 - integrating domains and making sense of complexity
 - combining “hard” with “soft” data
- Most (environmental) systems analysis tools follow rational, linear hard systems thinking
 - > *tailored systems analysis methodology*

Objectives of System Analysis

Content goals:

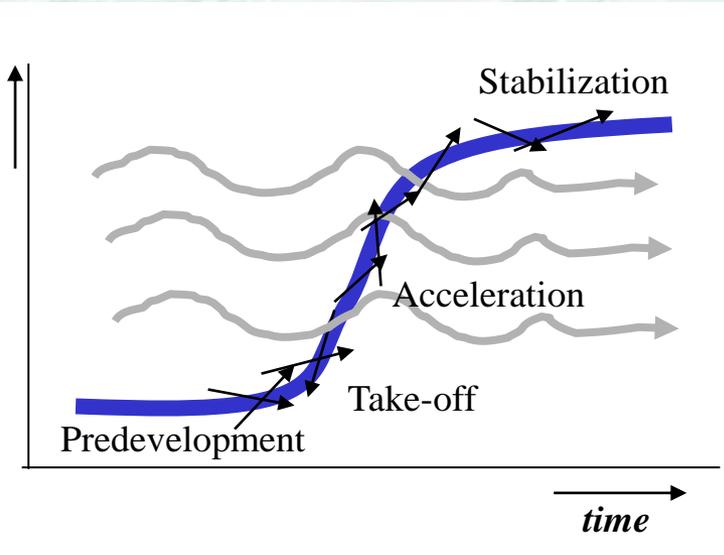
- Overview & analysis of the state and characteristics
- Analysis of the history
 - development, path-dependencies, historical parallels
- Problem formulation from a system's perspective
 - seeing interdependencies, distinct causes from symptoms

Process goals:

- Stimulate holistic thinking
- Provide a common information base and shared understanding amongst actors
- Create a sense of urgency

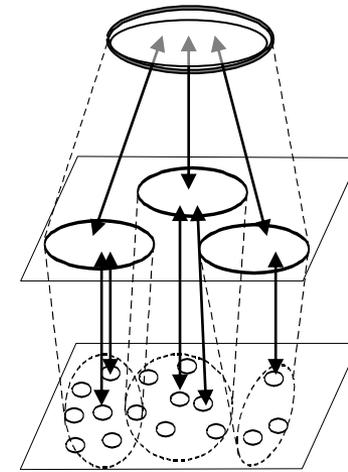
Systems Analysis Methodology builds upon

multi-phase model



From: Rotmans et al, 2000

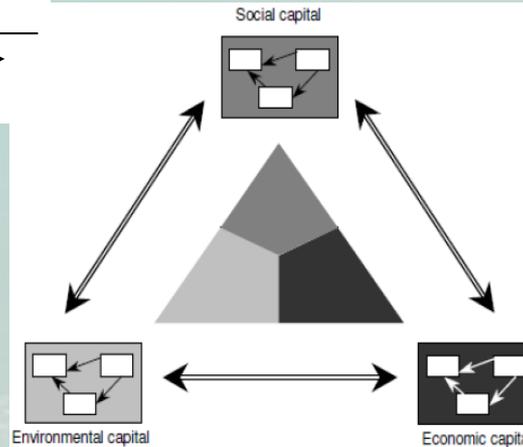
multi-level model



- Macro-level**
(landscape, trends)
- Meso-level**
(regimes, institutions)
- Micro-level**
(niches, individuals)

From: Geels and Kemp, 2001

SCENE model



From: Rotmans, 1998

System Analysis Methodology

- **Step 1:** system definition
- **Step 2:** system structuring
- **Step 3:** data gathering
- **Step 4:** data assessment and analysis

Lenses:

- Historical sketch
 - Landscape influences
 - Description of stocks
 - Relations between stocks
 - Selection of main themes
 - Trend analysis
 - Dominant structure, culture and practices
 - Identification of niches
- macro
- meso
- micro

Case Study: Ghent

Foto: Stad Gent

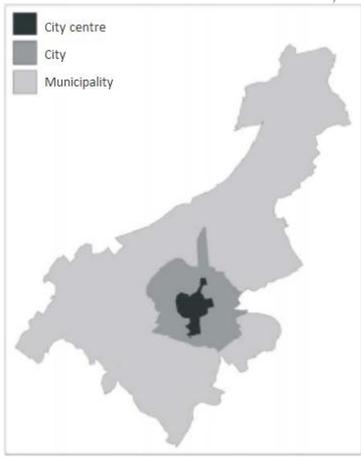
Ghent

- Ghent ambition: climate neutral in 2050
- Tasks climate team: “to study” & “to involve”
- Systems analysis methodology applied in context of (participatory) transition management approach



Systems analysis Ghent

1. System definition



2. System structuring

3. Data gathering



Domains	Stocks	Characteristics	
Environmental domain	Water	Surface water Water quality Water use	
	Green space	Surface forest and nature Public green space Green roofs	
	Energy	Energy production/consumption Renewable energy Energy infrastructure	
	Waste, soil and nuisance	Municipal waste Soil pollution Nuisance	
	Air pollution	Air quality Fine particulate matter emissions CO ₂ emissions	
	Social domain	Population	Population density Demographics Immigration/emigration
Housing		Ownership Housing types Energy performance	
Social services		Education Healthcare Associations	
Liveability		Satisfaction of living Social cohesion Segregation	
Leisure		Sports Culture Lifestyle	
Participation & politics		Participation possibilities NGOs Political attention energy/climate	
Economic domain		Mobility & infrastructure	Car use Public transportation Infrastructure
		Economic vitality	Income Unemployment Educational level
	Economic sectors	Harbour Knowledge institute Services	
	Knowledge & innovation	Knowledge economy (Green) investments	

Systems Analysis Ghent

4. Assessment and analysis

Presentation

Group discussions

Wrap up (ppt)

Background report

Landscape influences

State of the system

Dominant structure, culture and practices

Emerging niches

Historical sketch

System map

Trend analysis

“Trumps”

Systems Analysis Ghent

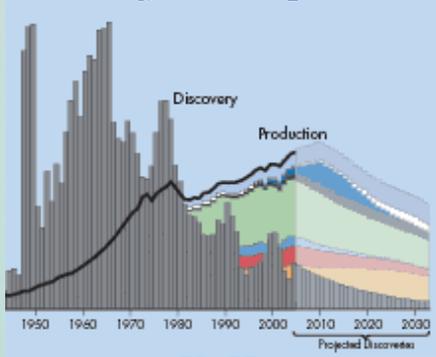
4. Assessment and analysis

Presentation

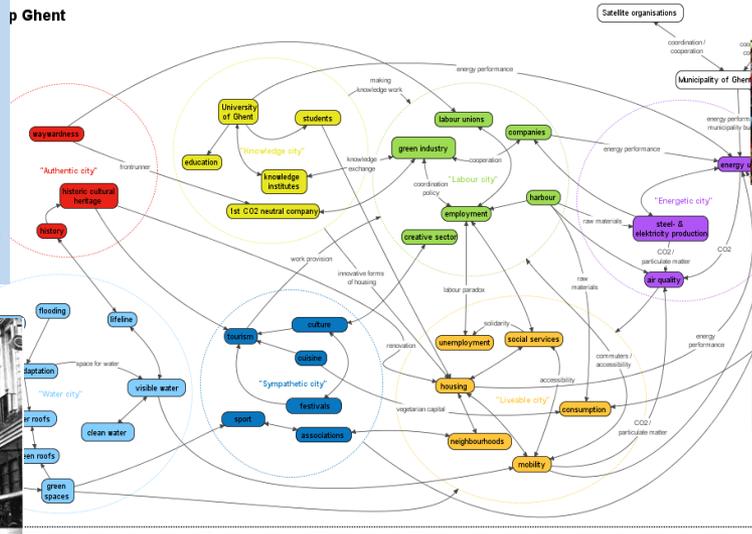
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Wrap up (ppt)

Background report



Ghent



Gent heeft troeven



Kennisstad



Gent heeft troeven



Economische stad



Gent heeft troeven



Waterstad



Gent heeft troeven



Groene stad



Gent heeft troeven



Levende stad



Gent heeft troeven



Energieke stad



Unraveling the dynamics and complexity of Ghent's urban context

Policy-science dialogues

- broadening the problem perception
 - from the narrow environmental focus on climate and energy towards a more holistic view of becoming a social, green and liveable city
- looking with eyes of others, acknowledgement of relevance of other actors
- putting climate neutrality on the agenda in various departments
- inspiration from policy in the past
- embracement of approach to be repeatedly applied

“I realized how little I knew of what is going on in my own hometown” (city officer)

Unraveling the dynamics and complexity of Ghent's urban context

Multi-actor negotiation

- Recognition: many different actors make up current situation and influence development
- Systems analysis helped to overcome difference in backgrounds and perspectives
- Participants recognized their perspective in the systems analysis, so it was “theirs”
- Catalyzer for mutual understanding and learning between the participants

“I valued the mix of technical knowledge and different backgrounds” (Workshop participant)

Reflections and Lessons Learnt

System Analysis objectives achieved?

- Content goals:

- Overview & analysis of the state and characteristics

Yes

- Analysis of the history

Yes, but...

- Problem formulation from a system's perspective

Yes, but...

- Process goals:

- Stimulate holistic thinking

Yes, very much

- Provide a common information base and shared understanding amongst actors

Yes, but...

- Create a sense of urgency

Yes

Evinced Added Value

*“This helps to get the concept of climate neutrality on the agenda in every department”
(Ghent City Officer)*

“Participation trajectories often fail because citizens do not have sufficient knowledge or only defend their own interests. This is a method for participation where the level of knowledge is increased and complexity of the subject is acknowledged.” (Ghent City Officer)

Application and Adaptation of Methodology

- Matters *why* to apply it:
 - Systems analysis can be applied with many different techniques
 - This system analysis methodology aimed to fit urban context and to provide input for a holistic, participatory transition management process
 - Not a “one size fits all”, careful application is needed
- Matters *who* applies it:
 - different problem entry points, different narratives
 - in Ghent, Environmental Officers framed the initial problem in terms of environmental threats (Aberdeen: economy risks, Rotterdam: urban development prospects)

Tensions

- Time/process versus content
 - In-depth exploration of the problem versus keeping the enthusiasm
 - In-depth discussions versus being specific and on-track of project/process objectives
- “Hard” data versus perspectives
- Systemic versus perceived problems
- Exploring problems versus looking for solutions
- Need to be self-critical

Thank you for your attention

For more information and publications:

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www.twitter.com/drifteur

www.sustainabilitytransitions.com

www.themusicproject.eu



More insights from the MUSIC project

- Website: www.themusicproject.eu
- Mid-term conference: November 21, Ghent
 - (incl presentation of *Urban Transition Management Manual*)
- Conference papers in August:
 - *Policy maker meets policy maker: Legitimizing Urban Transition Management and CO2 reduction in local governments (IPA conference)*
 - *A climate of change: a transition approach for carbon neutrality in the city of Ghent (IST conference)*
 - *Envisioning urban sustainability transitions: Lessons from an envisioning process for climate mitigation in five European cities (IST conference)*
 - *Making sense of complex systems: Exploring the challenges and opportunities for urban sustainability transitions with a systems analysis in Ghent and Aberdeen (IST conference)*

Key publications TM

Transitions Approach

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- Van der Brugge, R., and Van Raak, R., (2007), Facing the adaptive management challenge: Insights from transition management, *Ecology and Society*, 12.
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Transition Dynamics

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- Loorbach, D., (2010), Transition Management for Sustainable Development: A Prescriptive, Complexity-Based Governance Framework, *Governance: An International Journal of Policy, Administration, and Institutions*, 23(1), 161-183.
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- Frantzeskaki, N., and Loorbach, D., (2010), Towards governing infrasystem transitions, Reinforcing Lock-in or facilitating change?, *Technological Forecasting and Social Change*, Vol.77, pp.1292-1301.
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