

Sustainability transition approaches



Energy Business and Innovation – Session 3

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Today's session

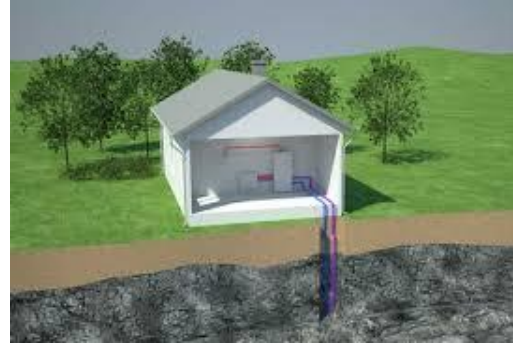
Sustainability transitions – short introduction

Group work 1 – create a poster on one of the transition theories

Group work 2 – gallery walk in groups

Wrap-up

What are sustainable energy transitions?



Sustainable energy transitions

Sustainability transitions in the energy sector involve changes, in:

- **Core technologies (e.g. wind, solar, EVs) as well as enabling technologies (e.g. storage, charging infra)**
- **New business models**
- **New regulatory frameworks**
- **Changing ownership structures**
- **New routines and practices**

New business model examples

Energy services for buildings

Mobility services

Renewable energy-based business models by utilities

(closer look at business models on Tue 17.05)



New regulation

Many policies and broader regulatory frameworks have been designed to facilitate the energy transition. E.g:

- **EU Fit for 55 – phasing out fossil fuels and supporting renewable energy**
- **Allowing micro-scale renewable energy to be sold to the grid**
- **Mobility services: requirements for operators to open up their digital interfaces for new mobility services**

More on policies on 10/05



Changing ownership structures

The move to decentralized renewable energy production also means some degree of shift in ownership from large businesses to smaller players:

- Energy communities (e.g. apartment blocks)
- Small-business owners (e.g. farmers)
- Households



New routines and practices

- **The role of the consumers is significant in more sustainable energy systems**
 - Active users of new services: holistic energy planning and management for households, new mobility services, demand response (reduction of unnecessary use or timing use more wisely)
 - Installing and owning renewable energy production
 - Thinking about your mobility needs, mode of transport and when to travel

Energy transition leads to more integration between sectors

- **Electrification of mobility and heating**
- **More integration of ICT solutions e.g. for energy system planning or mobility services**
- **Use of residual resources, e.g. agricultural or forestry byproducts for energy production**

Sustainability transitions as a research field

- **Originated in the late 1990s as an interdisciplinary social science research field, with an aim to tackle fundamental *environmental* sustainability challenges**
- **Tries to understand socio-technical system change through**
 - (a) creation and diffusion of innovations (niches, technological innovation systems)
 - (b) path dependencies, lock-ins and the processes of destabilising socio-technical regimes/systems
 - (c) influence of broader landscape changes

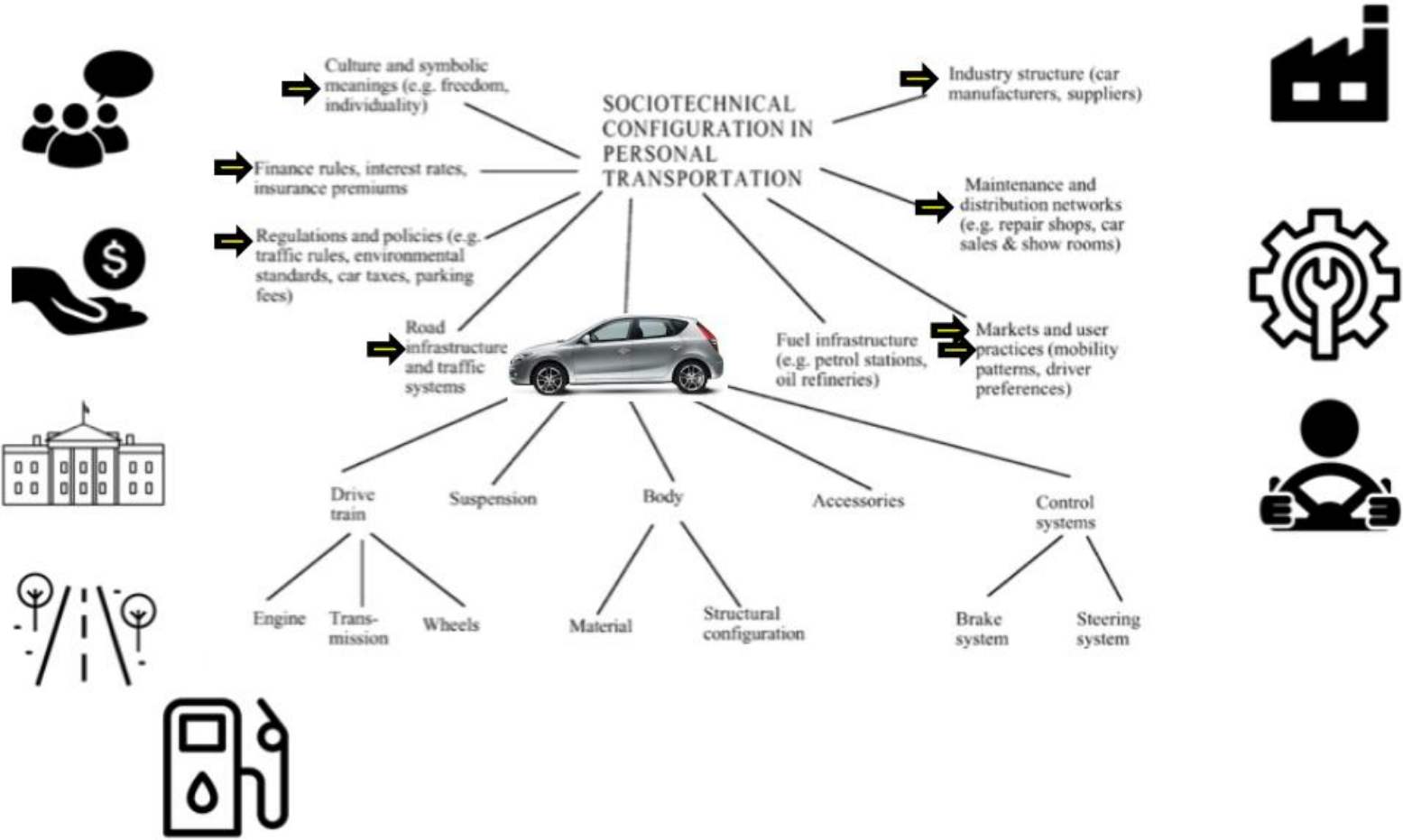
Key academic resources

- **Academic journal: *Environmental Innovation and Societal Transitions* (Elsevier)**
 - <https://www.journals.elsevier.com/environmental-innovation-and-societal-transitions/>
- ***Research Policy* also publishes a lot of research on transitions:**
<https://www.journals.elsevier.com/research-policy>
- **Sustainability Transitions Research Network (STRN)**
 - www.transitionsnetwork.org

Key concept: a socio-technical system

- E.g. energy supply, water supply, transportation, food supply
- *“consists of (networks of) actors (individuals, firms, and other organizations, collective actors) and institutions (societal and technical norms, regulations, standards of good practice), as well as material artefacts and knowledge”*
- Different elements of the system interact providing services for the society

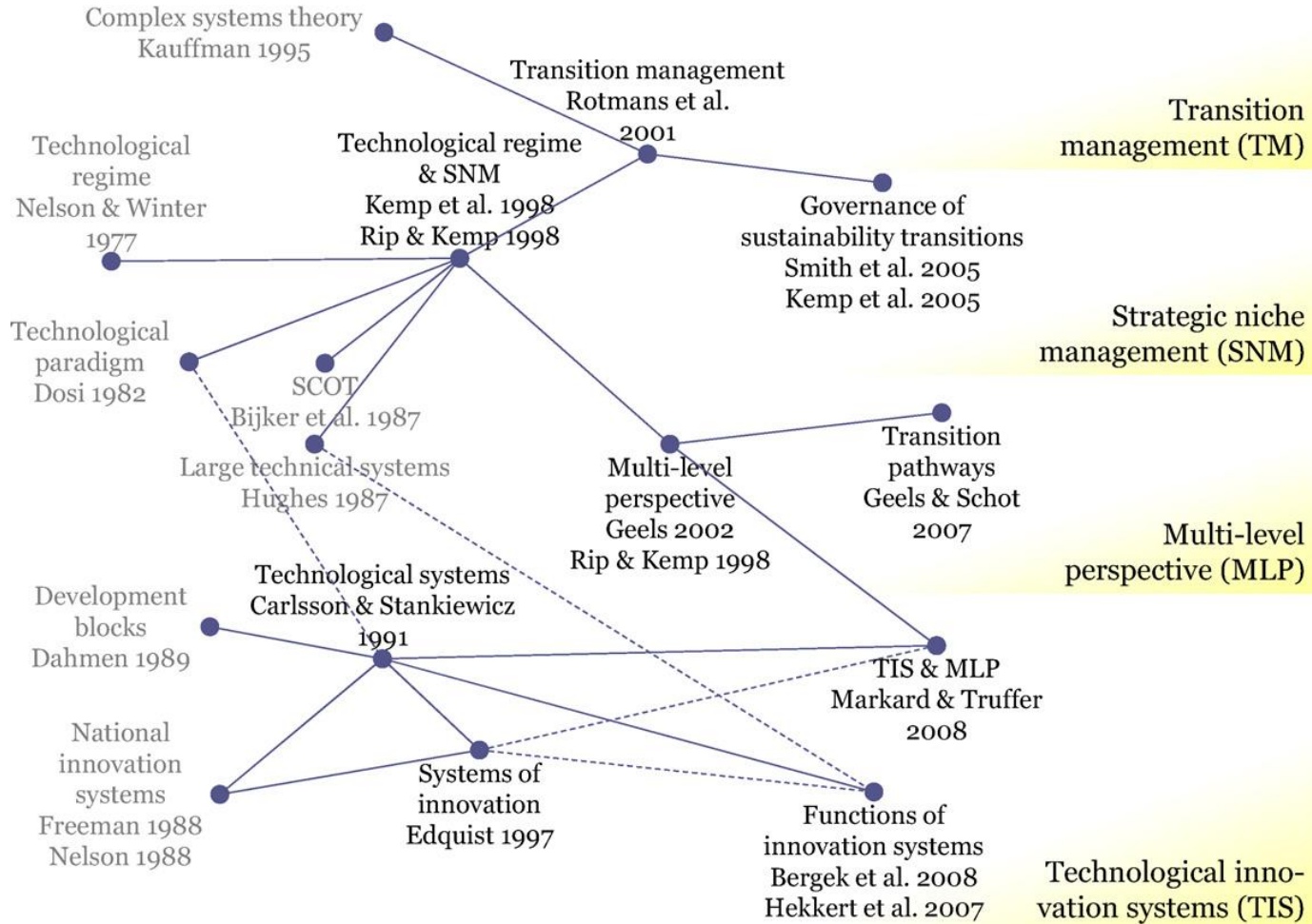
Example



Socio-technical transition

- ***“set of processes that lead to a fundamental shift in socio-technical systems”***
 - Contains extensive changes along different dimensions: not just technological, but also organisational, institutional, political, economic, and socio-cultural
 - Include a large variety of actors
 - typically take a very long time (> 50 years).
 - During a transition, new products, services, business models, and organisations emerge
 - Technological and institutional structures undergo fundamental changes

Four approaches



Markard et al. 2012

Group work

Group work process and tasks

The class will be divided to themes

- Multi-level perspective MLP
- Strategic niche management SNM
- Technology Innovation System TIS
- Transition management TM

Group size

- Each group will have >4 members
- We will have 2 main groups each of which have all 4 topics covered

There will be 2 rounds each 45 mins

- 1st round for poster creation (Flipped learning)
- 15 mins break after 1st round
- 2nd round for poster presentations (gallery walk)
- Wrap up

Poster content

- What it is (intro, basics)
- Unit of analysis
- Origins of the approach
- Figure(s) (optional)
- Canonical studies and author/year

- Utilize readings and all the resources you can find (Starting from Markard et al. and extra papers in MyCourses)

Poster presentation

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- 1st round for poster creation (Flipped learning)
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Groups and grouping

1st grouping:

- Group 1: MLP1
- Group 2: SNM1
- Group 3: TIS1
- Group 4: TM1

2nd grouping:

- Group 5: MLP2
- Group 6: SNM2
- Group 7: TIS2
- Group 8: TM2

2nd round: Mixed groups, circular through each poster in their grouping. Those who prepared the poster present

Cross-cutting concepts

- **Socio-technical regime** = the deep structure of the socio-technical system involving alignment between technologies, infrastructure, institutions, practices, behavioural patterns, markets, industry structures, etc. (Geels 2002, 2004)
- **Niche** = protected space, i.e., a specific market or application domain, where radical/disruptive innovations can develop uninfluenced by the selection pressures of the dominating regime (Kemp et al., 1998).

Conclusions

- 1. Energy transitions are more than just diffusion of renewable energy technology**
 - Changes in business models, policies, and practices – resulting in a systemic shift
- 2. Sustainability transition approaches aim to (1) explain how system transitions happen and (2) explore the ways we can accelerate them**
- 3. Fore core approaches with slightly different focus**
 - Transition management: a normative approach (i.e. toolkit) to facilitate transitions through vision building and experiments
 - Multi-level perspective & strategic niche management: broad interrelated approaches for explaining how transitions happen (with some implications for policy makers for developing right kind of strategies and instruments)
 - Technological innovation systems: focused on explaining and supporting the build up and diffusion of new (sustainability) innovations