



UNIVERSITY OF WESTMINSTER
Policy Studies Institute

New policy practices for a challenge led, broad based model of transformative innovation
Transition Cities and reconfiguring of sociotechnical networks

Fred Steward
Oslo January 2015



Modes of innovation

- Growing recognition of the diversity of modes of innovation
- *Mission oriented & diffusion oriented (1995)*
- *STI – Science, Technology & Innovation & DUI – Doing, Using & Interacting (Lundvall et al 'Forms of knowledge and modes of innovation', Research Policy 2007)*
- *Challenge led & technology driven (Steward 2012)*

Modes of innovation

- Different types of
- **knowledge** – codified, tacit, technical, organisational
- **networks of actors** – business, academic, public, societal
- **purposes** – deliberative, emergent, economic environmental
- **practical novelty** – product, process, singular, systemic

Innovation policy turning point



EUROPEAN COMMISSION

Green Paper on Innovation

December 1995

- recognition of multiple modes
- the successful production, assimilation and exploitation of novelty in the economic and social spheres

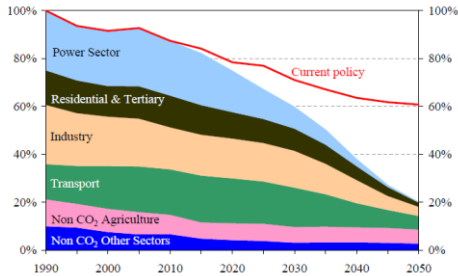
Europe's 'distinctive approach to innovation'

- Innovation Union (COM (2010) 546: challenge-led, broad based approach
- **challenge-led** focused on societal goals without predetermining the precise choice of technologies or solutions
- **broad concept of innovation** innovation takes 'many forms' such as novel advances in organizations, services and business models
- **all actors and all regions** wide partnership' of social actors from 'not only the business sector, but also public authorities at national, regional and local level, civil society organizations, trade unions and consumers'.

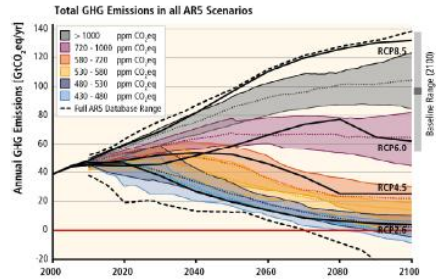
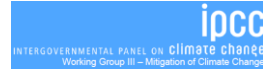
Novel concepts about innovation

- Past 40 years of innovation studies has produced many new approaches suited to this 'broad model'
- Interactive - Freeman, Rothwell SPRU
- User led – von Hippel
- Open – Chesbrough
- Actor networks – Callon, Latour
- Innovation commons – Lessig
- Sociotechnical transitions – Geels, Schot

The transition to a competitive low carbon economy 2011



'mitigation pathways'



Climate change - a 'comprehensive path'

- new policies needed in addition to the traditional avenues of research based technology programmes or indirect market schemes.
- a range of actors which will involve consumers as well as producers
- a diversity of innovation to address 'energy efficiency' of everyday consumption as well as shift to low carbon energy production
- 20/20/20 policy (COM[2008]30)

Transition & transformation need innovation

- the key to the transition to a green and low carbon economy is 'significant innovation'. (COM(2011) 571)
- 'our economy will require a fundamental transformation within a generation...in producer and consumer behaviour'. (COM(2011) 571)

National transition policies

The UK Low Carbon Transition Plan

National strategy for climate and energy

Enabling the Transition to a Green Economy:

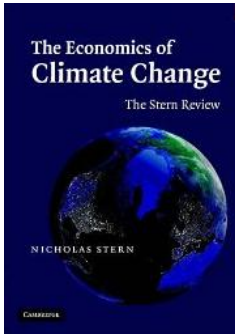


Energiewende

The new transitions policy discourse

- Policy recognition of the climate change 'problem' is accompanied by 'solution' through a low carbon transition
- Incorporation of ambitious targets for GHG emission reductions into national policy agendas
- Narratives of transformation innovation from margin to mainstream since 2000

Stern review 2006



- Climate change...is the greatest and widest-ranging market failure ever seen
- Policy challenge is managing the **transition** to a low-carbon economy

The Dutch school



- Major programme on transitions
- Multilevel perspective
- Historical transitions
- Transition management
- Governance of transitions

Conceptual sources

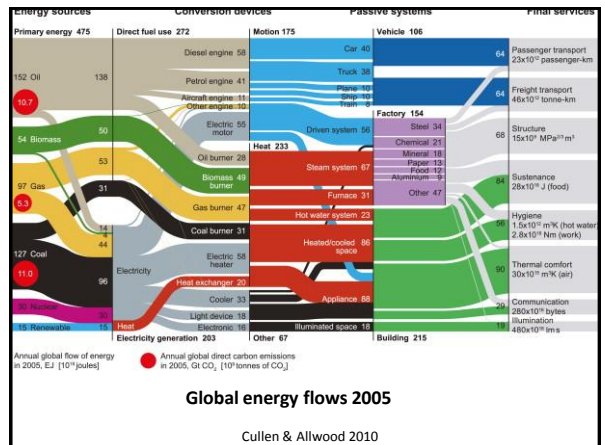
- 2 strands in the interdisciplinary field of Science Technology & Innovation Studies
- Economic - Evolutionary theories of epochal transformations - 'technoeconomic paradigm'
- Sociological- Interactionist theories of innovation path creation – 'social construction of technology'

A synthesis within innovation studies

- Seeks to bridge economic and sociological strands in STIS
- Dynamics of innovation in meso level sociotechnical systems
- Engaged with practice 'managing/governing transitions'

A new mode - system innovation

- 'system innovations' involve different technologies, a variety of social/behavioural innovations, and a diversity of societal actors
- better seen as 'sociotechnical' innovations rather than either technological or social innovation
- most sustainability/innovation policy and practice remains focused on singular technologies and needs to be reoriented



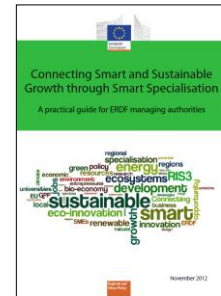
System innovation

OECD Science, Technology and Industry Outlook 2014

- climate challenge calls for new thinking on innovation policy
- sociotechnical systems
- demand side... behavioural, technological, policy and business practices among different act

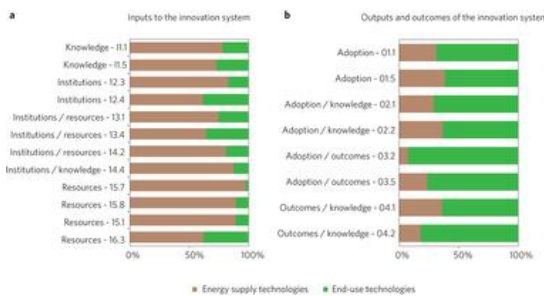
Multilevel governance

- DG Regio
- Regional and local authorities
- transformative innovations and systemic change
- far beyond the boundaries of one company or organisation



Marginalization of end-use technologies in energy innovation for climate protection

Wilson et al Nature Climate Change 2,780–788(2012)



Policy implications – a change in the dominant mode of innovation?

- Shift in focus from producer/technologies to consumers/use
- Attention to new social actors
- Engagement with new knowledge practices

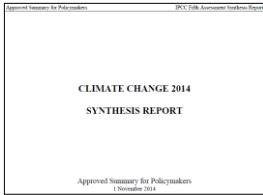
New place based actors

- leaders will be the institutions and organisations who deal with the key systems of mobility and household living.
- different to traditional product focused innovators
- regional players are well placed for this
- key responsibilities for transport, housing, waste and energy systems
- enable the participation of the diversity of actors involved in system innovation

New practice based knowledge

- more integrated and practice based than conventional academic science
- learning by doing - innovative approaches to mobility and household living in practice
- experimentation is often more feasible at regional - scale is manageable yet significant resources can be leveraged.
- challenge is to move from the specific to the general.

IPCC AR5 Synthesis report



- Systemic mitigation options are more cost effective than a focus on individual technologies or sectors
- Policy linkages among regional, national & subnational offer mitigation benefits

IPCC 5th assessment report

- The IPCC Fifth Assessment Report from Working Group III on Mitigation of Climate Change includes for the first time a specific chapter on Human Settlements, Infrastructure and Spatial Planning
- Yet the experts remain cautious about cities overall contribution to the global challenge of climate change and remains focused on technology driven sectors such as electricity production.

EU 2030 Framework for climate & energy policy



- First draft had no mention of cities and regions
- Following submissions from Climate-KIC and others they are now mentioned
- Focus on national and sectoral

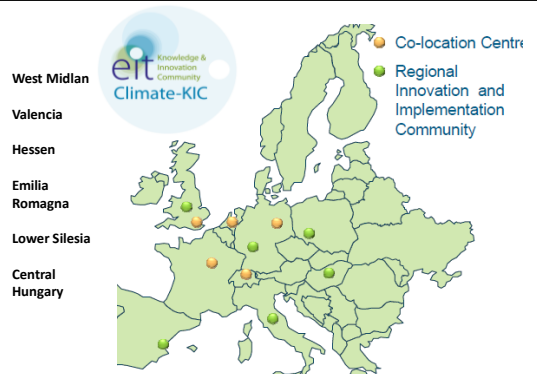
eit European Institute of Innovation & Technology

- EIT Established 2008: 3 Knowledge and Innovation Communities (KICs) established 2009
- Climate KIC to pioneer new innovation models to address climate change bringing together diverse actors – triple helix/knowledge triangle
- EIT is key delivery strand in Horizon 2020
- will strongly contribute to tackling societal challenges under Horizon 2020 and bring about systemic change
- close co-operation with regional authorities (EIT Strategic Agenda)

Horizon 2020 COM (2011) 808

• Part III: Priority 'Societal Challenges'

- a challenge-based approach, focusing on policy priorities without predetermining the precise choice of technologies or solutions
- a new focus on innovation related activities, such as piloting, demonstration, test-beds, support for public procurement, design, end-user driven innovation, social innovation



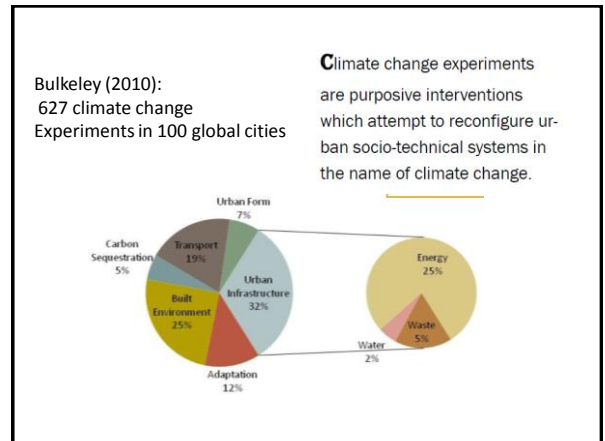
Regional Innovation Implementation Community (RIIC)



- To play a leading role in the transformation of regional innovation policy and practice in Europe on climate change'
- (Ritter, Nature Climate Change 2011).




- key sectors for mitigation initiatives
- built environment
- transportation
- urban infrastructure (energy, waste, water)
- urban form/spatial planning



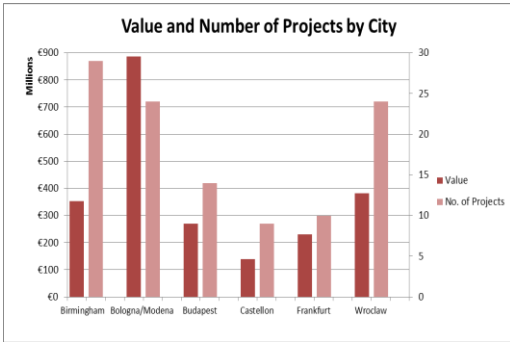
Transition Cities

- Birmingham, Frankfurt, Wroclaw, Budapest, Bologna/Modena, Castellon/Valencia
- Partnership of city authorities and transition researchers
- aim is to ensure that they contribute effectively to the transition to a low carbon society
- enable challenge led socio-technical innovation for low carbon transformation
- develop transition framework to facilitate systemic change
- demonstrate the feasibility of rapidly progressing EU energy & climate targets at local level

Approach

- Cities asked to identify all low carbon innovation projects:
 - currently active in period 2012-2013
 - mitigation oriented
 - addressing buildings, transport, energy networks upstream and downstream
- low carbon innovation projects were defined by the EU 'broad definition' of innovation and ranged across technology, service, organisation and business models.
- degree of novelty varied considerably as did their scale, and whether they were upstream or downstream

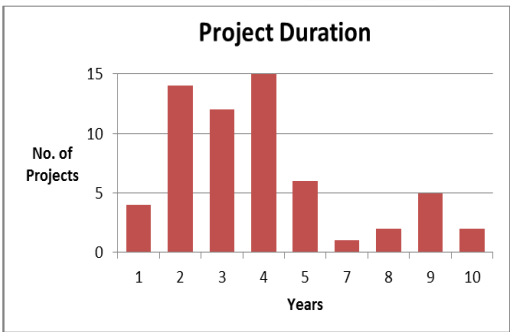
110 projects, €2 billion



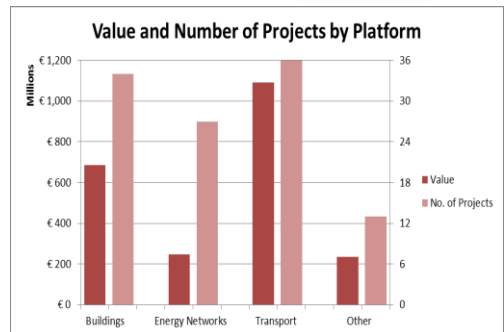
Inventory

- live projects during the period 2012-2013
- 110 projects valued at over €2 billion
- 'bottom up' approach adopted in the project shows a level of activity several times higher than that found in previous 'top down' surveys
- the three platform areas in which the majority of activity is located are key areas of carbon emissions identified in the European roadmap for a low carbon economy and is similar to that found in earlier global studies.

110 projects, €2 billion



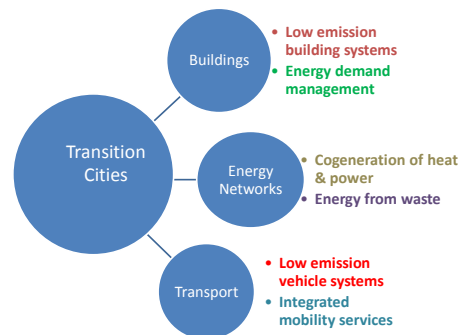
110 projects, €2 billion



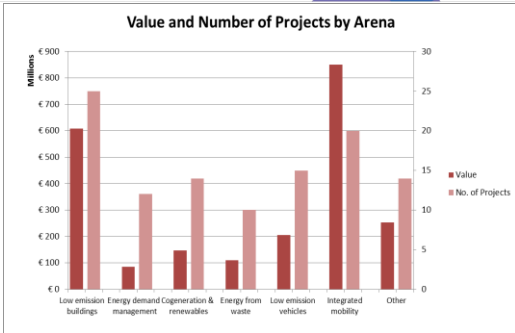
Transition platforms, arenas & experiments

- **Platforms** – broad areas defined by 'end use'
- **Arenas** - specific sociotechnical systems within the platforms which embrace a cluster of experiments
- **Experiments** – innovation projects which address a societal challenge, engage with system innovation and enable reflexive learning

Sociotechnical systems



110 projects, €2 billion



From innovation projects to transition experiments

- An innovation project is usually technology driven, singular and solution focused
- A transition experiment is challenge led, systemic and learning oriented
- Projects become experiments through selection, clustering within arenas, and developing transition awareness
- This involved the grouping of different projects into a *challenge led cluster* of organisations and activities relevant to a particular arena of sociotechnical system transition

- transformative innovation to address the challenge of climate change will be systemic in nature
- low carbon innovations usually treated separately from each other in a stand alone project management fashion
- the focus of the Transition Cities project is to address how the existing portfolio of innovation projects could be strategically managed in a more effective way to promote low carbon transitions in city-wide sociotechnical systems.

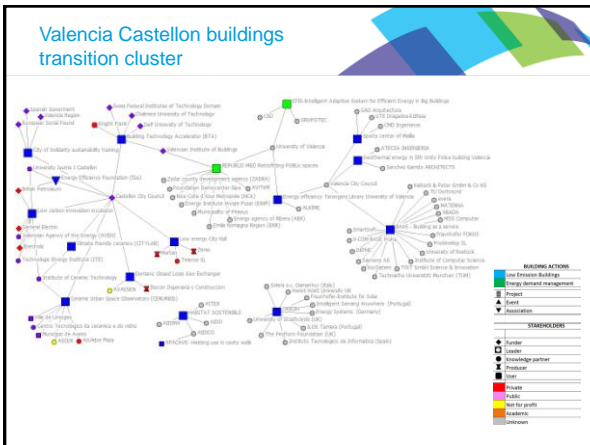
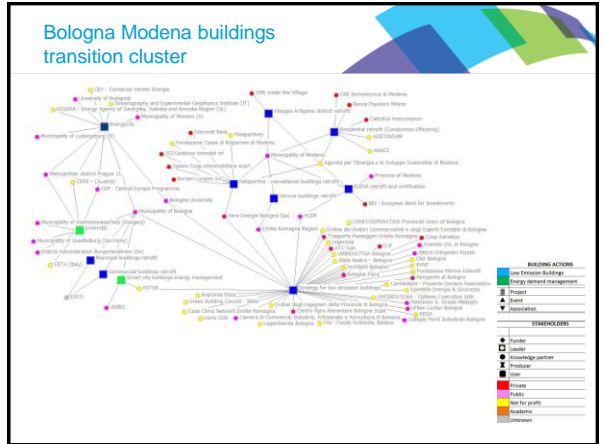
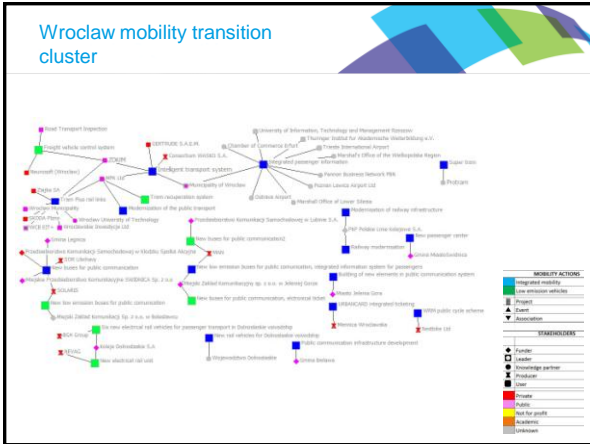
Goals

- to create an environment for a wide range of stakeholders to create systemic transition through replicating, broadening and scaling up proven niche innovative solutions to the climate change challenge
- by clustering projects, cities can deepen their understanding and gain a wider awareness of transition thinking.

Mapping process

- basic information about projects and organisations
- key dimensions of innovation and interaction
- to develop the concept and content of challenge-led low carbon clusters.

Broad cluster	Lead cities	Specific cluster 1	Specific cluster 2
Buildings	Valencia/Castellon Bologna/ Modena	Low emission buildings	Energy demand management
Energy networks	Budapest Frankfurt	Cogeneration and local renewables	Energy from waste
Mobility	Birmingham Wroclaw	Low emission vehicles	Integrated mobility



- ### Sociotechnical network mapping of transition clusters
- The purpose of the network maps is to develop a new framework for understanding the patterns of system wide change.
 - It uses a relational approach designed to reveal interlinkages and the role of different actors in the process of change.
 - The layout of the network maps uses techniques from social network analysis to place more prominent actors at the centre of the map and to place closer linked actors nearer to each other
 - It is a new type of 'language' for addressing the dynamics of transition.
 - .

- ### Conclusions
- The implications of the European innovation policy turn toward societal challenges such as climate change are profound.
 - The new challenge-led approach reframes the policy agenda compared to the traditional technology-driven model.
 - It is more attuned to systemic rather than singular innovation, and offers a broader definition of innovation which highlights social, organisational, and business model novelty.

- ### Conclusions
- It offers a richer and realistic perspective for the radical pervasive changes needed for the transition to a low carbon society
 - Prospects for transformative innovation can be addressed through a focus on the place based sociotechnical networks of mobility, buildings and energy
 - the Climate-KIC Transition Cities project seeks to make transition happen through building new transitions capabilities for the system mode of innovation in practice.