Transition Cities: cluster analysis of buildings

Fred Steward
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To play a leading role in the transformation of regional innovation policy and practice in Europe on climate change’

(Ritter, Nature Climate Change 2011).
The European Union Roadmap for moving to a competitive Low Carbon Economy 2011

![Graph showing energy consumption changes across different sectors from 1990 to 2050 under current policy.](image-url)
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

Value and Number of Projects by City

- Birmingham
- Bologna/Modena
- Budapest
- Castellon
- Frankfurt
- Wroclaw

Value
No. of Projects
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
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‘systems 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.
Systems innovation

- OECD
- climate challenge calls for new thinking on innovation policy
- sociotechnical systems
- demand side… behavioural, technological, policy and business practices among different actors
Multilevel governance

- DG Regio
- Regional and local authorities
- Transformative innovations and systemic change
- Far beyond the boundaries of one company or organisation
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
Pioneer Cities

- Buildings
  - Low emission building systems
  - Energy demand management

- Energy Networks
  - Cogeneration with local renewables
  - Waste into energy

- Transport
  - Low emission vehicle systems
  - Integrated mobility services
Arena 1: Energy efficient buildings

Finance provider

Energy services or construction company.

Council

Building owner

(Funds may be advanced directly to company implementing works)

Notice to pay environmental upgrade charge

EUC payment

If lease allows

Lessee

Lessee

Lessee
Arena 2; Energy demand management
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.
• develops the analysis of Transition Clusters for each Transition City
• builds on the 6 transition clusters that were mapped out in the Pioneer Cities project
• refines and enhances the content of these
• also situates them more clearly within a policy framework that links them to climate change policy at city level
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.
• Transition Cities have decided to explore this approach in six **specific** cluster areas.
• analysis will be organized around the three **broad** cluster areas each of which will be led by 2 of the Transition Cities.
• the other four partner cities will also contribute to the analysis in each of these platform areas
<table>
<thead>
<tr>
<th>Broad cluster</th>
<th>Lead cities</th>
<th>Specific cluster 1</th>
<th>Specific cluster 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings</td>
<td>Valencia/Castellon Bologna/ Modena</td>
<td>Low emission buildings</td>
<td>Energy demand management</td>
</tr>
<tr>
<td>Energy networks</td>
<td>Budapest Frankfurt</td>
<td>Cogeneration and local renewables</td>
<td>Energy from waste</td>
</tr>
<tr>
<td>Mobility</td>
<td>Birmingham Wroclaw</td>
<td>Low emission vehicles</td>
<td>Integrated mobility</td>
</tr>
</tbody>
</table>
Analysing transition clusters
Methodology

- Brings ‘analysts’ and ‘actors’ together to co-produce a shared ‘map’ of each transition cluster as a socio-technical system network.
- The analysts use state of the art social network analysis software (UCInet/NetDraw) to map out the pattern of social actors and low carbon innovation projects in a particular city.
- For each transition cluster this process will clarify the system configuration found in each partner city.
- Should also enable comparison between them and also with leading global models of successful system transition.
• analysis of the linkages between the stakeholder organisations in each of the broad transition clusters.
• construct a network map for each broad cluster in each city.
• explores the potential of the network mapping approach to support the focus of the Transition Cities project on developing transition clusters
• output is an accurate map of the broad cluster in Buildings, Energy networks and Mobility for each city
• further information has been supplied by the Transition Cities with regard to the **scope of the transition cluster analysis** in order to ensure
  1. that the **project** information is comprehensive and up to date and
  2. to add information on stakeholders and their links obtained from **events** in the transition cities from 2011 to date and
  3. to add information on stakeholders and their links obtained from **associations** involving transition city actors from 2011 to date.
• Projects, events and associations are all defined as **actions**
• depth of the transition cluster analysis
• more information about the stakeholder organisations
• a basic description has been added in the template including its broad societal type – government, business, academic, or civil society. details on level, size, status and role.
• Transition Cities supplied this information by July/August 2014.
• The cluster maps have been created on the information that has been entered in the Excel spreadsheets.
• This represents a substantial advance on what was gathered in the Pioneer Cities project and it is now possible to construct some more useful cluster maps.
• Nevertheless it remains the case that there are still a lot of gaps and there is considerable inconsistency in the nomenclature adopted for the names of specific actions and stakeholders. Both of these make the task of network analysis a lot more labour intensive and time consuming.
• The approach taken has been to make the best of the available data that has been supplied by the Transition Cities.
A cluster map represents a sociotechnical network based on a set of low carbon innovation actions implemented (since 2011) in each Transition City. A sociotechnical network includes both social stakeholders and technological projects.

The way in which the network is mapped represents stakeholders as one type of node and actions as another type of node.
• **Action nodes**
• These are the larger node shapes in the network maps. They express through their **colour** which **subcluster** (what we called arenas in Pioneer Cities) they are part of.
• They express through their **shape** which **type** of action they represent
• **Stakeholder nodes**
  • These are the smaller node shapes in the network maps.
  • **Role** – this can vary according to the project but some attempt has been made to code this by shape.
  • **Status** – this is expressed by colour (avoiding blue and green which are used for the subclusters (arenas)).
• Both action and stakeholder nodes are coloured **grey** if there is insufficient information supplied.
Reading networks

- Overall pattern
- Fragmentation or coherence
- Density
- Similarities and differences
- Centrality or isolation of some stakeholders
- Bridging roles in the network
Budapest energy transition cluster
Frankfurt energy transition cluster
Birmingham energy transition cluster
Valencia/Castellon energy transition cluster
Bologna/Modena energy transition cluster
Wroclaw energy transition cluster
• 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.

• The workshop should be seen as a learning process in the construction and interpretation of these transition clusters and in the assessment of their usefulness.
The purpose of the workshop is to supplement the analyst part of the process with the actor part of the process. This includes the staff working for the cities as well as a selection of stakeholders.

The overarching task is to assess whether the network map is a reasonable representation of the transition cluster in the city concerned.

We are making this assessment in the light of the type of new system configuration that the low carbon innovation projects are seeking to promote.

The basic question is to what extent the network of the existing projects in each city adds up to something more than the individual parts. Does it show the potential of a new system emerging as an alternative to the current prevailing unsustainable system?

This will form the basis for future workpackages which will assess the role of city wide policies in shaping and influencing sociotechnical transitions and the contribution of inter-city exchange and learning to promote system innovation.
Key questions

• Are there important actions or stakeholders missing? If so this is the opportunity to add them
• Is the network a fragmented one showing disconnected parts or a coherent one showing lots of inter-linkages
• Which stakeholders appear to play an important role in linking the network together and which are more isolated?
• Which appear to be the strong and successful parts of the network
• Which appear to be weak or absent (compare the different cities for suggestions about this)
• What are the opportunities for inter-city interaction over these strengths and weaknesses
• How separate are the specific clusters within the broad clusters and which are the interesting point of intersection between the two?
• Does the network include the elements needed for a system transition in that area?
Birmingham buildings transition cluster
Bologna Modena buildings transition cluster
Budapest buildings transition cluster
Frankfurt buildings transition cluster
Valencia Castellon buildings transition cluster
Wroclaw buildings transition cluster