

# ***Energy, Innovation, Equity and Justice***

**Prof. Malcolm Eames**

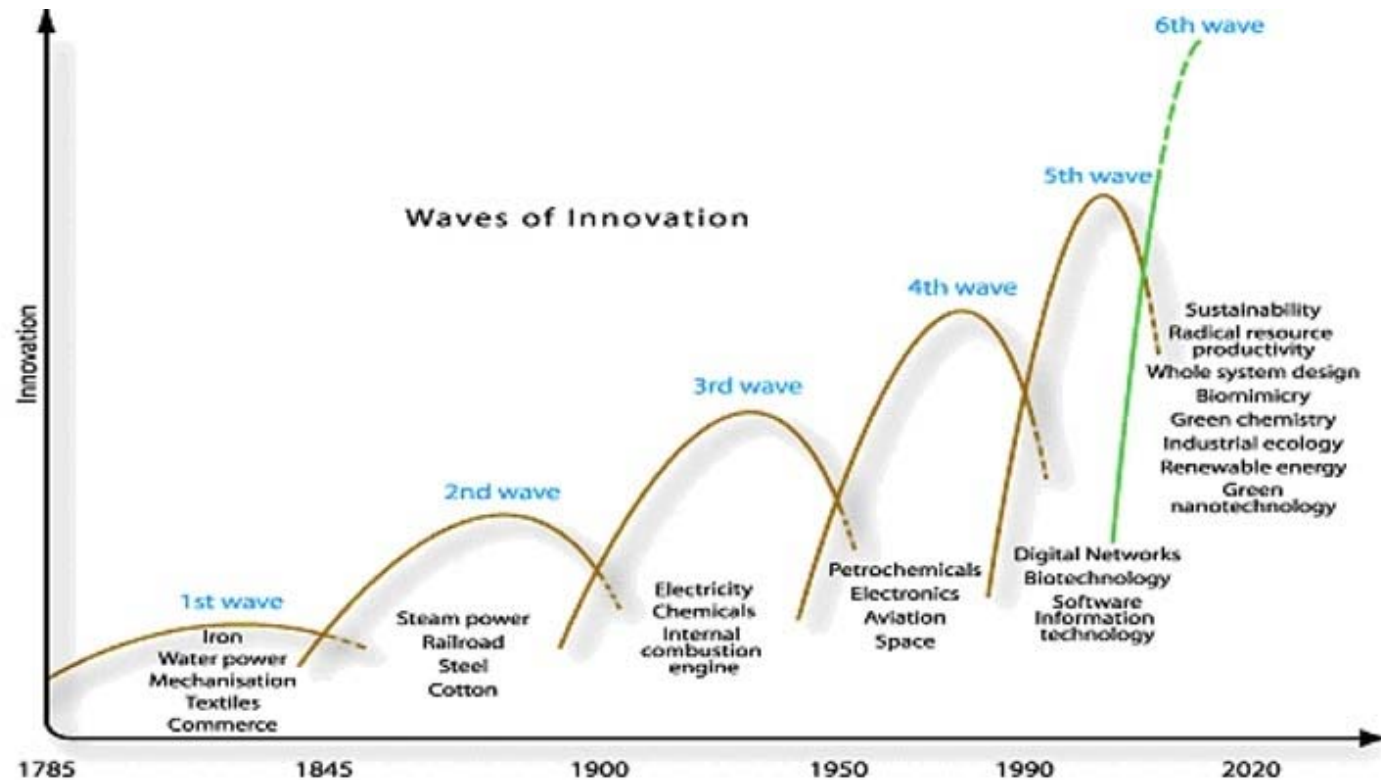
**Energy justice in a changing climate:  
defining an agenda conference**

**10<sup>th</sup> November 2011**

# Overview

- 1. Energy, innovation and society**
- 2. Energy justice?**
- 3. Low carbon transitions & sustainability transitions research**
  - systems innovation (MLP & TM) & innovation systems perspectives critically reviewed**
- 4. UK energy research & policymaking**
- 5. Insights towards an interdisciplinary research agenda**

# A long view of innovation..



Hargroves, K. and Smith, M. (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, The Natural Edge Project, Earthscan, London

# Energy (In)Justice

1. **Energy (environmental, economic & social) justice...**
2. **Past, present & future generations (?)**
3. **Human and non-human actors (?)**



# Energy (In)justice

1. **Distribution** - social, spatial and temporal - of costs and benefits
2. **Procedure** - how are unequal distributions created & maintained (power, choice, influence...)
3. **Recognition** - who (and what) is given respect

**Evidence of inequality x argument for 'fair' treatment  
= justice claim**

# Transitions to sustainability

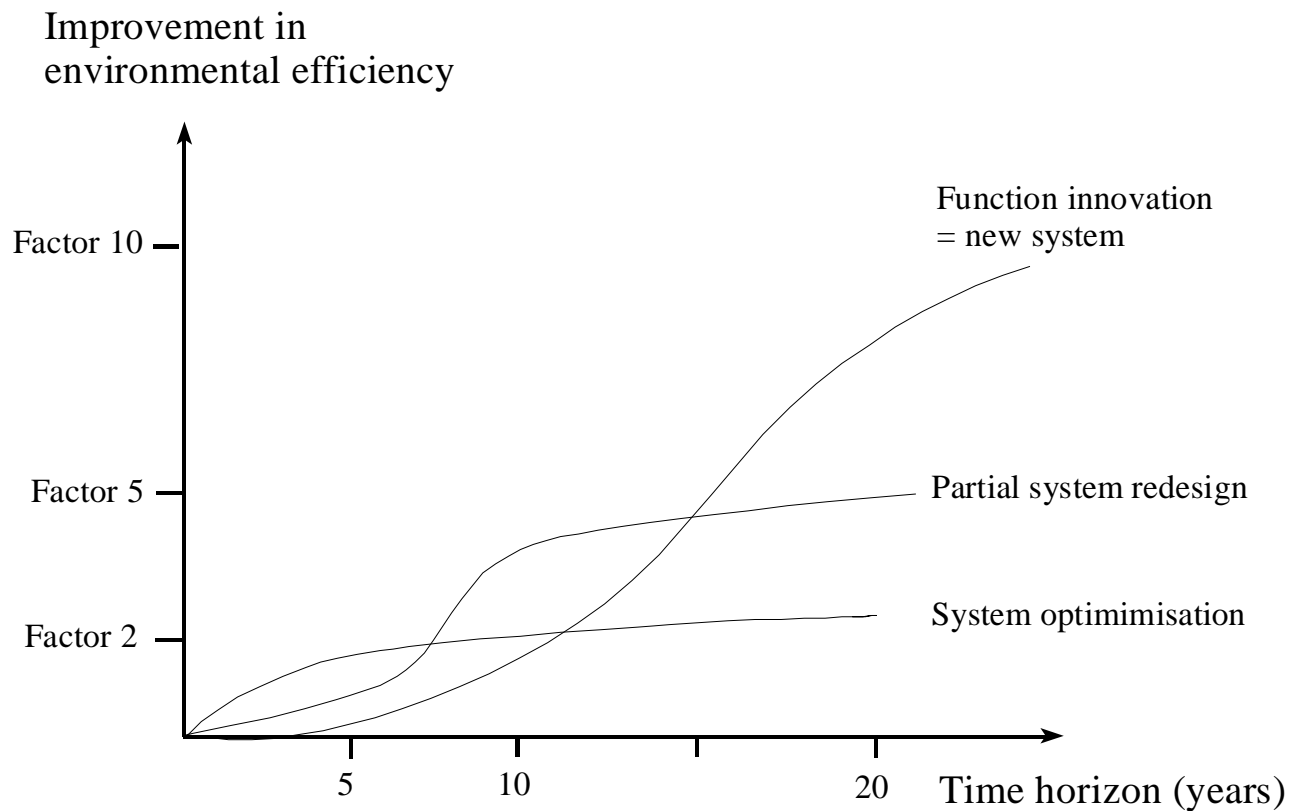
- *'...for those concerned with sustainability, the idea of transition – of substantial change and movement from one state to another – has powerful normative attractions'*. (Shove and Walker, 2007)



# But what do we mean by a 'transition'?

- Calls for a *transition* implies the need for **large scale socio-technical systems change** rather than simple product or process innovations or behavioural changes
- The *transition* to low carbon will not 'simply' require a transformation of our energy system
- But also finding radically more (eco-)efficient ways to fulfil societal functions and human needs (e.g. mobility, food, housing, heating, lighting, etc).
- Requires integrative and holistic view of **production & consumption of energy good & services**

# The need for systems change



*System optimisation versus system innovation (Weterings et al, 1997)*



# Systems change and transitions: some key concepts

- We know from history and innovation studies (Geels) that systems changes or transitions do occur and something about the innovation processes involved.
  - Systems changes are complex (co-evolutionary, multi-dimensional, multi-actor, multi-level; radical; long-term; non-linear process)
  - Existing systems resist radical change (lock-in, path dependencies, sunk investments, vested interests, etc...)
  - Radical R&D innovations face a 'valley of death' on journey to the market
  - Historically most transitions have been emergent processes
- Purposively shaping transitions seen as requiring new policy, institutional & governance structures

# The Multi-Level Perspective

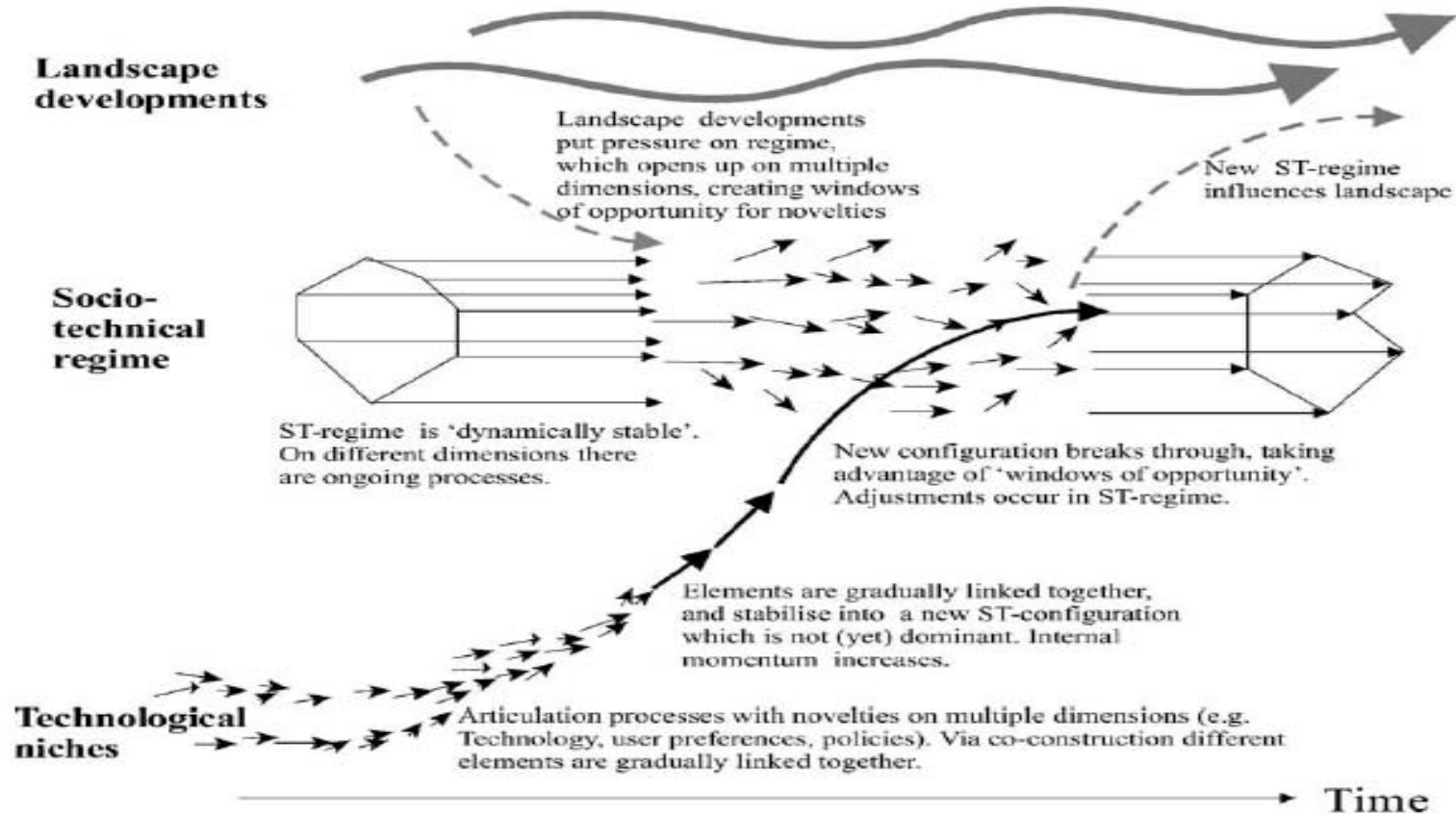
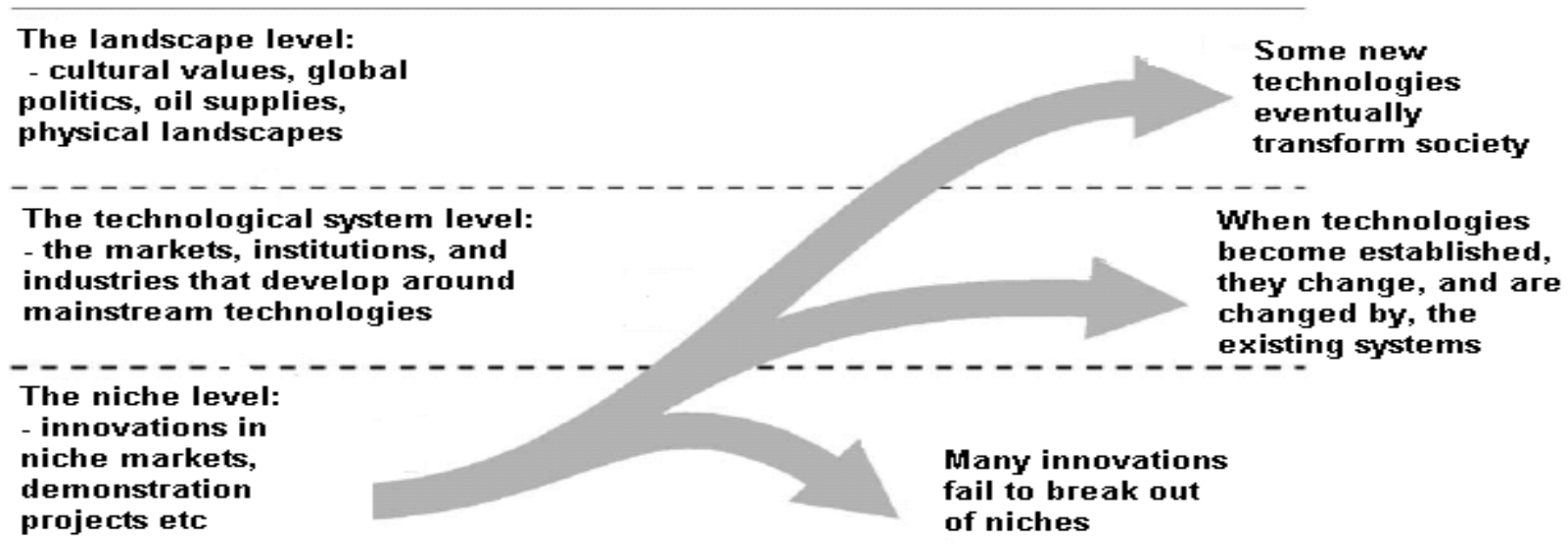


Fig. 9. A dynamic multi-level perspective on system innovations (Geels, 2002b, p. 110).



(Source: Eames & McDowall, 2010. Adapted from Geels, 2002)

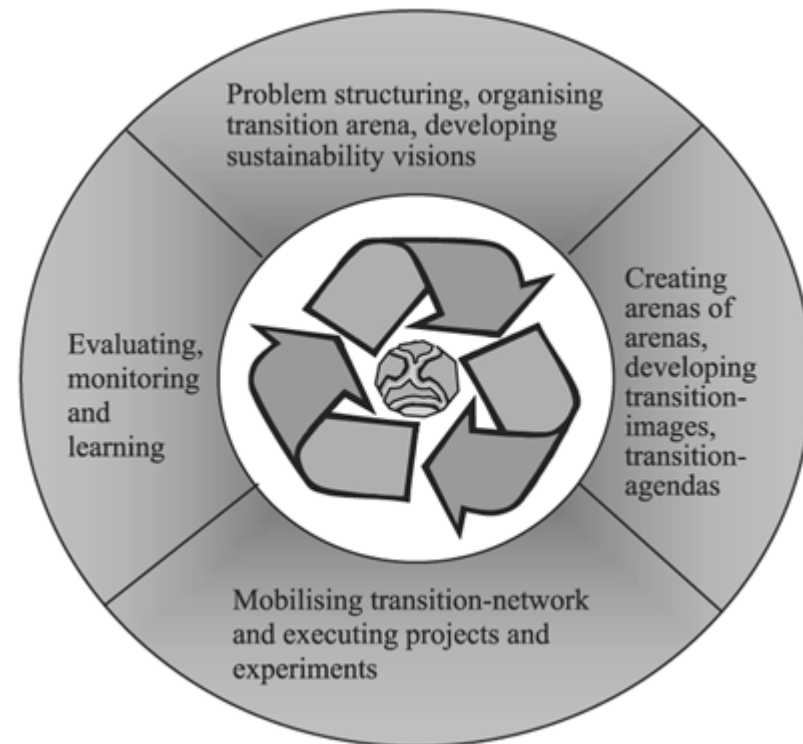
- **MLP provides a rich heuristic structure for analysis of past/prospective transitions, but need for greater attention to:**
  - **Agency and power**
  - **Spatial perspectives (inc' capacity & comparative advantage)**
  - **Social distribution (inc' vulnerability & resilience)**

# Transition Management

- TM places process of stakeholder engagement, foresight, scenario building, experimentation, evaluation and social learning centre stage
- ***‘The vision, in combination with the images, the transition paths and experiments, forms the joint transition agenda...This is where coalitions come together around specific options or expectations’***

(Kemp & Loorbach, 2006)

## The Transition Management Cycle



(Kemp, 2007)



# Low Carbon as a 'Guiding Vision'

- Power of 'low carbon' as a '**guiding vision**' lies in its **interpretive flexibility**
- However, **grounding and translation** must occur when guiding vision touches down in particular **places and communities**
- Moreover clearly there are **multiple** prospective low carbon **pathways and futures** embodying **deeply contested** and **irredeemably political choices**

(Stirling, 2007; Berkhout et al, 2004; Eames & McDowall, 2010; Shove & Walker, 2007; Eames *et al*, 2006; Berkhout 2006)

# TM and Energy Justice

- **Raises questions of procedural, epistemic and distributive justice**

Important to recognise these questions also apply to more established foresight and technology appraisal processes and conventional tools for innovations policy and support

- How is problem framed & who's vision (knowledge, values, interests, etc)
- Access to information, participation & agency in the process
- How are the social distribution of costs and benefits of different technological options evaluated?

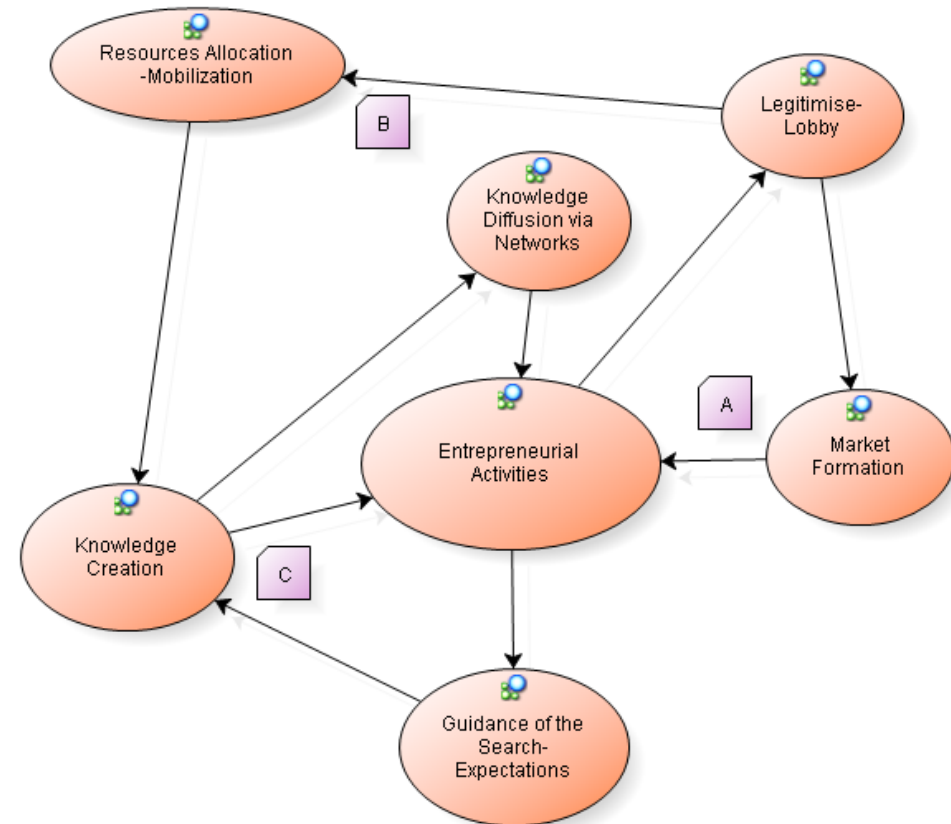
# Innovation Systems Approaches...

|   | Focus  | Scale                      | Comments   |
|---|--|----------------------------|--|
| <b>National Systems of Innovation (NSI)</b>   | <b>National economic competitiveness</b>               | <b>National</b>            | <b>Underpinned emergence of innovation policy and notion of ‘Knowledge Economy’</b>                        |
| <b>Sectoral Systems of Innovation (SSI)</b>   | <b>Differing patterns of innovation across sectors</b> | <b>(?)</b>                 |  |
| <b>Regional Innovation Systems (RIS)</b>      | <b>Regional economic competitiveness</b>               | <b>Regional (clusters)</b> | <b>Focus on under performing Regions</b>   |
| <b>Technological Innovation Systems (TIS)</b> | <b>Specific technological field or artefact</b>        | <b>National/Global (?)</b> | <b>Widely applied to analysis of sustainable technologies but lacks geographical and spatial dimension</b> |
| <b>Functions of Innovation Systems</b>        | <b>Structure &amp; dynamics of innovation system</b>   | <b>National/Global (?)</b> |  |

# Functions of a (Sustainable?) Innovation System

- **Guidance of search activities** (visions, targets, etc)
- **Knowledge creation** (R&D, pilot & demonstration projects)
- **Networks for knowledge diffusion**
- **Mobilisation of resources** (human, financial, etc)
- **Facilitate formation of new markets** (regulatory, fiscal, supply chain, etc)
- **Creation of legitimacy** (advocacy coalitions)
- **Entrepreneurial activities**

• **Precautionary appraisal** (of environmental, social & economic sustainability)



'Motors of change' in a TSIS – A, B & C feedback loops ( +/- ) (Hekkert et al, 2007)



# UK Energy Research/Polycymaking

- To date socio-technical transitions research has had rather limited impact on UK Energy policy
- Engineering/economic energy systems models predominate
- Top down linear models of innovation and separation of technological & behavioural change remarkably persistent
- Limited progress in 'opening up' processes of foresight & technological choice
- However, UK also has a remarkable history of institutional and policy innovation...

# Insights towards an interdisciplinary research agenda

- **The conceptual frameworks and policy oriented tools of sustainability transitions research need to incorporate more explicit consideration of (distributive, procedural & epistemic) justice**
- ...But then so do many more established fields of energy research

# Key challenges

- **Need to develop a more explicit ‘geography’ of energy & low carbon transitions**
- **Ground transitions research in particular communities & places in order to better understand distributive impacts and issues of vulnerability & resilience**
- **Pay attention to losers as well as winners in transitions**
- **‘Opening up’ of TM processes – framing, participation & agency**
- **Top down – bottom up dialogue**
- **Foster precautionary appraisal as an explicit function of sustainable/low carbon innovation systems**