Marrying innovation research with environmental assessment

René Kemp



Eco-efficiency conference
9-11 June, 2010
Egmond aan Zee

Maastricht University
UNU-MERIT

Four basic things about innovation

- Innovation **as something new** is **economically driven** (it is not driven by ideas of a better world). Disruptive innovations are disadvantaged.
- Innovation **as a production method and product transforms** inputs into outputs (desirable and undesirable ones)
- Innovation is a **source of wealth and growth**, leading to **spendings** having environmental impacts
- Innovation is an a element in a historical process of change, a shaper of change

Each of the issues is the topic of specific fields of research

- Innovation as novelty created in companies → Innovation studies
- Innovation as a transformer of inputs into outputs → Environmental assessment
- Innovation as a contributor to wealth → Economic growth analysis
- Innovation is an a element in a historical process of change → Transition studies

About sustainable technologies

- There are those people who talk about sustainable technologies
- Such a view is problematic (misleading) because it sees SD as technological or as something that can be determined in terms of outcomes.
- Such a view also overlooks the negative effects of "sustainable technologies" (environmental effects and other effects such as dependencies on scarce materials, bad labour conditions, …)

Everyone is in favour of SD

- Coal producers
- Car companies
- Politicians
- Consumers

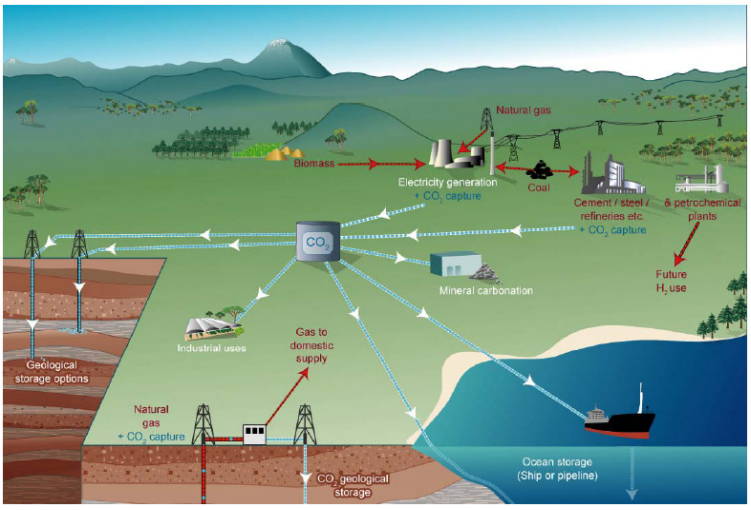
They are in favour of SD as a long-term goal, when it comes to **doing something** they only prepared to do easy things (affordable, not damaging to business, careers and lifestyles)

There is **not a simple choice issue** of achieving "what we want"

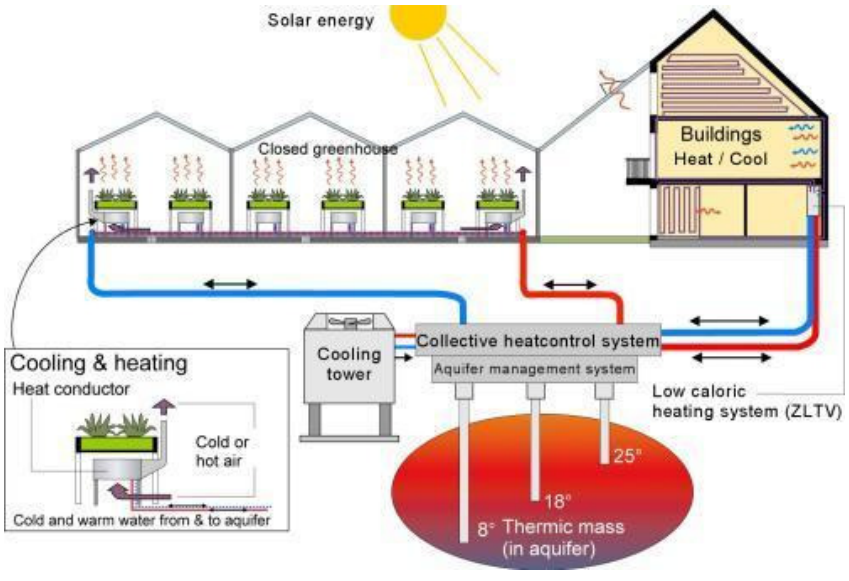
Regime-*preserving* change versus regime-*altering* change

- Users and suppliers typically favour regime-preserving change (greener cars, CCS)
- Environmentalist and sustainability scientists typically favour regime-altering change (solar power, alternative mobility, energy producing greenhouse)

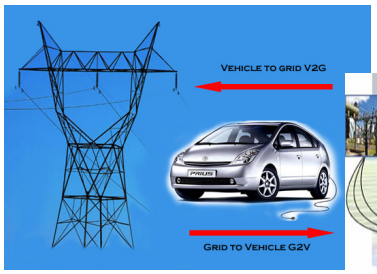
Carbon capture and storage



Energy producing greenhouse



Vehicle to Grid (V2G)



- Innovations studies as a multidisciplinary field of research based on a sociotechnical system perspective could be **married** with environmental assessment methods to investigate regime-preserving change and systemic change
- Such an analysis would pay attention to **long-term outcomes (positive and negative ones).**
- Consider battery electric vehicles, they do not emit emissions at the point of use but emissions emerge elsewhere, as a car they are no solution for problems of car dependent mobility but with time this may change. Battery electric vehicles have implications for the power sector not just in terms of they requiring power but also in creating demand for green power and possible use for frequency regulation.

An innovation-based environmental assessment of would assess battery electric vehicles

- On the basis of today's system configurations in which the electricity is produced through the use of various fossil fuels, nuclear fuels and renewables using today's technology.
- **For future system configurations** consisting of old systems with new elements (such as carbon capture and sequestering), improved products (plug-in vehicles with greater electric range) and altogether new systems with different products and changes in behavior (an example is the use of electric cars as part of intermodal travel organized around public transport, in which cars are rented on a trip basis rather than being owned).
- From an **interaction point of view**: how the particular innovation interacts with others innovations and developments, whether there is a synergy, certain fit-stretch patterns.
- With attention to **risks** and **possibilities to contain** these (the challenge is not get BEV but to get BEV that are as sustainable as possible)

- Whereas the first analysis would show that the societal benefits from moving to electric vehicles such as the Prius car are limited, the second type of analysis would show that there are large societal benefits to be obtained if the electricity supply would change, when they are used in within smart grid configurations, and when cars are used in combination with public transport rather than as a substitute. The third step would identify steps towards getting towards a low carbon energy and transport system. This would reveal plug-in electric vehicles as an enabler for wider change.
- The analysis would go beyond an environmental assessment by considering sustainability aspects: of negative effects and the possibility to contain these