PIP TRAVEL GUIDE

on climate change and system innovation

Regional Innovation & Implementation Community (RIC) – Climate KIC

European Institute of Innovation & Technology (EIT)
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CLIMATE CHANGE
an overview
Climate change and the greenhouse effect

Main drivers of climate change. Source: .
BERLIN, 13 April 2014 – The 5th report by the IPCC shows that global emissions of GHG have risen to unprecedented levels despite a growing number of policies to reduce climate change. Emissions grew more quickly between 2000 and 2010 than in each of the three previous decades.

Source: IPCC Fifth Assessment Report
2 degrees That’s the amount the planet will be allowed to warm. Leaders of the world’s eight richest economies have agreed to the historic deal setting 2 degrees Celsius as the maximum limit for global temperature rise.

Source: IPCC Fifth Assessment Report
Main drivers of GHG emissions

- **35%** Energy Sector
- **24%** Agriculture, forests and other land uses
- **21%** Industry
- **14%** Transport
- **6.4%** Building Sector

2010 GHG emissions
The short/mid term EU pathway

2020. In March 2007, a set three key objectives for 2020 was adopted by the EU countries:
• A 20% reduction in EU greenhouse gas emissions from 1990 levels;
• Raising EU energy consumption from renewable resources to 20%;
• A 20% improvement in the EU’s energy efficiency.

2030. The agreement reached by EU 23rd October 2014, Europe set out its stall on climate change.
Reduce its greenhouse gas emissions by 40% by 2030;
Increase the share of renewable energy consumption to at least 27%;
Increase the energy efficiency of its buildings by at least 27%...
The long term EU pathway

Low-carbon strategy for 2050
Targets compared to 1990 levels

However, current policies would only lead to ca. - 40% GHG emissions by 2050
"We must also develop a broader understanding of innovation. Yes, it is about research and development. But it is about changes to workplace organisation too. And new processes and business models."

"...It tends to happen at the intersection between different disciplines. It is sometimes disruptive, resulting in the downfall of established companies. Often, it is employee or consumer-driven."

President Barroso, speech to the European Parliament. 13 October 2009.
And more urgent challenges

Rockstrom et al, Nature 461, Sept 2009

The inner green shading represents the proposed safe operating space for nine planetary systems. The red wedges represent an estimate of the current position for each variable. The boundaries in three systems: rate of biodiversity loss, climate change and human interference with the nitrogen cycle, have already been exceeded.
"...The major problems of our time cannot be understood in isolation, are systemic, which means interconnected and interdependent."

### Problems solving approach

<table>
<thead>
<tr>
<th>Era</th>
<th>Description</th>
<th>ACTORS</th>
<th>DRIVERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960/70</td>
<td><strong>END OF PIPE.</strong> Production process and products unaltered. Come out the concept of circular economy.</td>
<td>Specialists</td>
<td>Reactive/Minimization</td>
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<tr>
<td>1970/80</td>
<td><strong>PROCESS INNOVATION.</strong> Focus on changing industrial processes. “Cradle to Cradle” ideas are brought up.</td>
<td>Managers</td>
<td>Receptive/Optimization</td>
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<tr>
<td>1980/90</td>
<td><strong>ECO-DESIGN.</strong> Change adaptation of products. Ecolabel, Footprint... Sustainable development concept is broadly accepted.</td>
<td>Sector</td>
<td>Constructive/acceleration</td>
</tr>
<tr>
<td>1990-</td>
<td><strong>SYSTEM INNOVATION</strong> Focus on systems’ functions. Spring ideas such as Socio-technical transitions, green economy, low carbon economy.</td>
<td>Society</td>
<td>Proactive/vision</td>
</tr>
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Potential environmental gains

Improvement in environmental efficiency

Function innovation = new system
System innovation
Partial system redesign
System optimisation
Ecodesign
End-of-pipe

Time horizon (years)
System innovation

Redesign of functions and/or networked production and consumption chains. It is a broad concept, a new territory outside technological innovation which entails a challenge lead process, in which all actors and all regions are involved, not only the business sector, but also public authorities at national, regional and local level, civil society organizations, trade unions and consumers.

Eg:
- Transport
- Housing
- Agriculture
- Energy production chain
- ..
Innovation in systems of practice and provision, not single innovations in products and processes. Think of:

**Transport system**: how people move, why..
**Housing**: In what houses people live, how they use their houses, what they find important, when they would be willing to move
**Building**: the system of how
Imagine an electric car in the middle. What is the impact on the topics/parts around the picture?
Innovation in infrastructure and behaviour
Innovation in multi-actor networks

Source: Frost & Sullivan

*The company logos mentioned are only for descriptive purpose
Need to deal with complexity

- Cross-boundary and trans-disciplinary work. Eg. people from government, civil societies, business, research, NGO's, People with financial, sociological, technical expertise...
- Multi-societal layers and the complexity and dynamics involved.
- Combine a long-term vision and near-term implementation
Need to monitor changing context, reflect and adapt works

Monitor, including landscape developments, regime, other niches. Such monitoring included giving attention to questioning of underlying assumptions such as social values and the willingness to change course if the innovation does not match these assumptions.

Reflect not only in terms of did I do the things that I planned to do but also did I do, or am I still doing the right things, given the long-term goals and changing environment?
EXAMPLE: ENERGIESPRONG

https://www.youtube.com/watch?v=lYla_JlcR3o

https://www.youtube.com/watch?v=57FOoJE9Ykg