Perspectives on transitions to sustainability

Brussel
Dr Hans Bruyninckx, 12 July 2018
1. The EEA and new knowledge needs
SOER 2015 concluded that the outlook for Europe’s environment in coming decades is worrying.

Achieving the EU’s 2050 vision of “living well within environmental limits”, will require “fundamental transitions, entailing profound changes in dominant institutions, practices, technologies, policies, lifestyles and thinking.”
• Engagement with academic communities

• Theoretical perspectives

• EEA reports in 2016 and 2017 explored transitions – linking to established policies and reporting
2. Why do we need transitions?
The challenge of the 21st century good life

Within environmental limits (Global Footprint Network, 2012; UNDP, 2014)
Global socio-economic trends

- Globalisation of unsustainable systems of production and consumption
Earth system trends

Expectations / policy promises

OR

How credible?
How feasible?
What sort of policies and knowledge?
The developing EU policy landscape

2020 Existing overarching EU policy frameworks, comprehensive policies, specific targets

2030 Emerging EU policy frameworks

2050 Long-term visions and targets with a societal transition perspective.

2020 7th EAP, Biodiversity Strategy, Climate and Energy Package, Climate Adaptation Strategy, Resource Efficiency Roadmap, Europe 2020, specific thematic policies

2050 7th EAP vision: Living well within the planet’s ecological limits, innovative circular economy, low-carbon growth, societal resilience

2030 Circular Economy Package, Post-Paris Climate and Energy Package, Energy Union, Sustainable Development Goals

SUSTAINABILITY

TIME
‘In 2050, we live well, within the planet's ecological limits.

Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our society's resilience.

Our low-carbon growth has long been decoupled from resource use, setting the pace for a global safe and sustainable society.’

Implicit order?(!)
Policy developments

Developments in *acquis*
- Implementation & compliance
- Strengthening of policies

Macro-integrated policies
- “The Union has set this transformation in motion with long-term, integrated strategies” 7EAP
Policy developments: key characteristics

• Long-term: 2030-2050-2100

• Integrated: e.g. Common Agricultural Policy

• Systemic: e.g. Decarbonisation of transport

• Developing/iterative: e.g. Circular Economy; Climate and Energy

• Thus, complex, uncertain, lacking knowledge (of a certain type)

• Explicit recognition of fundamental knowledge gaps: Priority Objective 5 (7EAP)
3. The logic of shifting knowledge and policy paradigms
Paradigm shift in knowledge and policies?

**Normal science**
- Puzzle solving stage
- Scientists share common paradigm
  - Make measurements
  - Articulate theory
  - Make predictions

**Anomaly**
- Blame apparatus
- Set aside problem
- Modify paradigm

**Crisis**
- Anomaly too problematic
- Faith in paradigm shaken

**Pre-paradigm phase**
- Alternative concepts compete
- Anarchic period
- Fact gathering appears unguided

**New paradigm**
- Scientists return to routine
- Revolution becomes invisible

**Change in world view**
- Gestalt shift
- Problem seen from different perspective
- New paradigms explored
“Over the past 40 years, a broad range of environment legislation has been put in place, amounting to the most comprehensive modern standards in the world. This has helped to address some of the most serious environmental concerns.” (7EAP)

**Policy theory**: initially ‘fighting pollution’

**Knowledge paradigm**: “Union environment policy is based on environmental monitoring, data, indicators and assessments linked to the implementation of Union legislation, as well as formal scientific research….” (7EAP)
Anomalies occur

“However, many environmental trends in the Union continue to be a cause for concern, not least due to insufficient implementation of existing Union environment legislation.” (7EAP)

“Addressing some of those complex issues requires tapping into the full potential of existing environmental technology [...], as well as increased use of market-based instruments.” (7EAP)

Modify policy theory: + Efficiency thinking

Modify knowledge: Effectiveness and efficiency; market-based instruments; BAT studies; voluntary instruments
## Tracking results of EU policies

### Protecting, conserving and enhancing natural capital

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<tr>
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- **Improving trends dominate**: Green
- **Trends show mixed picture**: Yellow
- **Deteriorating trends dominate**: Red
- **Largely on track**: ✔
- **Partially on track**: □
- **Largely not on track**: ×

Source: EEA, SOER 2015 Synthesis report.
### Tracking results of EU policies

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Source: EEA, SOER 2015 Synthesis report.
# Tracking results of EU policies

## Safeguarding from environmental risks to health

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<td><img src="https://example.com/emoji" alt="Not improve" /> / <img src="https://example.com/emoji" alt="X" /></td>
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**Legend:**
- **[Improve](https://example.com/emoji)**: Improving trends dominate
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- **Largely not on track**: ![Red](https://example.com/emoji)

Source: EEA, SOER 2015 Synthesis report.
Challenges for established governance approaches

Are we addressing the underlying drivers of environmental degradation?

In 2001, the EU set itself the target to halt biodiversity loss in the EU by 2010.

In 2011, the EU set the target to ‘halt loss of biodiversity and degradation of ecosystem services in the EU by 2020’.

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<td>2020 Headline Target</td>
<td>No significant progress towards the target</td>
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<tr>
<td>Halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.</td>
<td>Overall, biodiversity loss and the degradation of ecosystem services in the EU have continued since the EU 2010 biodiversity baseline, as confirmed by the 2015 European environment - state and outlook report. This is consistent with global trends and has serious implications for the capacity of biodiversity to meet human needs in the future. While many local successes demonstrate that action on the ground delivers positive outcomes, these examples need to be scaled up to have a measurable impact on the overall negative trends.</td>
</tr>
</tbody>
</table>

Source: Mid-term review of the EU biodiversity strategy to 2020
“Together with current wasteful production and consumption systems in the world economy, [...] depletion of resources [...], generating more pollution and waste, increasing global GHG emissions and exacerbating land degradation, deforestation and biodiversity loss.” (7EAP)

“This report has come to the conclusion that traditional incremental approaches based on the efficiency approach will not suffice. Rather, unsustainable systems of production and consumption require fundamental rethinking in the light of European and global realities.” (SOER2015)
The overall picture

Efficiency improvements have not secured long-term resilience

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Source: EEA, SOER 2015 Synthesis report.
“Biodiversity, including the ecosystem services it provides (natural capital), for its intrinsic value and for its essential contribution to human well-being and economic prosperity.”

“However, there are gaps between the available knowledge and that required to meet emerging policy demands. ... systems science; complex environmental change and systemic risks; global megatrends; interplay between socio-economic and environmental factors; transitions in production-consumption systems; environmental risks to health; and the inter-relationships between economic development, environmental change and human well-being.” (7EAP)
Planetary boundaries

Source: 2017 EEA elaboration on Stockholm Resilience Center’s original image
Sustainability transitions

Transitions

= fundamental shifts in the systems that fulfill societal needs,
through profound changes in dominant structures, practices, technologies,
policies, lifestyles, thinking ...

... in line with the sustainable development ambitions and objectives embedded in
the Sustainable Development Goals
Understanding systemic challenges

• Rebound effects limit the impact of efficiency

Source: EEA (based on Odyssee)
Achieving needed change requires system innovation

Source: UNEP (from Wetering et al., 1997)
IEA/IRENA, 2017: CO₂ prices in the 66% 2°C scenario (USD/tonne CO₂)

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2030</th>
<th>2040</th>
<th>2050</th>
<th>Annual % increase 2020-2030</th>
<th>Annual % increase 2020-2050</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OECD countries</strong></td>
<td>20</td>
<td>120</td>
<td>170</td>
<td>190</td>
<td>19.6</td>
<td>7.8</td>
</tr>
<tr>
<td><strong>Major emerging econ’s</strong></td>
<td>10</td>
<td>90</td>
<td>150</td>
<td>170</td>
<td>24.6</td>
<td>9.9</td>
</tr>
<tr>
<td><strong>Other regions</strong></td>
<td>5</td>
<td>30</td>
<td>60</td>
<td>80</td>
<td>19.6</td>
<td>9.7</td>
</tr>
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Rockström et al. (2017) estimate the need for $400 /tonne CO₂ by mid-century

**Political reality**

The multi-level perspective on transitions

**Directionality, credibility**
- Visions and pathways
- Long-term targets
- Scale and speed
- Foresight

**Environment and sectoral policies, e.g.**
- Carbon pricing
- Strict regulation
- Removing barriers (e.g. subsidies)

**Coordination across sectors, scales**
- Policy coherence and consistency
- Mission-oriented innovation
- Polycentric governance
- Stakeholder platforms, networks

**Innovation policies, e.g.**
- R&D
- Experiments
- Network building
- New entrant support

**Industrial policy, e.g.**
- Specific visions
- Market creation
- Adoption subsidies
- Backing winners

**Welfare, education policies**
- Compensating losers
- Offsetting inequities
- Retraining

Source: Geels
Key characteristics of transitions

Systemic change involves:

- multi-scalar processes of innovation, experimentation and learning
- upscaling, replication or adaptation of new technologies or practices
- disruption of the established regime, often as a result of external shocks

Transitions involve the co-evolution of technologies, behaviours, rules, values, etc.

The complexity of interactions and feedbacks implies that transitions produce highly uncertain, emergent outcomes
Rethinking how we meet societal needs

Systemic change involves multiple innovations – entailing a fundamental rethinking of how to perform societal functions

Source: Loorbach
The emerging transitions paradigm

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Puzzle solving stage
Scientists share common paradigm
- Make measurements
- Articulate theory
- Make predictions

New paradigm
Scientists return to routine
Revolution becomes invisible

Anomaly
Blame apparatus
Set aside problem
Modify paradigm

Crisis
Anomaly too problematic
Faith in paradigm shaken

Pre-paradigm phase
Alternative concepts compete
Anarchic period
Fact gathering appears unguided

Change in world view
Gestalt shift
Problem seen from different perspective
New paradigms explored

“The transition to a green economy is a long-term, multi-dimensional and fundamental process that will require a move away from the current linear economic model...” (SOER2015)

Alternative concepts:

Europe’s emerging transition agenda
Making sense of the Green, Blue, Circular, Resource Efficient, Low Carbon, Bio, Smart, Digital Economy?

Unguided fact gathering: e.g. green economy; green investments; green finance; circular economy; green jobs; smart cities; ...
Taking a fundamental **systems** perspective
Reflecting on the core of the system?
Creating **pathways** to sustainability
Transforming the EU power sector – avoiding a carbon lock-in

Total overcapacity: 278 – 347 units
(56 – 69 GWe)

Up to 190-240 gas-fired units could be stranded assets

Up to 110-150 coal-fired units could be stranded assets

If existing and planned units were operated according to extended lifetimes...

1/3 of the capacity of all coal-fired and gas-fired units, respectively, would be in excess in 2030, and thus at risk of becoming stranded

1 Unit = 200 MWe

Source: EEA (based on Platts, 2014)
Niches and policies that can create change

Car sharing market development in Europe (2006–2020)

Source: Monitor Deloitte
Niches and policies that can create change

EU-28 electric bike sales (2006–2016)

Source: Monitor Deloitte
Promoting and enabling social innovation

• Social practices
• New business models
• Consumer behaviour
• Changing mindsets
Catalysing the shift to electric vehicles

Supporting incentives and coordinated policies are key in accelerating electric vehicle market development.

<table>
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<tr>
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<th>EXAMPLES</th>
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<td>Regulatory incentives</td>
<td>CO2 standards, sales targets</td>
</tr>
<tr>
<td>Financial measures</td>
<td>Subsidies, loans, capital grants</td>
</tr>
<tr>
<td>Non-financial incentives</td>
<td>Access to bus lanes, free parking</td>
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<tr>
<td>Information provision</td>
<td>Product labels, PR campaigns, public debates</td>
</tr>
<tr>
<td>Infrastructure provision</td>
<td>Charging infrastructure, finance home chargers</td>
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<td>Technology push institutions</td>
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New paradigm-new normal

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European Environment Agency
4. What does this mean for policy?

What challenges for established policy approaches?
How is EU policy already evolving?
What opportunities to strengthen approaches?
Circular Economy Action Plan (2016)

“6. Innovation, investment, and other horizontal measures.

The transition to a circular economy is a **systemic change**. In addition to targeted actions affecting each phase of the value chain and key sectors, it is necessary to create the conditions under which a circular economy can flourish and resources can be mobilised.”
Policy mixes for systemic change

Small networks of actors support innovation on the basis of expectations and visions. Learning and experiments take place. New configuration breaks through, taking advantage of ‘windows of opportunity’. Adjustments occur in regime. The regime is dynamically stable. Landscape developments put pressure on existing regime. Innovation policies, e.g.
- R&D
- Experiments
- Network building
- New entrant support

Industrial policy, e.g.
- Specific visions
- Market creation
- Adoption subsidies
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Environment and sectoral policies, e.g.
- Carbon pricing
- Strict regulation
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Welfare, education policies
- Compensating losers
-Offsetting inequities
- Retraining

Directionality, credibility
- Visions and pathways
- Long-term targets
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An evolving paradigm for innovation policy?