

**Panel 3.2****Green economy as a successful model  
for innovation of industrialised countries**

**Chair:** Bert Metz (ECF)  
**Rapporteur:** Oscar Amerighi (ENEA)  
**Speakers:** David McLaughlin (NRTEE)  
Kirsten Halsnaes (DTU Climate Centre Riso)  
Patricia Crifo (Univ. of Paris West & Ecole Polytechnique)  
Gunnar Münt (EIB)  
Andy Gouldson (Univ. of Leeds)

**Overview**

The focus of Panel 3.2 was on devising and analysing crucial issues related to the green economy model of innovation. In particular, policies facilitating the transition to a new innovation model for industrialised countries; investments in low-carbon technologies that lead to their adoption, commercialisation and diffusion, independence from fossil fuels and benefits of sustainable economic practices in relation to the (market, technical and social) barriers that prevent a full exploitation of the potential benefits of the green innovation model and the attainment of climate prosperity (by turning the costs of climate change into opportunities).

Issues related to green economy and green innovation were tackled by the presenters from very different perspectives based on their heterogeneous background and expertise ranging from policy advisory to energy system modeling, and from the banking and financial sectors to academia.

**Major findings****David McLaughlin, NRTEE, Canada**

The presentation by David Mc Laughlin stressed the importance of indicators to support policy-making decisions toward climate prosperity by turning the risks of climate change into opportunities. The benchmarking of a low-carbon country performance is achieved through an index (Low Carbon Performance Index) that assesses a country's competitiveness in the areas of emissions and energy, skills, investment, innovation and governance. This leads to a clear-cut identification of specific criticalities and difficulties of a country for moving along a low-carbon growth plan.

Environmental and economic consequences for Canada to follow US climate policy choices were also discussed. In spite of the role of Canada as a primary natural resources and energy supplier for the US, the different composition of the power sector in the two countries implies that Canada cannot easily match US policy in terms of carbon price and emission reduction targets. Hence, it is critical for Canada to develop its own transitional policy approach based on US policy choices.

**Kirsten Halsnaes, DTU Climate Centre Riso, Denmark**

Kirsten Halsnaes discussed the costs and challenges to achieve a fossil fuel free energy system in Denmark. To this end, two alternative 100% renewable energy scenarios were compared, one with a central role for wind, the other one strongly relying on biomass. Increasing resilience on biomass would require very huge amounts of biomass imports from abroad, with huge costs for Denmark and uncertain effects on biomass producing countries. In any case, the wind source would still play a crucial role. The main challenges to achieve these

scenarios are related to the fact that renewable energies are fluctuating (central role of smart grids), energy savings need to be relevant, and most of the work has to be done in the transport sector. Macroeconomic costs for the two scenarios in 2050 are also computed.

#### **Patricia Crifo, Univ. of Paris West & Ecole Polytechnique, France**

From an economics perspective, the promotion of low-carbon technologies depends on the necessity to tackle two types of externalities: environmental and technological externalities. Technological externalities (knowledge diffusion and adoption) may lead to a paradox of under-investment in green technologies: though profitable, such technologies lack for instance of early adopters. There is a debate among economists on the need to design specific low-carbon innovation policies due to crowding-out effects of innovation in other sectors. The job impact of such policies should also be considered in order to avoid green innovation policies being consumed by rises in wages (inelastic labor supply in the short run), implying that labor market and education policies also matter for low-carbon policies.

#### **Gunnar Münt, EIB**

The presentation by Gunnar Muent showed that lending volumes for climate change action (on renewable energy, energy efficiency, sustainable transport, RD&I) by the European Investment Bank increased in the last years and is projected to increase significantly in the next years as well. The central objective is to finance the accelerated development, commercialisation and diffusion of cost-effective early-stage low-carbon technologies. To this end, new financing instruments have also been devised for the EU context. A major concerns is that private companies often under-invest in low-carbon technologies as they fail to take into account the societal perspective.

Another important point that was stressed by the presenter is the risk that lending to specific industrial sectors might lead to a contrast/conflict with climate policy objectives. The example provided was that of an EIB lending to the automotive sector, where 70% of the total amount went to traditional (fossil fueled) cars. By contrast, only 20% of the lending was directed to hybrid fuel cars and the remaining 10% to electric cars that might well represent the best contributors to achieve emission reduction targets.

#### **Andy Gouldson, University of Leeds, UK**

Andy Gouldson put forward the critical role of governance mechanisms for translating transition to a low-carbon economy and society into the appropriate incentives for different stakeholders. On the one hand, this calls for a complementary policy mix combining imperatives and incentives with capacities: the idea is that in the absence of appropriate capacities, higher incentives and tougher imperatives will be needed to drive change toward a green economy model. On the other hand, this requires a change in the role of government from provider and controller to facilitator, enabler, encourager in a context where governance issues have to be interpreted as multi-level, multi-actor, network based processes involving the political, economic, and civil society spheres. This appears to be a central issue in dealing with the social acceptance of low-carbon technologies.

## **Main issues discussed**

- Importance of building low-carbon performance indicators for benchmarking in order to highlight criticalities at the country level and identify a country-specific low-carbon growth plan.
- Framing the question on how to get to an LCS and to a green economy model of innovation.
- Indicators are important for policy-making, on the one hand to devise targets and on the other hand to evaluate intermediate steps to reach the targets.
- Scenario analysis relevant to assess costs and benefits of different alternatives for the evolution of the energy system. Useful tool to support policy-making.

- Under-investment in low-carbon technologies as private companies often take decisions based on a perspective different from the societal one. Standard policy instruments may not be enough.
- Important and innovative role of governments to create the necessary conditions to support the transition process.
- Critical role of governance for translating transition to LCS into the right incentives: need for multi-level, multi-actor, network-based processes.
- Stakeholder participation in the decision process is crucial to improve social acceptance of low-carbon green technologies.

## Items for Future Research

- Evaluation of crowding out effects of green investments on other sectors is important since renewable energy sector is mostly capital intensive.
- A hotly debated topic to be further investigated is the job impact of green economy. In particular, direct and indirect employment effects of investments in low-carbon technologies.
- Analysis of decoupling: relationship between GDP growth and absolute emission reduction on a per capita basis.
- Evaluation of costs of fossil fuel externalities (e.g., oil accident in the Mexico Gulf).
- Social acceptance of low-carbon technologies.

## Policy Relevant Questions

- Coordination efforts between Canada and the US on climate policy can be generalised to global climate policy issues.
- Industrial policy conflicting with climate policy objectives. How to avoid possible negative feedback effects?
- How to build a multi-level, multi-actor, network-based approach to facilitate transition process?
- How can governments create the conditions for a governance model supporting the transition process?