The STANDING GROUP ON LONG-TERM CO-OPERATION
&
The COMMITTEE ON ENERGY RESEARCH AND TECHNOLOGY

Hosts a joint workshop on

“The role of Energy Technology and Innovation in Combating Climate Change”

3 June, 2014
Background note for SLT-CERT Joint Workshop

Background

As part of the broad effort in the IEA, undertaken at the request of the Governing Board in its December 2010 meeting, to identify what priorities for the Agency and its work should be, the Standing Group on Long-Term Co-operation (SLT) and Committee on Energy Research and Technology (CERT) had a series of brainstorming discussions and prioritisation exercises through the 2011 and early 2012 SLT and CERT meetings.

Since then a series of discussions took place on the potential benefits of increased collaboration between the SLT and the CERT. These discussions highlighted the I.E.P. Agreement mandate for the SLT related to energy research and development, as well as the links created by the Governing Board between the SLT and the CERT in the CERT terms of reference. Hosting workshops to tackle issues cutting across the energy technology and policy landscape was seen as a good opportunity to discuss best areas for collaboration and to look at mechanisms on how the two committees could best work together.

On 4 June 2013, the SLT and the CERT held their first joint workshop and Delegates confirmed its usefulness to enhance collaboration. A request was made to the Secretariat to organise a joint workshop every year, with a focus on analysis relevant to both committees. It was suggested that the focus of the yearly Energy Technology Perspectives (ETP), which deals with issues crossing the Technology/Policy/Markets aspects, would be a good focal point for how SLT and CERT can guide Secretariat analysis.

Workshop Objectives

The main objective of this workshop is to enable enhanced communication and understanding between the CERT and SLT Delegates to identify issues and mechanisms for collaboration between the two committees. It is expected that the mere opportunity to meet on a regular basis, and to discuss energy technology and policy issues will be beneficial to raise an awareness of each committee’s challenges and priorities, and to identify synergies in their work.

In order to facilitate this collaboration, the workshop is centring on a theme that allows both policy and technology experts to exchange views, identify challenges and opportunities in terms of information for decision making, and jointly advise on potential IEA Secretariat work programme objectives. The agenda is designed to enable participants to actively participate in all discussions, spurring exchanges of ideas, and a better understanding of each other’s needs.

As an example of such a cross-cutting theme, the IEA’s Energy Technology Perspectives (ETP) project seeks to help decision makers in both governments and industry make better decisions, maximising the benefits of a transformation of the energy system and minimising the cost of such a transformation. One of the workshop’s objectives will therefore be to seek participant’s views on how the ETP analysis can help frame the role of energy technologies in meeting policy goals. In order to frame discussions that can help guide the analysis of the 2015 edition of ETP to contribute to the COP 21 in Paris with energy technology and innovation options to address the climate change mitigation challenges, the following agenda is proposed:
Joint Workshop on
“The role of Energy Technology and Innovation in Combating Climate Change”

DRAFT AGENDA

14:00-14:10  Welcoming remarks
SLT Chair: Robert F. Cekuta, CERT Chair: Alicia Mignone

14:10-14:30  Setting the Scene: Challenges and Expectations for COP21
Outside Speaker: Sylvie Lemmet

14:30-15:30  Discussion: Linking Energy Policy and Climate Change

15:30-15:45  Session 1 conclusion

15:45-16:15  Coffee

16:15-16:30  ETP 2015: Innovating a New Climate Deal
ETP Division Head: Jean-François Gagné

16:30-17:30  Discussion: Linking Energy Technology Innovation to Energy Policy Making

17:30-17:45  Session 2 conclusion

17:45-18:00  Closing: how to enhance SLT/CERT co-operation
Mme Sylvie LEMMET is the directrice des affaires européennes et internationales for the ministère de l'égalité des territoires et du logement and the ministère de l'écologie, du développement durable et de l'énergie.

Mme Lemmet began her career in the private sector before joining Médecins Sans Frontières as a Director, and then serving as a board member for six years. She has spent the past 15 years working for the environment, first at The World Bank, implementing sustainable development projects, and then for the French Government, where she evaluated environmental policies as a Senior Auditor at the Cour des Comptes. In 2007, she was appointed Director of the United Nations Environment Programme’s Paris-based Division of Technology, Industry and Economics, leading UNEP’s work on climate change, resource efficiency, and harmful substances and hazardous wastes. She was appointed to her current duties in October 2013.

Mme Lemmet, a French national, is a graduate of the French Ecole Nationale d’Administration and holds a Master’s Degree in Public Administration from Harvard University as well as a Master’s Degree in Business Administration from l’Ecole des Hautes Etudes Commerciales.
Background information on session topics

LINKING ENERGY POLICY AND CLIMATE CHANGE – Energy, Environment and Climate Change Landscape

Background

Climate change is widely considered to be the defining environmental challenge of our time. Energy is inextricably linked with climate change: nearly 70% of greenhouse gas emissions from human sources originate in the energy sector, and GHGs from human sources are thought to be the most significant driver of recent climate change, according to IPCC AR5. How our energy policies develop over time will affect future climate change, and human responses to climate change, including how we adjust our energy policies, will affect how we produce and use energy.

Despite progress in developing and deploying clean energy over the last decades, IEA analysis shows that our energy mix globally is not getting any cleaner. This is evident from the Energy Sector Carbon Intensity Index (ESCII), which has remained flat in the two decades after 1990. It indicates that as of 2010, a unit of energy was no cleaner, in terms of its embodied carbon, than it was 20 years before. Globally, gains in renewable energy deployment have been offset by increased use of coal. Modest declines in the ESCII achieved within the OECD region were offset by increases in the non-OECD region.

These trends leave us headed for 4°C warming by the century’s end, even if countries adhere to recent climate pledges and the already significant changes in policy and technology these will entail. IPCC AR5 reports that observed impacts of climate change are already widespread and consequential, and discusses anticipated climate impacts on the energy sector and the macroeconomic consequences thereof. Extreme heat-waves, declining global food stocks, loss of ecosystems and biodiversity, and life-threatening sea level rise are anticipated impacts in a 4°C world. With greater increases in average global temperature, the risks for more severe impacts increase, as do the risks of abrupt, irreversible changes.

Modelling conjectures aside, a “business as usual” scenario for the energy sector does not exist. Our choice is a world of high warming and extreme climate impacts, if we continue with our current approach to energy supply and use, or a rapid shift to clean energy and reduced climate impacts. Neither of these potential futures is the world in which our energy systems and energy policies have developed; we thus need a new mindset that better links energy policies with the realities of climate change. A radical but achievable transformation of energy systems could limit warming to 2°C or below, which it is believed would keep climate impacts to a manageable level (though enhanced resilience in the energy sector would still be required).

Energy policies for decarbonisation

IEA analysis shows that a spectrum of policies will be needed to accelerate decarbonisation of the energy sector, which will entail up-take of energy efficiency opportunities, deployment of clean energy, RD&D of advanced technologies, the roll-out of underpinning infrastructure for new technologies (such as smart grids and EVs), and retirement of high-emissions infrastructure that is already in place. IEA analysis shows that in the long run, the additional investments required for this shift more than pay off. However, there is an increased need for investment in the short term, and this remains a challenge.
Carbon pricing is a cornerstone policy for energy sector decarbonisation, as it sends signals economy-wide, across all suppliers and end-users of energy, to incentivize cost-effective cleaner energy choices. However, carbon pricing policies alone does not drive all aspects of decarbonisation.

The ESCII shows only one side of the energy sector decarbonisation challenge: the world must slow the growth of energy demand as well as making energy supply cleaner.

Many energy efficiency measures are cost-effective already, without raising prices further, but carbon pricing does not address underlying barriers to their implementation. RDD&D in advanced technologies could in theory be encouraged by a strong, rising long-term carbon price, but carbon pricing policies to date have been modest in ambition and short term in focus. Transition in underpinning infrastructure will likely require government support to overcome path dependence. And while carbon pricing could steer decisions among new investment choices, it is not clear that prices high enough to force early retirement of existing assets are feasible.

IEA analysis finds that packages of well-integrated energy policies are therefore desirable, to address all aspects of this complex policy challenge. In some jurisdictions, for political or institutional reasons, direct regulation of GHG emissions may be more feasible and still effective at reducing emissions.

International climate negotiations

The 195 countries that are Parties to the United Nations Framework Convention on Climate Change (UNFCCC) have targeted December 2015 (COP 21 in Paris) to negotiate a new climate agreement, applicable to all countries, to strengthen action from 2020 onwards in order to avoid dangerous climate change. Countries’ actions and targets will be nationally-determined, linked together by an overarching framework.

In the first quarter of 2015, countries will be putting forward their intended “contributions”, that is, their emissions reduction pledges for the post-2020 period. Countries’ understanding of energy policy options will play a pivotal role in what they view as feasible in terms of emissions reductions. One important issue in the energy policy-climate interface is to enhance the understanding among climate decision-makers about what is possible in energy sector transformation.

Climate agreements to date have focused on a series of short term targets for greenhouse gas emissions. A new agreement that only consists of short-term GHG targets may not provide an adequate investment signal for transition of long-lived energy sector assets. The importance of providing long-term investment confidence is understood by many in the climate negotiations, but there are few concrete proposals to date.

Suggested points for discussion

- What key aspect of climate negotiations should be on the agenda of energy sector decision makers?
- What questions should energy and climate experts try to answer jointly?
- What communications channel could be used to link energy stakeholders to the climate change community?
- How could industry and government decision making processes be better aligned?
- What messages could the energy sector send to climate negotiators?
INNOVATION AS A SUSTAINABILITY ENGINE – Tools to enable a low-carbon future

Innovation has always been at the core of changes in any established system, whether through novel technical solutions or by adapting existing solutions in new ways and in different environments. This will also be true for the changes needed to decouple the foreseen growth in global energy demand and from impacts of our energy dependence on our planet’s climate. Efficient innovation support mechanisms can therefore be important drivers for climate change mitigation action as they hold the potential to unlock least-cost options to achieve policy objectives, while also creating opportunities to address multiple side-benefits.

Proper visibility of innovation’s potential to enable an economically viable low-carbon energy system can provide policy makers with the necessary confidence to consider mitigation targets ambitious enough to meet short and long-term objectives. As specific innovation choices will depend on many factors, such as regional needs to improve energy security, service levels, population health and green growth perspectives, identifying the potential benefits of the various possible innovation trajectories is essential in our quest to develop a global climate change mitigation agreement.

The focus of the ETP project has always been to identify technology development and deployment opportunities that can contribute to a secure energy system that enables stable economic growth while minimising environmental impacts. Assessing options for cutting energy-related CO2 emissions in line with the targets set under the UNFCCC framework of limiting long-term global temperature increase to 2°C remains a central objective for the work, and the analysis aims to identify how this can be balanced with the other policy objectives of the IEA, namely promoting diversity, efficiency and flexibility within all energy sectors, ensuring the stable supply of energy to IEA member countries and promoting free markets to foster economic growth and eliminate energy poverty.

The 2015 edition of Energy Technology Perspectives will seek to increase policy maker confidence in the feasibility of achieving climate change mitigation targets ambitious enough to meet both short and long-term objectives, in support of the upcoming negotiations of COP 21 in Paris. It will do that by providing better visibility of the potential of energy technology and innovation, encompassing all stages of Research, Development, Demonstration and Deployment (RDD&D) processes, to enable an economically viable low-carbon energy system. It will also help decision makers identify tools to spur innovation and to evaluate their effectiveness, enabling coordination of public and private efforts to ensure that policy drivers and targets are matched by investments and market implementation instruments as well as innovative business models.

Proposed analytical methodology

To illustrate the benefits of innovation support mechanisms, and to increase policy maker confidence in their ability to substantially influence the trajectory of the global energy system, the proposed analysis will touch upon the following aspects:

- **Evaluating and prioritising innovation support** – analysing the complex relationships between energy innovation support schemes and changes in the energy system to provide a state-of-the-art view on how governments can improve the process of program priority-setting, monitoring and evaluation, and the impacts of technology policy decisions on the trajectory of the global energy system.

- **Adapting support schemes to maturity levels** – looking at the effectiveness of support schemes for various technology maturity levels to ensure policy levers are adapted to market needs and support transitioning to sustainable business models.
**Energy efficiency innovation** – linking country-specific context to innovative policies that work at the technology or improvement scale to drive actions now, especially in developing countries, and set the table for future innovative paradigm shifts that can transform the way energy efficiency policy is conceived, delivered, measured and managed.

**Short-term actions for long term objectives** – understanding the benefits of those technologies needed to unlock the deep emissions reductions needed in the long-term to support early actions that can ensure "no-regret" decisions and avoid deterring long term objectives because of short-term needs.

**Industrial innovation** – investigating private sector innovation decision making and identifying how the industrial sector can contribute to meeting global energy objectives to frame how governments and private actors can cooperate in the various stage of the RDD&D process, not only to share costs, and identify common goals and support a diversified set of inputs into the innovation priority-setting process.

**Accelerating clean energy deployment at the global scale** – looking at the link between energy technology and industrial policy, and identify gaps in global clean energy innovation capacity, to highlight opportunities for accelerating global clean energy innovation flows.

**Linking innovation, energy policy and climate mitigation in emerging economies** – collaborative analysis with government experts, business leaders and academia from IEA partner countries (e.g. China in 2015) to highlight similitudes and differences in drivers, barriers and methodologies to support innovation to improve dialogue and increase lessons sharing.

**Using the ETP toolbox for innovation analysis**

The role that technology innovation plays will grow over time and as mitigation targets tighten. ETP 2015 will give a greater emphasis to how short term actions will position countries better for longer term needs of the future. The analysis will follow three principal streams

1. **How innovation can facilitate mitigation by bringing down technology costs and facilitate deployment through other means, such as demonstration of feasibility and capacity building.** The work will be based on theory, past experience and case studies, and will consider impacts on various stages of technology maturity. This could include discussing how the effectiveness of innovation and RDD&D support mechanisms could be assessed, looking at cutting edge analytical methodologies and models on priority setting and their use in the management of governmental and industrial innovation support mechanisms.

2. **Modelling the impact of alternative innovation/technology scenarios.** For example, scenarios for energy technology development can be constructed and modelled in the ETP-TIMES modelling framework, with increased analysis of impacts of various input assumptions based and justified through innovation policy analysis.

3. **Shed light on how to link technology innovation support mechanisms and innovative diffusion strategies.** This will include a review of technology progress, market failures and information gaps to highlight policy hurdles and identify innovation opportunities. Of critical importance will be the strategies needed to bring recent progress to the global scale, and ensure lessons learned and best practices are easily shared amongst stakeholders. This could also lead to a discussion on international technology mechanisms, both inside and outside UNFCCC, and how to ensure synergies are properly identified and leveraged.
Suggested points for discussion

- How should energy technology and energy policy objectives be linked?
- What questions should energy and climate experts try to answer jointly?
  - What information is missing from a Policy Making point of view
  - What information is missing from a Technology Support point of view
- How could industry and government decision making processes be better aligned?
- How can ETP provide a bridge between the views and needs of technology and policy experts?
For further information:

www.iea.org