Institute for the Advanced Study of Sustainability, United Nations University

The United Nations University Institute for the Advanced Study of Sustainability ( UNU-IAS) is a leading research and teaching institute based in Tokyo, Japan. Its mission is to advance efforts towards a more sustainable future, through policy-oriented research and capacity development focused on sustainability and its social, economic and environmental dimensions. UNU-IAS serves the international community, making valuable and innovative contributions to high-level policymaking and debates within the UN system.

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DIRECTORS MESSAGE

The United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS) was created in January 2014 and I was honoured to become its inaugural director. The institute, based in Tokyo, Japan, aims to advance efforts towards a more sustainable future through policy-oriented research and capacity development. As such our activities go beyond research and analysis to include policy development, knowledge transfer as well as teaching and training which can have close contact with international policy making. We work in three focus areas:

- Sustainable Societies
- Natural Capital and Biodiversity
- Global Change and Resilience

Sustainability gained much prominence in 2015 with the COP-21 meeting on climate change anticipated to produce a landmark agreement following the adoption of the Sustainable Development Goals, which replace the Millennium Development Goals as the principal statement on global development to 2030. The role of technology will be indispensable for implementing these agreements and is of critical importance to the sustainability transition in general. However, there are hurdles that need to be overcome if this is to be realised. Developed countries have much to offer in this regard and can play an active role in this by enabling cooperative research, capacity building and policy development which facilitates the diffusion of low-carbon technologies in developing countries. UNU-IAS is contributing to this effort in a new project on Low Carbon Technology Transfer that will collect and analyse the experiences of several developed countries in low-carbon technology transfer to identify how greater cooperation can accelerate the diffusion of highly efficient, clean technologies. This brochure presents an overview of our aims and activities in this project.

I would like to express my sincere appreciation to Ministry of the Environment Japan for their generous support in this endeavour.

ABOUT THE PROJECT

The Low Carbon Technology Transfer Project (LC2T) is supported by the Ministry of the Environment Japan. It is part of wider project that is evaluating the effectiveness of low carbon technology in developing countries and is lead by the Institute for Global Environmental Strategies (IGES) and includes the Asian Institute of Technology (AIT). UNU-IAS’s role in this project is to examine the role of international cooperation in the area of low carbon technology transfer.

The LC2T project seeks to analyse international strategies of other active developed nations for promoting low carbon technology with a view to learning effective strategies for their diffusion to developing countries and build effective partnerships for doing so. The project was initiated in June 2015 with a scheduled timeline of 3 years. For this year, the objectives of the project are as follows:

OBJECTIVES

- To make an analysis of international strategies for promoting low carbon technology in developing countries by France, Germany, the UK and possibly the US
- To build a network for future research collaboration
- To make proposals on international cooperation and dissemination strategies and with a view to building cooperation on promoting low carbon technology in developing countries

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WHAT IS LOW CARBON TECHNOLOGY TRANSFER?

What are low carbon technologies?

Low carbon technologies may be defined as technologies that aim to minimize either the use of energy or generate clean(er) energy. They include renewable energy generation technologies, energy efficient end use technologies and more efficient fossil based energy generation technologies [1]. Such technologies are considered to be a key component not only for combating climate change but for achieving sustainable development more broadly [2,3]. The difficulty in decoupling the energy sector as a main source of greenhouse gas (GHG) emissions from economic growth [1] necessitates the urgent need to avoid future climate change through either mitigation or adaptation strategies.

What is technology transfer?

Technology transfer has long been a theme in economic and development studies and has come to encompass a wide range of perspectives and disciplines such that one can find relevant studies from different research areas including engineering, environmental science, management, energy and fuels, economics, and social behavior. A recent survey [2] evaluated the share of published papers from 1994 to 2010 in the LCT research area, the most common themes are "technology adoption and diffusion" and 'regulation or policy innovation' with 42% and 25% share of papers respectively.

With this range of topics in mind, it is clear that technology transfer covers more than just the artefacts but extends to areas of innovation, capacity development and social organization. Scholars identify that in addition to the transfer of capital goods and equipment from supply side to demand side, it is also found that it includes the transfer of skills and knowledge for operation and maintenance of hardware, and knowledge for understanding the technology. This approach for low carbon technology innovation illustrated in Figure (1).

Conceptually speaking, two dimensions for technology transfer, horizontal and vertical, can be considered. Horizontal technology transfer refers to the direction of flow of technology (e.g. north-south, south-south) while vertical technology transfer describes technology transfer along the innovation chain, from R&D through to commercial diffusion [4]. The transfer of LCT is particularly interesting this regard as the urgent need to address climate change means technologies at varying stages of maturity are often transferred [1]. Hence, some conventional LCTs are already transferred with regard to their application in the market or end user. On the other hand, many LCTs are still at early stage of R&D or intermediate stages of commercial development and accordingly, different policies have been identified as being appropriate at these respective stages (Figure 2).

What does this mean for transferring low carbon technologies?

The transfer of equipment, skills, capacity and innovation capacity for low carbon technologies will mean different things in different locations and applications but as they are closely connected to sustainable development, recipient countries usually view such technologies in economic as well as environmental terms. They can be broadly summarised as follows:

Technologies for fundamental human development:
Low carbon technologies can provide basic services (e.g. energy and lighting) to the least developed countries and possibly the opportunity to build innovative development models (e.g. through local, decentralised electricity generation). These are supported by the recently agreed Sustainable Development Goals, which set out goals and targets in 17 thematic areas.

Leading technologies for efficiency: In fast growing emerging economies, there is a need to make the most efficient devices in order to minimise energy use. However, local capacity and very often surrounding infrastructure support need to also be considered if the efficiencies are to be realised and sustained into the future.

Low carbon technologies for clean energy: Higher efficiencies are only one part of the equation and will not mitigate climate change if solely considered without regard to the how the energy that is used is being produced. Large scale deployment of renewable energy is vital for the required energy transition and can occur in both centralised and decentralised modes.
EVENTS

EXPERT WORKSHOP ON LOW CARBON TECHNOLOGY TRANSFER: FROM POLICIES TO PRACTICE
26-27 JULY 2015

The initial event of the project brought together a set of experts from Japan, UK and Germany to discuss the various facets of low-carbon technology transfer and gain insights from the approach of European countries. The UK and Germany were represented through the participation of the Carbon Trust and the New Climate Institute respectively. The meeting covered a wide range of topics including the role of the market in technology and finance, intellectual property regimes and the current state of research in low carbon development and innovation studies.

ISAP2015 SESSION ON LOW CARBON TECHNOLOGY COOPERATION IN ASIA TOWARD COP21: POSSIBILITIES AND CHALLENGES
28 JULY 2015

Held during lunch on the first day of the 7th International Forum of the International Forum on Sustainable Asia-Pacific (ISAP2015) in Yokohama, this public meeting showcased the project and key insights from the expert.

A “Combination of Planning and Flexibility” for technology development was the main representative message of the session. This broad message however contains a number of important sub-themes which include: flexible mechanisms and policies for different types of technologies, long-term and periodic tracking and analysis to learn the progress and trend of technologies, implementing right policies at the right time, finding the advantages of technologies in different locations in order to facilitate dissemination, and the cycle of “Plan -> Implement -> Update (of the plan) through learning from implementation” as an overall guiding strategy.

FORTHCOMING ACTIVITIES

The LC2T project aims to build on these insights by planning a series of workshops and data gathering missions in Germany, the UK, France and the US to build a picture of how other developed countries tackle the issue of low-carbon technology transfer.

The European workshops are structured around the following questions:

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>DURATION</th>
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<tbody>
<tr>
<td>A. Which technologies are considered the most suitable for transferring to developing countries?</td>
<td>One day</td>
</tr>
<tr>
<td>B. What barriers/obstacles have been encountered and overcome in transferring low-carbon technology to developing countries?</td>
<td>Two days</td>
</tr>
<tr>
<td>C. How are developing countries being supported in implementing and developing low-carbon technologies?</td>
<td>Three days</td>
</tr>
<tr>
<td>D. What are the key gaps in support (broadly defined) which prevent more effective transfer of low-carbon technology?</td>
<td>Four days</td>
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In addition to these meetings, the LC2T project will organise a side event at COP-21 in Paris to further disseminate the project and seek feedback from Parties as to the future direction of the project.

REFERENCES: