July 31, 2012

An Innovative Public-Private Approach for a Technology Facilitation Mechanism (TFM)

Summary

In response to paragraph 265-276 of the Rio+20 Outcome Document, this paper outlines an innovative public-private approach to support the development, adoption, and deployment of environmentally-sound technologies. The approach can provide options for a facilitation mechanism as requested in paragraph 273 of the Outcome Document to help countries drive technology transfer[1], spur innovation, and attract investment. The approach also helps to strengthen capacities for countries so they have ownership of the process and can move away from a project-based, top-down system toward strategically using technology transfer as means of implementing development that is sustainable, country-driven and achieves poverty reduction.

An Innovative Approach to Technology

To address climate change and other development challenges, countries can no longer only rely on traditional methods of technology transfer. With the fast pace of technological change seen today, countries must adopt a new paradigm in order to plan for, access, finance, and deploy environmentally-sound technologies. Countries must be in the driver's seat with the capacities, tools, and networks to identify and utilize technologies based on their own goals and circumstances. Utilising the process of determining domestic current technology capacities, as well as future technology needs, facilitates a country's transition toward sustainable development.

For such a transition to occur, countries will require a TFM that can contribute to establishing appropriate enabling environments that incentivise technology innovation, sustainable investment, and codification and dissemination of best practices, including through South-South, North-South and triangular cooperation. Technology transfer that is supported by a set of institutional, policy and financial structures can lead to long-term investment in, and promotion of, solutions that are embedded in national plans and objectives. Technology transfer should be mainstreamed into the national development process. By doing so countries will build capacity from the bottom up instead of further depending on outside sources for technology innovation and financing.

A critical component of instilling the right enabling environment includes strengthening indigenous research and development (R&D) capacity to drive innovation. To realize success, countries need to

[1] For the purposes of this paper, the term "technology transfer" refers to the entire technology process, including the identification, assessment, research and development, adoption, deployment and dissemination of environmentally-sound technologies.

create national and sub-national systems that support R&D and strengthen capacities to drive innovation and investment, including the creation of local employment and entrepreneurship. As a result, countries will be able to make dramatic advances (or leapfrogging outdated technologies altogether) and build entire industries that did not exist a decade ago.

Currently there are major inequalities among countries in accessing technologies and finance. For example, 2011 witnessed a record $263 billion global investment in clean energy. However, only 5% of these investments occurred outside of the G20[2]. The distribution of CDM projects shows similar geographical inequities, as Brazil, China, India and Mexico have accounted for as many as 85% of all projects as recently as 2011[3]. Many developing countries have yet to attract the appropriate technologies and finance because they are still creating a suitable mix of policies, regulations, fiduciary capabilities, and institutions to achieve their goals. The lack of this infrastructure can compromise the abilities of governments (national and local), communities, and households to take advantage of opportunities to transition toward sustainable development.

A New Paradigm for Technology Transfer

The TFM should provide a worldwide network that will "stimulate technology cooperation and enhance the development and transfer of technologies and assist developing country parties… to build or strengthen their capacity to identify technology needs, facilitate the preparation and implementation of technology projects and strategies..." The TFM should manage the process of receiving and responding to requests from developing countries and work with the established mechanism to respond to those requests. The TFM will serve as an important hub that ensures that developing countries receive the support and technical assistance they need to achieve their goals.

Therefore in order for the TFM to be effective, its services should not only be designed to deliver specific project results, but also contribute to the creation of a national and sub-national foundation of capacities for country-driven technology development and transfer. In this way, the services do not deliver results in isolation. Rather they each support a larger national and sub-national system that promotes innovation, breaks down silos, drives investment, and delivers technology in an integrated and sustained manner.

Readiness for Technology Transfer

The services of the TFM should maintain a two-track, parallel focus on building capacities of local and national stakeholders to ensure that countries are 1) ready for technology transfer and 2) able to access and deploy technology according to their specific needs. The first track, which we can call "Readiness for Technology Transfer" might contain the following pillars:

- **Building strong local research and development.** With strong R&D capacities to develop, finance, and disseminate technology, countries can spur innovation and attract investment. Local experts and centres of excellence, such as universities, research and policy institutions,

[2] Pew Charitable Trusts (2012) "Who's Winning the Clean Energy Race? 2011 Edition" p. 2.
[3] http://www.cdmpipeline.org/cdm-projects-region.htm#1

formal and informal education settings and private organizations, can provide the needed "laboratories" to develop new technologies or modify existing technologies to better meet local needs. These institutions can serve as an innovation engine that drives new technology, enabling countries to be technology transferors in the first place. They are also critical in enabling countries to access, finance, and deploy technology.

- **Identifying technology needs and options.** Countries must have the capacities to select technologies to fit their long-term sustainability objectives. This means creating an enabling environment where individuals and institutions have the capacities to identify and assess both technology and finance options through technology needs assessments as well as financial and policy gap analysis.

- **Integrating technology with sustainable development plans.** Technology transfer does not occur in isolation. Technology plans, strategies, projects and financing must be tailored to the country context. The needs of developing countries vary widely and the technology solutions for emerging economies are very different from those of Least Developed Countries. In this way, the TFM must assist in embedding technology into national and sub-national policies and plans. Ideally, countries can mainstream their technology plan into their national climate change and green growth strategies to ensure institutional integration and technology dissemination.

- **Monitoring, Reporting and Verification (MRV).** The TFM should assist countries to put in place the systems needed to collect data on technology transfer and its impact on sustainable development. Developing indicators for and tracking information regarding the research, development, identification, deployment, and dissemination of environmentally-sound technologies can provide a vivid picture of the results achieved. This data can also be collected by the TFM for a more accurate global outlook on technology. The TFM is therefore well-placed to facilitate knowledge sharing between and among institutions and networks, both public and private.

  In this context it is easy to see how MRV systems would help to create a feedback loop for constant learning and improvement to ensure that results are achieved in the most efficient and effective way possible. This feedback loop also ensures developing countries will continue to access and finance new technology by creating a track record of success in implementing sustainable technology.

Scaling-Up National Technology Transfer

In parallel with building countries' readiness for locally appropriate technology transfer, the TFM should assist in the development and maturation of capacities to finance and deploy both new and existing technology. UNDP envisions this process to involve connecting complementary institutions and

networks to catalyse technology adoption, dissemination, and significantly, local technology innovation. Taken together, these pillars are the "means" to the intended "end": a country experienced in the transfer, local generation, and deployment of environmentally-sound technology.

- **Engaging local, national, regional and global networks, including South-South, South-North, and triangular cooperation (Figure 1).** Networks play a critical role in technology transfer. Technical networks can provide the right data, information, analyses and tools to help countries identify the right technologies for their needs. Financial networks can assist countries to catalyze and increase public and private investment. Networks can also provide peer-to-peer advice, assistance and capacity building that strengthens individual entities within the networks, making the entire system stronger.

Figure 1 – TFM engagement in local, national, regional and global networks

Networks can also facilitate capacity building through South-South, North-South and triangular cooperation. By connecting institutions that specialize in areas related to technology transfer (e.g. energy, finance, agriculture, transport), countries have access to a specialised system of experts. In particular, experts at the local level that have intimate knowledge of the cultural, social, and economic priorities are in the best position to ensure that technology is applied appropriately, efficiently, and equitably.

- **Focussing on building partnerships.** The TFM should tailor technology solutions to the appropriate country context. Furthermore, countries must have the ability to identify and assess domestic and international stakeholders to build a cooperative system that can address unique country needs. This system would build on inherent strengths and expertise of diverse individuals and groups, including non-traditional actors in technology such as communities.

- **Mobilising the private sector.** One such critical partner is the private sector, both foreign and domestic, and the TFM should build the capacities of countries to mobilize these actors. Given that many technologies will be sustained by private investment, close partnerships with industry actors can ensure that technologies are developed and deployed strategically within the context of the market. In other words, partnerships with industry can help guide the creation and installation of the appropriate mix of incentives, regulations and frameworks to access, sequence, and combine private finance.

  Mobilising the private sector can also support local entrepreneurship. The TFM should help countries to install the institutional and regulatory frameworks to support local innovators and

entrepreneurs. This will help the country to depend less on the import of technologies that are not as well tailored to a country's development needs and will make a long-term and sustainable impact.

- **Maintaining strong local research and development.** The R&D component of building capacity for technology cannot be underestimated, nor can it be cleanly contained in either the "Readiness" or "Scaling-Up" tracks. This native skill set and knowledge base is essential in maintaining the momentum a TFM would catalyse in a given country. Therefore the cultivation of local R&D expertise is essential to both being ready for technology transfer and being able to scale-up technology in-country.

Outline for a Potential TFM Structure

In line with the above, UNDP maintains that the TFM should incorporate an innovative public-private approach for technology transfer, one that is owned by the countries it serves. This necessarily involves a wide range of stakeholders including private sector actors. UNDP envisions a hub of inter-connected institutions (Level 1) that represent a region (Level 2) supported by centres of excellence. The TFM hub and the regionally-represented network should be backstopped by a presence in each country (Level 3) that can provide targeted technical assistance, policy, and finance services. Additionally, this third level should include an effective dissemination mechanism at the national level in order to connect and mobilise the best local scientific and technical expertise (Level 4). As such, the TFM can leverage the experiences of all countries that are innovating, adopting, and deploying environmentally-sound technologies.

The graphic below (Figure 2) demonstrates how a TFM can be designed to operate as an inter-connected web of national, sub-national, regional, and global partners. At the middle of the graphic is a major hub in a developing country that takes on the coordination role. It is surrounded by a supporting structure of regional centres of excellence that connect directly to the TFM and to each other. The third ring represents the presence at the national-level; for example, the UN could leverage is presence in 177 countries and territories for this purpose. The fourth ring represents research institutions at the national and sub-national levels where countries can build and exploit local capacity in R&D, in cooperation with the private sector. When taken together, the web brings together the comparative advantages of these organisations at all levels to help countries address their specific technology circumstances and needs. The various entities share information with each other and through networks for the mobilisation of skills, policies, and finance to support effective technology transfer. If requested the UN can assist to develop this structure further based on its experience.

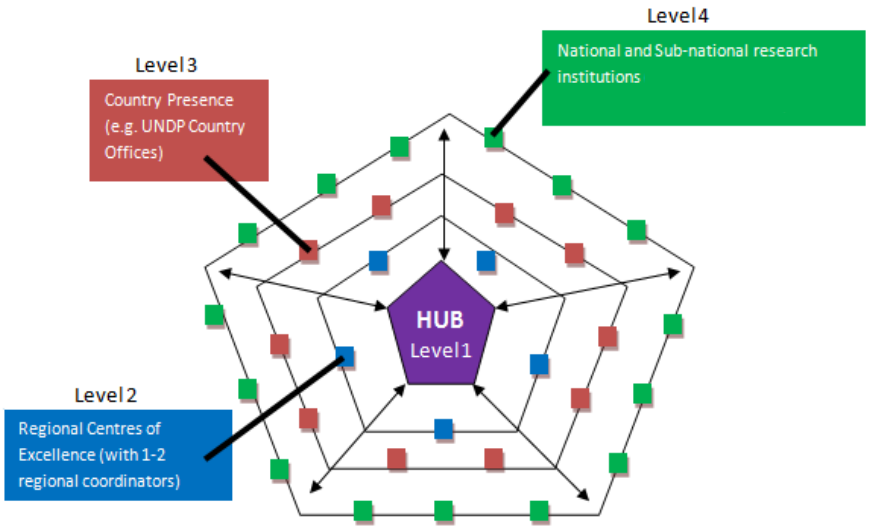

Figure 2 – A vision of the TFM as a hub for technology transfer

Such a structure necessarily means that the TFM will be at the heart of some of the world's best centres of excellence for technology transfer and innovation**.** Given that technology transfer can create markets for new products that may affect a country's imports and exports, it is essential to secure the neutrality of the TFM. Rather than "picking winners and losers", the TFM should ensure that countries operate on a level playing field, have the support necessary to achieve their goals, and are encouraged to pursue the appropriate technology mix that meets national needs. For this reason it is critical that the TFM operates at high levels of impartiality and transparency when it provides advice and support to countries.

The functions of the TFM will need support to provide services for accessing finance. Attracting the right investments is critical for the successful adoption and dissemination of environmentally-sound technologies. The TFM will need to enhance a country's ability to connect stakeholders to the appropriate types of financing sources.

UN Support for the Innovative Approach to Technology

The UN maintains a portfolio of thousands of technology and energy projects that support countries to combine and sequence different types of financing to enable a transition to sustainable development. Collectively, the UN can bring its expertise in areas such as capacity building, governance, and poverty reduction to facilitate technology transfer in an integrated, sustainable, and cross-sectoral manner. The UN stands ready to provide support to address the gaps described above and to assist the TFM to not only fulfill the services outlined by the Outcome Document, but also create the right foundation of technology needs identification and assessment and strong local R&D. On top of this robust base, the UN can assist countries with the integration of technology with low-emission and climate-resilient development plans, engagement with networks, mobilisation of the private sector, MRV and other functions.

Specifically, the UN can:

1. **Support a neutral approach by the TFM that supports all countries to build strong indigenous R&D capacities.** As a key service provider on technology, the UN has decades of experience in providing neutral support for R&D of technologies through programming under the Global Environment Facility, the Multilateral Fund for the Implementation of the Montreal Protocol, and other national, bilateral and multilateral sources. UNDP has piloted technology projects around the world and codified best practices and lessons learned. These experiences, can serve as important guides for countries as they undertake research, development, and demonstration of new technologies.

   Furthermore, the UN works to ensure that all countries have access to information from technology R&D efforts around the world. For example, UNDP created a ClimateTech Wiki online platform in partnership with UNEP, REEP, UNEP-Risoe, NL Agency in the Ministry of Economic Affairs of the Netherlands, Joint Implementation Network, and the Energy Research Centre of the Netherlands. The platform offers a knowledge sharing forum for a wide range of stakeholders in developed and developing countries who are involved in technology transfer. ClimateTechWiki offers detailed information on a broad set of mitigation and adaptation technologies.

2. **Connect the TFM to technical, policy and finance networks at the sub-national, national, regional and global levels.** Because the UN has a global presence, it could be requested to support the creation of this inter-connected web structure. For example, UNDP is an active convener of hundreds of networks that support countries to access the knowledge and information they need to achieve their development goals. UNDP's support to all levels of the layers mentioned above includes a vast organisational network of Country Offices, Regional Service Centres in Bangkok, Bratislava, Dakar, Pretoria, and Panama, and a global support team of technical advisors. This network provides advice and expertise on financial, scientific, institutional, regulatory, and policy issues. This structure helps achieve results effectively and efficiently, as it provides support countries as they identify, plan, deploy and finance environmentally-sound technologies.

3. **Transfer knowledge and expertise in implementing technology solutions.** The UN's decades of experience in delivering results can help ensure that countries have the capacities to succeed, including the abilities to identify needs, integrate technology with sustainable development strategies, and establish robust MRV systems. The UN's expertise from serving as an implementing entity can help to inform the on-the-ground functions of the TFM. The UN's lessons learned can be instilled in the TFM so it can begin effectively supporting countries to develop country-driven regulatory and financial systems can help to achieve their goals.

   For example, UNDP has assisted over 75 countries in the Technology Needs Assessment process and developed a guidebook on this topic in 2010. It also has provided services to help countries design inclusive green, development strategies that include the integration of technology

transfer into national development planning. UNDP also has provided support throughout its portfolio for Monitoring and Evaluation of all environment and energy projects.

4. **Provide services for countries to access financing for technology, including from the private sector.** The international community has created numerous financing instruments aimed at supporting technology transfer. The UN provides extensive support to countries to strengthen their capacities to address the informational, behavioral, regulatory, technical, and financial barriers to accessing finance. In this way, countries can more effectively catalyze finance to support the identification, adoption, and dissemination of environmentally-sound technologies.

   Moreover, UNDP helps countries to create the right enabling environment that can leverage public resources to attract private investment. This can also be used to promote local entrepreneurship and new employment opportunities at the national and sub-national levels.

Immediate Next Steps

To move forward, UNDP proposes that a two-step approach is taken to design a TFM that puts countries in the driving seat to spur innovation and achieve sustainable development that is pro-poor and pro-MDGs. In this UNDP model, countries lead the process. They can rely on technical and financial networks as they identify, develop, adopt, and disseminate technology but have ultimate ownership over the network, information exchange and project cycles.

UN Global Programme for Technology

As a first step, a US$10 million global programme should be created to enable the TFM to provide country-driven support. The programme will provide an integrated approach to technology where counties have what they need to identify and prioritize technologies according to their needs and circumstances. For example, the global programme should provide a framework for how the TFM will link technical and finance networks, serve as a hub to codify knowledge and lessons learned, and help countries to plan technology projects supported by assessing gaps and opportunities.

The global programme should also outline the capacity building needs of the TFM itself. By identifying gaps in knowledge, expertise and functions, the TFM can work more efficiently to address and resolve potential barriers.

Nationally-specific Technology Transfer Projects

Thereafter the TFM should support countries to create national technology transfer projects within this framework. Countries can use the national projects to identify and assess their technology needs and options within the framework of inclusive development strategies. These strategies promote the adoption of environmentally-sound technologies, drive investment, and build capacities of institutions, individuals and systems. Throughout the process, local skills are enhanced to ensure that technology choices respond to specific local needs and the development and installation of technology emerges from a knowledgeable and skilled domestic workforce.

It will be critical for countries to utilize South-South, North-South and triangular collaboration through the TFM. By learning from the experiences of other countries with similar challenges, developing countries can approach technology transfer more strategically. They can build on this knowledge to identify and install the appropriate place-based incentives and frameworks to access, sequence and combine different sources of finance toward environmentally-sound technologies.

By using this approach to design and shape the innovative public-private partnership for technology transfer, the TFM can provide effective support to countries. If designed well, the TFM will no doubt play an important role in strengthening national and local infrastructures and capacities of countries to develop, adopt and deploy sustainable technologies that will drive long-term development.

UNDP Environment and Energy Group, 30 July 2012