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Viewpoint

Multi-stakeholder partnerships for transfer of environmentally sound technologies

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ABSTRACT

Multi-Stakeholder Partnerships can overcome many of the problems which exist with the transfer of Environmentally Sound Technologies (ESTs) from developed to developing countries, but as yet they have not been explored in detail in the negotiations under the United Nations Framework Convention on Climate Change (UNFCCC). Technology transfer is an important part of the UNFCCC, but the mechanism for achieving this is problematic. Developed countries prefer a market approach whereas developing countries tend to negotiate for direct grants. Multi-stakeholder partnerships offer a pathway through which technology is transferred and developing country capacity enhanced, while the interests of developed country private enterprise innovators are also protected. We present opinions and a case-study on multi-stakeholder partnerships and discuss some of the advantages that multi-stakeholder partners can offer.

1. Introduction

Development of effective mechanisms and removal of obstacles to transfer of affordable Environmentally Sound Technologies (EST) from developed to developing countries is a central policy in the United Nations Framework Convention on Climate Change (UNFCCC). The goal is to enable less-industrialized countries to enhance their economic performance through adoption of technologies with low environmental impacts, thereby avoiding pollution problems associated with technologies that facilitated the rise of industrialized nations. However, the mechanism for achieving this is a subject of polarized debate. Developing countries (as defined by the UNFCCC as those which receive benefits from developed country parties to the convention listed in Annexes I and II) on the whole prefer a system of direct grants and limited restrictions on intellectual property rights (IPR), whereas developed countries in general argue for a market-based system which protects IPRs (Lovett et al., 2009). A market-based approach has obvious advantages. Environmental regulations put in place by UNFCCC agreements can, if properly designed (Stavins, 2003), stimulate innovation, production and transfer of ESTs into the market place without excessive cost to developed country governments and taxpayers. But equally there are clear disadvantages, particularly to developing countries, as the economic benefits are likely to go to those firms, which are best placed to create and market ESTs. Most firms with the capacity and technical ability to develop competitive ESTs come from developed countries, and a predominantly market-based approach could potentially create inequitable outcomes in the sense that developing countries will face the costs of acquiring ESTs while developed countries will also be able to reap benefits. On the other hand the role of the private sector in producing and diffusing ESTs is regarded as crucial, and has not fully been exploited in the current UNFCCC framework. This has led to calls for more effective technology transfer mechanisms to facilitate and accelerate the transfer of ESTs to developing countries (Wilkins, 2002).

Multi-stakeholder partnerships (MSPs) or cross-sector partnerships (CSPs) can be defined as "collaborations between investors, state actors and citizens (NGOs) where different actors share in defining or carrying out the purposes of investment." (Forsyth, 2007 p. 1685) and they can help in reducing transfer costs of ESTs. MSPs, in this context, are collaborations with local actors who have expertise in the recipient developing country. For example, they know the legal and regulatory framework, the important players in the national domain as well as the culture and social structure. A producer of ESTs entering a country without this knowledge may face a long period of costly and time-consuming information and experience development, in other words high transaction costs (in the sense of North, 1990). Collaboration may also overcome political obstacles and increase inclusion of diverse local actors into the technology transfer process, thereby building the necessary absorptive capacity and enabling environment for using and

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maintaining the acquired technology in the recipient country (Bell and Pavitt, 1993; Ockwell et al., 2008, Thorne, 2008). In addition they bring together a range of expertise and resources (potentially comprising key factors of supply, demand, finance and distribution, together with local social and political resources), while their decentralized and flexible nature creates space for linking local context with global trends and supports faster and more effective strategic decision-making and operations (Backstrand, 2006). In an ideal arrangement they have the potential to promote better decisions because of varied input, including important expertise, allowing minority groups to take part in policy-making, creating mutual benefits and commitment by enabling participants to identify with outcomes, creating clear and shared definitions of responsibilities and allowing stakeholders to bring their concerns to the political agenda (Hemmati, 2002: 23). In practice, the diversity of collaborating actors in terms of resources and power may frustrate effective partnerships. The challenge is therefore to encourage relevant stakeholders to look beyond their own limited self-interests and recognize the broader, long-term benefits inherent in collaboration and to allow for joint decision making by a diverse set of stakeholders (Hartman et al., 1999, 2002).

Despite the potential of MSPs for overcoming the technology transfer impasse in the UNFCCC and the fact that they already play an important role in the business of transferring ESTs to developing countries, they have hardly been considered in the policy process. In this paper we briefly review the potential for MSPs as a promising approach for transfer and diffusion of ESTs to developing countries and present successful examples from the information and communication technologies (ICT) and energy sector. The case of transfer of energy-efficient lighting technologies by Philips through an MSP in Lesotho is discussed. We present a table of successful strategies and barriers to technology transfer in developing countries and indicate how MSPs can be used to exploit these strategies and overcome barriers. In conclusion we note some possible problems associated with MSPs.

2. Multi-stakeholder partnerships in ICT

At 2008 conference held in Chatham House[1] an ICT company[2] stated "Creating an enabling environment for diffusing new technologies definitely impacts the uptake of the new technology but it is a lengthy process to understand what this enabling environment in a certain region or nation should look like and it is even more difficult and requires local knowledge to understand how things need to be changed to achieve this. A very critical factor in the diffusion of our technologies has been the creation of Multi-Stakeholder Partnerships with local stakeholders from different arenas because these provide local knowledge and know-how and have access to resources." MSPs were also deemed important because of the potential they have for creating a favorable policy and legal and regulatory environment as local actors are much more capable of understanding where barriers for technology uptake are and how these can be overcome. What also became evident during the conference is that the management of MSPs is a difficult process and requires monitoring and evaluation, experience and sharing of best practices.

An example of a multi-stakeholder partnership can be found in Rwanda where in the ICT sector public and private actors work together to promote ICT adoption in order to accelerate broader development processes. Government agencies such as the Rwanda Information Technology Authority (RITA), the national regulator Rwanda Utilities Regulatory Agency (RURA), the High Press Council, and the Human Institutional Capacity Development Agency (HIDA) are working together with the Rwandan Private Sector represented by SIMTEL credit card company and Public Telecom Service provider Rwandatel (RITA, 2006). The main constraints and challenges in the adoption of ICT in Rwanda are lack of purchasing power from rural customers, poor human resources as a consequence of the 1994 genocide, lack of institutional coordination, a lack of competition in the market, lack of standards, lack of a backbone infrastructure, poor rural communications and regulatory divergence in East Africa. Mechanisms to overcome these are efforts to coordinate stakeholder collaboration, legislation supported by sufficient regulatory efforts through training of professionals and harmonization, regulatory consensus building and effective, objective and transparent monitoring and evaluation. As part of the national information and communication infrastructure policy plan they have taken several steps together including the separation of Government regulatory and operator duties; the establishment of independent regulatory institutions; facilitating universal service and access to basic and value-added telecommunications services; the creation of conditions for an investor friendly telecommunications environment; the development of local communications industry towards competitiveness and the encouragement of private investment in the ICT sector. Some of the indicators that were used to assess successful transfer of ICT are uptake of telephone lines, teledensity, mobile subscribers, internet and mobile phone providers and internet bandwidth. Some of the achievements reported are increase in schools with internet from 1 to 40, increase in internet service providers from 1 to 4, increase in 118% of mobile telephone subscribers and 341% of rural telephone lines (RITA, 2006). The results in terms of ICT adoption in schools are somewhat more mixed, with ICT penetration and use increasing in schools but the actual contribution of ICT to learning is reported to be more limited due to a lack of integration of ICT through school's curriculum (Rubagiza et al., 2011). The focus on diffusion of hardware needs therefore to be more strongly accompanied with a focus on utilizing ICT as a learning tool.

An example with the private sector as one of the key stakeholders is the effort by Microsoft[3] to build ICT in schools in Kenya. Microsoft, with experience in more than 150 MSPs in the field of ICT for education stated at the Chatham House meeting: "*More than* 20 *years in the business of schools taught Microsoft that no single stakeholder, not even government, has the resources to plan, fund, implement and control successful, scalable, sustainable ICT deployments across an entire country. Partnerships are vital, and the real key to success is an inclusive partnership that pulls together the visions, resources and experiences of both the public and private sectors*" Microsoft has even gone as far as establishing a national Leadership Forum: The Kenya ICT Trust Fund, which formalizes the process of building and capitalizing on such partnerships. Some of the results of the partnership involved the provision of about 20 computers to about 400 schools, assistance in establishing connectivity and subsidized software provision in Kenyan schools and the delivery training courses to around 20,000 secondary school teachers (Swarts and Wachira, 2009; Ocheng, 2010).

[1] 'Technology: A Platform for Development?' On 30 and 31 October 2008 at the Chatham House, London.

[2] Name withheld because of Chatham House Rule: *When a meeting, or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed.*

[3] The representative from Microsoft at the Chatham House meeting gave permission for the company to be cited in this article.

3. Multi-stakeholder partnerships in energy-efficient lighting

Within the field of energy EST transfer, the electrical appliance company, Philips, plays a leading role in a successful example of transfer. Their approach included the negotiation of international agreements about collaboration in global markets with governments and private sector involvement from developing countries. In 2003, the then marketing manager of Philips, Harry Verhaar, embarked on a new strategy based on the premise that the environment would be a pressing global issue in the near future. The implementation of this

Table 1
Summary of the contribution that multi-stakeholder partnerships can make to an enabling environment for EST transfer. Compiled from the review by Hofman et al. (2008) including components from Figueres and Bosi (2006: 3) and SEEEM (2006). Additional information derived from interviews with companies mentioned in the text to combine lessons learned from the different sectors.

Success factors and barriers for EST transfer	Contribution of multi-stakeholder partnerships
An enabling policy framework through government programs and national coordination	– MSPs create dialogue between all stakeholders and government. – MSPs create representation of all stakeholders' interests in policies. – Through broader support MSPs create more options for coordination.
A supportive legal and regulatory framework	– Stakeholder representation in drawing the framework will lead to broader support.
Infrastructure for communication and distribution of technologies	– MSPs involve actors with existing infrastructure or actors who are suited to create this infrastructure.
Lack of financial capital of potential adopters	– MSPs ceate more awareness about benefits of the technologies among stakeholders and therefore increase the willingness to pay. – Through including MFIs and banks in the MSPs, availability of (micro)credit can increase ability to pay. – This may also increase the trust of investors because willingness to pay and demand are likely to increase.
Lack of fit with need and/or local circumstances	– Including actors with knowledge and experience about local conditions can increase the compatibility and adoption of the technology.
A conducive political context	– Knowledge about political parties and the affiliation of stakeholders with (different) political parties can assist in creating an MSP which will create broad support.
Greater alignment of international testing procedures, performance requirements and labeling schemes.	– Involving technicians, users of the technology, international companies and (inter)national agencies and government bodies in the MSPs assists in creating the right standards and schemes and creates broad support.
Market mechanisms and market transparency	– MSPs do not have the potential to create a competitive market for a product but by including civil society and government, transparency and monitoring can be demanded.
Economies of scale	– MSPs can be instrumental in creating economies of scale because MSPs have the potential to improve infrastructure, compatibility and willingness/ability to pay. This will increase the size of the market and thus make economies of scale more likely.
Cooperation with civil society	– Through involving NGOs and other civil society organizations, e.g. cooperatives, SACCO's and SHGs.
Built up of domestic technological capabilities & regional networks (suppliers, maintenance, installers)	– MSPs include national and local companies in exploration and exploitation of technologies. This will create employment and human capacity building in the local context in developing countries.
Effective supply chain organization & distribution channels	– Through including international and local actors with varying expertise and resources the right channels and supply chain can be created. It would require good management and coordination.
Market research	– Local actors will have more knowledge about local demand and can more easily conduct market research.
Limited access to the state of the art energy efficiency technology among manufacturers	– Through MSPs with companies with state of the art technology, manufacturers can get access to this knowledge. IPRs can stimulate state of the art technology companies to invest in new technologies because it protects their investments while the MSP can benefit the manufacturers in developing countries by making the technology available to them and in addition by stimulating the development of human capital.
Lack of trust of new equipment	– Through including technicians, users and manufacturers in the process of transfer, quality concerns can be expressed and stronger support will be built.

strategy and the utilization of multi-stakeholder partnerships as a vehicle led to the diffusion of several ESTs globally including energy-efficient lighting, solar lighting and manpower lighting. Harry Verhaar considers the MSPs they established are core features of this successful technology transfer. In 2008 Philips announced the opening of the first light bulb manufacturing facility in Lesotho, which is also the first ever factory producing light bulbs in Africa. This factory, based on Philips' investments, manufactures energy efficient light bulbs through a joint venture with the State-owned Central Energy Fund (CEF) and Karebo Systems, a private company which manages the demand side of the lighting sector. CEF is involved in the search for appropriate energy solutions to meet the energy needs of South Africa and the sub-Saharan region, including oil, gas, electrical power, solar energy, low-smoke fuels, biomass, wind and renewable energy sources. It also manages the operation and development of the oil and gas assets of the South African government. Karebo Systems is a private company that has been promoting energy efficient lighting since 1999 when the company was actively involved in the management of Bonesa Electricity. Bonesa was formed to establish the Efficient Lighting Program funded by Eskom and the Global Environment Facility (GEF) and was active until 2003. Its primary aim was to increase awareness around efficient lighting as well as to formulate and implement strategies for the market penetration of efficient lighting technologies such as compact fluorescent lamps (CFLs). To date, Karebo Systems has been managing part of the residential demand side management programs from Eskom, including the roll-out of more than 16 million CFLs to low-income communities throughout South Africa.[4]

Luc Escoute, general manager of Philips SA's Lighting explains that a quadruple win situation is created through this joint venture.

> *"The new production facility will enable us to meet the growing need in energy efficiency lighting solutions, stimulate the economic development and reduce the carbon emissions of the region at the same time. By saving on electricity costs, it also improves the Region's competitiveness. It's great to see business can help in so many ways at once."*[5]

The direct employment effects of Philips' investment were around 200 at the start of operation of the plant in 2009 and were expected to expand towards 500 people employed as the plant reached its full capacity, while also indirect economic effects through transport, distribution, shipping and component production were created (LNDC, 2009). A recent science and technology and innovation policy review of Lesotho give further support to these claims. In UNCTAD (2010) it is reported that Philips' efforts in Lesotho are noteworthy as it represents one of the few examples where foreign firms invest in further skill development and technology transfer (p. 42). However the report also notes that technology transfer and the creation of knowledge spillovers are hampered by a lack of local absorptive capacity such as a small industrial base and weak local knowledge infrastructure.

The MSP is important for overcoming issues on the demand side for energy efficient lighting, for building capabilities and the creation of an enabling policy framework and legal and regulatory framework (Harry Verhaar, pers. com.). For example appropriate standards have to be in place to assist in phasing out fluorescent lighting and creating quality standards.

[4] 〈http://www.newscenter.philips.com/about/news/press/20080327_light_bulbs_south_africa.page〉.

[5] 〈http://www.newscenter.philips.com/about/news/press/20080327_light_bulbs_south_africa.page on 01042009〉.

4. Conclusion and outlook

The examples given above, for both ICT and ESTs, show that MSPs can assist in overcoming barriers and challenges for technology transfer For example they can help in creating an enabling environment and can even be used as an argument to counter concern over IPRs. As Philips has shown, IPRs can lead to investment by multi-national companies in production plants in developing countries leading to stimulation of economic development, reducing carbon emissions, increasing the country's competitiveness through savings in electricity costs and human capital building. Similarly, Falvey et al. (2004) have also concluded that strong IPRs benefit low-income countries because they create an incentive for multi-nationals to invest in a plant in developing countries. The areas where MSPs can contribute to successful technology transfer are given in Table 1.

MSPs which include state, private and civil society actors at international, national and local levels can assist in creating the enabling environment for EST transfer through potential to influence most of the factors mentioned in Table 1: an enabling policy, legal and regulatory framework, infrastructure and understanding of local context such as market, political circumstances, social structure and culture.

However, there are also difficulties related to the set-up and implementation of MSPs. The ideal market-based solution would be to establish an EST product in an openly competitive market place defined by globally coherent environmental regulation. An MSP enables the product to be transferred from developed to developing country through a mutually agreed partnership. But establishing and maintaining this partnership can have high transaction costs in terms of time and effort. Moreover, intransigence by one of the partners could hold up the project even if the other partners are in favour. Another difficulty is that MSPs could be used to create anti-competitive behaviour by monopolizing key stakeholders into MSP agreements that then exclude other products from the market. Also it will be challenging to find the right mix of stakeholders. But in the final analysis they offer an exciting way forward to open up the huge market potential of ESTs.

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