

When policy meets evidence: What's next in the discussion on intellectual property, technology transfer & the environment?

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1 minute read: key messages

- *Dissemination and uptake of environmentally sound technologies (ESTs) are critical components of the global response to climate change.*
- *Public and private investment in ESTs is increasing steadily.*
- *EST transfers are occurring on a very large scale as part of an active, multidirectional process.*
- *Evidence indicates that effective intellectual property (IP) protection contributes to the speed of EST transfer as one of a number of complementary factors.*
- *Policymakers can significantly influence the transfer process (e.g., by developing comprehensive blueprints for EST adoption and diffusion).*
- *Ultimately, the question is: How can appropriate scientific, technological and IP frameworks be used effectively to promote successful assimilation and use of ESTs around the world?*

Why Do ESTs Matter?

The importance of the effective dissemination and use of environmentally sound technologies (ESTs) is increasingly evident, due to the growing emphasis in global politics on the need for climate change mitigation, and to expectations that global energy consumption will continue to increase dramatically in the coming decades.

ESTs are sources and methods for producing energy that reduce the emission of greenhouse gases (GHG). Their effective dissemination, adaptation and use by entities in all countries are considered integral to mitigating climate change, for which GHG emissions are recognized as a major contributing factor.

There are many types and fields of ESTs, all of which are in different phases of development. For instance, solar heating/cooling systems and biomass are at or nearing the commercialization stage, while many electricity storage technologies are still in the development stage.¹ Public and private investment in renewable sources of energy – including wind, biomass, solar, geothermal and wave – began in the 1970s and, since the 1990s, has continued to steadily increase. Together with other products and technologies that contribute to the reduction of GHG, these so-called “renewables” are types of ESTs. Major developed and developing country economies have committed to significant future investment in renewable fuels including: the United States, on the basis of the 2005 Energy Policy Act and the 2009 economic stimulus bill; the European Union (EU), as part of its “20 by 2020” program of action; and China, on the basis of its 2006 Renewable Energy Law and 2008 economic stimulus package.

What are ESTs ?²

“Technologies that protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their waste and by-products and handle residual wastes in a more acceptable manner than the technologies for which they are substitutes.”

The Kuang River



Examples of how ESTs are being used include :³

- *The treatment of domestic wastewater using a contact aeration process to improve the water quality of the Kuang River, which flows through the city of Lamphun in northern Thailand;*
- *The use of computer software to create long-term future scenarios of the Langat Basin, Malaysia, in order to examine possible policy choices and explore the environmental, social and economic consequences of those decisions;*
- *Implementation of a regional knowledge management system for ESTs in the Asian Pacific region; and*
- *The uptake and application of environmental management systems (EMS) by local government authorities in China.*

Many leaders and policymakers around the world today recognize that GHG emissions have a negative impact on the environment and must be reduced. During the mid-1990s, the United Nations Framework Convention on Climate Change (UNFCCC) established an initial framework for international efforts to address climate change, followed by the Kyoto Protocol which commits signatories to reduce GHG emissions. Continuing efforts resulted in the agreement of the Bali Plan of Action in 2007, and negotiations continue with a view to reaching a legally binding agreement on actions to address climate change. These accords emphasize the importance of financing and encouraging the transfer of ESTs,⁴ without specifying policies or mechanisms that could drive the process.

How Do Intellectual Property Policies Influence EST Transfer?

New technologies are usually protected by patents, and ownership of patents for new technologies, including ESTs, tends to be concentrated in developed countries or, to a lesser extent, more advanced developing countries. Moreover, patent holders

in developed countries may not make the technology available in all countries for different reasons, including the relative significance of a particular market or the fear of losing control over the technology in important markets. In light of these factors, researchers have dedicated substantial attention to the impact of intellectual property (IP) and IP rights, among other factors, on EST transfer to developing countries. Some authors have expressed concern that IP could potentially hinder the transfer of ESTs.

The growing body of evidence suggests, however, that IP rights *contribute* to the transfer of ESTs to developing countries. The knowledge base nevertheless contains significant gaps, and data regarding this relationship are not comprehensive. Additional data, evidence and analysis are needed, so that policymakers can implement appropriate IP and other, complementary policies that support EST transfer and, ultimately, contribute to the mitigation of climate change.

What Does the Evidence Suggest?

A number of conceptual studies about the role of IP in EST transfer have been published which: identify priority issues for research and analysis;⁵ present theoretical arguments regarding IP and EST transfer;⁶ and discuss whether the flexibilities in the World Trade Organization's (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) are adequate for enabling developing countries to access new ESTs.⁷ Such conceptual studies, which are not based on empirical evidence, reach widely divergent conclusions about the influence of IP on EST transfer.

The need to base further analysis on data and other evidence has been recognized by organizations including the UNFCCC, which has called for enhanced data collection regarding ESTs and technology transfer.⁸ Increasingly, experts are heeding this call, and a broad effort to establish a more reliable and complete evidence base regarding, in particular, the relationship between IP and EST transfer is underway.

Recent work based on case studies, data and databases, analysis and literature reviews supports the following:

- Economists generally agree that adequate protection of IP is an important factor in enabling conditions conducive to investment in environmental technologies;⁹
- Key factors impeding the transfer of ESTs appear to be: asymmetric information, market power and externalities, along with uncertainty regarding the quality of innovation and future input prices;¹⁰
- Of the existing evidence-based studies, most seem to suggest that IP rights are not a barrier to the transfer of ESTs and that, together with a range of other factors, they may play a positive role in facilitating the transfer of ESTs;¹¹
- The majority of developing countries still do not experience the transfer of ESTs from developed countries, with exist-

- ing EST transfer mainly focused on the BRIC countries;¹²
- Stronger protection of IP encourages IP owners to license technologies to entities in developing countries, according to organizations that are active in the development, patenting, commercialization and transfer of ESTs;¹³
- However, depending on the characteristics of the recipient country market, relatively weaker protection of IP may not necessarily deter companies from transferring technologies;¹⁴ and
- Protection of IP is just one of a number of factors affecting EST transfer, including infrastructure, effective government and the development of knowledge institutions, finance and human skills, together with the regulatory environment.¹⁵

How are ESTs transferred to and used in developing countries ?

- *Licensing agreements which grant permission to use EST and, ideally, also provide for the transfer of know-how;*
- *Joint research and development (R&D) initiatives between local and foreign partners to create new ESTs;*
- *Establishment of manufacturing plants in developing countries to produce and adapt ESTs for local use;*
- *Mergers, acquisitions and strategic alliances between developing and developed country entities to expand the use of ESTs in the developing country partner; and*
- *Capacity-building, through the provision of education, training and infrastructure, to support the assimilation and use of ESTs.*

Recommendations for Further Research

Significant additional research and analysis is needed in order to better understand the role of IP in the process of EST transfer. A clearer picture of this dynamic could contribute to identifying the IP policies that most effectively promote EST transfer, thereby providing a basis for evidence-based policy-making in this area. It could also shed light on the relative importance of other, complementary factors that appear to influence the process. Avenues for possible further research include the following:¹⁶

- The use of IP-protected ESTs by entities based in developing countries;
- The views of potential users in developing countries regarding the influence of IP on their access to ESTs;
- The contribution of EST transfer to innovation in developing countries;
- Case studies of failures and successes, in relation to different types of EST transfer to different developing countries;
- The contribution of complementary factors to successful technology transfer; and
- The types of macroeconomic structures that best support EST transfer to developing countries.

Key Implications & Considerations for Policy & Policymakers

The following key implications and considerations for policy and policymakers are intended as starting points for reflection, to be adapted to specific needs and circumstances.

On the basis of the existing evidence, some tentative conclusions can be drawn about the contribution of IP to EST transfer.

1. The EST sector is growing, and the international transfer of ESTs is happening on a large scale. Available evidence indicates that many developing countries are participating in EST transfer, which is targeted primarily towards the largest developing countries, particularly China, Brazil and India. EST dissemination occurs through many channels – including trade, mergers and acquisitions (M&A), licensing, joint ventures and technical assistance programs – and is not necessarily a unidirectional process from developed to developing countries.
2. Available evidence suggests that IP can play a positive, contributing role in the process of EST transfer, adaptation and utilization. However, because the dynamic underpinning this relationship is not yet fully understood, it is difficult to identify the optimal IP policies for promoting EST transfer. More data and other evidence are needed.
3. IP rights cannot be considered in isolation. Entities report that they take into account a variety of “complementary” factors when making decisions related to licensing and EST dissemination. In addition to the degree of IP protection and enforcement in the recipient country, technical capacity, infrastructure, macroeconomic indicators, the regulatory and political climate, and human factors play a role in such decisions.
4. Context is very important when assessing the role of IP in the transfer of ESTs to developing countries. The size and importance of the recipient market, or other characteristics of the recipient country, affect the IP-EST transfer relationship. Specifically, data suggest that a lack of effective IP protection and enforcement in a very large, fast-growing market may not prevent technology from being transferred to that country. Furthermore, the relative influence of IP rights, as opposed to the so-called complementary factors, varies from case to case, including as a function of the type of EST.
5. Finally, EST transfer appears not to be a passive, unidirectional process. In *Intellectual Property and Access to Clean Energy Technologies in Developing Countries*, the late Professor John Barton observes that the development



of renewables in developed countries has been stimulated more by regulation than by market forces.¹⁷ There is reason to believe that this pattern could repeat itself in developing country markets, and that officials in developing countries will be able to influence the process of EST transfer by actively promoting it, for instance by having in place a predictable regulatory framework, promoting development of the technical and scientific capacity necessary to adapt and use ESTs, improving infrastructure and participating in data collection and research.

Based on these initial conclusions, policymakers interested in fostering the transfer of ESTs, including through use of appropriate IP policies, may wish to consider the following:

- Analysis focused on the one-dimensional question “do IP rights help or hurt EST transfer” will likely not generate practical answers that can underpin policymaking. The framework for considering the role of IP in EST transfer should be updated, to focus on the question: “How can IP and IP rights be used effectively to promote the successful assimilation and use of ESTs by entities in developing countries?”
- A variety of factors must be taken into consideration by policymakers seeking to promote EST transfer. Available evidence indicates that, because IP rights do not work alone in influencing EST outcomes, policymakers must develop a comprehensive strategy to attract ESTs. At the same time, effective IP protection appears to be a key factor in the promotion of EST transfer, as indicated by studies such as the *Survey of Licensing Activities*.¹⁸

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WIPO Global Challenges Briefs provide overviews of issues relevant to debates about solutions to global challenges, such as climate change, public health and food security.

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