



*Intellectual Property and its Role in the Generation and
Diffusion of Green Technologies,
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The role of IP in the transfer of green technologies: what economists tell us

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OUTLINE

- What



What is technology transfer?

- Technology transfer refers to **any process by which the technical information of one party**



How does technology flow across borders?

- **Trade** in goods and services
- **Foreign direct investment** (FDI) through multinational enterprises (MNEs)
- **Technology licensing**, either within firms (where MNE retains proprietary control of the intellectual property and know how) or between unrelated firms at arm's length.
 - Mixed form of licensing and FDI **joint ventures**
- Cross border movement of **technical and managerial personnel**
- **Non market channels** such as imitation
 - through product inspection, reverse engineering, decompilation of software, and even simple trial and error
 - studying patent applications
 - temporary migration of students and scientists to universities, laboratories, and conferencesIPRs may reduce learning through non market channels



Do IPRs help or hinder technology transfer?



Technology transfer and climate change

- UNFCCC could have specific legal obligations to reduce greenhouse gases on the model of other MEAs such as the MP
 - Technology is the **essential cause** of anthropogenic climate change and is **necessary** part of the solution
 - Need enabling environment to generate **break through, disruptive**, new platform technologies as well as **cumulative and adaptive** innovation
- A growing sense of **urgency** – need to increase transparency, reduce transaction costs and reduce diffusion time
 - Many economists advocate a **carbon tax and other market formation policies** that would induce faster development of new and diffusion of existing technologies
 - Some argue that at least patents or other IPRs taken out on green **innovation financed by governments** should be diffused widely on reasonable terms
 - But diffusion needs deployment, not localization (Gallagher, 2014)
 - Large market a necessary condition for localization
- Ethical/human rights context for adaptation technologies
 - Adaptation technologies linked to right to **food, health, shelter**



Lessons from the diffusion of clean energy technologies

- For 4 CETs (gas turbine, advanced automotive batteries, solar PV, coal gasification), volume of world trade grew at 259% between 2000 2010
 - Chinese exports of solar PV were 45% of global exports in 2011 from 3% in 1997; price fell by 75% from 2008 2011
 - In 3 out of 4 sectors, Chinese patents have overtaken foreign patents
- Market



Montreal Protocol: case studies on IPRs being a barrier to access to ESTs

1. Korean Trade Promotion Agency, "Case Study 4: The Republic of Korea and the Montreal Protocol" in Veena Jha & Ulrich Hoffmann, eds., *Achieving Objectives of Multilateral Environmental Agreements: a package of trade measures and positive measures* (United Nations Conference on Trade and Development UNCTAD/ITCD/ TED/6), http://www.unctad.org/en/docs/itcdted6_en.pdf
2. Jayashree Watal, "Case Study 3: India: The Issue of Technology Transfer in the Context of the Montreal Protocol" in Veena Jha & Ulrich Hoffman, eds.,



Some caution on any absolute conclusions

- First, positive technology diffusion impacts are generally found only in larger and middle income countries



Concluding remarks

- Role of IPRs in technology development and diffusion contentious area in WTO and UNFCCC
- IPRs not sufficient condition to induce either but has largely positive effect on technology transfer, although need to consider how to accelerate rate of diffusion and overall welfare effects