

# **Frameworks for Technology Transfer: Conditions and scenarios for developing country participation**

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# Central Question

*How can the (widespread and effective) participation of developing countries in the international regime for climate friendly technology transfers be achieved?*

# Outline of Comments

I. Basics of International Technology  
Transfers: What? How? Who?

II. Analytic and Institutional Frameworks

III. Conclusions

# I. Basics: What is transferred?

## 'Technology'

Engineering (and managerial) knowledge/knowhow

Explicit and tacit

Hardware; Software; Orgware

Products; production processes

## 'Climate-friendly'

See lists of: EC, UNFCCC, US Department of Energy,  
World Bank; Pacala and Socolow, Stern, Walker and  
King

# How is it transferred?

1. 'Internalised' international transfers to local affiliates, including joint ventures, of multinational corporations through foreign direct investment projects  
Cf. *assimilation* into local economy

2. Trade in goods and services

3. Licensing

4. Movement of people – temporary and long-term migration

Note: Similarity with four 'modes' of international transactions in WTO General Agreement on Trade in Services

# Who transfers it?

Firms and governments

Large, medium and small-sized firms

Individuals

## II. Analytic Frameworks

- Official Development Assistance (ODA)
- Global Trade and Investment (GTI)
- Intellectual Property and 'Internalisation' (IPI)
- Business-Government Partnership (BGP)
- International Political Economy (IPE)
- Domestic Political Economy (DPE)

## Official Development Assistance (ODA)

Asymmetries in incomes, technological resources and historical responsibilities of 'developed' countries and 'developing' countries mean the *governments* of the former can and should provide financing and technology transfers to the latter.

### But...

Developing countries are sources as well as recipients

Developed countries are recipients as well as sources

Firms are the principal innovators and transferrers

Barriers include government international trade and investment policies

- EU 66% tariff on CFLs from China
- US firm-specific limits on tax credits for hybrid autos

## Global Trade and Investment (GTI)

*Firms* are the principal sources of technological innovation and diffusion, which occurs through international trade and investment. Firms in developing countries are increasingly important as leaders in technological innovation. International trade and investment barriers in all parts of the world restrain international technology transfers.

## Intellectual Property and 'Internalisation' (IPI)

Firms protect their *competitive advantages* by using intellectual property rights and 'internalisation' of knowledge to minimise technology transfers. The local foreign impacts of international technology transfers are limited by firms' use of foreign direct investments in foreign affiliates to keep the technologies internal to the firm even as the technologies are transferred internationally. Such 'internalisation' is central to the strategies and operations of large multi-national firms.

## Business-Government Partnership (BGP)

*Firms and governments* can cooperate to overcome the public goods problem of under-investment in new technologies and the 'valley of death' problem in the transition of new technologies from the demonstration phase to the commercialisation stage. E.g. Asia Pacific Partnership (APP).

## International Political Economy (IPE)

International technology transfers and their financing can be made conditional as side-payments to address the public goods – *free rider problem* of international agreements. I.e. use international technology transfers as carrot/stick.

## Domestic Political Economy (DPE)

International technology transfers are restricted by the vested interests in the status quo in both the potential *source and recipient countries*.

# Analytic and Institutional Frameworks

	<i>Problems</i>	<i>Solutions</i>	<i>Institutional Frameworks</i>
<b>ODA</b>	Low incomes, financial resources & capacities in developing countries	Increase financial aid & capacity building	Multilateral, regional & bilateral aid agencies – e.g. World Bank
<b>GTI</b>	Government policy barriers to int'l. trade and investment	Reduce tariffs & other trade & investment barriers	Multilateral, regional & bilateral trade- invest. agencies – e.g. WTO
<b>IPI</b>	Firms' anti-competitive practices	New IPR regime, IJV requirements, int'l. competition regime	FCCC, WTO, UNCTAD, national FDI regimes
<b>BGP</b>	'Valley of death' in RDD&D	Business-government collaborations	Multilateral, regional & bilateral RD&D – e.g. APP
<b>IPE</b>	Int'l. system public goods / free riders	Side payments: conditional access to technology funds	Multilateral, regional & bilateral tech financing schemes
<b>DPE</b>	Domestic interests threatened by transfers	Subsidies	Source-country and recipient-country trade & investment agencies

Analytic Frameworks	FCCC Draft Negotiating Text Provisions (19 May)
<b>ODA</b>	Paras. 167 & 168: 'options' on roles of public and private sectors; Para. 170: 'additional' to existing ODA
<b>GTI</b>	[maybe - see bottom row]
<b>IPI</b>	Paras. 187, 188, 189: 'options' concerning IPR
<b>BGP</b>	Para. 192: 'partnerships...engaging the private sector' shall/should be 'recognized'
<b>IPE</b>	Para. 178 (also 68): fines for non-compliance with financing commitments
<b>DPE</b>	Para 177: Parties establish 'national coordinating bodies' including 'all stakeholders'
<b>Several?</b>	<p>Para. 180: principles of new 'technology mechanism' include removing unspecified 'barriers to technology development and transfer'</p> <p>Para. 185: 'national technology road maps' shall/should include 'obstacles to development and transfer of ...technological options'</p>

# III. Conclusions

Address wide-ranging agenda of problems and solutions suggested by *analytic* frameworks

Address the agenda in the context of many *institutional* frameworks

## More conclusions

Adopt policies to overcome the barriers identified by *all* of the paradigms

FCCC: more emphasis on barriers to 'south-south' transfers

WTO: specific focus on barriers to climate friendly 'trade' in goods and services

WTO and/or UNCTAD: revisit competition policy

US: increase and focus bilateral and multilateral ODA

US: take lead in establishing international technology cooperation agreements

## Conclusions: Predictive

### *At the international level*

new institutional mechanisms (e.g. innovation centres)  
calls for/pledges of modest increases in financial flows

### *In the US*

increased imposition of conditions on recipient countries  
slight increases in ODA  
big increases in export subsidies

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## For further information ...

- “Technology Transfer and Climate Change: International Flows, Barriers and Frameworks,” in Lael Brainard, ed., *Climate Change, Trade and Competitiveness*. Washington, DC: The Brookings Institution, 2009; ch. 4.
- “Climate Change Technology Transfer: A New Paradigm and Policy Agenda,” *Climate Policy*, 8 (2008): 516-526.
- “International Energy Technology Transfers for Climate Change Mitigation: What, who, how, why, when, where, how much ... and the implications for international institutional architecture.” Paper prepared for CESifo Venice Summer Institute Workshop: Europe and Global Environmental Issues. Venice, Italy - 14-15 July 2008; CESifo Working Paper No. 2408.
- “The Technology Agenda for International Climate Change Policy: A Taxonomy for Structuring Analyses and Negotiations.” In Christian Egenhofer, ed. *Beyond Bali: Strategic Issues for the Post-2012 Climate Change Regime*. Brussels: Centre for European Policy Studies, 2008; pp. 134-145.

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