

How Trade in Renewable Energy Technologies Takes Place: Barriers and Opportunities to Increasing Deployment in Developing Countries

A Case Study of Wind Power

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Scope of Presentation

- Wind Power: the Global Trade Context
- The Disparities in Deployment of Wind Power and its Major Causes.
- Market Conditions and Trade Barriers:
Perspectives from OECD Firms on Accelerating Wind Power Deployment in Developing Countries.
- Findings and Recommendations



Study Methodology

- Primary sources:

Fourteen wind farm developers, wind turbine generator (WTG) manufacturers and technology firms, consulting engineers and others doing business internationally. All from OECD countries.

- Additional sources:

Approximately 20 participants in wind-power, solar PV, geothermal and concentrating solar thermal power sectors. Four non-OECD.

Published research by EBI, GWEC, ICTSD, IEA, IISD, etc.

- Note: Research based on historic conditions before global recession that began 3rd quarter 2008.

Wind power's relevance to other CCMTs

- Wind power is project-dependent; no sales to end-users without a wind farm project.
- Similar to utility-scale hydro, biomass, geothermal, cleaner coal.
- Distinct from PV (distributed) and energy-efficient goods sold to consumers through wholesale and retail channels.

Tariff and non-tariff barriers are not as formidable for wind as for some other CCMTs

- World Bank: reducing tariffs and removing NTBs would = 64% increase in imports of CFLs to 18 developing countries.
- For WTGs, liberalization would = 23% increase in trade.
- May be exaggerated.
- More important: GDP, energy policies, electricity markets, capacity to subsidize. (Cosbey et al., 2008; IEA, 2008; Jha, 2008).
- Few developing countries have feed-in tariffs or trade-able green certificate regimes.

Wind Power: The Global Context

- Modern wind power industry born of 1970s energy crises in OECD countries.
- Innovation and growth has been driven by domestic policies and incentives.
- Trade has been critically important from the beginning.
- Incredible success story: from 6,100 MW in 1996 to 121 GW in 2008.
- Today: Stark disparities in deployment between developed and developing nations.

Global Wind Power Capacity (2008)

	MW	% of Total
Europe	65,946	54.6%
North America	27,539	22.8%
Asia	24,368	20.2%
Pacific Region (Aus, NZ)	1,644	1.4%
Africa & Middle East	669	0.6%
Latin America & Caribbean	625	0.5%
Total	120,791	

(GWEC, 2007; GWEC, 2008).

Environmental Business International Inc. (San Diego, Calif.)

Global Disparities in Deployment of Wind Power

- Most developing countries produce no utility-scale electrical power from WTGs.
- 2008: Brazil only country in Latin America and Caribbean to install significant new capacity (94 MW).
- In Africa, little outside Morocco (134 MW) and Tunisia (54 MW).
- Outside of China, India, Japan, Chinese Taipei, South Korea and the Philippines, Asian countries have only 6 MW.

(GWEC, 2007; GWEC, 2008).

Vestas: Emblematic of Wind Power Industry's Dependence on Trade

- Built on domestic base but enjoyed early growth selling to USA.
- By 1997: subsidiaries and JVs in Sweden and Spain, first WTGs to India.
- Next decade: large sales to Australia, China, Egypt, France, Italy, New Zealand, Turkey and USA. Subsidiaries in Italy, Scotland, Germany, Australia and China.
- By 2008, 20,829 employees in 27 countries; 40% of revenue from outside Euro zone; sourced components internationally.

Globalized Supply Chain for Goods and Services

- Trade in services: licensing or acquiring technology and IP.
- India's Suzlon and GWP invest in European firms.
- Competition increasing from firms operating in non-OECD countries, especially China.
- European firms license technology, have JVs with Chinese firms.
- China's WTG sector: approximately 60 manufacturers.

Developers are Key Actors for Wind Power Deployment

- Finance and build wind farms.
- Identify and lease sites, assess resources, negotiate power sales agreements.
- Borrow \$ to build wind farms.
- Operate or sell.
- Bring specialized expertise.
- Firms from OECD countries pioneer wind power in developing countries which lack expertise and capacity.

Steps in Developing a Wind Farm

- Site prospecting and feasibility studies.
- Designing the layout of WTGs and modeling electricity production.
- Negotiating power-purchase agreements (PPAs) with wholesale electricity customers.
- Performing environmental assessments.
- Obtaining administrative approvals and grid connections.
- Securing project financing and long-term investment.
- Procuring and importing WTGs and related equipment.
- Engineering and constructing the wind farm.
- Operating and maintaining the wind farm.

Where NTBs can increase costs, deter future project development activity

Development Stage	Relevant NTB
<ul style="list-style-type: none">• Site prospecting and feasibility studies.	<p>None: Domestic partners, vendors perform; or company staff or consultants travel on short-term visas.</p>
<ul style="list-style-type: none">• Designing the layout of WTGs and modeling electricity production.	<p>Import of meteorological towers may be needed.</p> <ol style="list-style-type: none">1. Burdensome inspections and customs procedures;2. Import surcharges or other border taxes.

Development Stage

Relevant NTB

- **Negotiating power-purchase agreements (PPAs) with wholesale electricity customers.**

- 1. Non-transparent or arbitrary government-procurement procedures.**
- 2. Informal "additional payments" required to obtain administrative approvals.**

- **Performing environmental assessments.**

None: Domestic partners, vendors perform; or company staff travel on short-term visas.

- **Obtaining administrative approvals and grid connections.**

- 1. Non-transparent or arbitrary government-procurement procedures.**
- 2. Informal "additional payments" required to obtain administrative approvals.**

Development Stage

Relevant NTB

- **Securing project financing and long-term investment.**

1. **Restrictions on investment.**
2. **Regulations on payment or restrictive foreign exchange allocations.**

- **Procuring and importing WTGs and related equipment.**

1. **Burdensome inspections and customs procedures.**
2. **Import surcharges or other border taxes.**
3. **Import licensing, quotas or prohibitions.**

- **Engineering and constructing the wind farm.**

None: domestic or int'l EPC firm performs.

- **Operating and maintaining the wind farm.**

None: WTG manufacturers train domestic staff.

Ability to Deal with NTBs is a Competitive Advantage for Some Firms

- Some avoid China, others do business quite successfully, including licensing IP.
- Some avoid South Asia; at least one wind-power developer handles issues with little difficulty.
- Competitive advantage: adapt to business norms and conditions, including NTBs.
- Some small firms see more opportunity in developing countries than in domestic markets or other OECD countries.

What Wind Power Developers Look for in Developing Markets

- Electricity market restructured?
- Do state-owned utilities still resist IPPs, especially foreign-owned ones?
- Have grid connection agreements and PPAs been honored?
- Preferential rates for wind power? If not, are market power prices high enough?

Transmission Needed in Mature and Developing Markets

- Transmission expansion needed. Lack of grid connections where the good wind sites are.
- Lack of transmission capacity may explain why many countries have no utility-scale wind power.

Conclusions & Recommendations

- **Assist developing nations to create economic, policy and market conditions to support wind power and other renewable energy technology.**
- **Additional research to inform and develop strategies.**

Suggested additional research:

- **Policy tools to support deployment of wind and other renewable energy technology.**
- **What can developed countries and multilateral agencies do.**
- **Assess transmission needs.**

Suggested additional research continued...

- **Financing strategies to build additional transmission capacity.**
- **Tariffs and non-tariff barriers.**
- **Policies and incentives for technology innovation to exploit wind power sites with low average wind speeds.**

Thank you

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