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Technology Transfer and Climate Change: International Flows, Barriers and Frameworks

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Twin Energy Challenges

- Meeting significant increase in energy demand and improving access to energy
- Responding to GHG risks

Context:

2 Billion people without access to commercial energy
\$22T Investment (through 2030) energy supply and distribution
\$45T Investment (through 2050) to manage climate risks

Accelerated development and deployment of advanced technology will be essential to meet aspirations and manage risks at affordable costs

Emerging Issues: Trade & Investment

- **Competitiveness issues are inherent in differentiated national commitments for GHG reductions**
- **UN FCCC and KP contain no provisions for trade sanctions**
- **Rising calls within EU, US, Australia to protect domestic industry**
- **Proposed solutions may exacerbate trade debate**
- **Resolution of trade issues is complicated by differences in participants and approaches between WTO and UN FCCC**
- **Promotion of free trade and investment will be essential to deploy and utilize technologies to address climate risks**

Near term: trade tensions from differentiated commitments
Long-term: need to accelerate investment in low-GHG technology

Technology in Models of GHG Stabilization

- **Principal change between now and 2030**
 - Price driven reductions in energy demand
 - Price driven increases in end-use efficiency
 - Fuel switching, especially natural gas for coal
- **Principal change after 2030, widespread deployment of low-GHG technology for energy supply**
 - Nuclear
 - Carbon capture and storage
 - Bioenergy, especially biofuels
 - Future more widespread use of de-carbonized electricity, e.g. in transport
- **Assumed policy framework: uniform global carbon/GHG tax with universal participation (no trade or investment barriers)**

Tax trajectory and technology portfolios differ significantly between modeling groups, all assume no barriers to trade and investment

Key Question: Enabling Private Sector

- **UN FCCC institutions are largely irrelevant to mainstream energy investment... or discourage them**
 - **Focus on government controls and finance:**
Technology transfer under the protocol not under the market
 - **CDM, JI, GEF**
 - + **Bureaucratic, time consuming, costly procedures**
 - + **Narrow project eligibility under CDM, JI, GEF**
 - **CDM focus on green niche technologies**
 - + **Nuclear ineligible**
 - + **Carbon capture and storage faces delays, possibly exclusion**
 - + **Biofuels under intense debate**
- **Lip service paid to private sector role in creating and deploying solutions; UN FCCC debate is dominated by the north-south debate, efforts to direct technology trends, and focused on government funding mechanisms**
- **Some promise in bi-lateral and multi-lateral processes, e.g. Asia-Pacific Partnership, G8, IEA**

Enabling Frameworks for Business Contribution

To fulfill its potential most effectively, business requires a proper enabling framework that includes:

- Rule of law and good governance
- Transparent, uniformly enforced regulations
- Protection of intellectual property
- Free, open markets
- Safe and stable communities
- Partnership and multilateral cooperation

Private Sector Role

- **Profitable multi-national companies with strategic emphasis on R&D play an essential role in research, development and global deployment of advanced technologies: products, processes, services**
- **Research**
 - Aimed both at near term deliverables and long-term breakthroughs
 - Involving internal R&D and collaborations with academia, national programs, other companies
- **Commercial opportunities typically derive from a combination of technology and effective management systems (proprietary positions and know how)**

Financial controls	Market strategies
Production control	Operations integrity
Energy management	Environmental Compliance
Maintenance	...

Requires a corporate culture of promoting, utilizing and gaining competitive advantage from technological innovation

Government Role

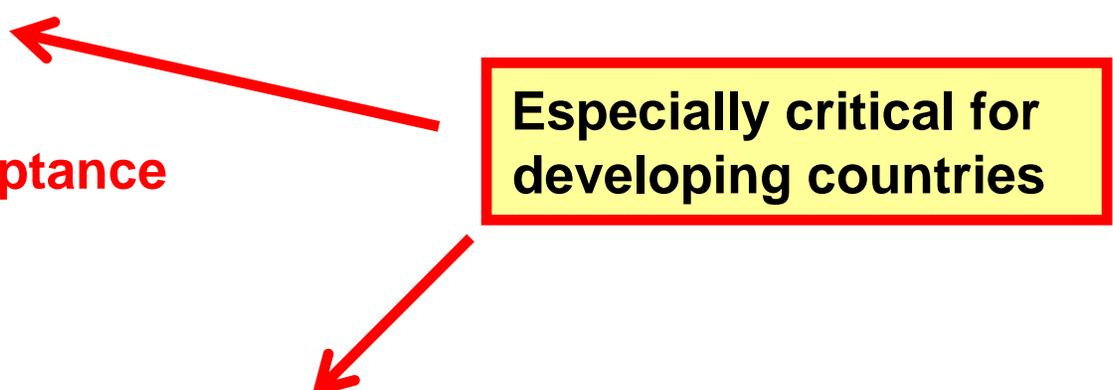
- **Establish stable policy/regulatory environment**
- **Build societal capacity**
 - Education/training especially in science and engineering
 - Fundamental research
 - Infrastructure
- **Create enabling frameworks**
 - Regulations and permitting
 - Investment
 - Technology deployment
 - Technology transfer
- **National circumstances affect policy choices: ability of nations, firms, citizens to respond to an economic signal depends on: structure of economy, national circumstances, institutions, ...**

Thank You

Criteria for Technology Commercialization

- **Performance**
- **Cost**
- **Consumer acceptance**
- **Safety**
- **Enabling infrastructure and capacity**
- **Regulatory compliance and frameworks**
- **Environmental impacts**

Especially critical for developing countries



Weakest link paradigm: failure in any dimension will prevent widespread commercialization