Suggested research topics in clean energy technology development Findings and implications of previous studies for future research projects on technology development

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Introduction: Climate Technology Center and Network (CTCN)

CTCN
Climate Technology Centre & Network

Unlocking the power of technology for climate smart solutions

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Home » Technical Assistance

Technical Assistance requested by NDEs

Date of submission	Countries	Title	Objective	Sectors	Enabler	Approach
1 July 2015	Viet Nam	Bio-waste minimization and valorization for low carbon production in rice sector	Mitigation	Industry	Economics and financial decision-making	
25 June 2015	Albania	Regional Energy Efficiency Action Plan for ESD in Albania	Mitigation	Energy use		
15 June 2015	Mali	Study of technical and economic feasibility to remove barriers to the implementation of drying and storage technologies for okra, mango and potatoes to support food security	Adaptation	Agriculture and forestry		
5 April 2015	Mongolia	Revision of existing Renewable Energy Law of Mongolia and developing framework of activities for enactment of draft Law of Mongolia on Energy Conservation	Mitigation	Energy supply		
13 March 2015	Uruguay	Replacement project of fluorinated refrigerants for end users of refrigeration equipment in the dairy sector in Uruguay	Mitigation	Energy supply		
9 February 2015	Senegal	Green technology deployment in industrial zones	Mitigation	Energy supply		

Introduction: Climate Technology Center and Network (CTCN)

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1-Jul-15	Viet Nam	Bio-waste minimization and valorization for low carbon production in rice sector	Mitigation	Industry
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15-Jun-15	Mali	Study of technical and economic feasibility to remove barriers to the implementation of drying and storage technologies for okra, mango and potatoes to support food security	Adaptation	Agriculture and forestry
5-Apr-15	Mongolia	Revision of existing Renewable Energy Law of Mongolia and developing framework of activities for enactment of draft Law of Mongolia on Energy Conservation	Mitigation	Energy supply
13-Mar-15	Uruguay	Replacement project of fluorinated refrigerants for end users of refrigeration equipment in the dairy sector in Uruguay	Mitigation	Energy supply
9-Feb-15	Senegal	Green technology deployment in industrial zones	Mitigation	Energy supply
8-Feb-15	Antigua and Barbuda	Technical Assistance for the Implementation of Projects related to the Establishment of a Sustainable Financial Mechanism for Climate Change in Antigua and Barbuda	Adaptation, Mitigation	Infrastructure, Transport and Urban design, Energy supply
5-Feb-15	Indonesia	The Development of Anaerobic Digester Technology for Palm Oil EFB Waste in Indonesia	Mitigation	Waste management
19-Jan-15	Dominican Republic	A Community based early Warning System in every pocket from Santo Domingo, D.N.	Adaptation	Early Warning and Environmental Assessment
16-Jan-15	Uganda	Formulating Geothermal Energy Policy, Legal and Regulatory Framework	Mitigation	Energy supply
1-Jan-15	Senegal	Development of energy efficiency projects in industries and services	Mitigation	Energy supply
17-Nov-14	Mauritius	Building Capacity for promoting a greenhouse gas mitigation strategy for the proposed power generation facility in Mauritius	Mitigation	Energy supply

What Is Technology Transfer?

What Is Technology Transfer?

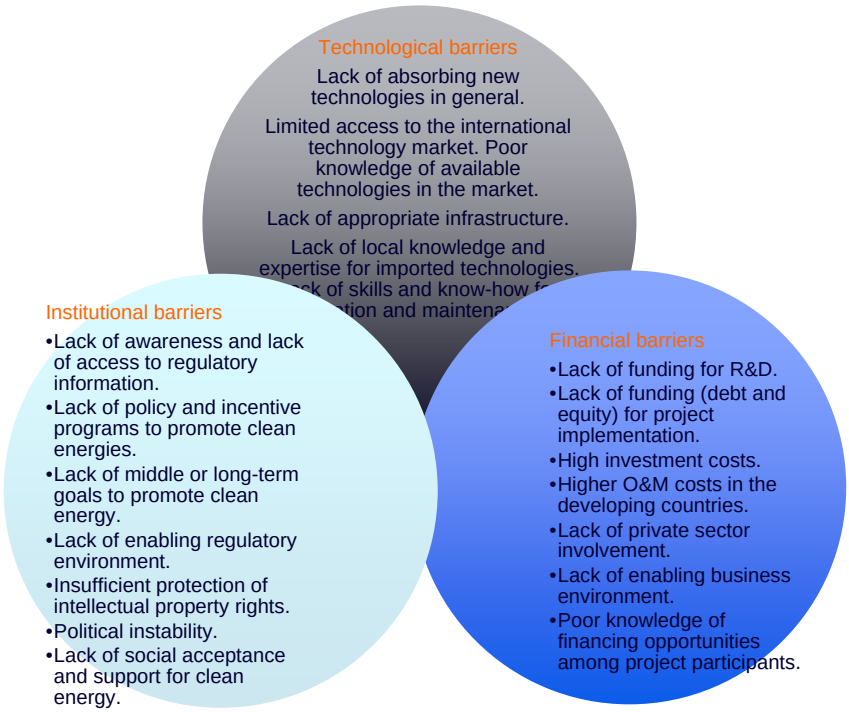
- Intra-organizational transfer (S&T)
- Inter-organizational transfer (S&T: from public to private, business magt.)
- Cross-boundary transfer (business magt., public policy)

What Is Technology Transfer?

Technology Transfer Channels:

- Voluntary-based co-operations (bilateral, multilateral, industry-wide)
- Exports
  - Machines
  - Production facilities (turnkey)
- Licensing agreements
  - Production process and services
  - Patents and know-how
- FDI (Foreign Direct Investment): “spillovers”
  - Wholly-owned (100% investment)
  - Joint venture
- Imitation (“reverse-engineering”)

Barriers: Technological, economic, institutional



There are a number of country-specific, technology-specific case studies.

Results of case studies on barriers

1. Technologies at innovation stage

- CCS and IGCC
  - Economic incentives such as CDM are not enough.
  - Building network for R&D and technology road-mapping necessary.

2. Technologies at diffusion and transfer stage (for industrial use)

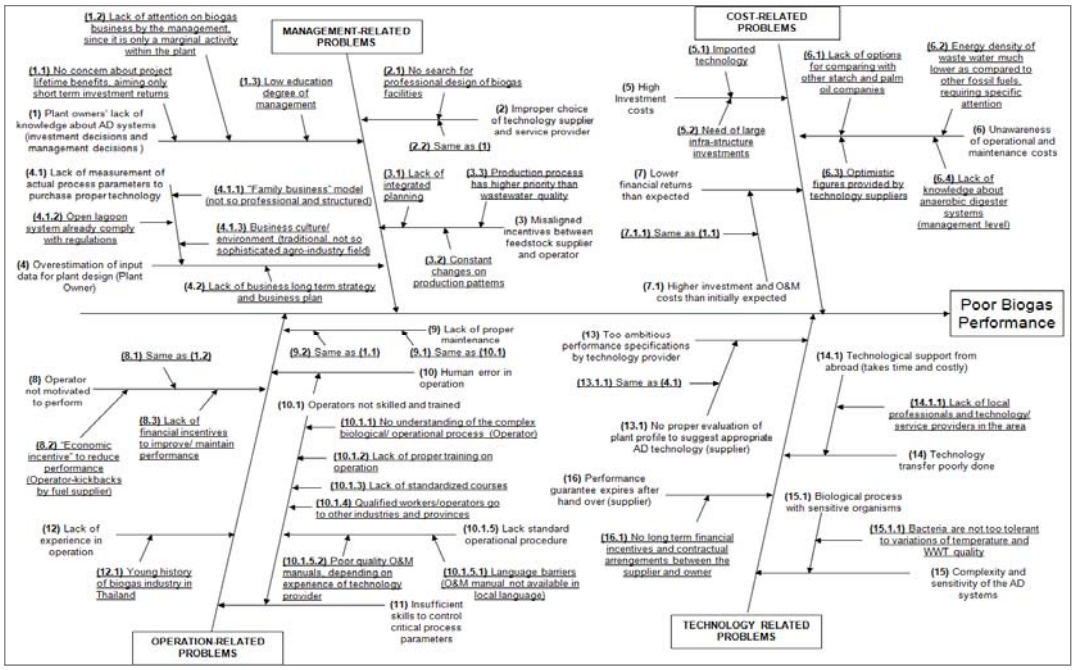
- Wind power in India and China
  - Cost to acquire patent. Technologies and know-hows owned by firms in the developed countries.
  - FIT in India and the policy to encourage domestic industry in China have lead to some success.
- Bio-energies in India and Thailand
  - Lack of know-how and expertise for imported technologies. Lack of skills in operations and maintenan
  - Banks are reluctant to finance agro residue projects since it lacks collateral value.

3. Technologies at diffusion and transfer stage（for individual use）

- LED in India
  - The size of the market is too small. Little foreign investment.
  - Economic incentives necessary including subsidy to cover some of the costs.
- PV in India
  - Mature production technology for silicon cells is available on the market without licenses since related patents have expired.
  - Technological standardization necessary.

Local learning is important.

Biogas projects in Thailand: Stakeholder consultation



Policies and institutions to overcome barriers

1. **Knowledge sharing and coordination**
   - R&D networking and road-mapping（Example: IEA's Technology Roadmap)
   - Multilateral and bilateral R&D co-operations (Example: EU-India solar joint project)
   - Partnership building for demonstration projects (Example: Global CCS Institute)

2. **Enhancing enabling environments**
   - Capacity building for expert training (NAMA and TNA）
   - Knowledge building on intellectual property rights (WIPO's roles）
   - Industry-specific technology cooperation programs (Examples: Technology Breakthrough Program (steel)、Cement Sustainability Initiatives (cement))

3. **Financing facilitation and support**
   - Domestic economic incentive policies such as FIT and subsidy
   - Matching between local project developers and foreign investors
   - Providing ways to mitigate investment risk

Theories referring to: Ron Benioff, Heleen de Coninck, Subash Dhar, Ulrich Hansen, Joyce McLaren, and Jyoti Painuly, Strengthening Clean Energy Technology Cooperation under the UNFCCC: Steps toward Implementation, 2010.

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Call for papers

New approaches for transitions to low fossil carbon societies: promoting opportunities for effective development, diffusion and implementation of technologies, policies and strategies

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The visions for and structure of the new international low fossil carbon technology governance are crucial for the success of future global climate governance structures, policies and procedures. With the establishment of the Climate Technology Center and Network (CTCN) in 2010 adopted in the Cancun and Durban agreements at the United Nations Framework Convention on Climate Change (UNFCCC), the preliminary institutional and financial architecture to promote development, diffusion and implementation of low fossil carbon technologies are being implemented (UNFCCC, 2011).

This Call for Papers (CfPs) for a Special Volume (SV) of the Journal of Cleaner Production (JCLP) focuses upon both international structures, policies, and strategies for low fossil carbon technology governance.

1. Topical areas

The Editorial Team (Team) of this SV invites authors to prepare and submit papers in the following topical areas related to low fossil carbon technology governance. The Team will accept review papers, research papers, case studies and other types of papers in one or more of the following areas:

What technologies?

1. **Technologies that may reduce greenhouse gas emissions significantly.**

- **In this case, the focus may be placed on technologies at the innovation stage such as clean coal and smart grid.**

What technologies?

1. **Technologies that may reduce greenhouse gas emissions significantly.**

Solar thermal technology (Source: The Economist)

"Super grid" (Source: DESERTEC Foundation)

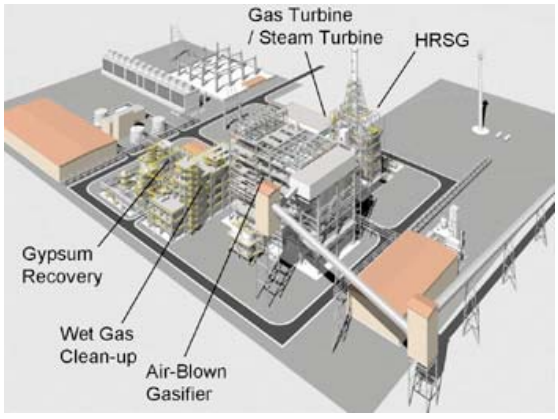
What technologies?

2. **Technologies that may be the focus of the Japanese government promotional strategies.**

- **In this case, energy efficiency improvement technologies may be good candidates.**
- **Are they large-scale industry specific technologies (as in steel and cement)? Are they technologies for individual consumers? (such as air-conditioners or electronic products)**

What technologies?

2. **Technologies that may be the focus of the Japanese government promotional strategies.**



Integrated gasification combined cycle
(Source: Mitsubishi Heavy Industries)

Energy efficient inverter compressor
(Source: www.airpurifier-review.com)

What technologies?

3. **In the area of renewable energy technologies, do Japanese companies still have advantages in the international market?---No. but maybe, yes, in some part of the value chain. If so, where is it?**

	Wind turbines			Photovoltaics		
2010	1	Vestas （Denmark）	14.8%	1	Suntech Power (China)	5.8%
	2	Sinovel (China)	11.1%	2	JA Solar (China)	5.4%
	3	GE WIND （U.S.）	9.9%	3	First Solar (U.S.)	5.2%
	4	Goldwind (China)	9.5%	4	Trina (China)	3.9%
	5	Enercon (Germany)	7.2%	5	Q-Cells （Germany）	3.7%
2003	1	Vestas （Denmark）	21.7%	1	Sharp （Japan）	26.6%
	2	GE WIND (U.S.)	18%	2	Kyocera （Japan）	9.7%
	3	Enercon （Germany）	14.6%	3	Shell Solar Industries (Netherlands)	7.0%
	4	Gamesa (Spain)	11.5%	4	Mitsubishi Electric （Japan）	5.4%
	5	NEG Micon （Denmark）	10.2%	5	Sanyo Electric （Japan）	4.7%

Comparison of the rankings of wind and photovoltaic producers and their market shares in the global market between 2003 and 2010. (Source: Information compiled by authors from various sources.)

What technologies?

4. **Technologies that may bring good social or sustainable development benefits to community.**

- **Micro-hydro, small PV, energy efficient cooking stove and others.**

- **However, these technologies may not lead to a good size of GHG emissions reduction or be part of business strategies.**

- **“Low technology” or “appropriate technology.” ? Is South-South cooperation more appropriate? Are there any good Japanese technologies?**

What technologies?

4. **Technologies that may bring good social or sustainable development benefits to community.**

Mini-hydro
(Source: www.toyama-brand.jp)

Energy efficient cooking stove
(Source: www.washington.edu)

In summary

There are different technologies. For further research, it is necessary to make clear the target technologies for research.

1. **Technologies reducing GHGs: Innovation**
2. **Technologies with the government's promotional strategy: Energy efficiency improvement**
3. **Renewable energy technologies**
4. **Technologies with good social benefits**
5. **Technologies with "co-benefit" impacts**