



GGKP Annual Conference 2019

Achieving Global Energy Transformation

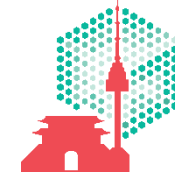
21–22 October | Seoul, Republic of Korea

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Unlocking Renewable Energy Potential



Climate Change & Technology Transfer –Barriers, Technologies and Mechanisms

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Objective

- Importance of Technology Transfer
- Barriers to Technology Transfer
- Prioritized Technologies
- Review of Technology Transfer Framework
- Way Forward

Presentation Outline

- Barriers
 - Financial Barriers
 - Intellectual Property Rights
 - Technical Barriers
 - Miscellaneous Barriers
- Which Technologies and Where are they?
 - OECD Patent Database Analysis
- What's Next?
 - Addressing the Barriers
- Conclusion



BARRIERS TO TECHNOLOGY TRANSFER

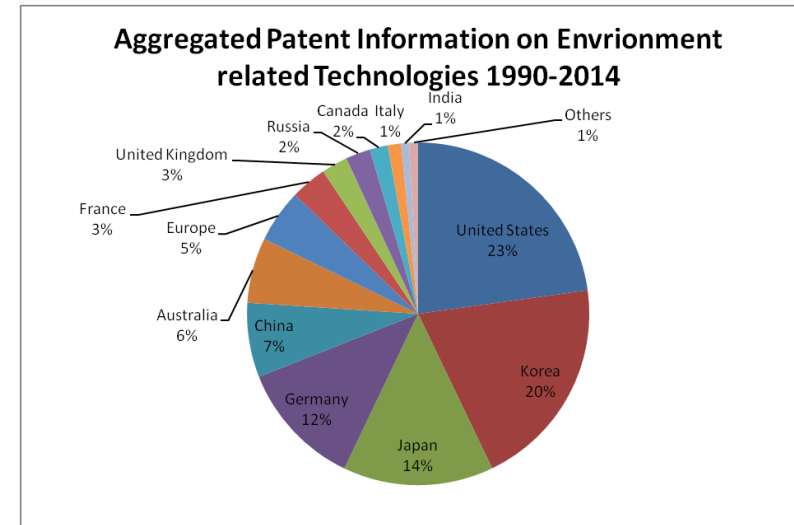
Financial Barriers:

Underdeveloped financial sector, high import duties, high or uncertain inflation or interest rates, uncertain stability of tax and tariff policies, and investment risks are some of the macroeconomic factors in recipient country which act as barriers to technology transfer.

High lending rates in country could also hinder the growth of technologies.

Country	Lending Rate, per cent per annum
Brazil	52.10
Russian Federation	12.60
South Africa	10.46
India	9.67
China: Mainland	4.35
The United States	3.51
Republic of Korea	3.37
Japan	1.04

Source: <http://data.imf.org> for 2016, accessed on April 15, 2019



Intellectual Property Rights:

While strong enforcement of the IPR framework in the recipient country is desirable as patents of technology received will be protected by it, a strict framework in countries where such technologies are developed makes it difficult for firms in recipient countries to obtain patent rights. In the case of emerging technologies, it is desirable to promote collaborative research that could result in joint ownership of patents.

Technical Barriers:

Primarily, sector specific barriers arising because of transaction costs, assurance costs and other sector specific factors.

Clean Coal Technologies:

- New technologies are driven by supply-side as commonly, end users are concerned about reliable power at reasonable tariff.
- Solar and Wind have a lucrative market, but clean coal technologies haven't found much attention.
- Main barrier is lack of finances for commercialization.

Biomass/bio-energy:

- Unregulated fuel supply and different fuel input e.g. agriculture waste, municipal solid waste etc. require different technologies.
- Role of community becomes very important which is the primary generator and owner of biomass.
- Cost of power and efficiency makes such plants less competitive.



Technical Barriers continue.....

Electric Vehicles:

- Affordability is one of the biggest barrier.
- Patents may not prove to be a barrier, but it is important to ensure knowledge spillover in recipient countries by shifting manufacturing and engineering.
- Adapting technology to match local conditions (weather, application use, etc.) is important.
- Innovation absorption capacity of recipient country is crucial.

Energy Efficiency -

- Supply driven; requires stringent regulations , financial support and enforcement.
- The technology transfer is through consumer goods for household energy efficiency or capital goods for industrial energy efficiency.
- India's recent success in household energy efficiency is an excellent model for many low-income countries.
- Low cost of procurement per unit may help diffusing technologies in case of large-scale appliances such as HVAC systems, agriculture equipment etc.



Other Miscellaneous Barriers

➤ *Mode of Transfer and Nature of Technology*

☐ Vertical Transfer - Sale or relocation of Equipment

- Barriers related to free trade, rules and regulations pertaining to the import and associated custom and excise duties. Suitable for consumer goods.

☐ Horizontal Transfer - long-term sharing of intellectual property, usually via joint ventures .

- Most of such initiatives are undertaken by the private entities engaging in business. The knowledge spillover in such cases is more but it occurs at a very slow pace.

➤ *Nature of Technology (Lifecycle and Market Characteristics):*

Phase	Barrier	Response
Research and Development Phase	High Failure prospects, Negative Income, High Cost	Collaborative research, Strengthening National Innovation Systems
Ascent	Initial high cost for adoption and production.	Joint ventures and private cooperation for local manufacturing
Maturity	Import of goods impeding progress of domestic industries and manufacturing capabilities	Support to domestic industries and flow of information
Decline	Dumping of technologies in developing and least developed countries	Anti- dumping regulations

Other Miscellaneous Barriers Continue..

Category	Description	Technology examples	Barriers and Stakeholders
Consumer goods	Goods specifically intended for the mass market; households, businesses and institutions.	Solar home systems, CFLs, energy-efficient air conditioners, drip irrigation tubes, seeds for drought resistant crops.	International Trade related rules, regulations, customs, excise etc. Primary stakeholders – private businesses.
Capital goods	Machinery and equipment used in the production of goods, e.g. consumer goods or electricity.	Utility technologies, such as biomass plants, small scale hydropower plants, or technological parts thereof. Could also be machinery used in agriculture, and technologies used in industrial processes.	Similar barriers as above along with barriers related to foreign direct investment . Primary stakeholders being manufacturers – PSUs and Private
Publicly provided goods	Technologies in this category are often (although not always) publicly owned, and production of goods and services are available (free or paid) to the public or to a large group of persons.	Sea dykes, infrastructure (roads and bridges, sewage systems), mass transport systems (metros).	Bilateral Negotiations related issues if any. Stakeholders – Governments and state agencies.
Other non-market goods	Non-tradable Technologies transferred and diffused under non-market conditions, whether by governments, public or non-profit institutions, international donors or NGOs.	Early warning systems for drought, seasonal forecast of rain for optimal planting, microfinance institutions, seed banks, energy saving by behavioural change.	International negotiation mechanism related barriers on platforms such as CTCN etc. Government agencies, research institutes etc.



Review of Existing Framework: CTCN

➤ Technology Mechanism under the UNFCCC = TEC + CTCN

❑ TEC: Technology Executive Committee (Policy Arm)

❑ CTCN: Climate Technology Centre and Network (Implementation Arm)



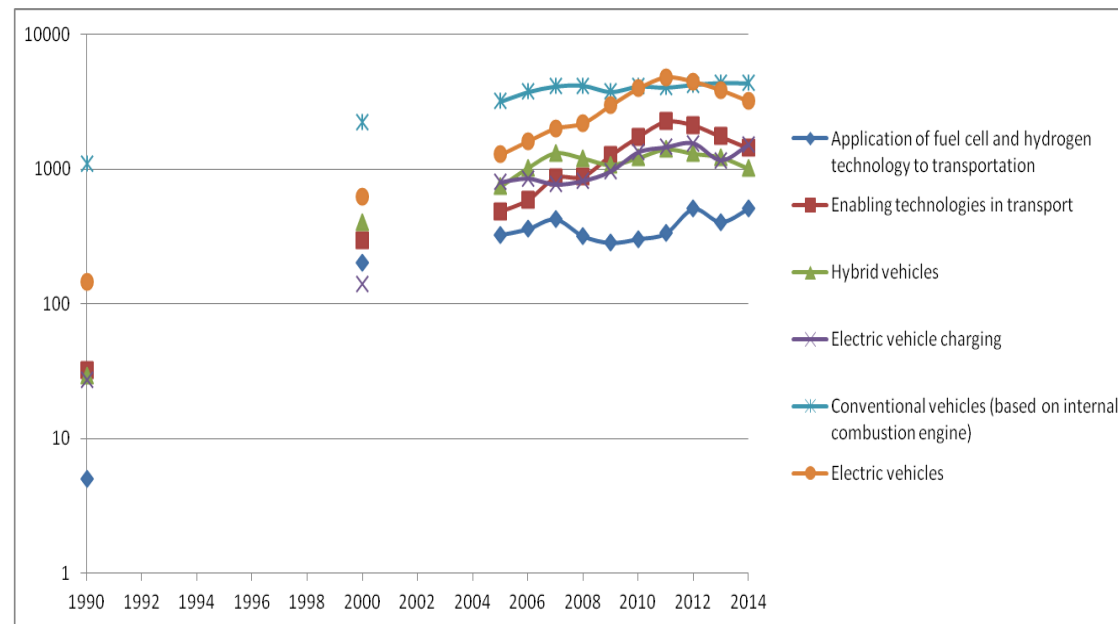
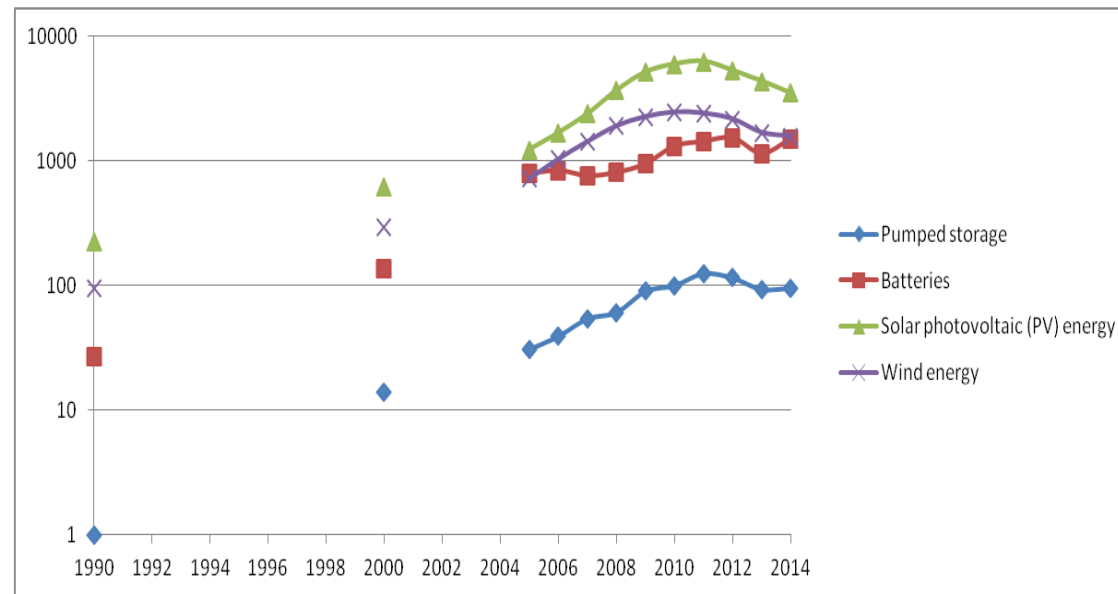
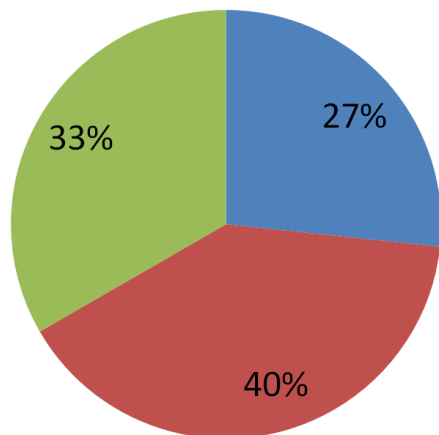
Independent review of CTCN published in 2017

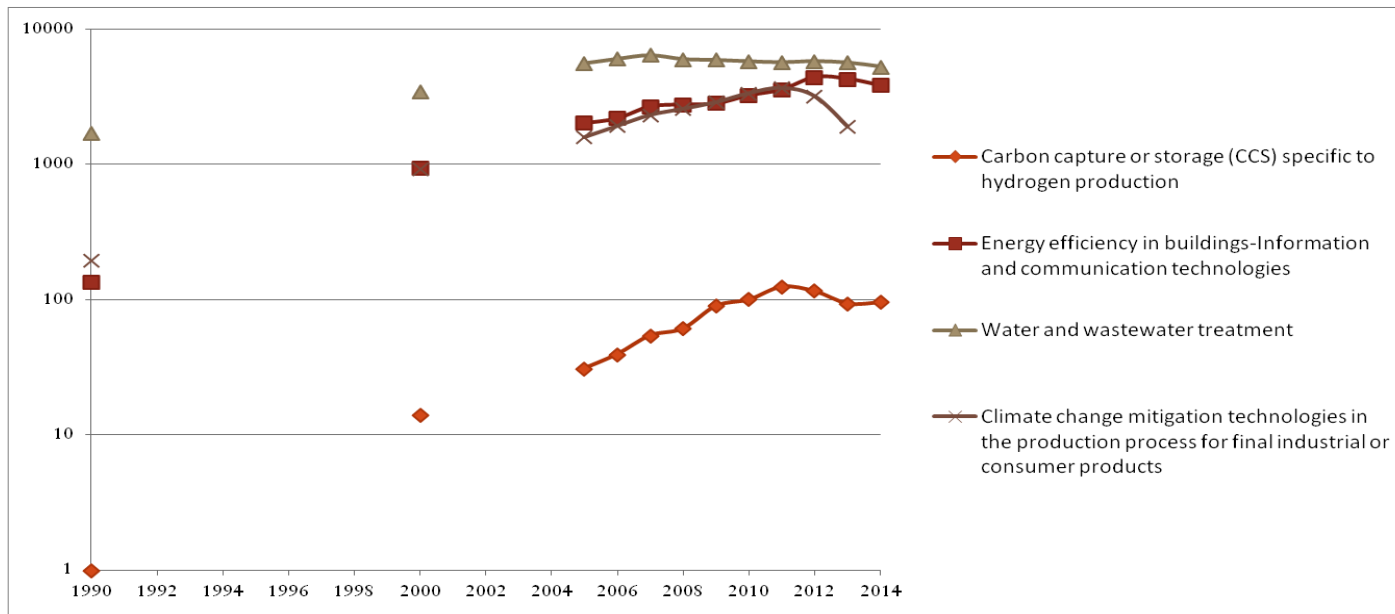
Outcome Indicators	Targets for the fifth year of implementation (2017)	Achievements as at the end of 2016
Number of national and sectoral technology plans resulting from CTCN assistance	50-75	7
Number of new country-driven technology projects and/or strategies (policies and laws) designed, implemented and scaled up as a result of CTCN assistance	100	9
Number of public–private partnerships formed as result of workshops	13	3
Number of twinning arrangements as a result of networking events	18	4
CTCN activity that directly or indirectly created a South–South, North–South or triangular collaboration	No target	5
Climate technology investments deriving from CTCN assistance and post-response plan intervention funding, directly or indirectly attributable to CTCN activities	USD 0.6 billion	USD 5 000 committed USD 1.14 million under direct negotiation or submitted to investors or donors USD 350 million estimated investment potential



Overview of Technologies – Analysis OECD Patent Database

■ Energy ■ Transport ■ Other





- Most of the innovations are taking place in transport and energy sector.
- There has also been growth in the number of patents for other technologies such as wastewater treatment, ICT for energy efficiency in buildings, carbon capture and storage, etc.
- Since most of these innovations have taken place in developed countries, these address the problems faced by these countries. For example, adaptation technologies, technologies in natural resource management, agriculture, etc., which are more relevant for developing countries, have not aroused much interest.
- Developing and underdeveloped countries must assess their technology needs and build domestic capacities to innovate in sectors that may be ignored by developed countries

Way Forward

- Business oriented technology sharing platform which facilitates conventional and unconventional institutional arrangements
- Building upon G20's core strength of economic cooperation, technology transfer mechanism should stress upon following features:

❖ Separate Technology Verticals

- ☐ Different technologies require different policy environment to facilitate their transfer and development – Learning from experience of countries like China
- ☐ Different sub-platforms for different types of technologies - Designing technology sensitive incentives and support policies
- ☐ Seamless integration of G20's existing initiatives and efforts in the area of energy efficiency

❖ Financial Synergies

- ☐ CTCN goal – Bringing synergies between climate finance and technology sharing/ development.
- ☐ CTCN financial mechanism is limited to voluntary funding and Global Environmental Fund .
- ☐ G20 platform – Possibility of mobilizing private funding in the sector.
- ☐ Financial innovation tailored for the technologies relevant to climate change resilience
 - E.g. Clean Technology Fund (Climate investment fund) financed solar power complex in Morocco with co-financing from multi-lateral development banks



Conclusion

- Barriers
 - Lack of finances
 - Understanding of technologies
 - Understanding the circumstances in recipient country
 - Intellectual property rights
 - Ad-hoc project base financing instead of sustained financing
- Way Forward
 - Strengthening innovation absorption capacities in recipient countries.
 - Achieving financial synergies between different sources of finances
 - Treating technologies distinctly
 - Involvement of businesses in technology sharing platform; initiatives such as innovation accelerator and business incubator programmes.
 - Experts'/scientists' network to collaborate on climate related technology development





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