

# Technology is indispensable to address climate change

There is a need for ‘the development, diffusion and transfer of climate technologies on a massive scale’ .

UNFCCC Executive Secretary, First meeting of the Technology Executive Committee, UNFCCC, Bonn, 1st September, 2011

# Need for cooperation in R&D

- Decision 4/CP.7, 2001
- Urged all the Parties ‘to promote joint research and development programmes, as appropriate, both bilaterally and multilaterally Paragraph 14(c)

# Expert Group on Technology Transfer (2010)

- Large number of international collaborative initiatives
- Most initiatives focused on enabling frameworks and facilitating deployment (identifying needs and facilitating sharing of knowledge rather than collaborative R&D)
- Mitigation technologies (energy technologies) dominate; relatively limited focus on adaptation.
- Most collaborations between developed and developing countries are targeted at or take place with the major developing economies

# Technology Mechanism

- Development and enhancement of endogenous capacities and technologies of developing country Parties, *including cooperative research, development and demonstration programmes;*
- 16th COP UNFCCC

# Climate Technology Network

- (b) Stimulate and encourage, through *collaboration* with the private sector, public institutions, academia and research institutions, the development and transfer of existing and emerging environmentally sound technologies, as well as opportunities for North/South, *South/South* and triangular technology cooperation;

# The scenario

- R&D in developing countries
- Ownership of ESTs
- Transfer of technology

# Increase of R&D in developing countries (2000–2007)

- Number of researchers: from 1.8 million to 2.7 million (30% to 38% of the world)
- Spending in R&D: from US\$135 to US\$274 billion (103%) [developed countries 32%]
- Total spending on R&D: from 0,8 to 1% of GDP [developed countries 2,3%]

# Global distribution of R&D efforts

- OECD countries 78 %
- Asia (excl. Japan) 19 % (China=11,8 %, 53% of researchers in developing countries )
- Latin America 2.4 % (Brazil: 1,3%)
- Near and Middle East 1.2 %
- Africa 0.7 per cent
- JACQUES GAILLARD, 'Measuring Research and Development in Developing Countries: Main Characteristics and Implications for the Frascati Manual' , *Science, Technology & Society* 15:1 (2010)

# Characteristics of R&D in developing countries

- Governments are the main suppliers of funding
- The business sector performs much less R&D than the public sector
- R&D is focused on basic and applied research
- Minor or incremental changes is the main source of innovation
- R&D is largely concentrated in one or very few institutions

# Global R&D in ESTs

	R&D (total spending)	Demonstration (total spending)	Deployment (additional cost of climate technologies)		Diffusion (additional cost of climate technologies)		Total
	Global	Global	Global	Developing countries	Global	Developing countries	Global
<b>Public</b>	6 10	Included with R&D	33 45 30	NA	19.5–27.0	8.0–15.5	55.5–82.0
<b>Private</b>	9.8–60	Included with R&D	NA	NA	12–22	3.3	21.8–82.0
<b>Total</b>	15.8–70		30–45	NA	31.5–49	11.3–18.8	77.3– 164.0

*Abbreviations:* NA = not available, R&D = research and development.

Source: UNFCCC, 2009a

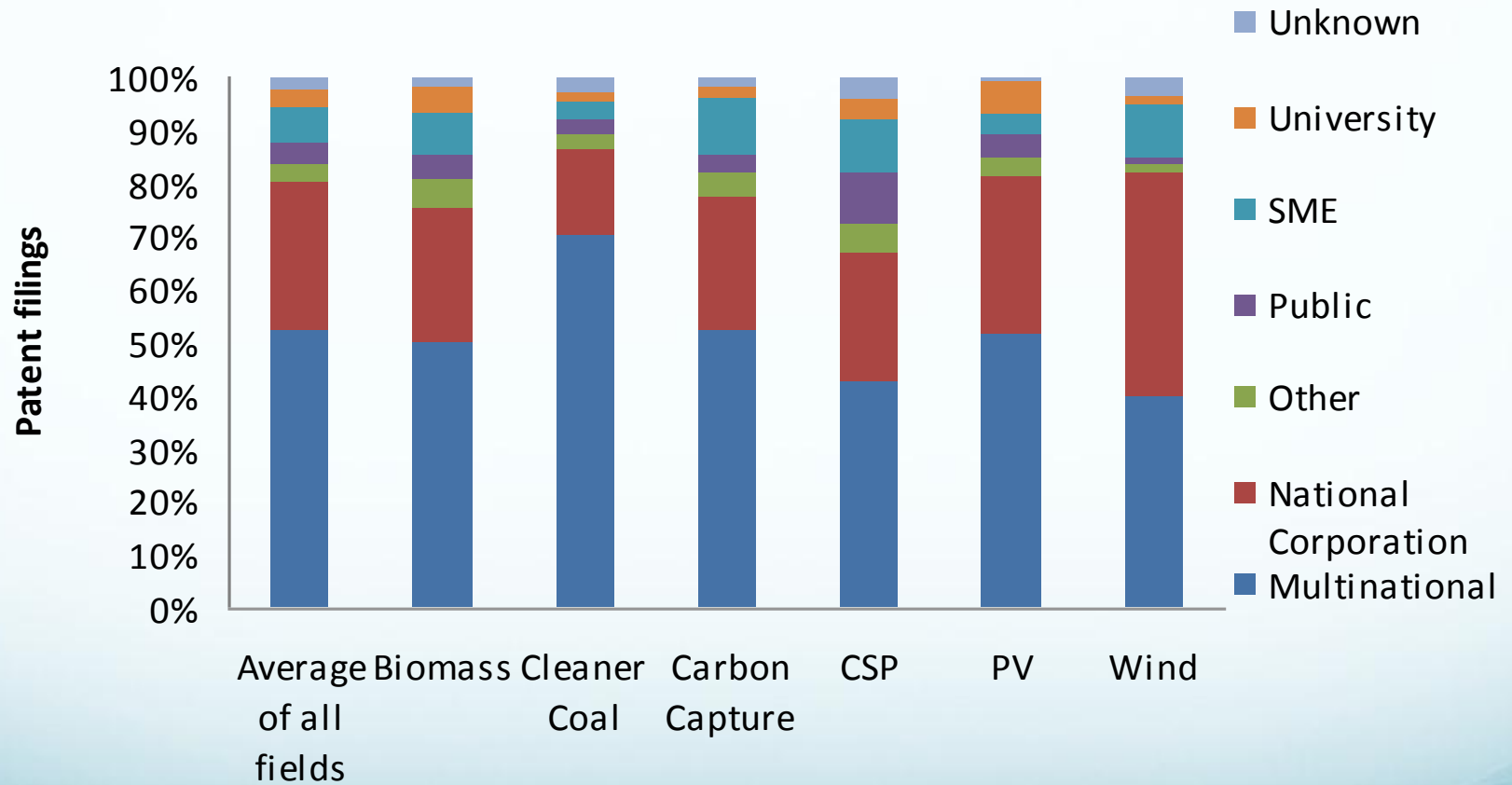
# Global financing of R&D for ESTs

- R&D for technologies for mitigation and adaptation less than 3.5% of global R&D
- Over 60% provided by businesses (most of the remaining by national governments)
- 90% of technology development concentrated in USA, EU, Japan and China

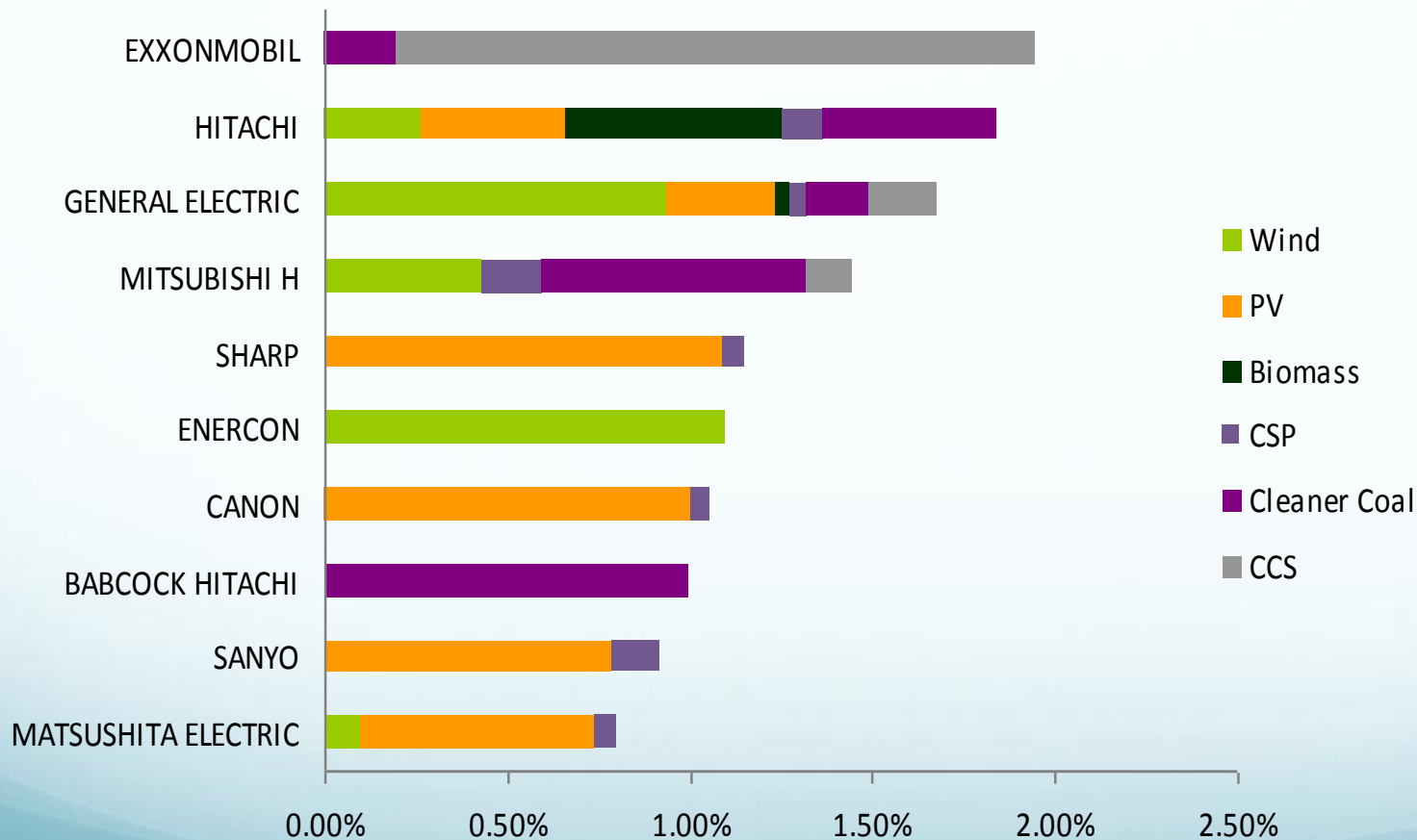
# Ownership of ESTs

- Japan, USA, Germany, Korea, France and the UK are the source of almost 80% of all patented innovations in solar PV, geothermal, wind, and carbon capture

# Ownership of ESTs



# Control of patents by high carbon corporations



# Transfer of technology

- Reluctance to transfer most efficient technologies, only available from second- or third tier companies
- High cost
- Restrictive practices (grant-back, exports, tying-clauses)

# South–South cooperation

- Pull mechanisms (e. g. advance purchase contracts prizes)
- ‘Push’ mechanisms (e. g. subsidies)

## South–South cooperation: type of R&D to be conducted

- Scientific (basic or applied research)
- Development of (new) pre-competitive or competitive technologies
- Adaptation or improvement

# Possible areas of cooperation

- **Mitigation technologies:** renewable energy, improved crop management, energy-efficient appliances, waste management, forestry-related technologies and more clean and efficient vehicles.
- **Adaptation technologies:** crop management, efficient water use, improving irrigation systems, afforestation and reforestation, protection against rises in sea level

# South–South cooperation

- Cooperating parties: public, private, mixed
- Global South or regional cooperation

# South–South cooperation: management of IP issues

- The outcomes of R&D will be
  - Public goods
  - Subject to IPRs, differential treatment for developing countries?
  - Licensed on an exclusive or non-exclusive basis

# South-South cooperation: organizational structure of R&D activities

- Open innovation
- R&D laboratories ‘without walls’ (networking)
- Set up of a new R&D facility
- Network of new international R&D centres

# Is the CGIAR the right model?

‘A CGIAR type of global network could provide international support for research and cooperation and ensure that they become centers of excellence’ .

Delhi High Level Conference on ‘Climate Change: Technology Development and Transfer’ , held on 23<sup>rd</sup> October 2009

# CGIAR system

- Loose network of specialized international agricultural research centres
- Technical Advisory Committee/ ‘Science Council’ defined priorities and assessed CGIAR’ s activities
- Partnership of 64 Members (21 developing and 26 developed countries, 4 co-sponsors as and 13 international organizations)

# CGIAR system

- 15 centres, 8000 scientists and staff
- Sharing of resources
- Coordination of policies at the system level (economies of scale and of scope)
- Generation of public goods to reduce poverty

# Conclusions

- Wide room for South-South cooperation
- Clearly defined objectives
- Based on definition of priorities
- Perception of mutual interest