The Scientific Basis for National and International Policies, Instruments and Co-operative Arrangements

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What is the basis in the literature for Box 13.7?

What we said about financing and the implications for the next IPCC assessment.

Box 13.7

The range of the difference between emissions in 1990 and emission allowances in 2020/2050 for various GHG concentration levels for Annex I and non-Annex I countries

Scenario category	Region	2020	2050
A-450 ppm CO_2 –eq[b]	Annex I	**–25% to –40%**	–80% to –95%
	Non-Annex I	Substantial deviation from baseline in Latin America, Middle East, East Asia and Centrally-Planned Asia	Substantial deviation from baseline in all regions
B-550 ppm CO_2 -eq	Annex I	–10% to –30%	–40% to –90%
	Non-Annex I	Deviation from baseline in Latin America and Middle East, East Asia	Deviation from baseline in most regions, especially in Latin America and Middle East
C-650 ppm CO_2 -eq	Annex I	0% to –25%	–30% to –80%
	Non-Annex I	Baseline	Deviation from baseline in Latin America and Middle East, East Asia

[a]The aggregate range is based on multiple approaches to apportion emissions between regions (contraction and convergence, multistage, Triptych and intensity targets, among others). Each approach makes different assumptions about the pathway, specific national efforts and other variables. Additional extreme cases – in which Annex I undertakes all reductions, or non-Annex I undertakes all reductions – are not included. **The ranges presented here do not imply political feasibility, nor do the results reflect cost variances.**

[b]Only the studies aiming at stabilization at 450 ppm CO_2-eq assume a (temporary) overshoot of about 50 ppm (See Den Elzen and Meinshausen, 2006).

Factors to Consider

- *The Literature:* 17 studies - 7 for a target of 450 ppm CO2 and 11 for a target of 550 ppm
- *Timing and Pathway:* Studies with more stringent reductions in the near term require less stringent reductions in the long-term; overshooting in the near term requires aggressive reductions later. The range is wide.
- *Baseline:* The baseline emissions are a major determinant for the results. More reductions are necessary if baseline emissions are high and less if emissions are low. Some models presume that all countries will meet their Kyoto targets; others start from existing trends, and do not assume Kyoto will be met.
- *Allocation schemes:* The studies differ widely in how they allocate emissions between Annex I and non-Annex I countries. Some studies grandfather historical emissions while others assume global convergence of emissions on a per capita basis – or even, in some cases, allocate using multiple regimes within a single study

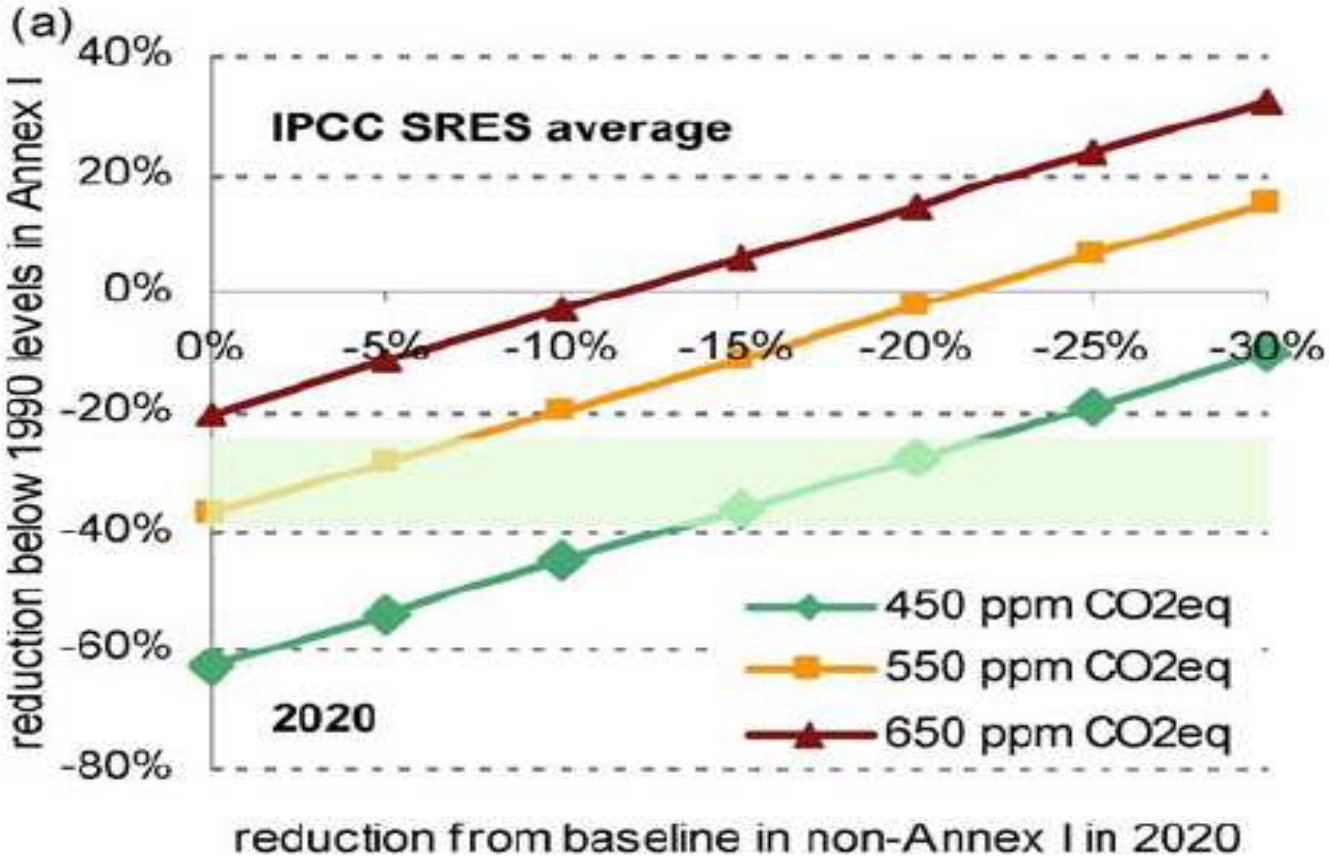
Factors to Consider

- *Deforestation*: Emissions from land-use change and forestry were not considered in the studies. While deforestation rates are high in many developing countries, some developed countries are holding forest rates fixed – or even increasing forest cover.
- *Gas coverage*: Some calculations were based on assumptions that all six GHGs are covered, while others are based on CO2 only
- *Data range*: The IPCC study left off outliers. The full range of results from the studies assessed (including the outliers) is +15 to -50% below 1990 levels.

Recently an additional 8 studies have been analyzed to determine whether the conclusions of the IPCC ought to be adjusted (den Elzen and Hohne 2008). The authors conclude that there is no basis for changing the conclusions of the IPCC 2007. However, none of the studies have considered the current economic down turn and its impact on global emissions in the near and long-term

Trade-offs in reductions for Annex I and Non-Annex I emissions for different stabilization levels

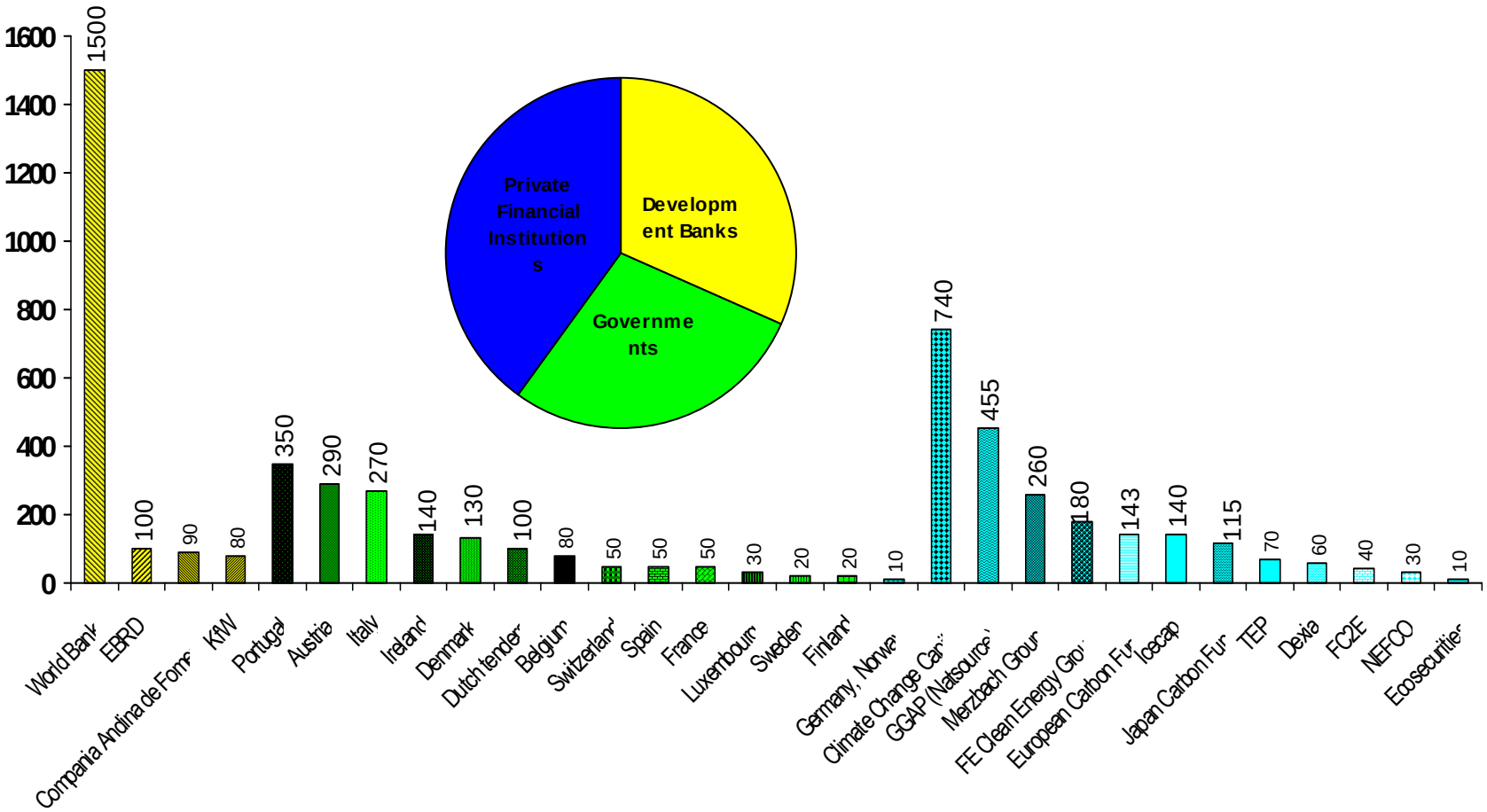
Source: den Elzen and Hohne, Climatic Change Policy, 2008



Governments have a crucial supportive role in providing an appropriate enabling environment for effective technology transfer

- Financial incentives are frequently used by governments to stimulate the diffusion of new, less GHG-emitting technologies. While economic costs are generally higher for these than for other instruments, financial incentives are often critical to overcoming the barriers.*(high agreement/much evidence)*.
- Financial flows through CDM, GEF and development assistance for technology transfer have so far been limited and geographically unequally distributed.
- A combination of policy instruments may work better in practice than reliance on a single instrument. An instrument that works well in one country may not work well in another country with different social norms and institutions.

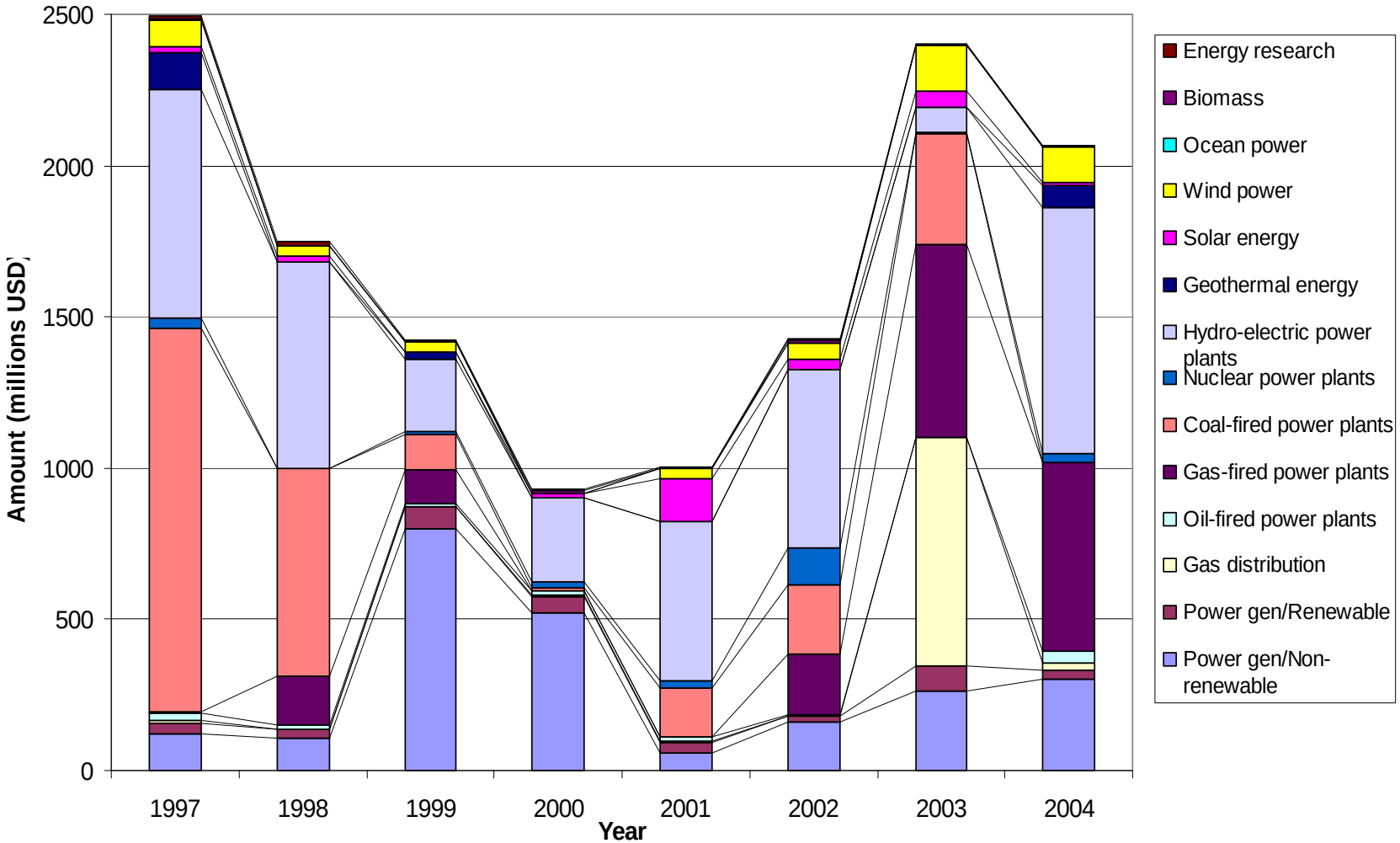
Carbon Funds for acquisition of emission reduction credits reached 6 billion € as of September 2006



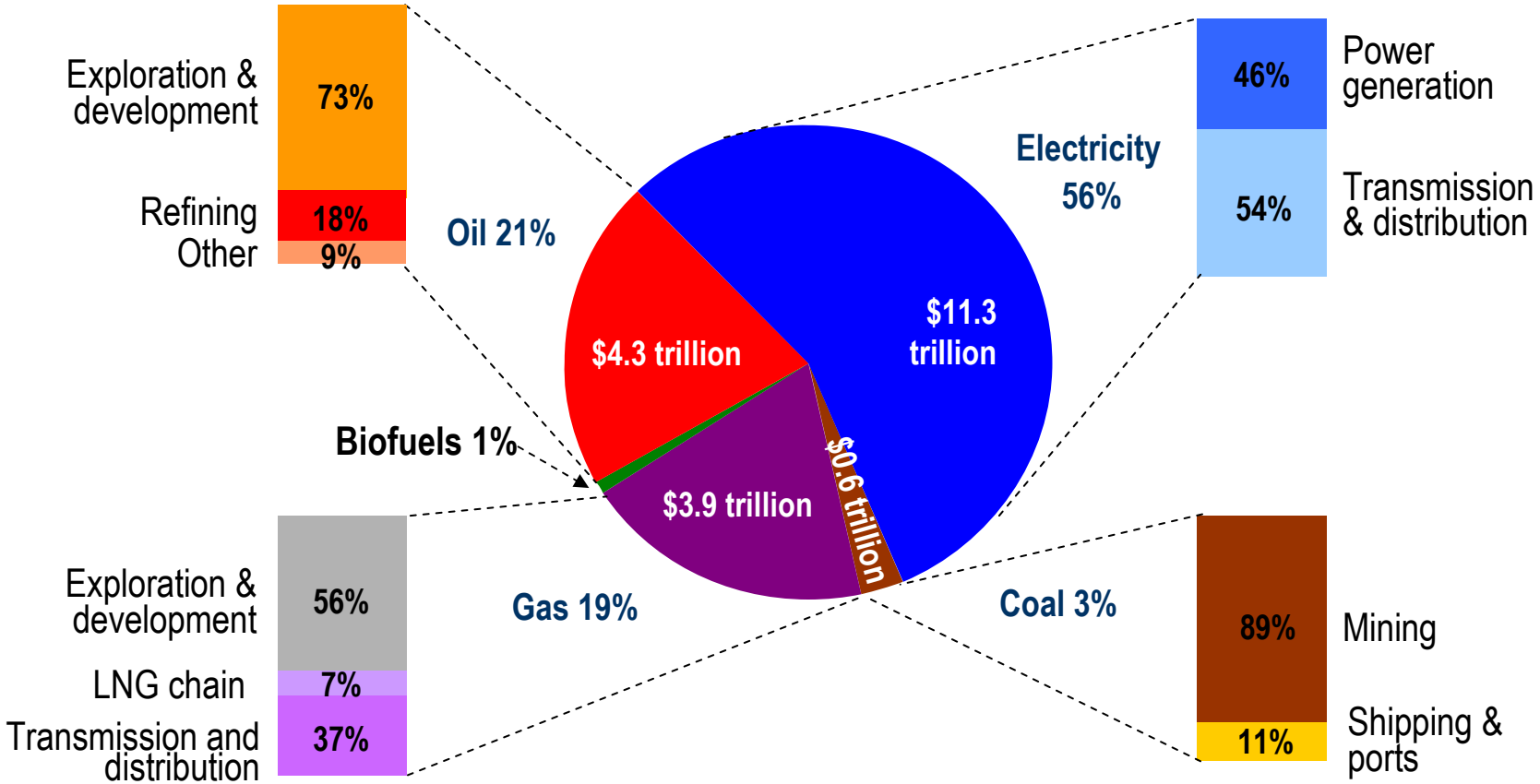
All Development Assistance for Energy M USD 1997-2005

			Multilateral and Bilateral Support for Energy Projects							
Source	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Bilateral Development Assista	3992	2522	1820	1294	1372	1950	2726	2296	2132	20104
World Bank Group	3633	3833	2258	2643	2642	2817	2450	1828	2794	24898
EBRD	357	357	357	587	620	680	667	768	765	5158
GEF	136	113	83	113	134	97	120	134	124	1054
Asian Development Bank	824	400	699	1042	663	927	654	707	677	6593
Inter-American Development I	1,131	1,261	464	1,172	1,188	184	379	152	1,056	6,987
Total	10073	8486	5681	6851	6619	6655	6996	5885	7548	64794

Bilateral development assistance for energy by category from 1997-2004 in US$ millions ..69

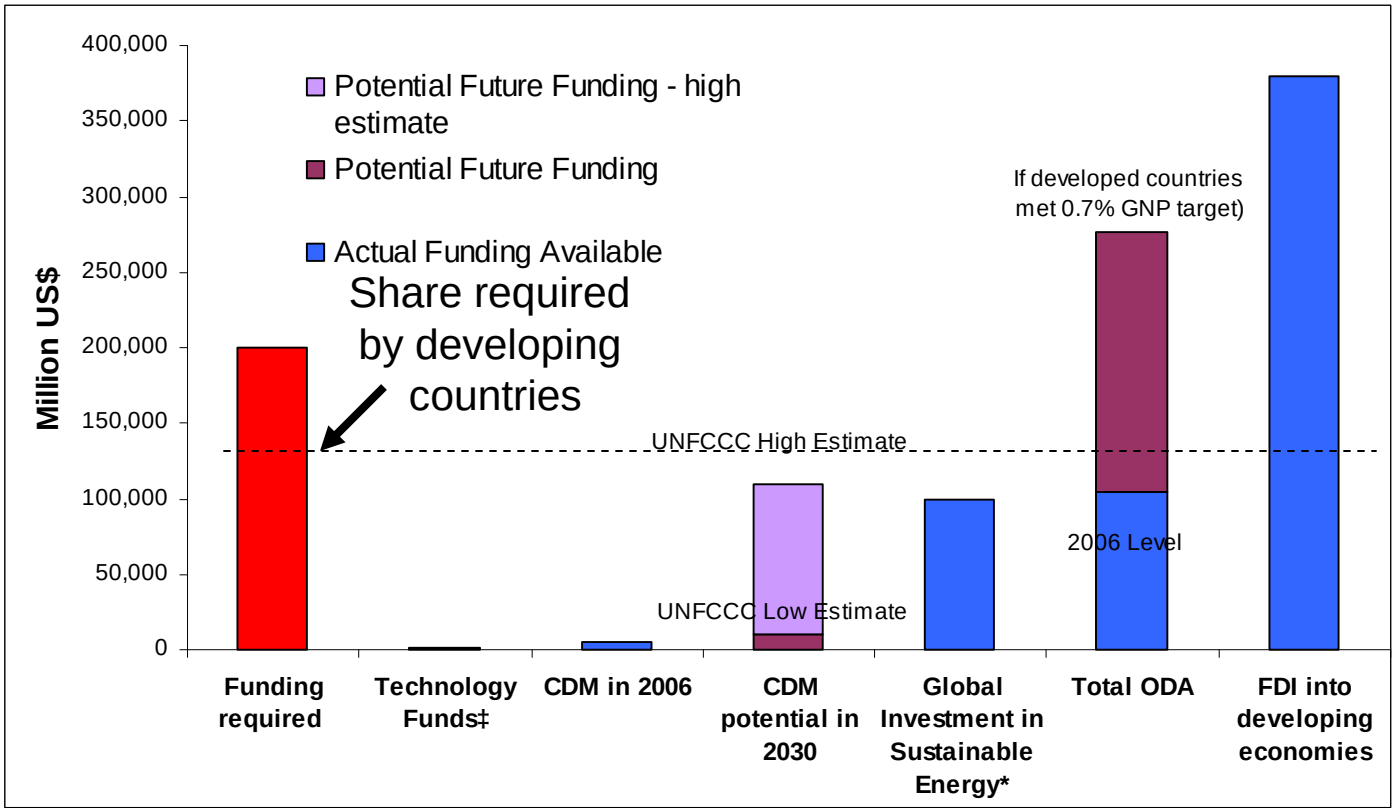


Cumulative Investment in Energy-Supply Infrastructure, 2005-2030 = $20.2 trillion (in $2005) (WEO 2006)



Just over half of all investment needs to 2030 are in developing countries, 18% in China alone

Global Financing/Investment



Sources: New Energy Finance, UNCTAD Statistics, UNFCCC, and The World Bank

A combination of regulations and financial incentives in a few countries are driving the growth in renewables

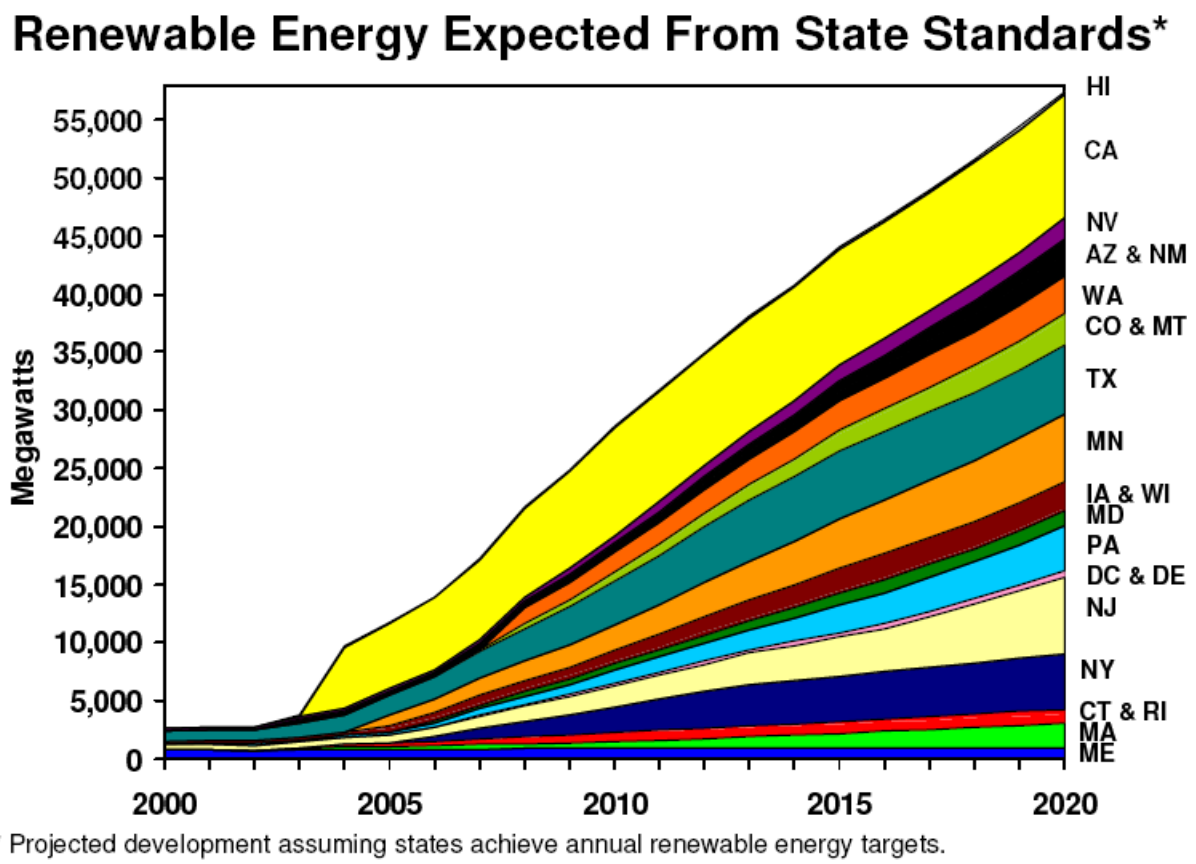
Regulations

- Renewable Performance Standards
- Performance standards for new facilities
- Green power purchasing requirements
- Interconnection standards
- Net metering rules
- Generation disclosure rules
- Contractor licensing
- Equipment certification
- (Solar) access laws/guidelines/zoning codes/building permits

Financial Incentives

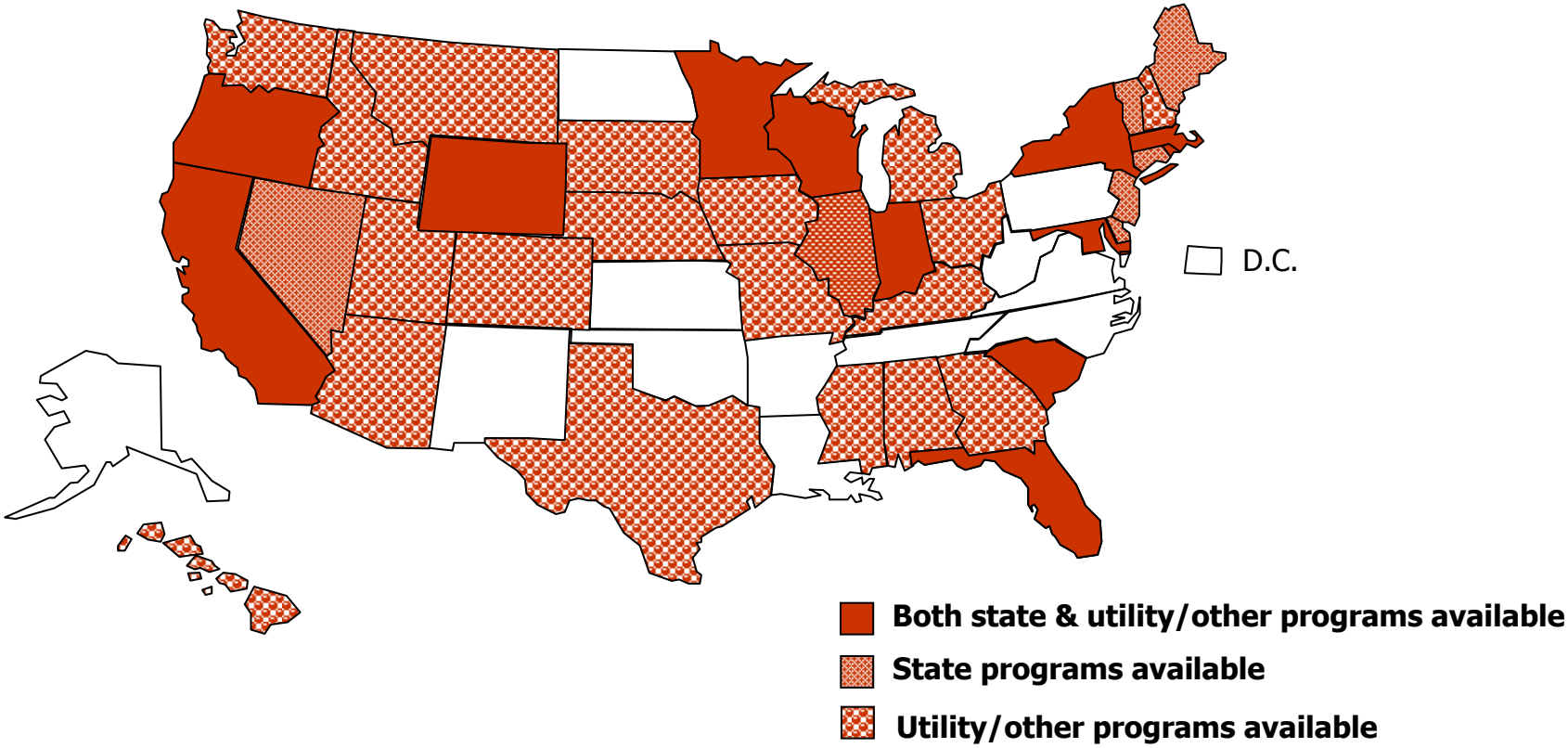
- Feed in tariffs
- Rebates
- Grant programmes
- Loan programmes
- Bonds
- Production incentives
- Government purchasing programmes
- Equity investments, including venture capital
- Insurance programmes

Example of RPS programs in the United States. The California RPS is most aggressive. It requires all retail energy sellers to procure 20% of their energy from renewables by 2010, but many other US states have similar programmes

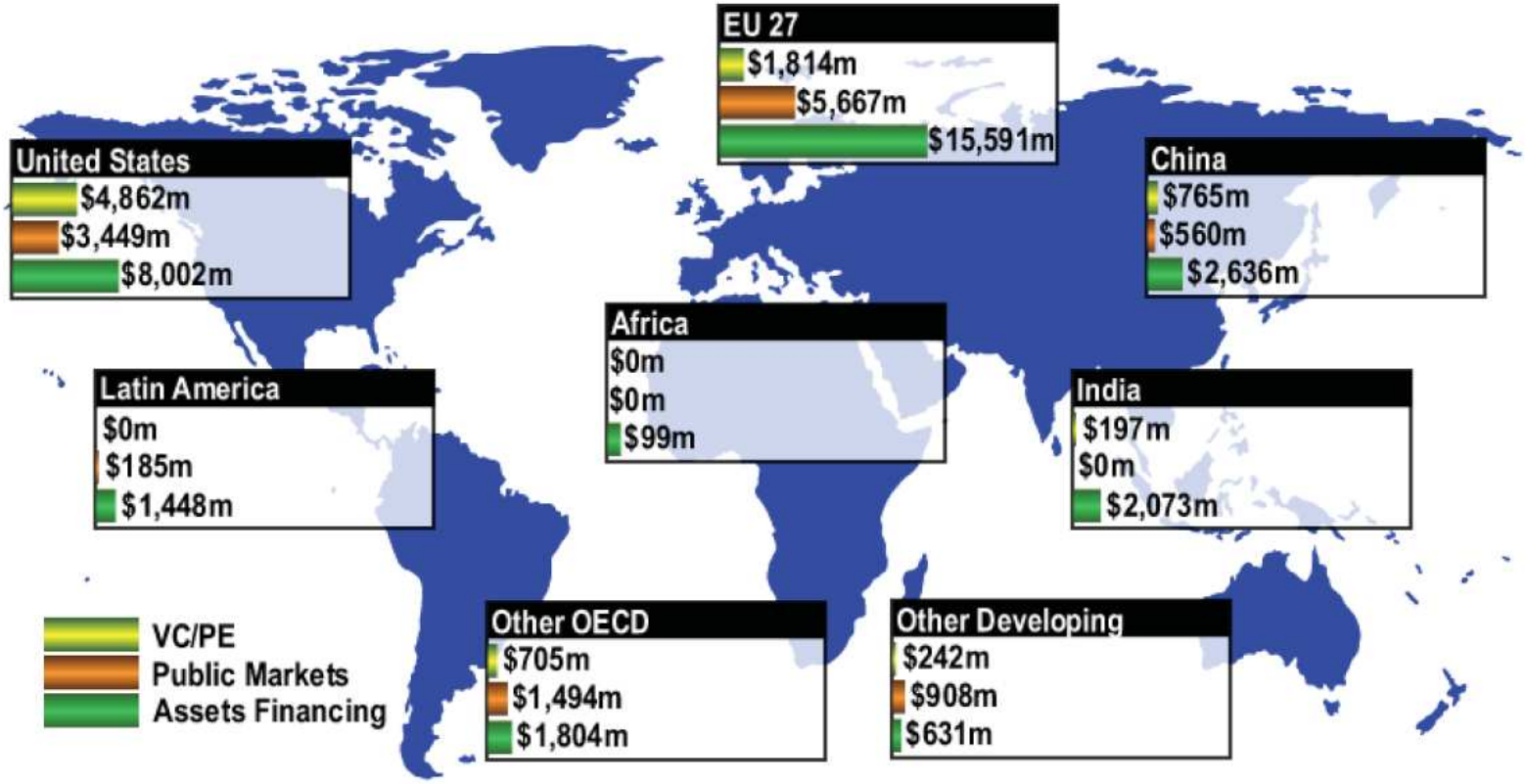


Source: Union of Concerned Scientists, Renewable Electricity Standards Fact Sheet
http://www.ucsusa.org/assets/documents/clean_energy/RES_in_the_States_-_01-05_Update.pdf

Rebate Programs for Renewable Energy Technologies



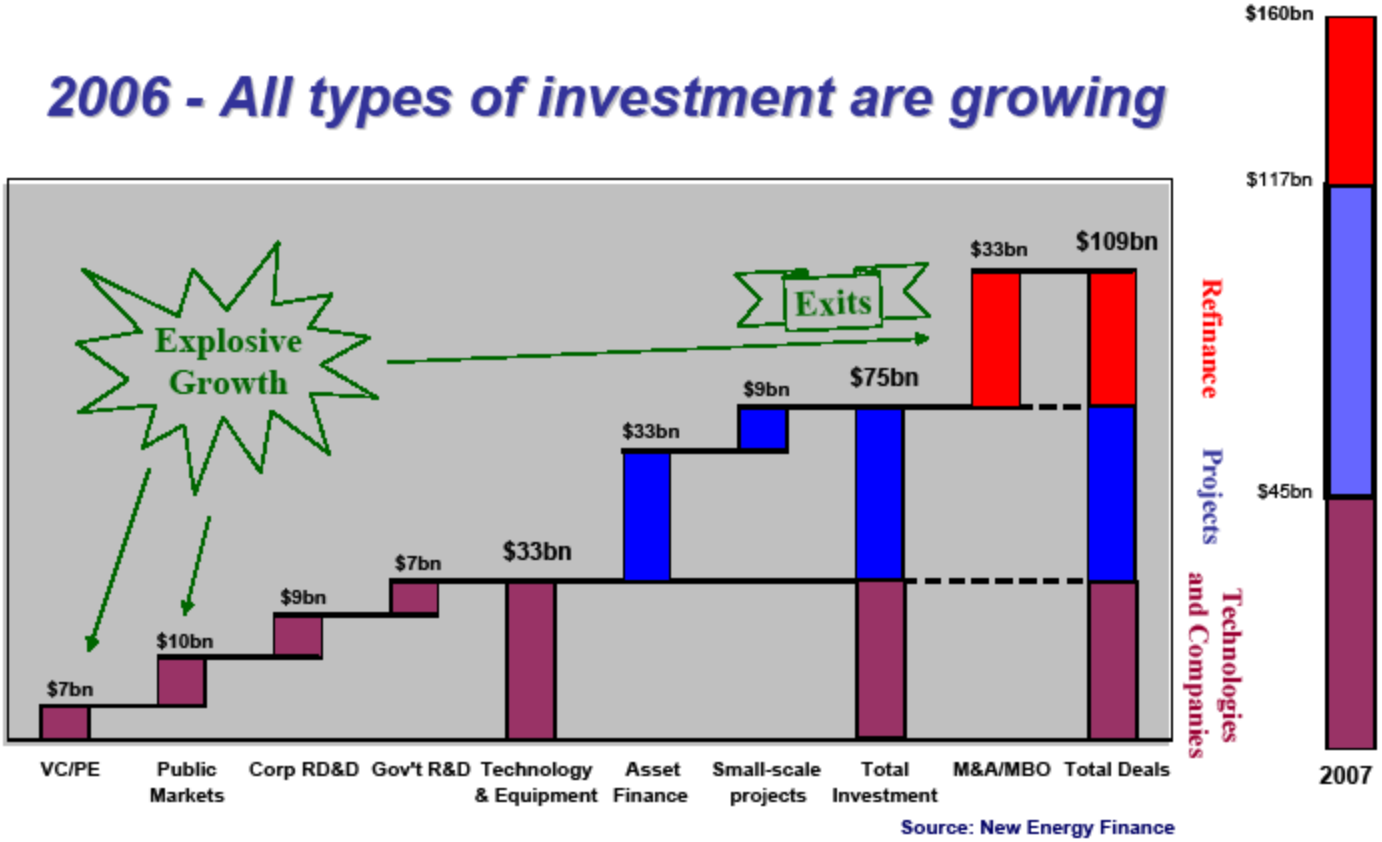
Investment in Sustainable Energy



Note: Grossed-up values based on disclosed deals. VC/PE figures: include PE buy-outs, and investor exits made through OTC market offerings. OTC & PIPE deals are included. Figures in brackets refer to (disclosed deals / total deals). Public Market figures: represent location of exchange on which a company raises money, not location of the company. Includes investor exits made through Public Market offerings. Figures in brackets refer to number of (IPOs / Secondaries / Convertible & Other). Asset Financing figures: represent total investment, and so include new build and refinancing of clean energy projects. Acquisitions of projects are not included. Figure in brackets refers to (total deals).

Source: SEFI, New Energy Finance

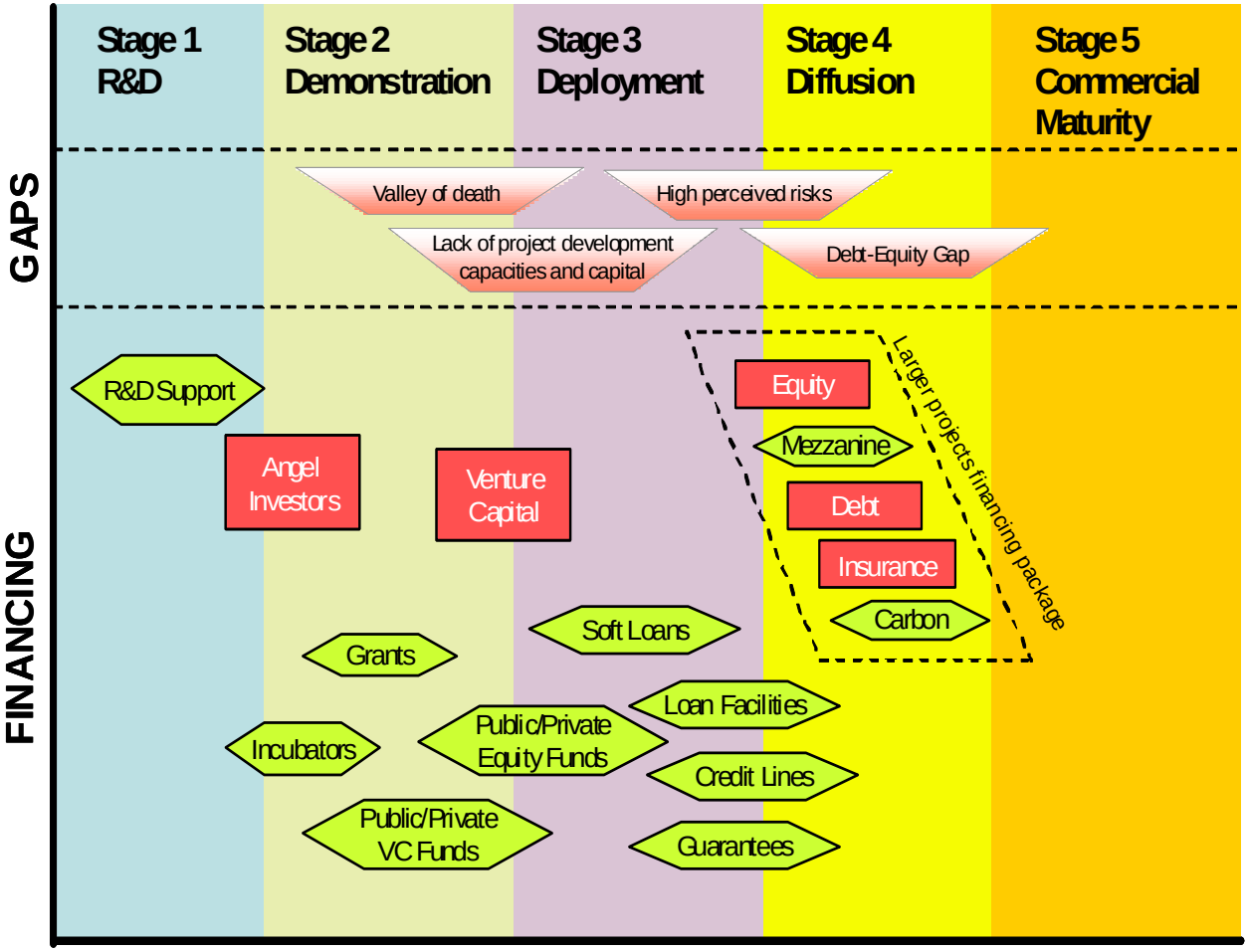
2006 - All types of investment are growing



Coming from a widening cross-section of the finance community.

The role of public finance instruments in accelerating the development and deployment of technology

Source: UNEP 2008

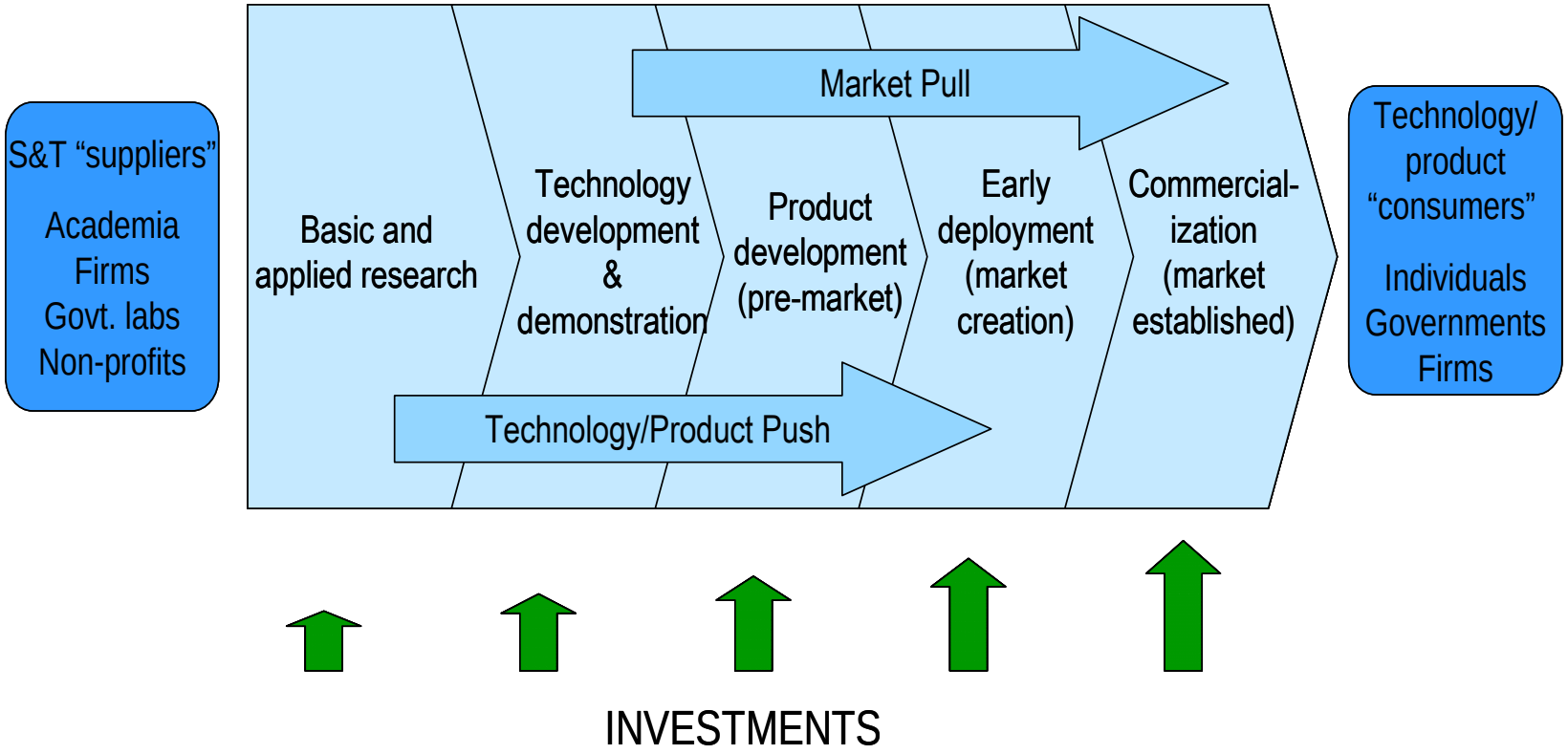


Public Finance Mechanisms

Commercial Financing Mechanisms

IPCC

The Technology Innovation Pathway



Further information:
See IPCC Working Group III

Chapter 13

or contact

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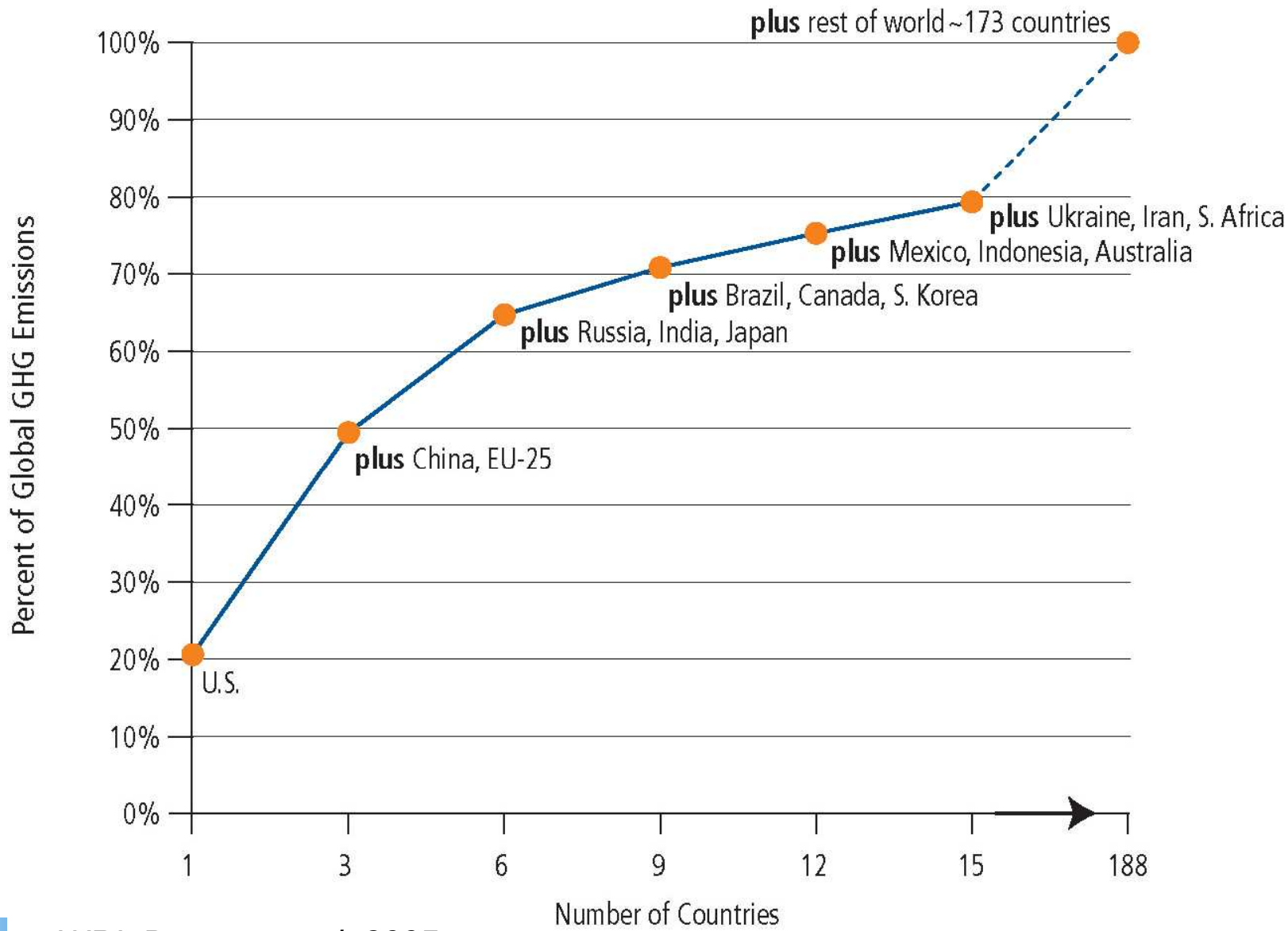
Criteria for Evaluating National Policies and International Agreements

- **Environmental Effectiveness**
  - Needs to actually achieve meaningful reductions of GHG emissions
- **Cost Effectiveness**
  - Needs to achieve environmental and distributional goals at the lowest possible cost
- **Distributional effects**
  - Needs to be fair (equity and competitiveness) to be politically acceptable
- **Administrative Feasibility**
  - Needs to be easy to administer and with minimum legal constraints

Largest Emitters: *Developed & Developing*



Source: WRI, Baumert et al, 2005