

Investment and financial flows to address climate change

Presented to:
Q&A
Vienna – August 28, 2007

Methodology



Definitions

Investment is the initial (capital) cost of a new physical asset with a life greater than 1 year.
Excludes purchases of existing physical assets and financial assets

Financial flow is an ongoing expenditure related to climate change mitigation or adaptation that does not involve investment in physical assets.

R&D considered as a financial flow

Methodology

- Analysis for I&F flows in 2030
- As much disaggregated data as possible:
 - Regional detail
 - Sectors (economic sectors may not always match mitigation and adaptation sectors)
- Reliance on existing models/scenarios and data sets
- Annual data for year indicated, 2005 USD

Methodology for mitigation

Current
Investment
2000

Reference
Scenario
2030

Mitigation
Scenario
2030

Adjust for
purchases

Difference between totals or
additional investment

Sources

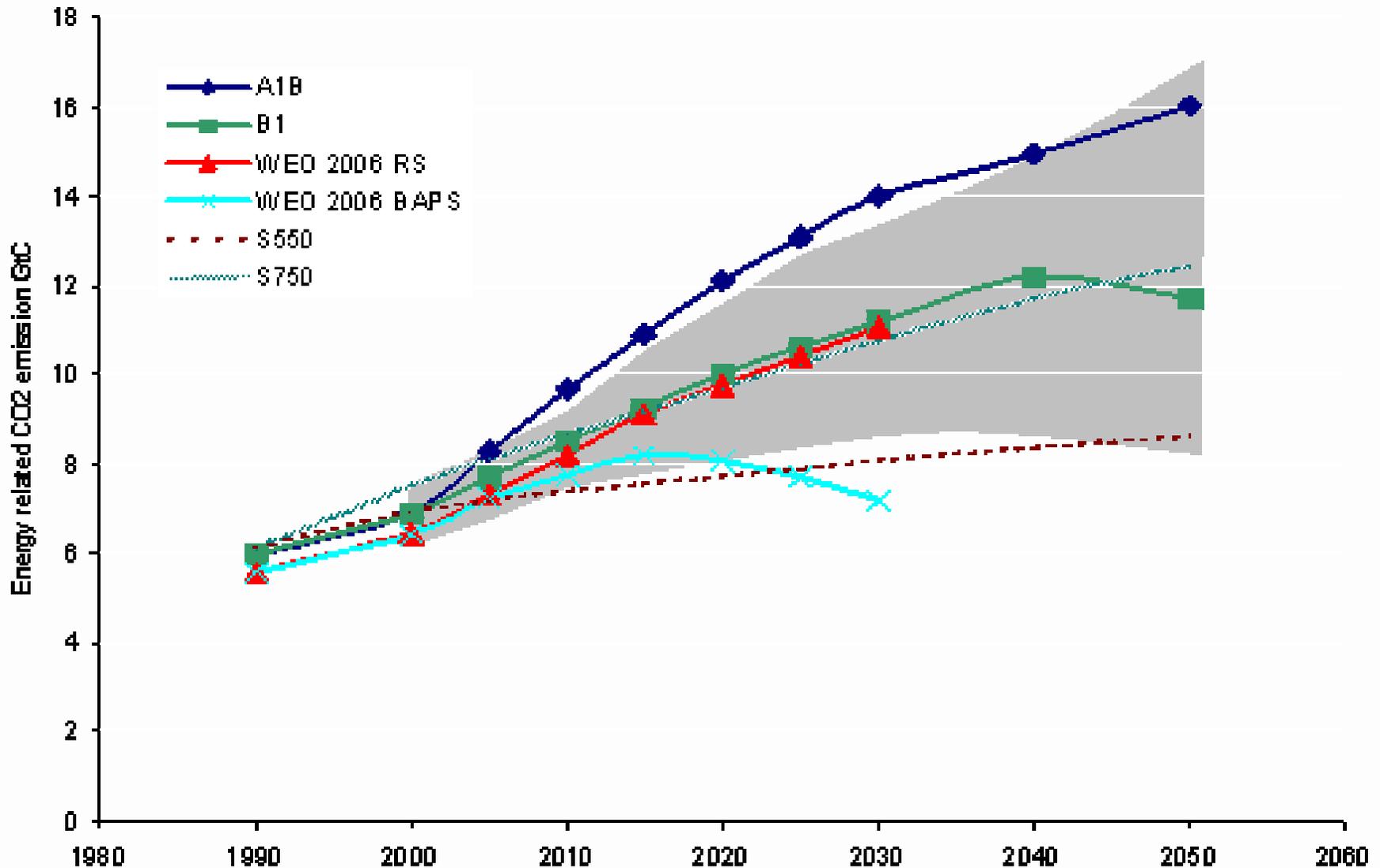
Assume current mix of sources

- IEA WEO 2006 Reference and BAP scenarios for energy-related CO₂ emissions with other scenarios for remaining emissions
- Annual data for year indicated, 2005 USD

Methodology for adaptation

- Estimate based on modeling
 - Water supply (scenario A1B and B1)
 - Health (scenario s550 and s750)
 - Coastal Resources (scenario A1B and B1)
- Estimate based on current and projected level of investment and financial flows and assumption about adaptation needs
 - Agriculture, forestry, and fisheries (WEO reference scenario)
 - Infrastructure (WEO reference scenario)
- Difficult to estimate climate change adaptation costs for ecosystems

Comparison of scenarios



Current Global Investment (2000)

Source		Share	Range
Households	Total investment	26%	15 to 30
Corporations	Total investment	60%	55 to 75
	Domestic funds	21%	15 to 65
	FDI	22%	0 to 30
	Foreign debt	17%	0 to 30
Government	Total investment	14%	10 to 25
	Domestic funds	12%	0 to 25
	Foreign debt	1%	0 to 10
	ODA	0%	0 to 6
Total investment		100%	
	Domestic funds	60%	35 to 100
	FDI	22%	5 to 45
	Foreign debt	18%	0 to 35
	ODA	0%	0 to 6

Global investment in 2000 = US\$6,875 billion = 2005 US\$7,750 billion

Tool Box/Instrument Panel



Tool Box/Instrument Panel

- **Scaling-up** financing under the Convention
 - Existing sources
 - Annex II Parties, Financial Mechanism, Carbon Markets, Adaptation Fund, etc.
 - New international sources of finance (e.g. air travel levy, Annex I renewables programmes, debt swap)
- **Shifting-over** current investment
 - Re-directing private investment through policy
 - Removing policy barriers, providing information, making the polluter pay, paying the innovator
 - Re-directing public investment
 - Domestic priorities
 - IFI/donor strategies and commitments
- **Optimizing** available financing
 - Across investor preferences for risks and returns over time
 - Mitigating technology, project and country risks

Next Steps



Next Steps

- By Secretariat
 - October 31 workshop
 - Paper for Bali on review of the Financial Mechanism
 - Publication of background paper
- Possible next steps by other institutions
 - Meeting of finance ministers at Bali?
 - Release of the Clean Energy Investment Framework?
 - Discussing of climate issues at IFI/MDB meetings this autumn?
 - Maintaining and updating data collected for Investment Paper?
 - Identification and completion of additional analyses (areas needing clarification, gaps to be filled)?
 - Further analyses to support future negotiations?
 - Mechanisms for consultations with private sector and civil society?

Possible further analysis needed for adaptation

- Examine importance of baseline assumptions.
- We need better understanding of what investment adaptation takes in each sector and region. More on the ground studies will be needed.
- As needs and potential sources of financing varies greatly by sector and region, analysis of needs and potential tools at these levels is needed.
- Specific adaptation should be assessed in light of cost-benefit.

Possible further analysis needed for mitigation

- More analysis on technology R&D funding
- More disaggregation by regions
- Cost of policies and capacity building
- Reconciliation of different data sources
- Costs of mitigations measures for forestry (in particular REDD)
- International support to national policies

Back-up Charts



Adaptation



Additional investment and financial flows in 2030

Sector	Global (billion USD)	Share of developing countries
Agriculture, forestry and fisheries	14	50 %
Water supply	11	80 %
Human Health	5	100 %
Coastal zone	11	40 %
Infrastructure	8–130	25 %

- Correspond to 0.2–0.8% of global investment flows or 0.06-0.21% of projected GDP in 2030.
- Needs are tens to hundreds times greater than the current sources of funding available for adaptation under the Convention and the Kyoto protocol.

Additional adaptation

- Ecosystem;
- Migration;
- Air pollution;
- Water quality, flooding, hydropower;
- Other health issues;
- Etc.

Coastal Resources



- Study only consider the cost associated with the construction of dykes and beach nourishment
- Estimate is USD 10 -11 billion
 - About half in non-Annex I countries
- Used DIVA model
 - Assumed anticipation of Sea level rise to 2080

Coastal Zones

- Adaptation of coastal resources to climate change is highly dependent on public sources of funding.
- In the developed world and in parts of the developing world, the necessary financial resources are likely to be available to adapt coastal resources to climate change.
- Deltaic regions, particularly the large coastal deltas in Asia and in Africa and small island states may have significant problems responding to sea level rise and climate change. In these countries, additional sources of external public financing will be needed.

Agriculture, Forestry and Fisheries

- Estimate is USD 14 billion
 - USD 3 billion for R&D and extension activities
 - USD 11 billion for production and processing
- Estimates based on analysis of current and projected investments and financial flows and gross assumptions
 - 10 % more than what is needed for economic and population growth for R&D and extension
 - 2 % more than what is needed for economic and population growth for production and processing



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Agriculture, Forestry and Fisheries

- Most of the additional investment needed will be in physical assets owned by private sector agents.
- Additional public resources will be needed to provide the private sector with the necessary information and incentives. Small-scale farmers will need some direct financial support.
- Public sources account for 90 per cent of research funding in developing countries. Thus, for research and extension in developing countries, most of the additional funding would need to come from public sources.

Sources of investment and financial flows

- Both public and private sources of funding will be needed
- The relative contribution will vary by region and sector
- Private sources will be particularly important in the AFF and Infrastructure sectors.
- Public resources will play a critical role in all sectors, particularly in the coastal zone and water sectors.
- Measures will be needed to encourage/support private sector adaptation
- Additional sources of public funding dedicated to adaptation will be needed.

Mitigation



Additional investment and financial flows in 2030

Sectors	Global, billion USD	Share of NAIP (percentage)
Energy Supply Infrastructure	(-) 67	55%
Industry	36	55%
Building	51	27%
Waste	0.9	67%
Transport	88	40%
Agriculture	35	67%
Forestry	21	99.5%
Energy RD&D	35 - 45	-

Global: 200 – 210 billion USD (0.92% of projected global investment and 0.26% of global GDP in 2030)

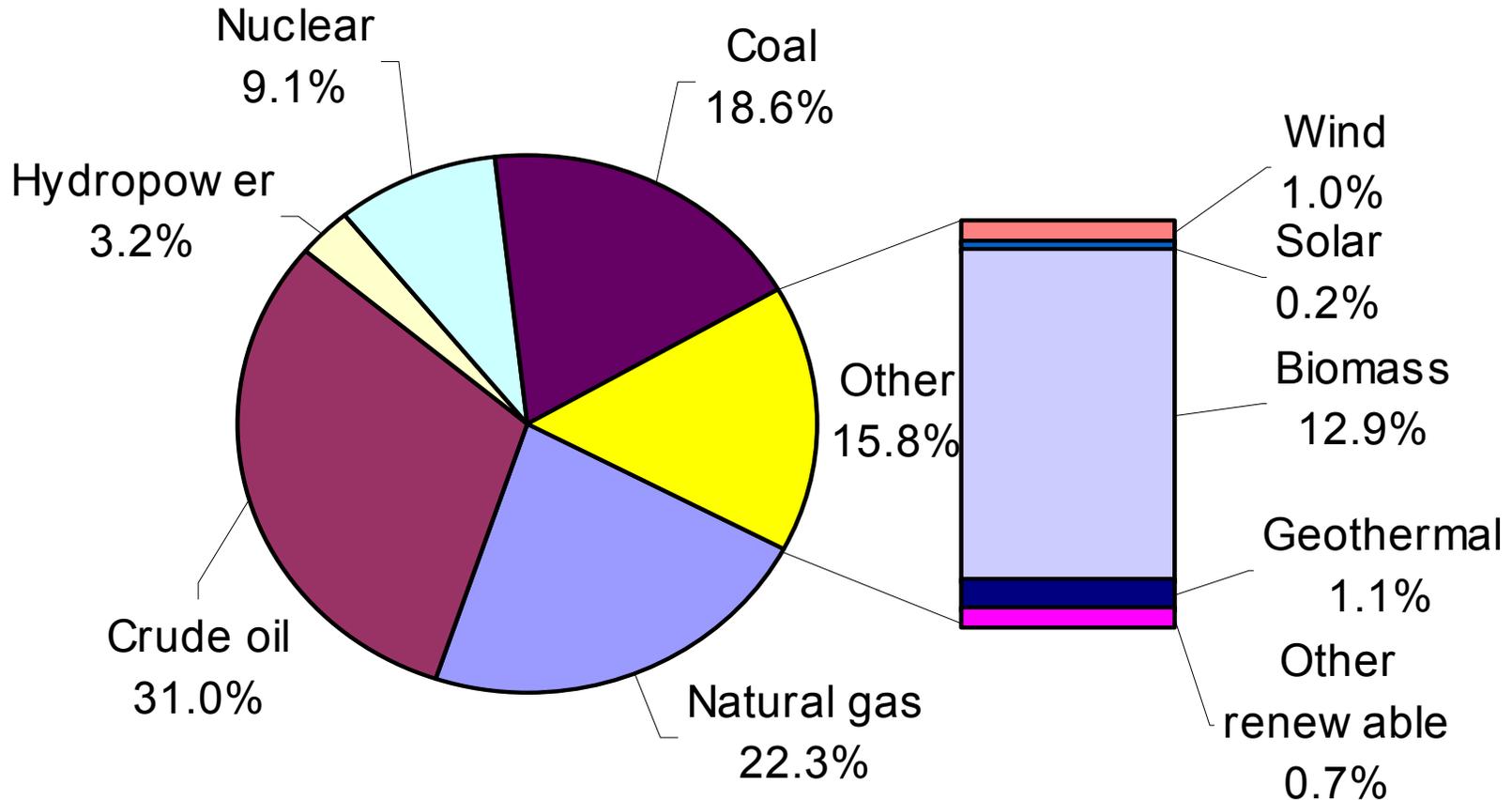
Non Annex I Parties: 76 - 77 billion USD (0.86% of Investment and 0.29% of GDP in 2030)

Amounts large in absolute terms, but small relative to GDP and investment

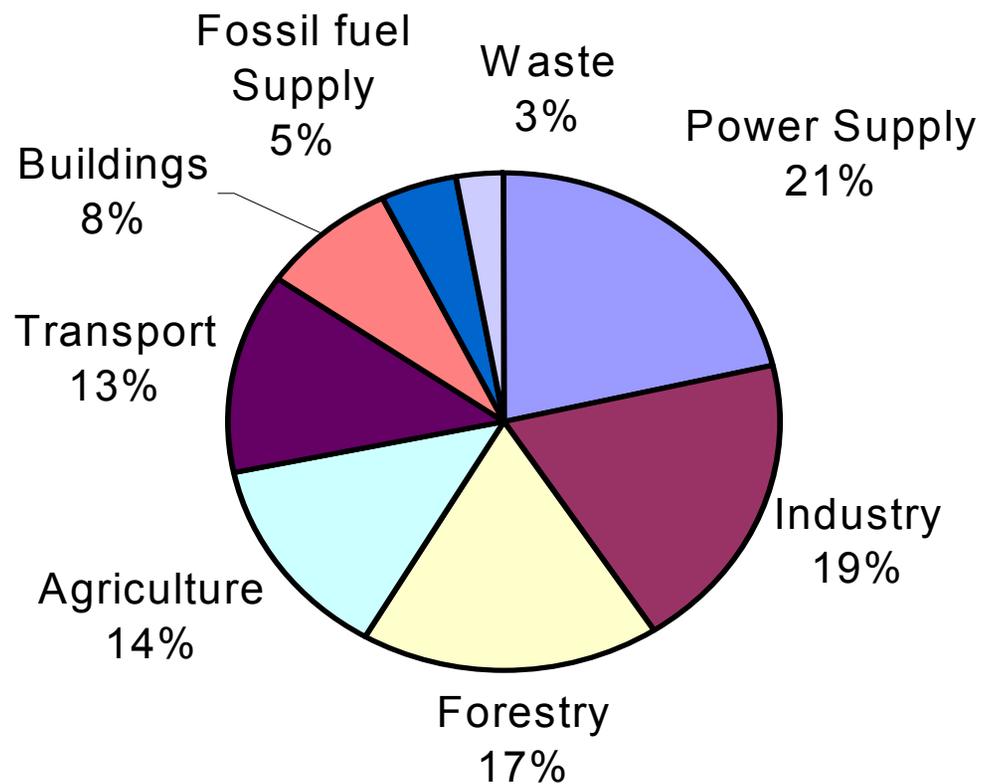
Approaches

- Period of 2005 – 2030: the **global** level of detail declines sharply as the time horizon is extended beyond 2030.
- Scenarios: IEA World Energy Outlook 2006 Reference and Beyond Alternative Policy Scenarios for energy-related CO₂ emissions, US EPA scenarios for non CO₂ emissions, and cost-effective mitigation potential for agriculture and forestry.
- The mitigation scenario BAPS was the most aggressive scenario available (2 °C).
- IEA World Energy scenario includes a number of technologies and measures assessed based on national planning and data available.

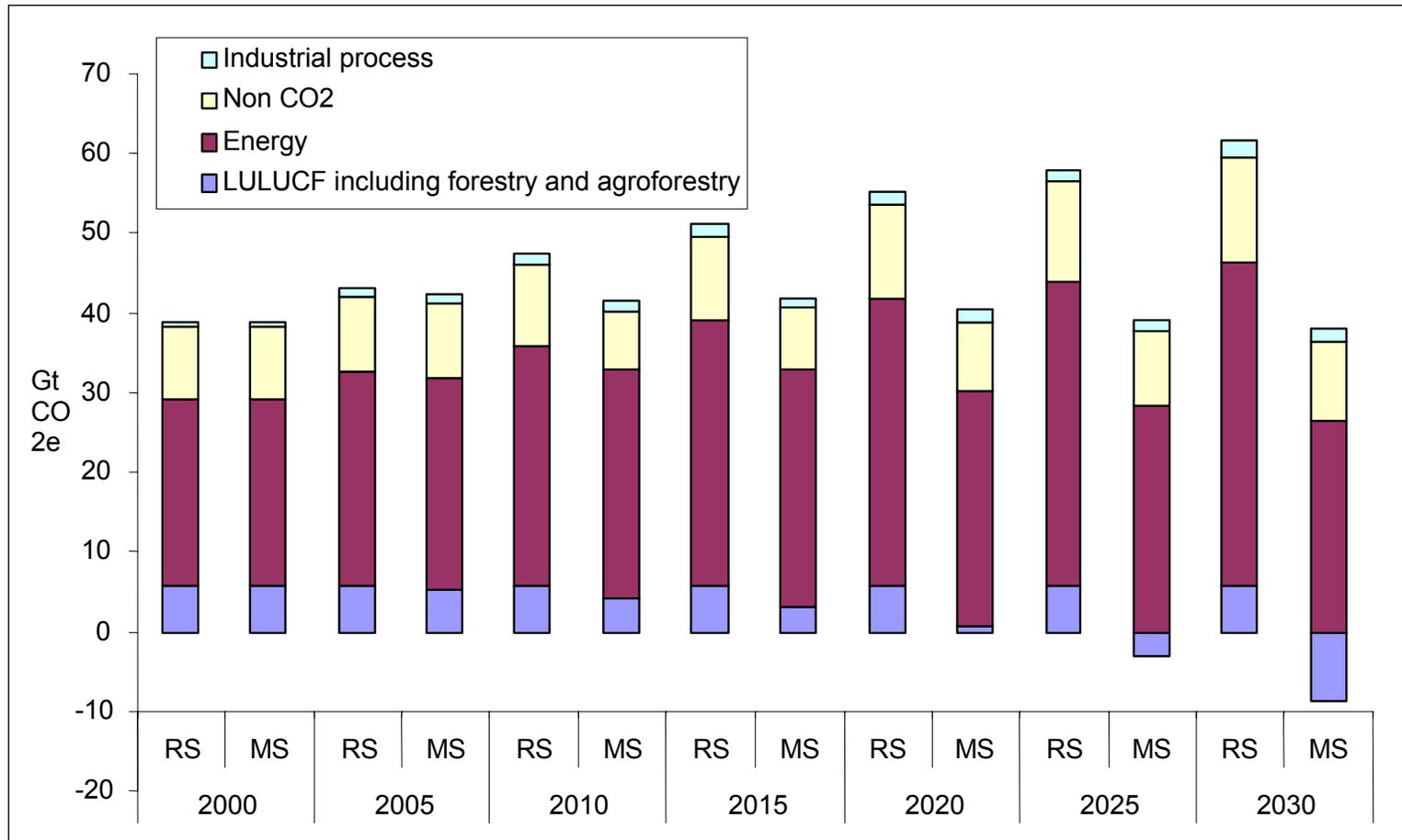
Energy mix in mitigation scenario



Emissions by Sector, 2004



GHG emissions under reference and mitigation scenarios



The mitigation scenario reduces **energy-related** emissions by 35 per cent, **industrial process** CO₂ emissions by 11 per cent, **non-CO₂ gases** emissions by 25 per cent and **LULUCF** emissions by 252 per cent

Carbon markets



Carbon Market

- A carbon market is a market for GHG emission reductions (credits) and rights to release greenhouse gas emissions (allowances).
- Each GHG emissions trading system creates its own market.
- The largest markets are established by the Kyoto Protocol and Parties that have emissions limitation commitments under the Protocol:
 - 2006 transactions,
 - 2010 (2008-2012) international market for Annex B compliance,
 - 2030 international market for possible Annex I compliance

Current CDM Market

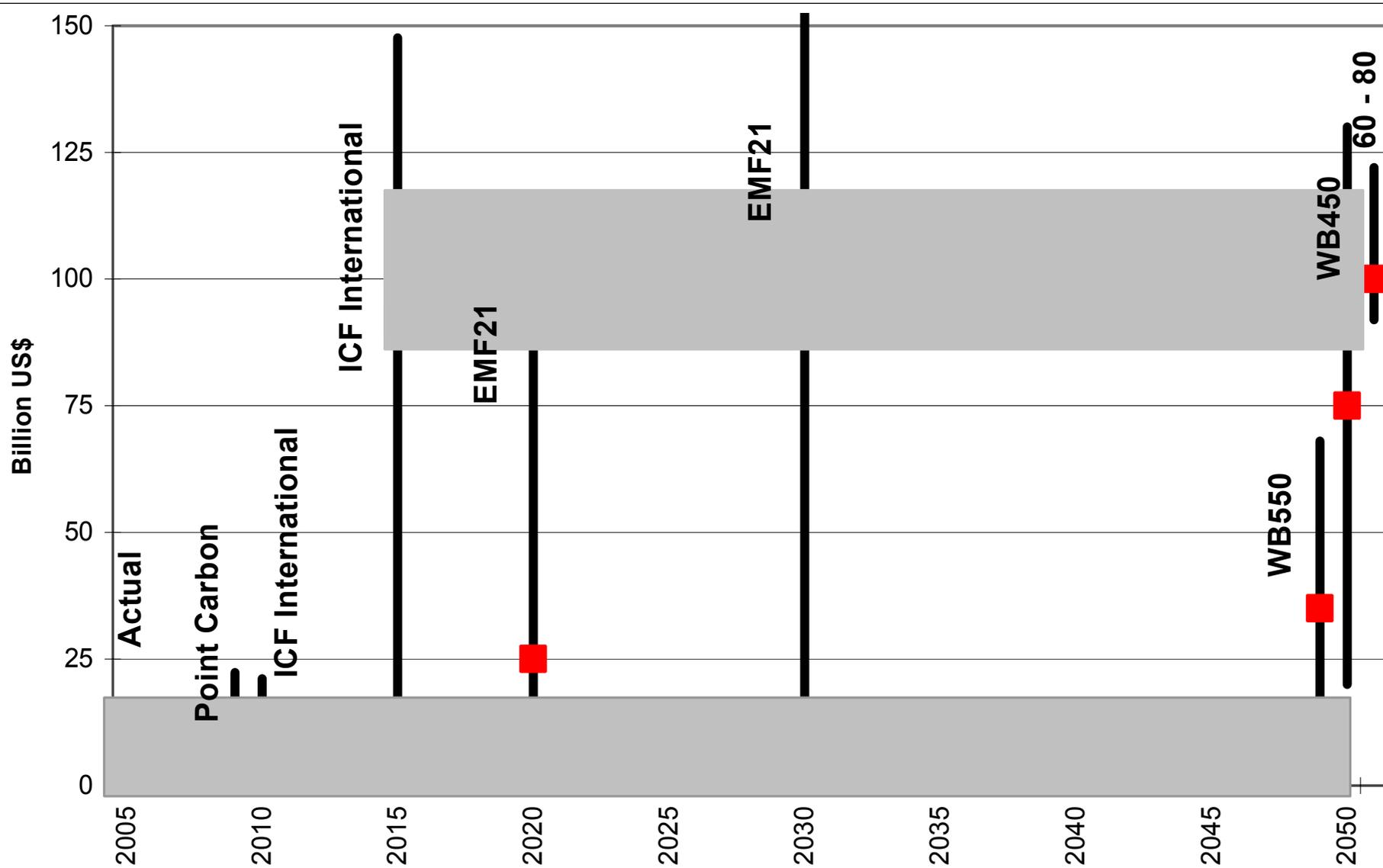
	Registered during 2006	Entered pipeline during 2006
Number of projects	403	954
Estimated annual reductions (MtCO ₂ e)	89	146
Annual revenue (USD billion)	1 to 1.5	1.5 to 2.5
Projected investment (USD billion)	6.9	26.5
Unilateral investment (USD billion)	2.5	12.9
Renewables and efficiency (USD billion)	5.7	24.2

Transactions during 2006 – USD 5 billion, 475 million CERs

International Market for Compliance 2010

- Compliance demand ex Canada 400 to 600 MtCO₂e/year
- CDM supply 300 to 450 MtCO₂e/year
- JI supply 40 to 60 MtCO₂e/year
- Surplus AAUs up to 1,650 MtCO₂e/year
- Ample supply; could increase further
- Rules suggest AAUs be carried over
- Projected price USD23.60/tCO₂ (USD 13.50 to 33.75)
- Market of USD 5 to 25 billion per year

International Market post 2012



Issues that may affect the carbon market

- Post 2012 uncertainty could affect project flow
- Impact of proposed extensions on supply
- Market affects profitability of each project type differently
- Carry over rules for Non-Annex I Parties, firms
- Current project flow sufficient for low future demand
- High demand requires almost all potential emission reductions, probably new mechanisms

New sources of financing under the convention

Options for other sources of funding

- Compilation of suggestions made so far in the literature
- No judgment – tried to quantify what these options mean
- Parties may have other options
- All options would need further analysis
- Some may be achieved through negotiations at climate change Convention, some may need to be addressed somewhere else

Option	Revenue	Notes
Application of a levy similar to the 2 % SOP from the CDM to international transfers of ERUs, AAUs and RMUs	U\$ 10 - 50 mio	Annual average for 2008 to 2012
	Depends on size of carbon markets post-2012	Any estimate for post 2012 requires assumptions about future commitments
Auction of allowances for international aviation and marine emissions	U\$ 10 - 25 bio	Annual average for aviation rises from 2010 to 2030.
	U\$ 10 - 15 bio	Annual average for marine transport rises from 2010 to 2030.
International air travel levy	U\$ 10 - 15 bi0	Based on charge of USD 6.50 per passenger per flight.
Funds to invest foreign exchange reserves	Fund of up to U\$ 200 bio	Voluntary allocation of up to 5 % of foreign exchange reserves to a fund to invest in mitigation projects to diversify foreign exchange reserve investments
Access to renewables programmes in developed countries	U\$ 500 mio	Eligible renewables projects in developing countries could earn certificates to be used under renewables programmes in developed countries to a specified maximum, such as 5 %
Debt-for-efficiency swap	Research needed	Creditors negotiate an agreement that cancels a portion of the non-performing foreign debt outstanding in exchange for a commitment by the debtor government to invest the cancelled amount in clean energy projects domestically
Tobin tax	U\$ 15 - 20 bio	A tax of 0.01 % on wholesale currency transactions to raise revenue for Convention purposes
Donated special drawing rights	U\$ 18 bio	Special drawing rights are a form of intergovernmental currency provided by the IMF to serve as a supplemental form of liquidity for its member countries.