

# Estimates of investment and financial flows for mitigation in 2030

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# Project Goal

- To estimate **additional** investment and financial flows needed in selected sectors to return global greenhouse gas emissions to **current levels in 2030**

# Challenges

- Estimate investment and financial flows in as much detail as possible – including regional disaggregation.

# Approaches

- Additional investment and financial flows estimated in a particular year as the difference between the flows in mitigation and reference scenarios in that year.
- Future flows are compared with sources of funds for current flows.
- Period of 2005 – 2030: the 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 CO<sub>2</sub> emissions, US EPA scenarios for non CO<sub>2</sub> emissions, and cost-effective mitigation potential for agriculture and forestry.

# Limitations

- Limited availability of data for **regional disaggregation**.
- Current data cover investment flows for aggregated sectors. Identifying **role of different sources of funding for specific sectors** is not easy.
- The mitigation scenario does not consider the the **need for increased electricity access in developing countries**.
- No reference **scenario available for forestry**.
- Difficult to project investment needs for **non-commercialized mitigation technologies** like CCS
- The analysis does not provide **total cost of climate change mitigation**.
- The **estimates are preliminary, should be treated as indicative**.

# Findings

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## 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*

# Energy Supply | Power Supply

- 35% of USD 432 billion annual investment shifted to renewables, CCS, nuclear and hydropower; over 55% in Non Annex I Parties.
- Investment made by government-owned or private, usually regulated, utilities and is domestically funded in most regions
- Renewables concentrated in few countries; private investment and CDM
- T&D investment needs further analysis



# Energy Supply | Fossil Fuel Supply



- Annual investment in 2030 reduced by about 10% to USD 263 billion; about 55% in non-Annex I Parties

Investment continues to grow, but at a reduced rate

Investment mainly by large corporations, either government owned or private



# Industry

- Additional investment of USD 36 billion for energy efficiency, CCS, and reduction of process emissions (CO<sub>2</sub> and non-CO<sub>2</sub>); about 55% in Non Annex I Parties
- Energy efficiency and process emission reductions financed internally
- Increased investment in energy efficiency and process emission reductions is best achieved through appropriate policies or regulations



# Building



- Additional investment of USD 51 billion for energy (electricity and fossil fuel) efficiency; about 27% in non-Annex I Parties
- Energy efficiency financed internally
- Increased investment in energy efficiency is best achieved through appropriate policies or regulations (investments are incremental, and have short payback periods, but adoption is hampered by recognized barriers)

# Transportation

- Additional investment of USD 88 billion for improved efficiency (90%) and biofuels (10%); about 40% in non-Annex I Parties
- Vehicle owners will bear the higher initial cost of more efficient vehicles
- Private sector will invest in biofuel production
- Increased investment needs appropriate policies or regulations for vehicle fuel efficiency and biofuel use



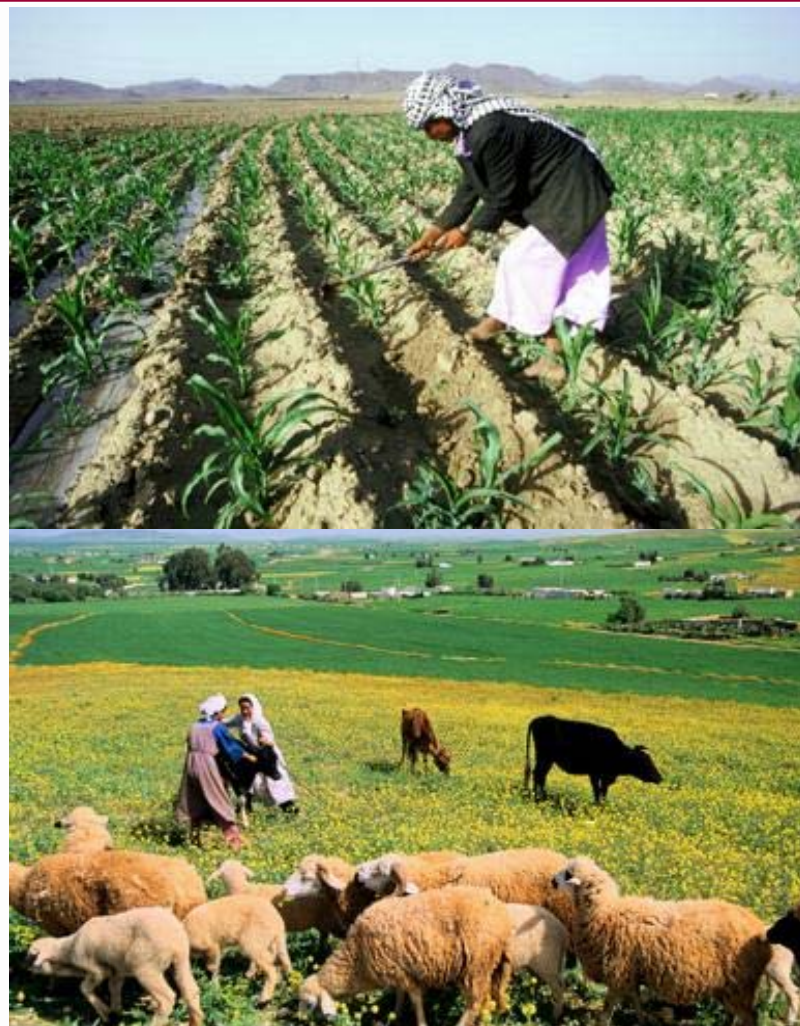
# Waste Management



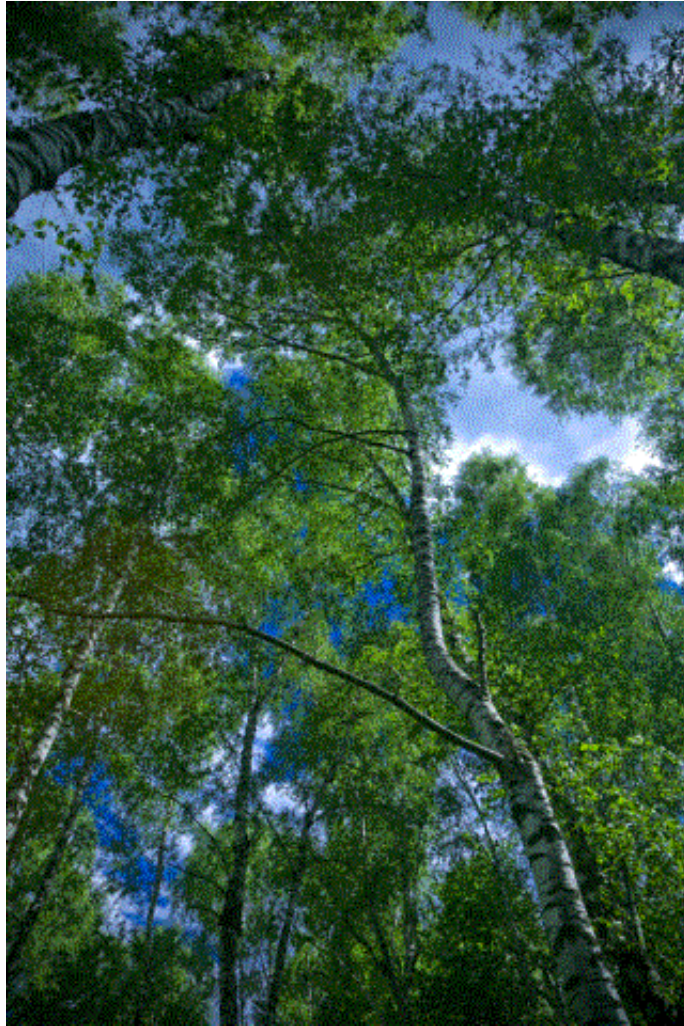
- Additional investment of USD 0.9 billion to capture CH<sub>4</sub> from landfills and wastewater treatment for energy use; about 67% in non-Annex I Parties
- Most landfills, wastewater treatment facilities are government owned or regulated
- Investment depends on government action
- CDM improves economics appreciably; can increase investment in non-Annex I Parties

# Agriculture

- Investment of USD 15 billion in agroforestry to enhance sinks and financial flow of USD 20 billion to reduce non-CO<sub>2</sub> emissions; about 67% of latter in non-Annex I Parties
- Agroforestry more profitable, but has negative cash flow for a few years
- Actions to reduce non-CO<sub>2</sub> emissions probably need financial incentives
- CDM projects reduce CH<sub>4</sub> emissions from manure



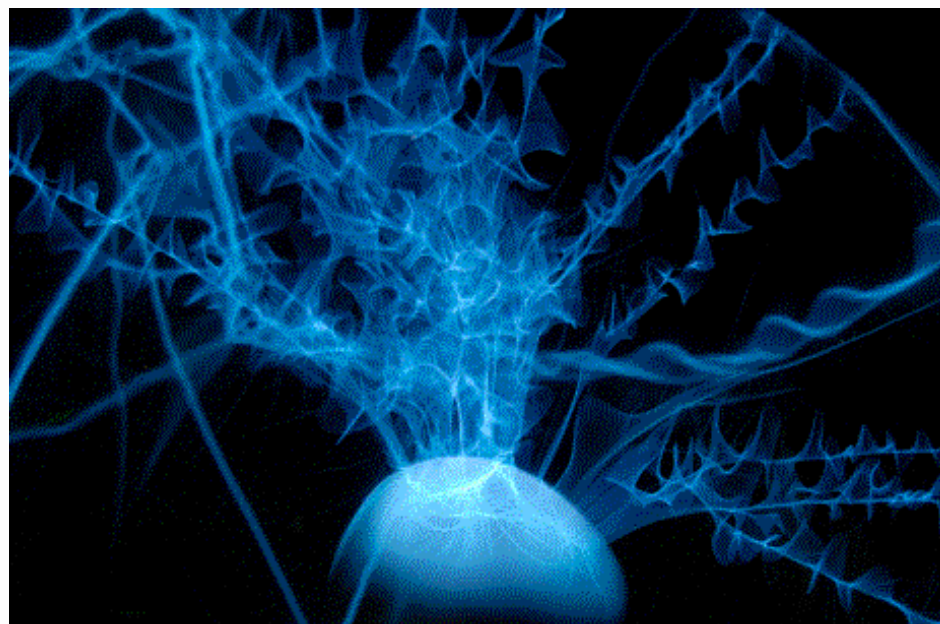
# Forestry



- Financial flow of USD 21 billion to reduce emissions and investment of USD 12 billion for reducing deforestation, USD 8 billion for forest management and USD 1 billion for forestation; almost all in non-Annex I Parties
- Reduced deforestation, forest management need financial incentives; great uncertainty and many operational issues to be resolved
- Several options for supporting reduced deforestation proposed by Parties and NGOs; little funding for forest management

# Energy R&D and Deployment

- Government spending on energy R&D has stagnated at about USD 10 billion, while private sector spending has fallen; most research in Japan and USA
- Stern Review suggested government energy R&D budgets need to be doubled to USD 20 billion
- Support for deployment of low GHG emitting technologies needs to double from USD 30 billion to about USD 60 billion



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# Potential For Enhanced Investment and Financial Flows

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# Sources of investment and financial flows

- Most of the investment in mitigation measures is domestic
- Important to focus on the role of private-sector investments as they constitute the largest share of investment flows
- ODA is important in Africa and the LDCs
- Potential of the financial mechanism of the Convention is limited if it continues to rely on current levels and voluntary contributions = USD 990 million for the period 2006-2010
- Carbon market is already playing an important role in shifting investment flows.

# Summary of changes needed

- Need **substantial shifts** in investment **as well as increase** in investment and especially **financial flows**
- **National policies** can play key role in driving many of the needed shifts and increases
- **Currently available sources** could cover a substantial part of the additional investment and financial flows needed
- However, **optimal combination of mechanisms**, such as the carbon markets, the financial mechanism of the Convention, ODA, national policies **and new sources** of finance is needed
- **Substantial share in non Annex I Parties**; lowest investment per tCO<sub>2</sub>e reduction there
- **The entities that make the investment decisions are different** in each sector, and the policy and/or financial incentives needed will vary accordingly

# Carbon Markets

- **CDM already shows a significant potential to leverage domestic and international investments**
- The **supply of Kyoto units will be abundant** compared with to the level of compliance demand for the **period 2008–2012**
- **Under a low estimate** of compliance demand by Annex I Parties in 2030 (market of USD 5–25 billion per year), the current flow of CDM projects would provide sufficient supply
- **Under a high estimate** of compliance demand (market of USD 100 billion per year), a large fraction of the potential emission reductions, from all existing and new categories of projects/mechanisms would be needed to for the supply
- **Policy certainty is important for investors.** A longer-term international agreement on climate change broadens the range of mitigation measures that are attractive investments

# Policies

- Appropriate national policies can achieve many of the changes in all countries:
  - Types of new generation capacity
  - Energy efficiency regulations, biofuels
  - Planning regulations and design standards for infrastructure
- Policies should differ by sector
- Policies to attract foreign investment can increase the funds available
- International co-ordination of policies is desirable in technology R&D and deployment, and energy efficiency standards for internationally traded appliances and equipment

# Options for new sources of funding

- Several possible new sources of funds, e.g.:
  - Int’nl air travel levy USD 10 to USD 15 billion/year
  - Access to renewables programmes in developed countries - USD 500 million
  - Donated special drawing rights - USD 18 billion
- Could generate funds commensurate with needs predictably
- Sources and uses of funds need to be negotiated as part of new agreement