



Estimation on Cost for Mitigation and Adaptation to Climate Change

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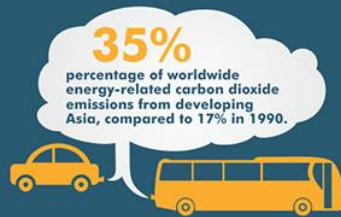
CLIMATE CHANGE

in Asia and the Pacific



Scientists warn that the world's climate is changing because of rising greenhouse gas emissions that might end up warming the planet by well over 2 degrees. Here are some glaring numbers that show the impacts of climate change in Asia and the Pacific.

Asia is key



Impacts to the Region

7 out of the 10
nations at greatest risk to climate change and natural disasters globally are in Asia and the Pacific, and 3 of these are small Pacific island states.

20 million
number of Bangladeshis who will be displaced by a 1-meter rise in sea level in 2050.

More than > 60%
number of the region's population working in agriculture, fisheries, and forestry, the sectors most at risk to climate change.

300 million to 410 million
estimated increase of Asian urban dwellers at risk of coastal flooding by 2025. In inland areas, the number of people at risk will rise from 245 million to 341 million by 2025.

DISASTER RISK MANAGEMENT



\$40 billion
budget required annually to help Asia and the Pacific transition to low-carbon and climate-resilient economies.

\$7 billion

approximate amount of ADB investment in clean energy related projects since 2008, with

\$2.1 billion
in 2011 alone.

Sources

* Emissions Database for Global Atmospheric Research (EDGAR)
* Key World Energy Statistics
* World Energy Outlook 2012
* World Risk Report 2012
* Pender, J.S. 2008. What Is Climate Change? And How It Will Effect Bangladesh. Briefing Paper. Final Draft). Dhaka, Bangladesh. Church of Bangladesh Social Development Programme.

* Stern Review on the Economics of Climate Change
* Stern Review on the Economics of Climate Change
* Massive investments are required
* Fast Facts: Vulnerable Cities - Waking Up to the Need for Urban
* Stern Review on the Economics of Climate Change

ADB Asian Development Bank
FIGHTING POVERTY IN ASIA AND THE PACIFIC
<http://www.adb.org/themes/climate-change/>

Facts on Climate Change in Asia and the Pacific :

1. **AP has been the world's largest resources user since the mid-1990s.** If the current trends continus, its CO2 emissions are likely to more than triple by 2050
2. Energy : **global energy demand is set to increase by 1/3 from 2010 to 2035 with China, India and other developing Asian contries accounting for over 60% of the global total.**

Without greater use of RE and improved EE, developing Asia's share in global energy-related CO2 emissions could increase from the current 35% to 45% by 2030

Source : ADB

Previous Studies on Cost for Adaptation

Table 1 Estimates of adaptation costs in developing countries, for 2010-2015

Source	US\$ billion p.a.	Comments
World Bank (2006)	9-41	Cost of climate-proofing FDI, GDI and ODA flows
Stern (2006)	4-37	Update, with slight modification of World Bank (2006)
Oxfam (2007)	>50	Based on World Bank, plus extrapolation of costs from NAPAs and NGO projects
UNDP (2007)	86-109	World Bank, plus costing of PRS targets, better disaster response

Source: Agrawala and Fankhauser (2008)

Note: FDI = foreign direct investment, GDI = gross domestic investment, ODA = official development assistance, NAPA = National Adaptation Programme of Action, PRS = poverty reduction strategy

Table 2 UNFCCC estimate of additional annual investment need and financial flow needed by 2030 to cover costs of adaptation to climate change (billion dollars per year in present-day values)

Sector	Global cost	Developed countries	Developing countries
Agriculture	14	7	7
Water	11	2	9
Human health	5	Not estimated	5
Coastal zones	11	7	4
Infrastructure	8 – 130	6 – 88	2 – 41
Total	49 – 171	22 – 105	27 – 66

Source: UNFCCC (2007)

Cost of Adaptation

Adaptation	ANNUAL COST Geography Timeframe	Methodology
Stern Review (2006)	\$ 1,5 trillion globally	Integrated Assessment Model (IAM)
Parry, et al (2009) Assessing the Costs of Adaptation to CC	\$ 1,9 trilliion globally 2030	Used Stern's IAM, adjusting discount rate and means of vulnerability, plus added in costs of adaptive capacity
World Bank (2010)	\$ 70- \$100 billion developing countries 2050	Estimated the cost of climate proofing "climate-sensitive" investment flows
UNFCCC (2007) Investment flows report	\$27-66 billion Developing countries 2030	
UNEP (2010) ADAPT Cost Report	\$20-60 billion Africa 2030	Applied two different IAMs to Africa

Additional Cost of Mitigation

IEA 450 Scenario (WEO 2011)

- \$15,2 trillion of additional cost over New Policies Scenario, growing from \$160 billion today to \$1,1 trillion in 2035
 - 40% of additional costs in transport;
 - 27% in buildings;
 - 20% in power generation
- Other spending in 450 scenario :
 - Fuel costs
 - Global fuel cost decreases \$690 billion
 - Middle East sees \$2,5 trillion increase
 - China/India see \$1,4 trillion decrease
 - Subsidies
 - Fossil fuel subsidies : \$4,1 trillion to \$6,3 trillion
 - Renewable energy subsidies up \$550 billion

Redrawing the Climate-Energy Map

- Energy is at the heart of the challenge to meet the 2° C : **energy sector** accounts for around **2/3 of GHG emissions** as more than **80% of global energy consumption is based on fossil fuels**
- **Four policies** that could reduce significant greenhouse gases emissions :
 - Specific energy efficiency measures (49% of emissions savings)
 - Limiting the construction and use of the least-efficient coal-fired power plants (21%)
 - Minimizing methane emissions from upstream oil and gas production (18%)
 - Accelerating the (partial) phase out of subsidies to fossil-fuel consumption (12%)

How Much Emissions Reduced?

How Much Money 'Involved'?

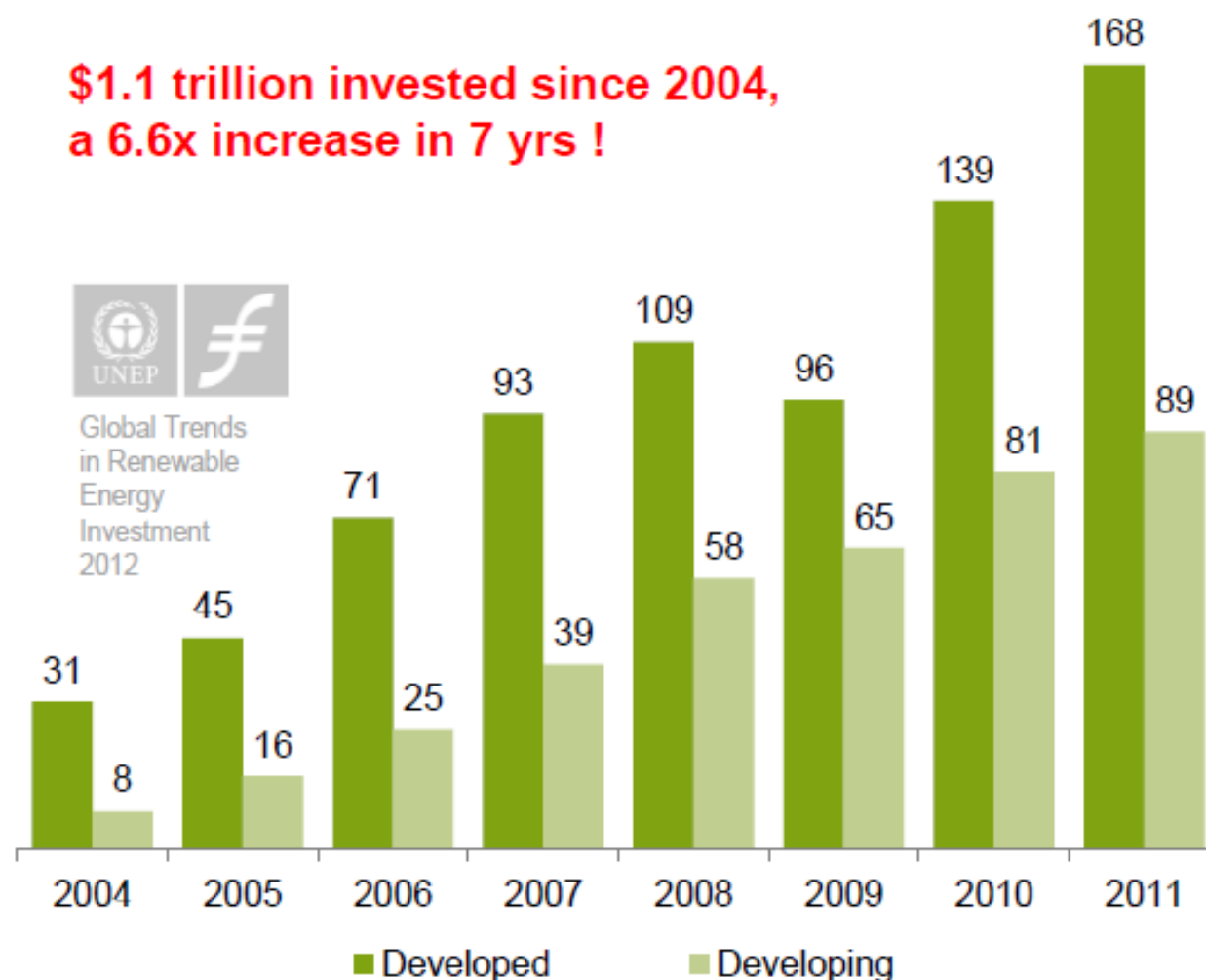
- Energy efficiency : **1,5 Gt by 2020**, with additional investment of \$ 200 billion
- Shifting the coal-fired plants : **640 Mt** in 2020
- Methane reduction at the upstream of oil and gas production : halved in 2020 (2010 : 1,1 Gt of emission)
- Partial phase out of fossil-fuel subsidies : **360 Mt. FFS** amounted to **\$ 523b** in 2011, around 6 times at the level of support to RE
 - Currently : 15% of global CO2 emissions receive an incentive of \$ 110 per tonne of FFS
 - Only 8% are subject to a carbon price

GLOBAL NEW INVESTMENT IN RENEWABLE ENERGY: DEVELOPED VS. DEVELOPING, 2004 – 11 (\$BN)



Frankfurt School
UNEP Collaborating Centre
for Climate & Sustainable Energy Finance

**\$1.1 trillion invested since 2004,
a 6.6x increase in 7 yrs !**



Note: New investment volume adjusts for re-invested equity. Total values include estimates for undisclosed deals. Developed volumes are based on OECD countries excluding Mexico, Chile, and Turkey.

Source: Bloomberg New Energy Finance; UNEP

- Climate change could result a sudden and destructive impacts that pose risks to power plants and grids, oil and gas infrastructure, wind farms and other infrastructure.

Delaying stronger climate action to 2020 would come at a cost : **\$ 1,5 trillion** in low carbon investments are avoided before 2020, but **\$ 5 trillion** in additional investments would be required thereafter to get back on track.

Redrawing Climate-Energy Map, IEA 2013

Case Study : Indonesia Needs for Climate Finance for National Action on Adaptation

Estimasi Total Kebutuhan Pendanaan RAN-API

Bidang / Sub Bidang	Anggaran (milyar Rupiah)	
(1) Ketahanan Ekonomi	176.600,1	
• Ketahanan Pangan	22.453,8	
• Kemandirian Energi	154.146,3	
(2) Ketahanan Sistem Kehidupan	193.764,2	
• Kesehatan	122.742,9	
• Permukiman	13.428,1	
• Infrastruktur	57.593,2	
(3) Ketahanan Ekosistem	428.124,8	
(4) Ketahanan Wilayah Khusus	40.290,9	
• Perkotaan	37.987,4	
• Pesisir dan Pulau-Pulau Kecil	2303,5	
(5) Sistem Pendukung	1.532,0	
Total Rencana Anggaran RAN-API	840.312,0	

Sumber: Draft RAN-API, 28 Mei 2013

~ IDR : \$ 84 triliun

Case Study for Mitigation

(in the context of 26% emission reduction voluntarily : Energy and Forestry sectors)

No.	Sources	Mitigation Needs (in USD)	Annual Mitigation Needs (in USD)
1	Mid-Term Development Plan, 2010	3.7 bn (2010-2014)	925 million
2	Second National Communication, 2009	8.3 bn (26%); 16.8 bn (41%)	0.83 bn –1.68 bn
3	NEEDS/ DNPI – McKinsey Cost Curve, 2009	385.2 bn (2010-2030)	19.26 bn
4	Bappenas, 2011	28.07 bn (RAN-GRK 2010-2020)	2.8 bn
5	CPEIR, 2012	70.5 bn (RAN-GRK until 2020)	7.05 bn

THANK YOU

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