Investments in Climate Change Adaptation and Disaster Resilience

Workshop on Building Resilience to
Natural Disasters and Climate Change

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Meeting Asia's Infrastructure Needs

Fractured roads, shattered rail links, ruined water wells, broken power lines. They're distressing facts of life for many communities in Asia and the Pacific, even as countries invest more than ever to improve their infrastructure.

Increasingly, climate change is the culprit. Its impacts include stronger and more frequent natural disasters, like Cyclone Winston which wiped out much of Fiji's infrastructure last year. No less destructive are gradual impacts like erosion and encroaching salinity, which can collapse roads and taint vital water supplies.

In the Asian Development Bank's 45 developing member countries disaster losses averaged $126 million a day between 2006 and 2015. Left unchecked, the toll on the region's infrastructure will grow even higher as climate change escalates.

ADB

Presentation

- Investment needs
- ADB's climate financing
- Project classification
  - Mitigation – eligibility and an example
  - Adaptation – eligibility and an example
- Project level climate risk management
- Recent changes in project economic analysis

Investment needs

Cost for achieving climate-resilient development

- Offsetting the impacts of climate change
- Building climate change adaptive capacity
- Climate proofing for key sectors

Estimated annual cost (up to 2050): 1.5% - 2.5% of GDP

Mainstreaming climate change actions in development planning
(reflecting into national policy and sector program)

Mitigation and Adaptation

Mitigation: Activities that promote "efforts to reduce or limit GHG emissions or enhance GHG sequestration."

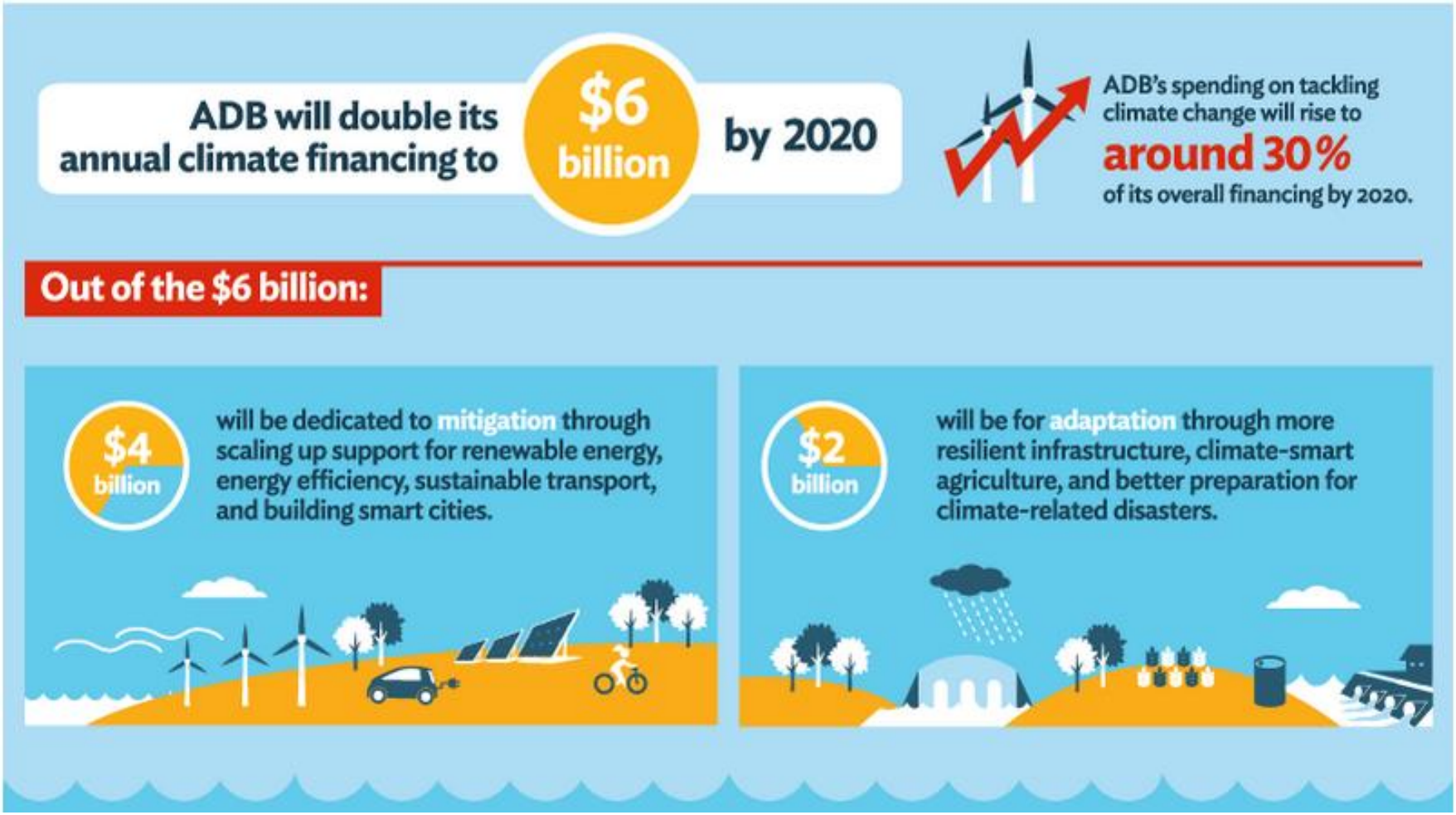
Adaptation: Activities that consist of the following elements:

1) Understanding the projects vulnerability to climate change;

2) Stating the intent to address identified climate change risks and vulnerabilities as part of the project;

3) Demonstrating a direct link between identified vulnerabilities and project activities.

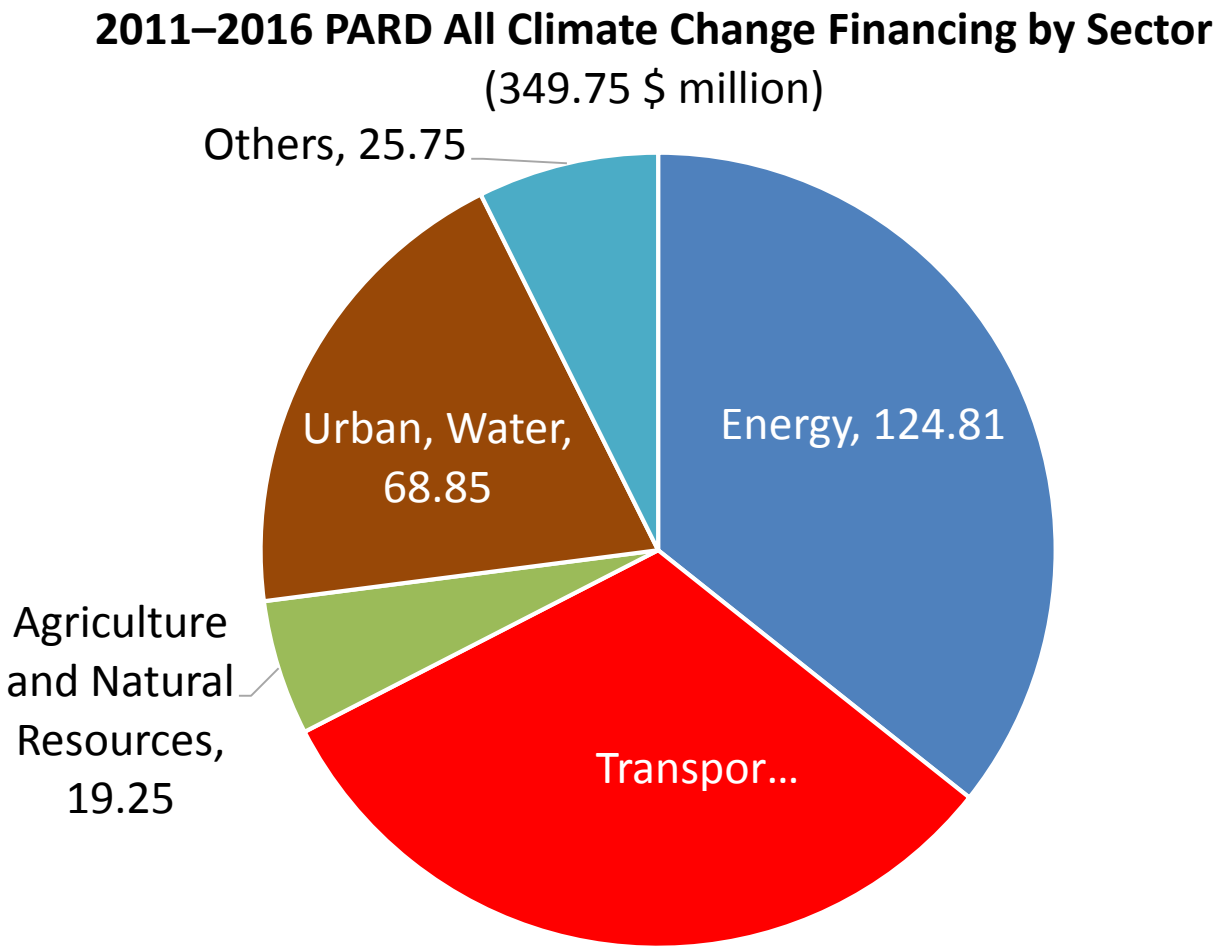
ADB's Climate Finance Target



ADB climate operations

- ADB 2016: $2.65 b. for climate mitigation and $1.08 b. for climate adaptation (internal sources) plus external sources ($595 m. for mitigation and $106 m. for adaptation)
- ADB Pacific: 2011-2016: mobilized about $350 m. in climate finance (including $100 m. in additional grant resources) to address climate change and disaster risk management.
- Mobilization of external sources: GCF, CIF, GEF, etc.

PARD Climate Change Financing by Sector, 2011-2016



Mitigation: Eligible activities

1. Renewable energy
2. Lower carbon and efficient energy generation
3. Energy efficiency
4. Agriculture, forestry and land-use
5. Non-energy GHG reductions
6. Waste and wastewater
7. Transport
8. Low-carbon technology
9. Cross-cutting issues
10. Miscellaneous

Joint Report on MDBs' Climate Finance
https://www.adb.org/sites/default/files/institutional-document/189560/mdb-joint-report-2015.pdf

Adaptation: Potential activities

1. Waste and wastewater systems
2. Crop production and food production
3. Other agricultural and ecological resources
4. Industry, extractive industries, manufacturing and trade
5. Coastal and riverine infrastructure
6. Energy, transport, and other built environment and infrastructure
7. ICT
8. Financial services
9. Institutional capacity support or technical assistance
10. Cross-cutting sectors

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ADB assesses and addresses climate risks of all Pacific projects

Climate and disaster risks are routinely identified, assessed, and managed during the project cycle, resulting in more climate resilient designs and ensuring that intended outcomes of investments are not compromised by climate change.

Climate Risk Management at the Project Level

Concept stage

- Climate risk screening (AWARE, 16 indicators)
- Indicators: temperature increase, precipitation change, sea level rise, water availability etc

Preparation stage

- Climate risk and vulnerability assessment (CRVA)
- Technical feasibility
- Economic analysis (CB, with and without)

→ Identification of the most viable adaptation options

Mitigation: Example

COO: Renewable Energy Sector Project

Diesel-powered generators:

99% of the total electricity generating capacity

Changing to renewable energy sources (solar)

reduce diesel consumption by 95%

free up government funds for priority areas

Mitigation: Example

COO: Renewable Energy Sector Project

Total project cost: $24.28 million

ADB: $11.19 million (OCR); EU: $7.26 million; GEF: $4.27 GEF

Project scope:

1. Solar photovoltaic power system development
2. Institutional strengthening and project management support

CONTRIBUTION TO THE ADB RESULTS FRAMEWORK

No.	Level 2 Results Framework Indicators (Outputs and Outcomes)	Targets	Methods/Comments
1	Installed clean energy generation capacity	3,180 kW by 2017	3,180 kW solar photovoltaic power plants under the three core subprojects and the three noncore subprojects fully operational by 2017.
2	Reduced greenhouse emission reduction	2,930 tCO_2e to be avoided (per year)	Carbon dioxide reduction was calculated based on the estimated savings of 1.09 million liters of diesel fuels to be used for an equivalent diesel power generator sets.

kW = kilowatt, tCO_2e = ton of carbon dioxide equivalent.
Source: Asian Development Bank estimates.

Mitigation Finance: $11.19 million (OCR); $7.26 million (EU)

Adaptation: Example

FIJ: Urban Water Supply and Wastewater Management Investment Program

- Increase water production by 20%, and waste water treatment by 200%
- Adaptation to floods, droughts, salinity intrusion due to sea level rise
- Ecosystem conservation through the increased sewerage coverage and better wastewater processes
- Improve sector management and capacity development (WAF)

Adaptation: Example

FIJ: Urban Water Supply and Wastewater Management Investment Program

Total project cost: *$405.1 m*

ADB (OCR): *$153.20 m (Multi-tranche Financing Facility)*
GCF (grant): $31.04 m
European Investment Bank (loan): $70.8 m
Government: $150.1 m

Project components

- Water infrastructure
  - **To enhance climate resilience, the location of new Rewa river scheme is located 49 km from the river's mouth to avoid the potential impacts of rising sea levels that can push saltwater up the river**
- Wastewater infrastructure
- Institutional strengthening and capacity building (WAF, Department of Environment)

Adaptation Finance: $31.04 million

Project economic analysis
- recent revisions -

- Lowering the social discount rate (SDR) to 9%
- Applying 6% for social sector, poverty targeting and environmental protection projects
- Country-specific SDR can be estimated and used with strong justifications
- Incorporating **social cost of carbon (SCC)** in project economic analysis (for energy, transport, and climate change mitigation projects)

Social cost of carbon (SCC)

- **Why?**
  - No consideration of cost of emissions makes it impossible to capture intended benefits from climate mitigation projects or negative external impacts of projects that increase emissions
- **IPCC's marginal global damage cost**
  - SCC at $36.3 per tCO_2eq in 2016
  - Annual 2% increase to reflect increasing environmental damage or benefits accruing to emission reduction over time
- **EIRR with carbon valuation**

Thank you

Category	Sub-category	Example
1. Renewable Energy	1.1 Electricity Generation	Wind power
		Geothermal power (only if net emission reductions can be demonstrated)
		Solar power (concentrated solar power, photovoltaic power)
		Biomass or biogas power (only if net emission reductions, including carbon pool balance, can be demonstrated)
		Ocean power (wave, tidal, ocean currents, salt gradient, etc.)
		Hydropower plants (only if net emission reductions can be demonstrated)
		Renewable energy power plant retrofits
	1.2 Heat Production or other renewable energy application	Solar water heating and other thermal applications of solar power in all sectors
		Thermal applications of geothermal power in all sectors
		Wind-driven pumping systems or similar applications
		Thermal applications of sustainably produced bioenergy in all sectors, including efficient, improved biomass stoves
	1.3 Measures to facilitate integration of renewable energy into grids	New, expanded and improved transmission systems (lines, substations)
		Storage systems (battery, mechanical, pumped storage)
		New information and communication technology, smart-grid and mini-grid

7. Transport	7.1 Urban transport modal change	Urban mass transit
		Non-motorized transport (bicycles and pedestrian mobility)
	7.2 Transport oriented urban development	Integration of transport and urban development planning (dense development, multiple land-use, walking communities, transit connectivity, etc.), leading to a reduction in the use of passenger cars
		Transport demand management measures dedicated to reduce GHG emissions (e.g., speed limits, high-occupancy vehicle lanes, congestion charging/road pricing, parking management, restriction or auctioning of license plates, car-free city areas, low-emission zones)[f]
	7.3 Inter-urban transport	Railway transport ensuring a modal shift of freight and/or passenger transport from road to rail (improvement of existing lines or construction of new lines)
		Waterways transport ensuring a modal shift of freight and/or passenger transport from road to waterways (improvement of existing infrastructure or construction of new infrastructure)

Sectoral	Examples of sectors	Potential impacts	Potential adaptation activities in
Water and Wastewater Systems	Water supply	Increased risk of flooding of well fields leading to contamination	Well fields relocated away from floodplains, raised well heads
	Wastewater infrastructure/ management	Increased exposure to damage and storm water overload due to coastal flooding and sea- level rise	Protection of wastewater infrastructure from increased flooding
	Water resources management (not included under cross-sector)	Reduction in river water levels and flows due to reduced rainfall	Improved catchment management planning and regulation of water abstraction

Coastal and Riverine Infrastructure (including built flood protection infrastructure)[a]	Sea defenses/flood protection barriers	Increased storm damage along coastline due to sea level rise and increased storm surges	Physical/natural reinforcement of coastline and/or additional coastal structures/vegetation. Incorporate climate risk and vulnerability assessment in land use planning.
	River flood protection measures	Increased risk of riverine flooding due to heavier and/or more frequent rainfall events	Increased river dredging programs, reinforcement of levees, reestablishment of natural flood plains and vegetation in upstream areas/river banks. Develop emergency plans to cope with extreme events focused on evacuation and rescue.