

Business Opportunities Seminar Energy Sector

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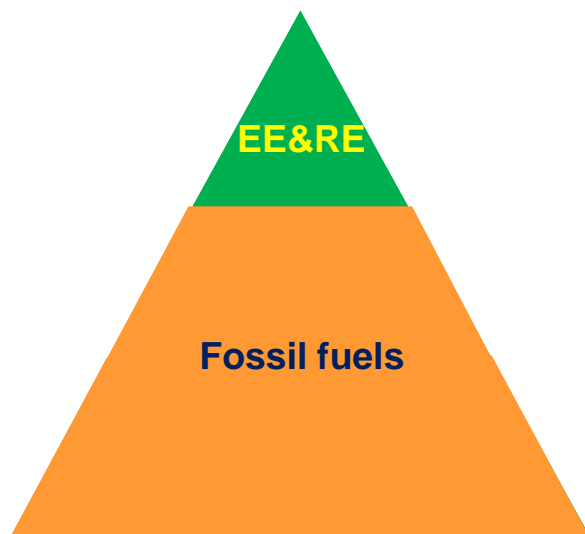
September 2015



Outline

- Context and Overview of the Sector
- Programs and Approaches
- General Business Opportunities

Market Transformation: Unlock Asia's Clean Energy Future



Current



2050

Huge challenges remain...



4.2 Billion
Population in Asia



1.8 Billion
People without access to
clean cooking



600 Million

People without
access to electricity

Climate Change in Asia and the Pacific

Asia is key

35%

percentage of worldwide energy-related carbon dioxide emissions from developing Asia, compared to 17% in 1990.



70%

percentage of the region's emissions that comes from the People's Republic of China. The country's per capita emission, however, is only about

50%

of the developed world's average.



2030

the year when developing Asia's share in global energy-related emissions could reach about

45%

without greater use of renewable energy and improved energy efficiency.

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.



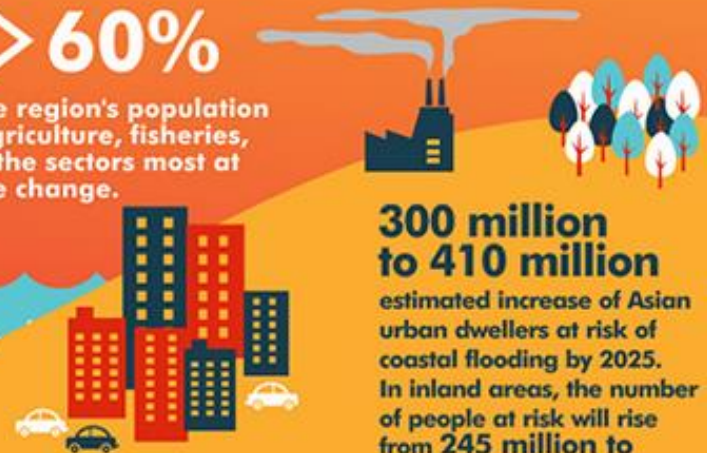
20 million

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.

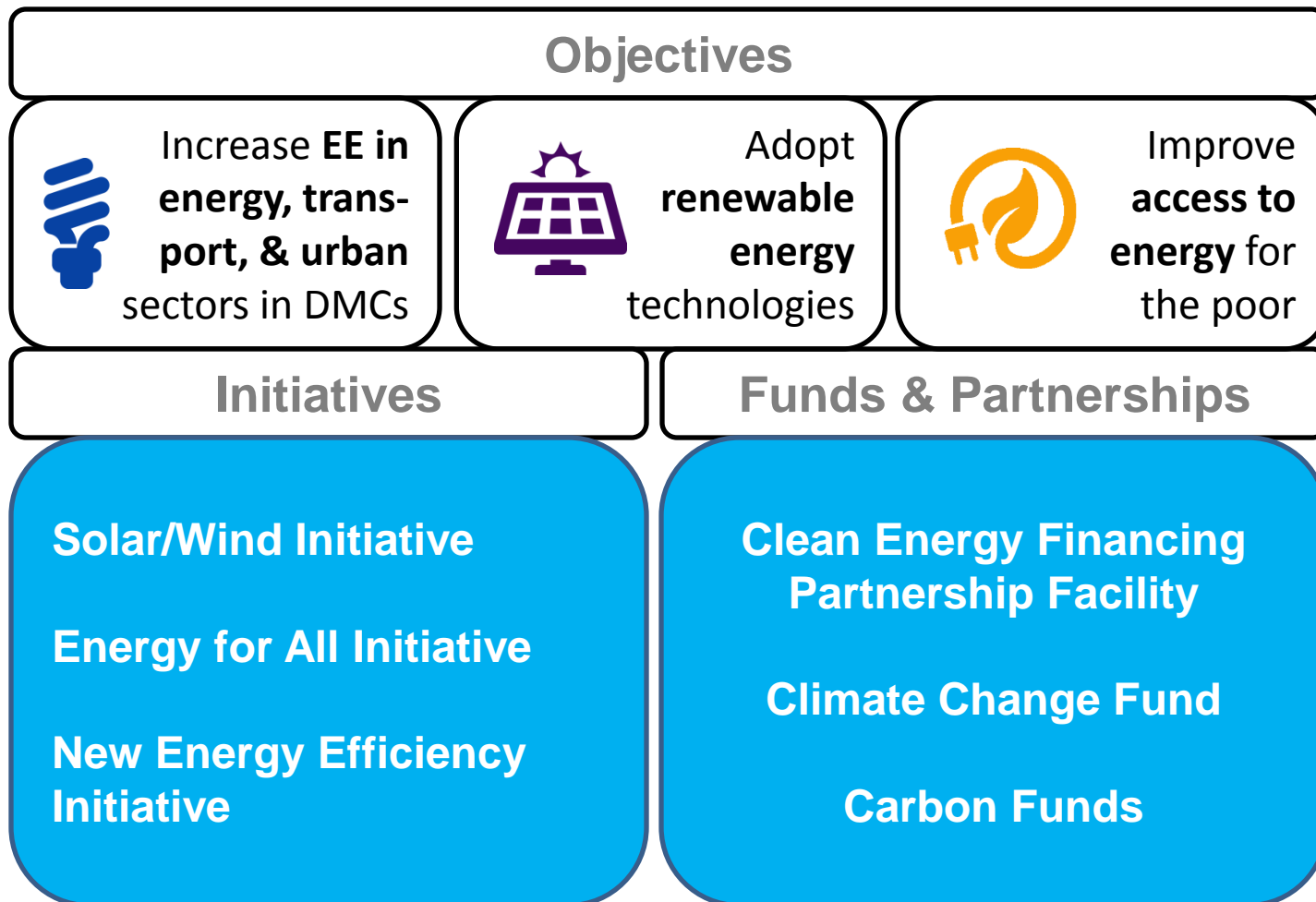
Asia's Energy Trilemma

- **Accessibility:** 600 million people without access to electricity (and intermittent services for those who have access)
- **Affordability:** costs of supply are high (or unsustainable subsidies)
- **Sustainability:** air pollution and CO2 emissions

Programs and Approaches

CLEAN ENERGY PROGRAM

Umbrella Program for ADB's Low-carbon Energy Work



Energy Sector Programs and Approaches

Aggregating Clean Energy Markets

- Asian Solar Energy Initiative
- Quantum Leap in Wind/Small Wind
- Carbon Capture and Storage

Supporting Growth Through Clean and Environmentally Sustainable Energy

- Energy for All
- Sustainable Transport Initiative
- Cities Development Initiative for Asia

Facilitating Clean Energy Technology Development and Diffusion

- Climate Technology and Finance Center
 - Integrating financing needs
 - Catalyzing climate technology deployment
 - Establishing a pilot “marketplace”

New Programs

- Small Project Development Facility for Energy for All Projects
- CCS Center of Excellence
- Asia Energy Efficiency Accelerator

The ADB Clean Energy Program

- To accelerate low-carbon growth and reduce greenhouse gas emissions in the region, ADB set the following targets:
 - \$1 billion annual target of clean energy investments from 2008
 - \$2 billion annual target of clean energy investments from 2010

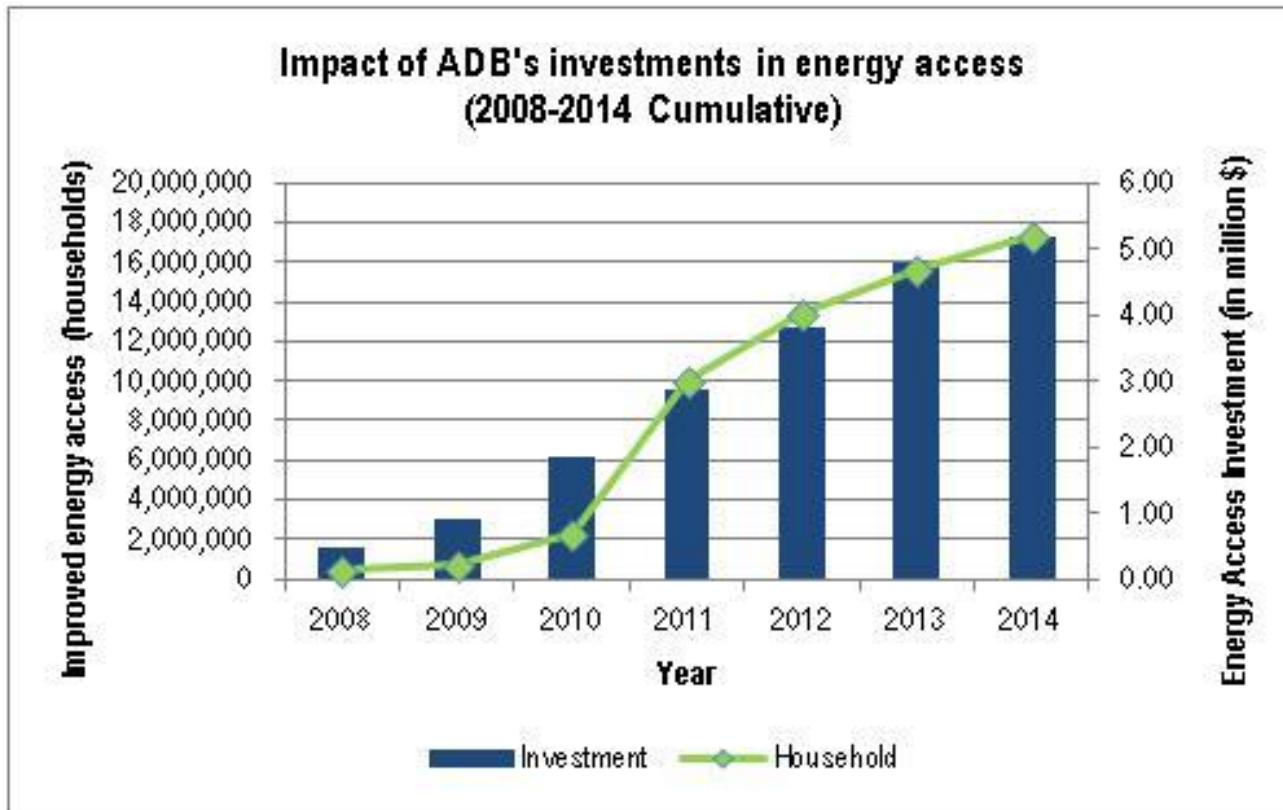
ADB Energy for All Program

- To promote access to modern forms of energy:
 - Increase ADB's investment on access to energy
 - Energy for All Partnership with target of reaching 100 million people by 2015 (on track!)
 - ADB serving as regional hub for **Sustainable Energy for All** with UNDP and ESCAP

Energy Sector Lending 2008-2014

Energy Sector Approvals, 2008-2014 (in US\$ million)				
Year	Public Sector Loans	Non-Sovereign Investments	Grants	Technical Assistance
2008	1,363.40	1,259.08	259.9	16.50
2009	1,908.01	469.07	95.3	32.91
2010	1,865.90	848.11	215.95	37.26
2011	2,896.69	1,461.61	125.70	51.10
2012	1,943.19	757.74	258.50	29.38
2013	2,879.44	679.00	459.37	43.37
2014	1,915.84	1,054.00	274.70	40.02

ADB's Contribution to Energy Access 2008-2014



USD 5.2 billion
total ADB investment
in energy access
(2008-2014)

86.4 million
number of people
benefiting from
ADB's energy
access investments

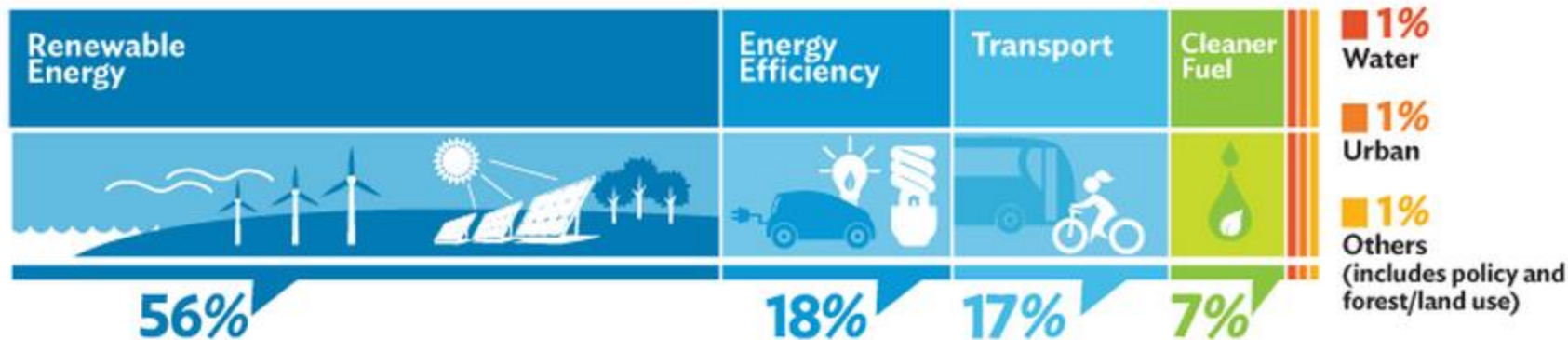
Key Multilateral Climate Funds (as of July 2015)

Fund*	Pledged (\$ million)	ADB-Administered (\$ million)
Mitigation	13,008	1,502
Climate Investment Funds (CIF)-Clean Technology Fund (CTF)	5,300	1,288
CIF-Scaling-Up Renewable Energy Program for Low Income Countries (SREP)	796	78
CIF-Forest Investment Program (FIP)	785	31
GEF Trust Fund - Climate Change Focal Area and Sustainable Forest Management/REDD+	6,127	105.14
Adaptation	2,834	315
CIF-Pilot Program for Climate Resilience (PPCR)	1,200	286
GEF-Least Developed Countries Fund (LDCF)	934.5	13.94
GEF-Special Climate Change Fund (SCCF)	348.9	14.8
Kyoto Protocol Adaptation Fund (AF)	351	0
Total	15,842	1,817

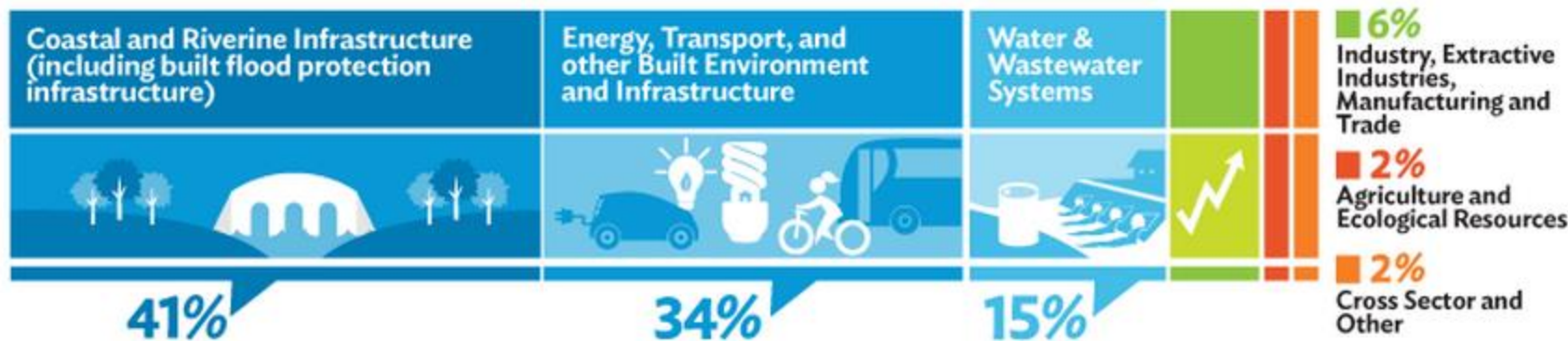
* Not a comprehensive list. Does not include other funds such as the Forest Carbon Partnership Facility (\$435 million) and the UN REDD Programme (\$119 million)

Share in Total Climate Finance by Sector

MITIGATION



ADAPTATION



Technology Innovation

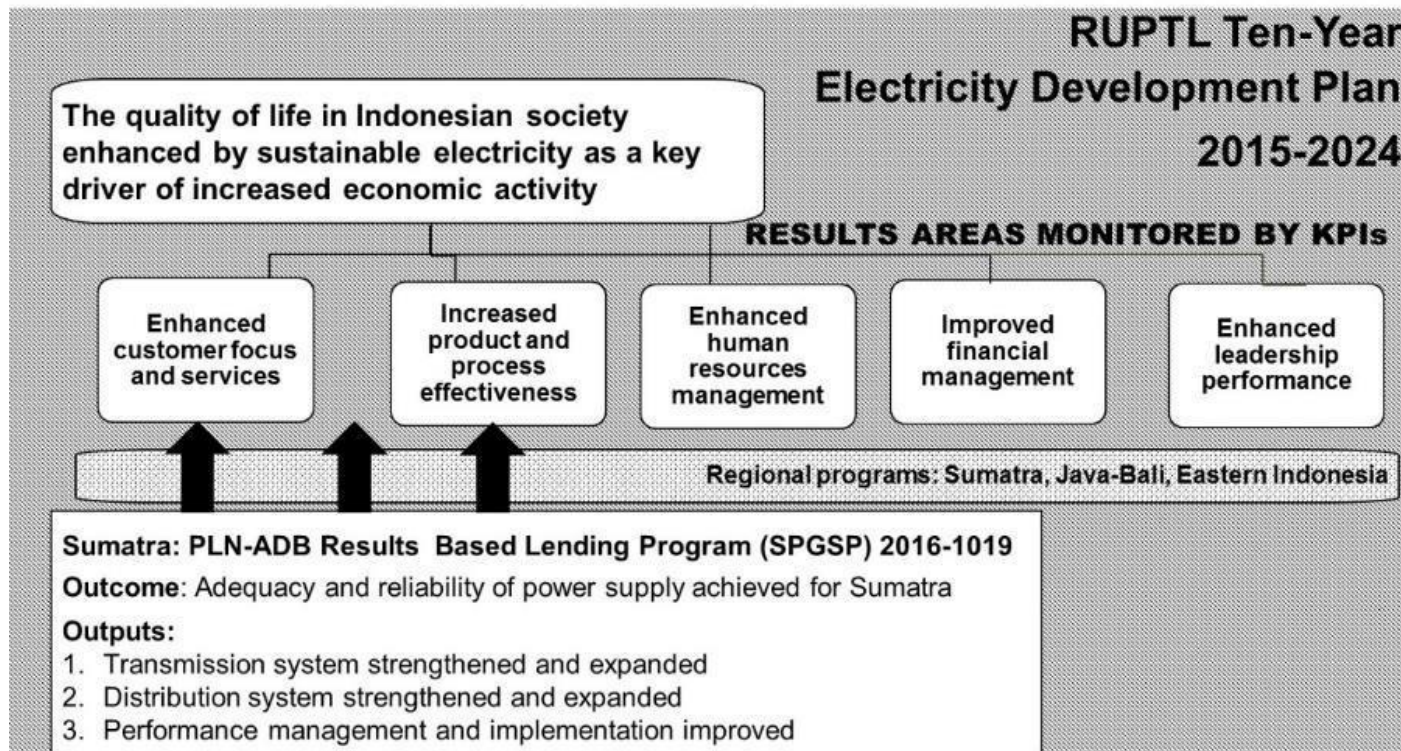
- **Distributed renewable (e.g. rooftop solar)**
 - *Supporting India's Solar Rooftop Program*
- **Smart grid/smart meters - promoting renewable energy and energy efficiency**
 - *Uzbekistan Advanced Electricity Metering Project*
- **Mini grid with storage – providing affordable renewable energy**
 - *Maldives Renewable Based Hybrid Mini-Grid Project*
 - *Solar Energy Development in Solomon Islands*
- **Cost Effective innovative transmission /distribution**
 - *Nepal Power Transmission Project/Myanmar Power Transmission Project (using aluminum compact core conductor)*
 - *Single Wire Earth Return in Mongolia*



HANDBOOK FOR ROOFTOP SOLAR DEVELOPMENT IN ASIA

Financing Innovation

- \$600 million for Indonesia Result Based Lending for Sumatra Power Grid Strengthening Project – the first RBL in the energy sector, effective way to expand the lending



Introducing New business models

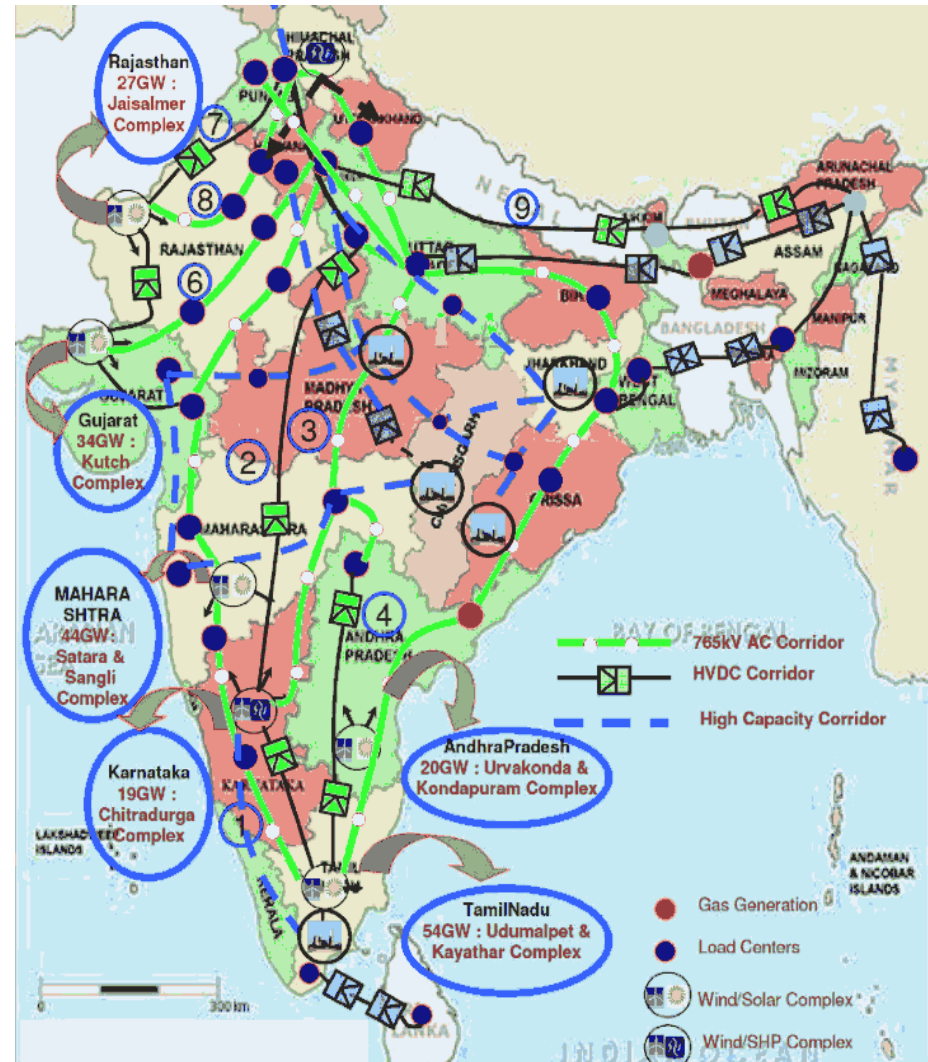


- Simpa Networks (“Off Grid Pay-As-You-Go Solar Project”) in India
 - **ADB Investment:** \$2 million equity investment in 2013, \$5 million CTF loan under preparation in 2015
 - **Investee:** Simpa Networks, a venture-backed technology company with a bold mission: to make modern energy simple, affordable, and accessible for everyone.
 - **Strategy:** Simpa offers an unique pay-as-you-go metering solution for off-grid solar home systems in rural India by using mobile phones technology to transform recurring energy expenditures into an eventual capital asset purchase. Scaling up of solar “leasing as a service” model.
 - **Development Impacts:** Increased access to affordable clean energy for base of the pyramid (BoP) consumers in rural India (10,000 systems installed as of April 2015), avoiding the greenhouse gas emissions by reducing kerosene usage.

Joint Public and Private Sector Operations

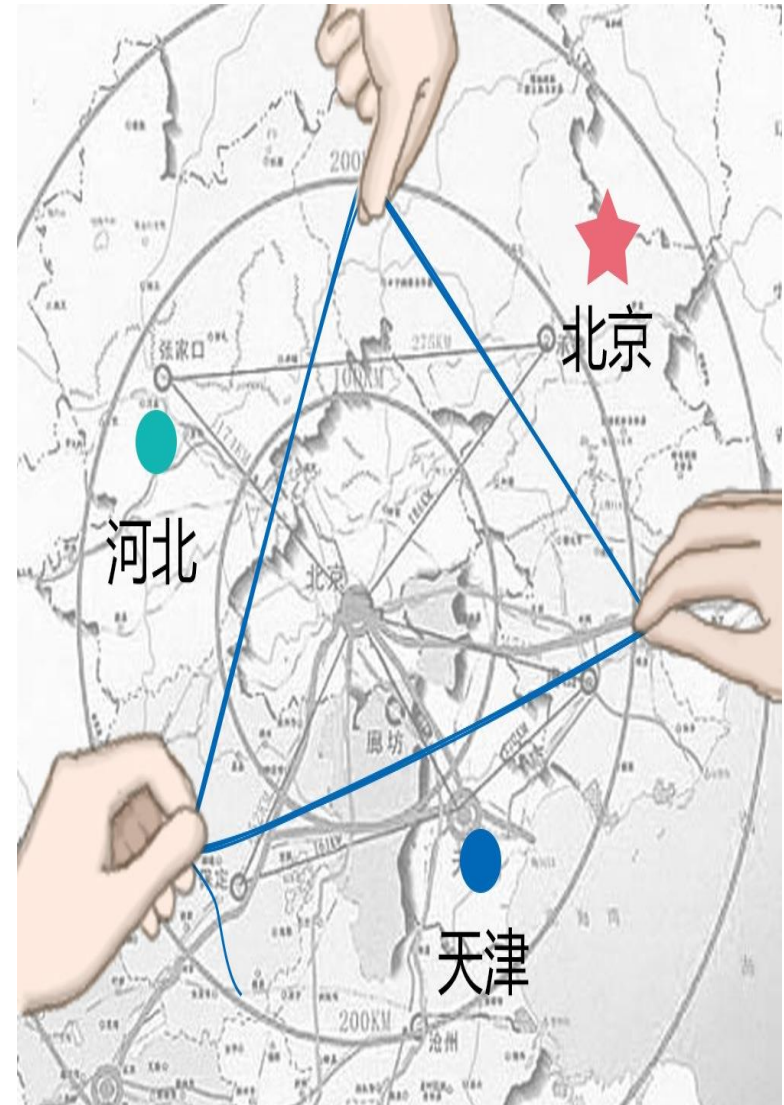
India Power Grid Green Corridor Development Project (up to \$800 million by SARD and PSOD)

- India's "Green Energy Corridor" facilitates the transfer of renewable energy to load centers
- Absorption and smoothing out of the RE intermittency
- Static compensators (STATCOMs) to enhance grid stability



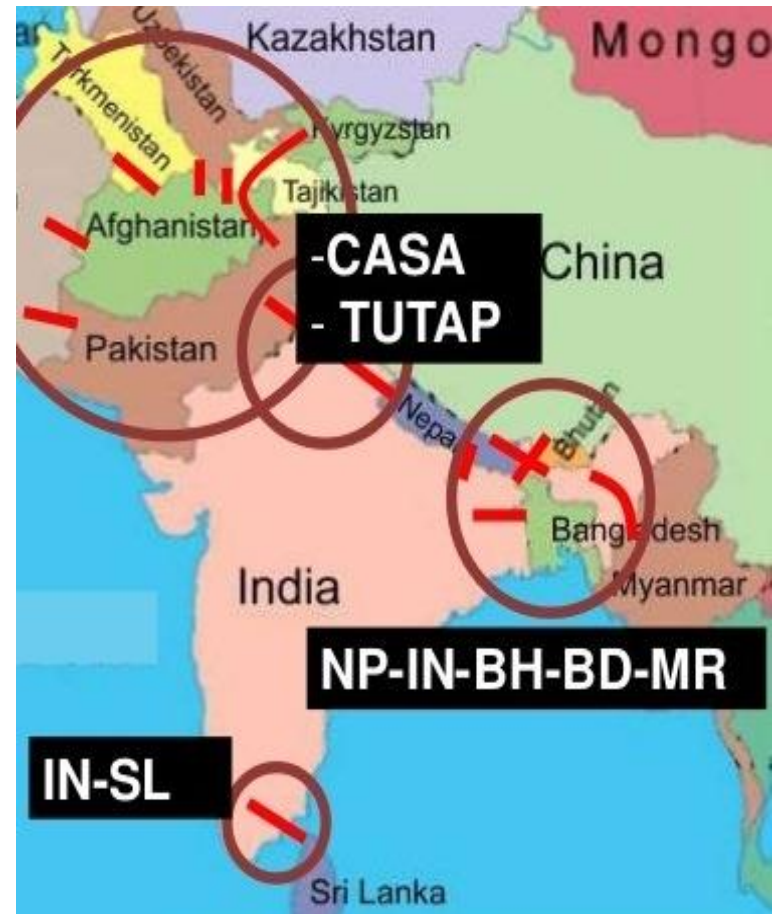
Multi Sector Approach

- **PRC Beijing-Tianjin-Hebei Air Quality Improvement Program**
- \$300 million programmatic policy-based lending with horizontal packaging to enhance Government's clean air action plan.
- Policy actions for (i) reduced PM2.5 emissions from **energy, industry, transport, urban and agricultural sectors**; (ii) strengthening environmental policy and regulatory framework; and (iii) development of social protection system for inclusive industrial restructuring.
- Project being peer reviewed by Energy, Transport and Urban SGs





Cross Border Energy Initiatives

- CAREC
 - *TUTAP (Turkmenistan, Uzbekistan, Tajikistan, Afghanistan, and Pakistan) Transmission Interconnection*
 - *TAPI (Turkmenistan, Afghanistan, Pakistan and India) Gas Pipeline (ADB providing transaction advisory services)*
- GMS
 - *With progress in physical interconnections in GMS, a Regional Power Coordination Center (RPCCC) is being established with ADB support*
- SASEC
 - *Bangladesh-India Interconnection*
 - *Nepal-India Interconnection*
 - *Bhutan Hydropower Export Project (first cross border CDM)*
 - *Sri Lanka – India Interconnection Study*
- Northeast Asia Power Interconnection Study



Examples of Knowledge Work


- Sustainable Energy Access Planning Framework
- Market Place for Low Carbon and Clean Energy Technology Transfer
- India-PRC Low Carbon Development Study
- Power Sector Reform Study in South Asia
- Power Interconnection Study in Northeast Asia
- Developing Wind Power and Rooftop PV Market in Indonesia



The Government of Indonesia
& Asian Development Bank

**Achieving Universal Electricity
Access in Indonesia**

Draft Report
30 January 2015



General Business Opportunities

ADB's Energy Sector Focus

- Support new **Sustainable Development Goal** on Energy (in addition to Poverty, Food, Health, Education, Gender, Water goals)

- Focused Areas

- *Energy access*
- *Renewable energy*
- *Energy efficiency*
- *Sector reforms*

- Expanding Operations with Innovations

- *Advanced technologies*
- *New financing instrument*
- *New business model*
- *“PPP” within ADB (joint PSOD/RD project)*
- *Multi-sector approach*
- *Cross border energy initiatives*



Energy Sector Operational Focus (2015-17)

1. Demand Side Energy Efficiency (Industrial and Building)



2. Solar (Rooftop/ Ground mounted)



3. Smart Grid/ Mini Grid



SE4All ASIA-PACIFIC REGIONAL HUB



ADB, in partnership with UNDP and UNESCAP, was launched as the **REGIONAL HUB** for Sustainable Energy for All Initiative in 18 June 2014.



Empowered lives.
Resilient nations.



Pipeline Projects (2015/16)

Department	Project title
<p>Central and West Asia</p>	<p>PAK: Sustainable Power Sector Reforms (Subprogram 2) PAK: Power Distribution Enhancement Investment Program II AFG: Energy Development 2015-2025 (AFG-TKM Power Interconnection Project Phase 2) KAZ: Karaganda District Heating Network Rehabilitation Project UZB: Advanced Electricity Metering Phase 2 UZB: Northwest Region Power Transmission Line Project</p>
<p>East Asia</p>	<p>PRC: Chemical Industry Energy Efficiency Project PRC: Qingdao Innovative District Heating Project PRC: Gansu Jinta Concentrated Solar Power Project PRC: Shaanxi Energy Efficiency Project MON: Electricity Transmission and Distribution Project</p>
<p>Pacific</p>	<p>VAN: Energy Access Project SAM: Renewable Energy Development and Power Sector Rehabilitation Project SOL: Solar Power Development Project FIJ: Support for Energy Sector Regulatory Capacity and Electrification Investment Planning</p>

Pipeline Projects in 2015/2016

Department	Project title
South Asia	IND: Green Corridor Development Project IND: Energy Efficiency Financing Program (EESL) BAN-IND: Interconnection Upgrading BAN: Hybrid Energy for Rural Electrification NEP: Power Sector Reform Program
South East Asia	INO: Results-Based Lending for Sumatra Grid Strengthening Program INO: Energy Program Loan MYA: Power Transmission Project VIE: Transmission Investment Program – Tranche 3

Flagship Knowledge Event Asian Clean Energy Forum

- The *Asian Clean Energy Forum* for last 10 years, now well established as an effective platform for energy policy, financing and technology sharing for DMCs and ADB staff. More than 1000 participants from around the world attended ACEF last week.



Operations/Knowledge Partnerships

Sustainable Energy for All (Asia Pacific Hub with UNDP and ESCAP)	Project preparation facility/capacity building
New Energy and Industrial Technology Development (NEDO), Japan	Smart grid, storage
Korea Energy Management Corporation (KEMCO), Korea	Energy efficiency
Tsinghua University (including TsuScience Park), China	Clean tech technologies/PV for poverty reduction
The Energy Research Institute (TERI), India	Energy access
World Resources Institute (WRI)	Smart communities/cities
World Bank and other RDBs	Knowledge sharing, peer review, co-financing
International Energy Agency	Staff skills development
International Renewable Energy Agency	Renewable technologies
Sustainable Energy Association of Singapore	Capacity building in Sustainable Energy for All

Expanding Energy Sector Operations

- Overall energy sector lending currently at about **\$3-4 billion** per year.
- With OCR/ADF merger, the lending in the energy sector is expected to reach **\$5 billion** per year by 2017.
- Clean energy lending increasing from **\$2 billion** towards **\$3 billion** per year beyond 2017.
- Mobilize climate and other co-financing (e.g. Green Climate Fund, Clean Investment Funds) **Climate Change Conference COP21 – opportunities**
- **\$95** million available for allocation under Clean Energy Financing Partnership Facility (CEFPPF) to support Operations (grants, PPTAs, CDTAs, RETAs)

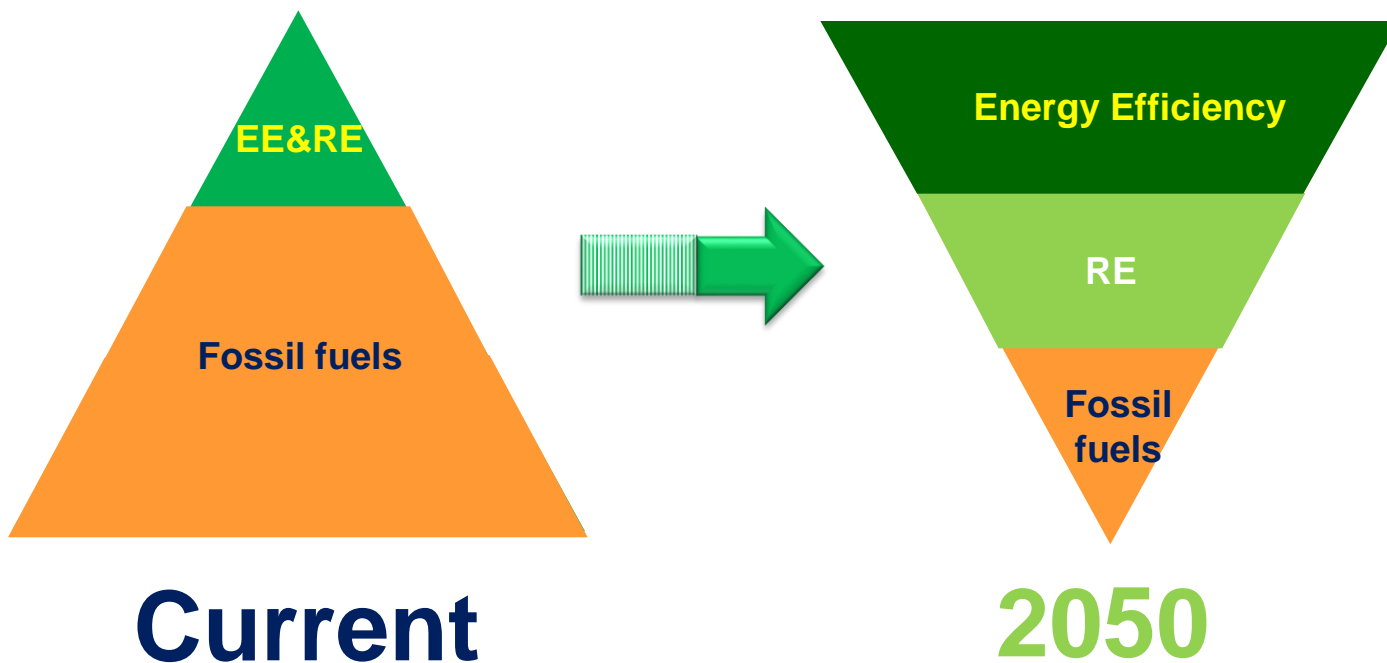


110.7 kWp ADB Solar Power Plant Solar Power PV Panels

Fast Facts:

- Plant Capacity: 110.7 kWp
- Panel Qty: 369.0 pcs.
- Brand/Model: Suntech/STP 300-24/Ve
- Rated Power: 300 Watt-peak @ 1000 W/m² 25 deg C
- Technology: Silicon Polycrystalline
- Conversion Efficiency: 15.5 %
- Positive Power Tolerance at +5% (315 Wp)
- Excellent Weak Light Performance
- Extreme Material design to withstand 3800 Pascal or 280 kph wind pressure
- Lowest mis-match losses at 2%
- Performance Warranty of 25 years

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Thanks

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