

Role of ADB in Supporting Wind in Asia and Pacific: Quantum Leap in Wind Initiative

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Overview

- Wind potential and development in Asia and the Pacific
- ADB assistance in wind
- Wind Developments in South and East Asia
- Barriers/Challenges in wind development
- ADB Quantum Leap in Wind Initiative

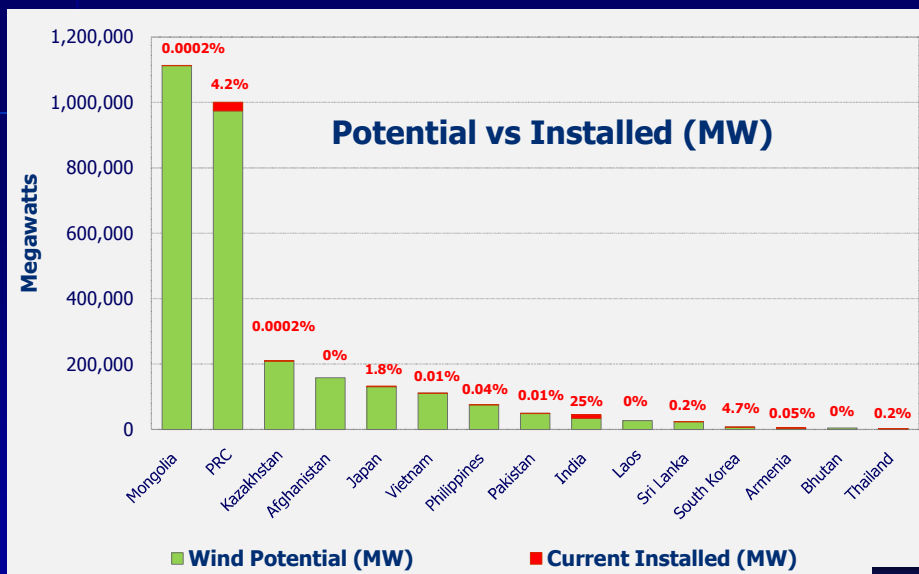
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Why Wind in Asia and Pacific?

- Wind is a source of **clean energy**
- Wind is **free**
- Asia and Pacific have **good wind resource potential**; Asia is world's largest regional market for wind energy with many countries still untapped
- Aside from China and India, many Asian countries now **have policies and targets for renewable energy by 2020**, utilizing wind power
- Maturing wind energy technology – becoming more **efficient** and **competitive** with conventional sources

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Asia Wind Potential



Wind energy worldwide to provide up to 10% of electricity demand by 2020

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Country	Wind Potential (MW)	Installed (MW) as of July 2010	% Installed	Under Construction (MW)
Mongolia	1,113,300	2	0.0002	50
PRC	1,000,000	41,830	4.1830	10,500
Kazakhstan	210,650	1	0.0002	5
Afghanistan	158,100	0	0.0000	
Japan	133,000	2,360	1.7744	
Vietnam	111,916	11	0.0094	30
Philippines	76,600	33	0.0431	
Pakistan	50,000	6	0.0120	
India	48,500	12,128	25.0062	1500
Laos	27,104	0	0.0000	
Sri Lanka	24,000	33	0.1250	
South Korea	7,800	364	4.6718	200
Armenia	4,900	3	0.0531	
Bhutan	4,825	0	0.0000	
Thailand	3,050	6	0.1839	240

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Wind FIT Rates in Asia

Country	USD/kWh
Japan	0.18 - 0.24
Taipei, China	0.07 - 0.20
Thailand (base (\$0.09) + adder (\$0.11))	0.20
Sri Lanka	0.19
Pakistan (cost + system ROI 17%)	0.09 - 0.12
<i>Kazakhstan²</i>	<i>0.11 - 0.12</i>
Malaysia ¹	0.07 - 0.11
India	0.07 - 0.10
<i>Mongolia²</i>	<i>0.08 - 0.10</i>
China	0.08 - 0.09
Vietnam ¹ (EVN + State budget + Clean Energy Fund)	0.09
Korea	0.09
Armenia (AMD 31.3 w/o VAT)	0.09

*These are indicative ranges. In many countries, FIT vary by state and / or wind regimes

*Additional incentives that needs to be counted: number of years for FIT, tax holidays and import duties reductions are offered in many countries

¹Tentative, for approval

²For verification

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ADB Assistance for Wind in Asia

**Public sector
Loans, Grants & TA**

**Guarantee for projects in Pakistan,
1 Project in China**

**Private Sector
Loans, Equities, &
TA**

**2 Projects in China, 2 in India, 2 in
Pakistan, several under considerations in
Thailand and TAs in Philippines, Bhutan,
Afghanistan, Vietnam and Thailand**

**Catalytic tools for
clean energy**

**Clean Energy Financing Partnership
Asia Pacific Carbon Fund, Future Carbon
Fund, Technical Support Facility, EEI,
EFA**

**Policy and
knowledge
management**

**Clean Energy support, Small Wind TA and
QLW TA as well as Policy dialogues with
DMC, capacity building and general TA**

Examples of Recent ADB Investments in Wind

Title	Country	Type	Year
Jilin Wind Power Project	PRC	Loan	2010
Three Wind Farm Projects in Luzon	Philippines	PPTA	2010
Zorlu Enerji Power	Pakistan	Loan	2010
Wind Power Development	Vietnam	Loan & TA	2010
Pilot Wind Power Generation Project	Bhutan	Grant & TA	2009
Zhangbei Wind Power Project	PRC	Loan	2009
Effective Deployment of Small Wind Power Systems	Regional	TA	2009
Chaiyapun and Lamthakung Wind Farm Devt	Thailand	PPTA	2009
Inner Mongolia Wind Power Project	PRC	Loan	2008
Pasuquin East Wind Farm Development	Philippines	TA	2008
Development of Wind Energy	Afghanistan	TA	2008
Gujarat Paguthan Wind Energy Financing Facility	India	Loan	2008
CLP Wind Farms Private Limited	India	Loan	2008
TATA Power Wind Energy Financing Facility	India	Loan	2007

Wind Developments: South Asia

BANGLADESH

- Good wind potential in coastal areas
- High wind speed in monsoon months, use of hybrid (wind-diesel or wind-diesel-PV) other months
- 20 wind monitoring stations by LGED/BUET
- RE Target (Wind) 2020*: **1,000MW**
- Current installed capacity: 2MW (BPDB) + several kW from demonstration projects

*Power Cell, Government of Bangladesh

Sources: SWERA, BPDB, LGED-REIN

Wind Developments: South Asia

SRI LANKA

- Meteorological wind potential: **25,000 MW**
- Realizable potential*: **200 MW**
- **Wind Sites:** NW Coastal Region, Central Highlands, & parts of Sabaragamuwa and Uva
- Current Installed Wind: 33MW
- Government target **10% grid-connected RE** by 2015

*Business-as-usual scenario, given system absorption limitations

Source: Sri Lanka Sustainable Energy Authority

Wind Developments: South Asia

PAKISTAN

- Estimated wind potential: **50,000 MW+**
- Gharo Wind Corridor: Ave. **7.4 m/s** wind speed
- Alternative Energy Development Board (AEDB)
– **one window facilitator** for RE
- Various incentives offered for RE development
- RE Target by 2030: **9,700 MW**
- **Zorlu Enerji Power: 6MW -> 56.4MW with ADB financing (2010)**

Source: Presentation by Mr. Arif Allaudin, AEDB; ADB

Wind Developments: South East Asia

Philippines

- Wind Potential: **76,600 MW**
- Current Installed Wind Capacity: 33 MW
- Renewable Energy Act 2008
 - National Renewable Energy Board
- RE Target: **2X** installed capacity, **2010 to 2030**
- Awarded 44 wind service contracts (920MW)
- **ADB Private Sector PPTAs: Pasuquin East and Three Wind Farm Projects in Luzon**

Source: Presentations by Usec. Jose Layug and Mr. Fort Sibayan, DOE

Wind Developments: South East Asia

Thailand

- Wind monitoring: 44 wind stations (at 40m), 23 wind stations (at 90m)
- With imported and local manufacturers
- Wind demo projects: about **2 MW installed** total
- RE Development Plan
 - Wind Target: **800 MW by 2022**
- **Tax incentives** provided for RE
- **High Tariff:** base (\$0.09) + **adder (\$0.11)**
- PPA signed: 240 MW; Approved waiting PPA: 9 MW
- **ADB PPTA:** Chaiyapun and Lamthakung Wind Farm Development (2009)

Source: Dr. Twarath Sutubutr Presentation, DEDE

Wind Developments: South East Asia

Vietnam

- Wind Potential: > **8,700 MW** (WB); 1,785 MW (EVN)
- High Wind Areas: Center, Highland, Islands, Coastal
- Installed Capacity: 10.5 MW
- RE Target: **5% by 2020, 11% by 2030**
- **ADB Loan and TA:** Vietnam Wind Power Development (2011)
- With completed FS: 10 projects; Pipelined: 40 projects

Source: Dr. Nguyen Anh Tuan Presentation, IEVN

Barriers to Scaling Up Wind in Asia

- Policy and Regulations in other Asian countries
- Risk Perception – resource uncertainty
- Institutional Capacity
- Technical/Infrastructure
- Economic and Financial
- Market – energy planning does not include externalities

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Is Wind Power 'too expensive'?

1. Renewable costs are going down while fossil fuel costs are expected to go up
2. *Economies of scale: as supply increases, price goes down*
3. Compare with cost of no power
4. Energy diversity, security and sustainability
5. Future carbon market
6. **Externalities** - Environmental costs to society
7. Subsidies to conventional energy – globally > US\$ 500 billion annually
8. Europe after 2012: *wind power least cost option for adding new capacity*

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Key Challenges for Financing Wind and other Renewable Energy

- Bankable PPAs are still an issue
- How to mitigate / wrap key technical and commercial risks (wind CUFs, solar DNI) to facilitate non-recourse financing by developers
- How to raise long-term, fixed-rate local currency financing for projects (12+ years)
- How to leverage the capital markets for financing (e.g., solar bonds, takeout financing schemes)
- Regulatory independence and enforcement of RPOs is as important as feed-in tariffs and policy

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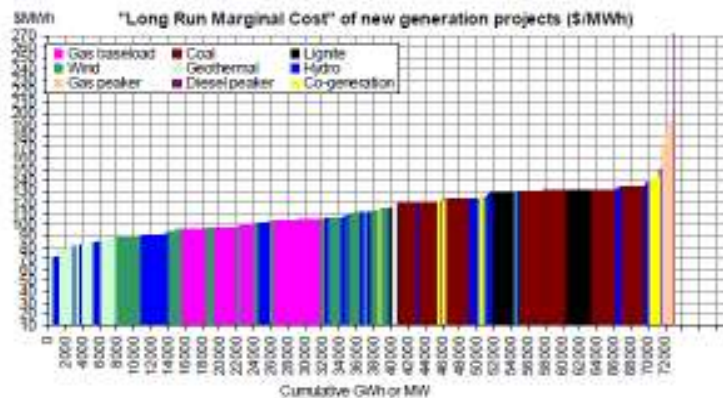
NZ Electricity Supply Growth

For the next 10 years at least, the majority of demand growth is expected to be met from wind, geothermal and hydro.

No gas plants are expected except for peaking to mid-merit plant to support intermittent renewable generation.

Why?

Economics favour renewable investment.



Quantum Leap in Wind Initiative

OBJECTIVES:

1. Access to clean and affordable energy

- Reach more than 5 million people
- Target 1 GW wind in Asia (excluding PRC and India) in 5 years
- 2 million tons per year reduction in CO2

2. Promote and build capacity for wind and other renewable energy

- Expanding to Asia Pacific market will encourage competition and technological innovation

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Phase II: QLW Technical Assistance

DMCs: MONGOLIA, PHILIPPINES, SRI LANKA, VIETNAM

DURATION: 3 Years, 2011-2013

COMPONENTS	BARRIERS ADDRESSED
Wind Energy Development Roadmaps*	Policy and Regulations, Institutional, Market
Resource Assessments	Risk Perception and Financing
Knowledge and Capacity Building	Institutional
Pre-feasibility Studies	Technical/ Infrastructure, Environmental
Business & Financial Models and Draft Contracts	Economic and Financial, Market

IEA inputs maybe available for country level roadmaps

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Seizing Opportunities: South and Southeast Asia

- Opening up of **Asia Pacific wind market** – access suppliers from neighboring countries with mature wind technology
- Support and encourage **Private Sector Participation**
- Early involvement -- share **best practices** in wind development

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THANK YOU

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