

Wind Futures in Asia



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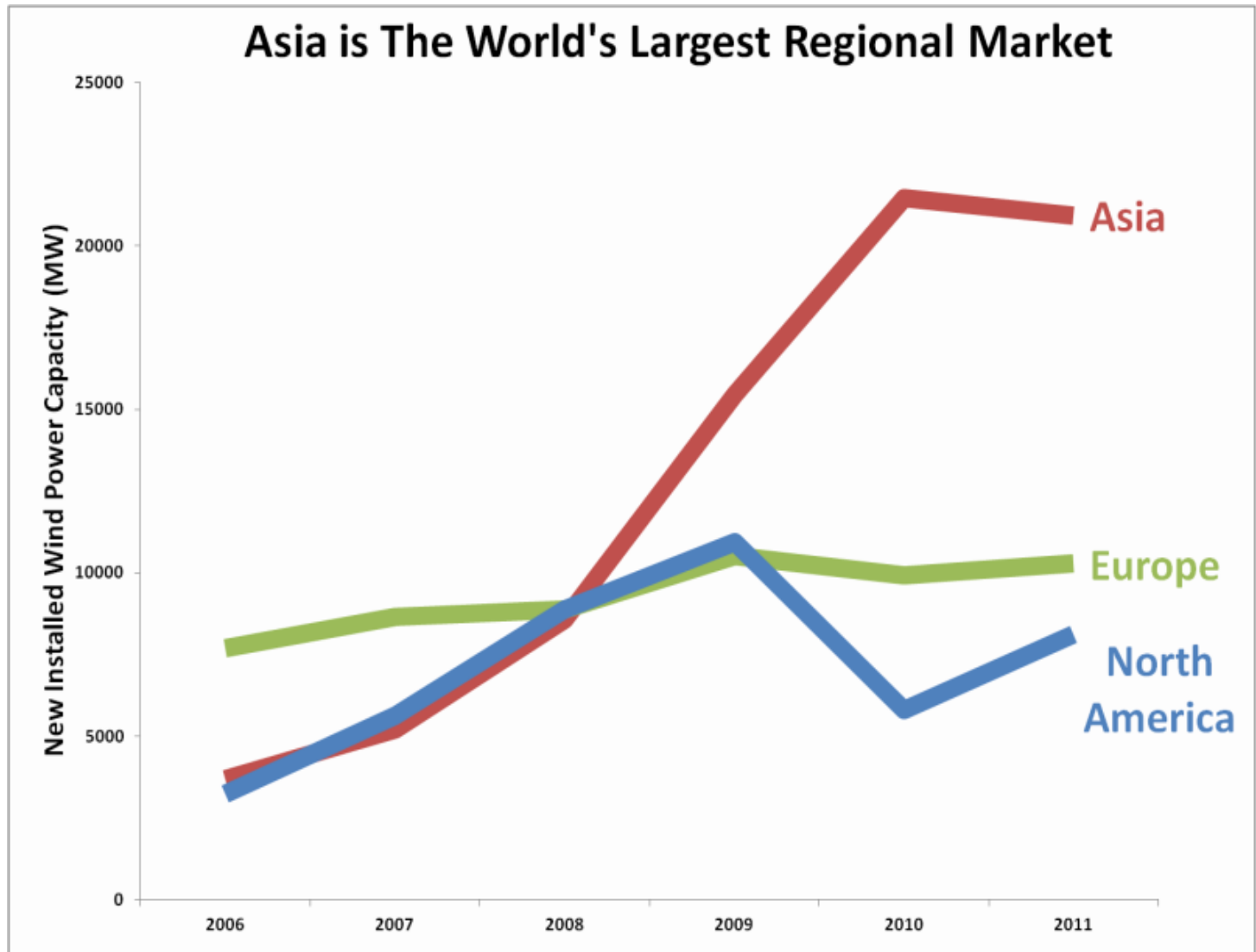
Third Quantum Leap in Wind Workshop

What will it take to accelerate wind development in Asia and the Pacific?

4 – 5 June 2012, ADB Headquarters, Manila, Philippines

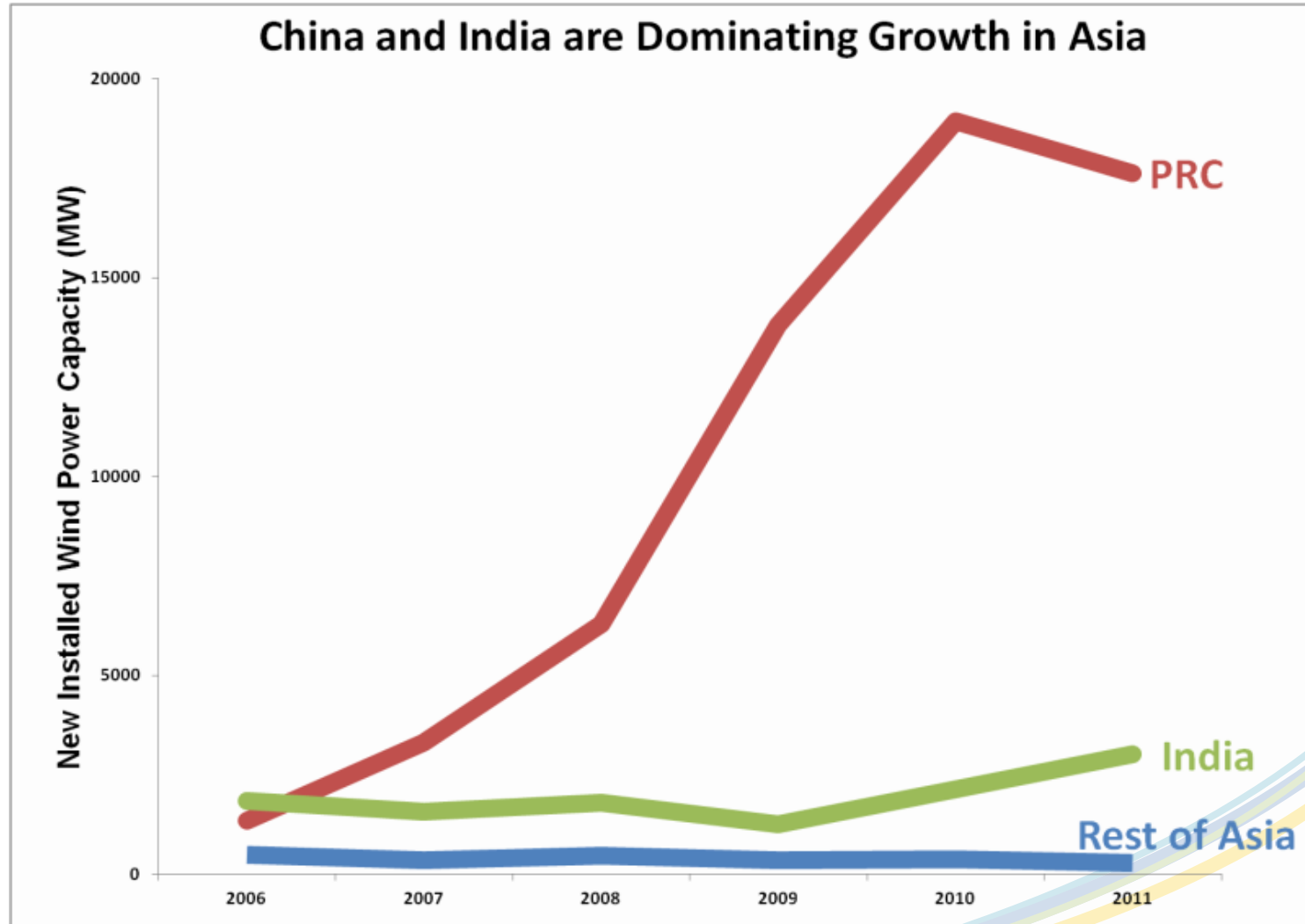
The Growth of Wind Energy in Asia

Wind development in Asia leads the world



The Growth of Wind Energy in Asia

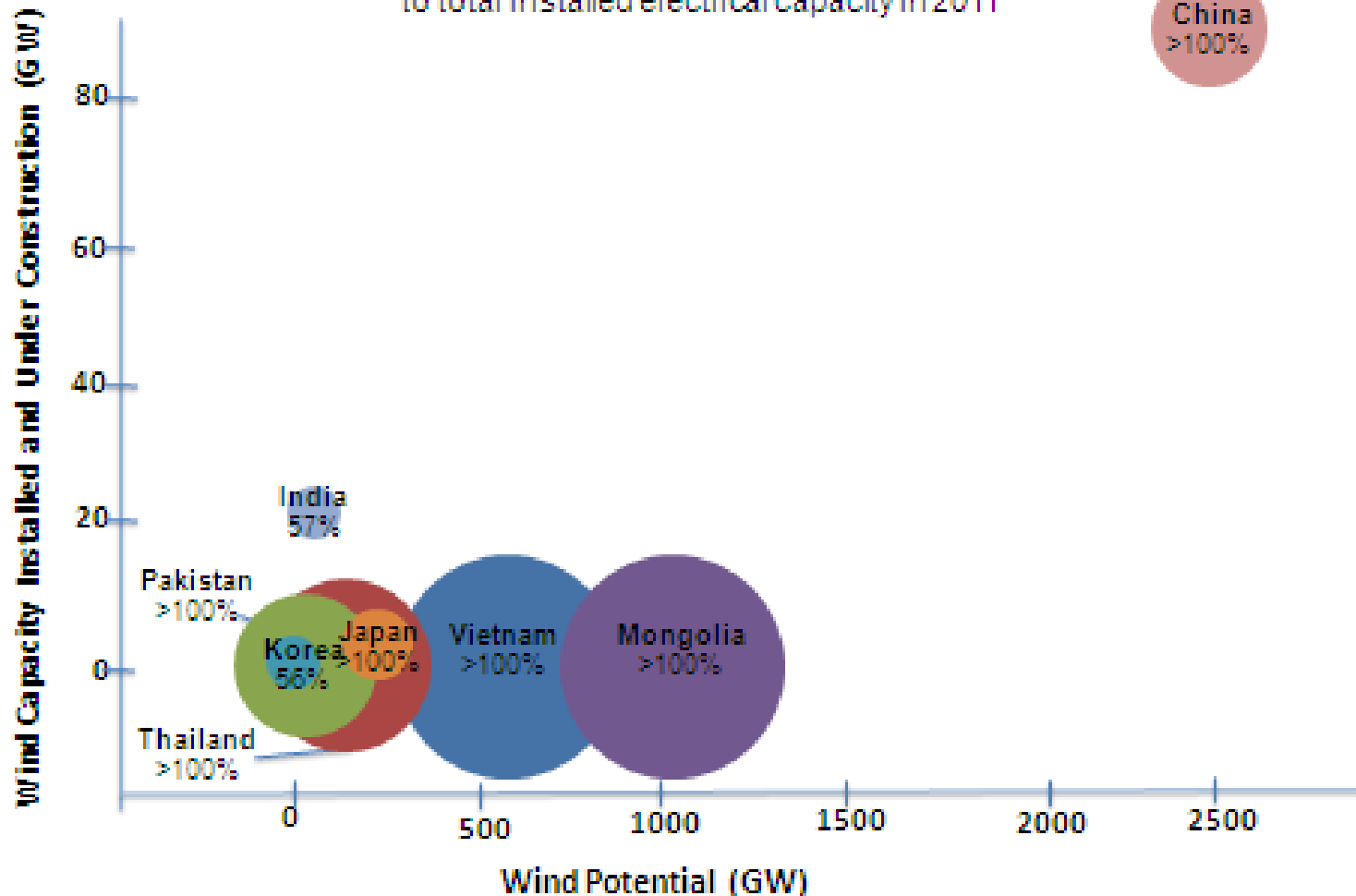
Wind development in China and India lead the world



Wind Potential in Asia and the Pacific

The Largest Potential Wind Resources in Asia

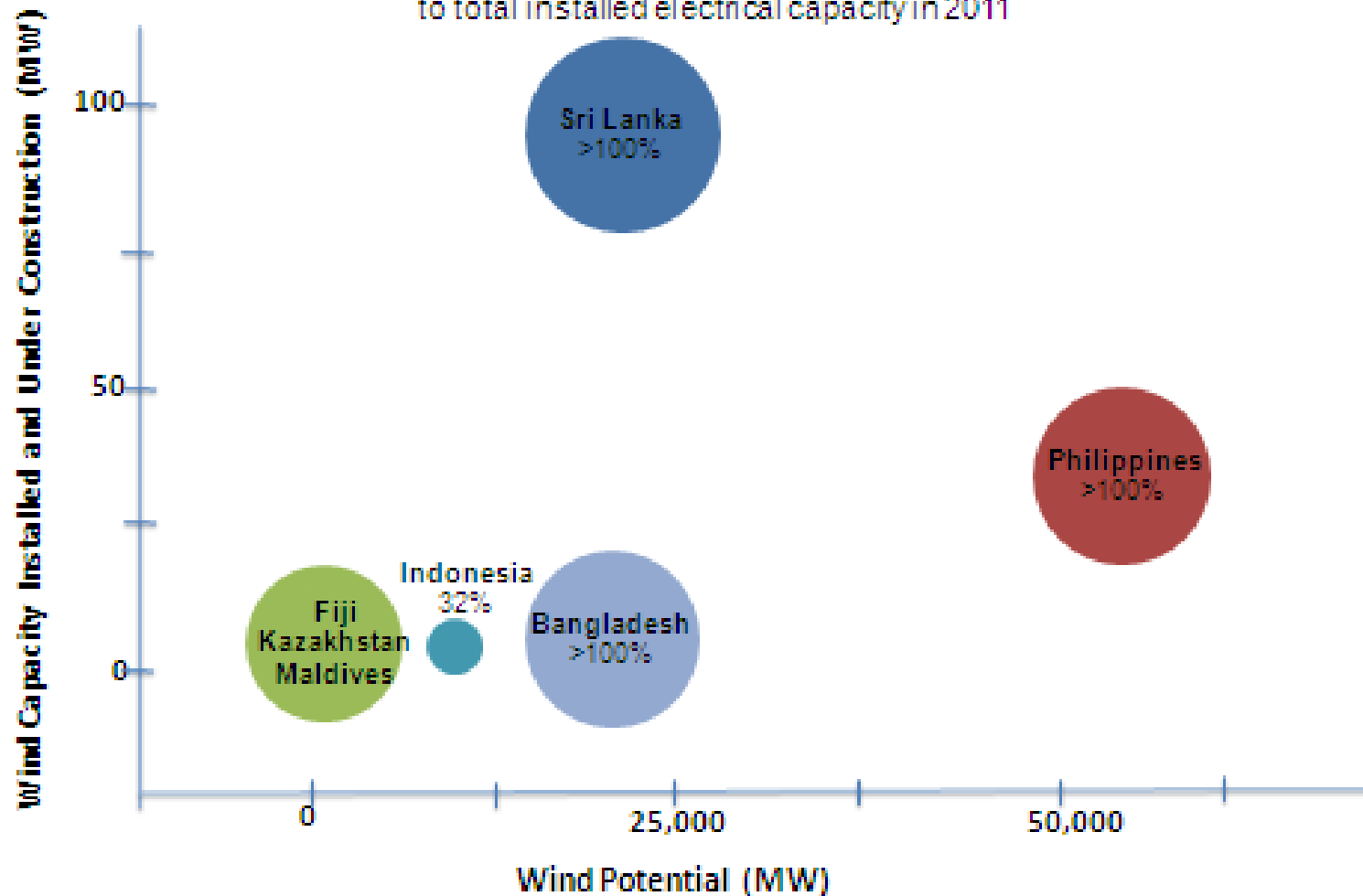
Circles represent the percentage of potential wind capacity to total installed electrical capacity in 2011



Wind Potential in Asia and the Pacific

The Rest of Asia: Poised for a Quantum Leap in Wind

Circles represent the percentage of potential wind capacity to total installed electrical capacity in 2011



Tariff Comparisons Across Asia

- It is like comparing Apples and Oranges
- Apples: Published feed-in tariff
- Oranges: Incentives—investment-based and generation-based
- Mangos: Income-tax benefit, sales-tax benefit
- Strawberries: Renewable portfolio obligations
- Grapes: Renewable energy credits
- Papaya: Wind regime
- Coconut: Capex and Opex of projects
 - Capex: \$1m/MW to \$2.4m/MW
 - Opex: 1.5c/kWh to 3c/kWh

Tariff Comparisons Across Asia

- Capex:
 - Cost of turbines
 - Cost of land
 - Cost of logistics
- Opex:
 - Cost of operations and maintenance
 - Interest rate
- Do not look at single fruit
- Compare the entire fruit basket



Tariff (in USD cents) Comparison

Country	Tariff	Comment
Afghanistan	?	
Bangladesh	? Adder	
China	7.8 - 9.7	Based on wind resource. 50% off VAT
Fiji	14	
India (old)	7 - 11	State specific. GBI: 1c, 80% AD in yr 1
India (current)	7 - 11	State specific. RPO: 1 to 12%
Mongolia	8 - 9.5	
Pakistan	17.5	Cost plus 17% ROE. USD based
Philippines (2005)	12	
Philippines (current)	15	GBI: Cash increment. Off-grid
Philippines (proposed)	22.5	
Sri Lanka (current)	19.5	Flat or 3-tier (1-8, 9-15, 16-20)
Sri Lanka (proposed)	15	
Thailand	8.6 + 11.7	No tax yrs 1-8; 50% exemption yrs 9-12
Vietnam	7.8	Credit guarantee, Land fee, IT reduction

Summary Data: Wind Development

Country	Installed (MW)	Under Construction (MW)	Pipeline (MW)	Potential (MW)	Projected in 5 years (MW)	Investment in 5 years Millions USD
Afghanistan	0.4			158,000	20	50
Bangladesh	2	-	50 - 200	20,000	200	400
China	62,360	1,213	18,339	2,590,000	90,000 to 100,000	100,000 to 120,000
Fiji	10			110	20	50
India	17,372	3,400	48,000	100,000	25,000 to 30,000	30,000 to 36,000
Mongolia	1	100		1,100,00	500	1,000
Pakistan	6	100	556	80,000	1,000	2,000
Philippines	33	-	324	55,000	400	800
Sri Lanka	30	60	100	20,740	300	600
Thailand	7	207	1,000	190,000	1,000	2,000
Vietnam	30	99		642,000	500	1,000
Total					119 - 140 GW	\$138 - \$168B

Investment in Asia

Highlighting in-country investments

- 70% to 75% of Capex is wind turbine cost
 - 11% is tower cost
 - 8% is transportation cost
- 30% to 25% of Capex is Balance of plant cost
 - ~ 10% is construction cost:
 - Foundation, roads, civil works
 - ~ 3 to 5% is transmission cost
 - 6 to 7% is labor costs
 - 3 to 5% is engineering costs
 - 2 to 5% financing and other costs

