



Developing Renewables In Southeast Asia

ASIA GREEN CAPITAL PARTNERS
Presentation ACEF 2016



1 Introduction

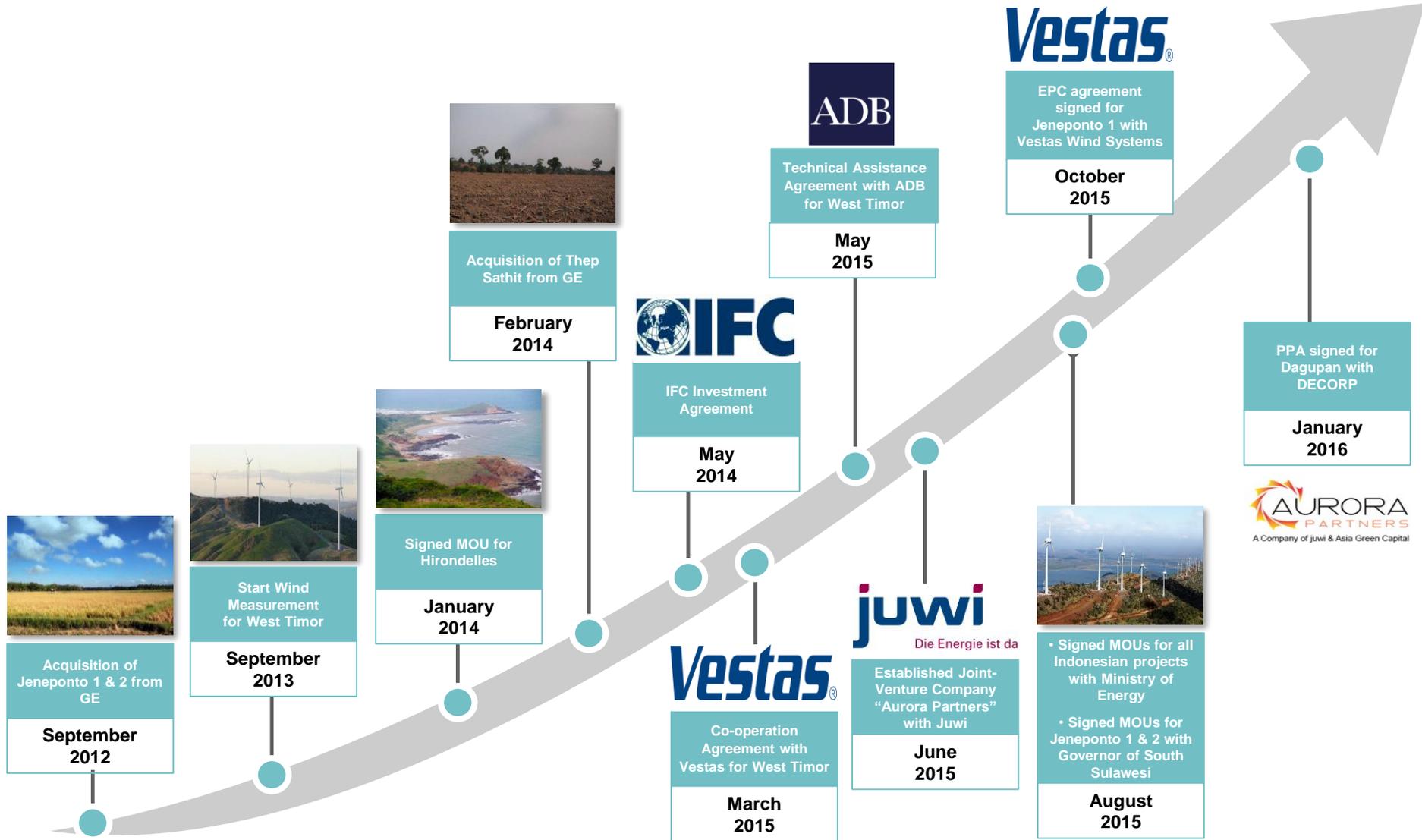
Introduction

ASIA GREEN CAPITAL

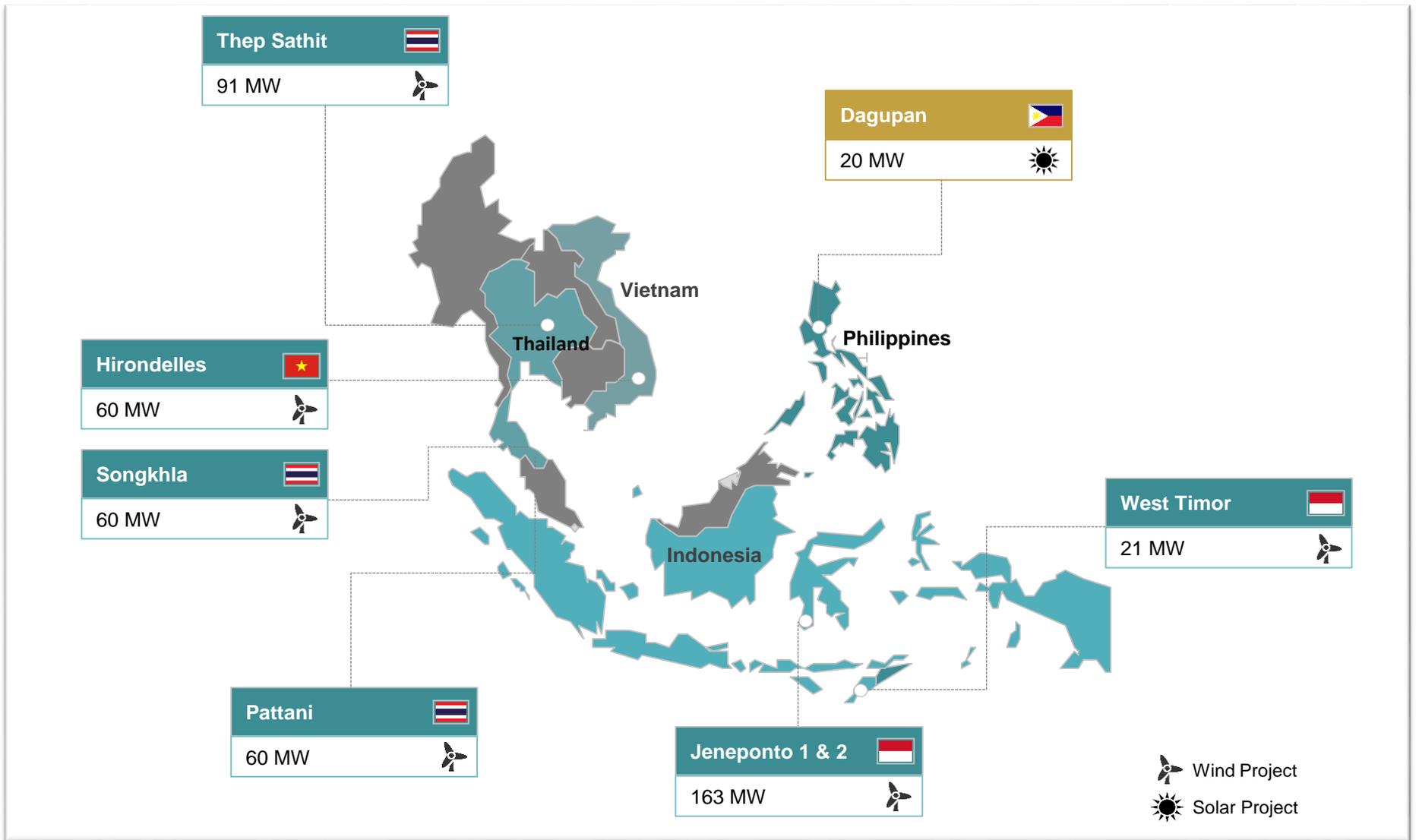


- Developing renewable energy projects in Indonesia since 2012
- Renewable Energy Platform
 - Asia Green Capital Partners is one of the first pan-ASEAN renewable energy development companies.
 - Indo Wind Power Holdings is developing 3 wind projects in Indonesia with combined capacity of 183 MW.
 - Thai Wind Power Holdings is developing 3 wind projects in Thailand with combined capacity of 210 MW.
 - Aurora Partners – A joint-venture with Juwi AG which serves as a solar project development platform across Southeast Asia.
 - Aurora Partner is developing a solar project in the Philippines with a capacity of 20 MW.
 - Additional projects under development in Philippines and Vietnam.
- Strategic Partners
 - IFC / World Bank Group
 - Asian Development Bank
 - Juwi AG
 - Vestas Wind Systems

Company History



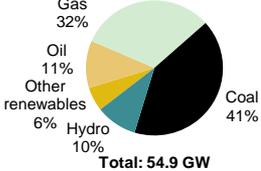
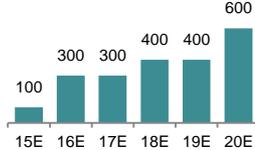
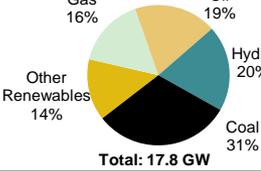
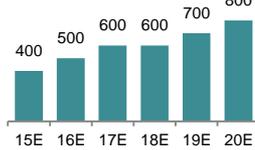
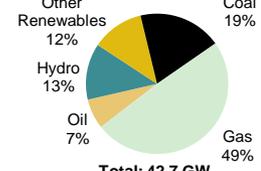
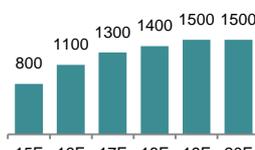
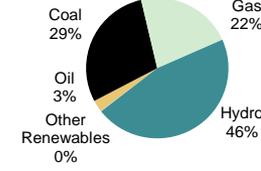
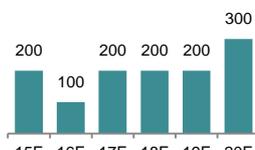
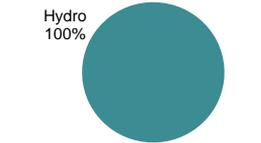
Project Locations





2 Regional Overview

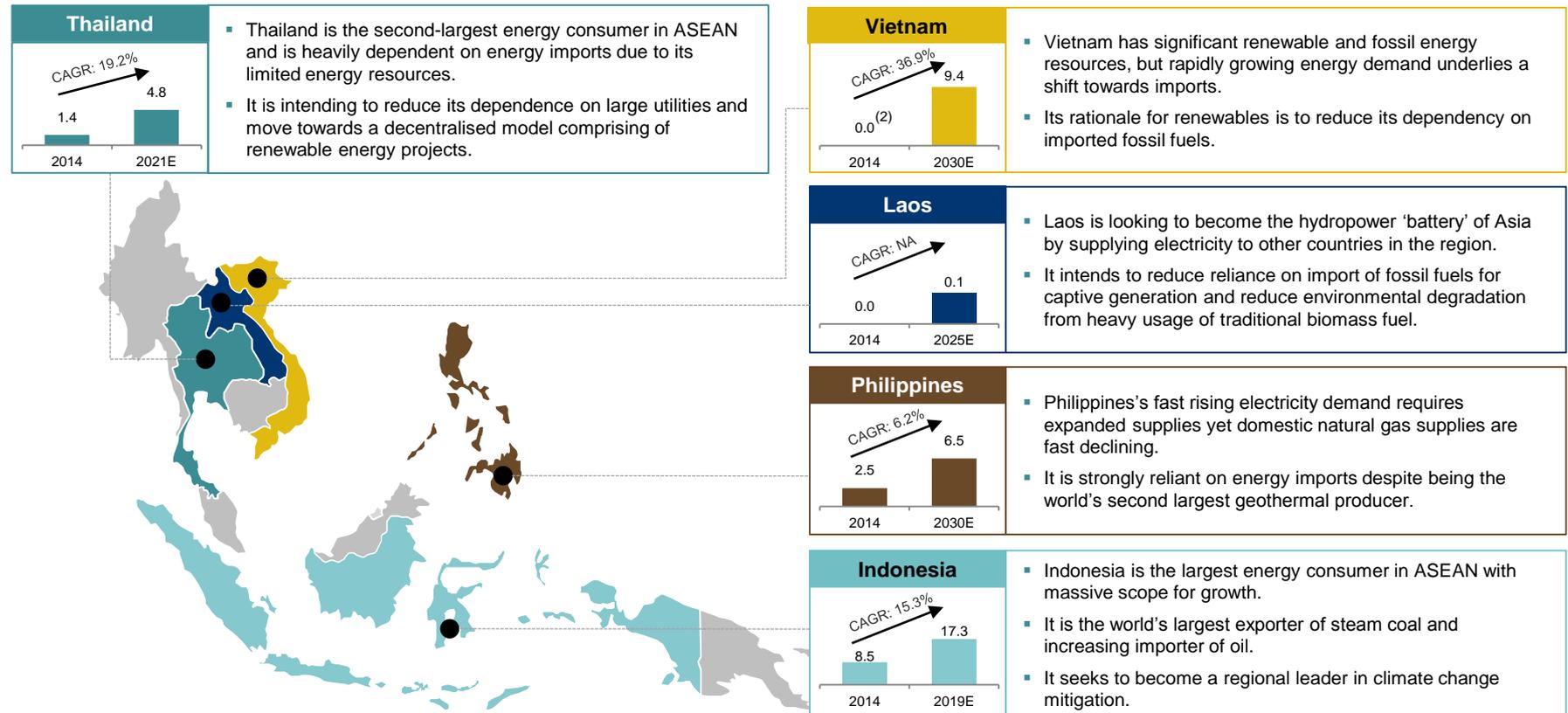
Market Overview

Country	Electricity Mix and CY14 Installed Capacity	Electricity Market Growth ⁽¹⁾	Rationale for Renewables	Policy Support	Government Target	Forecast Annual RE Capacity Additions (MW)
 Indonesia	 <p>Total: 54.9 GW</p>	10.3%	<ul style="list-style-type: none"> Seeking to become a regional leader on climate change mitigation. Undeveloped renewables potential of 95%.⁽²⁾ 	<ul style="list-style-type: none"> Feed-in tariffs ("FiT") have recently been introduced for solar and mini-hydro. FiT for wind expected in the near term. 	<ul style="list-style-type: none"> Targets 25% share of renewable energy for recently announced 35,000 MW program.⁽³⁾ 	
 Philippines	 <p>Total: 17.8 GW</p>	2.7%	<ul style="list-style-type: none"> Decreasing domestic natural gas supply. Highly vulnerable to climate change. 	<ul style="list-style-type: none"> FiT regime introduced. Duty-free import of renewable-related equipment for 10 years. Income tax holiday for 7 years. 	<ul style="list-style-type: none"> Renewable energy target of 50% of installed capacity by 2030 (current: 34%). 	
 Thailand	 <p>Total: 42.7 GW</p>	4.3%	<ul style="list-style-type: none"> Large importer of energy. Keen to reduce dependence on large utilities and shift to decentralised model comprising more renewable energy. 	<ul style="list-style-type: none"> FiT of USD 0.17 / kWh⁽⁴⁾ for wind projects. FiT of USD 0.16 / kWh for solar projects. 	<ul style="list-style-type: none"> Aims for an additional 3 GW of solar capacity and 1.8 GW of wind capacity by 2021 (current solar capacity of 1.2 GW and wind capacity of 0.2 GW). 	
 Vietnam	 <p>Total: 33.8 GW</p>	13.4%	<ul style="list-style-type: none"> Reduce dependence on imported fossil fuels. Highest wind energy potential in mainland Southeast Asia (c.24 GW). 	<ul style="list-style-type: none"> Current tariff of USD 0.08 / kWh for wind. Favourable revision to wind tariff (USD 0.10-0.12 / kWh) expected. Income tax holiday for 4 years and 50% tax credit for another 9 years. 	<ul style="list-style-type: none"> Non-hydro renewable energy target of c.9% of installed capacity by 2030 (current: 0.1%). 	
 Laos	 <p>Total: 3.2 GW⁽⁵⁾</p>	17.1%	<ul style="list-style-type: none"> MOU signed for export of 7 GW to Thailand by 2020. Potential for wind energy generation in central provinces (c.3 GW). 	<ul style="list-style-type: none"> Duty-free import of renewable-related equipment. Up to 75 years lease term for enterprise construction land. 	<ul style="list-style-type: none"> Targets to develop 650 MW of small hydropower capacity and a number of wind power projects by 2025. 	Not available

Market Overview

- Southeast Asia faces a substantial increase in energy demand resulting from its rapid economic growth.
 - The development of renewable energy resources remains relatively subdued and differs significantly among different nations.
 - However, nations are increasingly focusing on renewables in order to reduce their dependence on fossil fuels and ensure a more sustainable power supply.
- The draft ASEAN Plan of Action for Energy Cooperation (“APAEC”) 2016-20 envisions a collective target for renewable energy of 25% of total power capacity by 2020.

Current and Targeted Renewables Capacity (GW)



Thailand

Rationale	<ul style="list-style-type: none"> ▪ Thailand is the second-largest energy consumer in ASEAN and is heavily dependent on energy imports due to limited energy resources. ▪ It intends to reduce dependence on large utilities and move towards a decentralized model comprising of renewable energy projects.
Wind Potential	<ul style="list-style-type: none"> ▪ Thailand has potential for 14 GW of wind power generation. ▪ Central, western and coastal regions of Thailand have been identified as potential sites. <ul style="list-style-type: none"> – Wind speeds estimated at 6.4 m / s at a height of 50m.
Target	<ul style="list-style-type: none"> ▪ The Thai government aims for an additional 4.8 GW by 2021. <ul style="list-style-type: none"> – As of 2014, Thailand had 0.2 GW of installed wind capacity.
FiT and Government Policy	<ul style="list-style-type: none"> ▪ Thailand has a FiT Program for renewable VSPPs⁽¹⁾ where a fixed amount per kWh is paid over 20 years. <ul style="list-style-type: none"> – The FiT rates comprise of a Base FiT rate and a FiT Premium, whereby the Base FiT rate will be increased after 2017 based on inflation. – Approved FiT rates for wind: USD 17 cents / kWh – The government has set up a Power Development Fund which allows the Energy Regulatory Commission to promote renewable energy from funds sourced through contributions⁽²⁾ from electricity industry licensees, fines and donations. – Licensees are required to send contributions to the fund during plant construction at a rate of USD 1,429 / MW / year and also during plant operation period⁽³⁾. ▪ The Board of Investment has also allowed an eight year corporate tax exemption for renewables-related manufacturing, consulting and installation of capacity. <ul style="list-style-type: none"> – Foreign companies that are considered to have made a ‘major investment’ receives a number of benefits, including permission to bring in foreign skilled workers, permission to own land and exemption on import duties.

Philippines

Rationale	<ul style="list-style-type: none"> ▪ Philippines' fast rising electricity demand requires expanded supplies yet domestic natural gas supplies are in rapid decline. <ul style="list-style-type: none"> – It intends to reduce reliance on energy imports.
Wind Potential	<ul style="list-style-type: none"> ▪ Philippine has potential for 70 GW of wind power generation. <ul style="list-style-type: none"> – This is based on conservative assumptions of 7 MW / sq km. – Good location on the fringes of the Asia-Pacific monsoon belt. ▪ The wind industry is presently underdeveloped with many of best possible wind sites located far from population centers.
Target	<ul style="list-style-type: none"> ▪ The government aims to increase renewable energy-based capacity to c.50% of installed capacity by 2030 (currently 20%) and to become a leading wind power producer in Southeast Asia.
FiT and Government Policy	<ul style="list-style-type: none"> ▪ Approved FiT Rate for wind: USD 16 cents / kWh ▪ Chapter VII of the Renewable Energy Act provides for a number of incentives for achieving renewable energy targets. <ul style="list-style-type: none"> – These include income tax holiday, corporate tax rate of 10%, accelerated depreciation and duty-free importation of renewable energy-related equipment for 10 years.

Vietnam

<p>Rationale</p>	<ul style="list-style-type: none"> ▪ Vietnam has significant renewable and fossil energy resources but rapidly growing energy demand underlines a shift towards imports. <ul style="list-style-type: none"> – It is looking to reduce dependency on imported fossil fuels.
<p>Wind Potential</p>	<ul style="list-style-type: none"> ▪ Reports by DLA Piper and AWS Truepower estimates that Vietnam has potential for 24 GW of wind power generation. <ul style="list-style-type: none"> – This is based on Vietnam’s 3,500 km coastline and high wind speeds averaging more than 6.0 m / s. – It has greater wind power generation potential along its coast as compared to Thailand, Laos and Cambodia.
<p>Target</p>	<ul style="list-style-type: none"> ▪ Power Development Plan 7 targets non-hydro renewables to comprise c.9.4% of total installed capacity by 2030 (c.14 GW of non-hydro renewables capacity), with a targeted wind power capacity of 6.2 GW by 2030. <ul style="list-style-type: none"> – In 2014, Vietnam had 45 MW of installed non-hydro renewables capacity.
<p>FiT and Government Policy</p>	<ul style="list-style-type: none"> ▪ Vietnam introduced a feed-in tariff framework for wind generated power in 2011. <ul style="list-style-type: none"> – It comprises of 2 parts: fixed purchase price of USD 6.8 cents / kWh from wind power purchasers and USD 1.0 cents / kWh subsidy financed from state budget through the Environment Protection Fund⁽²⁾. – The tariff for wind is currently under revision and government is expected to announce a more favourable wind tariff of USD 10 - 12 cents / kWh. ▪ The government has also introduced other policy supports for the renewables industry. <ul style="list-style-type: none"> – 100% corporate tax exemption for the first four years and 50% corporate tax exemption for the next nine years. – Tax and land use fee exemption for renewable energy projects; import tax exemptions for renewables-related equipment which cannot be produced inland.



3 Indonesia

Overview

<p>Rationale</p>	<ul style="list-style-type: none"> ▪ Indonesia is the largest energy consumer in ASEAN with massive scope for growth. <ul style="list-style-type: none"> – It seeks to become a regional leader in climate change mitigation.
<p>Wind Potential</p>	<ul style="list-style-type: none"> ▪ Global Atlas of the International Renewable Energy Agency has estimated Indonesia's potential for wind power generation at 10 GW. <ul style="list-style-type: none"> – Wind speeds of over 7 m / s at 80m height have been measured in Sumatra, West Timor and Sulawesi. – Additionally, other regions have measured wind speeds of over 6 m / s at 80m height. ▪ Wind power opportunities in other locations are likely limited to small or medium-sized projects requiring lower wind speeds.
<p>Target</p>	<ul style="list-style-type: none"> ▪ Indonesia recently announced a 35 GW program⁽¹⁾, where the government is targeting an additional 8.8 GW of new and renewable capacity to be built by 2019. <ul style="list-style-type: none"> – In 2014, renewable energy comprised 16% of installed capacity.
<p>FiT and Government Policy</p>	<ul style="list-style-type: none"> ▪ The government introduced a solar auction policy in June 2013 in which PLN is obliged to purchase solar electricity from solar PVs of between 1 – 6 MW at a ceiling price of USD 25 cents / kWh (USD 30 cents / kWh for projects using at least 40% local solar equipment). <ul style="list-style-type: none"> – The solar PV regulation is currently under revision and a new regulation will be issued. ▪ In May 2014, the government approved a c.64% raise to FiTs for small hydropower projects. <ul style="list-style-type: none"> – PLN obliged to purchase electricity from hydro projects under 10 MW. ▪ Other policy supports for renewables include corporate tax reduction of up to 30% of investments (5% each year for 6 years), lower tax tariffs for dividends, accelerated depreciation and renewables-related equipment to be exempt from value-added tax and import duties.

Market Opportunities

WIND RESOURCES

- Good to very good in certain areas (up to 9 m/s at 100hh)
- Potential for off-grid diesel replacement projects
- Larger rotors will unlock a growing number of opportunities

ENERGY OVERVIEW

- Only 73% of population has access to electricity
- Primary energy mix 2012: 36% oil, 27% coal, 23% Gas, 14% renewables (hydro, geothermal, solar, small biomass)

ENERGY SUPPLY-DEMAND

- 7% electricity sales growth since 2002, expected to remain at same pace
- Supply growth has been lower than demand growth

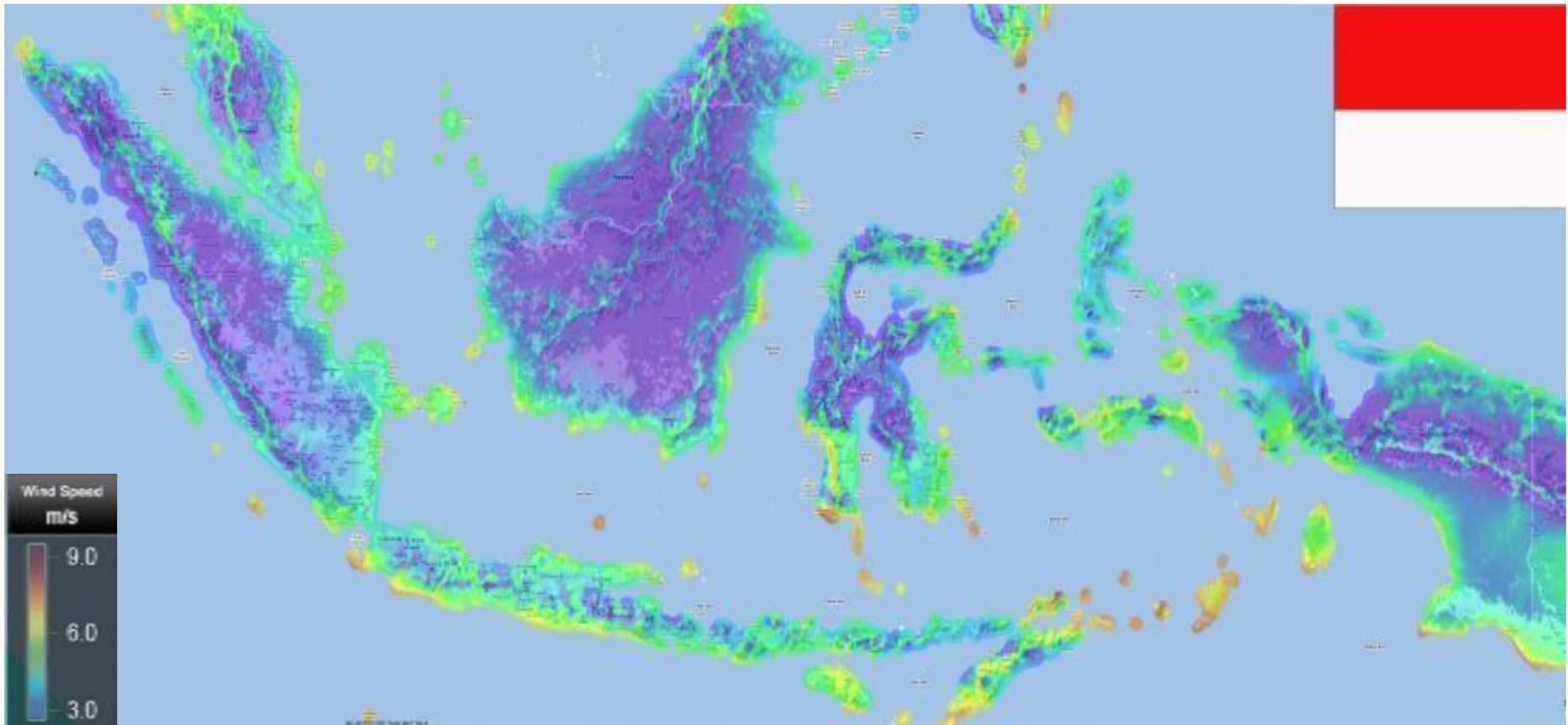
GOVERNMENT SUPPORT

- 2025 Target: coal 30%, oil 25%, renewable 23%, gas 22%
- Low wind targets: 130 MW by 2018

HIGH DEVELOPER INTEREST

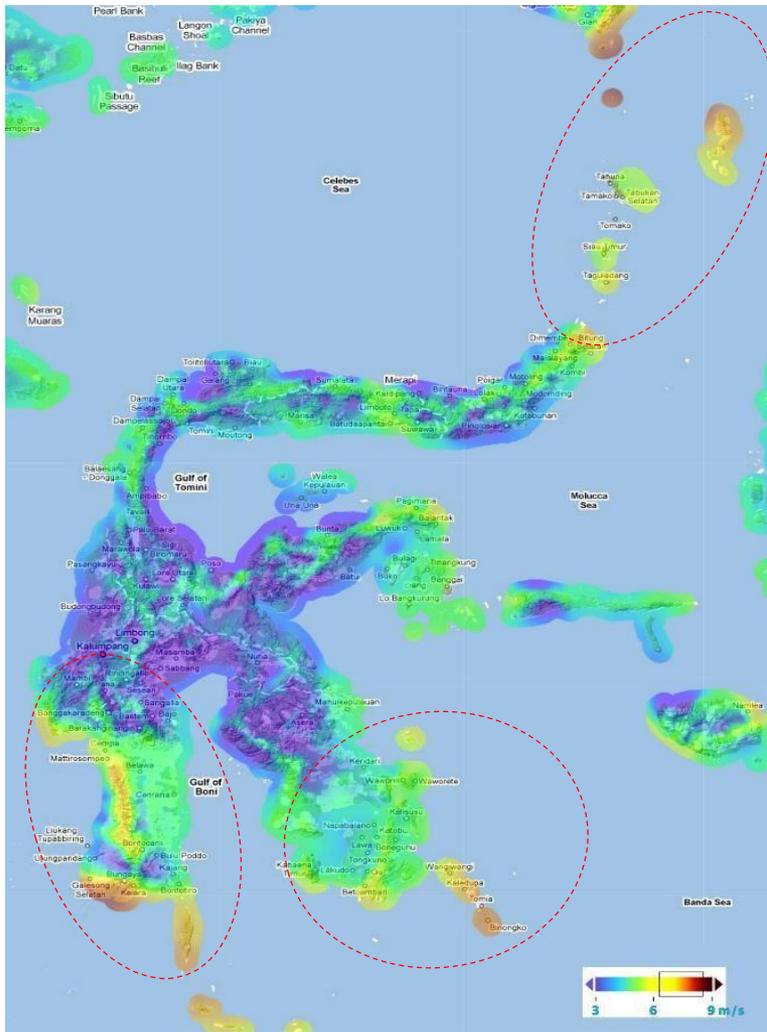
- Good sites being developed by professional developers
- Increasing interest of financiers
- Projects are getting on PPA negotiations and lack of FiT

Wind Resource Map



Source: 3TIER Services Global Wind Dataset
(80 m Height, 5 km Resolution)

Sulawesi

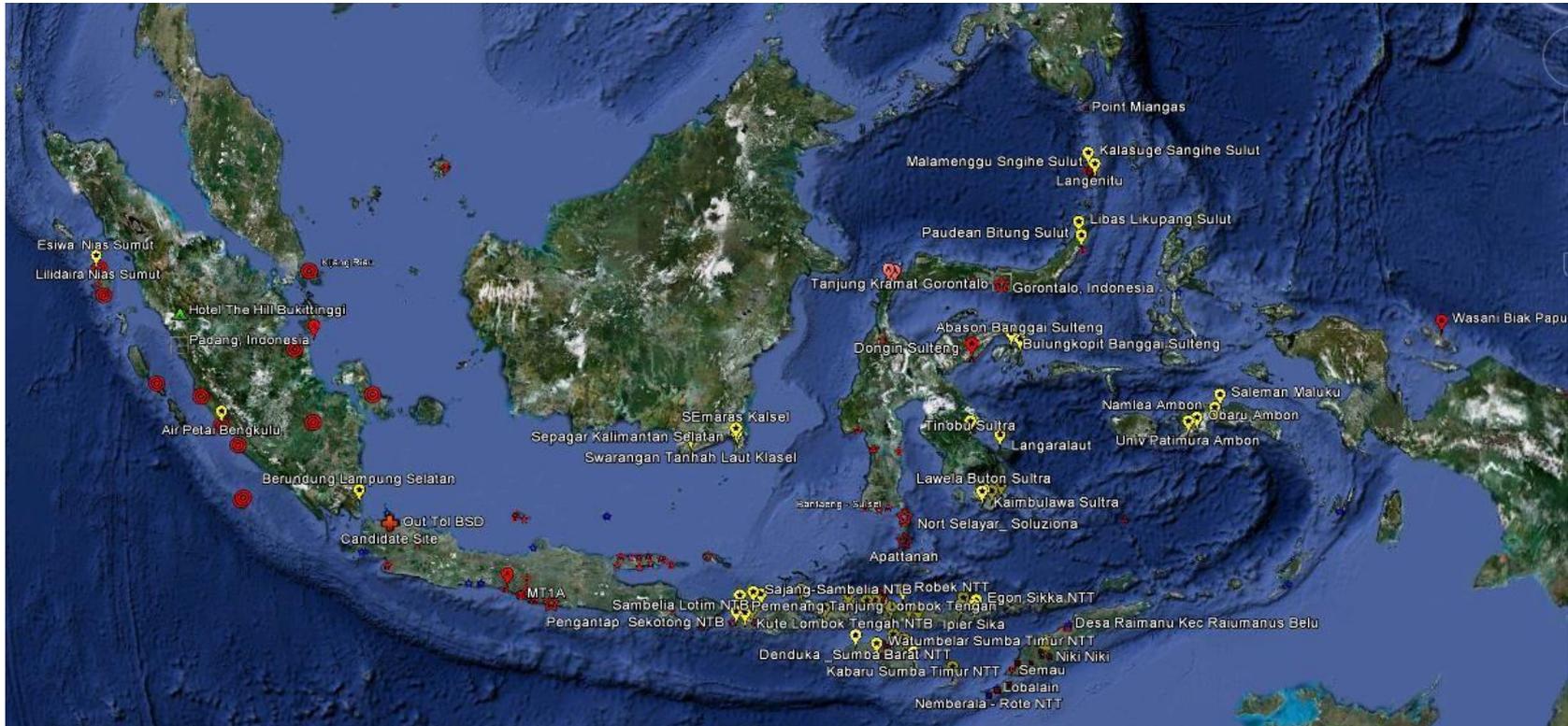


- North Sulawesi
- Gorontalo
- South Sulawesi
- South East Sulawesi

Wind Data Status

- Wind Measurement in Indonesia:
 - Conducted by Indonesian government through Ministry of Energy and Mineral Resources (MEMR) and National Institute of Aeronautics and Space (LAPAN) for over 130 sites.
 - Conducted by other agencies such as Wind Guard, Winrock, European Union and World Bank for 36 sites.
 - A mesoscale wind resource map for Indonesia was developed by EMD International A/S, Denmark in partnership with Environmental Support Programme the Ministry of Energy and Mineral Resources.
- Secondary data data from is available from companies such as BMKG , WMO , NCDC , 3TIER , Truepower and others.
- Out of the 166 sites, 35 sites have the best potential for wind power development.
- There is ongoing measurement for 20 new and validation sites by several companies and institutions.
- Existing Wind Map by NREL- USA : Sumba and Timor Islands.

Sites for Wind Measurement



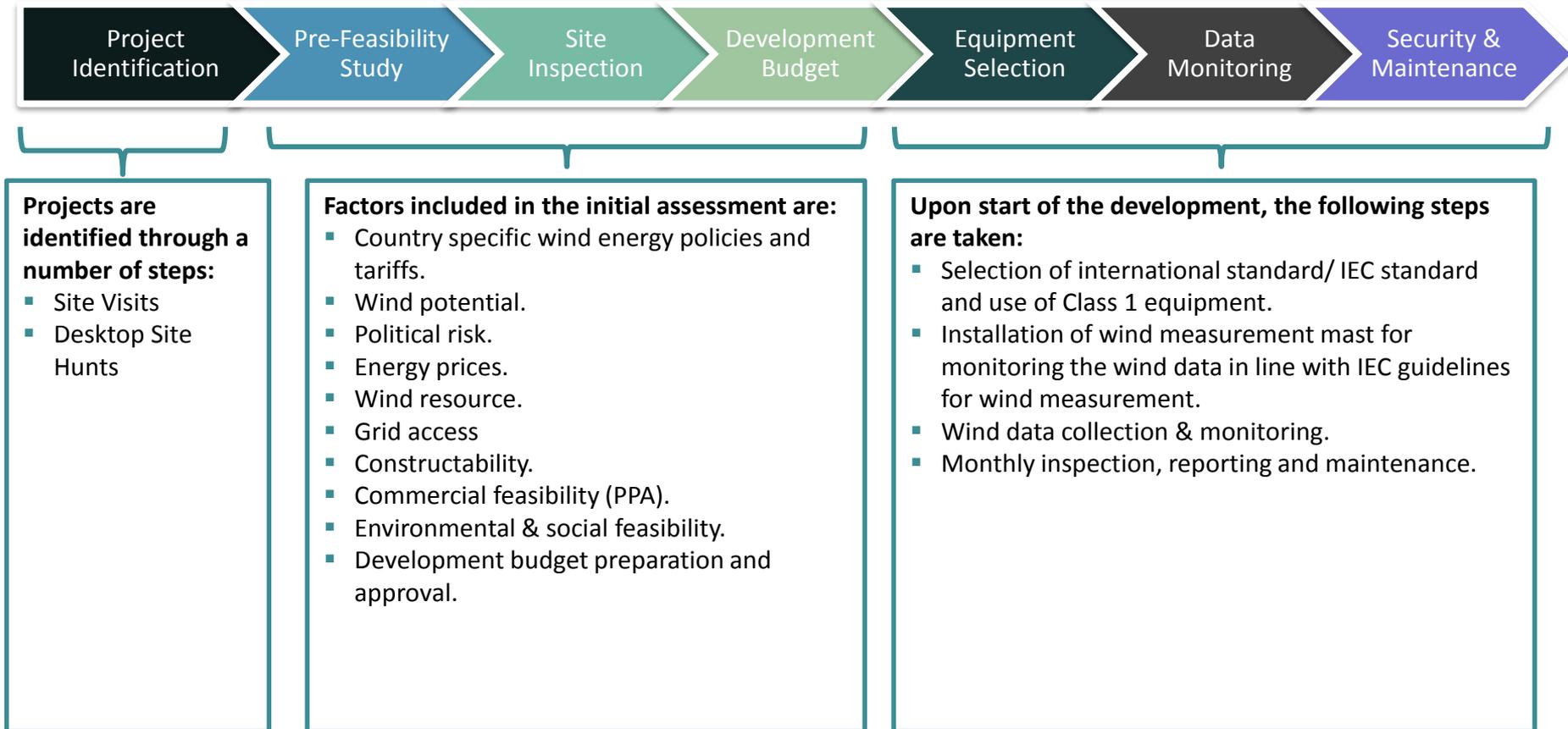
1	Sumatera	18 sites	5	Nusa Tenggara Timur	54 sites
2	Jawa	37 sites	6	Maluku	8 sites
3	Kalimantan and Sulawesi	38 sites	7	Papua	2 sites
4	Bali and NTB	15 sites		Total Sites	166 sites

Source: WHyPGen Report

A vertical collage of three images related to renewable energy. The top image shows a wind turbine against a cloudy sky. The middle image shows a close-up of solar panels with a bright sun flare. The bottom image shows a hydroelectric dam with water cascading over its spillway.

4 Site Selection

Criteria for Site Selection



Key Considerations

Project Capacity	Large projects have considerable economies of scale in project development costs, capex per MW and O&M costs per MW
Funding	Non-recourse bank financing requires higher development costs and running costs, but significantly reduces investor risk and therefore cost of capital.
Site	The costs can differ based on the exact location and accessibility of the site.
Wind Resource	A site with good wind resource can afford higher costs.
Additional Requirements	Land, Grid Connection, Construction, etc.
Conclusion	Costs are highly dependent on the individual project and change over time.



5 Project Financing

Financing Options

Corporate Financing

- Less complicated – relatively quick and easy.
- Balance sheet based financing – for sponsor that has existing business.
- Short tenor of around 5-7 years.

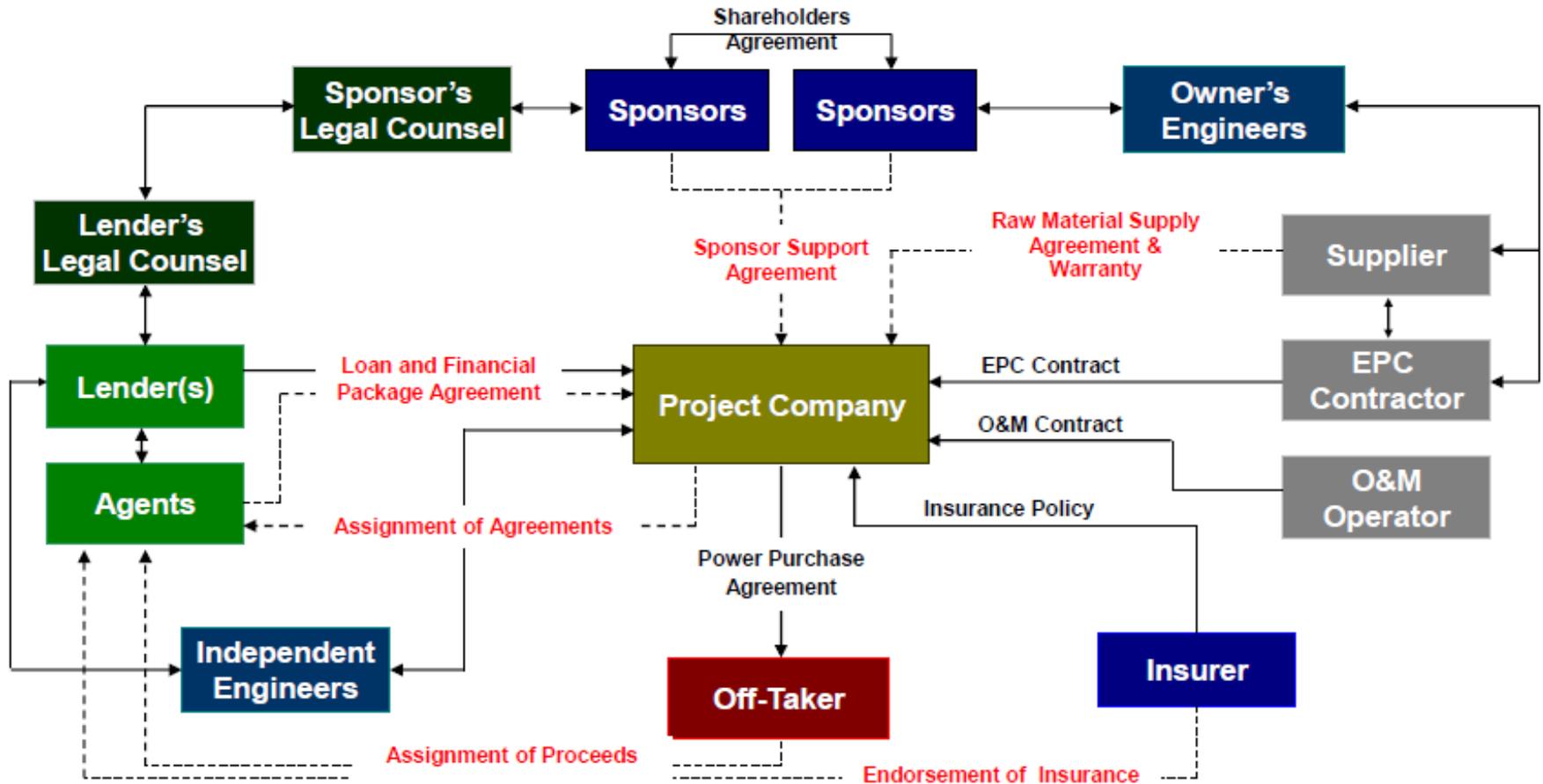
Project Financing

- Complicated and lengthy process.
- Project based financing.
- Under full control by lender (e.g. financial covenants, assignment of major project documents, share pledge and cash flow waterfall applications).
- Long tenor but unlikely to exceed 10-12 years.
- Relatively high transaction costs.

Capital Markets Instruments

- Examples are Green Bonds, Infrastructure Funds, IPO.
- However, scale is required for these type of instruments.

Typical (Project) Financing Structure

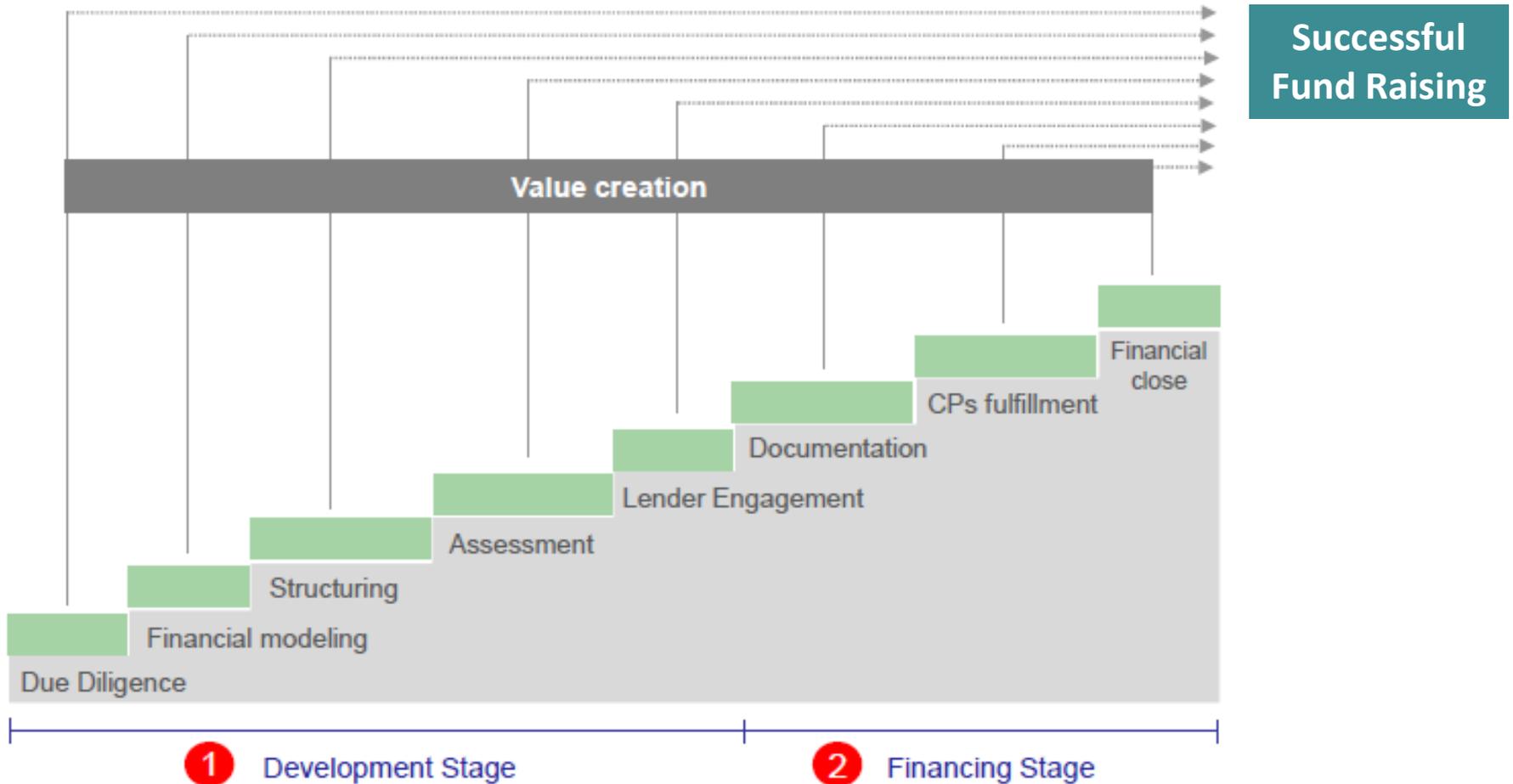


Key Role & Challenges of Project Parties

	Key Role	Key Challenges
Sponsors	<ul style="list-style-type: none"> Main contributor/conductor Key liaison party 	<ul style="list-style-type: none"> Ability to manage all parties Large capital investments
Lenders	<ul style="list-style-type: none"> Main source of funds Secured lending with strict covenants 	<ul style="list-style-type: none"> Conservative mindset Approval timeframe
Off-Taker	<ul style="list-style-type: none"> Main sources of revenue Project length determinant 	<ul style="list-style-type: none"> Regulatory framework Financial strength
EPC	<ul style="list-style-type: none"> Construction management Project performance 	<ul style="list-style-type: none"> Delays / Force Majeure Quality assurance
O&M	<ul style="list-style-type: none"> Operation/revenue management Maintenance program 	<ul style="list-style-type: none"> Human error Limited experiences for renewables
Advisors	<ul style="list-style-type: none"> Project feasibility and environmental review Technical contractual review 	<ul style="list-style-type: none"> Familiarity with technology Experience
Legal	<ul style="list-style-type: none"> Legal contractual review Legal validity and enforceability 	<ul style="list-style-type: none"> Complex contractual arrangements Due diligence timeframe
Insurance	<ul style="list-style-type: none"> Insurance adequacy review Claim Management 	<ul style="list-style-type: none"> Costs & benefits balance advises Limited experience within region

Project Financing – Completion Cycle

Value creation can be achieved throughout the fund raising process





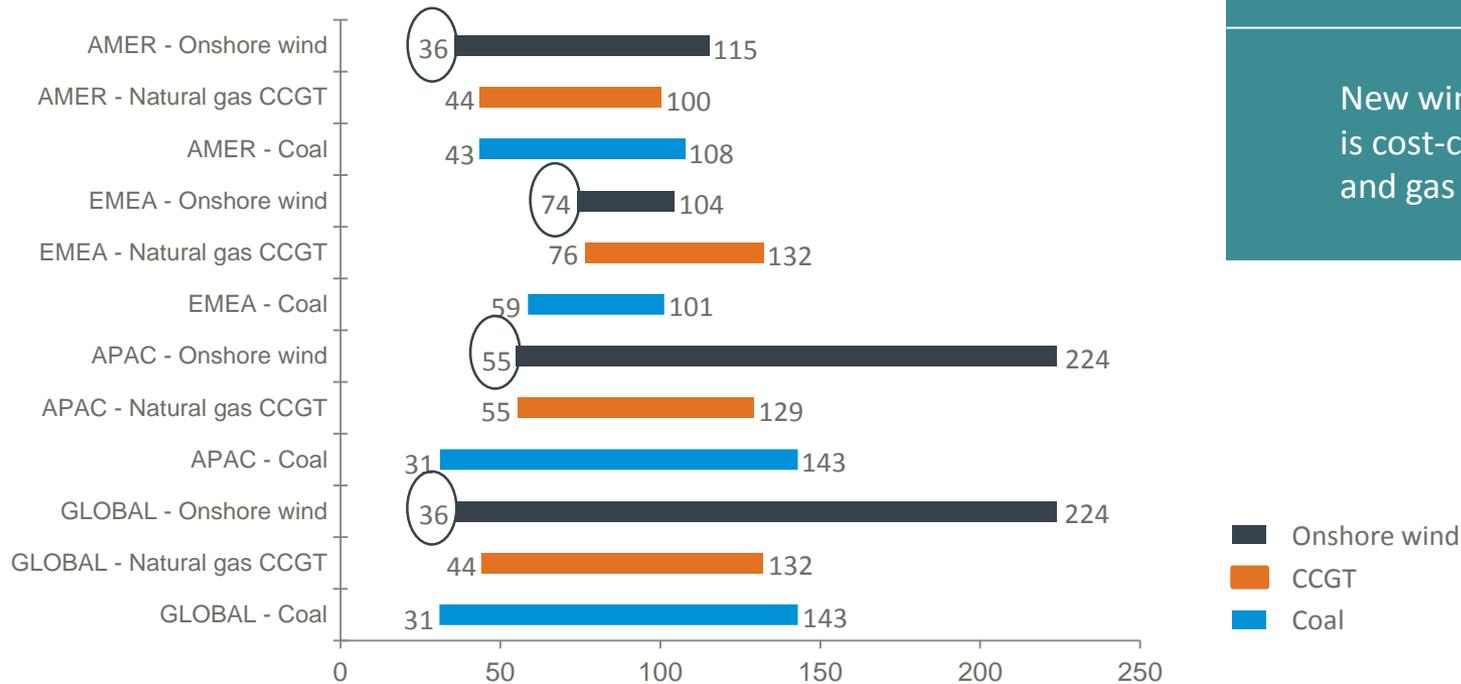
6 Conclusion

Wind as a Competitive Solution

Minimum LCoE of wind repeatedly below coal and gas

Current LCoE ranges

\$/MWh (nominal; excluding subsidies)



Key Takeaways

New wind – on global level – is cost-competitive with coal and gas already today.

Sources: BNEF, Fossil and Wind LCOE ranges by region, H1 2015; GLOBAL: BNEF, Levelised cost of Electricity update: H1 2015, 03/2015

Suggestions to accelerate wind in Indonesia

1

Implement the first FIT policy, and/or fast track first PPAs

2

Enhance wind competences and understanding within the Ministry of Energy and PLN (central and regional offices)

3

Increase existing renewable energy targets

4

Streamline permits and licensing processes of national government agencies and local government units

5

Improve and upgrade existing transmission lines