ESMAAP Workshop
Development of a Wind Energy Project
Case Study:
Indowind/ PT. Energi Angin Indonesia

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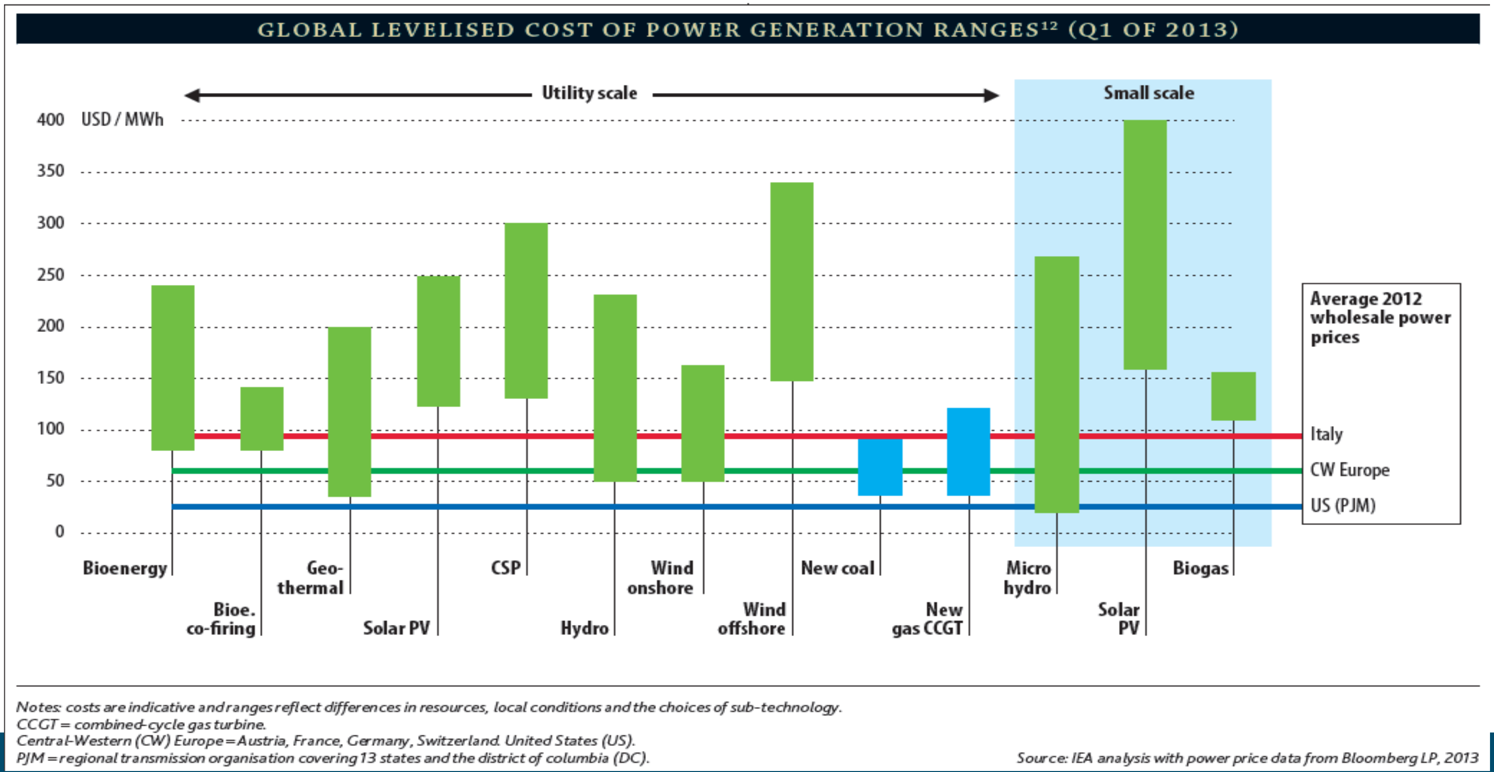
Wind Power Industry

- Wind power is now seen as a fully proven and bankable technology with a 320 GW installed capacity (end of 2013)
- While in most developed countries the best sites have already been developed, a huge potential remains in the rest of the world leading to strong growth prospects for the coming 5 years
- The levelised cost of generation of wind energy has been dropping over time as well making it an interesting resource



Source: GWEC

Current RE Fiscal Regimes/ Incentives

	REGULATORY POLICIES						FISCAL INCENTIVES				PUBLIC FINANCING	
	Feed-in tariff (incl. premium payment)	Electric utility quota obligation/ RPS	Net metering	Biofuels obligation/ mandate	Heat obligation/ mandate	Tradable REC	Capital subsidy, grant, or rebate	Investment or production tax credits	Reductions in sales, energy, CO_2, VAT, or other taxes	Energy production payment	Public investment, loans, or grants	Public competitive bidding
LOWER-MIDDLE INCOME COUNTRIES												
Armenia	●											
Bolivia									●			
China	●	●		●	●		●			●	●	●
Ecuador	●											
Egypt							●		●		●	●
El Salvador								●	●	●	●	●
Guatemala			●					●	●			●
Honduras	●							●	●			●
India	●	●		●		●	●	●	●		●	●
Indonesia	●						●	●	●		●	●
Jordan			●						●			
Marshall Islands									●			
Moldova	●								●		●	
Mongolia	●											●
Morocco											●	
Nicaragua	●							●	●			
Pakistan			●				▲				●	
Palestinian Ter.*									●			
Philippines	●	●	●	●			●	●	●	●	●	●
Sri Lanka	●											
Thailand	●			●							●	
Tunisia							●		●		●	
Ukraine	●											
Vietnam							●	●	●			

Source: KPMG: Taxes and Incentives for Renewable Energy 2012

Principal Risks and Mitigants

Funding Follows Quality Cash Flow

- Lenders & Investors seek quality cash flows.
- Quality cash flows produce stable margins, robust debt service coverages and leverage.
- Stable cash flows produced by appropriate structuring, risk identification and allocation.
- Due diligence and contractual structuring facilitate appropriate risk allocation.

Risk Identification and Allocation

- Lenders look for stable cash flows. Identify risks by asking how could the project fail?
  - Completion
  - Operating
  - Technology
  - Revenue
  - Tax & Political Risks
  - Change of Law

- This list is not nearly exclusive
- Seek to reduce collective risk of the structure
- Efficient structuring allocates risk to best able to bear or control

Completion Risk

Risk project is not completed on time, on budget and capable of operating as expected.

- Traditional Completion Risk Mitigants
  - Site Control
  - Turnkey Contracts
    - Proven creditworthy contractor
    - Fixed cost, date certain and scope
    - Liquidated damages
    - Performance bonds/retainage
  - Proven Technology and Designs
  - Due Diligence
  - Insurance
  - Contingency Amounts

Wind Project Completion Risk Issues

- Site control
- Permits
  - Possible Delay - NIMBY
  - Environmental and Regulatory
- No wraps for wind projects
  - TSA/BOP Installation
- Suppliers strike back
  - Availability & Cost
  - Down Payments
  - Delivery Flexibility
  - Warranties

Wind Project Completion Risk Issues (cont'd)

- Tightly crafted Supply & Installation
  - Proven contractor and design
  - Fixed cost/scope/schedule
  - Liquidated damages - cover loss revenues/debt service/PTCs?
  - Credit issues with contractors performance bonds/retainage/LOCs/ guarantees
- Liability caps
- Warranty terms significantly affecting the bottom line
- Qualifying for PTC and other Incentives
- Interconnection upgrades

Investor Completion Risk Mitigants

- Independent Engineers
- Sponsor guarantors
- Government guarantors
- Funded reserves or security and budget contingencies to fund cost overruns and completion costs
- Sufficient equity and contingent equity
- Completion tests that demonstrate physical, legal, financial, operational completion
- Legal Opinions

Operating Risk

The risk that the project, once complete, will not perform as expected. Mitigated by:

- experienced, creditworthy operator
- safety, security and environmental safeguards
- permits
- perform PPA and interconnection agreements
- incentives for good performance
- O&M reserves
- insurance
- equipment & service warranties
    - Link to PPA capacity & performance standards to supplier warranties

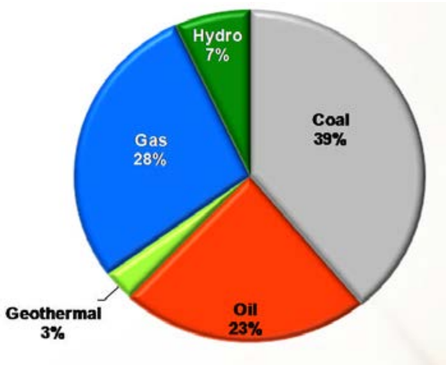
Revenue Risk

- The risk that the project will not have adequate cash for debt service, costs and return to sponsors.
  - Resource
    - Wind Resource
    - Technology
    - Market and Engineer Studies
    - Interconnection Studies
  - PPA/Firm Offtake - Term
    - As available, must take
    - Energy Only, usually RECs
    - Pricing fixed (with escalator) or, less favorable, indexed to gas/power markets
    - Capacity payment rare if not dispatchable

Revenue Risk (cont'd)

- Major Issues
  - Changes in Markets
  - Output Guarantees
  - Credit Support
- Major Issues – Wind
  - Transmission
  - Scheduling
  - Curtailment

Indonesian Electricity Market Snapshot



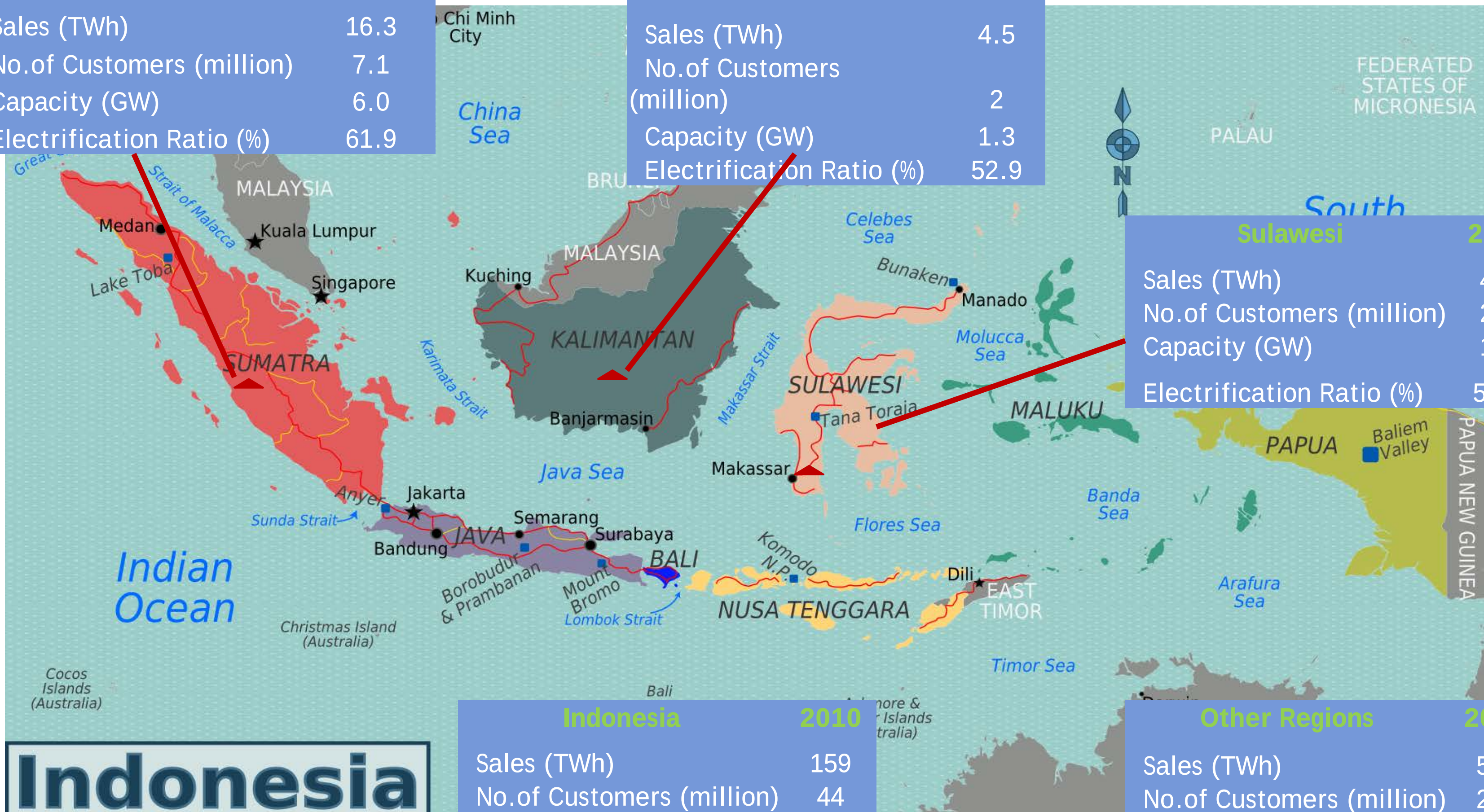
Electricity Mix.
Source: Ministry of Energy & Mineral Resources

- Indonesia currently has over 33 GW of electricity generating capacity installed of which 79% is operated by state-owned power company PLN, 18% by independent power producers (IPP) and 3% by Private Power Utilities (PPU).
- Only around 10% of the installed capacity is renewable, consisting mainly of hydro power (7%) and geothermal (3%).
- The remaining 90% consists of coal (39%), gas (28%) and oil / diesel (23%).
- Electricity demand until 2029 is projected to grow by 9.5% per year, translating into a need for additional capacity of 156 GW until 2029.

Indonesian Electricity Market

Sumatera	2010
Sales (TWh)	16.3
No.of Customers (million)	7.1
Capacity (GW)	6.0
Electrification Ratio (%)	61.9

Kalimantan	2010
Sales (TWh)	4.5
No.of Customers (million)	2
Capacity (GW)	1.3
Electrification Ratio (%)	52.9



Sulawesi	2010
Sales (TWh)	4.4
No.of Customers (million)	2.6
Capacity (GW)	1.3
Electrification Ratio (%)	53.8

Indonesia	2010
Sales (TWh)	159
No.of Customers (million)	44
Capacity (GW)	37.9
Electrification Ratio (%)	67.0

Other Regions	2010
Sales (TWh)	5.3
No.of Customers (million)	2.1
Capacity (GW)	1.1
Electrification Ratio (%)	37.9

Source: PT. PLN

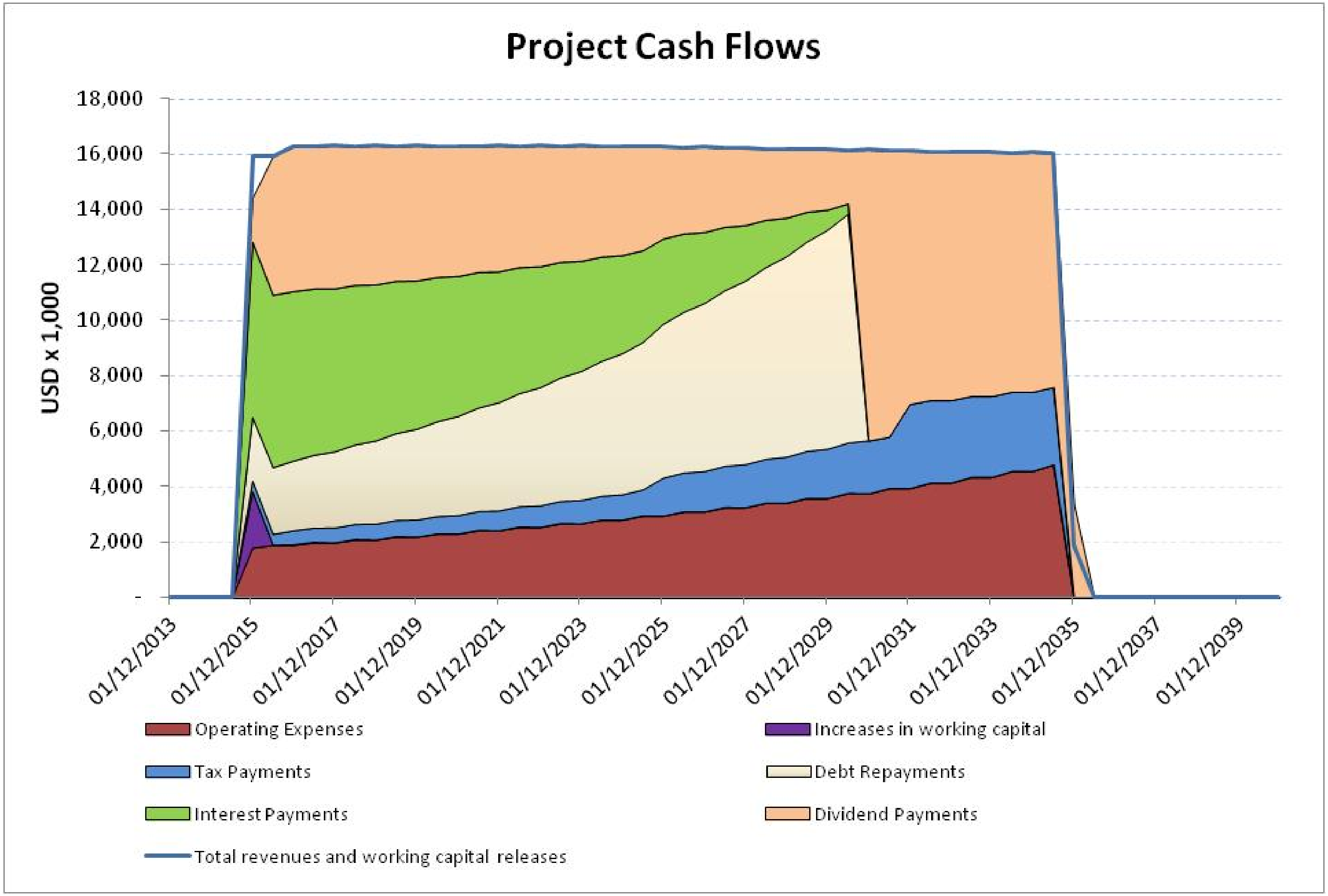
Introduction – The Project

- Indo Wind Power has entered into an exclusive agreement with GE Energy to acquire the development rights of a wind farm in the Jeneponto Regency in South Sulawesi (Indonesia).
- The total project capacity will be 62.5 MW.
- The proposed site is currently used as farmland, mainly corn.
- A wind yield study has been performed on 3.5 years of data
- A 150 kV transmission line runs past the site.

Geographical Location

- The proposed site is located on the island of Sulawesi in the South Sulawesi province
- The proposed site is located 2 km from the coast on a ridge which creates optimal conditions for wind turbines.
- The area's infrastructure is well developed with 150 kV transmission lines passing near the site.
- The main road along the coast is 2 km away.

Financial Forecast - Project Operational Cash Flows



Note: Depicted cash flows are semi-annual

International Finance Corporation
World Bank Group

Some of the project specific perceived risks by Lenders

- Ability to attract equity investors and lenders
- High project costs
- PPA not being honored by PLN
- Project may not end up being bankable
    - Wind resources not sufficient
    - Access to the port/ logistics
    - Grid integration issues
    - Land issues
    - EPC contracting
    - Terms of PPA not being acceptable (i.e. tariff too low, no preferential dispatch, inadequate offtaker credit, weak termination)
    - Unsurmountable E&S issues

Managing Risk: Strategy on Financing

Project Financing

- Indo Wind Power in cooperation with Asia Green Capital as financial advisor aims to attract long-term project financing from Indonesian banks.
- In cooperation with the project consortium, Indo Wind Power will be able to meet the bankability conditions on schedule:
  - Bankable wind study
  - Bankable PPA
  - Bankable EPC and O&M contracts
  - Obtaining all permits and licenses

Equity Financing

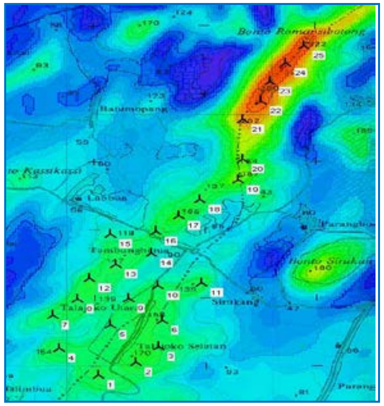
- Indo Wind Power envisages 2 rounds of equity raising:
  - Round A: development stage to jointly bring the project to Financial Close
  - Round B: construction of the plant and becomes majority shareholder in the project

Wind Assessment: good - but not good enough

Source: National Geographic

Managing Risk: Wind Yield Study – Assumptions & Results

Data collection equipment at Mast 0952



Wind Resource Map. Source: GE Energy Report

Main Inputs & Assumptions:

- Wind data from Mast 0952 (22 November 2009 – 22 November 2012).
- Digital Elevation Map acquired from the Shuttle Radar Topography Mission (SRTM) up to 10km from the site to analyze terrain elevations.
- Roughness model was created by Wind Prospect based on publicly available images and site photographs. The map extends at least 25 km from the site.

Results:

- Annual mean wind speed at hub height at WTG locations: 6.1 to 7.8 m/s.
- Annual Energy Production (P50) after terrain and wake effects (6.5% loss) only:
  - Energy Production: 217.9 GWh / year
- Net Annual Energy Production (P50) after terrain and wake effects (6.5% loss), electrical efficiency losses (3%), availability losses (3%), scheduled maintenance (0.7%), substation maintenance (0.2%), grid interruptions (2%), high wind hysteresis (0.5%) and blade degradation (0.5%):
  - Energy Production: 197.1 GWh / year
  - Capacity Factor: 36%

Managing Risk: Geographical Location – Infrastructure

Makassar port

Sea Transport

- There are 2 possible locations to transport the wind turbines and related equipment to the site:
  - The port of Makassar, which is 75 km by road to the site. This is a 'Pelabuhan Kelas Utama' which is the highest port classification of the Indonesian government.
  - The private port of PT. Bosowa Energy (subsidiary of the Bosowa Group) at its 2 x 125 MW coal-fired steam power plant which is used for coal delivery. The distance to the site is about 8 km by road.
- In cooperation with the EPC contractor, Indo Wind Power will select the most suitable port.

Road Transport

- From the selected port the equipment will be transported by road. The road leading up to the site is narrow (3-4m) and has a number of sharp turns. It is expected some civil works are required to bring the equipment to the site.

Grid Connection

- A 150kV transmission line runs near the main road to the south of the site.
- Potential connection points are the Jeneponto substation at 23 km distance (by road) or a grid connection point into the transmission line near the site. PLN prefers a connection into the transmission line near the site.

Managing Risk: Grid Connection

- The proposed site is less than 2 km away from a 150 kV transmission line.
- The Jeneponto substation is 23 km away by road. According to PLN, this substation had a peak demand in 2011 of 15.9 MW and a capacity of 20 MW, considerably smaller than the output of the wind farm at most times.
- The 2 x 125 MW coal-fired steam power plant of PT. Bosowa Energy is connected to the transmission line between Jeneponto and Tallasa (‘U’ in the picture) and the power is directed in the direction of Makassar.
- It is expected that the wind farm will be connected to the transmission line as near as possible to the proposed site.
- The project team is currently prioritizing discussing the grid connection and PPA with PLN. PLN has indicated they also prefer a grid connection directly into the transmission line near the site.
- A grid integration study is currently being performed by GHD Michael Hill.

High voltage grid in southern South Sulawesi. Source: PLN (RUPTL 2011-2020)

Managing Risk: Land Rights

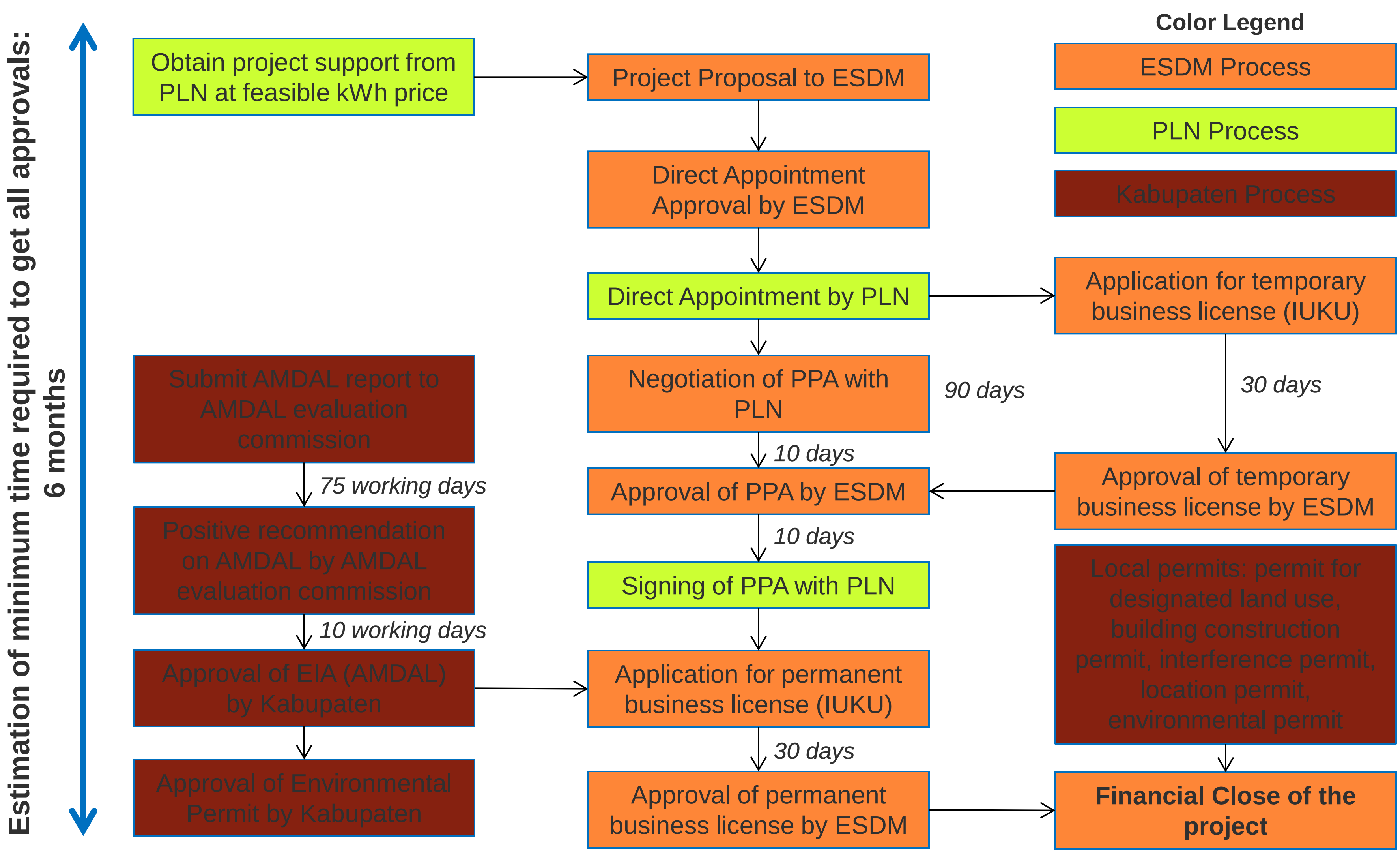
Mountain ridge in the north part of the site

View towards the sea from the mountain ridge

Plan for Securing Land Rights

- An estimated 90% of the land is privately owned and the remaining 10% is owned by local villagers.
- Currently, the discussions with the bupati (local regent) of Jeneponto and land owners are in progress.
- In the process possible nuisances for the local community such as noise emitted by the turbines and shadow flickering are being addressed. Noise levels are expected to be kept below 50 decibels in the community's residences.
- The land rights will be secured following the guidelines of IFC's Performance Standards under supervision of AECOM. AECOM will also conduct the Environmental and Social Impact Assessment based on IFC's PS.

Overview Project Permits and Licenses Process



Managing Risk: EPC Contract – Key Terms & Conditions

- Indo Wind Power aims to come to a bankable EPC contract with a workable distribution of risks.
- The EPC contract will include the following key terms and conditions for which the numbers will be negotiated in a later stage with the turbine supplier and BoP contractor.

Key terms and conditions:

- Construction period: [18] months
- Performance Bond by parent company: [x]% of contract value
- Limitation on Liability: cap of [x]%
- Availability Guarantees by contractor:
  - Guaranteed Availability of each WTG: [x]%
  - Guaranteed Availability of wind farm: first [x] months
  - Penalty for availability below Guaranteed Availability
- Liquidated Damages:
  - Delay LDs: USD [x] per day per WTG with cap
  - Performance LDs: USD [x] per day per WTG if wind farm is constrained with cap
- Power Curve Test: Power Curve Guarantee of [x]% with damages [x]% of EPC price with cap and a period of [x] years

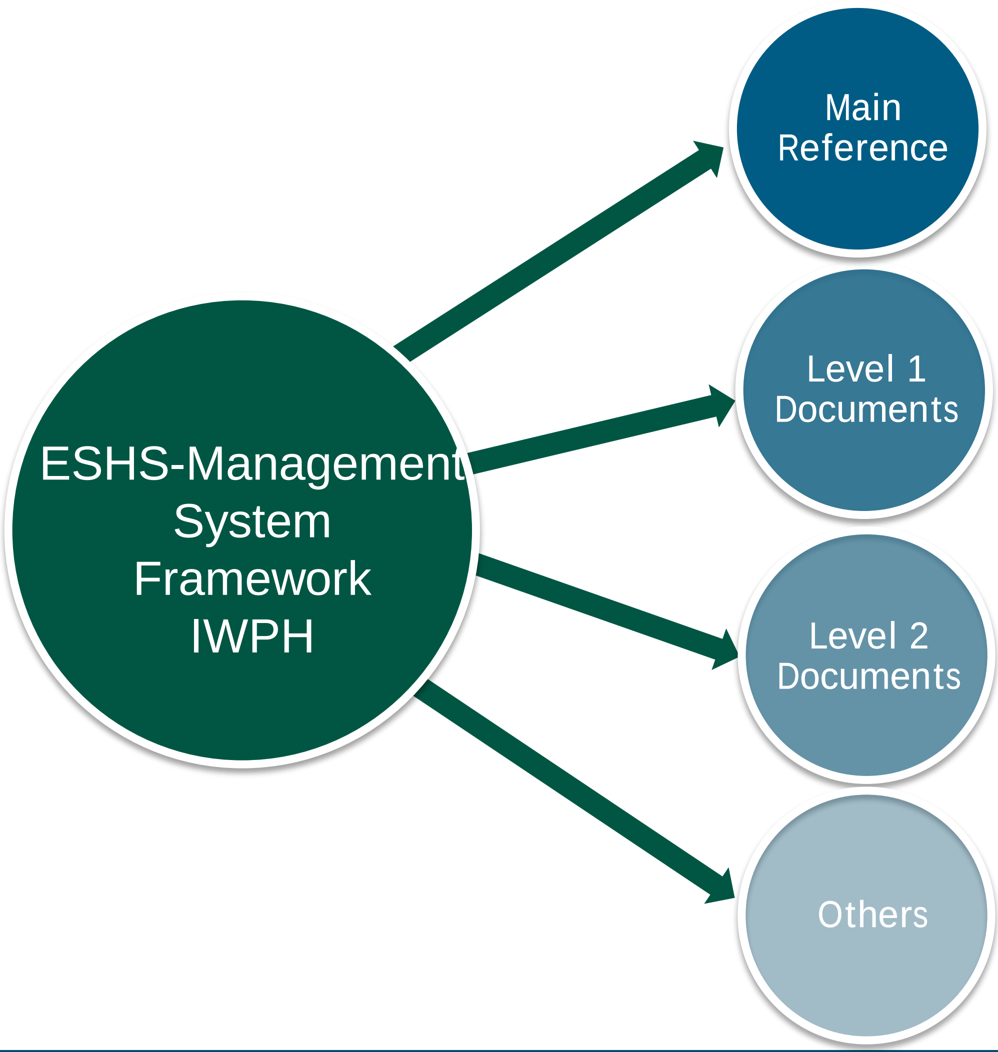
Some of the perceived risks by Lenders/ IFC

- Ability to attract equity investors and lenders
- High project costs
- PPA not being honored by PLN
- Project may not end up being bankable
  - Wind resources not sufficient
  - Access to the port/ logistics
  - Grid integration issues
  - Land issues
  - EPC contracting
  - Terms of PPA not being acceptable (i.e. tariff too low, no preferential dispatch, inadequate offtaker credit, weak termination)
  - Unsurmountable E&S issues

Managing Risk: Power Purchase Agreement

- Indo Wind Power intends to enter into a Power Purchase Agreement (PPA) with PT. PLN (Persero) or one of its subsidiaries to be guaranteed off-take of its electricity for a period of at least 20 years.
- Indo Wind Power will seek to negotiate the following provisions in the PPA:
  - Guaranteed off-take of all electricity produced at an agreed price
  - Tenor of 20 years or more
  - PLN guarantees the functionality of the electricity grid, i.e. PLN still purchases the produced electricity in case of a grid black-out
  - Measurement of produced electricity at the point of grid connection
  - Indo Wind Power retains all rights for carbon credits
  - Payment in US Dollars

Managing Risk: ESHS Management System



Main Reference

IFC Performance Standards (2012)
WBG EHS Guidelines General
WBG EHS Guidelines for Wind Energy (2007)
WBG EHS Guideline for Electric Power Transmission and Distribution
IFC ESMS Handbook

Level 1 Documents

- IWPH Environmental, Social, Health and Safety (ESHS) Policy

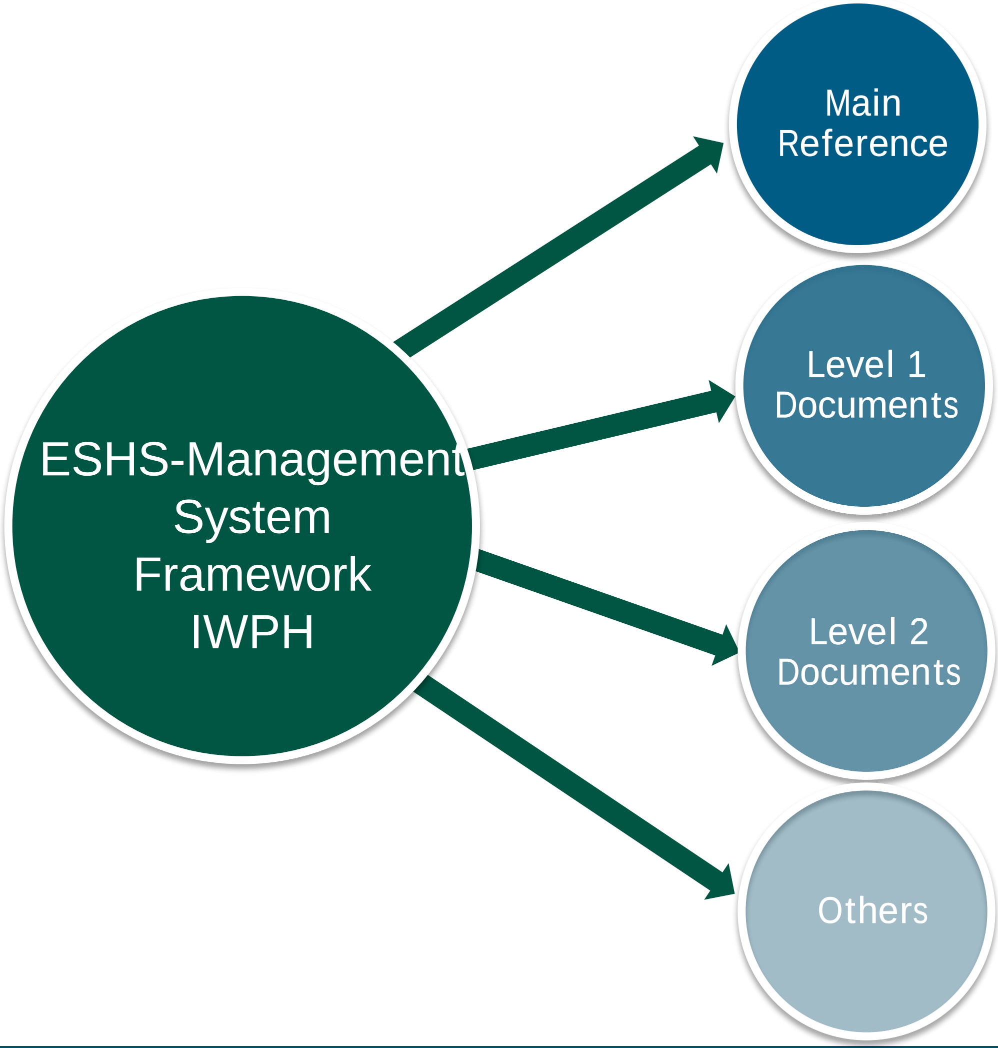
Level 2 Documents

- IWPH Environmental, Social, OHS Procedures
- Other SOPs
- Guidelines
- Plans

Others

- ISO 14001
- ISO 26000

Managing Risk: ESHS Management System



Format:

Refer to ISO 14001

Main goal:

Compliant document to IFC & EP

Main input level I:

AGC E&S Policy (to be established)

Main input level 2:

- No existing documents (need to be developed and established)
- E&S Consultant Data base.

Other input:

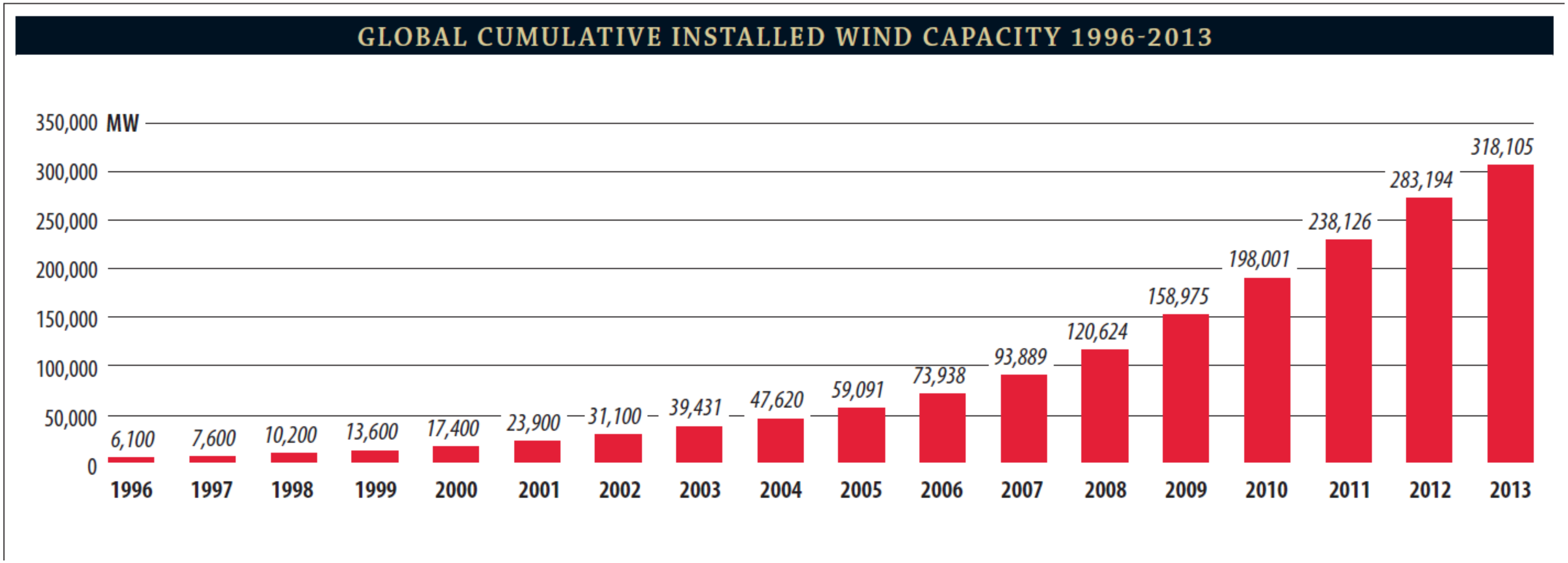
ISO 26000 (Social Responsibility)

Q&A

Back up

Wind Power Industry

- The modern wind industry started in the late 70's when a number of Danish companies started serial production of wind turbines.
- In the late 70's and 80's most wind turbines were installed in Denmark and California, USA.
- At the end of 2013 total wind power capacity was nearly 320 GW worldwide.



Indonesia's Renewable Energy Potential

Energy Source	Installed Capacity (MW)	Resource Potential (MW)	Undeveloped Potential (%)
Hydropower	4,264.0	75,670	94
Micro & Mini Hydropower	86.1	500	83
Solar Power	30.0	…	…
Wind Power	1.1	9,910	99
Ocean	0.0	35	100
Geothermal	1,052.0	27,510	96
Biomass	445.0	49,810	99

Snapshot of Development Timelines/ Budget

Sulawesi Site 52 - Development Budget and Time Scale (Outputs)

Aria Green Capital

Months shown: Sep, Oct, Nov, Dec, Jan, Feb, March, Apr, May, June, July, Aug, Sept, Oct, Nov, Dec, Jan

Deliverable	Lead	Review	Bar span (months)	Budget
Due Diligence & Equity Investment				
Technical Due Diligence	Wind Prospect	Wind Prospect		
Wind Prospect			Oct – Feb	$[illegible]
Project Co Establishment	Aria Green Capital			
PT PMA Indo Wind Power			Feb – March	$0
Indo Wind Power (Singapore) Holdings Ltd			Feb – March	$815
Website and PR				
Website, logo, corporate style			Oct – Apr	$1,250
Asset Purchase & Joint Development Agreement	Aria Green Capital	Wind Prospect		
Payment to GE Energy			March	$[illegible]
Legal Advisor			Feb – March	$7,000
Wind Prospect			Feb – March	$400
Wind Monitoring Plan				
Wind Mast Installation	WinRock	Wind Prospect		
Mast Contractor			March – Apr	$[illegible]
WinRock			March – Apr	$10,000
Wind Prospect			March – Apr	$2,500
Turbine Layout	Wind Prospect	Wind Prospect		
Revision of Layout			March	$20,000
Continuous Wind Monitoring	Wind Prospect	Wind Prospect		
Wind Prospect			Apr – Jan	Apr $0; May $1,100; June $1,100; July $1,100; Aug $1,100; Sept $1,100; Oct $1,100; Nov $1,100; Dec $1,100; Jan $1,100
Wind Report Update	Wind Prospect	Wind Prospect		
Wind Prospect			Oct	$13,500
Bankable Wind Report	Wind Prospect	Wind Prospect		
Wind Prospect			Nov – Dec	$22,500
Project Development				
Land Security	WinRock	Aria Green	March – June	Critical Path
WinRock				$10,000
Legal Advisor				$12,500
Land Acquisition/Option Payments				$0
Wind Prospect				$5,000
EIA/Community	WinRock	Wind Prospect	Apr – Jan	
WinRock				$20,000
Legal Advisor				$10,000
Community Consultation				$20,500
EIA Assessment/ Flora & Fauna/ EMI/ Etc				$100,000
Photo Montage				$5,000
Planning Application				$20,000
Connection Access	Aria Green Capital	Wind Prospect	Apr – Nov	
Access Arrangement				$10,000
Grid Connection Agreement Technical Advisor				$10,000
Grid Connection Agreement Legal Advisor				$10,000
Load Flow Modelling				$50,000
PLN Negotiation	Aria Green Capital	Wind Prospect	June – Sept	
PPA Agent				$0
Legal Advisor				$16,000
Wind Prospect				$4,000
Carbon Credits	Aria Green Capital		June – Nov	
Carbon Credits				$40,000
WTG Supply Contract	Wind Prospect	Wind Prospect	July – Nov	
Wind Prospect				$20,833
Legal Advisor				$14,167
BOP Contract	Wind Prospect	Wind Prospect	Aug – Nov	
Wind Prospect				$25,000
Legal Advisor				$12,500
Geotechnical Investigations				$50,000
Contour Data (1m intervals)				$100,000
O&M Agreement	Wind Prospect	Wind Prospect	Sept – Nov	
Wind Prospect				$12,500
Legal Advisor				$7,500
FINANCIAL CLOSE	Aria Green Capital		Nov – Jan	
Lender's Due Diligence				$150,000
Legal Review				$75,000
Legal costs for financial agreements and project contracts				$300,000
Contingency			March – Jan	$100,000

Wind Resource/ Prospecting

Prospect with Wind Maps

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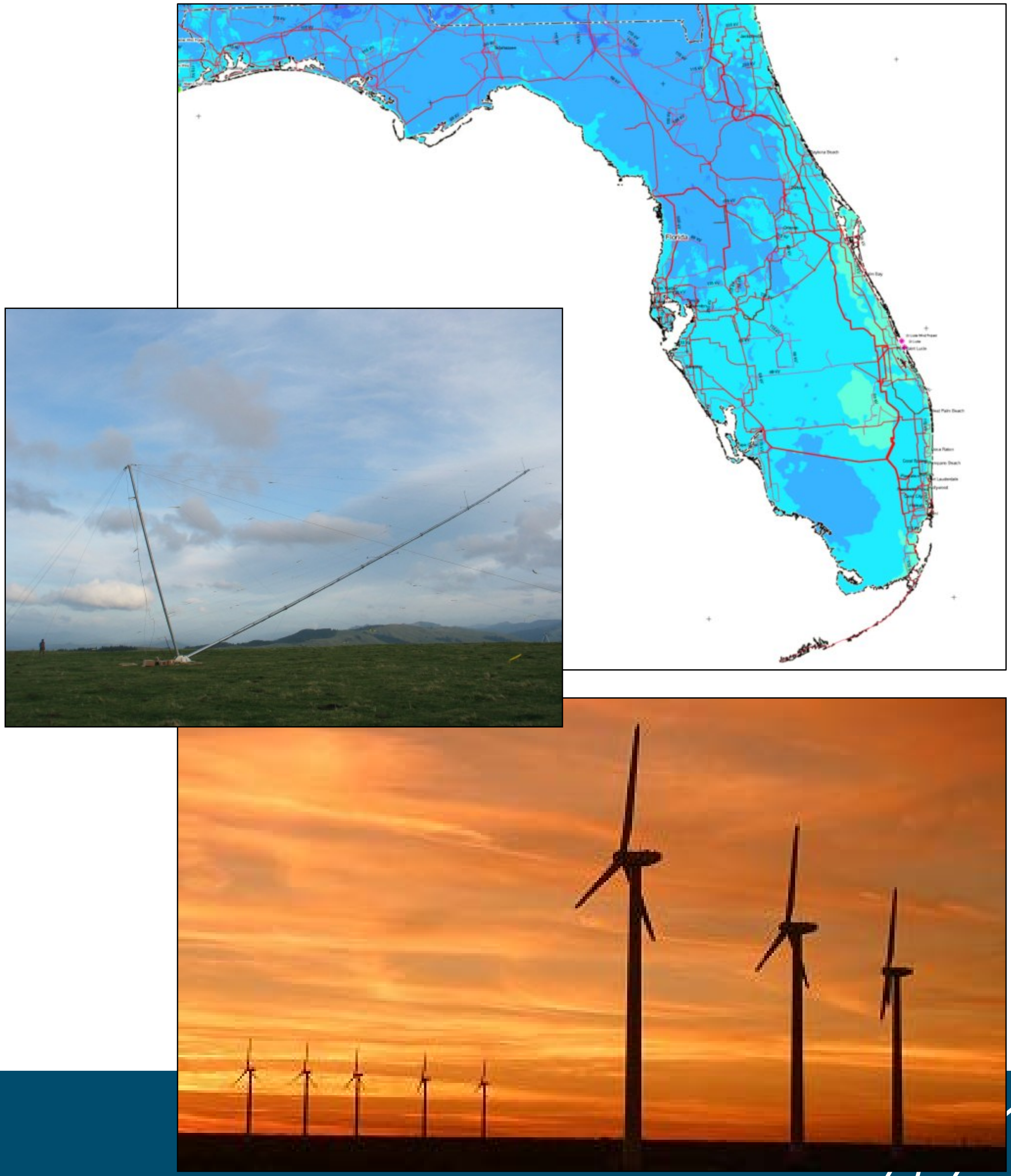
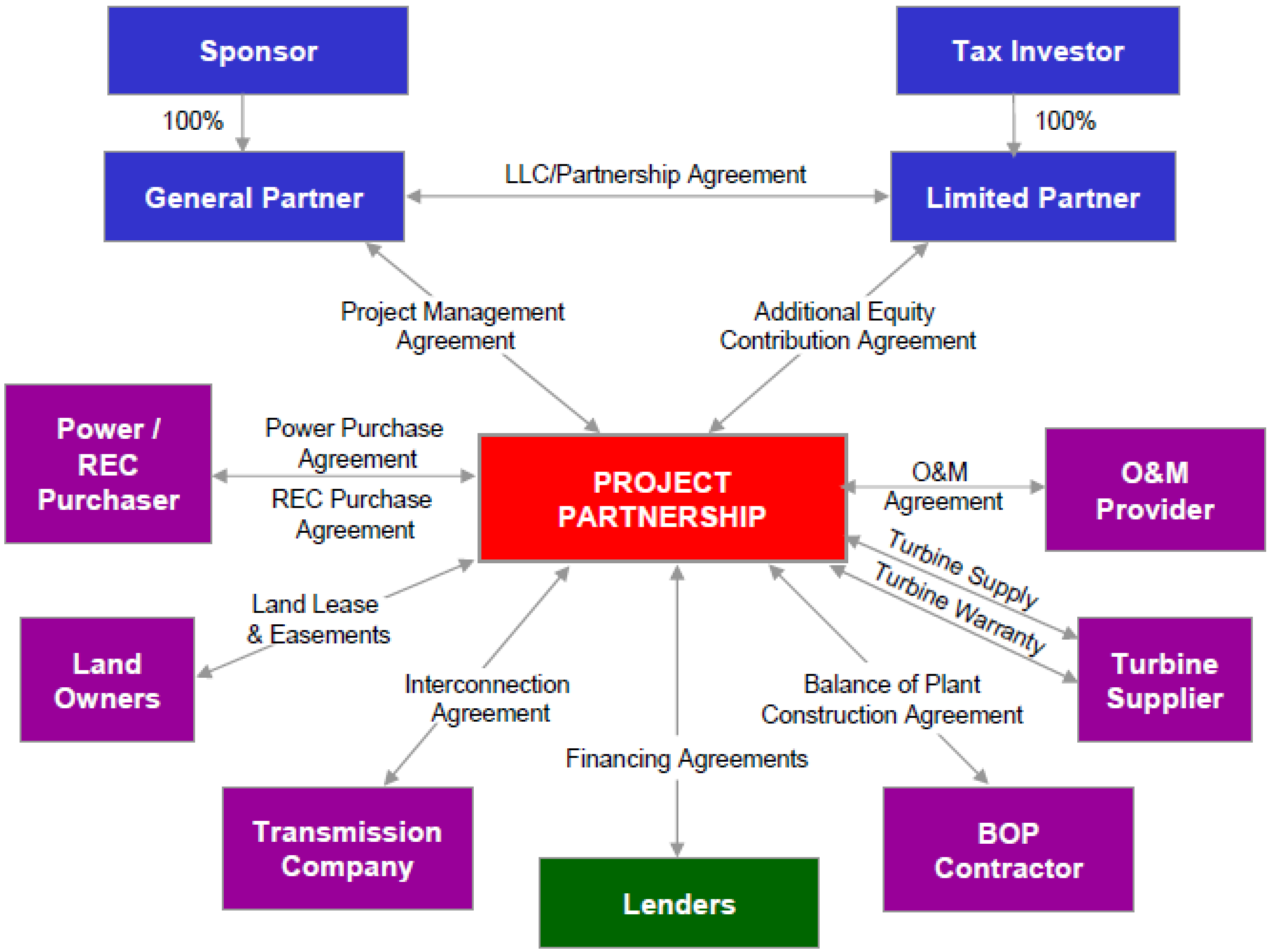
Install Monitoring Equipment

↓

Calculate Wind Resource from Wind Speed Measurements



Operating Structure of a Typical Wind Project with tax credits



Examples: Project Contracts

- Partnership/Limited Liability Company Agreement
  - Special Purpose Entity
  - Management Rights
  - Cash Flow/Tax Attribute Allocation
  - Limited Liability
  - Segment Cash Flows
  - Maximize Incentives
- Additional Equity Contribution Agreement
  - Capital Contributions
  - PTC Monetization
- Power Purchase Agreement
  - Sale of Energy, Environmental Attributes
  - Access to Projects' Capacity
  - Credit Support

Project Contracts (cont'd)

- Construction Contracts
  - Turbine Supply
  - Balance of Plant
- Land/Lease/Easement
  - Control of Site
- Operating Agreements
  - Turbine Warranty
  - O&M Agreement
  - Project Administration Agreement
- Access to Grid - Interconnection Agreement
- Credit Agreement/LLC Agreement/Security Documents
  - Financing/Conditions/Covenants/Representations
  - Security Agreement, Collateral, Cash Flow Waterfall
  - Consents of Project Contract Counterparties