



Republic of the Philippines
Department of Energy
Renewable Energy Management Bureau

WIND RESOURCE ASSESSMENT

“THE PHILIPPINE EXPERIENCE”

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Solar and Wind Energy Management Division

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ADB Headquarter, Mandaluyong City
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Outline of Presentation

- Policy Framework
- Wind Energy Development and Utilization
- Wind Resource Assessment (WRA)
- Snapshots of WRA activities
- Accomplishments
- Challenges and Enabling Strategies
- Way Forward

Policy Framework

Republic Act No. 9513

NATIONAL RENEWABLE ENERGY PROGRAM (Wind Energy Sub-Program)

TECHNOLOGY
SUB-PROGRAM

COMMERCIALIZATION
SUB-PROGRAM

PROMOTION
SUB-PROGRAM

AREA-BASED
SUB-PROGRAM



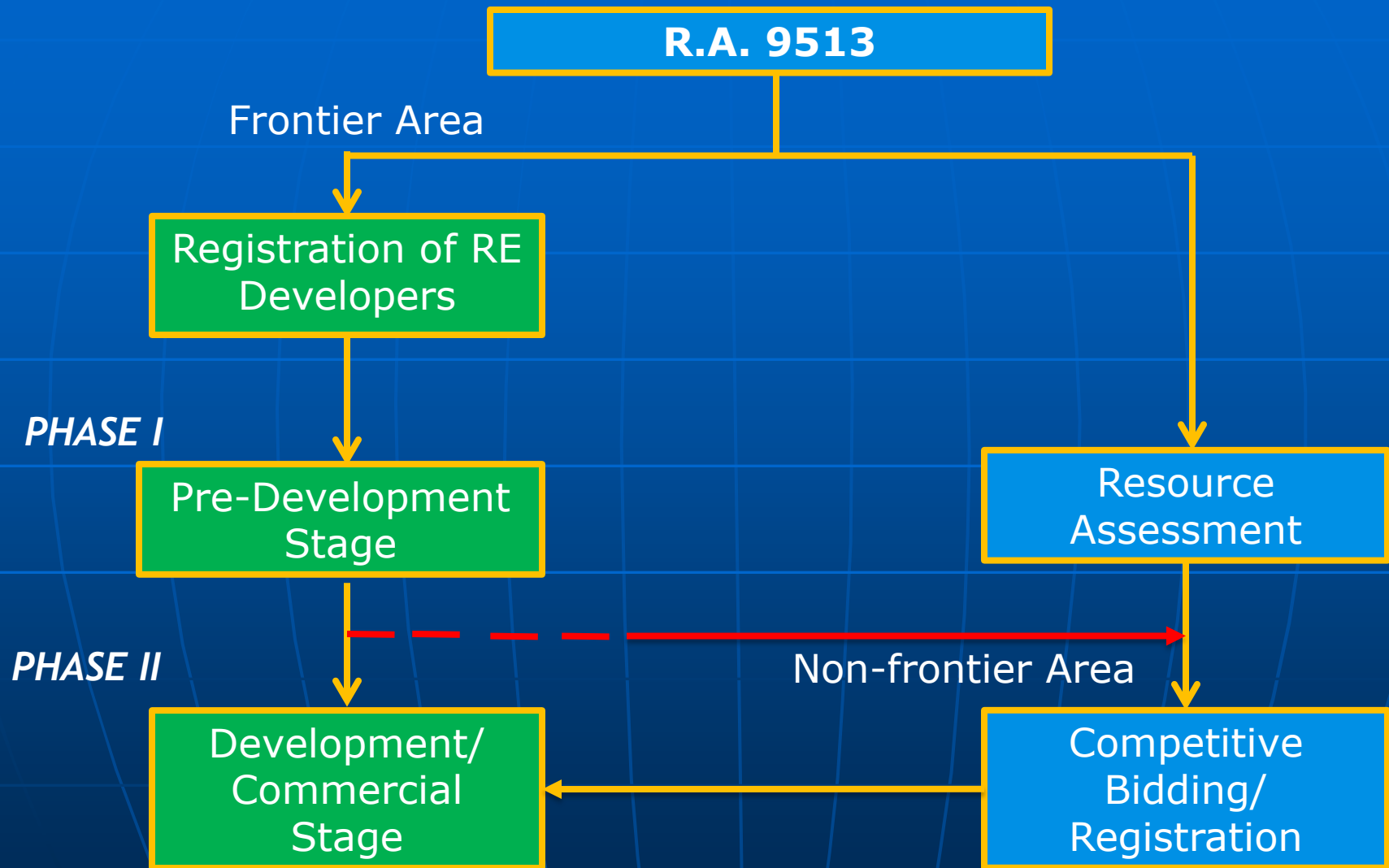
- Administer RA 9513
**(RE PROJECT DEVELOPMENT
AND UTILIZATION)**

- **National RE Database**
- Information, Education and
Communication Campaign

Accelerate the exploration and development of RE resources to achieve:

- Energy self-reliance
- Reduce the country's dependence on fossil fuels
- Minimize the country's exposure to price fluctuations

Wind Energy Development & Utilization



Detailed Wind Resource Assessments

GEF/UNDP/DOE CBREP Project

- Government initiated wind resource assessment for utility-scale wind energy project started as program component of the **GEF/UNDP/DOE CBRED Project in 2009**.
- Aimed to **address the gaps of the country's wind database** which would be utilized by project developers/investors in conceptualizing, designing and evaluating wind energy projects.
- The project procured five (5) 50m tubular met towers.
- The DOE conducted the micro-siting, permitting, installation, operation and maintenance of met towers.

Detailed Wind Resource Assessment

DOE WRAP Project

- The Government approved the WRAP Project in 2012 as part of its **commitment to sustain wind resource assessment (WRA)** after the conclusion of CBRED Project in 2010.
- Envisioned to identify viable and feasible wind sites; create local expertise on WRA; and update the country's wind database and atlas.
- The DOE is full hands-on in the whole process of WRA, from procurement up to installation and management of met-towers.

Detailed Wind Resource Assessment

ADB's QLW Project

- Wind Resource Assessment Campaign of QLW is **subsumed under the DOE-WRAP Project** through a Memorandum of Agreement (MOA) between DOE and ADB;
- ADB tendered the supply, installation and commissioning of four (4) met towers; and DOE conducted the siting and permitting activities and eventually manage the met towers;

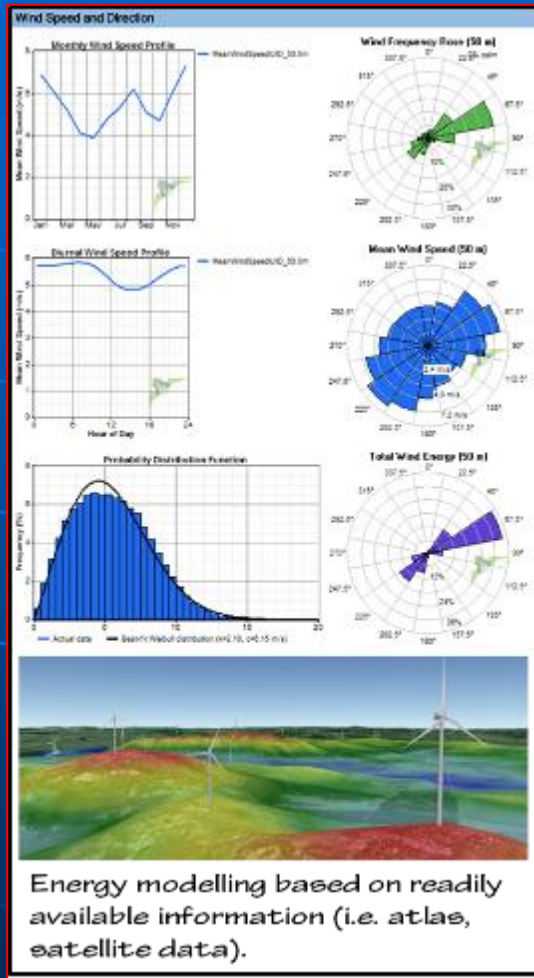
SNAPSHOTS...



WRA

...through the lens.

Site Prospecting



Desk Study



Site Validation

Permits, Agreements & Resolutions

CONSULTATION MEETINGS

DOE, DENR/CENRO/PAMB, LGUs and BLGUs of Pantabangan and Carranglan, Nueva Ecija



Meeting with BLGU Ibis, Bagac, Bataan.



Meeting with LGU Dasol, Pangasinan.



Installation, Testing & Commissioning

- Site layout using old school technique and precision instrument.



The old school – measuring tape and leveling hose.



Precision instrument - Digital Theodolite.

Installation, Testing & Commissioning

- Pre-Installation test of data logger, GSM i-Pack and sensors prior to field deployment.



Installation, Testing & Commissioning

- Hauling of equipment and materials



Installation, Testing & Commissioning

- Anchoring



Installation, Testing & Commissioning

- Assembly of baseplate.



Installation, Testing & Commissioning

- Assembly of ginpole and tower tubes.



Installation, Testing & Commissioning

- Installation of booms, sensors, sensor cables and aviation warning light.



Installation, Testing & Commissioning

- Mounting of winch and hydraulic power unit.



Installation, Testing & Commissioning

- Application of protective coating and installation of guy rings and guy wires.



Installation, Testing & Commissioning

- Toolbox meeting prior to tilting-up of met mast.



Installation, Testing & Commissioning

- Inspection, check and countercheck prior to tilting-up of met-tower.



Installation, Testing & Commissioning

- Tilting-up of Ginpole.



Installation, Testing & Commissioning

- Tilting-up of Ginpole.



Installation, Testing & Commissioning

- Tilting-up of met-tower.



Installation, Testing & Commissioning

- Sighting of (check sag) guy wire while tilting-up the met-tower.



Installation, Testing & Commissioning

- Adjustment of guy wires tension during tilting-up of met-tower.



Installation, Testing & Commissioning

- Transfer of lifter wires to front anchors.



Installation, Testing & Commissioning

- Straightening of met-tower.



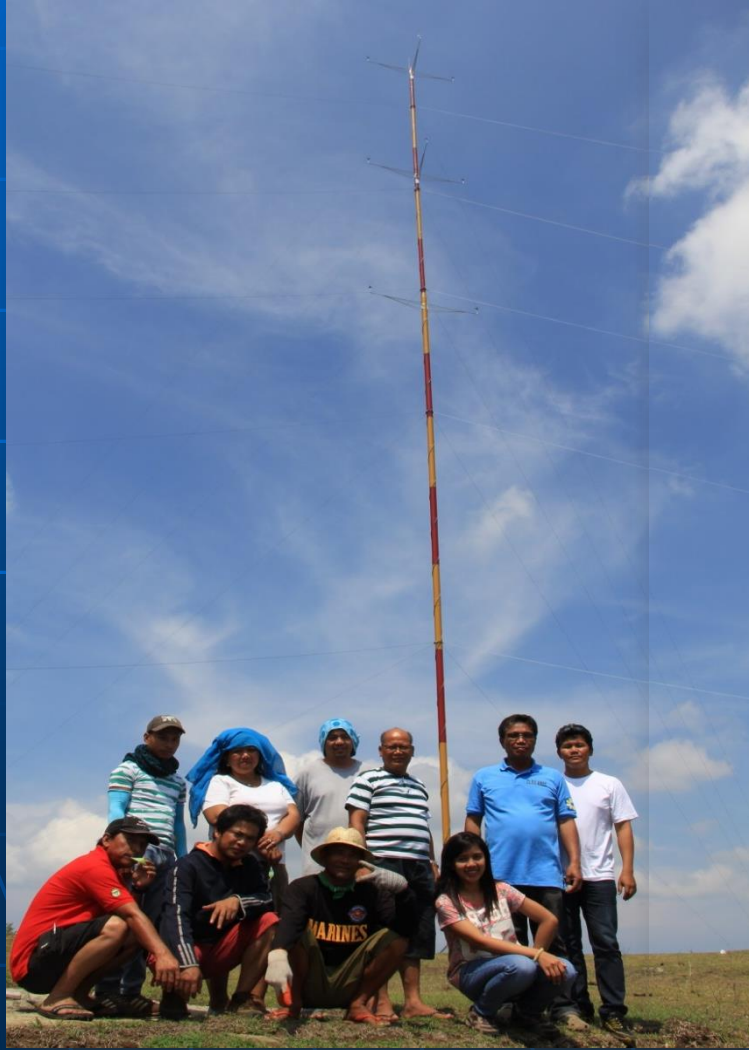
Installation, Testing & Commissioning

- Installation of data logger and GSM i-Pack.



Installation, Testing & Commissioning

- Brgy. Malacapas, Dasol, Pangasinan
- DOE, CLSU-AREC, BLGU & Locals
- May 26 to June 12, 2015



- Brgy. Ibis, Bagac, Bataan
- DOE, PSAU-AREC, BLGU & Locals
- November 3-14, 2015



Monitoring & Maintenance



BEFORE
lack of Personal Protective
Equipment (PPE)



NOW
partially equipped with PPE

Decommissioning, Refurbishment & Re-Commissioning



- Brgy. Malasin, San Jose City, Nueva Ecija, May 2015.
- Tilting-down of met-tower; painting of tower tubes; replacement of booms, sensors and aviation warning light; tilting-up and straightening of met-tower ; and testing and re-commissioning.

Decommissioning, Refurbishment & Re-Commissioning



- Brgy. Fatima, Pantabangan, Nueva Ecija, May 2015.
- Decommissioning and site restoration.

Capacity Building

- Classroom-Type Training Approach.



Capacity Building

- Outdoor practical sessions.



Capacity Building

- Full Hands-On On-Site Skills Training Scheme.



Capacity Building

- Learning while doing approach.



DOE Team : Capacity Building



Accomplishments

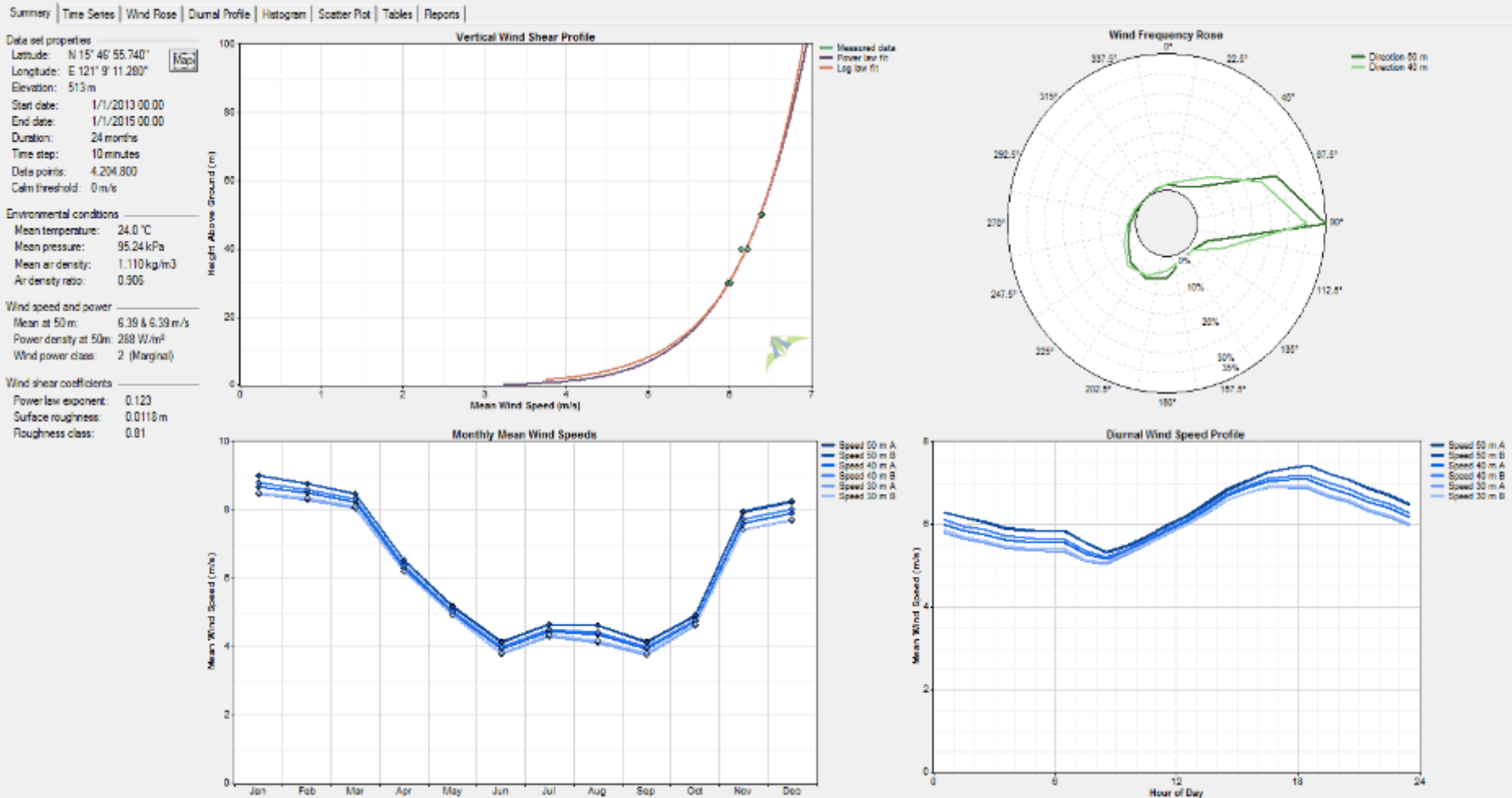
INITIATIVE	NUMBER OF SITES
1. CBRED Project	<ul style="list-style-type: none"> • Four (4) sites, mainly in Luzon. • Data provided to US NREL for the updating of Philippine Wind Atlas. • Data in Lubang, Occidental Mindoro was provided to NPC-SPUG for possible development of wind project.
2. WRAP Project	<ul style="list-style-type: none"> • Sustained four (4) sites from CBRED Project. • Additional two (2) met-mast sites completed in 2015. • One (1) met-mast for installation in the second half of the year.
3. QLW Project	<ul style="list-style-type: none"> • On-going installation of met towers in four (4) sites, mainly in Visayas



Accomplishments

Synopsis of Wind Data

Brgy. East Poblacion, Pantabangan, Nueva Ecija



Challenges and Enabling Strategies

1. High attrition rate of candidate sites.

- At the onset, **forty (40) sites** were prospected and sited for met tower installation, however, **not realized** because of **strong interest from private sector**
- **Strategy:** move to sites with no interested private wind developers but considered viable/feasible in medium/long term due to advancement of wind energy technology.

Challenges and Enabling Strategies

2. Limited local expertise

- **Strategy:** The DOE creates its capability by conducting series of full hands-on, on-site skills training for met-mast technicians and trainors.
- To date, the DOE has developed five (5) trainors and seven (7) wind mast technicians

RECOGNITION



Renewable NRG Systems Certificate of Recognition for

SOLAR AND WIND ENERGY MANAGEMENT DIVISION
Renewable Energy Management Bureau
Philippine Department of Energy
(PDOE/REMB/SWEMD)

For satisfactorily completing the installation of various meteorological towers
as per guidelines, standards and safety requirements prescribed by Renewable NRG Systems.

These meteorological tower installations include:

- 50m HD RNRG TallTower located in Brgy. Tagbac, Lubang Island, Occidental Mindoro, Luzon, Philippines - January 2010
- 50m HD RNRG TallTower in Brgy. Malasin, San Jose City, Nueva Ecija, Luzon, Philippines - February 2011
- 50m XHD RNRG TallTower in Brgy. East Poblacion, Pantabangan, Nueva Ecija, Luzon, Philippines - June 2011
- 50m XHD RNRG TallTower in Brgy. Fatima, Pantabangan, Nueva Ecija, Luzon, Philippines - June 2011
- 50m XHD RNRG TallTower in Brgy. Malacapas, Dasol, Pangasinan, Luzon, Philippines - June 2015

Renewable NRG Systems recognizes the qualification and expertise of PDOE/REMB/SWEMD in the installation of 50m HD and 50 XHD RNRG TallTower and similar meteorological towers.

Given this 29th day of September 2015 at 110 Riggs Road, Hinesburg, Vermont 05461 USA

Signed:

A handwritten signature in black ink, appearing to read "Greg Erdmann".

Greg Erdmann | Vice President, Global Sales
Renewable NRG Systems
110 Riggs Rd. Hinesburg, VT 05461 USA



Way Forward

- **Immediate term** : Complete the installation of met masts of the ADB QLW Project;
- **Short/Medium term** : Expand resource assessments thru the use of SODAR/LIDAR, if possible;
- **Medium/Intermediate term** : Develop detailed Feasibility Studies; and conduct bidding thru Open and Competitive Selection Process (OCSP).

THANK YOU!

www.doe.gov.ph