

Advancing Clean Energy in the Philippines: Using a Grid Integration Study to Identify Pathways

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Presentation Outline

- **Philippine Renewable Energy Integration Study**
- **Luzon and Visayas in 2014 at a Glance**
- **Targets**
- **Assumptions and Methodology**
- **Way Forward**



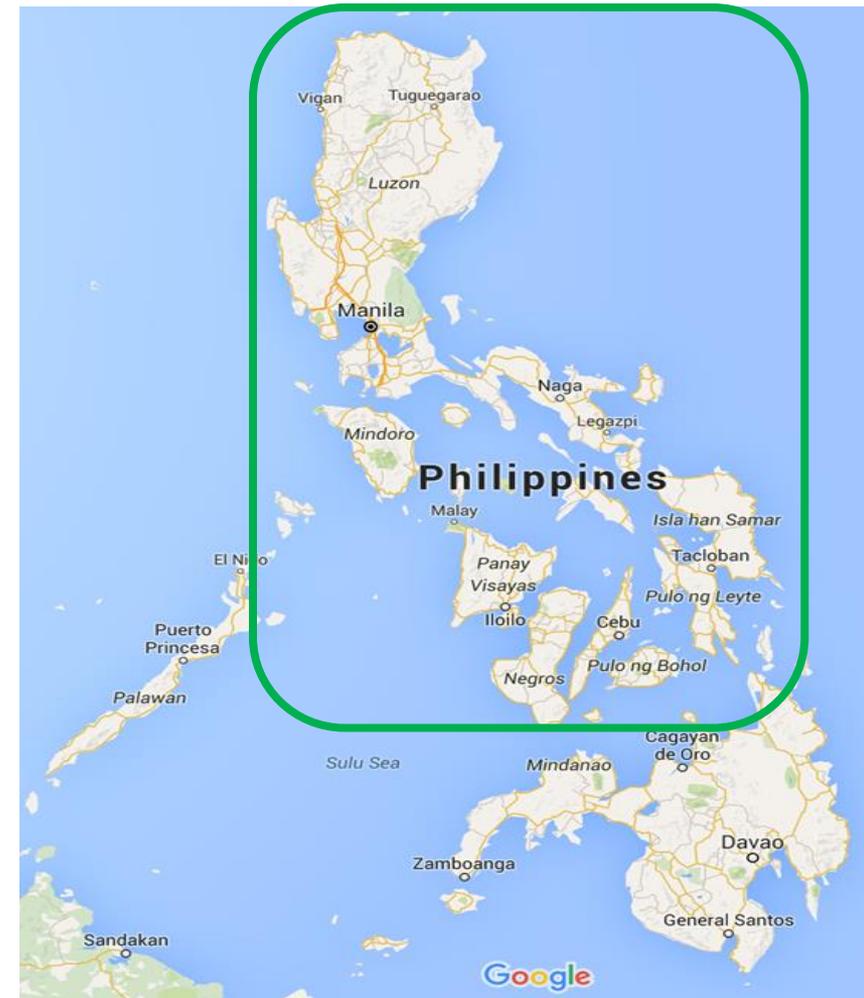
Greening the Grid Project

PHL RE Grid Integration Study



Scope

- **Geographic focus**
 - Luzon and Visayas grids
- **Study years**
 - 2014 reference case
 - 2030 target year
- **RE technology focus**
 - Wind
 - Solar PV
 - Other technologies (biomass, hydropower, geothermal) can help reach a RE target



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Objective of Study:

- **Identify Potential Grid Reliability Concerns with the scaling of Variable Renewable Energy (VRE) Resources**
- **Have Options to improve system flexibility and power system balance; and**
- **Have a new installation and grid integration targets**

Partners:

- **United States Agency for International Development (USAID)**
- **US National Renewable Energy Laboratory (NREL)**

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Organizational Structure



A) Technical Advisory Committee (TAC)

Core TAC

- **Department of Energy (DOE) – Lead Agency**
- National Grid Corporation of the Philippines (NGCP)
- Philippine Electricity Market Corporation (PEMC)
- Energy Regulatory Commission (ERC)
- Grid Management Committee (GMC)
- Distribution Management Committee (DMC)
- National Transmission Corporation (TransCo)
- National Renewable Energy Board (NREB)
- National Electrification Administration (NEA)
- Philippine National Oil Company – Renewable Corporation (PNOC-RC)

Ad Hoc TAC

- Philippine Independent Power Producer Ass’n (PIPPA)
- Philippine Electric Power Owners Ass’n (PEPOA)
- MERALCO
- Retail Electric Suppliers Association (RESA)
- RE Developers Ass’n
 - PSPA, WEDAP, BREA, PASSHYDRO
- Philippine Rural Electric Cooperative Ass’n Inc. (PHILRECA)
- Affiliated Renewable Energy Centers (ARECs)
- National Economic and Development Authority (NEDA)
- University of the Philippines – National Engineering Center (UP-NEC)
- International Grid Experts
 - Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

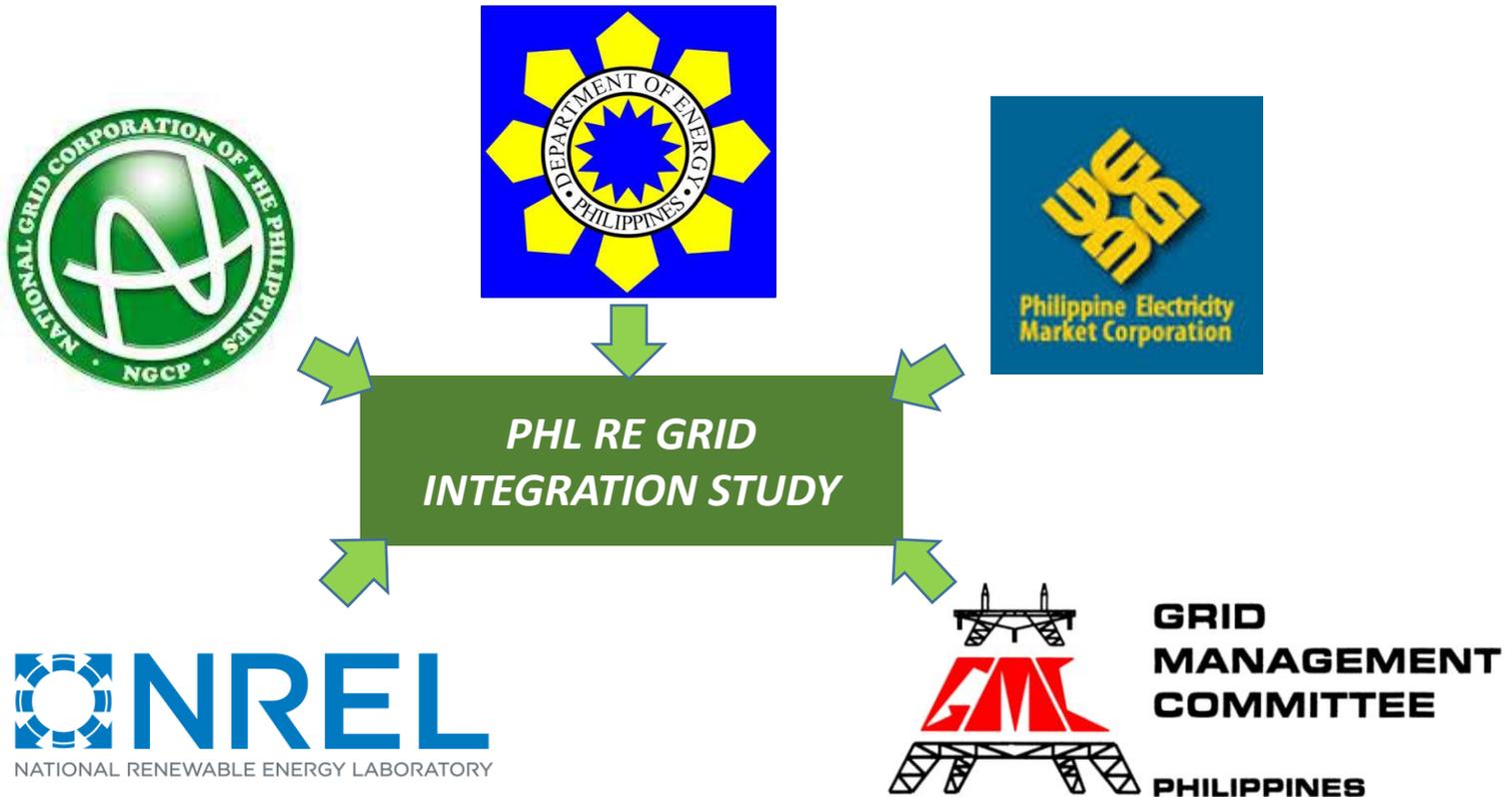
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Organizational Structure



B) Modeling Working Group (MWG)

Composed of representatives from:



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Accomplishments



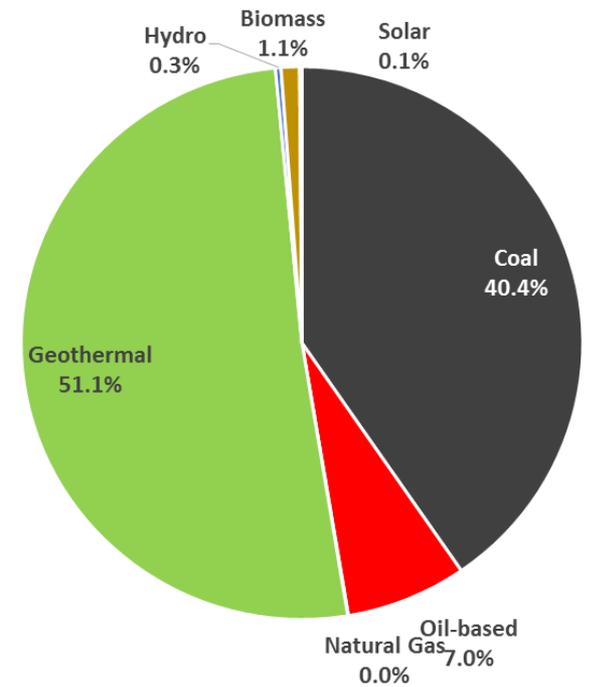
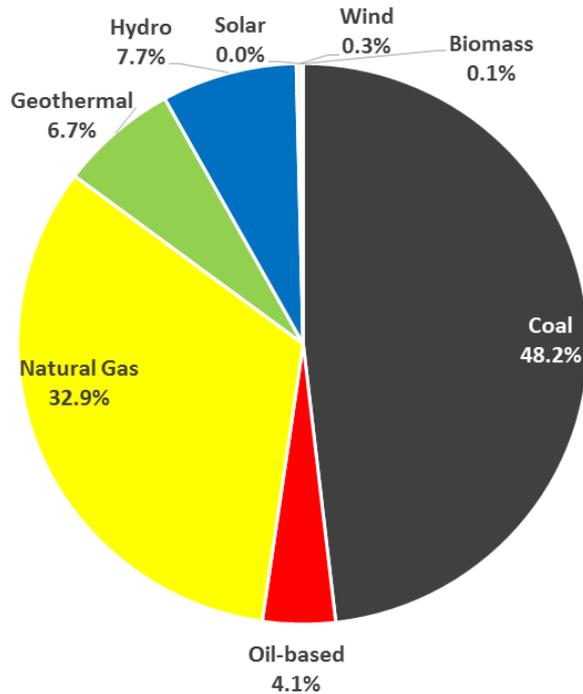
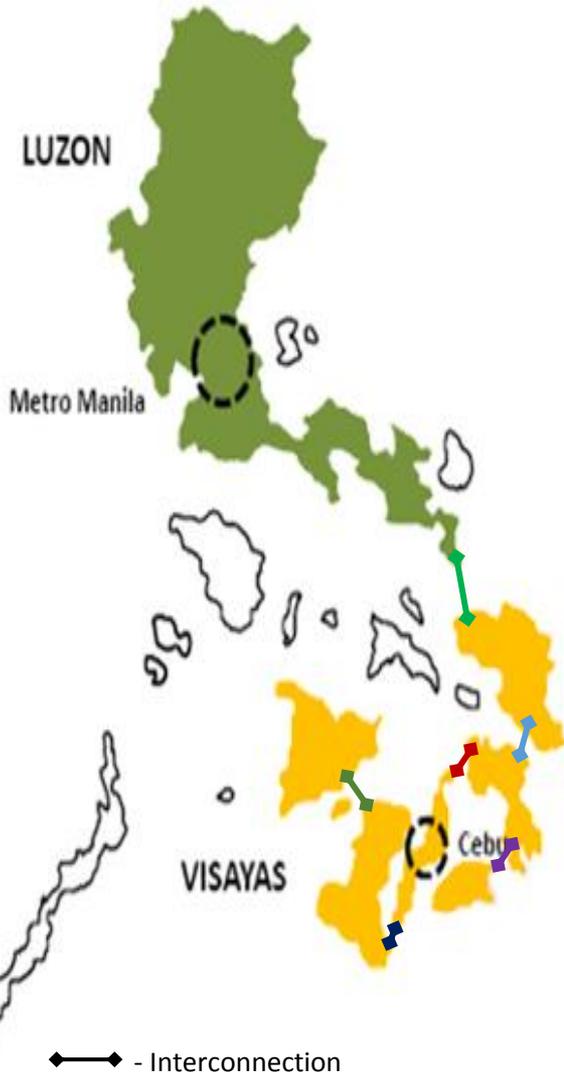
- **Briefing on the Greening the Grid Project : July 2015**
- **Department Circular Dc2015-11-0017 : November 2015 to March 2016**
 - *Creation of TAC and MWG*
 - *Data Sharing Non-Disclosure Agreement (NDA)*
- **1st TAC meeting : 21 January 2016**
 - *Establishment of Assumptions*
- **2nd TAC meeting : 3 June 2016**
 - *Validation of 2014 Model*
 - *Modeling Assumption of 2030 Model*

Luzon and Visayas in 2014 at a Glance

GENERATION MIX

Total Luzon Generation =
~56.8 TWh

Total Visayas Generation =
~11.0 TWh



**Luzon RE =
14.8%**

**Visayas RE =
52.6%**

Solar&Wind = 0.27%

Solar&Wind = 0.14%

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Targets



- ***30% RE by 2030***
 - ***Impact to the Power System***
 - ***Generation***
 - ***Capacity***
 - ***GHG Emission***

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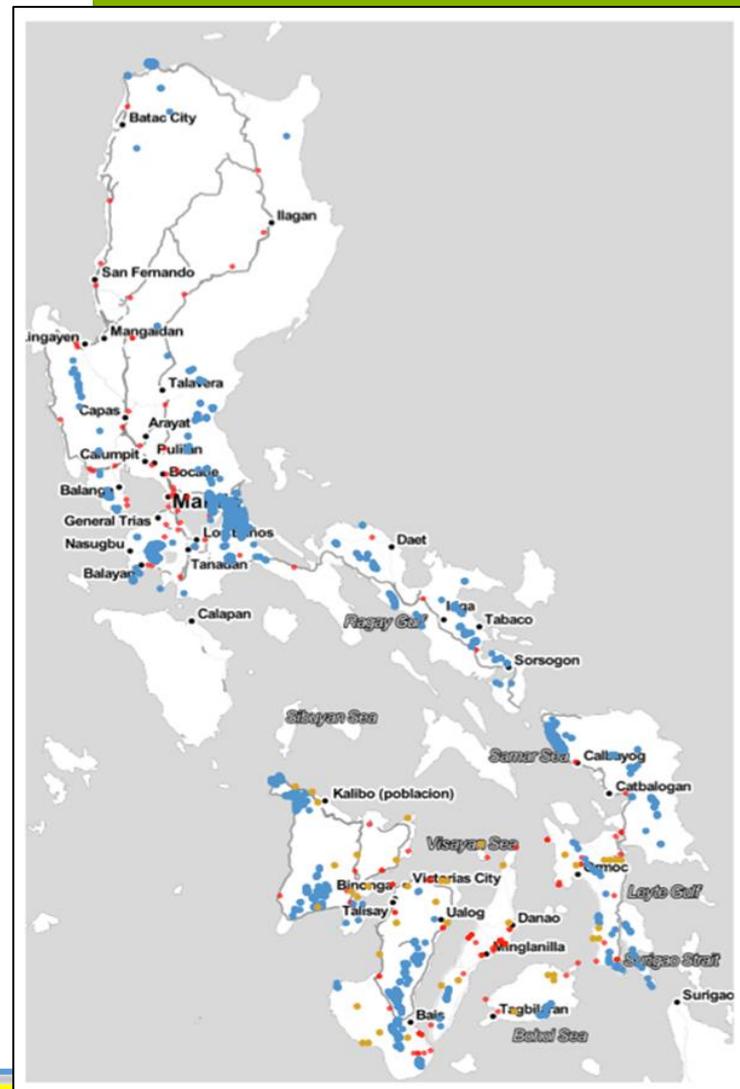
Assumptions and Methodologies



- **Establishing 2014 Basecase Model**
 - **Generation**
 - **Transmission**
 - **Outages**
 - **Dispatch**
- **Four Agreed Scenarios (based on RE Target and Best Location)**

Scenario	RE (MWh)	Solar and wind siting strategy
Base case	20% approx.	Existing locations
“BR-30”	30%	Best resource
“LowTX-30”	30%	Minimize new transmission
“BR-50”	50%	Best resource
“LowTX-50”	50%	Minimize new transmission

- **Establishing RE Siting**



Note: Preliminary Results for generation and site selection 10

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Way Forward



- **Continuing to improve 2030 scenarios**
- **Input Sensitivities in High RE Scenarios**
- **Analyze Results, Prepare Documents**
- **Communicate results with TAC (3rd TAC meeting) and presentation to DOE Secretary**
- **Target Completion of Project: October 2016**

Final report will highlight operational changes, flexibility enhancements, or transmission expansions that may help enable high renewable penetrations on the Luzon and Visayas systems.

END OF PRESENTATION

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