
51st EGNRET MEETING: PHILIPPINES

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Le Medidien Hotel, Chiang Mai, Thailand / 10-14 September 2018



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- I. Power capacity and generation mix
 - II. Laws governing RE resource development
 - III. RE roadmap for development
 - IV. Status of RE installations
 - V. Policy mechanisms to accelerate RE deployment
 - VI. Challenges and way forward



CAPACITY MIX (As of 31 December 2017)

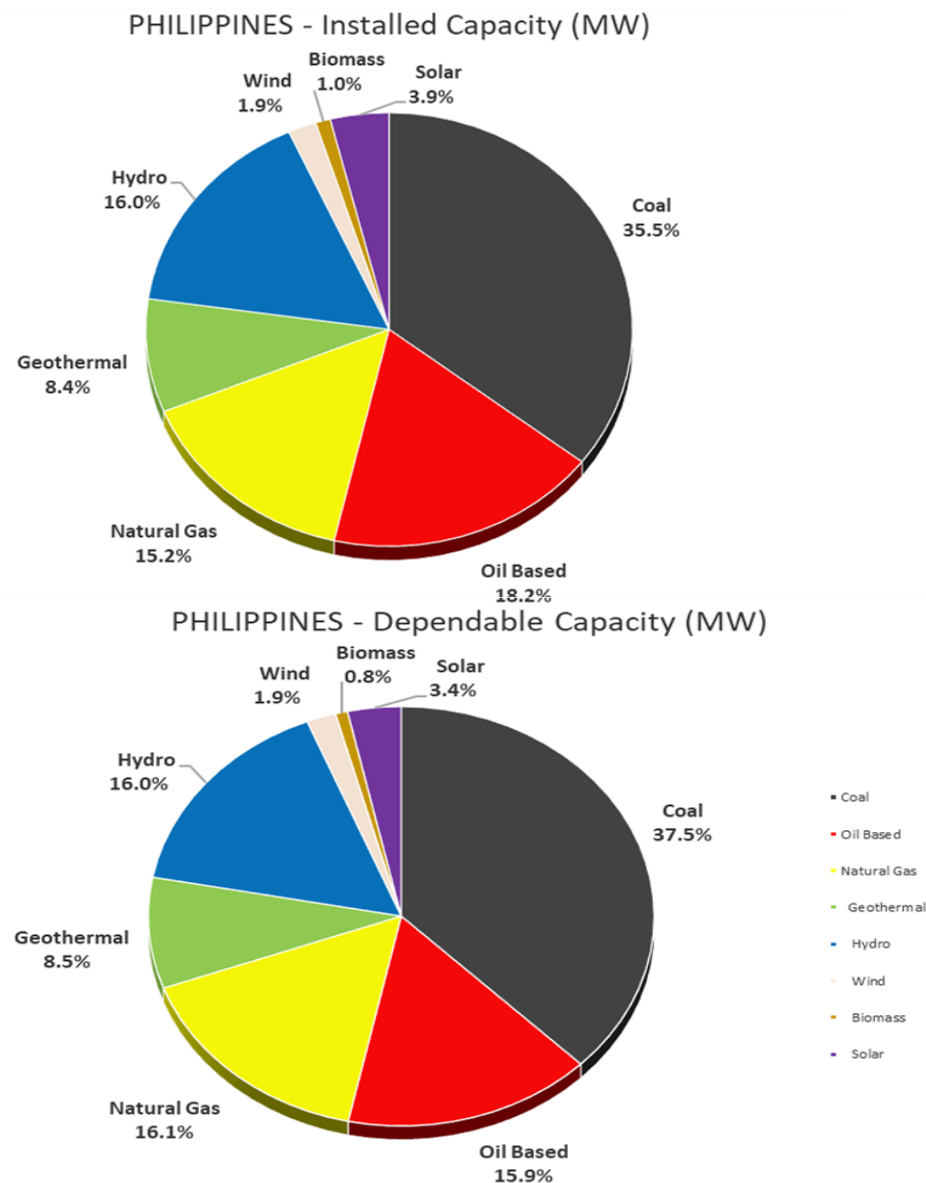
FUEL TYPE	PHILIPPINES			
	Capacity (MW)		Percent Share (%)	
	Installed	Dependable	Installed	Dependable
Coal	8,049	7,674	35.4	37.4
Oil Based	4,153	3,286	18.3	16.0
<i>Diesel</i>	2,682	2,216	11.8	10.8
<i>Oil Thermal</i>	650	530	2.9	2.6
<i>Gas Turbine</i>	822	540	3.6	2.6
Natural Gas	3,447	3,291	15.2	16.0
Renewable Energy	7,079	6,264	31.1	30.5
<i>Geothermal</i>	1,916	1,752	8.4	8.5
<i>Hydro</i>	3,627	3,269	16.0	15.9
<i>Wind</i>	427	383	1.9	1.9
<i>Biomass</i>	224	160	1.0	0.8
<i>Solar</i>	885	700	3.9	3.4
TOTAL	22,728	20,515	100.0	100.0

Note:

Installed - The generator nameplate capacity expressed in megawatts (MW).

Dependable - The load-carrying ability of a station or system under adverse conditions for a specified period of time.

Source: DOE List of Existing Power Plants as of 31 December 2017, released 15 February 2018
US Energy Information Agency (EIA)

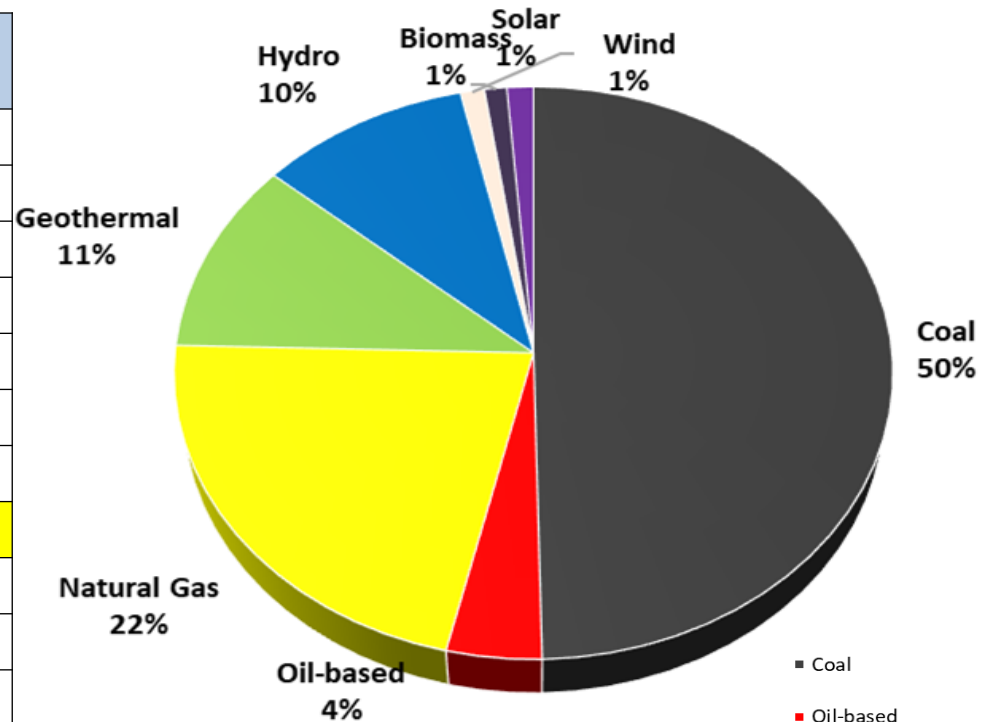


GENERATION MIX (As of 31 December 2017)

Plant Type	Total Generation (MWh)	% Share
Coal	46,847,274	49.6%
Oil-based	3,787,093	4.0%
<i>Combined Cycle</i>	405,022	0.4%
<i>Diesel</i>	3,100,113	3.3%
<i>Gas Turbine</i>	0	0.0%
<i>Oil Thermal</i>	281,958	0.3%
Natural Gas	20,547,239	21.8%
Renewable Energy	23,188,735	24.6%
Geothermal	10,270,077	10.9%
Hydro	9,610,799	10.2%
Biomass	1,013,148	1.1%
Solar	1,201,152	1.3%
Wind	1,093,558	1.2%
Total Generation	94,370,341	100.0%

Note:

Gross Generation - The total amount of electric energy produced by generating units and measured at the generating terminal in kWh or MWh.



By Grid	Total Generation (TWh)	% Share
Luzon	68.512	72.6
Visayas	14.054	14.9
Mindanao	11.804	12.5
Total Generation	94.370	100.0

Source: DOE Power Statistics 2017 (including off-grid generation), revised as of 30 April 2018
US Energy Information Agency (EIA)



Biofuels Production

Current Mandate: B2, E10

Targets: B10 and E20 by 2020, B20 and E85 by 2025

Renewable Energy	Capacity (in Million Liters)								No. of Projects Monitored as of 4 th Quarter 2016
	As of 2015				As of 2016				
	Construction*	Operational	Production	Sales	Construction*	Operational	Production	Sales	
Biodiesel	-	584.9	204.0	200.6	90.0	614.9	225.9	217.7	13
Bioethanol	83.0	222.1	167.9	168.4	149.0	282.1	230.2	226.9	13
TOTAL	83.0	807.0	371.9	369.0	239.0	897.0	456.1	444.6	26

* With Certificate of Registration of Notice to Proceed Construction



90 ML Chemrez Technologies Inc., Biodiesel Plant
(Bagumbayan, Quezon City)



54 ML Green Future Innovation Inc., Bioethanol Plant
(San Mariano, Isabela)

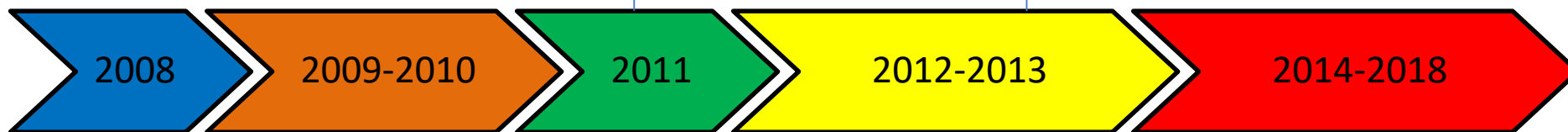
RENEWABLE ENERGY ACT OF 2008

Milestones: RA 9513

Enacted the R.A. 9513: Renewable Energy Act of 2008

National Renewable Energy Program 2010-2030

- 1st FIT Rates
- Guidelines for the Selection Process of RE Projects under FIT System and Award of Certificate for FIT Eligibility)
- Rules on Net-Metering Program
- FIT Allowance Payment and Collection Guidelines



- Implementing Rules and Regulations of RE Act
- Renewable Energy Management Bureau
- Registration of RE Developers
- National Renewable Energy Board)
- Feed-in-Tariff (FIT) Rules

- 2nd FIT Rates
 - Amendment of Installation Target
 - April 2014, 50 MW to 500 MW for Solar
 - April 2015, 200 MW to 400 MW for Wind
- Renewable Portfolio Standards Rules (On-Grid)
- FIT installation target completion for Biomass and Hydropower extended until Dec. 2019
- Green Energy Option Program Rules



RENEWABLE ENERGY ROADMAP

Short-Term (2017-2018)

- Review and update 2011-2030 NREP
- Monitor and assess RESCs awarded for the conversion of indicative projects to committed
- Finalize rules and implement RPS and REM
- Finalize rules and implement Green Energy Option

Medium-Term (2019-2022)

- Intensify development in off-grid areas for wider populace access to energy
- Determine realistic RE potential
- Update the NREP 2017 – 2040

Long-Term (2023-2040)

- Continue and accelerate implementation of RE projects
- Conduct regular updating of RE resource database

ACCELERATION OF RE POSITIONING

- Conduct detailed RE technology and resource assessment
- Review other RE policy mechanisms

CREATION OF CONDUCTIVE BUSINESS ENVIRONMENT

- Streamline administrative processes of RESC applications
- To work on DOE energy projects to be declared as projects of national significance
- Enhance EVOSS for RE projects
- Provide technical assistance to lower investment cost
- Promote and incentivize local technology producers
- Establish RE Information Exchange
- Explore and initiate on the harmonization of LGU and national government related programs and policy

RELIABLE AND EFFICIENT INFRASTRUCTURE

- Strengthen resiliency of RE systems and facilities
- Harmonize transmission Development Plan with RE targets
- Develop geographical installation target
- Enhance local technical capabilities
- Conduct R&D on the efficiency of RE technologies on the Smart Grid System

**INCREASED RE INSTALLED CAPACITY
TO AT LEAST 20,000 MW**

RENEWABLE ENERGY ROADMAP

**Short-Term
(2017-2018)**

**Medium-Term
(2019-2022)**

**Long-Term
(2023-2040)**

PROMOTE AND ENHANCE RD&D AGENDA

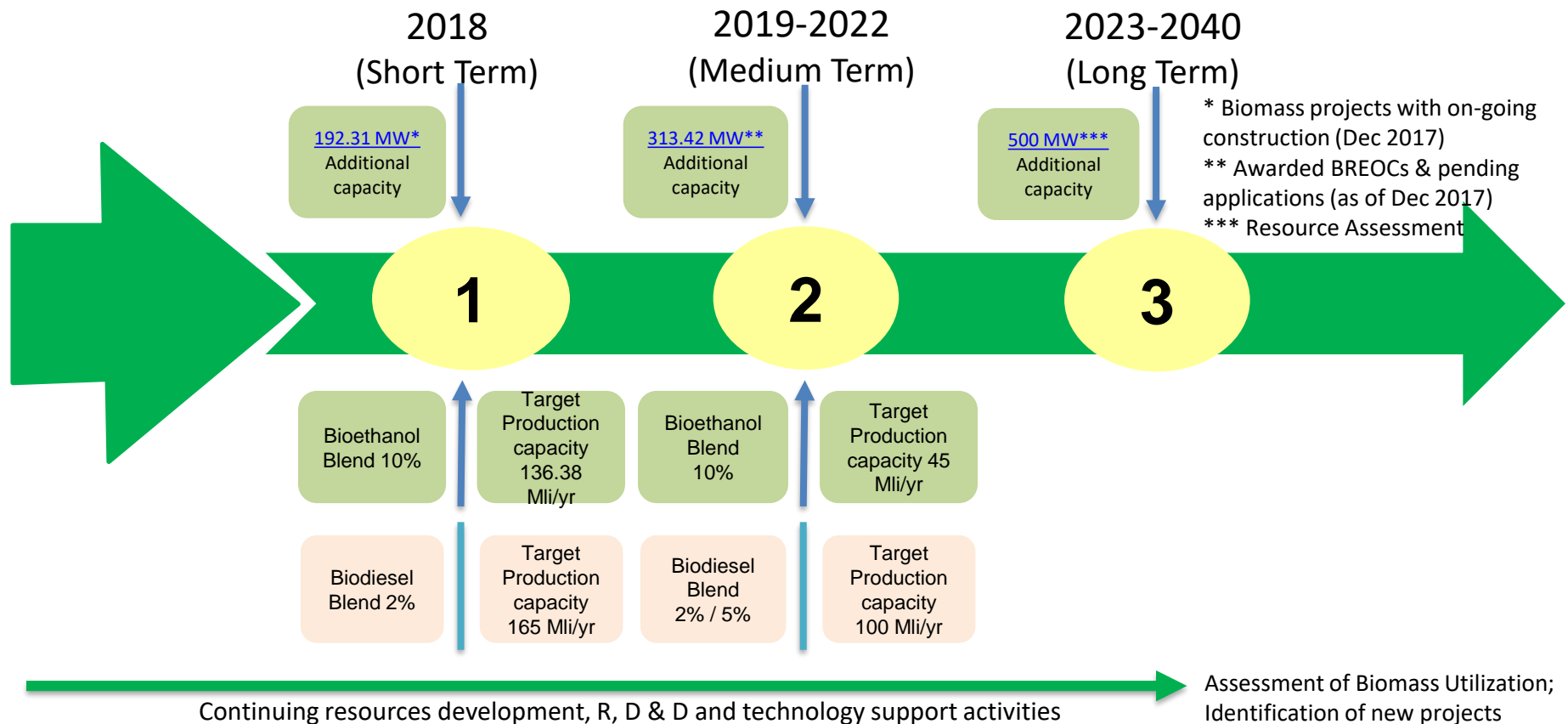
- Strengthen the management and operation of ARECS
- Continue conduct of RE technology research and development studies
- Identify viability of new technologies
- Construct Ocean pilot/demo Energy projects
- Implement, monitor and evaluate pilot/demo projects for new RE technologies

OTHER ACTIVITIES

- Identify parameters to determine the viable Ocean Energy tariff rate
- Continue technical capacity building on RE
- Conduct research and promote low-enthalpy geothermal areas for power generation and direct use/non-power application for development
- Harmonize the DOE related programs with agro-forestry policies for an integrated use of biomass
- Continue the conduct of IEC to attain social acceptability

**INCREASED RE INSTALLED CAPACITY
TO AT LEAST 20,000 MW**

TARGETS: Biomass Sector Roadmap (2018-2040)



RE CAPACITY ADDITIONS

From 2009 – December 2017

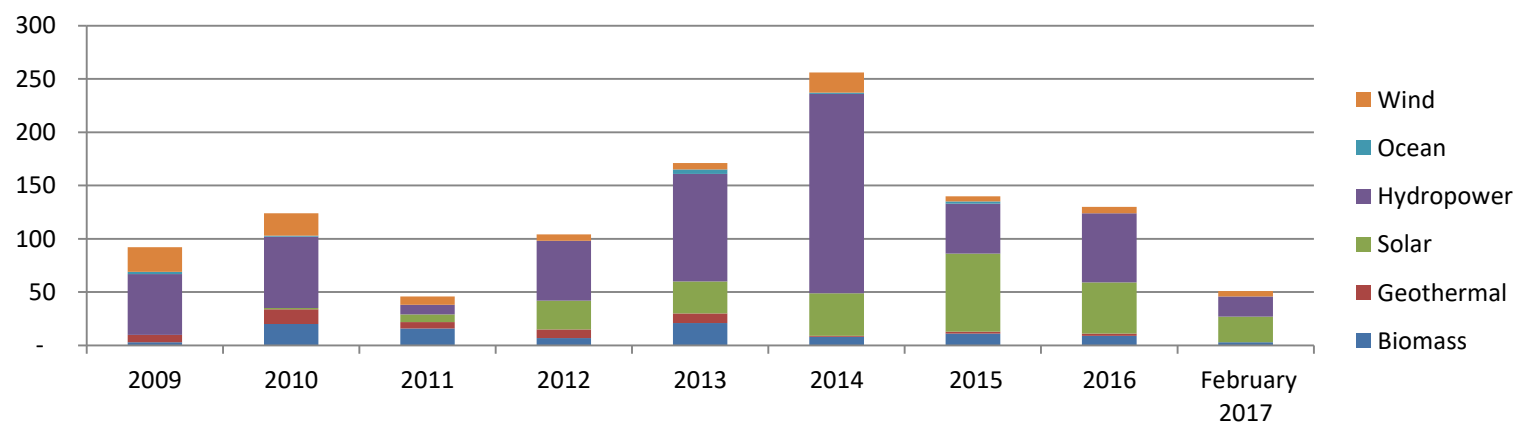
RESOURCES	2009	2010	2011	2012	2013	2014	2015	2016	2017	Own-Use	Net Metering	Total
	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW
Biomass	37.33	35.90	19.00	19.00	0.876	12.00	124.50	40.80	17.14	128.16		434.71
Geothermal	-	-	-	-	-	50.00	10.00			-		60.00
Solar	-	-	-	-	-	22.00	141.77	728.58	-	3.22	8.163	903.73
Hydro Power	-	2.00	2.10	11.80		16.65	14.82	10.00	8.50	-		65.87
Ocean Energy	-	-	-	-	-	-				-		-
Wind	-	-	-	-	-	303.90	90.00			0.006		393.91
TOTAL	37.33	37.90	21.10	30.80	0.88	404.55	381.09	779.38	25.64	131.38	8.16	1,858.20



Renewable Energy Service/Operating Contracts Milestone

Awarded Renewable Energy Service/Operating Contracts (RES/OCs) and Certificate of Registrations (CORs) for Own-Use

Resource	2009	2010	2011	2012	2013	2014	2015	2016	February 2017	TOTAL RESOC/COR as of Feb 2017	TERMINATED as of Feb 2017	ACTIVE RESOC/COR as of Feb 2017
Biomass	3	20	16	7	21	8	11	9	3	98	29	69
Geothermal	7	14	6	8	9	1	2	2	-	49	6	43
Solar	-	1	7	27	30	40	73	48	24	250	60	190
Hydropower	57	67	9	56	101	187	47	65	19	608	176	432
Ocean	2	1	-	-	4	1	2			10	3	7
Wind	23	21	8	6	6	19	5	6	5	99	35	64
Grand Total	92	124	46	104	171	256	140	130	51	1,114	309	805

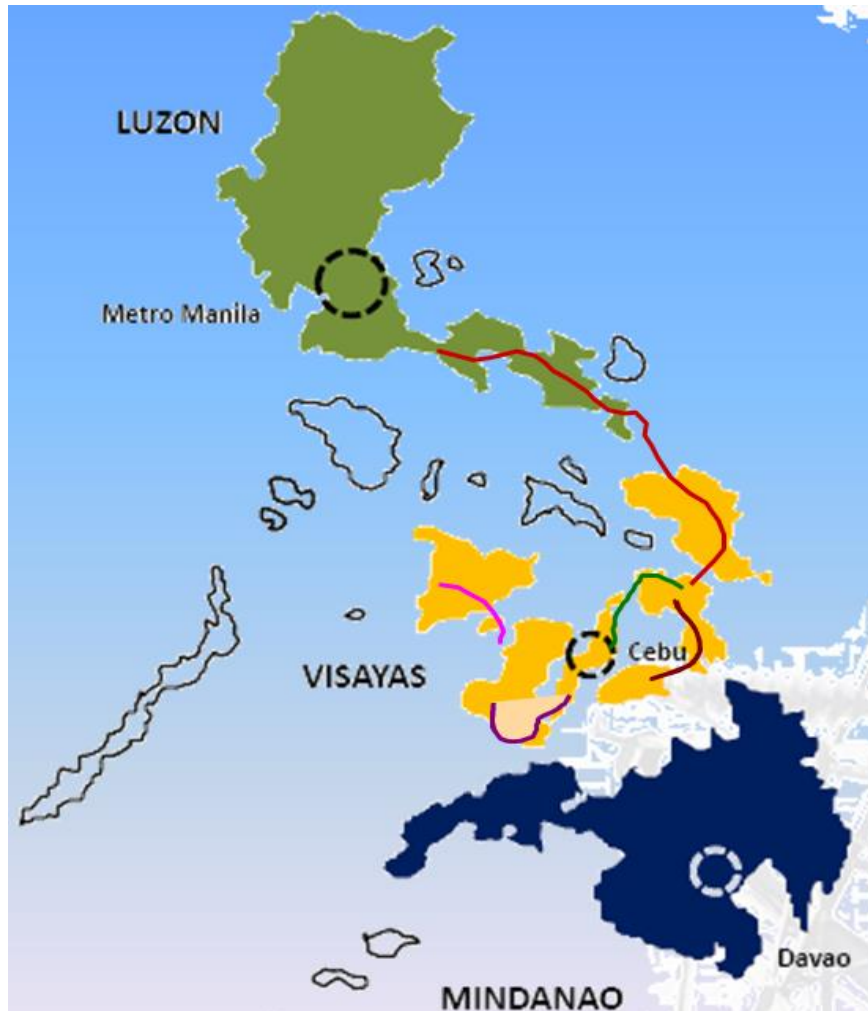


ACCREDITED RENEWABLE ENERGY (RE) SUPPLIERS, MANUFACTURERS AND FABRICATORS

- Solar and Wind – 9
 - Biomass – 1
 - Geothermal – 4
 - Hydropower – 1
-
- Term – 3 years renewable for the same period.



MICRO-GRID AND REGIONAL GRID POLICIES

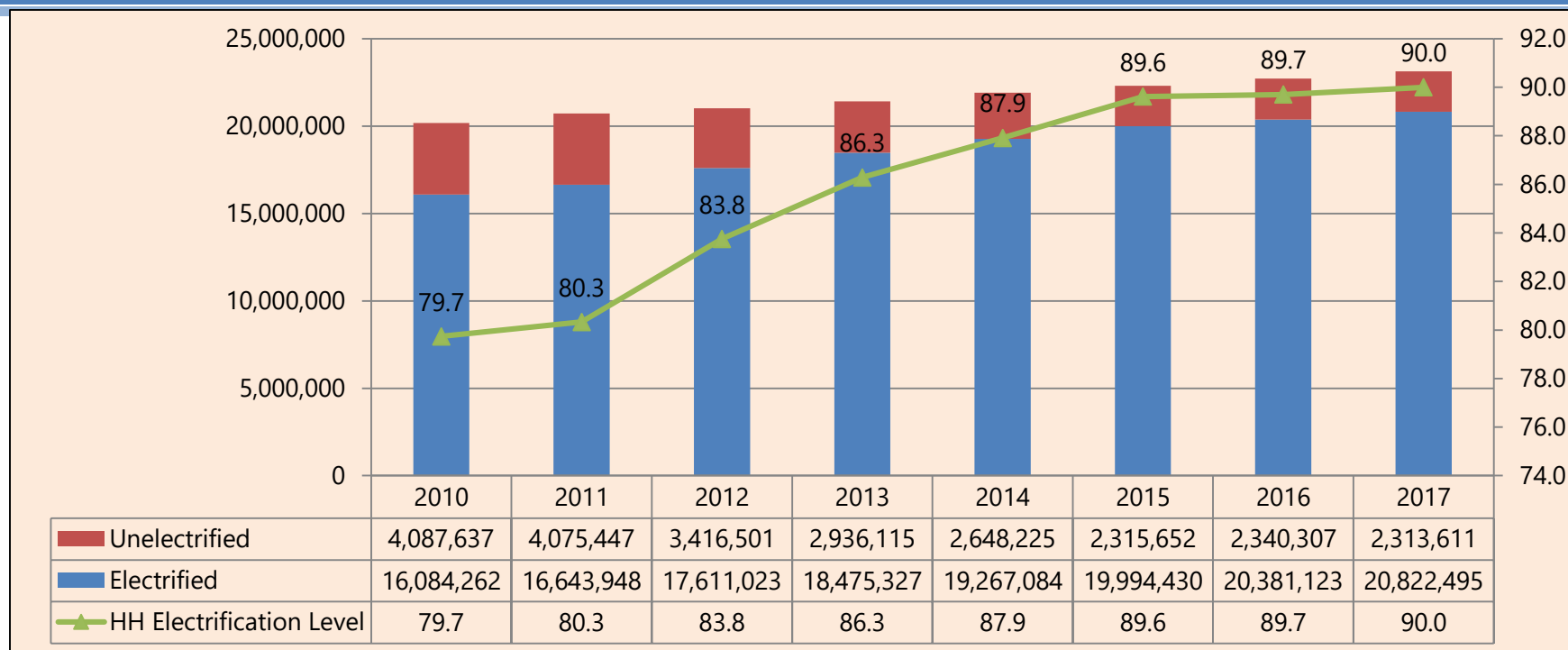


Draft licensing rules for distributed energy resources that includes rules on micro-grid

- Entry of private entities into franchise area of electric cooperatives.
- A group of interconnected loads and distributed energy resources with clearly defined boundaries.
- Act as a single controllable grid and can connect and disconnect from the national grid to enable it to operate both grid-connected or island mode.
- Mindoro
- Romblon
- Palawan



Household Electrification 2010 - 2017



Note: 2010 – 2015 are actual HH electrification level data. 2016-2017 were computed based on the HEDP sub-program household targets for said years.



- Household electrification level stands at 89.6 percent as of December 2015
- Attaining 90 percent household electrification by 2017 entails providing electricity access to 828,065 households (2016 – 386,693; 2017 – 441,372).

POLICIES SUPPORTING MICROGRID SYSTEMS

Exempt small RE systems from re service contract requirements.

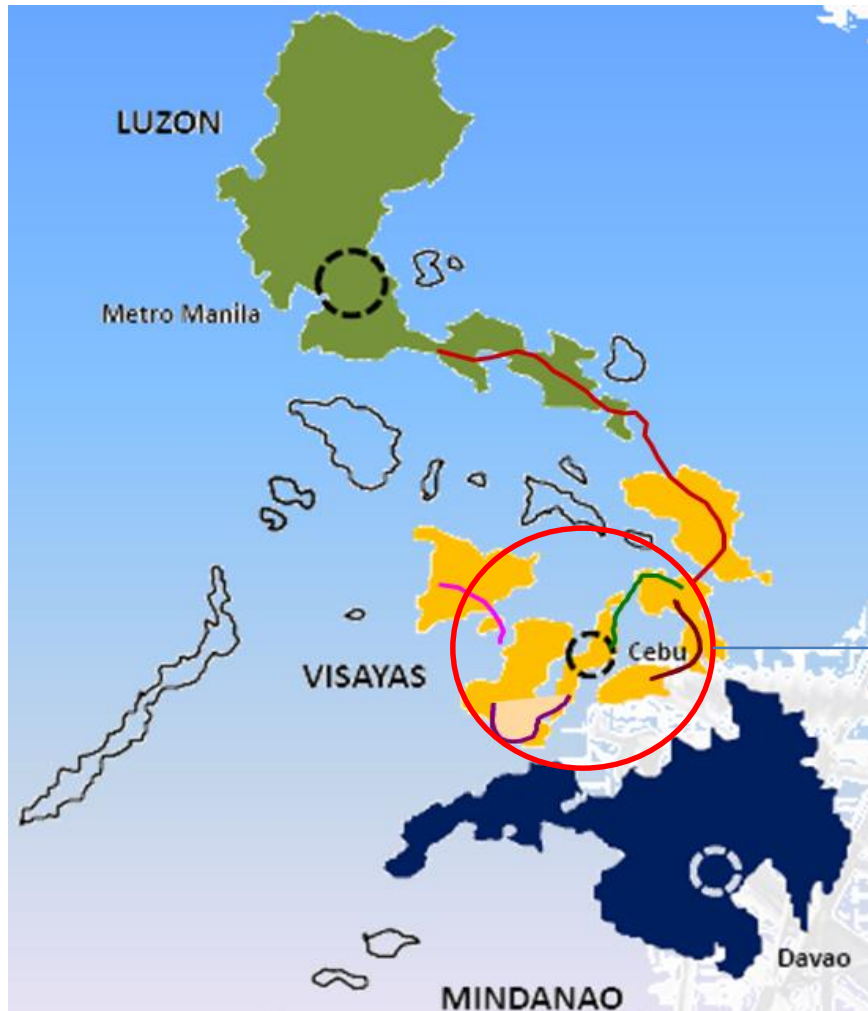
Rules on energy storage systems (EES)

Encourage hybridization

RPS in off grid areas.



CHALLENGES AND WAY FORWARD



- Grid Congestion brought about by limited transmission line capacity
- NGCP to upgrade grid by 2020

On-going studies:

- Competitive RE Zoning
- Variable RE Cost-Benefit Analysis applying (RECD) Model



SOLAR INSTALLED CAPACITY (as of June 2018)

PARTICULARS	NO. OF PROJECTS	CAPACITY (MW)
FIT System	20	525.94
PhP9.68/kWh	6	108.90
PhP8.69/kWh	17	417.04
Non-FIT System	18	374.23
Under WESM	16	361.03
Under PPA	2	13.20
Net-Metering	(1698 end-users)	13.37
Total	38	913.54



RENEWABLE ENERGY GREEN JOBS

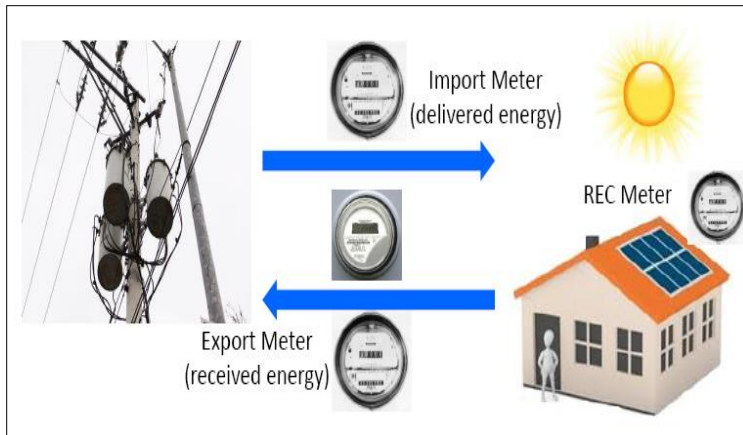
2009-2017	BIOMASS	SOLAR	WIND	HYDROPOWER	GEOTHERMAL	TOTAL
Additional Capacity	306.55	892.35	393.9	65.87	60.00	
Construction Jobs	12,875	80,312	35,451	4,051	720	133,409
O & M Jobs	1,379	1,606	1,773	474	306	5,539
TOTAL	14,255	81,918	37,224	4,525	1,026	138,947

138,947 Green Jobs



NET-METERING RULES

- Facilitate customer to produce its own electricity supply @ 100 kW or below.
- Connection/Sale of customers' RE Generation to the Grid
 - ERC approved the Net Metering Rules on 27 May 2013
- As of June 2018, a total of 1698 net metering customers have an estimated compounded capacity of 13,373.44 kWp (all solar PV systems)



FEED-IN-TARIFF SYSTEM

FIT-Eligible Projects as of December 2017

RESOURCE	INSTALLATION TARGET	ERC APPROVED FIT RATES	ERC APPROVED DEGRESSION RATES RATES	WITH CERTIFICATE OF ENDORSEMENT TO ERC		INSTALLATION TARGET BALANCE
	CAPACITY (MW)	(PhP/Kwh)		NO. OF PROJECTS	CAPACITY (MW)	CAPACITY (MW)
HYDROPOWER	250	5.90	.5% after year 2 from effectivity**** of FIT	5	34.60	215.40
		5.8705***			-	-
WIND	200	8.53	.5% after year 2 from effectivity of FIT	3	249.90	6.10
	200 *	7.40**		3	144.00	
SOLAR	50	9.68	6% after year 1 from effectivity of FIT	7	108.90	-
	450 *	8.69**		17	417.05	
BIOMASS	250	6.63	.5% after year 2 from effectivity of FIT	15	125.16	111.39
		6.5969***		4	13.45	
OCEAN	10	Deferred	-	-	-	-
TOTAL	1,400.00			54	1,079.61	332.89

* - Additional installation targets

** - FIT rates for the respective additional installation targets (W -ERCRes14,s2015; S -ERCRes6,2015)

*** - Degressed FIT rates (H&B-ERCRes1,2017)

**** - Reckoning date is January 2015 (Deadline: December 2019)

US \$1.00 = Php 53.37 (20 August 2018)



RENEWABLE PORTFOLIO STANDARDS (RPS)

Separate rules for on-grid and off-grid

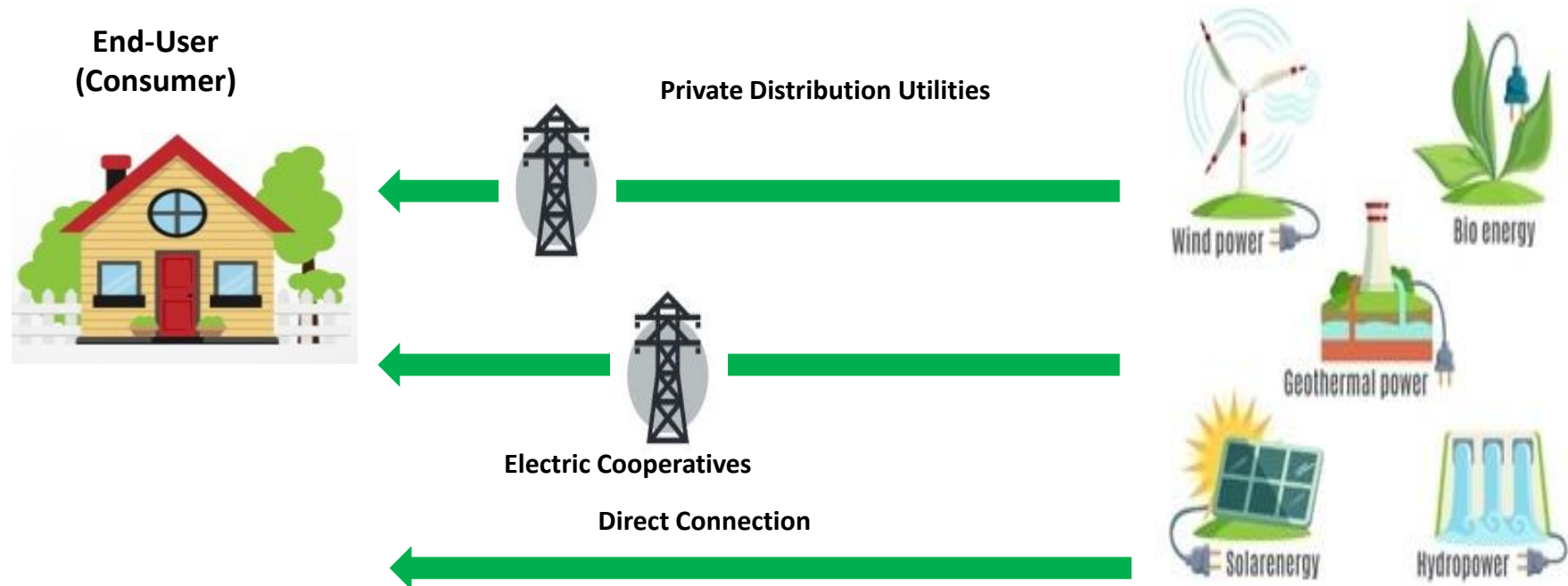
- Mandates minimum percentage of RE generation to the total supply of electricity.
- Mandating all utilities and GENCOs with directly connected costumers.
- Full implementation in 2020.
- Generates RE Certificates for compliance



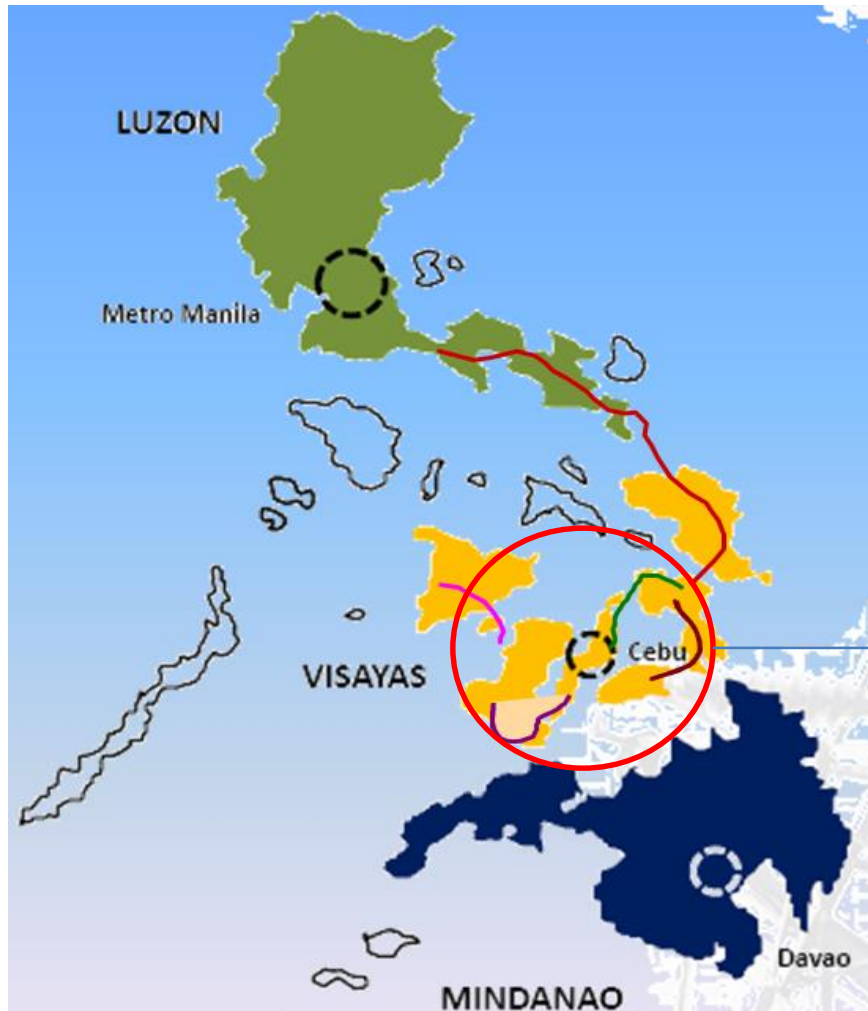
GREEN ENERGY OPTION PROGRAM

Guiding Principles

- Provides end-users the option to choose RE Resources as their source of energy.



CHALLENGES AND WAY FORWARD



- Grid Congestion brought about by limited transmission line capacity
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STREAMLINING OF PERMITS

- Executive Order No. 30 (EO 30)
 - Creating the Energy Investment Coordinating Council (EICC) in Order to Streamline the Regulatory Procedures Affecting Energy Projects
 - Classification of Energy Projects of National Significance (EPNS)
- Republic Act No. 11032 or “Ease of Doing Business and Efficient Government Service Delivery Act” – May 2018



RELIABLE RE FACILITIES

- Energy Resiliency Policy
 - “Adoption of Resiliency Planning and Program in the Energy Industry to Mitigate Adverse Effects Brought About by Disasters”
 - Promotes planning and investment to ensure nation’s energy infrastructure continues to deliver while anticipating and reducing vulnerabilities



THANK YOU!



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