49TH EGNRET MEETING AND ASSOCIATED EVENTS
23-27 October 2017, Tokyo, Japan

Philippines Renewable Energy Development

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Presentation Outline

I. Governing Laws
   - Biofuels Act of 2006
   - Renewable Energy Act of 2008

II. Implementation Updates (RA 9513)

III. Challenges

IV. Way Forward

Governing Law

R. A. No. 9367: The Biofuels Act of 2006

Mandates the Use of Biofuel-Blended Gasoline and Diesel Fuels

BIODIESEL

- 2008 consumption of 91 million liters (CME)
- 1% biodiesel blend sold in all gasoline stations
- 2% current mandated blend since 2009

BIOETHANOL

- 5% by total volume in February 2009
- 10% current mandate blend since February 2012

RA No. 9367: The Biofuels Act of 2006

IMPLEMENTATION STATUS

BIODIESEL

Supply:

- 11 Accredited Producers with annual total capacity of 584.9 million liters
- 2 pending applications with proposed total annual capacity of 90 million liters

Feedstock Used:

- Coconut oil (current)
- Jatropha, waste cooking oil, microalgae (under study)

BIOETHANOL

Supply:

- 10 Accredited Producers with annual total capacity of about 282.12 million liters
- 3 production facilities to be on-stream between 2016-2018 with additional capacity of 149 million liters/year

Feedstock Used:

- Sugar Cane, Molasses (current)
- Sweet sorghum, cassava, nipa sap, macroalgae (under study)

RA No. 9367: The Biofuels Act of 2006

Biofuels Production

Current Mandate: B2, E10

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

Renewable Energy	Capacity (in Million Liters)- As of Dec 2016				No. of Projects Monitored as of 4th Quarter 2016
	Construction*	Operational	Production	Sales	
Biodiesel	90.0	614.9	225.9	217.7	13
Bioethanol	149.0	282.1	230.2	226.9	13
TOTAL	**239.0**	**897.0**	**456.1**	**444.6**	**26**

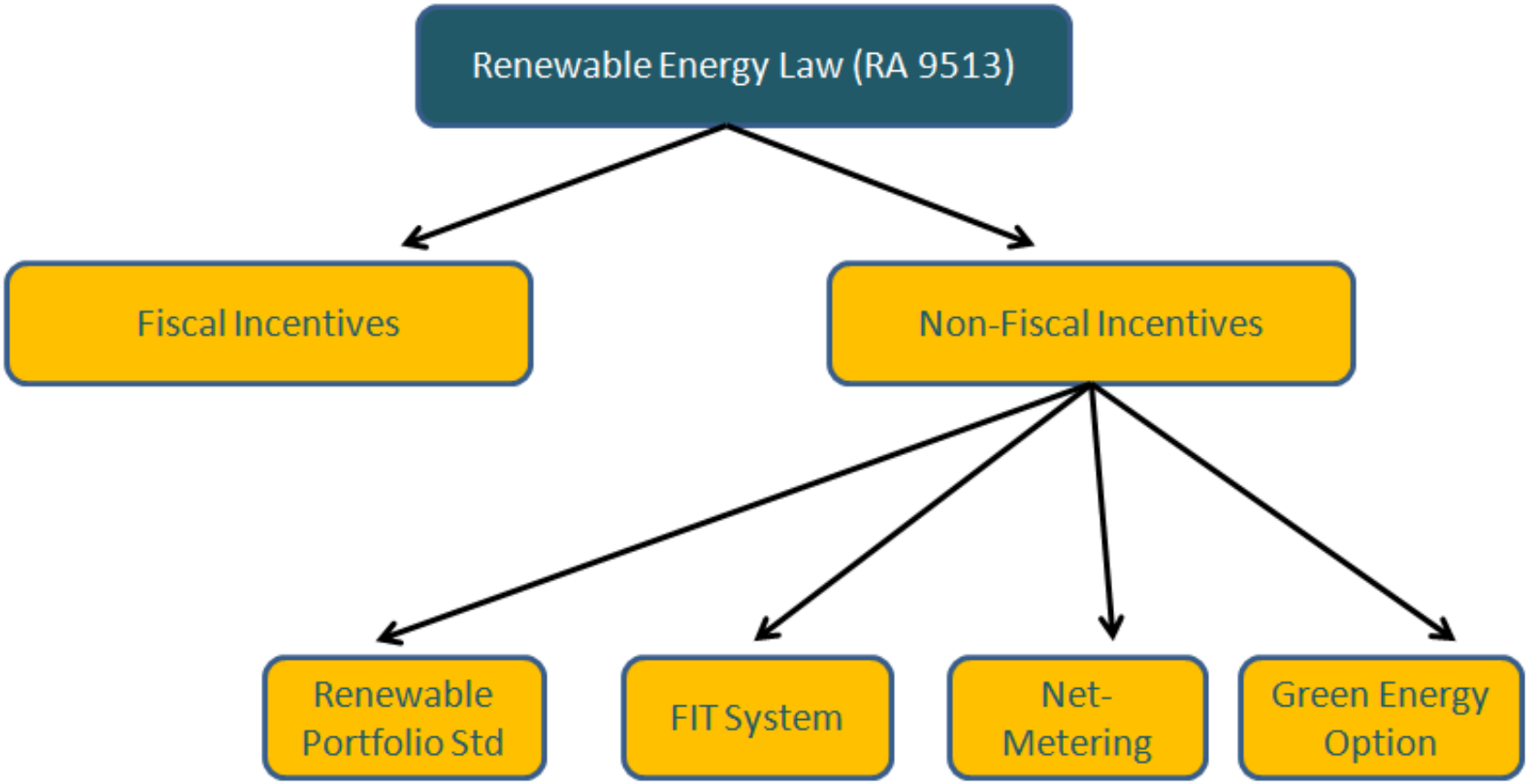
**** With Certificate of Registration of Notice to Proceed Construction***

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

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

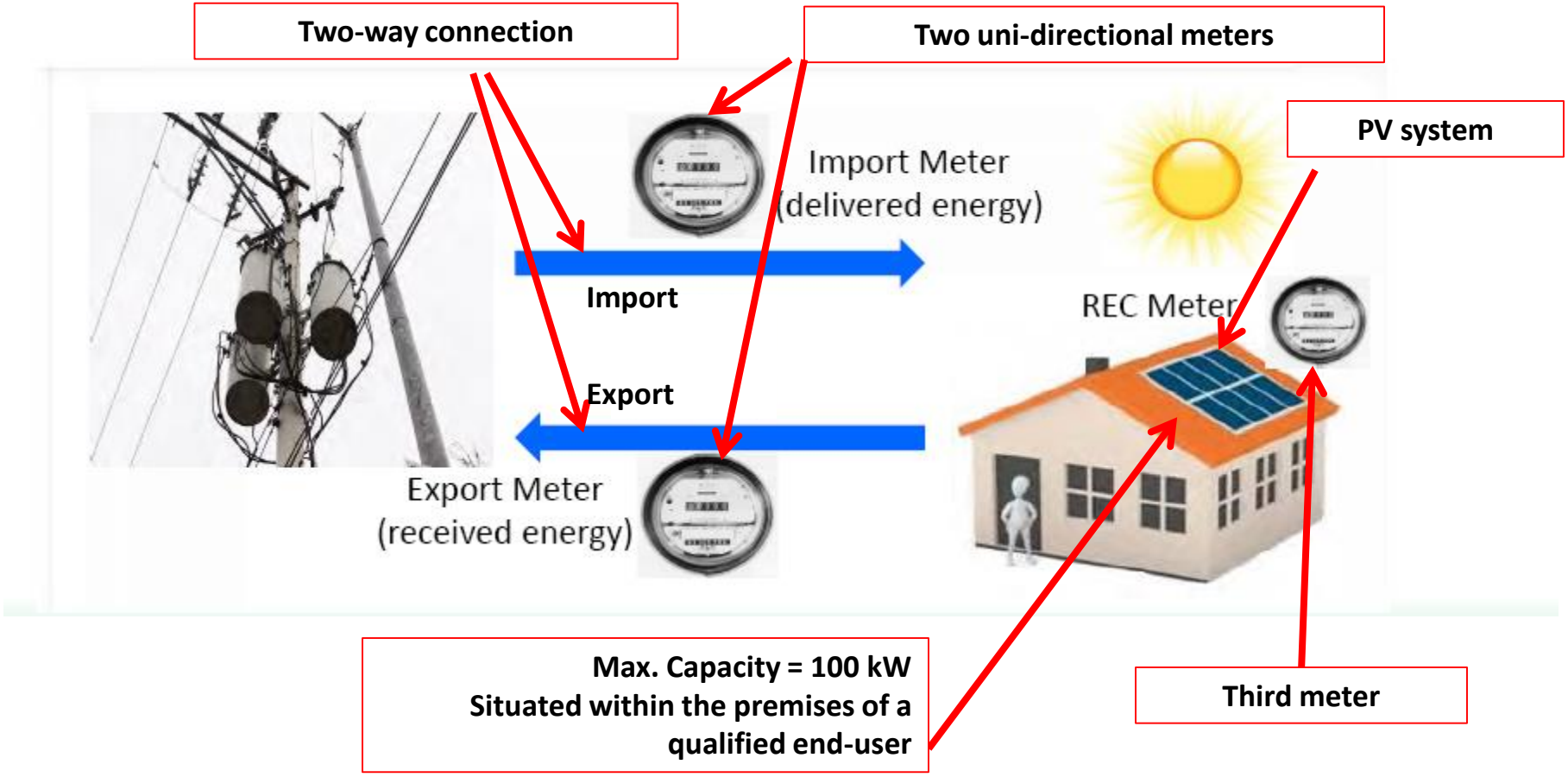
Republic Act No. 9513: The Renewable Energy Act of 2008

Incentives under the RE Act



Net Metering Program

- ✓ A Renewable Energy Policy Mechanism which shall provide consumers to produce its own electricity requirement with maximum capacity of 100 kW.



Implementation Updates: RA 9513

Net-Metering Rules and Interconnection Standards

- Connection / sale of customers' RE generation to the grid
- The ERC approved the Net Metering Rules last May 27, 2013
- Total Number of Net Metering Customers as of July 2017 is 822 with a installed capacity of 6,304.44 kWp

St. Scholastica's College

UPDATE ON NET-METERING AS OF 31 July 2017

DUs	NO. OF CUSTOMERS	Capacity (kWp)
MERALCO	880	5610.48
VECO	32	193.21
CEBECO III	1	3.00
CEBECO I	5	84.00
DLPC	14	193.20
AEC	9	48.82
BATELEC I	1	10.00
PELCO II	6	39.00
LEYECO V	2	6.00
PANELCO	1	100.00
OEDC	2	16.73
Total	**953**	**6304.44**

Implementation Updates: RA 9513

Feed-in-Tariff (FIT) System

- NREB established a Committee to conduct study on the way forward for FIT System. (Stranded RE Generation, RE Auction, Impact of FIT System)

Feed-in-Tariff (FIT) Rates

RE Technology	Approved Rates (PHP/kWh)	Installation Target (MW)
Run-of-River Hydro	5.8705***	250
Biomass	6.5969***	250
Wind	7.40*	(with initial target of 200) 400**
Solar	8.69*	(with initial target of 50) 500**

* *Feed in Tariff (FIT) rates for solar was revised in March 2015 under Resolution No. 6, series of 2015 issued by ERC from Php 9.68 to 8.69/kWh covering additional target of 450 MW.*
The second FIT rate for wind energy was issued by the ERC on October 2015 at Php 7.40/kWh from Php 8.53/kWh covering additional target of 200MW under ERC Resolution No. 14, series of 2015.

** *Amended targets for wind energy and solar power up to March 15, 2016.*

*** *Under Resolution No. 1 series of 2017, the ERC on January 2017 issued the degressed FIT rates to cover January to December 2017 for Run-of-River Hyro Plants from Php 5.9 to 5.8705/kWh and Biomass Plant from Php 6.63 to 6.5969/kwh.*

Implementation Updates: RA 9513

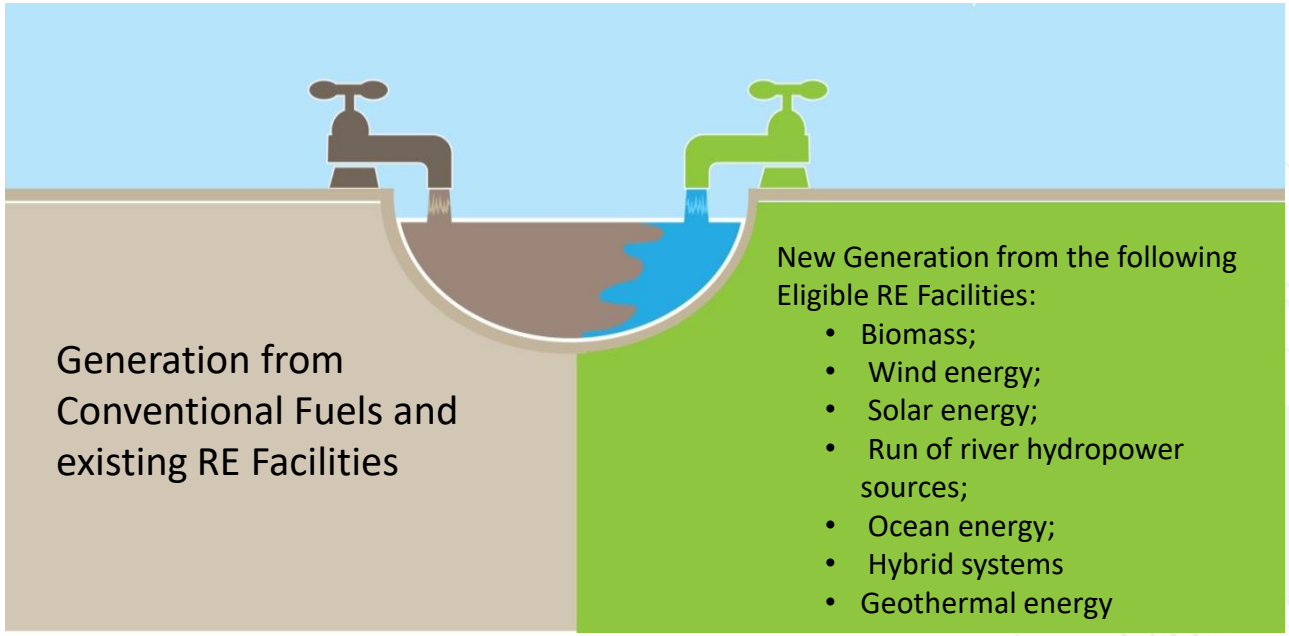
Feed-In Tariff Monitoring Board (as of June 2017)

RESOURCE	FOR NOMINATION / CONVERSION		WITH CERTIFICATE OF CONFIRMATION OF COMMERCIALITY		WITH CERTIFICATE OF ENDORSEMENT TO ERC	
	NO. OF PROJECTS	CAPACITY (MW)	NO. OF PROJECTS	CAPACITY (MW)	NO. OF PROJECTS	CAPACITY (MW)
HYDRO		-	103	841.80	5	34.60
WIND	7	1,023.55	12	987.30	6	393.90
SOLAR	15	565.18	51	1,320.60	24	525.95
BIOMASS			18	153.76	15	125.16
TOTAL	**22**	**1,588.73**	**184**	**3,303.46**	**50**	**1,079.61**

Note: For the Northwind 33 MW Wind Power Project in Bangui, Ilocos Norte, the ERC on June 2014 issued a special rate of Php 5.76/kwh

Renewable Portfolio Standards (RPS)

- ✓ **Mandated Renewable Energy electricity blend to the total supply of electricity for on-grid and off-grid areas.**

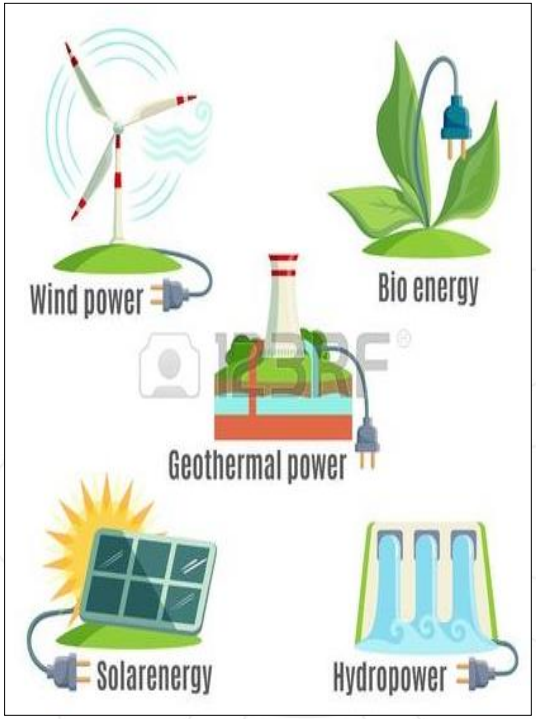


Green Energy Option Program

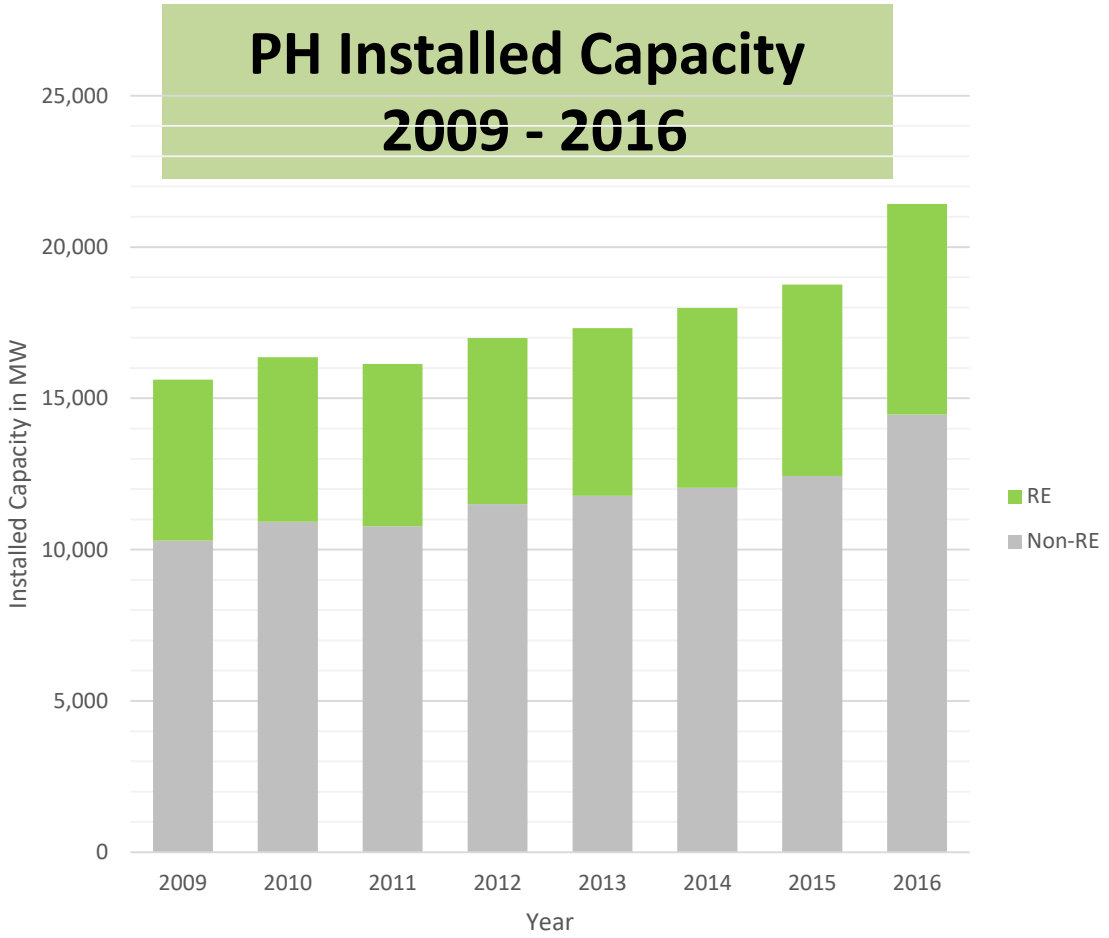
✓ **A Renewable Energy Policy Mechanism which shall provide end-users the option to choose RE Resources as their source of Energy.**

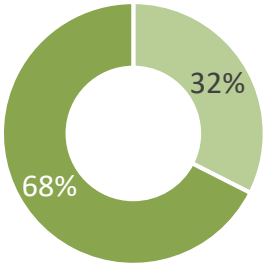
End-Users

- **Distribution Utilities**
- **Electric Cooperatives**
- **Direct Connections**



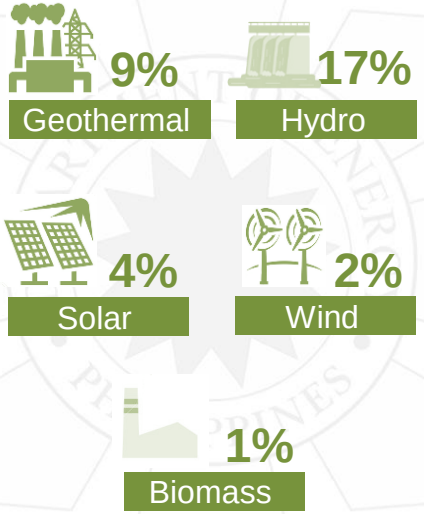
Implementation Updates: RA 9513





21,423MW

2016 PH Total Installed Capacity



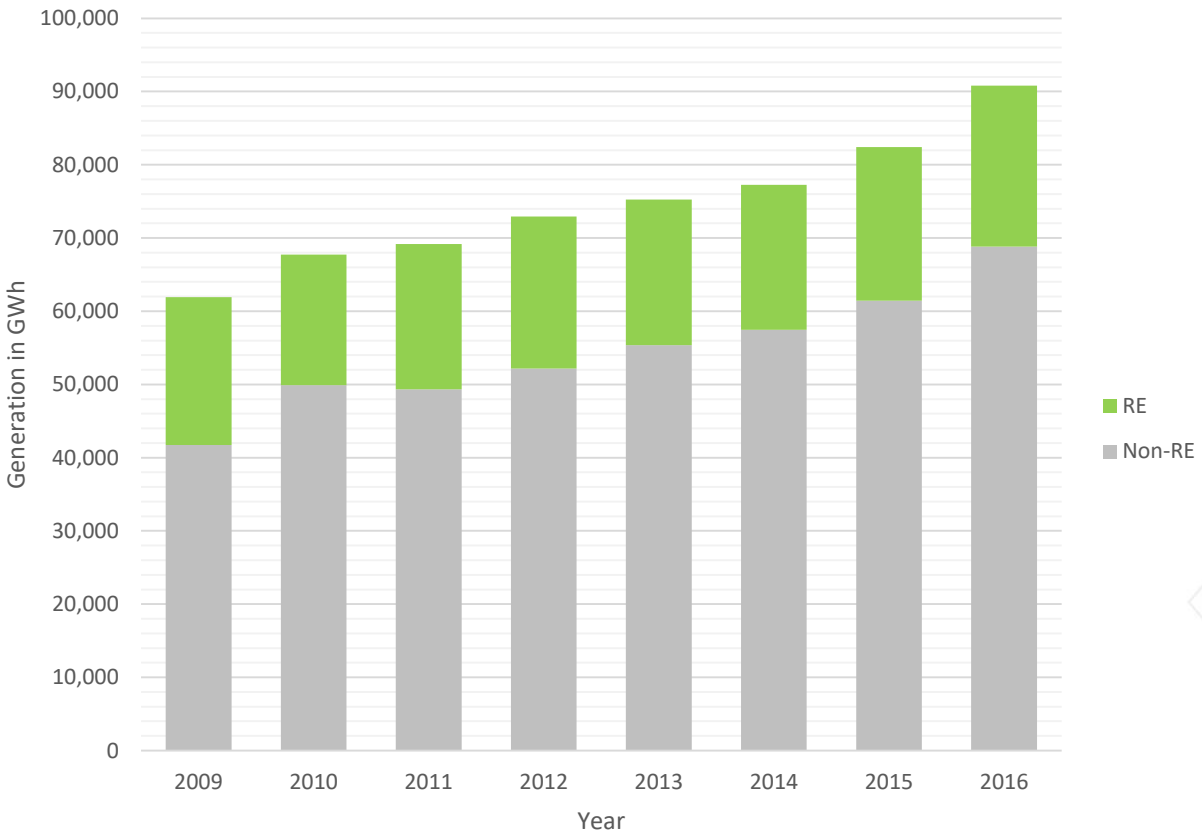
Capacity Addition since the enactment of RE Law = **1,835.89** MW

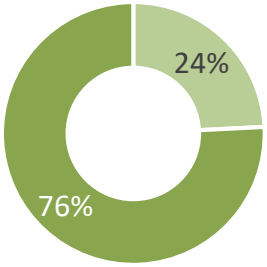
Installed Capacity under Net-Metering (recorded) = **5.324** MWp

TOTAL = 1,841.214 MW

Implementation Updates: RA 9513

PH Gross Power Generation 2009 - 2016





90,797 GWh

2016 Gross Power Generation

12% Geothermal

9% Hydro

1% Solar

1% Wind

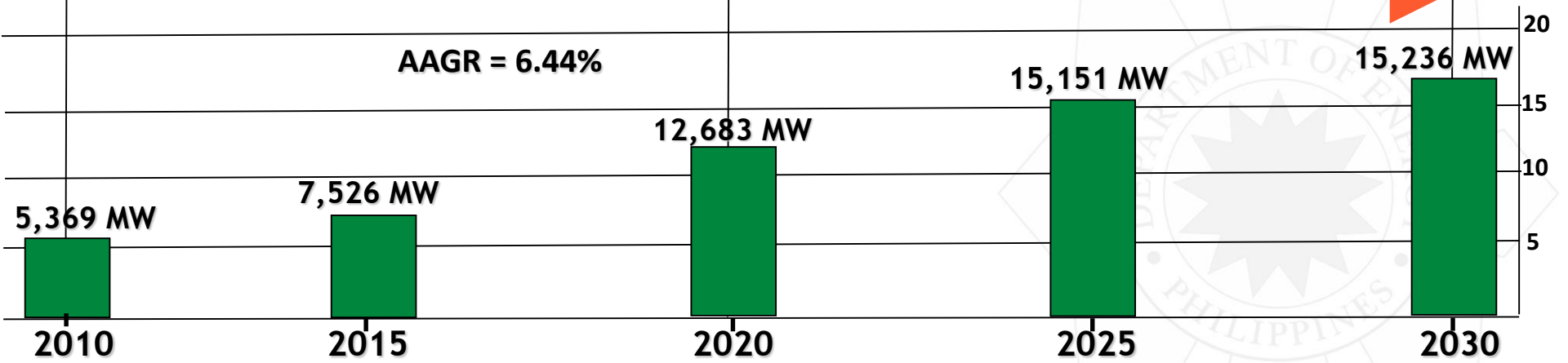
1% Biomass

NREP ROADMAP (2010-2030)

- 2012 - Full implementation of RA 9513
- 2015 - Target additional biomass capacity of 277 MW is reached
- 2018 - Commissioning of the 1st OTEC facility
- 2020 - Solar grid parity is attained

- Target additional RE capacities are reached by:
  - 2022 - Wind : 2,345 MW
  - 2023 - Hydro : 5,398 MW
  - 2025 - Ocean : 75 MW
  - 2030 - Solar : 284 MW*
  - Geothermal : 1,495 MW
- 2025 - Wind grid parity is attained

IMPLEMENTATION OF NREP SECTORAL SUB-PROGRAMS



Note: The National Renewable Energy Program (NREP) is currently under review of NREB to reflect developments on RE sector and the DOE's issuances of new Installation targets.

Source: Philippine Department of Energy/NREP

Implementation Updates: RA 9513

Summary of RE Awarded Projects as of July 2017

AWARDED PROJECTS UNDER RE LAW

RESOURCES	AWARDED PROJECTS		POTENTIAL CAPACITY MW		INSTALLED CAPACITY MW	
	Commercial	Own-Use	Commercial	Own-Use	Commercial	Own-Use
Hydro Power*	451		13,513.63		965.04	
Ocean Energy	6		26.00			
Geothermal**	41		575.00		1,906.19	
Wind	59	1	2,341.50		426.90	0.0006
Solar	196	16	5,567.27	4.286	900.18	3.218
Biomass	51	24	326.68	16.15	389.58	126.78
Sub-Total	**804**	**41**	**22,350.08**	**20.436**	**4,587.89**	**130.00**
TOTAL	**845**		**22,370.52**		**4,717.89**	

NOTE:

** - excluding 55 installed projects with 3,050.47MW capacity under RA 7156, CA 120, PD 1645, RA 3601 & Own-Use*

*** - excluding 1 potential project with 20MW capacity under PD 1442.*

PENDING APPLICATIONS UNDER RE LAW

RESOURCES	PENDING APPLICATIONS		POTENTIAL CAPACITY MW		INSTALLED CAPACITY MW	
	Commercial	Own-Use	Commercial	Own-Use	Commercial	Own-Use
Hydro Power	86		2,227.17			
Ocean Energy	-		-			
Geothermal	3		60.00			
Wind	22		80.00			
Solar	162		3,377.20			
Biomass	7		91.30			
Sub-Total	**280**	**-**	**5,835.67**	**-**	**-**	**-**
TOTAL	**280**		**5,835.67**		**0.00**	

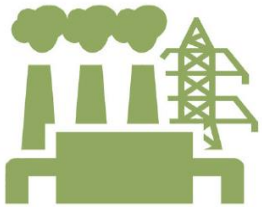
Implementation Updates: RA 9513

ACCREDITED RENEWABLE ENERGY (RE) SUPPLIERS, MANUFACTURERS AND FABRICATORS

Solar

Wind

= 9

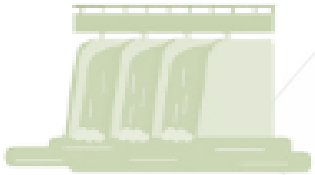


Geothermal

= 4

Biomass

= 1



Hydro

= 1

Term: Three (3) years renewable

Environmental & Social Impact

Year	Capacity Addition (MW)	Emission Reduction (t-CO2/year)	Cumulative Emission Reduction (2009-2015)
2008	3.6	11,600.45	11,600.45
2009	29.33	94,511.48	106,111.93
2010	23	71,876.27	177,988.20
2011	29.1	91,420.71	269,408.91
2012	30.8	86,045.66	355,454.57
2013	1.476	4,085.00	359,539.57
2014	468.65	1,138,632.50	1,498,172.07
2015	361.09	1,163,557.80	2,661,729.87
2016	782.21	2,520,553.18	5,182,283.05
Total	1,729.3	5,182,283.05	5,182,283.05

35,055 Green Jobs

Generated (2008-2016)

Total	Capacity Addition (MW)	Construction Jobs	Full Time O&M Jobs
2008	3.6	90	11
2009	29.33	733	88
2010	23	558	64
2011	29.1	710	82
2012	30.8	672	65
2013	1.476	32	4
2014	468.65	7,251.00	410
2015	361.09	5,332.00	316
2016	782.21	16,855	1782
Total	1,729	32,233	2,822

Challenges and Way Forward

- Awareness and social acceptance
- Streamlining of Administrative Process
- Full implementation of Policy Mechanisms under the RE Law
- Harmonization of laws/policies
- Renewable Energy development hindered by geographical boundaries

RE Resource Assessment

Hydropower Potential Sites- JICA resource inventory result

- 1,413 Sites with potential capacity of 20,599.05 MW
  - Out of the 1,413 Sites, 188 sites is located in Mindanao with a potential capacity of 912.13 MW.

USAID Biomass Resource Inventory Result

- 4,446.54 MWe Potential Power Generation Capacity net of Competing uses (MW)
- 17.26 MtCO2 Potential GHG emission reduction (tCO2)

On-going detailed resource assessment of selected Low Enthalpy Geothermal Areas

Detailed Wind Resource Assessment Project launched last February 20, 2015

Battery Energy Storage System (BESS) be classified as a new source of Frequency Control Ancillary Services (FCAS), particularly as contingency reserve (primary reserve) and Frequency regulation (secondary reserve).

IRENA
International Renewable Energy Agency

RENEWABLES
READINESS ASSESSMENT

THE PHILIPPINES

March 2017

IRENA
International Renewable Energy Agency

ACCELERATING RENEWABLE
MINI-GRID DEPLOYMENT:

A STUDY ON THE PHILIPPINES

OCTOBER 2017

Energy Storage Project

Committed (CONSTRUCTED):

- 10MW Masinloc, Zambales

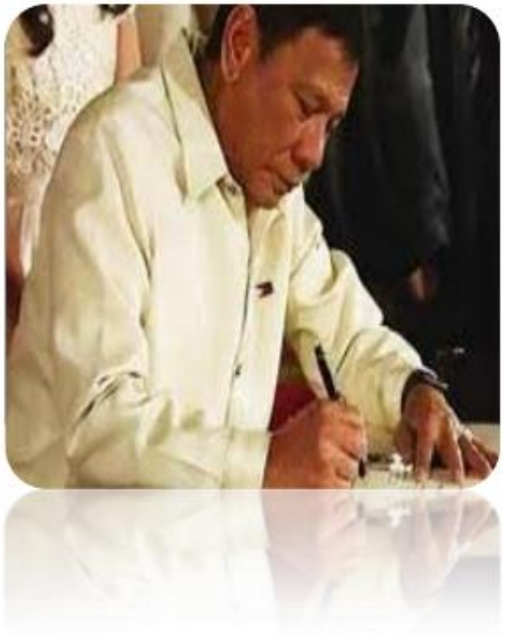
Indicative:

- 40MW - Kabankalan, Negros Occ.
- 15MW - Amlan, Negros Oriental
- 15MW - Ormoc, Leyte
- 15MW - Compostela, Cebu
- 15 MW - Cadiz City, Negros Occidental
- 30 MW - Silay, Negros Occidental

WHERE ARE WE HEADED?

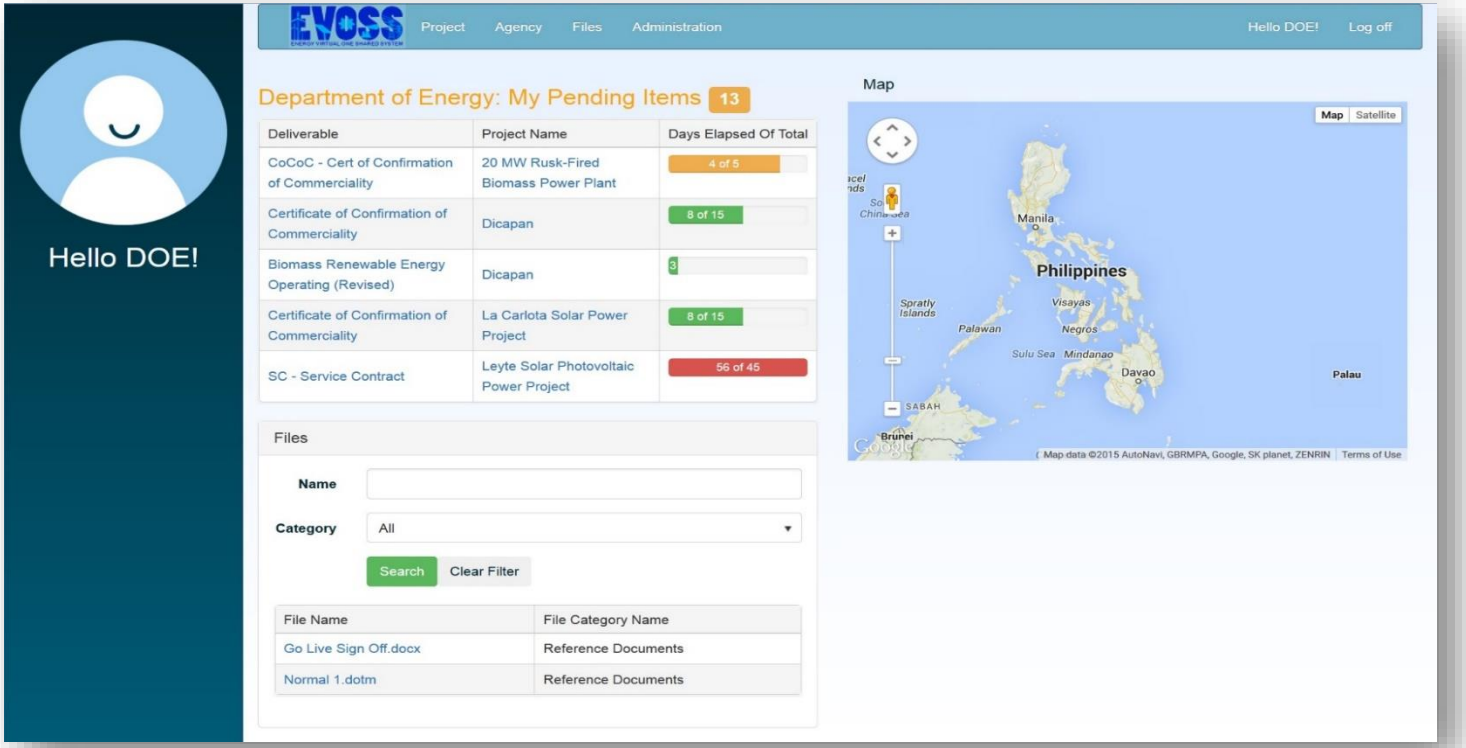
New Policy Initiatives

- 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)
    - Capital Investment of at least PhP 3.5 Billion
    - Contribution to the country's economic development
    - Consequential economic impact
    - Potential contribution to the country's balance of payments
    - Impact on the environment
    - Complex technical processes and engineering designs
    - Infrastructure requirements



Energy Virtual One Shared System (EVOSS)

- Web-based monitoring system to facilitate approval process of applications in the energy sector and contains a database of processes, existing forms, fees, project related information and permits issued



WHERE ARE WE HEADED?

New Policy Initiatives

- 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

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Thank you!

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