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# Renewable Energy in the Philippines

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# Renewable Energy

- Biomass / Biofuels
- Geothermal
- Solar Power
- Hydropower
- Ocean
- Wind Power



# Renewable Energy

- **sustainable** as it is obtained from sources that are inexhaustible
- It is clean energy and non-polluting.
- Many forms do not emit any greenhouse gases or toxic waste in the process of producing electricity.
- It is a sustainable energy source which can be relied on for the long-term.



# Why Renewable Energy?

- RE is practically infinite if managed properly
- It mitigates climate change & foster sustainable development
- The Clean Development Mechanism provides carbon credits & the RE Law gives incentives for RE sources to make RE projects attractive and viable



# Why Renewable Energy in the Philippines?

## 1. ENERGY SECURITY

- Supports the government's goal of energy self-sufficiency and sustainability
- Climate Change imperative
- Addresses environmental concerns
- Widens carbon trading opportunity for the country
- Visionary: preparation for time when consumers will demand/prefer green energy.



# Why Renewable Energy in the Philippines?

## 2. ECONOMIC AND LOCAL DEVELOPMENT

- Promotes favorable investment climate
- Leads to avoided fuel costs or foreign exchange
- Promotes rural and off-grid development
- Savings in health and welfare costs/benefits amounting to billions of dollars due to less air pollution
- Job Creation



# Renewable Energy Potential



- Geothermal > 4,000 MW
- Wind resource > 76,600 MW
- Hydropower > 10,000 MW
- Solar > 5 kWh/m<sup>2</sup>/day
- Ocean > 170,000 MW
- Biomass > 500 MW (*bagasse & rice hulls only*)
  - Largest producer of coconut oil
  - Ranks 10th in world sugarcane production

Source: Philippine Department of Energy/REMB



# Challenges and Barriers

- High upfront and technology costs
- Non-competitiveness
- Non-viable markets
- Inaccessible Financial Packages
- Social Acceptability

*To address these barriers, the Government promulgated landmark Laws to accelerate development of the Country's renewable energy resources.*





# Enactment of Landmark Laws

Republic Acts Nos.  
(RA) 9367 and 9513



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

Provide fiscal incentives and mandate 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% biodiesel blend by Feb. 6, 2009

## BIOETHANOL

- Start of 5% by total volume mandate on Feb. 6, 2009
- 10% bioethanol blend to all gasoline on Feb. 6, 2012



# R. A. No. 9513: The Renewable Energy Act of 2008



Accelerate the development of the country's renewable energy resources by providing fiscal and non-fiscal incentives to private sector investors and equipment manufacturers / suppliers.

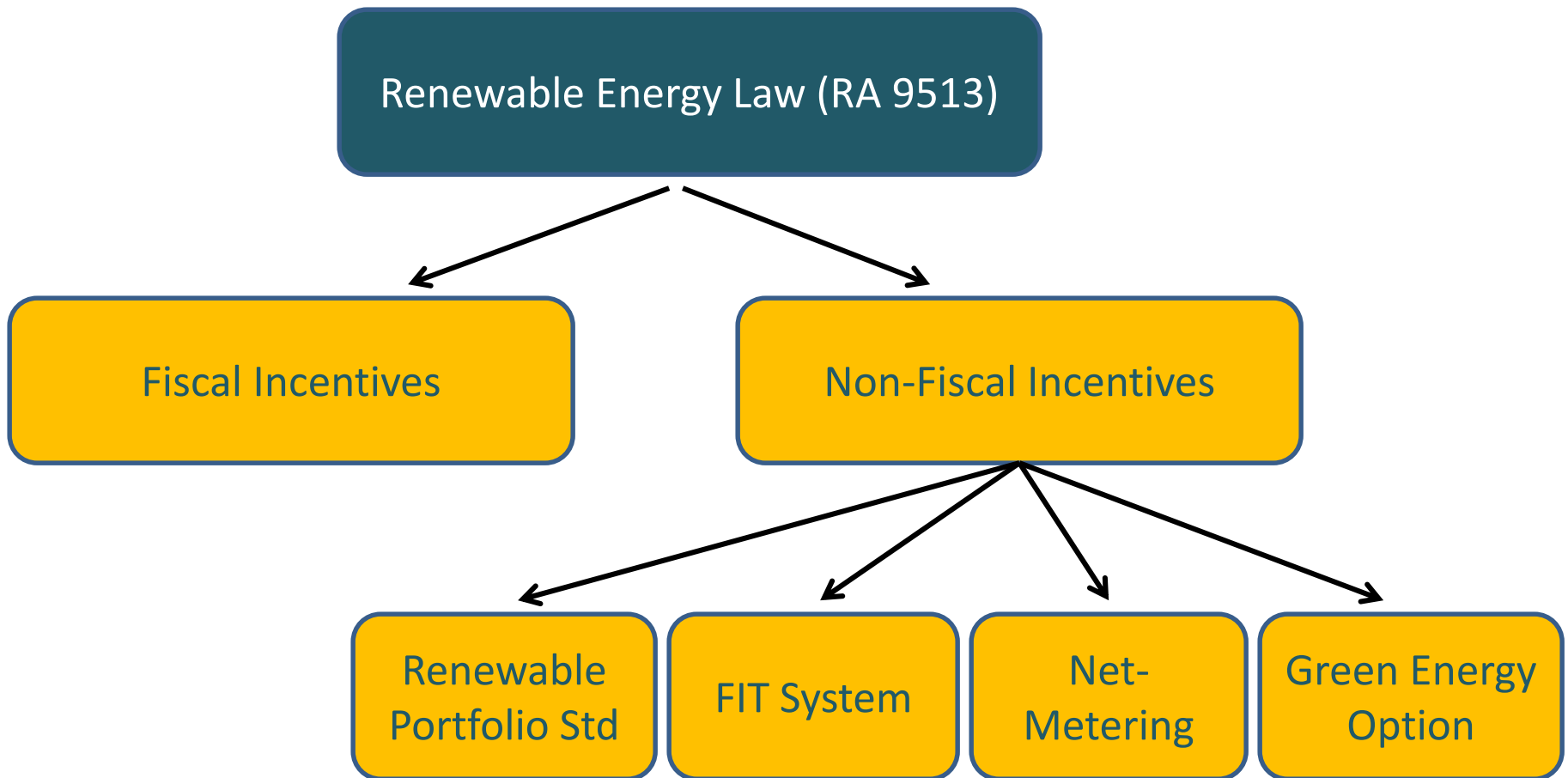


# R. A. No. 9513: The Renewable Energy Act of 2008

- Accelerate the exploration and development of renewable energy resources
  - achieve energy self-reliance
    - to reduce the country's dependence on fossil fuels
    - minimize the country's exposure to price fluctuations
  - adoption of clean energy to mitigate climate change
  - promote socio-economic development in rural areas
- Increase the utilization of renewable energy by providing fiscal and non fiscal incentives;



# R. A. No. 9513: The Renewable Energy Act of 2008



# R. A. No. 9513: The Renewable Energy Act of 2008

## Fiscal Incentives

- Income Tax Holiday and Low Income Tax Rate
- Reduced Government Share
- Duty-free Importation of Equipment and VAT-zero Rating
- Tax Credit on Domestic Capital Equipment
- Special Realty Tax Rate on Equipment and Machinery
- Cash Incentive for Missionary Electrification
- Exemption from Universal Charge
- Payment of Transmission Charges
- Tax Exemption on Carbon Credits



# R. A. No. 9513: The Renewable Energy Act of 2008

## Non-Fiscal Incentives:

### ▪ Feed-in-Tariff (FIT)

- Priority connection to the grid
- Priority purchase and transmission of and payment for by grid system operators
- Fixed tariff for 20 years
- To be applied for generation utilized in compliance with RPS
- DOE issued List of guidelines for the Selection Process of Renewable Energy Projects Under Feed-In Tariff System and the Award of Certificate for Feed-In Tariff Eligibility



# R. A. No. 9513: The Renewable Energy Act of 2008

## Feed-in-Tariff (FIT) Rates

RE Technology	Approved Rates (PHP/kWh)	Installation Target (MW)
Run-of-River Hydro	5.90	250
Biomass	6.63	250
Wind	8.53*	(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 April 2015 (resolution no. 6, series of 2015) from Php 9.68 to 8.69/kWh covering additional target of 450 MW and the second FIT rate for wind energy was issued by the ERC at Php 7.40/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.*





# Feed-In Tariff Monitoring Board (as of June 2016)

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		-	86	732.12	4	26.60
WIND	7	1,023.55	11	715.30	6	393.90
SOLAR	15	565.18	47	1,227.73	20	525.95
BIOMASS			18	147.40	12	97.05
<b>TOTAL</b>	<b>22</b>	<b>1,588.73</b>	<b>162</b>	<b>2,822.543</b>	<b>42</b>	<b>1,043.50</b>



# R. A. No. 9513: The Renewable Energy Act of 2008

## Non-Fiscal Incentives:

- 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 September 15, 2016 is **568** with a capacity of **3,306.89 kWp**



# R. A. No. 9513: The Renewable Energy Act of 2008

## Non-Fiscal Incentives:

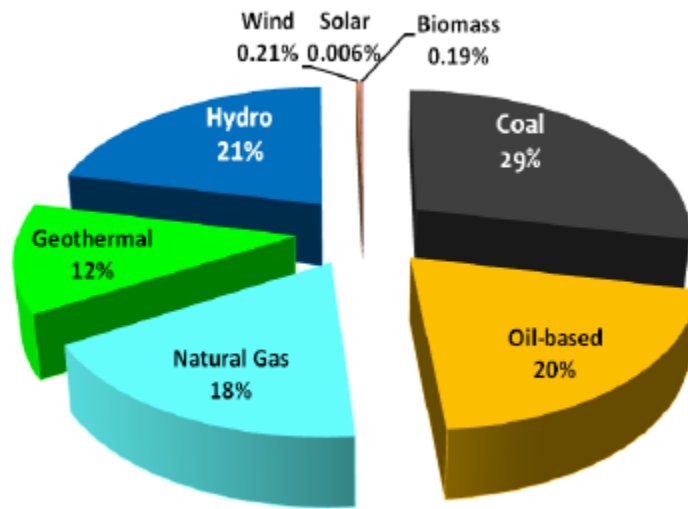
- **Renewable Portfolio Standards (RPS) for On-grid and Off-Grid Areas**
  - Mandated minimum percentage of RE generation
    - *For Department of Energy's finalization*
  
- **Green Energy Option Program**
  - End-users' option to purchase electricity from RE facilities (open access)
    - *For Department of Energy's finalization*



# RE in the Philippines

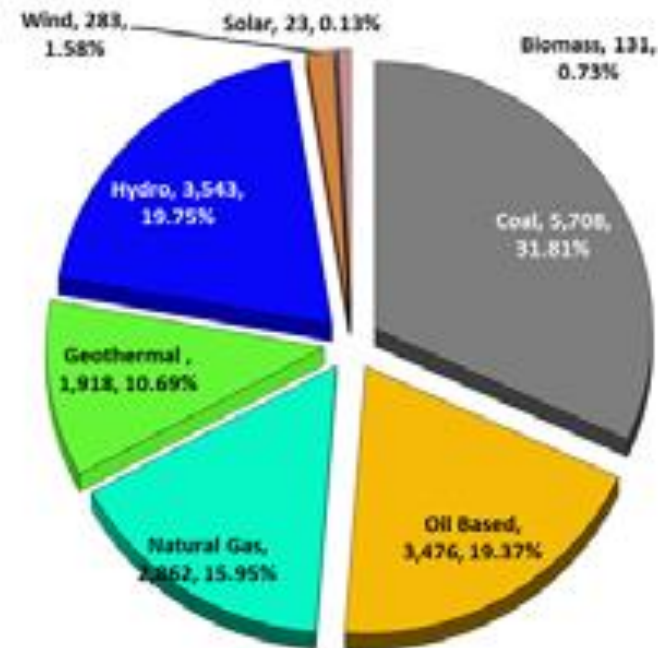
## 2010 and 2014 Total Installed Capacity Mix (MW)

2010



Total Installed Capacity = 15,881 MW  
RE Capacity Share = 5,304.25 MW  
% RE Share = 33.4 %

2014



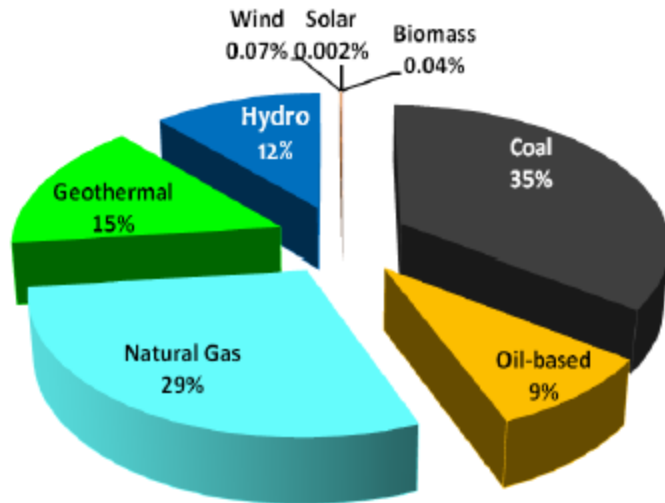
Total Installed Capacity = 17,944 MW  
RE Capacity Share = 5,900 MW  
% RE Share = 32.88 %



# RE in the Philippines

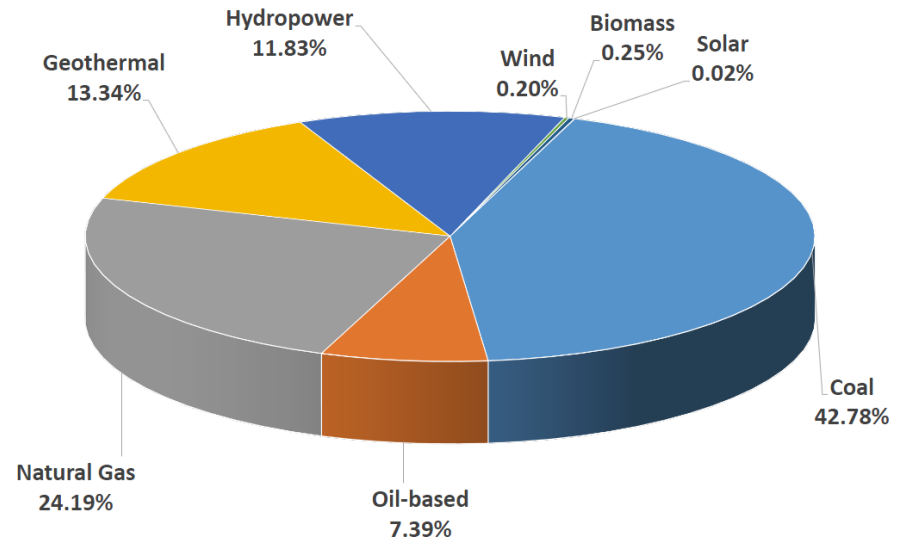
## 2010 and 2014 Total Generation Mix (GWh)

2010



Total Generation = 65,795 GWh  
RE Generation Share = 17,830.4 GWh  
% RE Share = 27.1%

2014



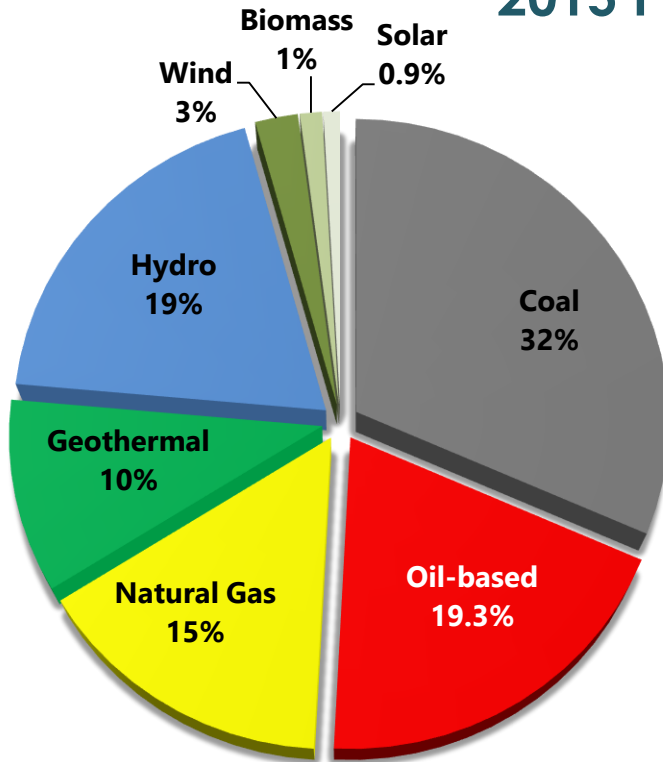
Total Generation = 77,261 GWh  
RE Generation Share = 19,809.7 GWh  
% RE Share = 25.64 %



# RE in the Philippines

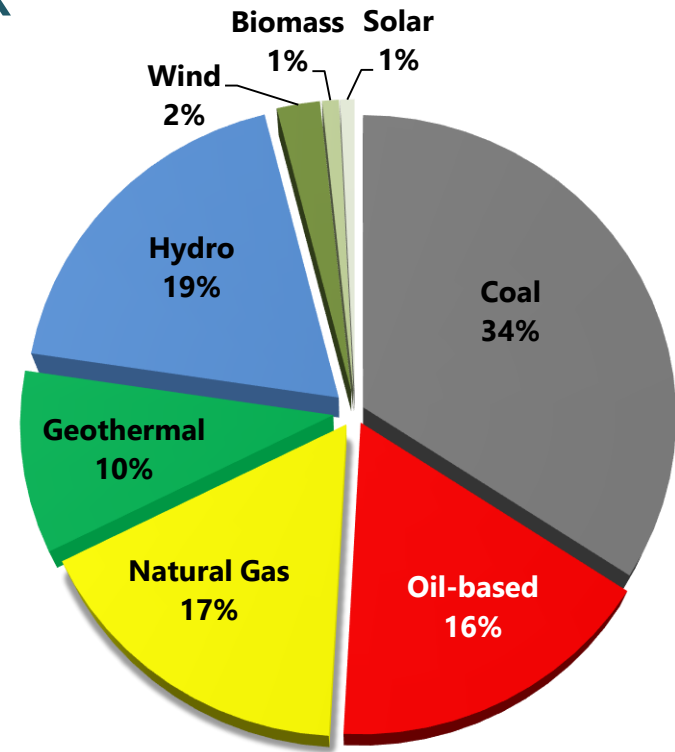
## 2015 POWER MIX

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Total Installed Capacity = 18,765 MW  
RE Share = 34%

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Total Dependable Capacity = 16,432 MW  
RE Share = 32%



# RE in the Philippines

Table 1. 2015 vs. 2014 Installed, Dependable and Available Capacity, Philippines (in MW)

FUEL	PHILIPPINES						2015 Available Capacity
	Installed Capacity			Dependable Capacity			
	2015	2014	Difference	2015	2014	Difference	
Coal	5,963	5,709	254	5,613	5,378	235	5,051
Oil Based	3,610	3,476	134	2,734	2,705	29	1,787
Natural Gas	2,862	2,862	0	2,759	2,760	(1)	2,730
Geothermal	1,917	1,917	0	1,602	1,607	(5)	1,340
Hydro	3,600	3,543	57	3,072	2,982	90	2,062
Wind	427	283	144	379	103	276	96
Biomass	220	130	90	147	81	66	70
Solar	165	23	142	125	17	108	54
<b>Total</b>	<b>18,765</b>	<b>17,944</b>	<b>821</b>	<b>16,432</b>	<b>15,633</b>	<b>799</b>	<b>13,188</b>

Source: DOE List of Existing Power Plants as of December 2015, released March 2016



# Summary Renewable Energy Projects Registered under RE Law (as of June 2016)

RESOURCES	AWARDED PROJECTS		POTENTIAL CAPACITY MW		INSTALLED CAPACITY MW	
	Grid-Use	Own-Use	Grid-Use	Own-Use	Grid-Use	Own-Use
Hydro Power	352	1	7,053.15	1.50	141.49	-
Ocean Energy	7	-	26.00	-	-	-
Geothermal	41	-	610.00	-	1,906.19	-
Wind	56	1	1,180.80	-	426.90	0.006
Solar	129	16	3,820.24	4.286	893.24	3.218
Biomass	39	25	163.38	3.92	260.57	166.18
<b>Sub-Total</b>	<b>624</b>	<b>43</b>	<b>12,853.57</b>	<b>9.706</b>	<b>3,628.39</b>	<b>169.40</b>
<b>TOTAL</b>	<b>667</b>		<b>12,863.28</b>		<b>3,797.79</b>	

## BIOFUELS REGISTRATION / ACCREDITATION

RESOURCES	No. of Companies	No. of Projects
Bioethanol	10	10
Biodiesel	11	11
<b>Total</b>	<b>21</b>	<b>21</b>





# National Renewable Energy Program

- Increase RE-based capacity by 200% within the next 20 years (2011-2030)
- Increase non-power contribution of RE to the energy mix by 10 MMBFOE in the next ten years
- Be the number one geothermal energy producer in the world (additional 1,495 MW)
- Be the number one wind energy producer in Southeast Asia (up to 2,500 MW)
- Double hydro capacity (additional 5,400 MW)
- Expand contribution of;
  - biomass - 265 MW
  - solar - at least 280 MW
  - ocean energy – at least 10 MW

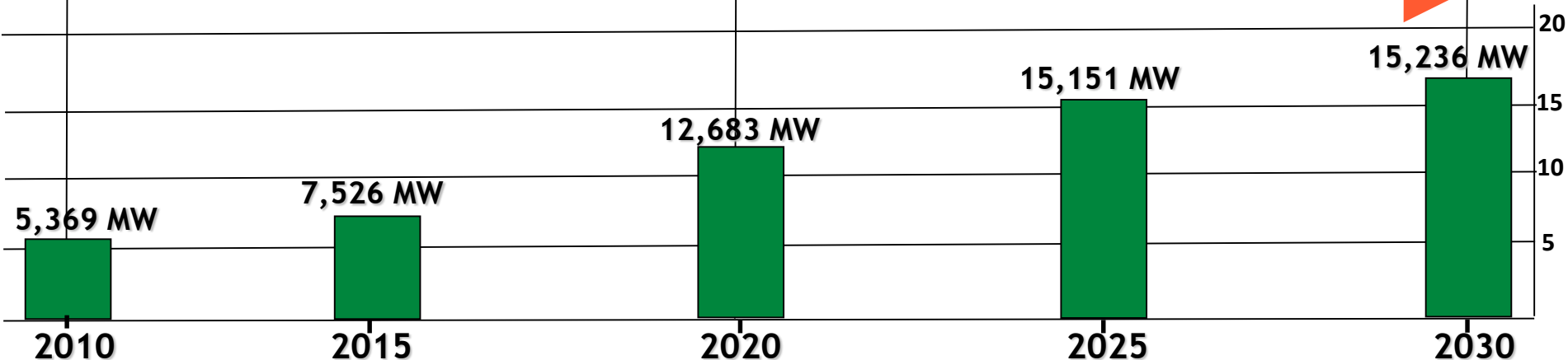


# NREP ROADMAP (2010-2030)

- 2012 - Full implementation of RA 9513
- 2015 - Target additional biomass capacity of 277 MW is reached
- 2018 - Commissioning of the 1<sup>st</sup> 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



# Challenges in collecting RE Statistics

- Timely submissions of monthly generation reports
- Determination of other data that must be collected



**THANK YOU**

**&**

**MABUHAY!**

