Updates in Renewable Energy Development: Philippines

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PRESENTATION OUTLINE

- RE Roadmap (2010-2030)
- Status of RE Projects
- Energy Situation
- Power Demand-Supply Outlook
- RE Capacity Addition
- Socio-environment Impact
- Current Policy implementation
- Challenges
- Way Forward

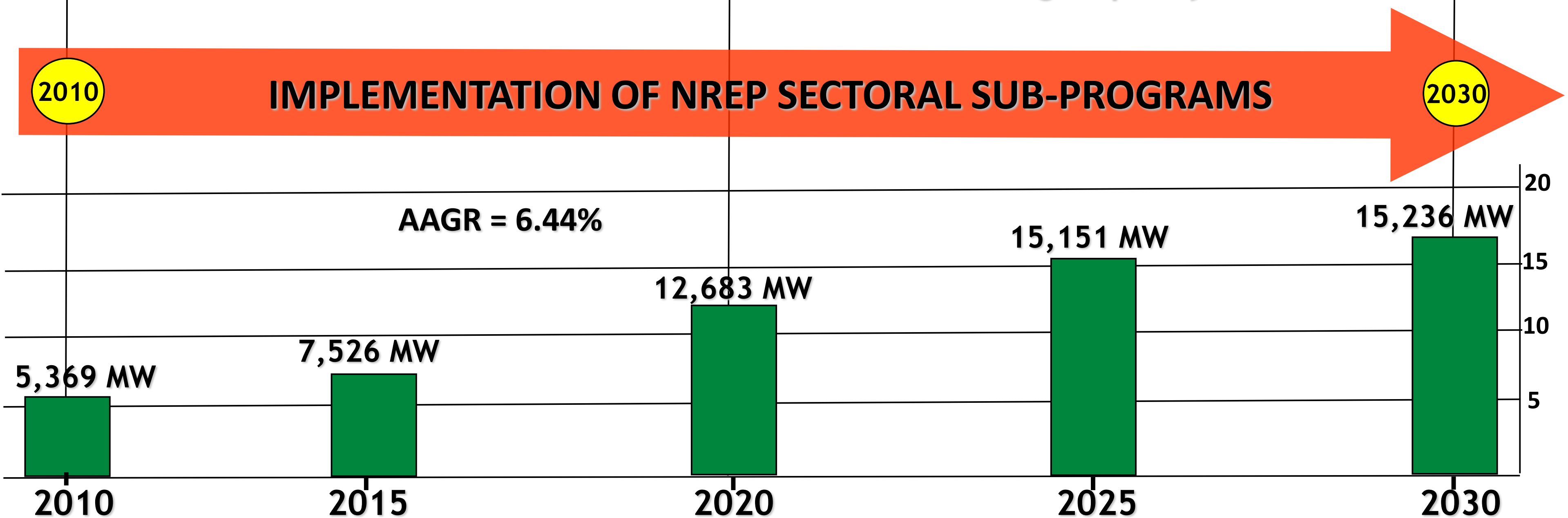
NREP ROADMAP (2010-2030)

- 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



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

Summary Renewable Energy Projects under RE Law (as of Feb. 2017)

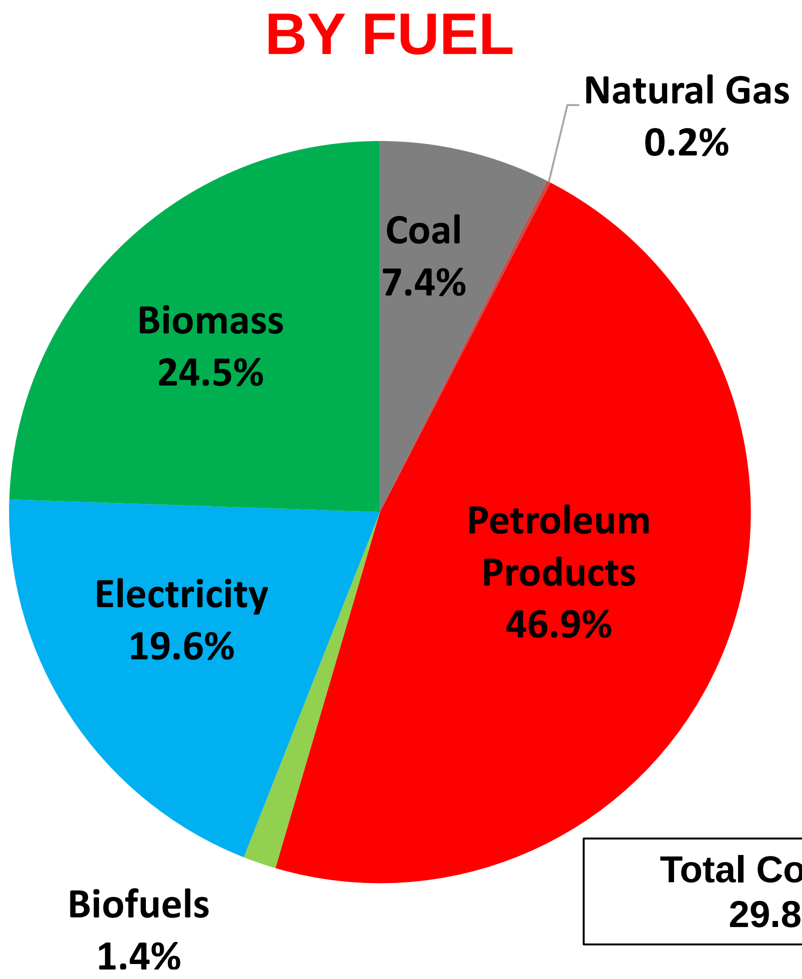
RESOURCES	AWARDED PROJECTS		POTENTIAL CAPACITY MW		INSTALLED CAPACITY MW	
	Grid-Use	Own-Use	Grid-Use	Own-Use	Grid-Use	Own-Use
Hydro Power	432	-	10,796.17		858.15	-
Ocean Energy	7	-	26.00	-	-	-
Geothermal	43	-	684.00	-	1,906.19	-
Wind	63	1	1,038.95	-	426.90	0.006
Solar	174	16	4,077.22	4.286	900.18	3.218
Biomass	47	22	312.38	13.77	343.57	119.86
Sub-Total	**766**	**39**	**16,934.72**	**18.056**	**4,434.99**	**123.08**
TOTAL	**805**		**16,952.78**		**4,558.07**	

PENDING APPLICATIONS UNDER RE LAW

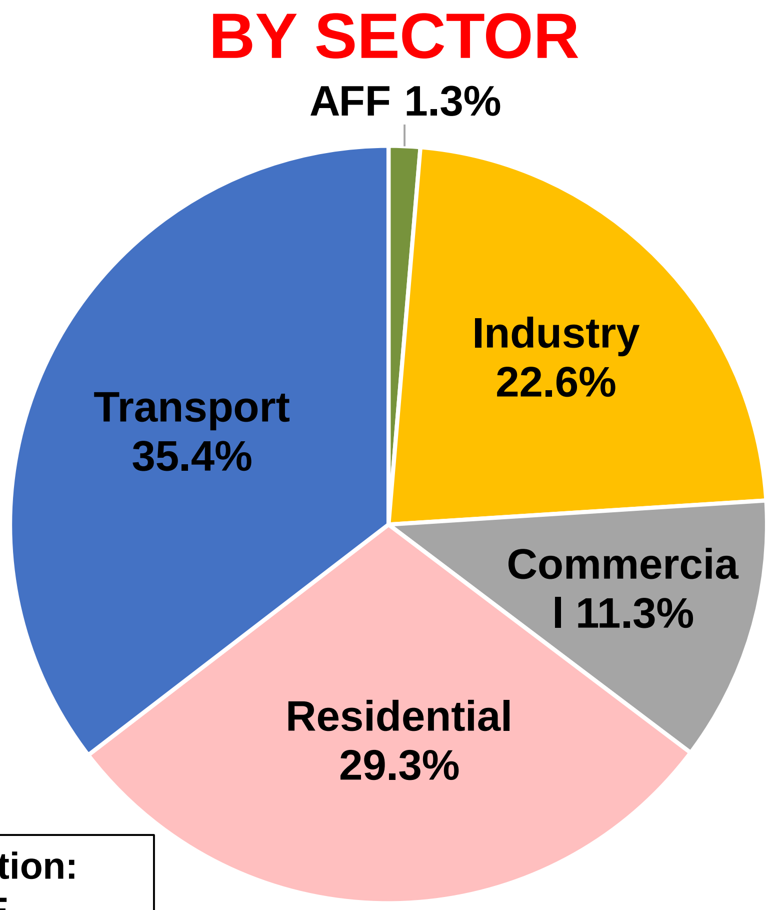
RESOURCES	PENDING APPLICATIONS		POTENTIAL CAPACITY MW		INSTALLED CAPACITY MW	
	Grid-Use	Own-Use	Grid-Use	Own-Use	Grid-Use	Own-Use
Hydro Power	92	-	1,961.96			
Ocean Energy	-	-	-	-	-	-
Geothermal	3	-	60.00	-	-	-
Wind	26	-	260.00	-	-	
Solar	228	-	2,130.80		-	-
Biomass	8	2	43.00	9.90	-	-
Sub-Total	**357**	**2**	**4,455.76**	**9.90**	**-**	**-**
TOTAL	**359**		**4,465.66**		**0.00**	

Energy Situationer

2015 Final Energy Consumption



Total Consumption: 29.81 MTOE



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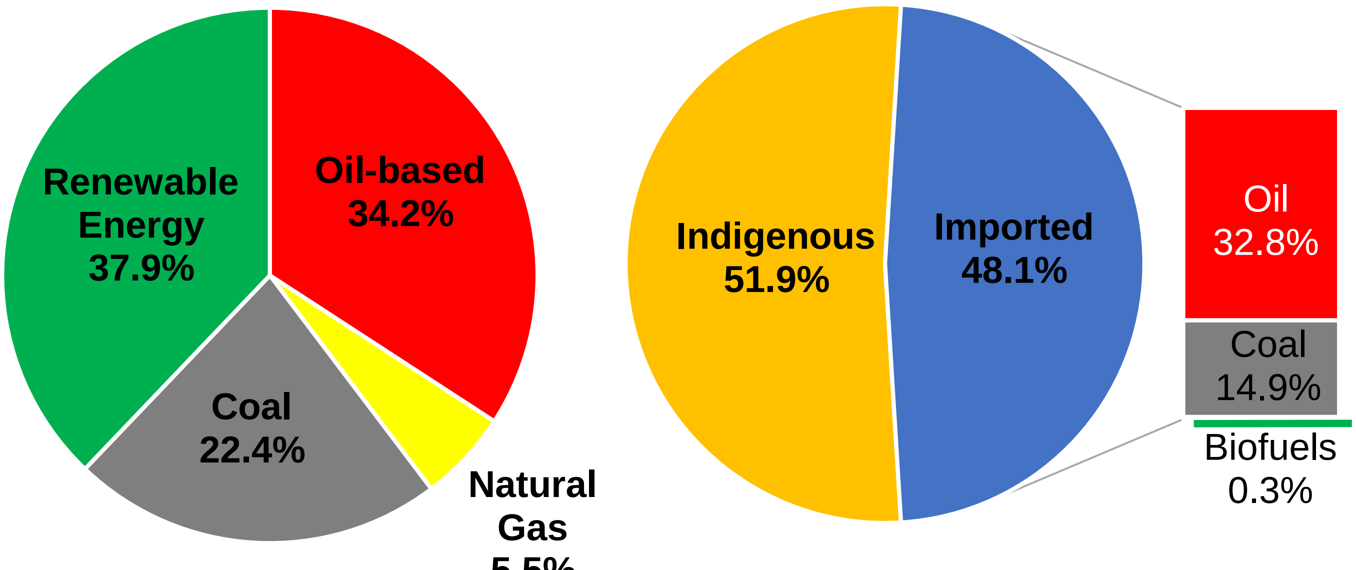
Energy Situationer

2015 Energy Supply



Total Energy:	**51.75 MTOE**
Self-sufficiency:	**51.9%**
Renewable Energy:	**37.9%**
RE + Nat Gas:	**43.4%**

Imported Crude Oil = 77,911 MB

- Saudi Arabia – 44.2%
- Kuwait – 21.7%
- UAE – 10.7%
- Qatar – 9.6%
- Malaysia – 7.4%
- Russia – 6.1%
- Vietnam – 0.3%

Imported Petroleum Products = 77,934 MB

- OTHER ASIA – 68.2%
- ASEAN – 25.6%
- MIDDLE EAST – 2.2%
- OTHERS – 4.0%

Imported Coal = 17,279 MMT

- Indonesia – 96.5%
- Australia – 1.8%
- Vietnam – 1.0%
- Others* – 0.8%

**Includes Russia, USA, Taiwan, South Korea and South Africa*

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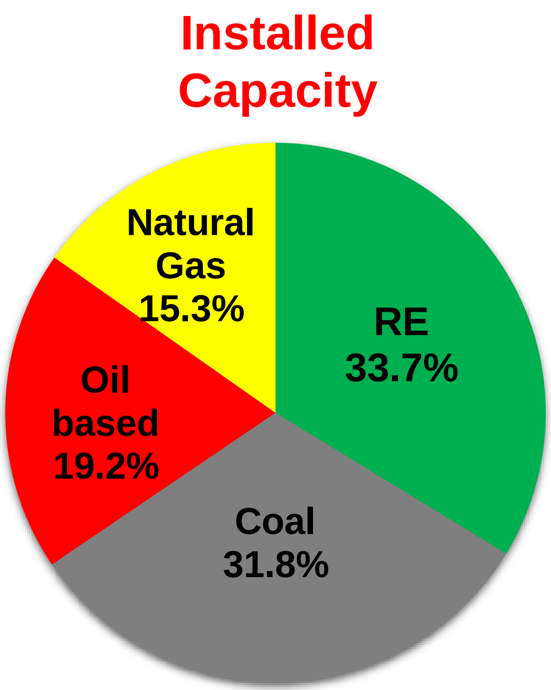
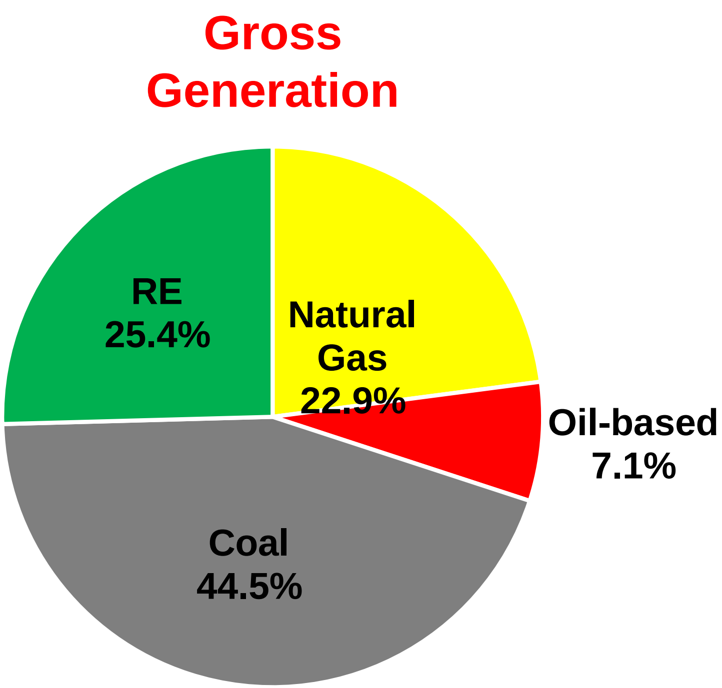
Energy Situationer

2015 Power Capacity and Gross Generation



Total Installed Capacity = 18,783 MW
Renewable Energy Share = 33.7%



Total Generation:	82,413 GWh
Self-sufficiency:	73%
Renewable Energy:	25.4%
RE + NG:	48.3%

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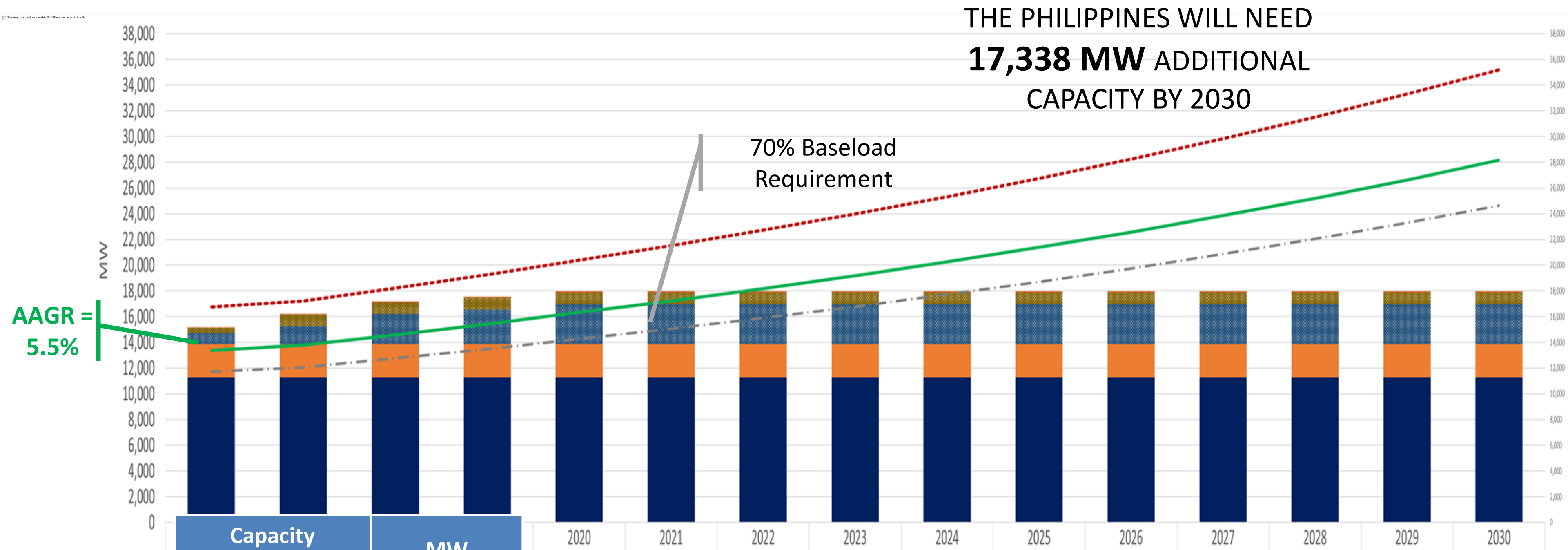
Power Demand-Supply Outlook 2016-2030

High GDP Scenario (8% GDP; 25% Reserve Requirement)



Capacity Addition	MW
Baseload	8,388
Mid-merit	7,800
Peaking	1,150
TOTAL	**17,338**

RE Additional Installed Capacity under RA 9513

RESOURCES	2009		2010		2011		2012		2013		2014		2015		2016 (Jan-Jun)		Own-Use		Total	
	No. of Projects	Installed Capacity (MW)	No. of Projects	Installed Capacity (MW)	No. of Projects	Installed Capacity (MW)	No. of Projects	Installed Capacity (MW)	No. of Projects	Installed Capacity (MW)	No. of Projects	Installed Capacity (MW)	No. of Projects	Installed Capacity (MW)	No. of Projects	Installed Capacity (MW)	No. of Projects	Installed Capacity (MW)	No. of Projects	Installed Capacity (MW)
Biomass	2	29.33	1	21.00	3	27.00	1	19.00	1	0.876	2	28.00	5	108.50	1	10.80	21	170.1	37	414.61
Geothermal	-	-	-	-	-	-	-	-	-	-	2	50.00	1	10.00	-	-	-	-	3	60.00
Solar	-	-	-	-	-	-	-	-	-	-	1	22.00	9	141.77	28	729.47	6	3.22	44	896.46
Hydro	-	-	2	2.00	1	2.10	2	11.80	-	-	4	16.65	2	14.82	2	2.00	-	-	13	49.37
Ocean	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wind	-	-	-	-	-	-	-	-	-	-	4	303.90	2	90.00	-	-	-	-	6	393.90
TOTAL	**2**	**29.33**	**3**	**23.00**	**4**	**29.10**	**3**	**30.80**	**1**	**0.88**	**13**	**420.55**	**19**	**365.09**	**31**	**742.27**	**27**	**173.32**	**103**	**1,814.34**

Capacity Addition since the enactment of RE Law = 1,814.34 MW
Installed Capacity under Net-Metering (recorded) = 4.752 MWp

TOTAL = 1,819.092 MW

- **Completion and Commissioning of Renewable Facilities**
  - **BIODIESEL – 545 Million Liters / Year**
  - **BIOETHANOL – 183 Million Liters / Year**

Environmental Impact and Social Responsibility

Year	Capacity Addition (MW)	Emission Reduction (t-CO_2/year)**	Cumulative Emission Reduction (2009-2015)
2008	3.6	11600.45	81203.15
2009	29.33	94511.48	567068.88
2010	23	71876.27	359381.35
2011	29.1	91420.71	365682.84
2012	30.8	86045.66	258136.98
2013	1.476	4085	8169.72
2014	468.65	1,138,632.50	1138632.5
Total	585.956	1,498,171.93	2,778,275.42

2,778,275.42 t- CO_2

Reduction (2009-2015)

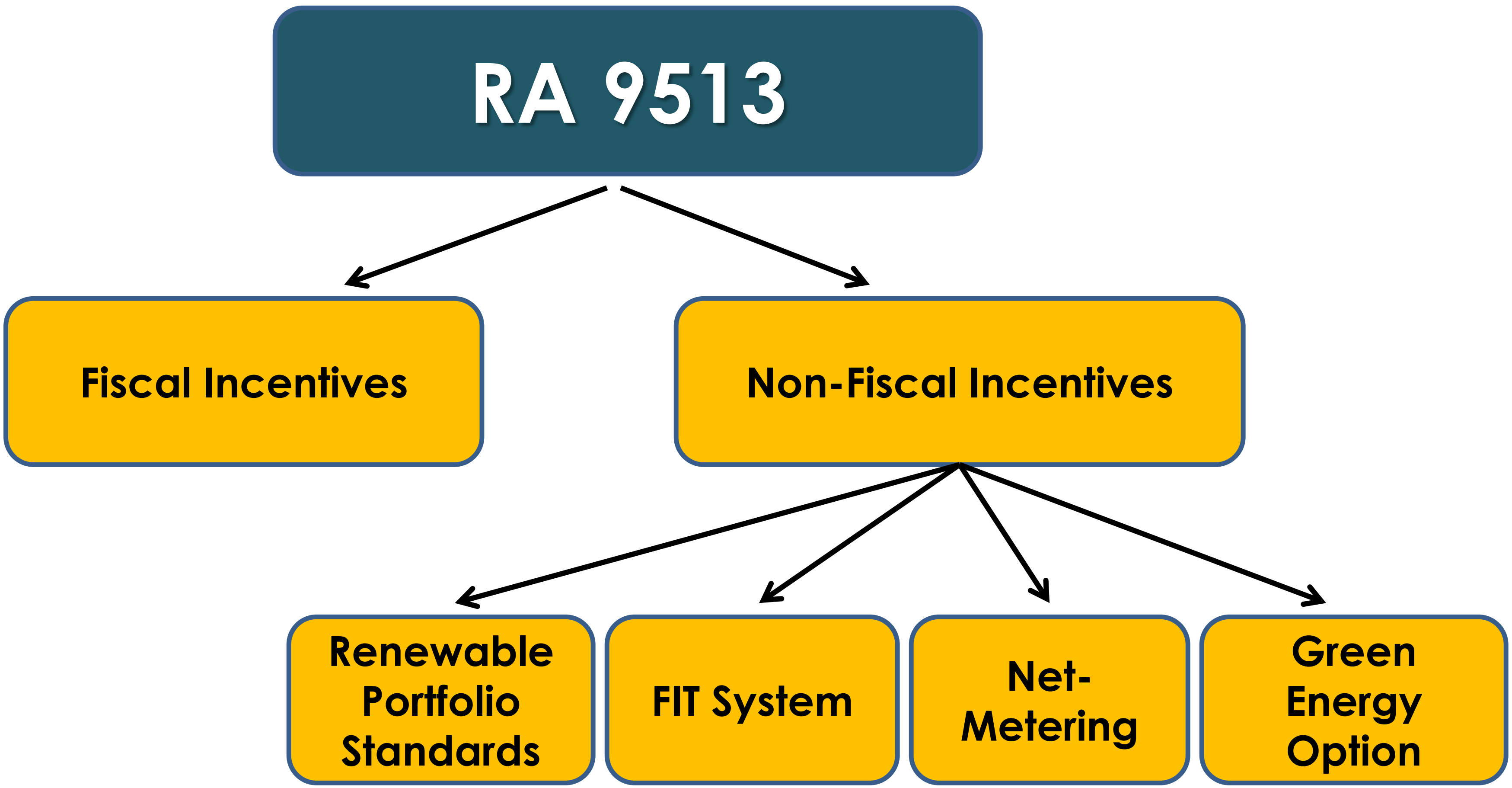
Total	Capacity Addition (MW)	Construction Jobs	Full Time O&M Jobs
2008	3.6	90	11
2009	29.33	733	88
2010	23	558	64
2011	29.1	710	82
2012	30.8	672	65
2013	1.476	32	4
2014	468.65	7,251.00	410
2015	342.4	5,332.00	316
Total	928.356	15,378	1040

Source: IRENA Rule of Thumb

16,418 Green Jobs

Generated (2009-2015)

Incentives Under the RE Act



Market Options for RE

- Feed-in-Tariff (FiT) - REPA
- Bilateral Contracts - PPA
- Spot Market - Price Taker / Actual Bidding
- Net Metering Program
- Green Energy Option - Retail Competition and Open Access
- Renewable Portfolio Standards (RPS) for On and Off Grid Areas

Existing RE Policy Mechanisms

Feed-in-Tariff (FIT) Rates

RE Technology	Approved Rates (US$/kWh)	Installation Target (MW)
Run-of-River Hydro	0.1174*	250
Biomass	0.1314*	250
Wind	0.1699*	(with initial target of 200) 400**
Solar	0.1730*	(with initial target of 50) 500**

** 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. 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. ERC Resolution signed by the ERC on January 24, the degressed FiT rates for January to December 2017 hydro and biomass plants with commercial operations within the year are P5.8705/kWh and P6.5969/kWh, respectively.*

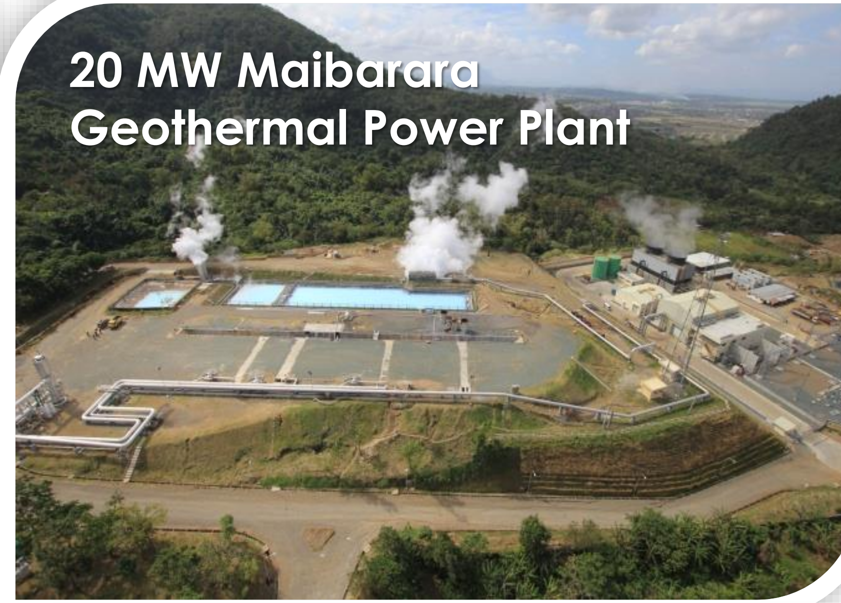
*** Amended targets for wind energy and solar power up to March 15, 2016.*

Existing RE Policy Mechanisms

Net-Metering Rules and Interconnection Standards

- ✓ Connection/sale of customers' RE generation to the grid
- ✓ The ERC approved the Net Metering Rules on 27 May 2013
- ✓ As of February 2017, there are 773 customers connected to 10 different Distribution Utilities in the Philippines under the Net-Metering agreements, reaching 4.752 MWp

Existing RE Projects



Existing RE Projects

Challenges in RE Development

Awareness and Social Acceptance

Administrative/Permitting Process

Grid Interconnectivity (geographical)

Land use competition

Way Forward

- Work on INDC (Provisionally approved NAMA proj)
- Issue updated NREP
- Enhance administrative support
- Promote Smart Grid System (inc. Distributed Generation facilities, integration in off-grid area)
- Implement RPS and Green Energy Option
- Capacity-building
- Intensify IECs (with academe and NGOs, CNOs)
- Enhance resource data base (low-enthalpy, feedstock supply)
- Strengthen international cooperation

Thank you!

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