

Bright Archipelago: NREB Roadmap for Renewable Energy in the Philippines

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Chairman
National Renewable
Energy Board



DISCUSSION OUTLINE

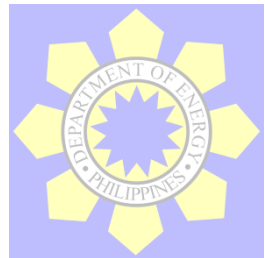
- **Background**
 - Available RE Resources
 - Power Supply Mix and Energy Resource Production
 - Supply and Demand Outlook
- **Legal Framework**
 - Biofuels Act of 2006
 - Renewable Energy Act of 2008
- **National Renewable Energy Board**
- **2010-2016 Updates**
 - Feed-in Tariff
 - Other RE Mechanisms
 - RE Contracts
- **Next Steps - 2016 and beyond...**



NATIONAL RENEWABLE ENERGY PROGRAM



BACKGROUND

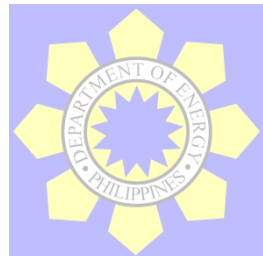


RENEWABLE ENERGY RESOURCES



- **B**iomass (bagasse) – Potential of 4,449.54 MW*
- **G**eothermal Resource – 1,200 MW
- **S**olar Energy – Average potential 5kWh/m²/day
- **H**dropower - 10,500 MW
- **O**cean energy - 170,000 MW
- **W**ind resources – 76,600 MW

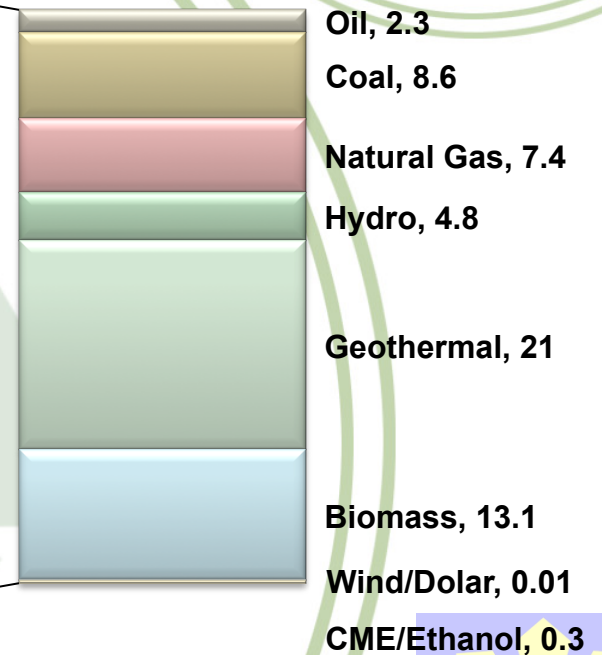
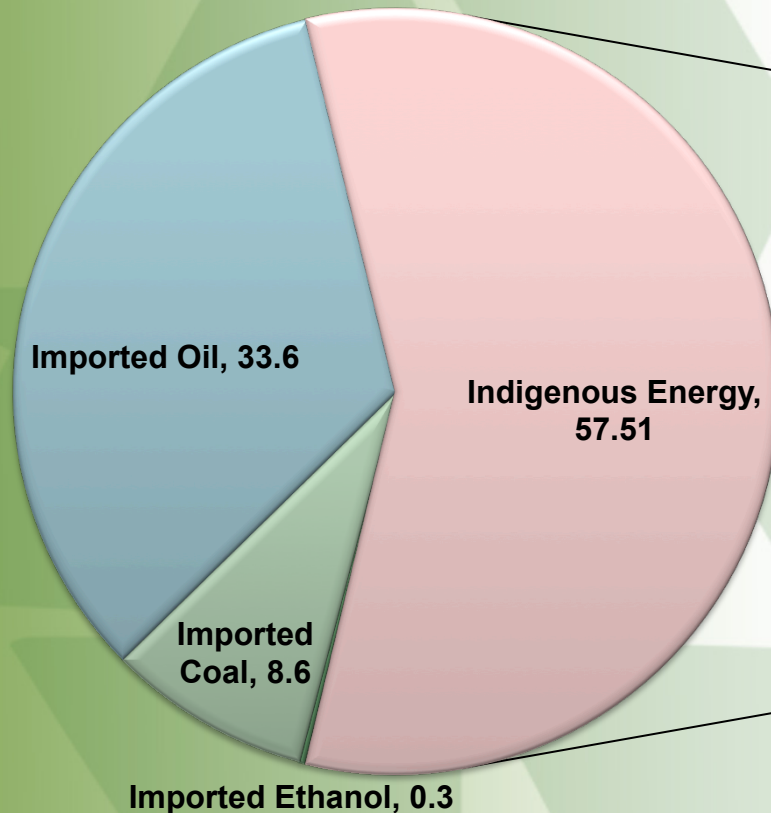
USAID and Climate Change and Clean Energy Project Study



PRIMARY ENERGY SUPPLY MIX



2014-2015

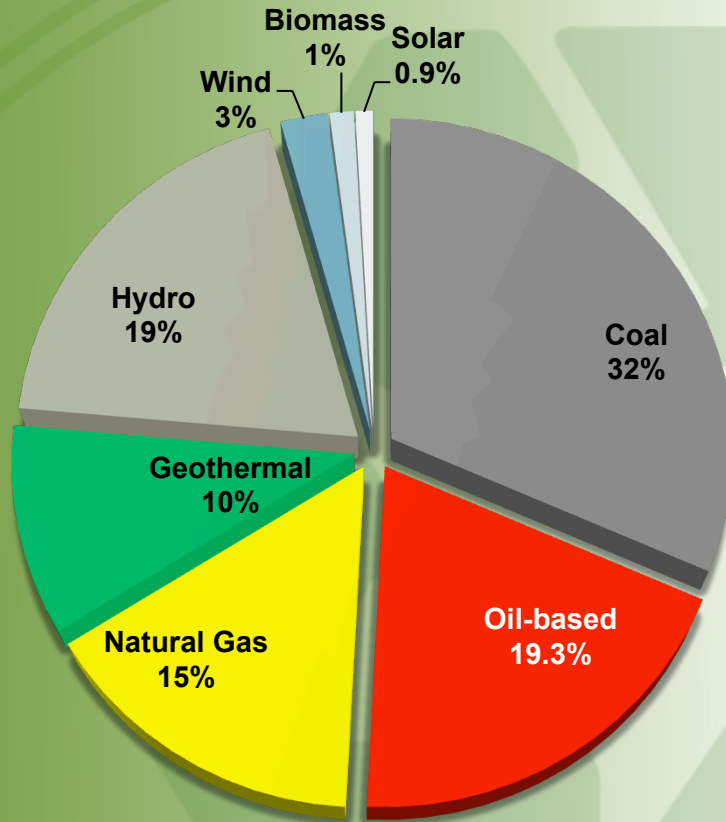


ENSURED SUFFICIENT SUPPLY

2015 CAPACITY MIX

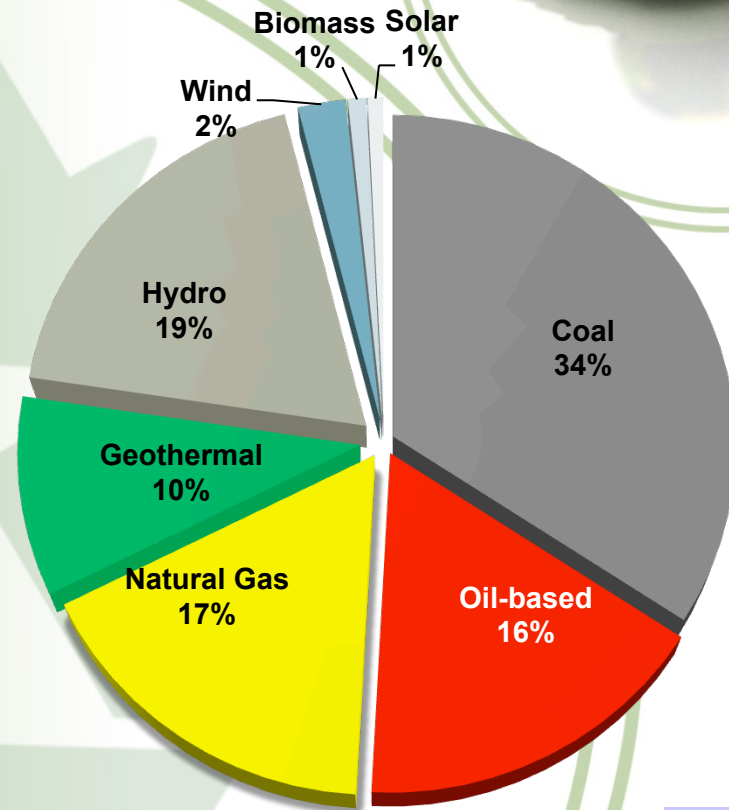


INSTALLED

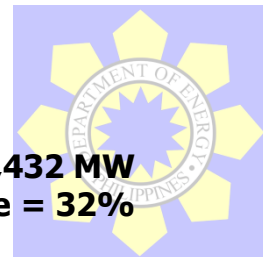


Total Installed Capacity = 18,765 MW
RE Share = 34%

DEPENDABLE



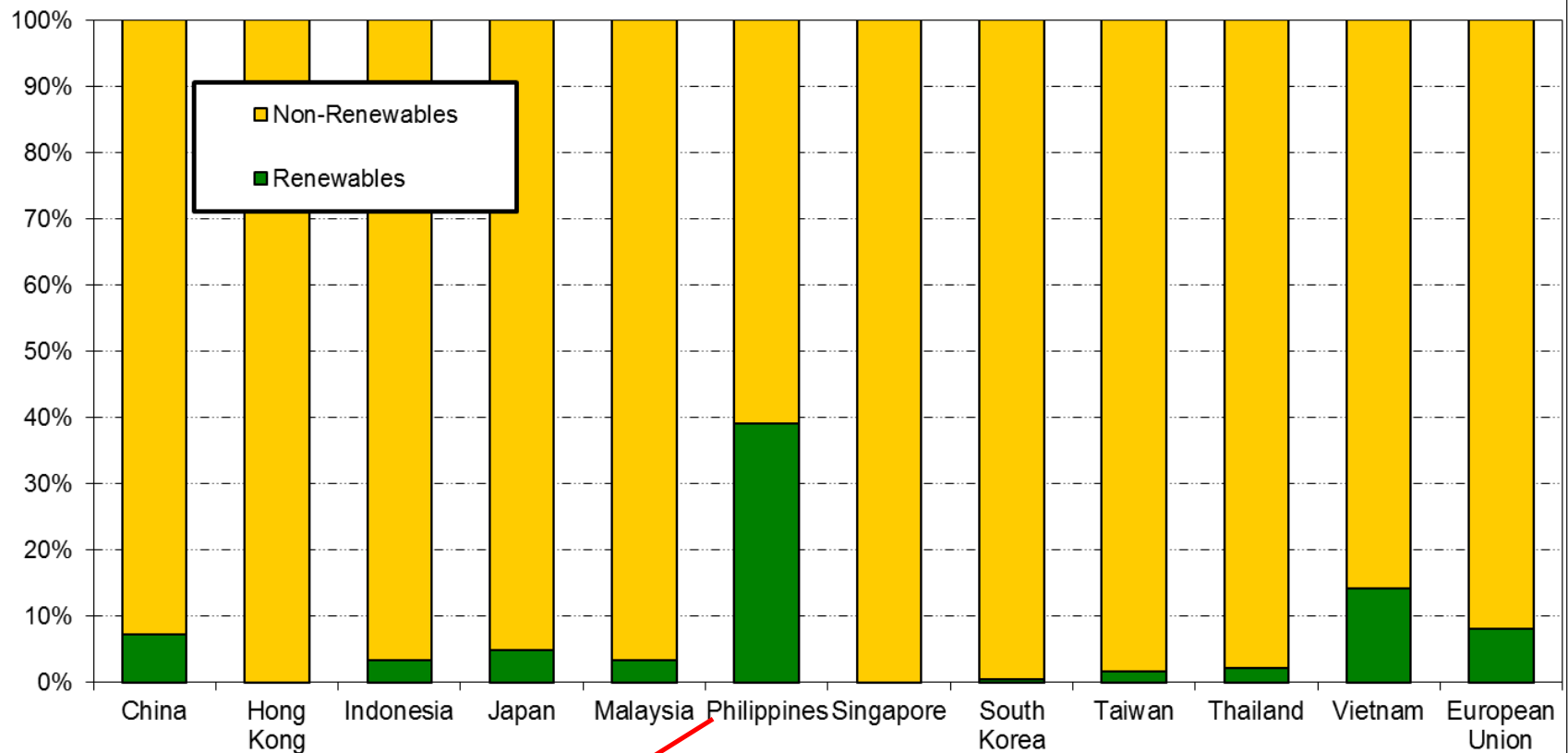
Total Dependable Capacity = 16,432 MW
RE Share = 32%



COMPARATIVE RE UTILIZATION



Share of RE and Non-RE



38.9% Renewables

COMPARATIVE ENERGY DATA

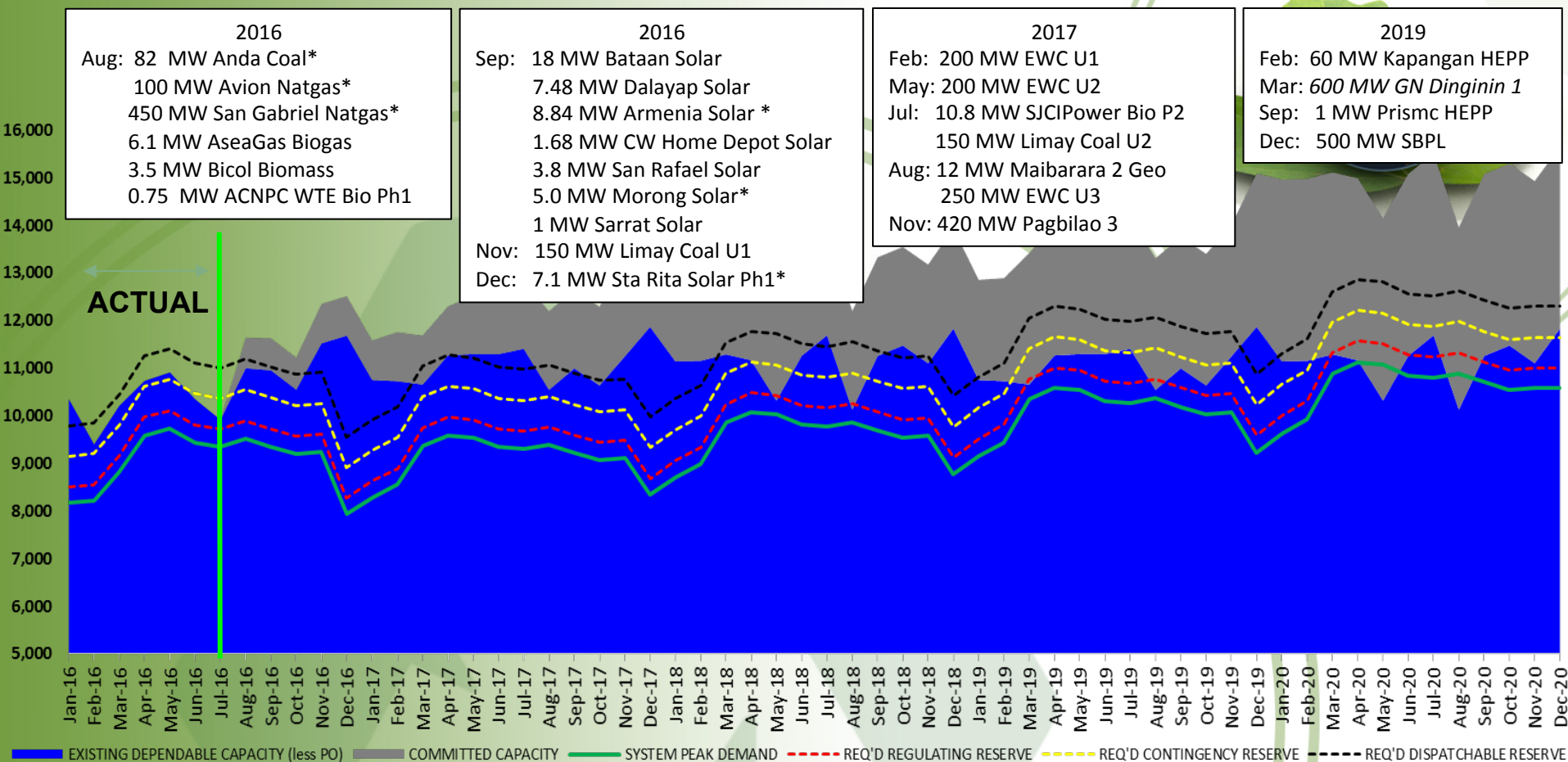


Country	Oil Production	Gas Production	Coal Production	RE Target
China (coal 70%)	3.99 mb/d (5 th)	94 bcm (8 th)	3,240 Mt (1 st)	30% (2035)
Vietnam (coal)	300 kb/d (35 th)	9.4 bcm (42 nd)	44.1 Mt (17 th)	5% (2020)
Thailand (natural gas 66%)	380 kb/d (32 nd)	30.8 bcm (25 th)	17.9 Mt (25 th)	25% (2021)* (currently 2%)
Indonesia (coal and oil)	1.09 mb/d (21 st)	82.8 bcm (12 th)	305.9 Mt (6 th)	25% (2025)* (currently 4%)
Malaysia (natural gas 60%)	693 kb/d (27 th)	58.6 bcm (16 th)	78 Mt	17% (2030)* (currently 5%)
Taiwan (nuclear, oil and natural gas)	276 kb/d (37 th)	310 m3 (71 st)	N/A	15% (2025)* (currently 8%)
India (coal 53%)	878 kb/d (24 th)	120 bcm (5 th)	569.9 Mt (3 rd)	15.9% (2022) (currently 11%)
South Korea (oil, coal and nuclear)	48 kb/d (65 th)	532 m3 (66 th)	3 MMst (short tons)	10% (2022)
PHILIPPINES (coal and gas)	9 kb/d (85th)	3.1 bcm (52nd)	7.2 Mt (31st)	50% (2030) (currently 30%)

SUPPLY AND DEMAND OUTLOOK (2016-2020)



Luzon Demand-Supply Outlook 2016-2020



Notes

- Existing Dependable Capacity factoring in planned maintenance schedule based on NGCP GOMP
- Committed Capacity based on DOE's List of Power Projects as of 31 July 2016
- 8.4 % peak demand growth rate for 2016 based on the DOE's High GDP Demand Forecast.
- 5.1 % average peak demand rate for 2017-2020 based on the DOE's High GDP Demand Forecast.
- Required Reserve Margin (RM) i.e. 4% regulating reserve and contingency and dispatchable reserve requirement

* On-going testing and commissioning



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ENERGY



As of: July 2016

Visayas Demand-Supply Outlook 2016-2020

2016

Aug: 150 MW PEDC Expansion
 Sep: 135 MW Concepcion Coal U1
 10 MW Biliran GPP U1
 5.67 MWp Miag-ao Solar Power Project
 49.8 MWp Palo Solar Power Project

2016

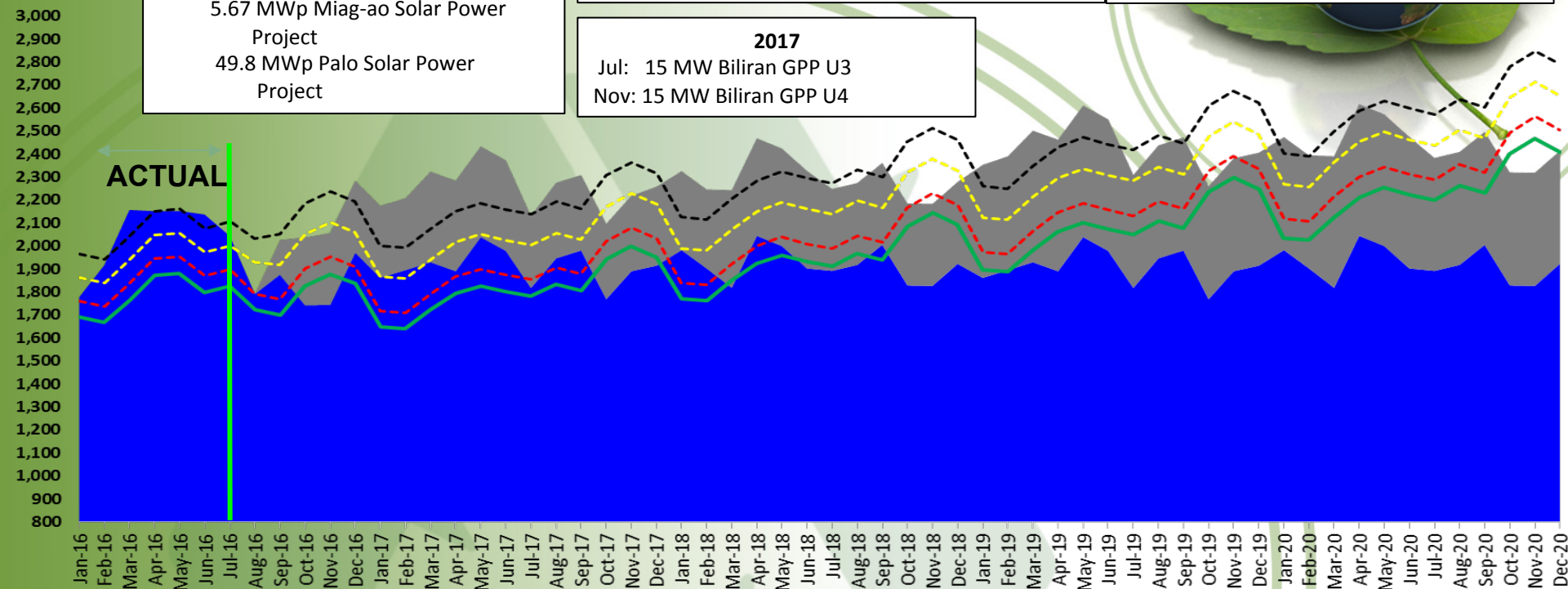
Oct: 10 MW Biliran GPP U2
 8 MW Calumangan DPP U4
 Dec: 60 MW First Toledo Solar Power Project

2018

Jun: 5.1 MW Igbulo HEPP
 8 MW Cantakoy HEPP
 Dec: 135 MW Concepcion Coal U2

2017

Jul: 15 MW Biliran GPP U3
 Nov: 15 MW Biliran GPP U4



* On-going testing and commissioning

Notes

- Existing Dependable Capacity factoring in planned maintenance based on NGCP GOMP 2016-2018
- Reserve Margin (RM) i.e. 4% regulating reserve and largest online unit for contingency reserve (CR) and dispatchable reserve (DR) requirement (103 MW to increase by 150 MW for CR and 135 MW for DR in 2016)
- Committed Capacity Based on DOE's List of Power Projects as of 31 July 2016
- 6.3 % peak demand growth rate for 2016 based on the DOE's High GDP Demand Forecast. 7.3 % average peak demand rate for 2017-2020 based on the DOE's High GDP Demand Forecast.



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As of July 2016

Mindanao Demand-Supply Outlook 2016-2020

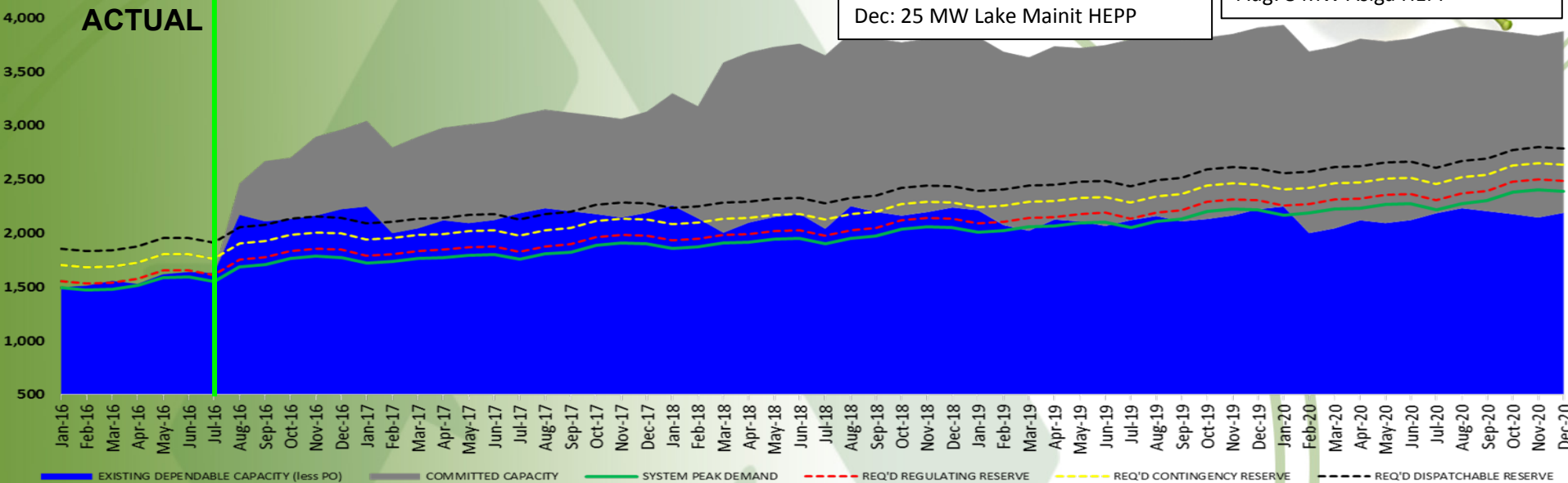
2016
 Aug: 135 MW FDC Coal U1*
 150 MW SMC Davao Coal U1*
 2.6 MW GEEC Biomass Cogen
 1.6 MW PTCI Biomass *

2016
 Sep: 135 MW FDC Coal U2
 135 MW FDC Coal U3
 Oct: 10 MW LPC Biomass
 Nov: 13.94 MW PSI DPP
 150 MW SMC Davao Coal U2
 Dec: 5.2 MW PSFI DPP

2017
 Jan: 55 MW Minergy Coal 1
 2.4 MW New Bataan Hydro
 Mar: 55 MW Minergy Coal 2
 Apr: 10.4 MW PBI DPP
 May: 55 MW Minergy Coal 3
 Jun: 43.4 Manolo Fortich 1 HEPP
 25.4 Manolo Fortich 2 HEPP
 Dec: 25 MW Lake Mainit HEPP

2018
 105 MW SEC Coal U2
 Mar: 4x135 MW GNPowr Coal 1, 2, 3, 4
 Jul: 30 MW Puyo HEPP

2019
 Aug: 8 MW Asiga HEPP



* On-going testing and commissioning

Notes

- Existing Dependable Capacity factoring in planned maintenance based on NGCP GOMP 2016-2018
- Reserve Margin (RM) i.e. 4% regulating reserve and largest online unit for contingency reserve (CR) and dispatchable reserve (DR) requirement (105 MW to increase by 150 MW for CR and DR in 2016)
- Committed Capacity Based on DOE's List of Power Projects as of 31 July 2016
- 17.7 % peak demand growth rate for 2016 based on the DOE's High GDP Demand Forecast. 8.0 % average peak demand rate for 2017-2020 based on the DOE's High GDP Demand Forecast.



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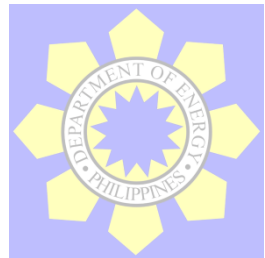


As of July 2016

NATIONAL RENEWABLE ENERGY PROGRAM



LEGAL FRAMEWORK



PHILIPPINE RE LAWS



- **Biofuels Act of 2006**

(Republic Act No. 9367)

Provides fiscal incentives and mandates the use of biofuel-blended gasoline and diesel fuels.

- **Renewable Energy Act of 2008**

(Republic Act No. 9513)

Provides fiscal and non-fiscal incentives to private sector developers and manufacturers



THE BIOFUELS ACT OF 2006

Provides for 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

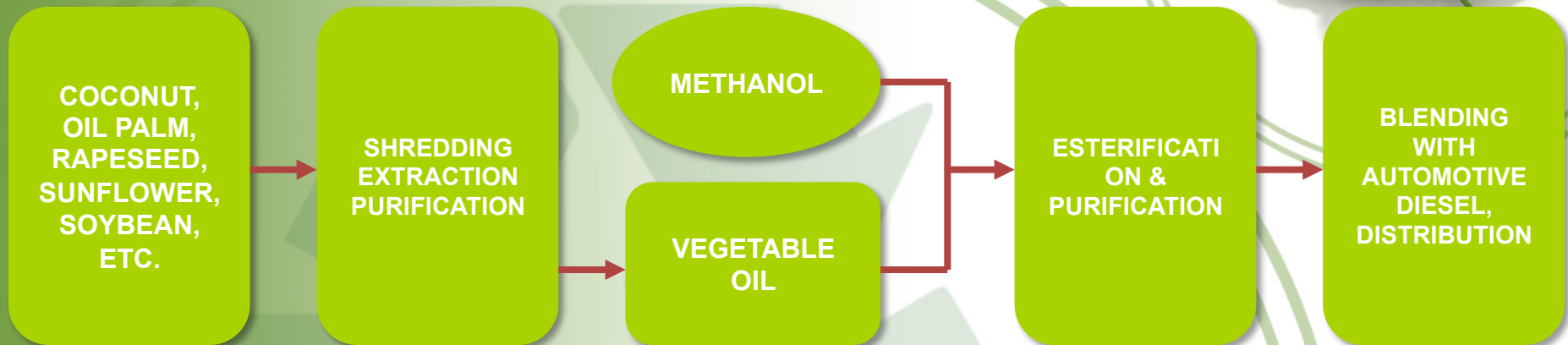
BIOETHANOL

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

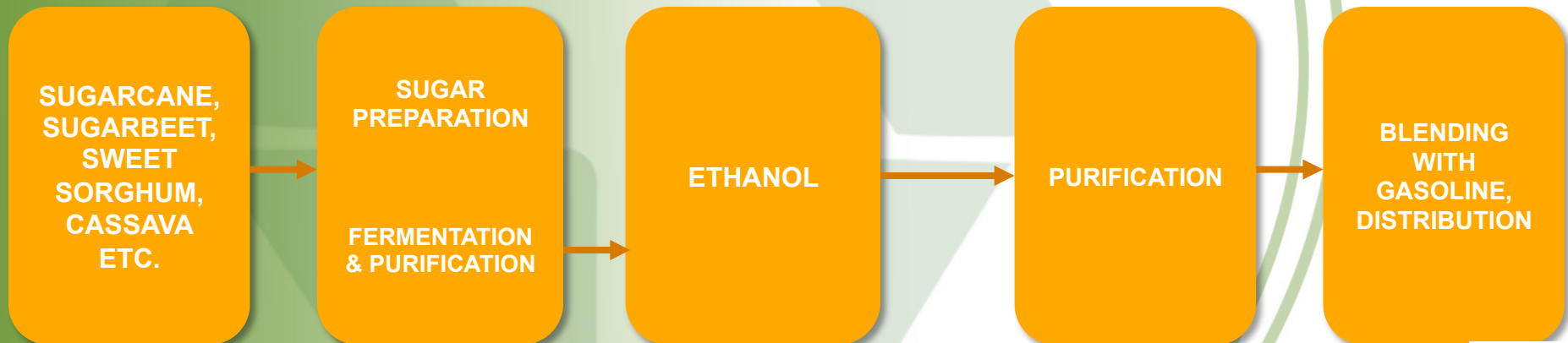


BIOFUEL TECHNOLOGIES

▪ BIODIESEL PRODUCTION



▪ BIOETHANOL PRODUCTION



BIOFUEL REQUIREMENTS

BIODIESEL

MINIMUM BLENDS:

- @ 1% (2007) = 62.10 M liters
- @ 2% (2009) = 133.68 M liters
- @ 2% (2010) = 138.70 M liters
- @ 2% (2014) = 160.70 M liters

BIODIESEL SUPPLY:

- 9 Accredited Producers with annual total capacity of 392 million liters

FEEDSTOCKS USED:

- Coconut oil (current)
- Jatropha (under study)

BIOETHANOL

MINIMUM BLENDS:

- @ 5% (2009) = 208.11 M liters
- @ 5% (2010) = 218.93 M liters
- @ 10% (2011) = 460.63 M liters
- @ 10% (2014) = 536.29 M liters

BIOETHANOL SUPPLY:


- 3 Accredited Producers with annual total capacity of about 79 million liters
- 3 production facilities to be on-stream between 2012-2013 with additional capacity of 134 million liters/year


FEEDSTOCKS USED:


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

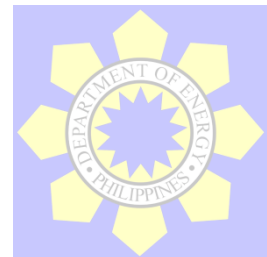
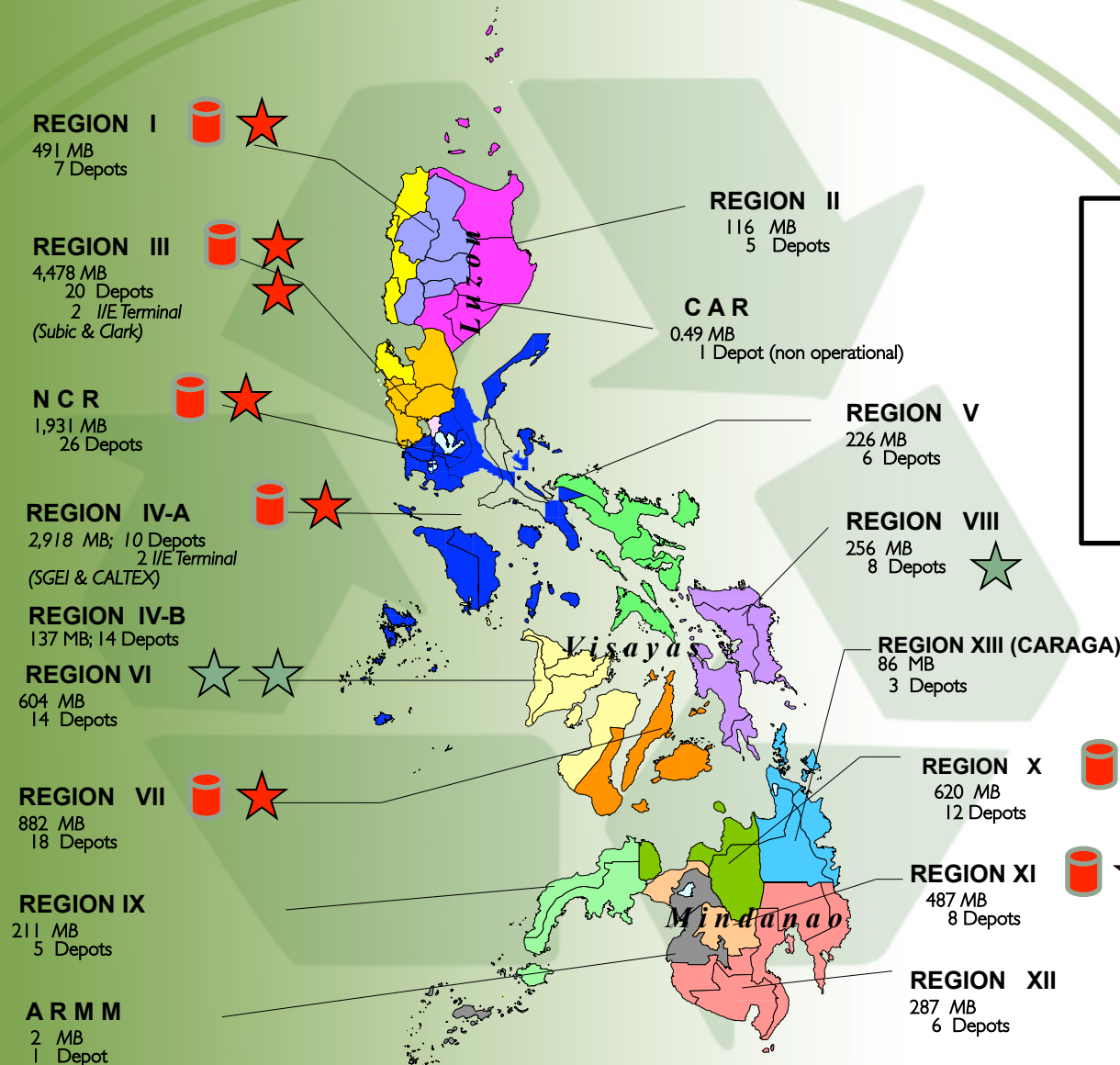
Ethanol Plant Landscape



 Denaturing Sites

 Local Ethanol Plant Sites

 Diesel, Gasoline Import Terminal



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.

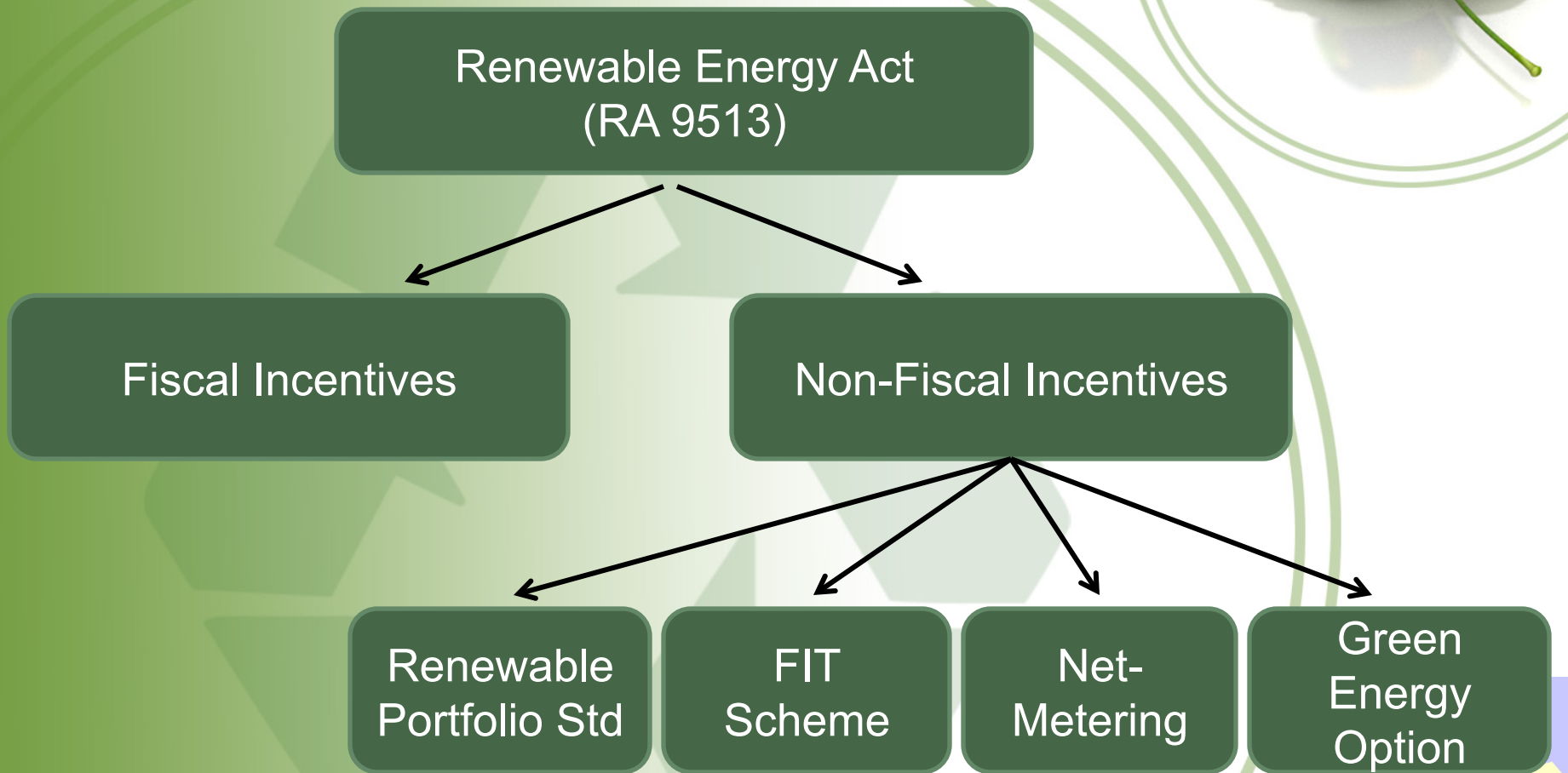


Functions of Agencies



NREB	DOE	ERC
<ul style="list-style-type: none">• Recommend to ERC FIT for each RE resource	<ul style="list-style-type: none">• Approve RE Contracts applications	<ul style="list-style-type: none">• Establish FIT Rules
<ul style="list-style-type: none">• Recommend and monitor National RE Program (NREP)	<ul style="list-style-type: none">• Establish and implement NREP	<ul style="list-style-type: none">• Approve FIT petition filed by NREB
<ul style="list-style-type: none">• Recommend and monitor Renewable Portfolio Standards (RPS)	<ul style="list-style-type: none">• Draft and implement RPS	<ul style="list-style-type: none">• Establish FIT-Allowance annually based on NGCP petition
<ul style="list-style-type: none">• Oversee RE Trust Fund	<ul style="list-style-type: none">• Establish RE Market Rules and Trust Fund	<ul style="list-style-type: none">• Review and adjust FIT as appropriate

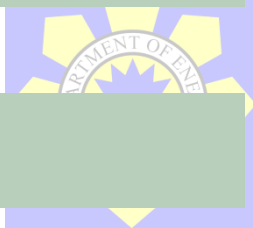
INCENTIVES UNDER RE ACT



FISCAL INCENTIVES



Incentives	RE Developers	Local RE Suppliers
7-Year Income Tax Holiday	Yes	Yes
Duty-free Importation	Yes	Yes
VAT-free Importation	No Tax Credit	Yes
Special Realty Tax Rate = 1.5 %	Yes	
Net Operating Loss Carryover	Yes	Yes
10% Corporate Tax Rate after ITH	Yes	
Accelerated Depreciation	Yes	Yes
Zero Percent VAT on RE Sales & Purchases	Yes	Yes
Cash Incentive = 50% of UC for Missionary Electrification	Yes	
Tax Exemption on Carbon Credits	Yes	
Tax Credit on Domestic Capital Equipment & Services	Yes	Yes

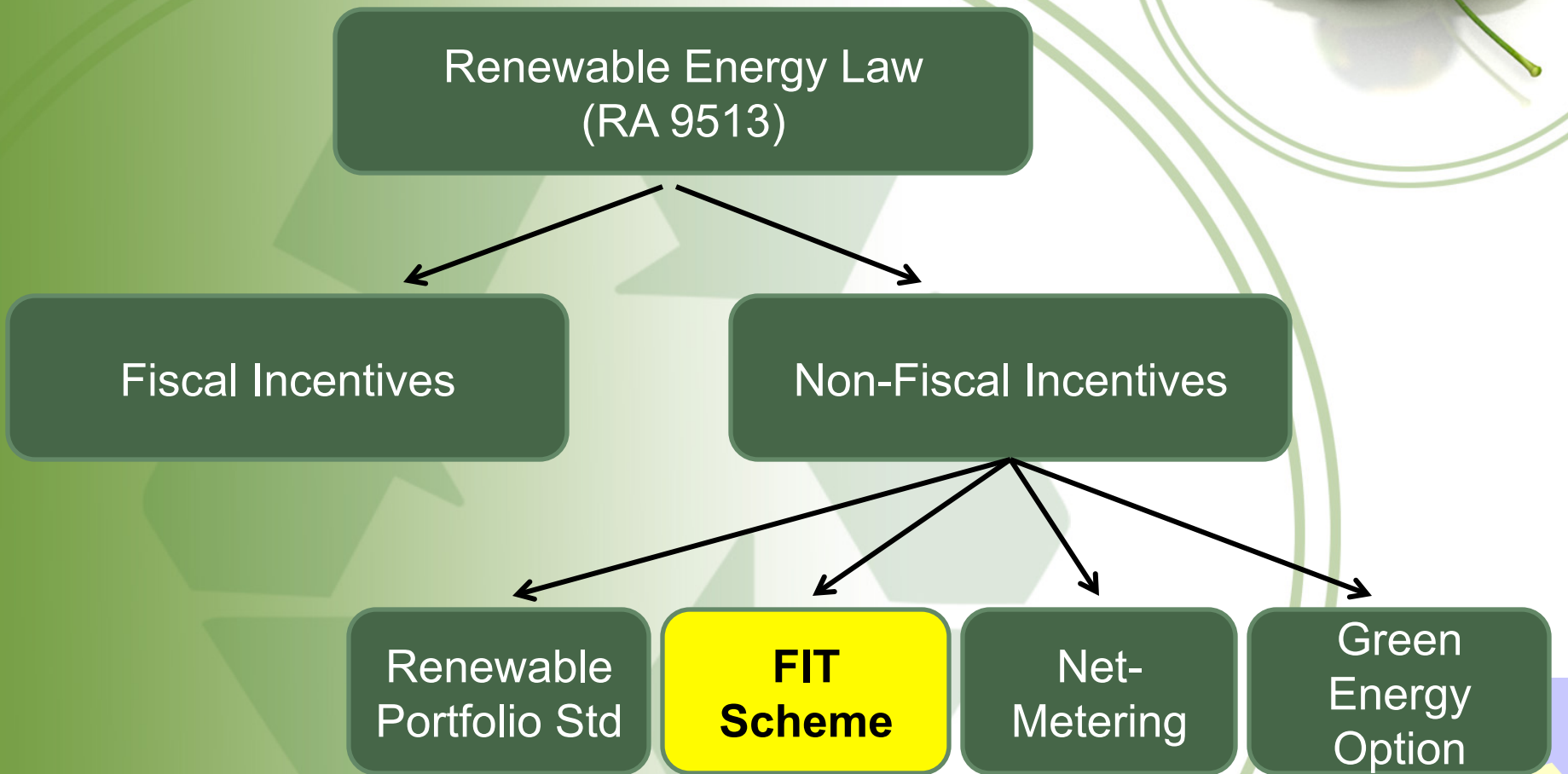


NON-FISCAL INCENTIVES



Incentives	RE Developers	Electricity Suppliers	End-users
Renewable Portfolio Standards	Yes		
Feed-In Tariff on Emerging Technologies	Yes	Yes	
Renewable Energy Market & Certificates	Yes (for Non-FIT)	Yes	
Green Energy Options			Yes
Net Metering			Yes
Government waives share of proceeds on RE micro-scale Projects ≤ 100 kW	Yes		
Exemption from Universal Charge			Yes
Tax Rebate for RE Components	Yes		
Financial Assistance Program			Yes
Incentives for Host Communities			Yes

INCENTIVES UNDER RE LAW



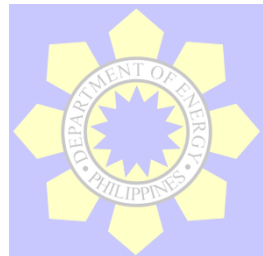
FIT and FIT-Allowance (FIT All)



“FIT refers to a renewable energy policy that offers guaranteed payments on a fixed rate per kWh for emerging renewable energy sources, excluding any generation for own use or to rate itself as established pursuant to these Rules.”

“Electricity consumers who are supplied with electricity through the distribution or transmission network shall share in the costs of the FITs in part through a uniform charge (in Php/kWh) to be referred to as the FIT All and applied to all billed kWh.”

(Section 2.5, 2010 ERC FIT Rules)



FEED-IN TARIFF

Elements	Provisions under the RE Act, IRR & FIT Rules
Payment	.Guaranteed, on a fixed rate per kWh
Coverage	.Emerging technologies- biomass, solar, run-of-river hydro, ocean and wind, excluding generation for own use .For projects which enter into commercial operations after effectivity of the FITs with certain exceptions for existing plants .On-Grid areas only
Mandated duration	.Initial FITs- 20 years; Minimum – 12 years
Connection to Grid	.Priority connection, purchase, transmission and payment by grid system operator .NGCP to determine maximum penetration limits for intermittent REs .PEMC and NGCP to implement technical mitigation & improvements to ensure reliability of transmission
Dispatch	.Priority and must dispatch

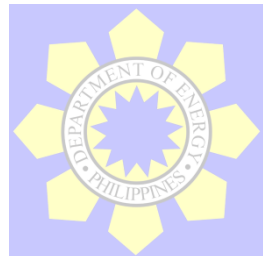
FIT System



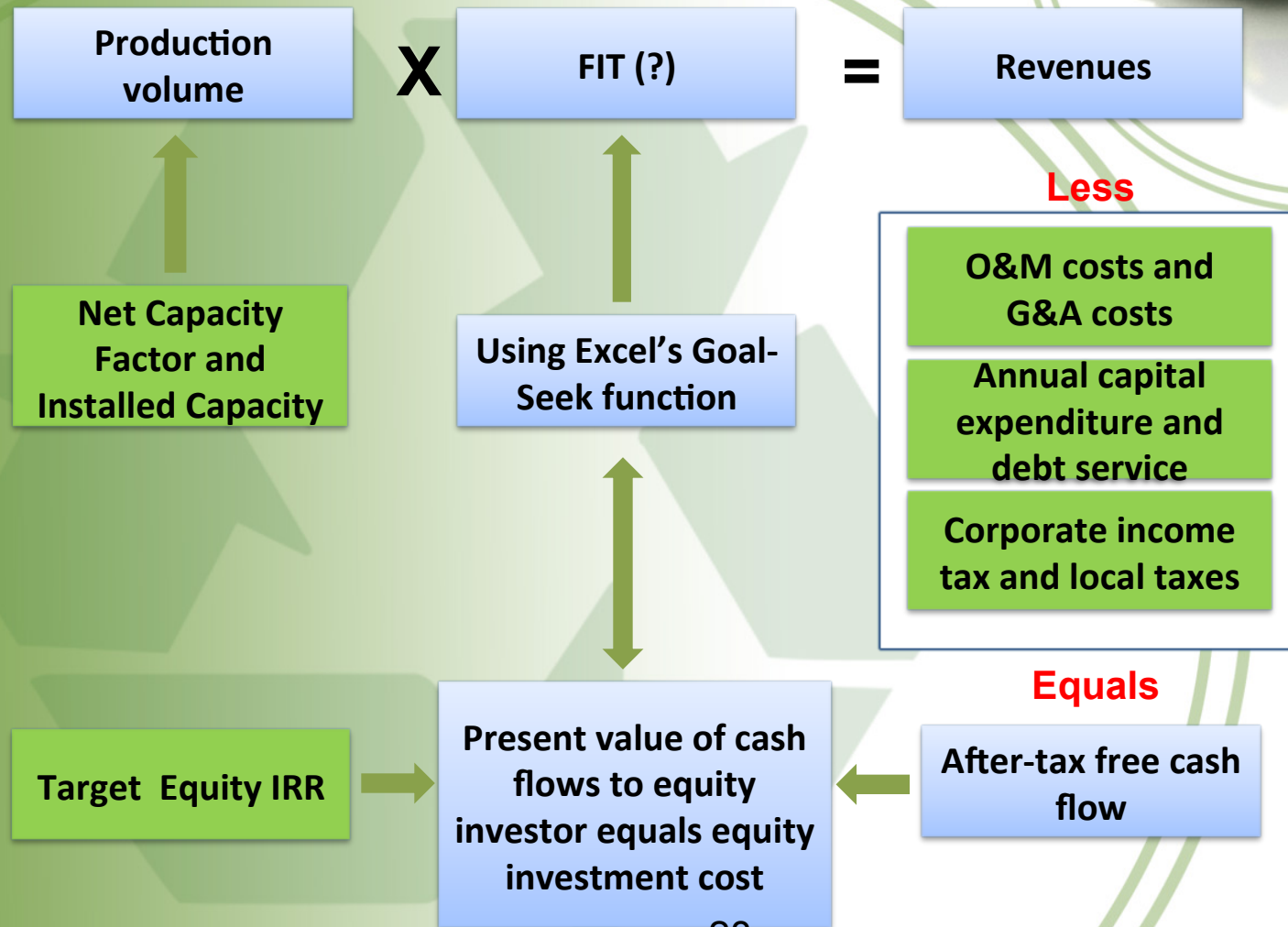
Mandated for electricity produced from emerging RE resources:

- Wind
- Solar
- Ocean
- Run-of-River Hydro
- Biomass

ERC in consultation with NREB shall formulate and promulgate FIT system rules.



How Did We Compute for the FIT?



Representative Ocean Power Project in the Philippines

Key Inputs and Assumptions

Renewable Energy Source		Ocean		Technical and EPC Assumptions		Debt and Equity Assumptions	
Timing							
Construction Period (Mos. from FC)	24			Unit Capacity of Plant	1.8	Local/Foreign Capital Ratio:	
Operating Period (yrs from COD)	20			No. of Units	9.0	Local Capital Ratio	30%
Yrs from base year CPI & Forex (2009) for FIT	4			Gross Installed Capacity (MW)	16.2	Foreign Capital Ratio	70%
Yrs from base year CPI (2011) for Capex	1					Debt:	
Yrs from base year CPI (2011) for Opex	3					Debt ratio	70%
Construction Sources and Uses of Funds (\$000)				Plant Availability Factor %	95.2%	Local & Foreign Upfront and other financing fees	2.00%
Uses of Fund:				Guaranteed Efficiency Factor %	100.0%	Local & Foreign Commitment Fees	0.50%
EPC (Eqpt, bal. of plant & transport)	\$157,982			Allowance for losses and own use	37.0%	Local All-in Interest Rate excluding tax	10.00%
T-line Interconnection facility	437			Net Capacity Factor after losses & own use %	60.0%	Local Debt Payment Period (from end of grace pd)	10 Years
Sub-station facility	1,276			Net Electrical Output (MWh in 1st Year)	85,147	Foreign All-in Interest rate excluding tax	8.00%
Development & other costs	241			Plant Degradation (%/Year)	0.0%	Foreign Debt Payment Period (from end of grace pd)	10 Years
Construction contingency	12,287					Local & Foreign Grace period from COD (months)	6
Value added tax	16,083			Equipment Cost ex BOP & transport (\$000/MW)	7,939	Local and Foreign Debt service reserve (months)	6
Financing costs	15,608			Transportation cost to site (% of Equipment)	0%	Total Local Debt (\$000)	163
Initial working capital	803			Balance of plant (% of Equipment)	20%	Total Foreign Debt (\$000)	143,139
Uses of Fund	<u>\$204,717</u>			T/line distance (km)	5	Total Debt Amount (\$000)	\$143,302
Sources of Fund:				T/line cost per km - 69kV (\$000/km)	84	Equity:	
Debt	\$143,302			Switchyard and transformers (\$000)	1,227	Equity ratio	30%
Equity	61,415			Access roads (\$000/km)	20	Equity Investment (\$000)	\$61,415
Sources of Fund	<u>\$204,717</u>			Distance of access road (km)	-	Cost of Equity (Onshore Equity IRR) - Nominal	17.0%
Construction Cost Metrics (USD/kW):				Dev't. & others (land, permits, etc) (% of EPC)	0.2%	Cost of Equity (Onshore Equity IRR) - Real	12.5%
EPC cost	\$9,752			VAT on importation (70% recoverable)	12%		1,700
Plant cost excl VAT & financing	\$10,631			Initial Working capital (% of EPC)	0.5%	WACC pre-tax	11.3%
All-in Installed Project Cost	\$12,637			Contingency (% of total cost)	7.6%	WACC after-tax	10.1%
Model Check:				Operating Assumptions		Tax Assumptions	
Balance Sheet	OK			Feed-in Tariff (LC / kWh)	17.65	Income tax holiday (years)	7
Foreign Debt Amortization	OK			Duration of FIT (years)	20	Income tax rate % (after ITH)	10%
Local Debt Amortization	OK			Tariff post FIT period (LC/kWh)	7.00	Property tax (from COD)	1.5%
Depreciation	OK			FIT using Asset Base Methodology (LC/kWh)	17.64	Property tax valuation rate (% of NBV)	80%
Sources and Uses of Funds	OK			Annual CER volume (tCO2e / yr)	-	Local Business tax	1.0%
Debt-to-Equity Ratio	OK					Government share (from COD)	1.0%
				O&M Cost (\$000/Unit/yr)	225	ER 1-94 contribution (Php/kWh)	0.01
				Spare parts, tools, & equipment (\$000/MW/yr)	-	Withholding tax on interest (Foreign Currency)	10%
				O&M + Spares as a % of EPC, T/line, & Sub-stn	1.27%	Gross receipts tax on Interest (Local Currency)	5%
				Refurbishment Cost (% of EPC)	0%	Economic Assumptions	
				Timing of Refurbishment (Year from COD)	-	Base Foreign Exchange Rate (LC / USD) - 2009	47.8125
				G&A Cost (\$000/yr)	-	Forward Fixed Exchange Rate (2011)	44.0000
				Fuel Cost (switch for Biomass (1 = yes; 0 = no))	0	Base Local CPI - 2009	160.00
				Average Fuel Cost (Php/ton)	-	Annual Local CPI	4.0%
				Feed rate (kWh/ton)	-	Annual US CPI	2.0%
				Average Fuel Consumption (tons/year)	-		
				Average Unit Cost of Fuel (Php/kWh)	-		
				Days receivable & payable	30		
				VAT recovery %	70%		
				Timing of VAT recovery (years after COD)	5		

Parameters and Assumptions – ERC

Particulars	ROR Hydro	Biomass	Solar	Wind	Ocean
Representative Size (MW)	6.0	8.3	10.0	30.0	
Project Cost (US\$ per kW)	3,195	2,594	2,437	2,354	
EPC Cost (US\$ per kW)	2,189	1,880	1,954	1,790	
Net Capacity Factor (%)	47.0	72.0	22.0	27.0	
O&M Cost (US\$000/unit/year)	400	1,115	530	100	
Fuel Cost (Php per ton)	N.A.	1,297	N.A.	N.A.	
Feed Rate (kWh / ton)	N.A.	700	N.A.	N.A.	
Equity IRR (%)	16.44	17.0	16.44	16.44	
After-Tax WACC (%)	10.44	10.44	9.99	10.08	
Approved FIT (Php per kWh)	5.90	6.63	9.68	8.53	

Initial Feed-in Tariffs in Php/kWh

Technology	Proposed by RE Developers			DOE	NREB Approved (DOE)	ERC Approved
	Oct. 2010	Nov. 2010	April 2011	April 2011	May 2011	2012/2015
Biomass ^{1/}	11.48	9.94	8.22	6.09	7.00	6.63
Run-of-River Hydro ^{2/}	7.44	7.40	6.56	5.64	6.15	5.90
Solar ^{3/}	23.81	20.55	19.11	9.50	17.95	9.68/8.69
Wind	11.92	11.85	11.29	8	10.37	8.53/7.40
Ocean	18.52	18.52	18.52		17.65	Deferred

^{1/} For a solid biomass project

^{2/} For a project with capacity between 1MW and 10MW

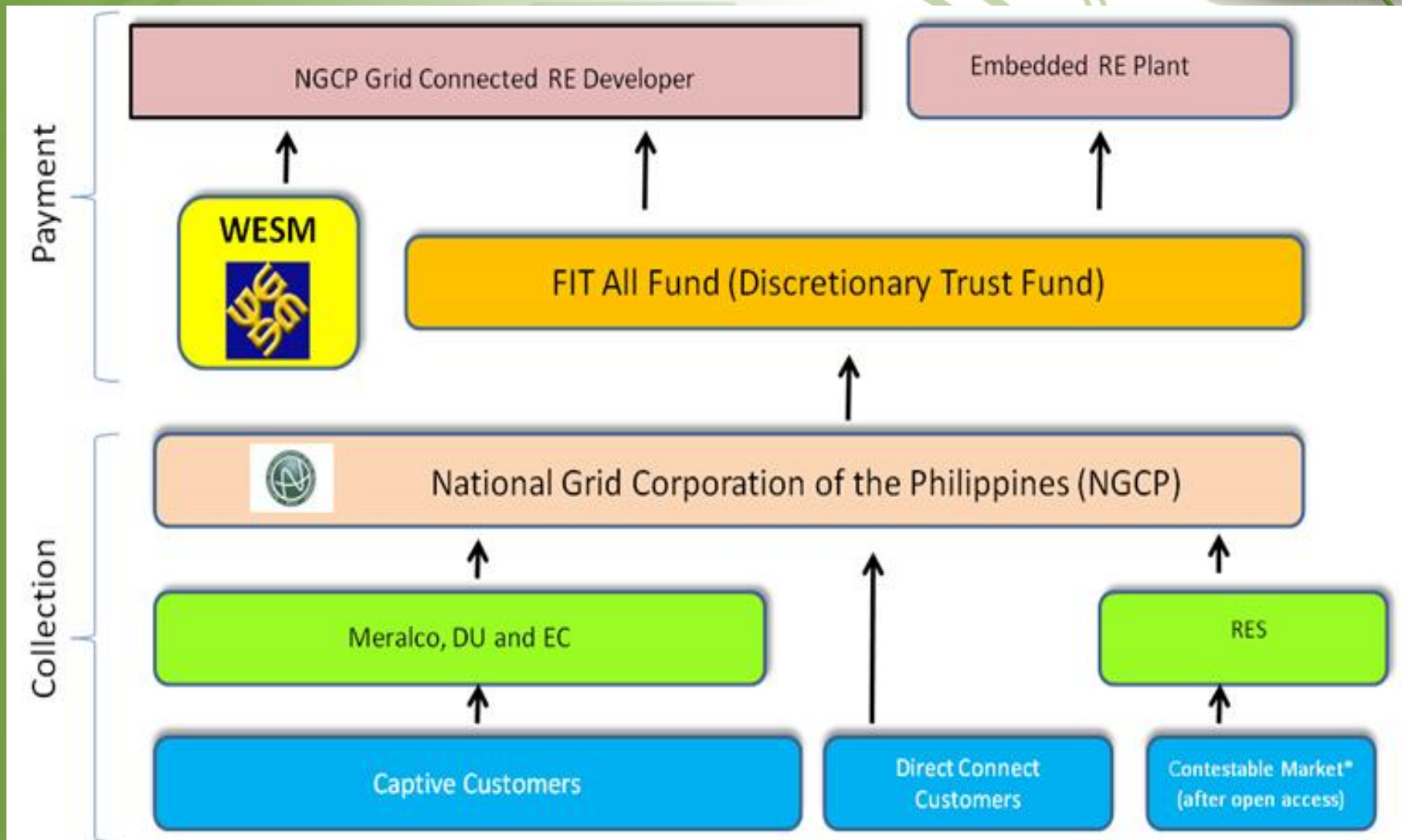
^{3/} For a ground-mounted project with more than 500kW capacity

INSTALLATION TARGETS

in MW

Technology	Proposed by RE Developers		DOE	NREB Approved (April 2011)	DOE Certification to ERC
	June 2010	November 2010			
Biomass	357	416	233	250	250
Run-of-River Hydro	131	131	170	250	250
Solar	235	542	20	100	50/500
Wind	710	710	220	220	200/400
Ocean	10	10	10	10	10
TOTAL	1,443	1,809	653	830	760

Overview of Collection and Payment

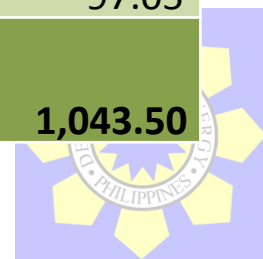


FEED-IN TARIFF MONITORING BOARD

(as of June 2016)



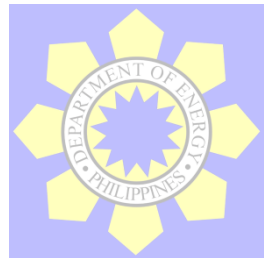
RESOURCE	FOR NOMINATION / CONVERSION		WITH CERTIFICATE OF CONFIRMATION OF COMMERCIALITY		WITH CERTIFICATE OF ENDORSEMENT TO ERC	
	NO. OF PROJECTS	CAPACITY (MW)	NO. OF PROJECTS	CAPACITY (MW)	NO. OF PROJECTS	CAPACITY (MW)
HYDRO		-	86	732.12	4	26.60
WIND	7	1,023.55	11	715.30	6	393.90
SOLAR	15	565.18	47	1,227.73	20	525.95
BIOMASS			18	147.40	12	97.05
TOTAL	22	1,588.73	162	2,822.543	42	1,043.50



IMPLEMENTATION OF RE LAWS



Developments and Updates



NREP TARGETS



RE-based On-Grid Capacity Installation Targets

Sector	Installed Capacity, MW as of 2010	Target Capacity Addition by				Total Capacity Addition, MW 2011-2030	Total Installed Capacity by 2030
		2015	2020	2025	2030		
Geothermal	1,972.0	220.0	1,100.0	95.0	80.0	1,495.0	3,467.0
Hydro	3,333.0	343.3	3,161.0	1,891.8	0.0	5,396.1	8,729.1
Biomass	30.0	276.7	0.0	0.0	0.0	276.7	306.7
Wind	33.0	1,048.0	855.0	442.0	0.0	2,345.0	2,378.0
Solar	1.0	269.0	5.0	5.0	5.0	284.0 ⁹	285.0
Ocean	0.0	0.0	35.5	35.0	0.0	705.0	70.5
Total	5,369.0	2,157.0	5,156.5	2,468.8	85.0	9,855.4	15,236.3

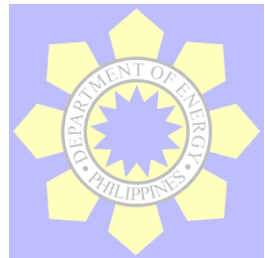
⁹ Based on existing RE Service/Operating Contracts awarded and being evaluated by the DOE. The aspirational target of 1,528 MW solar power capacity will still be pursued.



NATIONAL RENEWABLE ENERGY PROGRAM



NATIONAL RENEWABLE ENERGY BOARD



CREATION OF NREB

Renewable Energy Act of 2008

Sec. 27. Creation of the National Renewable Energy Board
(NREB)

The NREB is hereby created...

...It shall be composed of:

- A Chairman
- One (1) representative each from the following agencies: DOE, DTI, DOF, DENR, NPC, TRANSCO or its successor-in-interest, PNOC and PEMC who shall be designated by their respective secretaries on a permanent basis; and

COMPOSITION OF NREB

Sec. 27. (Continued)

... one representative each from the following sectors: RE Developers, Government Financing Institutions (GFIs), private distribution utilities, electric cooperatives, electricity suppliers and non-governmental organization, **duly endorsed by their respective industry associations and all to be appointed by the President of the Republic of the Philippines.**

COMPOSITION OF NREB

Breakdown of the NREB Membership:

- Government: Eight (8)
- Private: Seven (7)*
- TOTAL Fifteen (15)

Notes:

1. Government representatives include GFI
2. Private representatives include NGCP & the Chairman

** To be appointed by the President*

NREB PRIMARY ROLE

Under Section 27 of the Republic Act No. 9513 (Renewable Energy Act of 2008), NREB is primarily the policy recommendatory and monitoring body for the implementation of the RE Act of 2008.

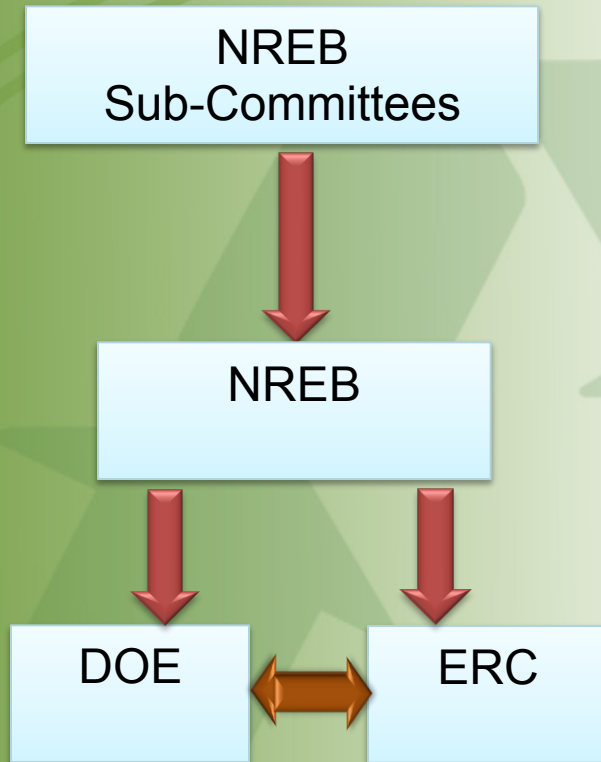
POWERS AND FUNCTIONS

1. Evaluate and recommend to the DOE the mandated RPS and minimum RE generation capacities in off-grid areas, as it deems appropriate.
2. Recommend specific actions to facilitate the implementation of the National Renewable Energy Program (NREP) to be executed by the DOE and other appropriate agencies of government, and to ensure that there shall be no overlapping and redundant functions within the national government departments and agencies concerned.
3. Monitor and review the implementation of the NREP, including compliance with the RPS and minimum RE generation capacities in off-grid areas.

POWERS AND FUNCTIONS

4. Oversee and monitor the utilization of the Renewable Energy Trust Fund created pursuant to Section 28 of this Act and administered by the DOE;
5. Cause the establishment of a one-stop facilitation scheme to accelerate implementation of RE projects; and
6. **Perform such other functions, as may be necessary to attain the objectives of the RE Act.**

WORK FLOW OF RE POLICY INSTRUMENTS



1. Collation of information on RE resources in the Philippines.
2. Technical working groups per function, i.e., RPS, FiT, Net Metering, Green Option, RETF)
3. Conduct of informal discussions and consultations with stakeholders on policy issues per RE resource and per regional grid.
4. Formulation of proposed policy instruments.
5. Deliberation and approval of RE policy instruments at the Board level.
6. Endorsement of proposed policy instruments to DOE.

7. Review and approval.
8. Promulgation and implementation.
9. Endorsement of approved policies to ERC, as appropriate, e.g., FiT, Net-Metering Standards.
10. Review and approval.
11. Conduct of consultative public hearings.
12. Promulgation, e.g. FiT, Net-Metering Standards

NREB ORGANIZATIONAL STRUCTURE

NATIONAL RENEWABLE ENERGY BOARD

CHAIRMAN

VICE - CHAIRMAN

VOTING MEMBERS

DEPARTMENT OF ENERGY (DOE)
PHILIPPINE NATIONAL OIL COMPANY (PNOC)
NATIONAL POWER CORPORATION (NPC)
NATIONAL GRID CORPORATION OF THE PHILIPPINES/
NATIONAL TRANSMISSION CORPORATION (NGCP/
TRANSCO)
PHILIPPINE ELECTRICITY MARKET CORPORATION
(PEMC)
DEPARTMENT OF TRADE AND INDUSTRY (DTI)
DEPARTMENT OF FINANCE (DOF)
DEPARTMENT OF ENVIRONMENT AND NATURAL
RESOURCES (DENR)
RENEWABLE ENERGY DEVELOPER
GOVERNMENT FINANCIAL INSTITUTION (GFI)
NON-GOVERNMENT ORGANIZATION (NGO)
PRIVATE DISTRIBUTION UTILITIES

NON VOTING MEMBERS/ OBSERVERS

ENERGY REGULATORY COMMISSION (ERC)
NATIONAL ELECTRIFICATION ADMINISTRATION
(NEA)
DEPARTMENT OF AGRICULTURE (DA)
DEPARTMENT OF SCIENCE AND TECHNOLOGY
(DOST)
NATIONAL COMMISSION ON INDIGENOUS
PEOPLE (NCIP)

NREB COMMITTEES, SUB-COMMITTEES AND TWGS

NATIONAL RENEWABLE ENERGY BOARD

National Renewable
Energy Plan Committee

Finance & Planning
Committee

Technical Committee

Market Transformation
& Promotion Committee

RE Trust Fund
Subcommittee

FIT Subcommittee

FIT TWG

One-Stop-Shop
Subcommittee

RPS Subcommittee

REPA TWG

RE Hosts
Incentive
Subcommittee

GEOP Subcommittee

RPS TWG

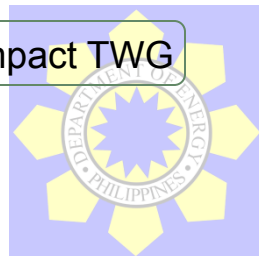
Planning & Budget
Subcommittee

TDD Subcommittee

Grid Impact TWG

REM Subcommittee

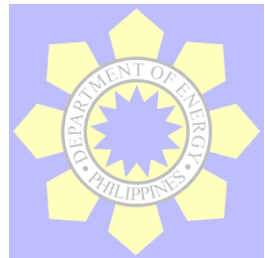
Net-Metering
Subcommittee



IMPLEMENTATION OF RE LAW



WHAT ARE NEXT STEPS IN 2016-2022?



RENEWABLE PORTFOLIO STANDARDS

Elements	Provisions under the RE Act & IRR
Purpose	To contribute to the growth of the RE industry by diversifying energy supply To help address environmental concerns by reducing GHG emissions
Coverage	Electric power industry participants such as generators, distribution utilities, or suppliers serving On-Grid areas on a per grid basis
Types of RE Resources	Eligible RE resources, not limited to emerging technologies To be identified under the RPS Rules
Annual Minimum Incremental %	No less than one percent (1%) of annual energy demand of the mandated electricity industry participant
RPS Rules	DOE to formulate and promulgate upon recommendation of NREB
Yearly minimum RPS requirement	To be set by NREB in accordance with the RPS Rules

GREEN ENERGY OPTION

Elements	Provisions under the RE Act & IRR
Definition	.A mechanism which shall provide end-users the option to choose RE Resources as their source of energy
Regulatory Framework	.DOE in consultation with NREB to establish the IRR .ERC to issue the regulatory framework
Mandated Parties	.The TRANSCO or its successor-in-interest, DUs, PEMC and all relevant parties mandated to provide the mechanisms for the physical connection and commercial arrangements
Information to End-Users	.End-user to be informed by way of its monthly electric bill how much of the monthly energy consumption and generation charge is provided by RE Facilities.

NET METERING

Elements	Provisions under the RE Act & IRR
Purpose	.To encourage end-users to participate in RE generation
Definition	.Consumer-based RE incentive wherein power generated by an end-user delivered to the local distribution grid may be used to offset electric energy provided by the DU to the said end-user.
Mandate	.Upon request by the end-user, the DUs shall without discrimination enter into Net-Metering arrangements with qualified end-users
Qualified End-Users	.Entities that generate electric power from an eligible on-site RE generating facility, such as but not limited to house or office building with PV system that can be connected to the Grid
RE Certificates	.DU shall be entitled to any RE Certificate resulting from Net Metering arrangements

NET METERING CUSTOMERS



DISTRIBUTION UTILITIES	NO. OF CUSTOMERS	Capacity (kWp)
MERALCO	637	3823.34
VECO	26	155.62
CEBECO III	1	3.00
CEBECO I	5	84.00
DLPC	9	81.20
AEC	3	25.46
BATELEC I	1	10.00
PELCO II	3	24.50
LEYECO V	2	6.00
Total	687	4213.12



RENEWABLE ENERGY MARKET

Elements	Provisions under the RE Act & IRR
Purpose	To expedite compliance with the establishment of the RPS
Market	REM shall be a Sub-market of the WESM, where the REC trading may be made
Framework	DOE to establish framework that will govern REM operation and direct PEMC to implement
REM Rules	PEMC to implement changes to the WESM Rules to incorporate the rules specific to REM
Renewable Energy Registrar	PEMC shall issue, keep and verify RE Certificates
RE Certificates	Will be used in compliance with the RPS

OFF-GRID DEVELOPMENT

Elements	Provisions under the RE Act & IRR
Purpose	To encourage RE deployment in Off-Grid Areas
Mandated Entities	NPC-SPUG, DUs, and/or qualified third parties in Off-Grid areas in pursuance of mandate to provide missionary electrification
Obligation of Mandated Entities	To source a minimum % of their total annual generation from available RE Resources in the area concerned
Guidelines	DOE to determine minimum percentage upon recommendation of NREB
RE Certificates	Eligible RE generation in Off-Grid and missionary areas shall be entitled to RECs

NATIONAL RENEWABLE ENERGY PROGRAM TARGETS, 2011-2030



Sector	Short Term	Medium Term	Long Term	Total
	2011-2015	2016-2020	2021-2030	
Geothermal	220 MW	1,100 MW	175 MW	1,495 MW
Hydropower	341.3 MW	3,161 MW	1,891.8 MW	5,394.1 MW
Biomass	276.7 MW	0	0	276.7 MW
Biofuels	<ul style="list-style-type: none"> •DC on E10 in 2011 •Mandatory E10 to all Gasoline by 2012 •PNS for B5 by 2014 •DC on B5 by 2015 •Mandatory B5 to all Diesel by 2015 	<ul style="list-style-type: none"> •PNS for B20 & E85 by 2020 •DC on B10 and E20 by 2020 	<ul style="list-style-type: none"> •DC on B20 and E85 by 2025 	
Wind	200 MW	700 MW	1,445 MW	2,345 MW
Solar	50 MW	100 MW	200 MW	350 MW
Ocean Power	0	35.5	35	70.5
Total	1,088 MW	5,096.5 MW	3,746.80 MW	9,931.3 MW

Note: RE Targets under review of NREB to reflect developments on RE sector and the DOE's issuance of new Installation targets

NREB 2017 KEY TARGETS



Subject Matter	Target Completion Date
Update of National Renewable Energy Program	<ul style="list-style-type: none"> Public Consultation: September 2017 Launching: December 2017
RPS (On Grid) Rules	<ul style="list-style-type: none"> Finalize Draft Rules: June 2017 Public Consultation: End of June 2017 Endorse Final Draft to DOE: July 2017
RPS (Off Grid) Rules	<ul style="list-style-type: none"> Finalize Draft Rules: June 2017 Public Consultation: End of June 2017 Endorse Final Draft to DOE: July 2017
RE Market Rules	<ul style="list-style-type: none"> Finalize Draft Rules: July 15, 2017 Public Consultation: End of July 2017 Endorse Final Draft to DOE: End of August 2017
Green Energy Option Rules	<ul style="list-style-type: none"> Finalize Draft Rules: June 9, 2017 Endorse Final Draft to DOE: June 16, 2017
RE Trust Fund Rules	<ul style="list-style-type: none"> Finalize Draft Rules: June 9, 2017 Endorse Final Draft to DOE: June 16, 2017
Review of Net Metering Rules	<ul style="list-style-type: none"> Conduct Committee Meetings: June-August 2017
Transmission and Distribution Program and ERC Matters	<ul style="list-style-type: none"> Conduct Committee Meetings: June-September 2017
One-Stop Shop Rules and Legislative Agenda	<ul style="list-style-type: none"> Conduct Committee Meetings: June-September 2017
DOF-BIR Matters	<ul style="list-style-type: none"> Finalize Draft Rules: August 2017

APPLYING RULES ON RE PROJECT DEVELOPMENT



RE PROJECTS COMPLETED



COMPLETED PROJECTS



12 MW (Phase 1) San Jose City I Power Corporation



20 MW Maibarara Geothermal Power Plant



22 MW San Carlos Solar Power



COMPLETED PROJECTS



150 MW Burgos Wind Power Project



54 MW San Lorenzo Wind Power Project (Guimaras)



7 MW Tudaya 2 Hydroelectric Power Plant

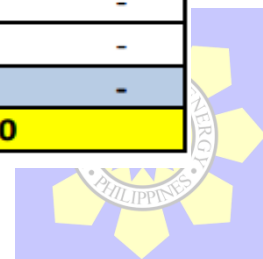


SUMMARY RENEWABLE ENERGY PROJECTS UNDER RE LAW (as of Feb. 2017)

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	



RECURRING ISSUES AND CHALLENGES



MAJOR MILESTONES



- **DAR-DA:** Land Conversion and Approvals
- **DOE:** RE Contract Application, Endorsements to ERC
- **NGCP:** Grid Impact Study, Upgrade of Transmission
- **ERC:** COCs, Point-to-Point Applications, FIT-All Adjustment, Power Supply Agreement Approvals, Ancillary Charges and Transmission Costs, Approval of NGCP Transmission Upgrades
- **PEMC:** Market Participant Registration
- **DENR:** Environmental Compliance Certificate
- **NWRB:** Water permits
- **BIR:** Revenue Regulations for RE Law; VAT refund
- **LGUs:** Barangay, Municipality, City, Province endorsements
- **JCPC:** 15% requirement in EPIRA; Zero-VAT for RE sales and services
- **NREB:** RPS, GEO, RE Market, Net Metering Amendment, Extension of FIT deadline for undersubscribed hydro and biomass



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

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

CREATION OF CONDUCTIVE BUSINESS ENVIRONMENT

RELIABLE AND EFFICIENT INFRASTRUCTURE

- 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

- 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**

BIOFUELS ROADMAP

OVERALL
OBJECTIVE
BY 2030

Short-Term
(2017-2019)

Medium to Long
Term
(2020-2040)

BIODIESEL

B2

Maintain 2%
biodiesel blending on
diesel

E10

Review the
bioethanol mandate

BIOETHANOL

- Revisit blending requirement and available feedstock
- Continuous conduct of research and development on feedstock sources

Pursue the development of Biofuels in compliance
with the Biofuels Act of 2006 (R.A. 9367)

Bright Archipelago: NREB Roadmap for Renewable Energy in the Philippines

ATTY. JOSE M. LAYUG, JR.
Chairman
National Renewable
Energy Board

