

Roadmap for Hydropower Development in the Philippines



Outline of Presentation

- Brief History of Hydropower Development in the Philippines
- Challenges and Barriers
- Enactment of Landmark Law
- Policy Directions and Mechanisms
- Where are we now
- Hydropower Sector Roadmap



Brief History

- Hydropower Development
 - Started in the early 1900's for electricity generation and non-power applications (e.g., millings), in rural communities
 - Government initiated commercial development of hydropower resources thru the National Power Corporation and the National Electrification Administration
 - Promulgation of Republic Act No. 7156 which provided full private sector development of mini-hydropower resources (up to 10 MW) in 1991
 - Private Sector participation thru Build-Operate-Transfer Scheme of large hydropower projects in mid 1990's



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 renewable energy resources.

Enactment of Landmark Laws

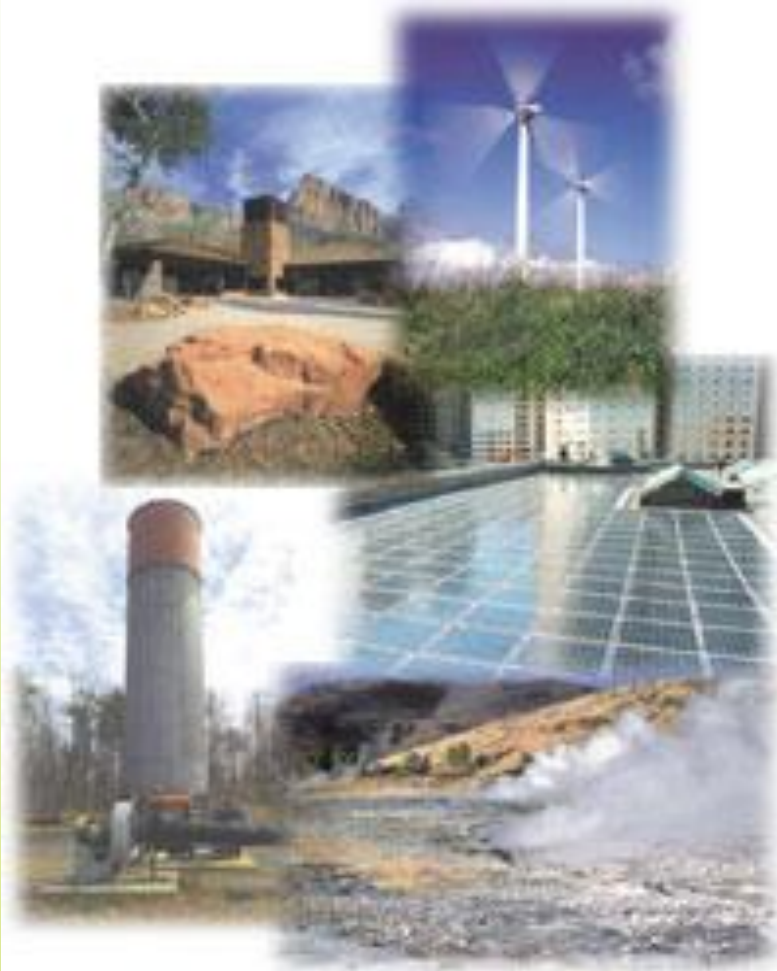
Republic Act 9513

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.

Renewable Energy



- ▣ **B**i omas / **B**iofuels
- ▣ **G**eothermal
- ▣ **S**olar Power
- ▣ **H**ydropower
- ▣ **O**cean
- ▣ **W**ind Power

Policy Implementation

- **Establishment of the Renewable Energy Management Bureau**
 - DOE's lead unit in the implementation of the Acts
 - Operationalized on 14 July 2009
 - Creation of the Interim Negotiating Panel for RE Service / Operating Contracts on 09 September 2009

- **Creation of the National Renewable Energy Board**
 - Created Sub-committees and working groups to facilitate the formulation of mechanisms, rules and guidelines on the ff.:
 - Renewable Portfolio Standard / Feed In Tariff
 - Net Metering
 - Green Energy Option
 - Renewable Energy Trust Fund

Policy Directions

- 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;

Policy Mechanisms

- Lowering of investment costs
 - 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

Policy Mechanisms

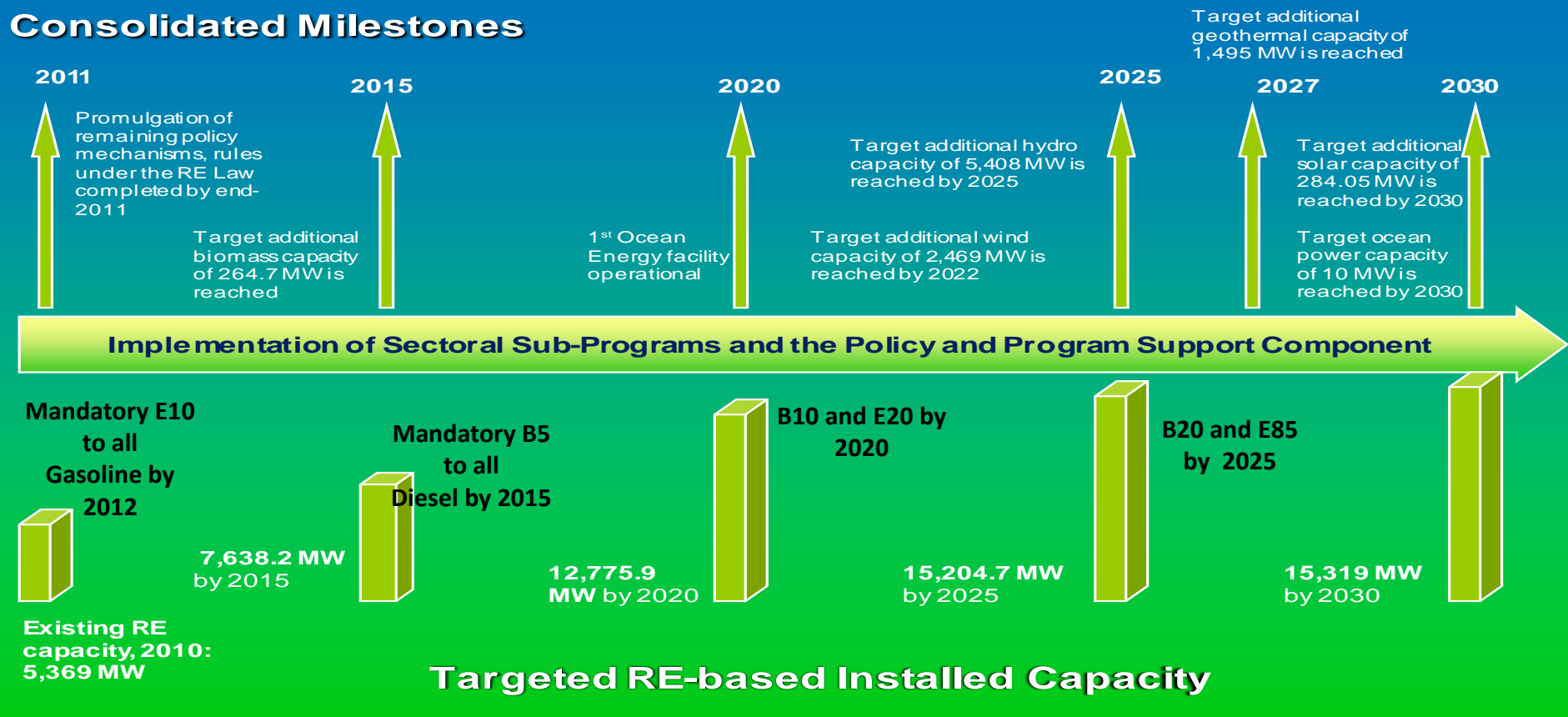
- Enhanced Competitiveness
 - Mandatory Utilization of RE Resources
 - Biofuels Mandate
 - Renewable Portfolio Standard (RPS)
 - Feed-In Tariff (FIT)
 - Provision of Interconnection / Ancillary Services
 - Other Market Options
 - Net Metering Concept
 - Green Energy Option

Renewable Energy Outlook, 2011 – 2030

under the

“National Renewable Energy Program”

Consolidated Milestones

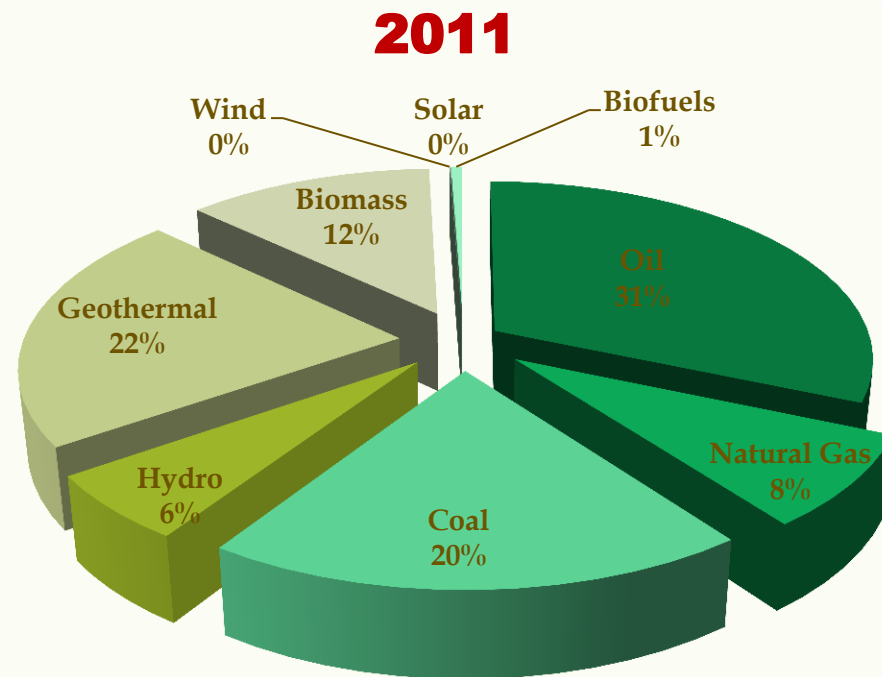
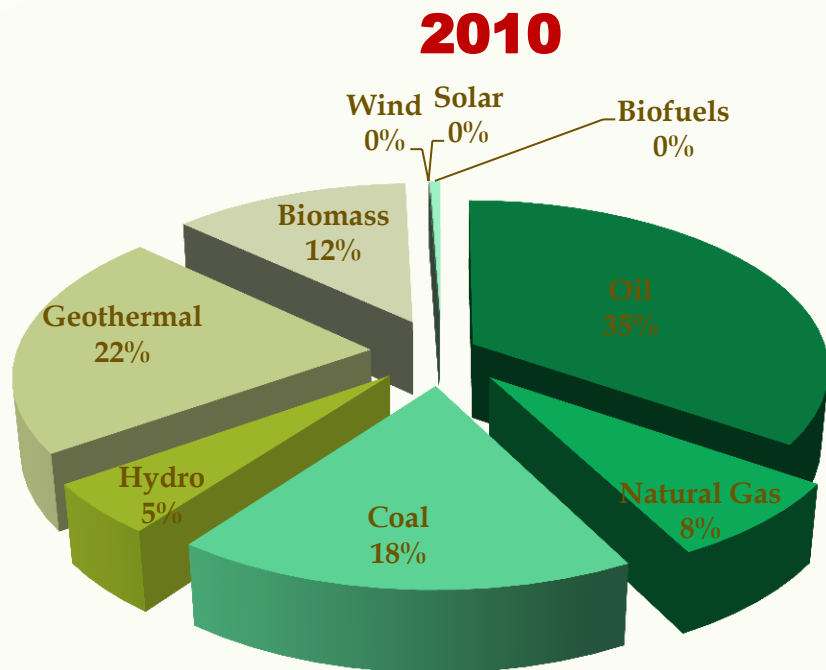


Note: The National Renewable Energy Program (NREP) is a live document and will be subjected to public consultations. Figures presented may change based on regular updates of the NREP.



Where are we now?

Primary Energy Mix



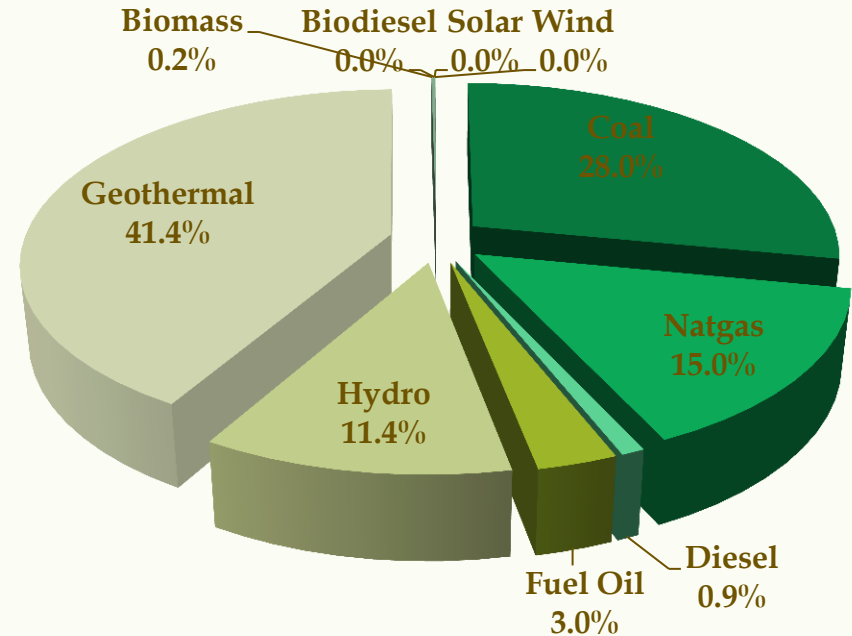
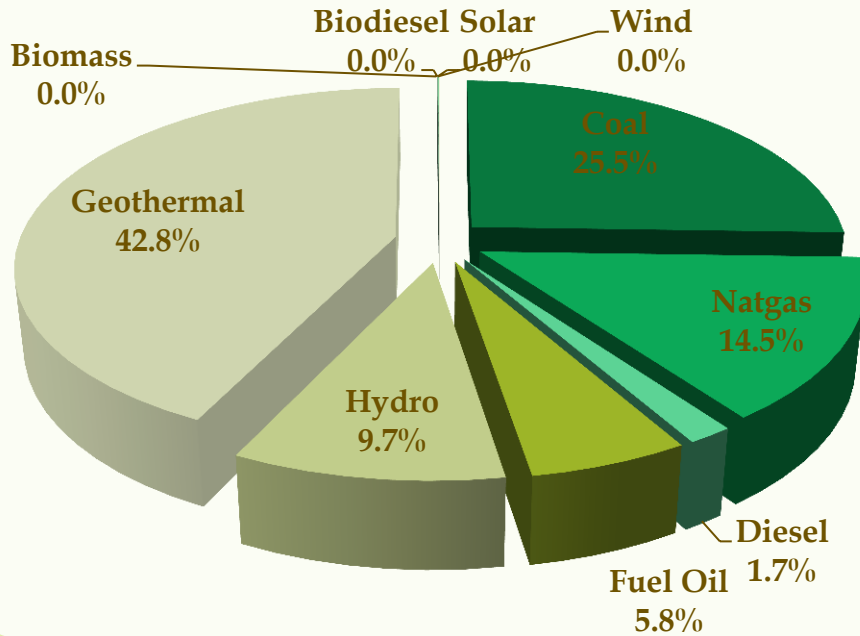
	2010	2011
Total Energy (MTOE)	39.29	39.40
Self-sufficiency	58.5	60.0
Shares (%)		
Renewable Energy (RE)	39.8	40.7
Hydropower	5.0	6.0
Green Energy (RE + Natural Gas)	47.8	48.7

Where are we now?

Fuel Input Mix for Power Generation

2010

2011



	2010	2011
Total Energy (MTOE)	19.97	20.63
Self-sufficiency	67.12	68.11
Shares (%)		
Renewable Energy (RE)	52.61	53.07
Hydropower	9.7	11.4
Green Energy (RE + Natural Gas)	67.12	68.11



Where are we now?

Updates on RE Policy Mechanisms

Renewable Portfolio Standard (RPS)

- Conducted seven (7) Regional Public Consultations (Luzon, Visayas, Mindanao) and Plenary Public Consultation at PICC on 14 November 2011
- RPS Rules for final review

ERC Approved Feed-in-Tariff (FiT) on 27 July 2012

- Solar P9.68/kWh
- Wind P8.53/kWh
- Biomass P6.63/kWh
- Hydro P5.90/kWh

FIT-ALL Payment and Collection Guidelines

- Guidelines were submitted by NREB to ERC on 18 April 2012.

Net-Metering

- The Rules Enabling the Net Metering Program for Renewable Energy was endorsed by NREB to ERC on 20 April 2012.

Policy Mechanisms

Updates on Feed-In Tariff (FIT) Implementation

- Call for conversion of RE Contracts from Pre-Development to Development Stage
 - Letters sent to RE Developers on Feb 25 covering a total of 72 contracts
- Affirmation of Declaration of Commerciality and endorsement to NGCP included in approval process
- Qualification under FIT system endorsement to ERC for the COC is determined upon commissioning and affirmation of the DOE of start of commercial operation, on a “first-come-first serve basis

Summary of Renewable Energy Projects

(as of February 2013)

AWARDED PROJECTS UNDER RENEWABLE ENERGY (RE) LAW						
RESOURCES	AWARDED PROJECTS		POTENTIAL CAPACITY		INSTALLED CAPACITY	
			MW		MW	
	Grid Use	Own-Use	Grid Use	Own-Use	Grid Use	Own-Use
Hydropower	176		2,772.56		131.31	1.5

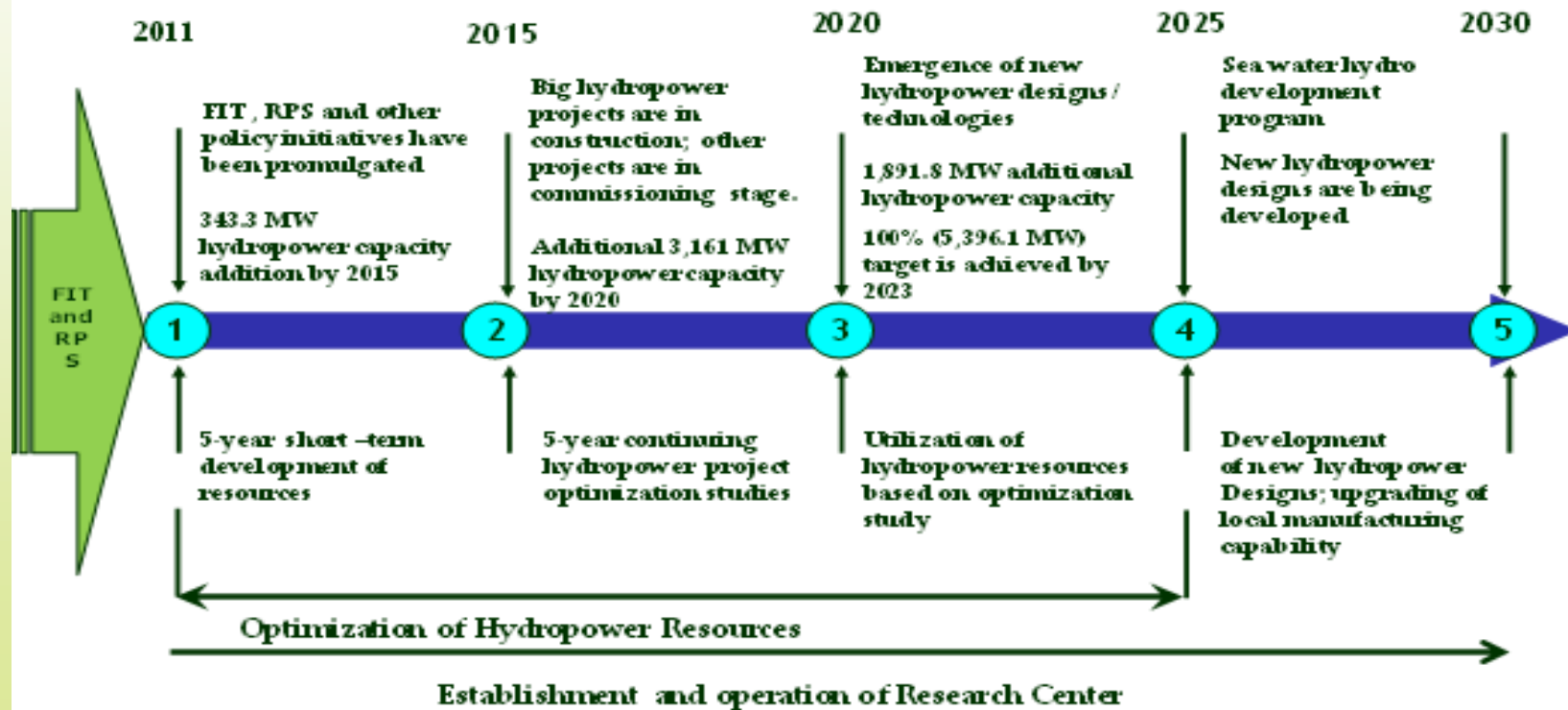
RESOURCES	PENDING APPLICATIONS		POTENTIAL CAPACITY		INSTALLED CAPACITY	
			MW		MW	
	Grid Use	Own-Use	Grid Use	Own-Use	Grid Use	Own-Use
Hydropower	236		2,737.57			



HYDRO SECTOR ROADMAP

under the National Renewable Energy Program

Hydro Sector Roadmap (2011 – 2030)



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Renewable Energy 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

Historical Background

- **1913** - first power plant in Baguio City
 - **560 kW John Hay MHP**
- **1936** - Commonwealth Act 120
 - **created the National Power Corporation**
- **1979** - Presidential Decree 1645
 - **mandated NEA to develop small-scale hydropower potentials**
- **1987** - Executive Order No. 215
 - **approve private sector participation in power generation**
- **1990** - Republic Act 6957
 - **BOT/BT Law to compliment EO 215**
- **1991** - Republic Act No. 7156
 - Mini-hydroelectric Power Incentives Act**
- **1994** - Republic Act No. 7718
 - BOT/BOO/BT Law amending RA 6957**



Hydropower Classification

Micro-Hydro - Up to 100 kW

Mini-Hydro - 101 kW - 10,000 kW

Small Hydro - 10,001kW - 50 MW

Large Hydro - Above 50 MW



Early Micro-hydros

VILLA ESCUDERO HP

Operator/Owner	:	Villa Escudero Plantations & Resort
Capacity	:	75 kW
Year of Operation	:	1937

CALIBATO HP

Operator/Owner	:	PHILPODECO
Capacity	:	80 kW
Year of Operation	:	1939



Mini-hydros in Early 1900s

CAMP JOHN HAY MHP

Operator/Owner	:	John Hay Development Corp.
Capacity	:	560 kW
Year of Operation	:	1913

BALOGBOG MHP

Operator/Owner	:	PHILPODECO
Capacity	:	650 kW
Year of Operation	:	1928

PALACPAQUIN MHP

Operator/Owner	:	PHILPODECO
Capacity	:	400 kW
Year of Operation	:	1937



Large Hydros

BOTOCAN HP

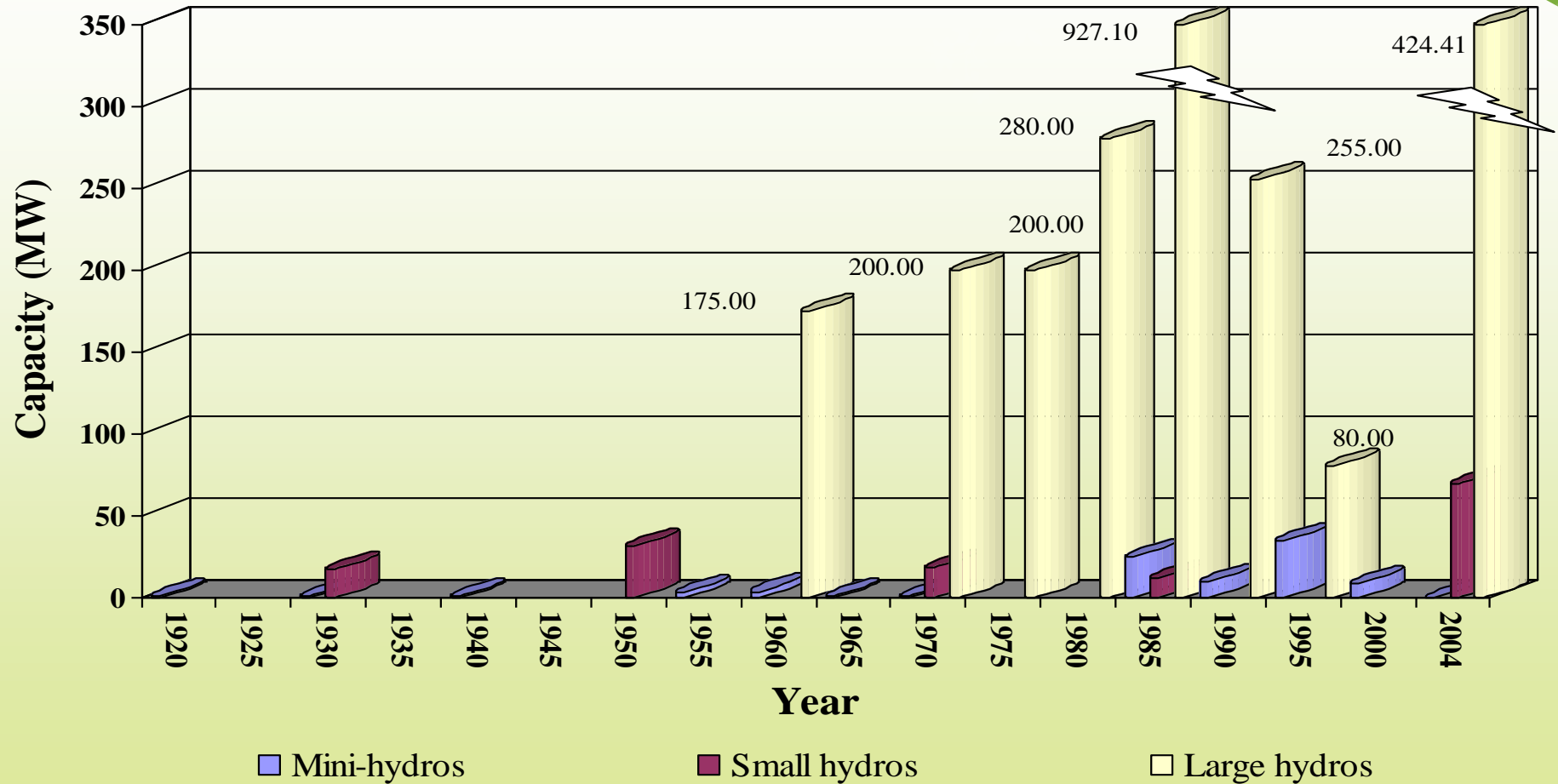
Operator/Owner : **MERALCO /
NPC (1979)**
Capacity : **16.96 MW**
Year of Operation : **1930**

CALIRAYA HP

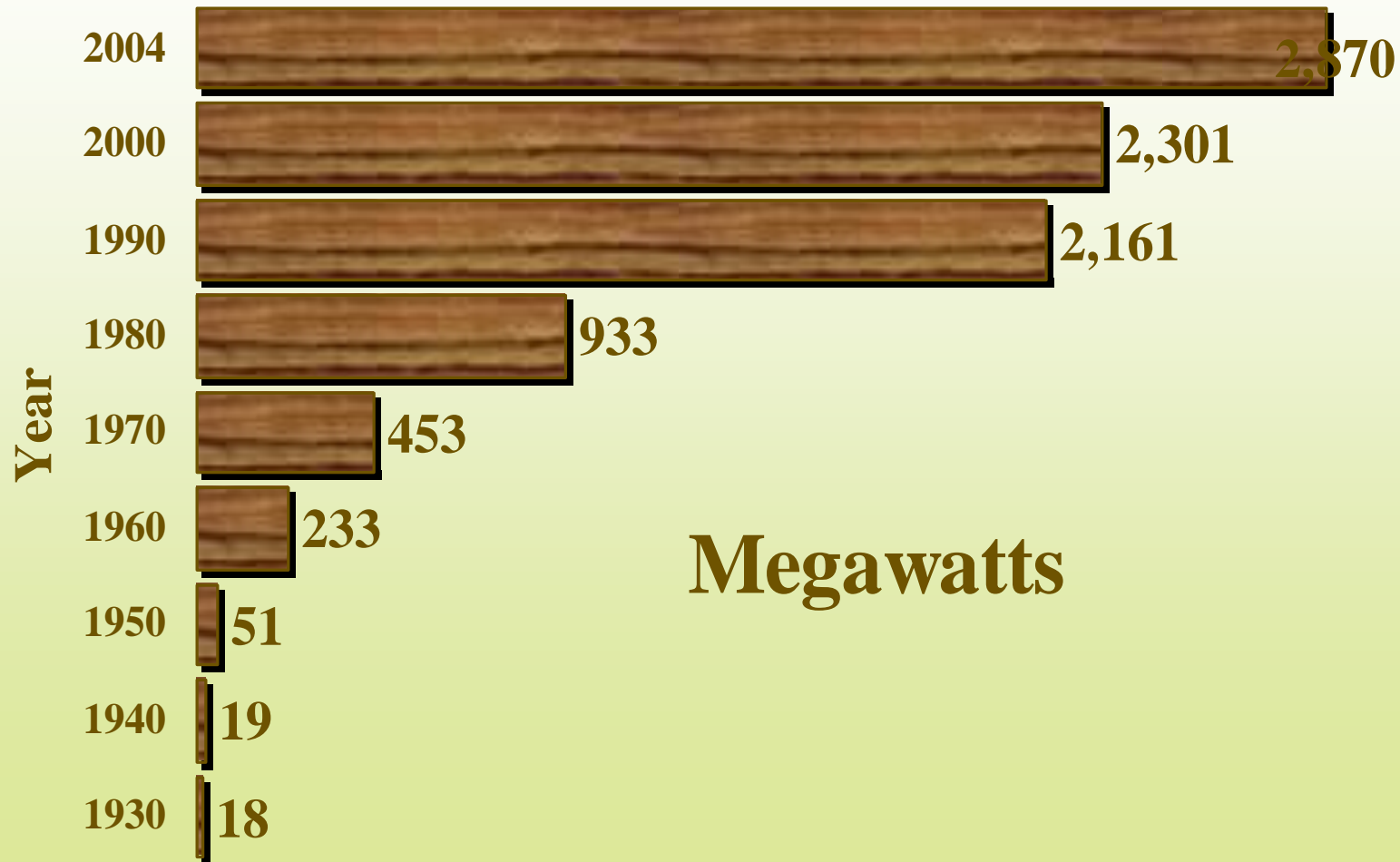
Operator/Owner : **NPC**
Capacity : **32.0 MW**
Initial Year of Operation : **1941**
Complete Operation : **1950**



Philippine Hydropower Industry



Philippine Hydropower Capacity Growth



Megawatts

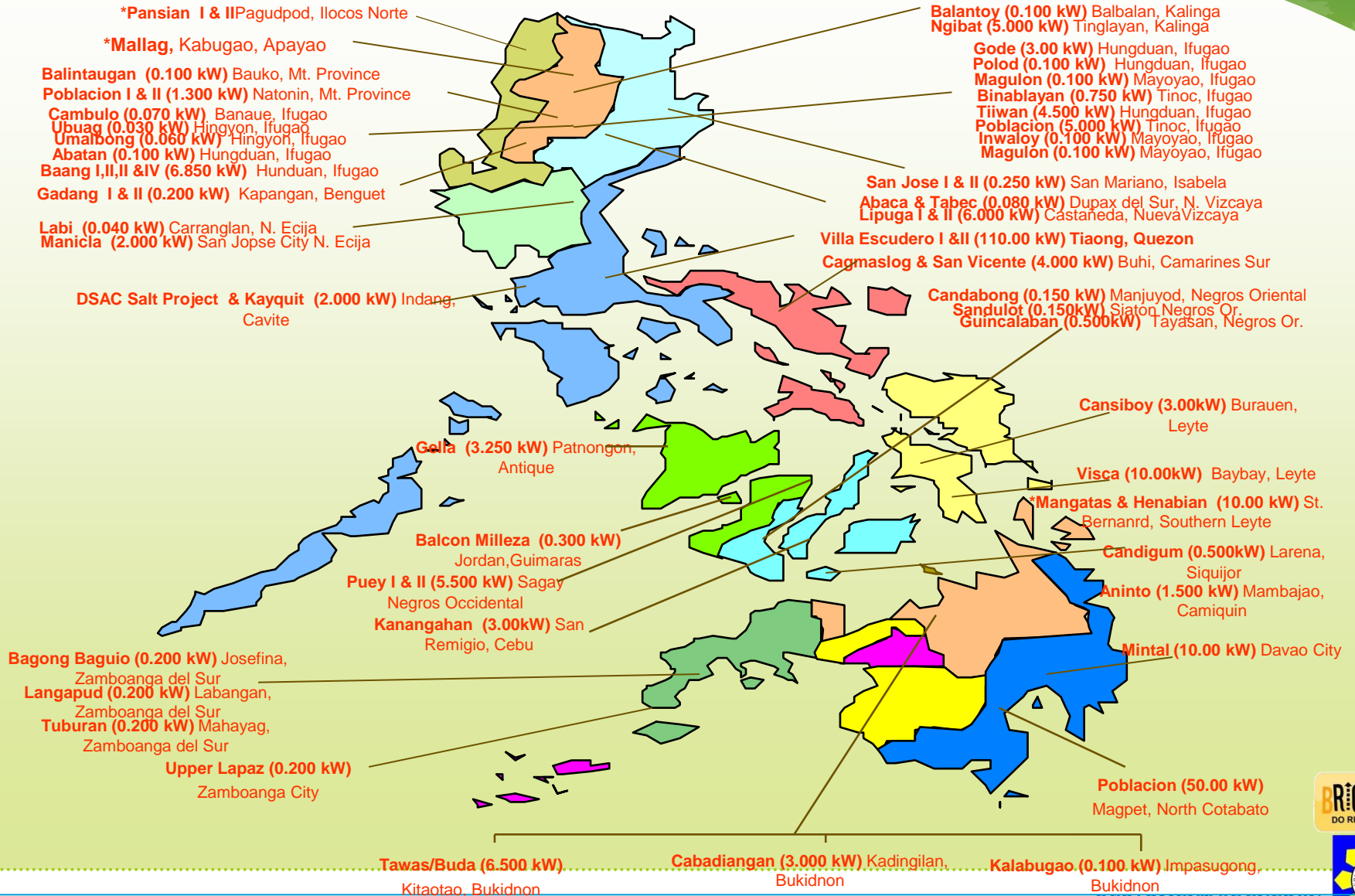
Existing Generating Capacity

Hydropower Plant	Aggregate Capacity (MW)
Micro-hydro Facilities	0.15
Mini-hydropower Facilities	99.785
Small hydropower Facilities	280.40
Large Hydropower Facilities	2,724.10
TOTAL	3,104.435

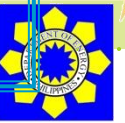
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EXISTING MICRO-HYDROPOWER PLANTS IN THE PHILIPPINES



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EXISTING MINI-HYDROPOWER PLANTS IN THE PHILIPPINES

Dawara (525 kW)**
 Lon-oy (3,200 kW)*
 F. L. Singit (6,400 kW)*
 Lower Labay (2,400 kW)*
 Club John Hay (560kW)**
 Amburayan (200 kW)**
 Bineng 1, 2, 2B, & 3 (9,850 kW)*
 Ampohaw (8,000 kW)*
 Irisan (1,200 kW)*
 Asin 1, 2, & 3 (3,050 kW)*
 Batchelor (750 kW)**
 Kalayaan (145 kW)
 Balugbog (650 kW)
 Palakpakin (400 kW)
 Dulangan (1,600 kW)

Basak (500 kW)
 Matutinao (750 kW)
 Mantayupan (500 kW)

Janopol (5,000 kW)
 Loboc (1,200 kW)
 Amlan (800 kW)

Balactasan (270 kW)
 Kumalarang (680 kW)

Agua Grande (4,550 kW)
 Tumauini RIS (250 kW)**
 NIA Baligatan (6,000 kW)
 Magat A (1,440 kW)
 Magat B (1,080 kW)
 Omico-Cauyas (2,400 kW)*
 Peñaranda (300 kW)**
 Inarihan (960 kW)*
 Yabo (200 kW)
 Coyaoyao (350 kW)**
 Balongbong (1,800 kW)
 Barit (1,800 kW)
 Cawayan (400 kW)
 Ton-ok (1,080 kW)
 Amanjuray (1,000 kW)
 Henabian (810 kW)**
 Bubunawan (7,000 kW)
 Agusan (1,600 kW)
 Mt. View College 1&2 (800 kW)
 Matling (1,500 kW)
 Talomo (2,500 kW)

Upper Talomo (1,200 kW)*

Total: 99,785 kW

EXISTING SMALL HYDROELECTRIC POWER PLANTS IN THE PHILIPPINES

BAKUN A (40.0 MW)
Alilem, Ilocos Sur

BAKUN B (40.0 MW)
Alilem, Ilocos Sur

BOTOCAN (29.9 MW)
Majayjay, Laguna

AGUS 1 - UNIT 1 (40.0 MW)
Marawi City, Lanao del Sur

AGUS 1 - UNIT 2 (40.0 MW)
Lanao del Norte

MASIWAY (12.0 MW)
Pantabangan, Nueva Ecija

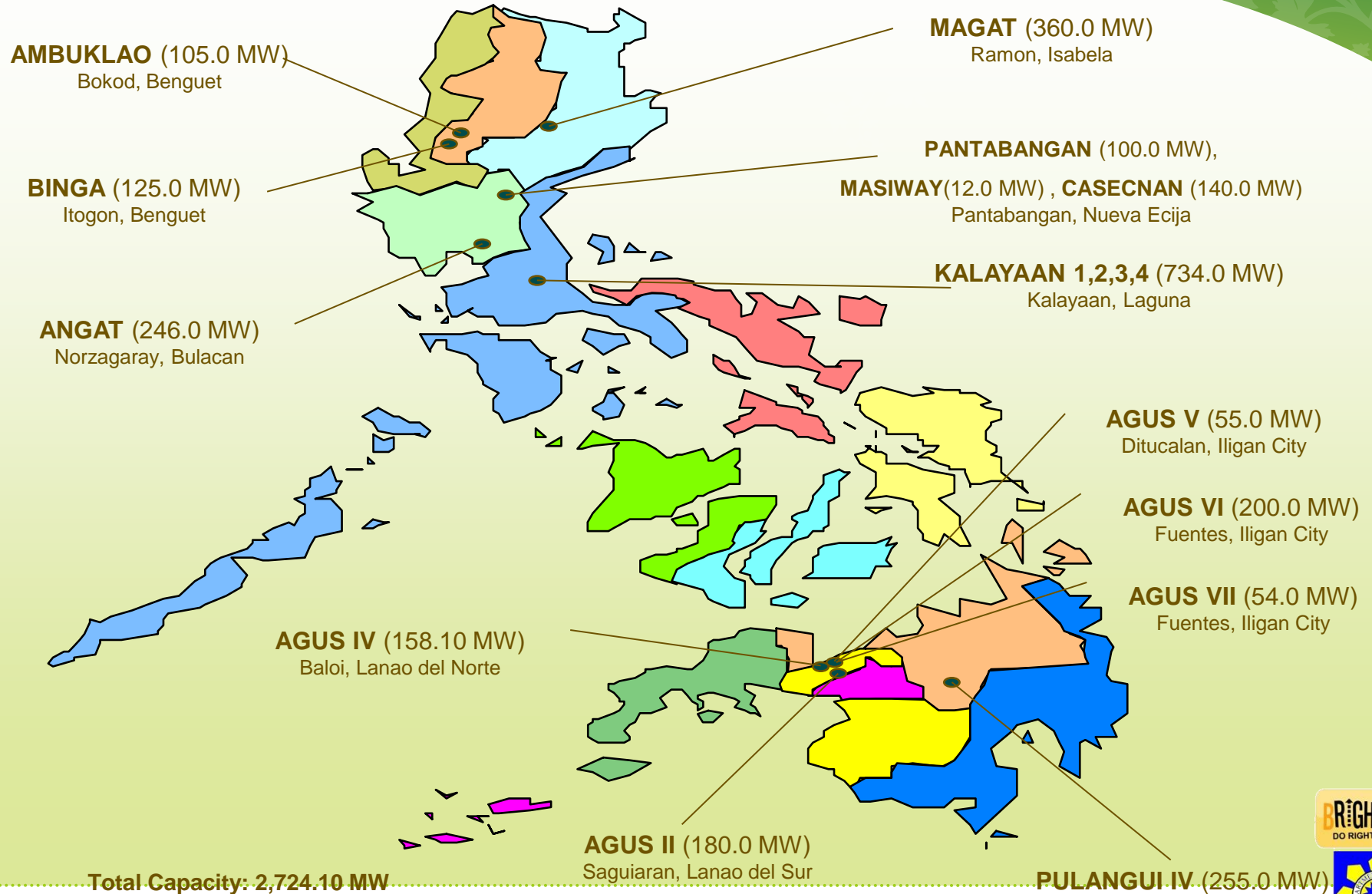
CALIRAYA (36.0 MW)
Lumban, Laguna

SIBULAN A,B (42.5MW)
Sta. Cruz, Davao del Norte

Total Capacity: 280.4 MW



EXISTING LARGE HYDROELECTRIC POWER PLANTS IN THE PHILIPPINES



Total Capacity: 2,724.10 MW

PULANGUI IV (255.0 MW)

Maramag, Bukidnon

DEPARTMENT OF ENERGY



2006 POWER GRID MAP



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MABUHAY

MABUHAY

THANK YOU ! ! !

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