

Energy Programs and Investment Opportunities



Secretary Alfonso G. Cusi
Department of Energy

2016-2030 STRATEGIC DIRECTIONS

1 ENSURE
ENERGY
SECURITY

2 EXPAND
ENERGY
ACCESS

3 PROMOTE A
LOW CARBON
FUTURE

4 ENCOURAGE
INVESTMENT IN
INFRASTRUCTUR
E AND FACILITIES

5 PURSUE
DEVELOPMENT &
IMPLEMENTATION
OF LOCAL ENERGY
PLANS

6 IMPLEMENT &
MONITOR
SECTORAL
ROADMAPS &
ACTION PLANS

9 FOSTER
STRONGER
INTERNATIONAL
RELATIONS AND
PARTNERSHIPS

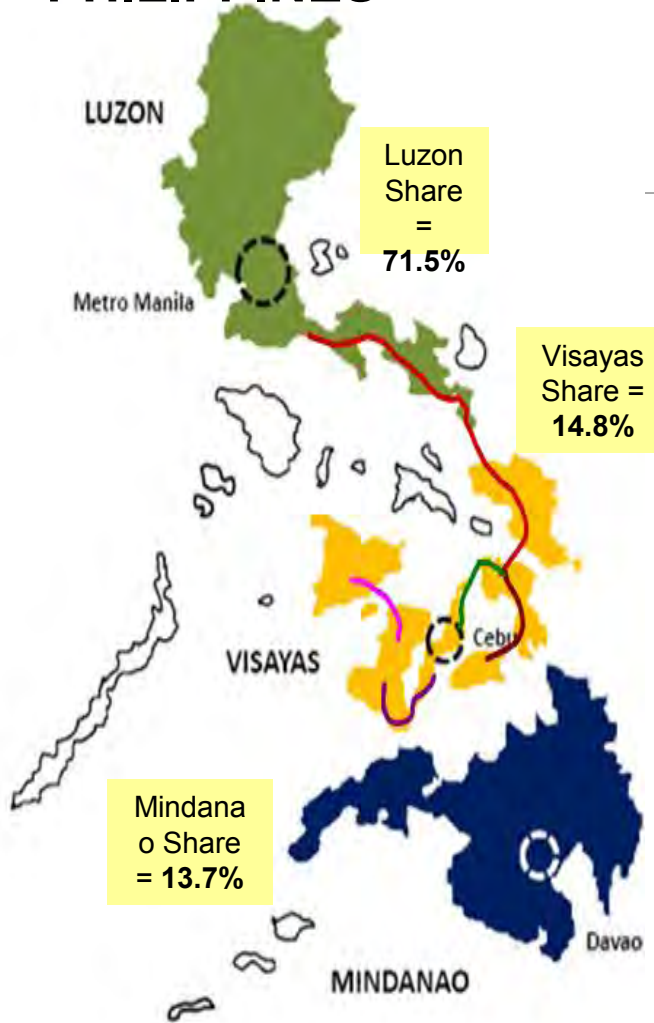
8 STRENGTHEN
CONSUMER
WELFARE AND
PROTECTION

7 ADVOCATE THE
PASSAGE OF
THE
DEPARTMENT'S
LEGISLATIVE
AGENDA

Power Sector

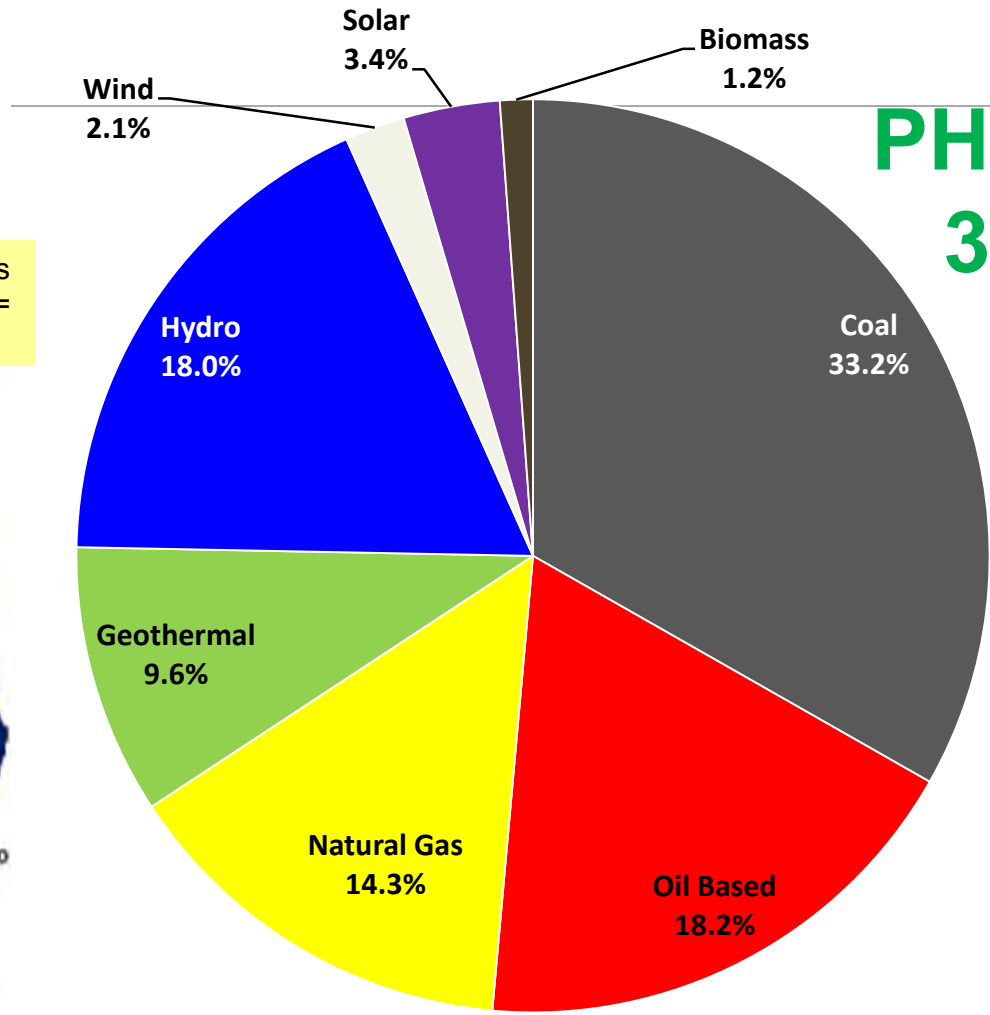
1st Half 2016 Capacity Mix

PHILIPPINES



Note: Transparent islands in the above diagram are not covered by NGCP's network.

PHL Installed Capacity ≈ 20.06 GW

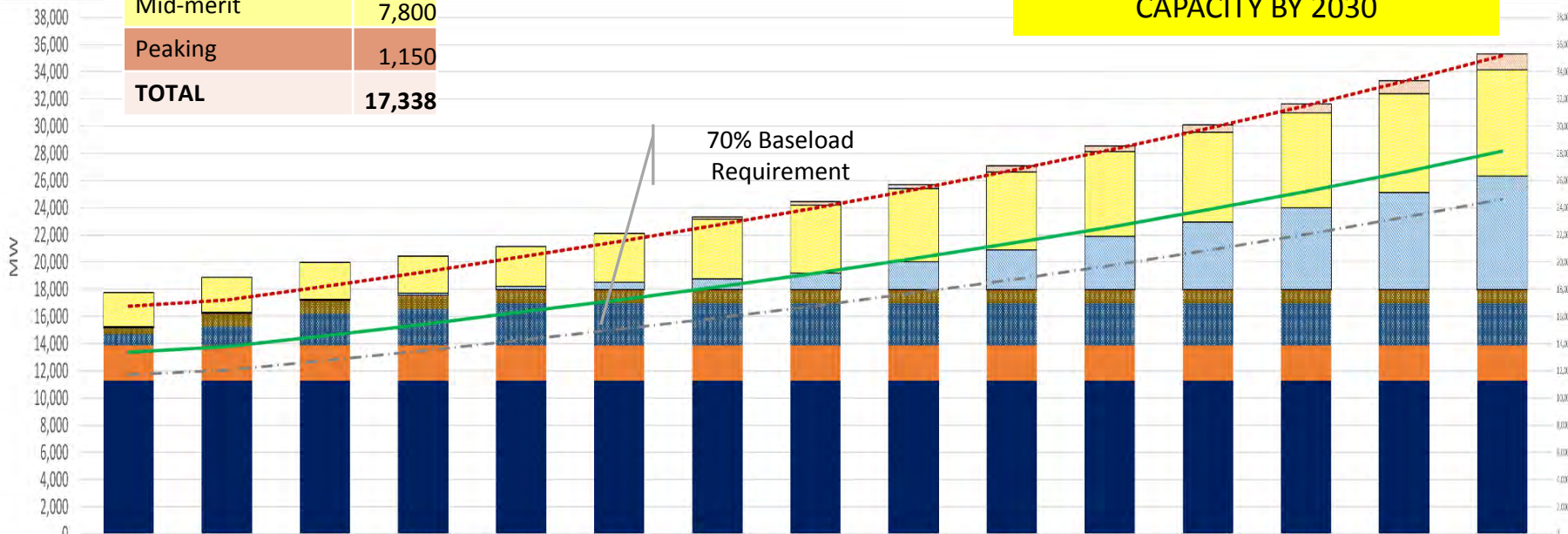


PHL RE = 34.3%

Philippines Demand-Supply Outlook 2016-2030

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

**THE PHILIPPINES WILL NEED
17,338 MW ADDITIONAL
CAPACITY BY 2030**



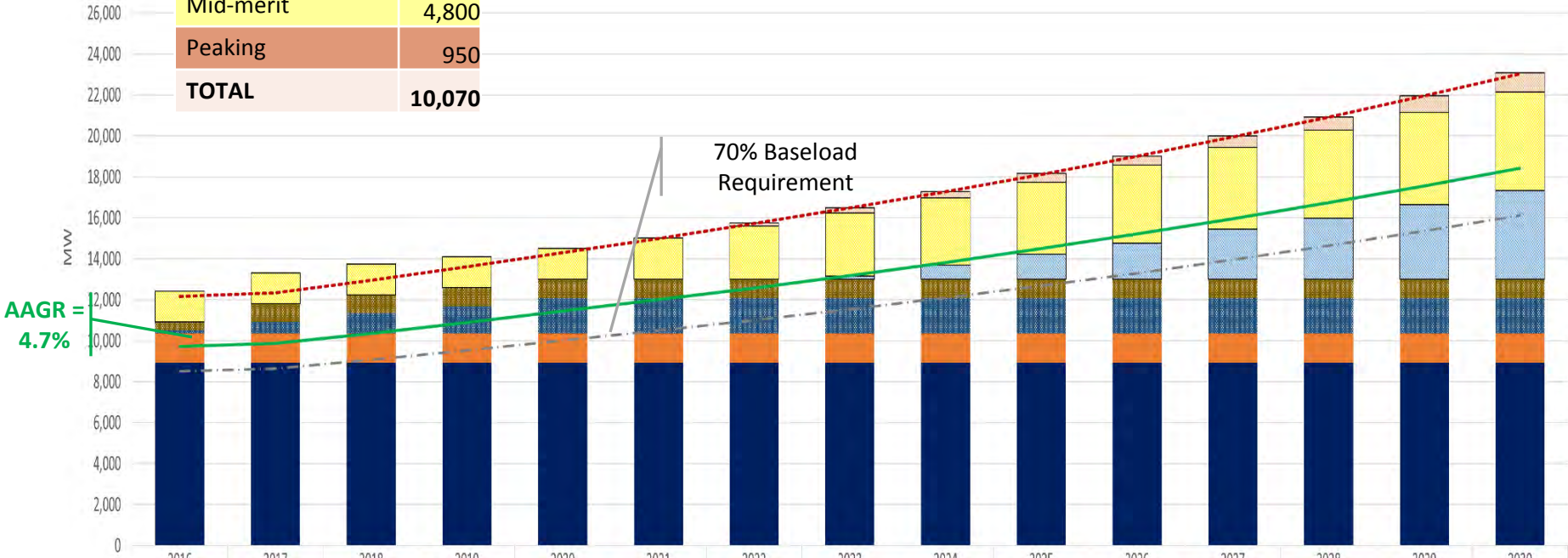
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Capacity Addition - Peaking	0	0	0	0	0	0	150	250	300	450	450	550	650	950	1,150
Capacity Addition - Midmerit	2,500	2,600	2,700	2,700	2,900	3,600	4,400	5,000	5,400	5,700	6,200	6,600	7,000	7,300	7,800
Capacity Addition - Baseload	105	105	105	187	269	538	807	1,234	2,043	2,957	3,953	5,002	6,021	7,152	8,388
Committed Peaking	37	66	77	110	111	111	111	111	111	111	111	111	111	111	111
Committed Midmerit	402	876	876	876	876	876	876	876	876	876	876	876	876	876	876
Committed Baseload	850	1,383	2,343	2,683	3,091	3,091	3,091	3,091	3,091	3,091	3,091	3,091	3,091	3,091	3,091
Existing Peaking	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600
Existing Midmerit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Baseload	11,277	11,277	11,277	11,277	11,277	11,277	11,277	11,277	11,277	11,277	11,277	11,277	11,277	11,277	11,277
Reserve Requirement	3,347	3,445	3,644	3,855	4,081	4,305	4,543	4,795	5,063	5,346	5,646	5,965	6,302	6,660	7,039
System Peak Demand	13,390	13,778	14,575	15,422	16,323	17,221	18,173	19,182	20,251	21,384	22,585	23,859	25,209	26,640	28,158
70% baseload Req	11,716	12,056	12,753	13,494	14,282	15,069	15,901	16,784	17,720	18,711	19,762	20,876	22,057	23,310	24,638

Luzon Demand-Supply Outlook 2016-2030

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

**LUZON WILL NEED 10,070 MW
ADDITIONAL CAPACITY BY 2030**

Capacity Addition	MW
Baseload	4,320
Mid-merit	4,800
Peaking	950
TOTAL	10,070



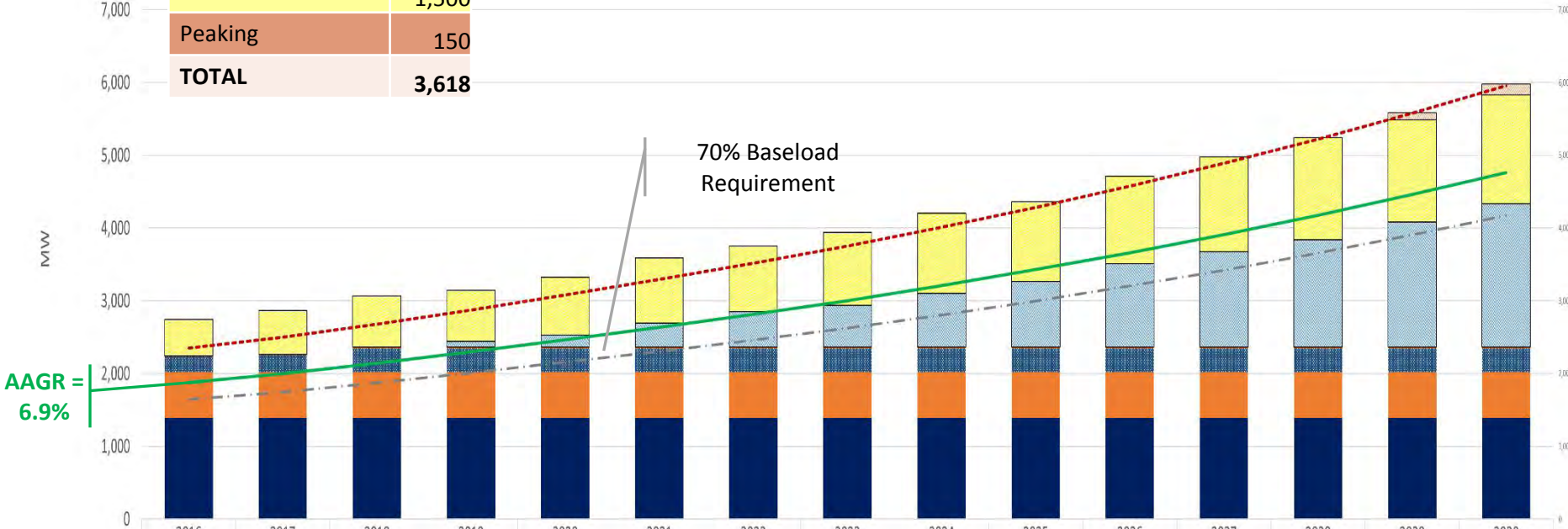
Capacity Addition - Peaking	0	0	0	0	0	0	150	250	300	450	450	550	650	800	950
Capacity Addition - Midmerit	1,500	1,500	1,500	1,500	1,500	2,000	2,600	3,100	3,300	3,500	3,800	4,000	4,300	4,500	4,800
Capacity Addition - Baseload	0	0	0	0	0	0	0	135	675	1,215	1,755	2,430	2,970	3,645	4,320
Committed Peaking	7	7	7	37	38	38	38	38	38	38	38	38	38	38	38
Committed Midmerit	402	876	876	876	876	876	876	876	876	876	876	876	876	876	876
Committed Baseload	160	558	988	1,328	1,736	1,736	1,736	1,736	1,736	1,736	1,736	1,736	1,736	1,736	1,736
Existing Peaking	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422
Existing Midmerit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Baseload	8,939	8,939	8,939	8,939	8,939	8,939	8,939	8,939	8,939	8,939	8,939	8,939	8,939	8,939	8,939
Reserve Requirement	2,432	2,467	2,592	2,724	2,863	3,000	3,145	3,297	3,457	3,625	3,802	3,989	4,185	4,391	4,608
System Peak Demand	9,726	9,870	10,368	10,895	11,451	12,000	12,579	13,187	13,828	14,501	15,210	15,955	16,739	17,564	18,432
70% baseload Req	8,510	8,636	9,072	9,533	10,019	10,500	11,007	11,539	12,099	12,688	13,308	13,961	14,647	15,369	16,128

Visayas Demand-Supply Outlook 2016-2030

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

VISAYAS WILL NEED **3,618 MW** ADDITIONAL CAPACITY BY 2030

Capacity Addition	MW
Baseload	1,968
Mid-merit	1,500
Peaking	150
TOTAL	3,618



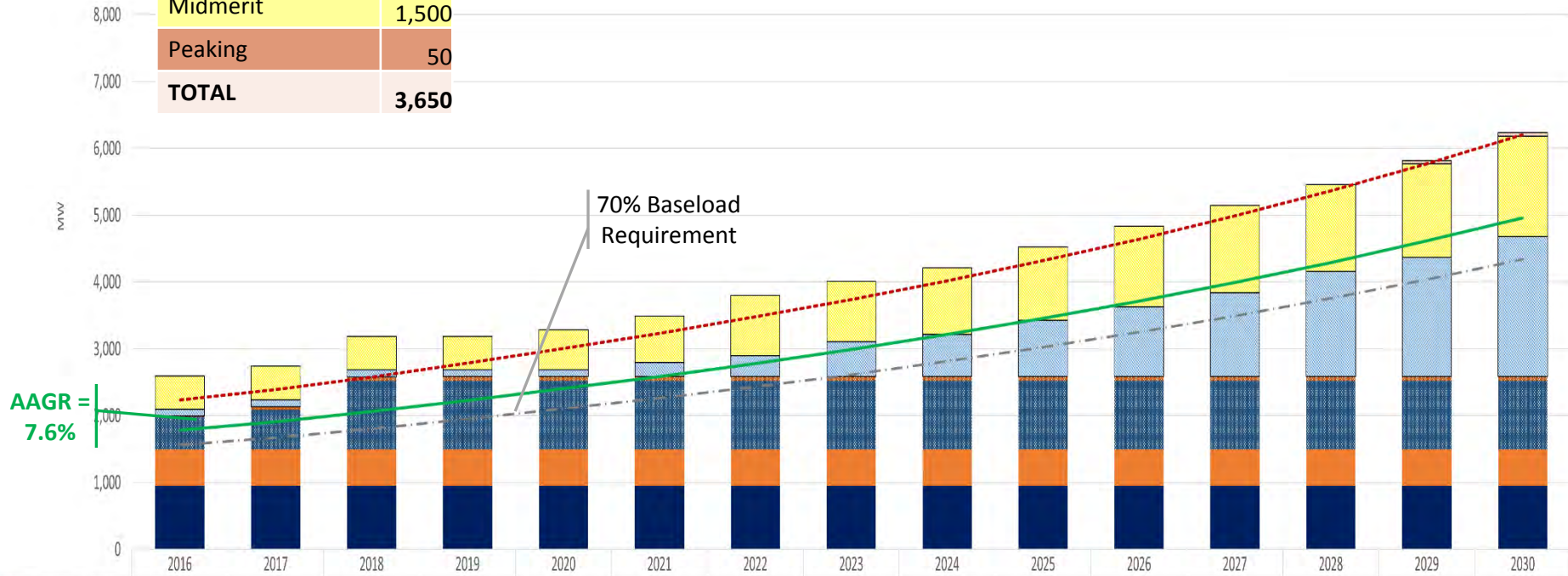
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Capacity Addition - Peaking	0	0	0	0	0	0	0	0	0	0	0	0	0	100	150
Capacity Addition - Midmerit	500	600	700	700	800	900	900	1,000	1,100	1,100	1,200	1,300	1,400	1,400	1,500
Capacity Addition - Baseload	0	0	0	82	164	328	492	574	738	902	1,148	1,312	1,476	1,722	1,968
Committed Peaking	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Committed Midmerit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Committed Baseload	208	231	326	326	326	326	326	326	326	326	326	326	326	326	326
Existing Peaking	629	629	629	629	629	629	629	629	629	629	629	629	629	629	629
Existing Midmerit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Baseload	1,390	1,390	1,390	1,390	1,390	1,390	1,390	1,390	1,390	1,390	1,390	1,390	1,390	1,390	1,390
Reserve Requirement	470	499	536	575	616	658	703	751	802	857	915	978	1,044	1,115	1,191
System Peak Demand	1,878	1,997	2,143	2,298	2,465	2,633	2,812	3,004	3,209	3,427	3,661	3,910	4,176	4,461	4,765
70% baseload Req	1,643	1,748	1,875	2,011	2,157	2,304	2,461	2,629	2,808	2,999	3,203	3,421	3,654	3,903	4,169

Mindanao Demand-Supply Outlook 2016-203

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

**MINDANAO WILL NEED 3,650 MW
ADDITIONAL CAPACITY BY 2030**

Capacity Addition	MW
Baseload	2,100
Midmerit	1,500
Peaking	50
TOTAL	3,650



	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Capacity Addition - Peaking	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50
Capacity Addition - Midmerit	500	500	500	500	600	700	900	900	1,000	1,100	1,200	1,300	1,300	1,400	1,500
Capacity Addition - Baseload	105	105	105	105	105	210	315	525	630	840	1,050	1,260	1,575	1,785	2,100
Committed Peaking	13	42	53	56	56	56	56	56	56	56	56	56	56	56	56
Committed Midmerit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Committed Baseload	482	594	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029
Existing Peaking	549	549	549	549	549	549	549	549	549	549	549	549	549	549	549
Existing Midmerit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Baseload	948	948	948	948	948	948	948	948	948	948	948	948	948	948	948
Reserve Requirement	446	478	516	557	602	647	695	748	804	864	929	998	1,073	1,154	1,240
System Peak Demand	1,786	1,911	2,064	2,229	2,407	2,588	2,782	2,990	3,215	3,456	3,715	3,993	4,293	4,615	4,961
70% baseload Req	1,563	1,672	1,806	1,950	2,106	2,264	2,434	2,617	2,813	3,024	3,250	3,494	3,756	4,038	4,341

Required Power System Capacity Addition between 2016-2030

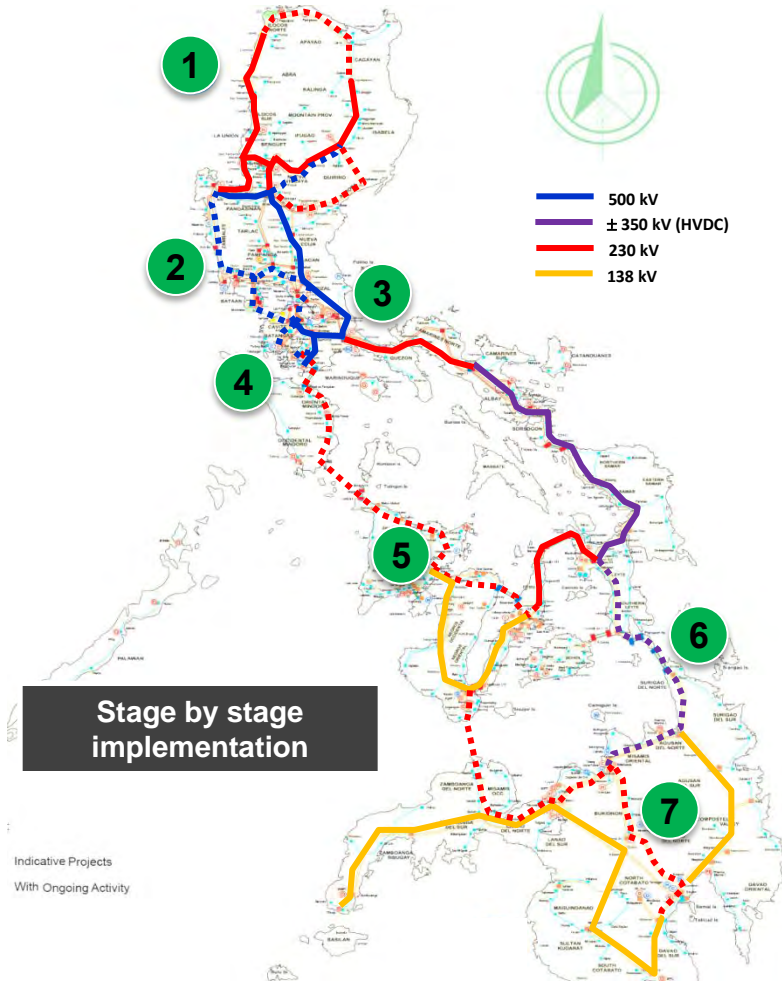
Capacity Addition (MW)	Luzon	Visayas	Mindanao	Total by Type
Baseload (Coal, Geothermal, NatGas*, Nuclear, Biomass* and Hydro*)	4,320	1,968	2,100	8,388
Mid-merit (NatGas and all others)	4,800	1,500	1,500	7,800
Peaking (Oil, Solar PV – daytime and Wind)	950	150	50	1,150
Total per grid	10,070	3,618	3,650	17,338

Note: At 70-20-10 Baseload, Mid-merit, Peaking Requirement

*NatGas currently considered as baseload but belongs to mid-merit category;

Biomass is baseload only during availability of feedstock;

Hydro is baseload only during rainy season.



- 1 Northern Luzon 230 kV Backbone (2022)
- 2 Western Luzon 500 kV Backbone (2028)
- 3 Metro Manila 500 kV Backbone Loop (2030)
- 4 Batangas-Mindoro Interconnection (2022)
- 5 Cebu-Negros-Panay 230 kV Backbone (2021)
- 6 Visayas-Mindanao Interconnection (2022)
- 7 Energization of the Mindanao Backbone to 230 kV (2018)

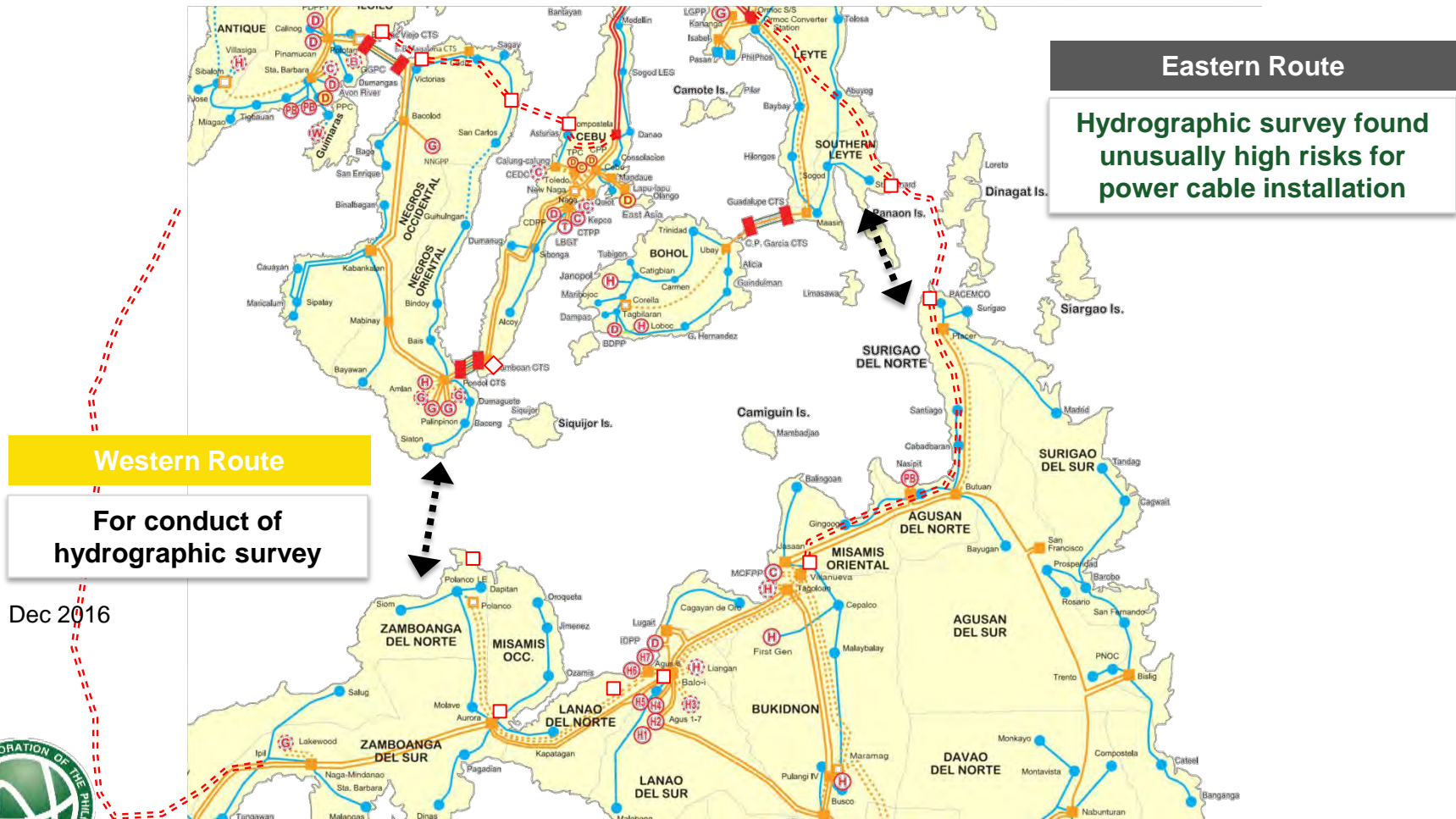


NGCP

Transmission Master Plan

Visayas-Mindanao Interconnection Project

Target Completion: April 2022



NGCP

EO Highlights

Strategic Power Infrastructure Development Program for Social and Economic Growth

- Expedite a time-bound permitting process
 - Grant of business permit, licenses and clearances
 - Protection from being subject of judicial reliefs e.g. TRO, preliminary injunctions and preliminary mandatory injunction
- Delegate to DOE the issuance of ECC for energy projects
- Pursue the implementation of a power supply auction system
- Encourage economies-of-scale power projects
- Expedite interconnectivity of the Visayas and Mindanao grid
- Expedite ROW acquisitions
- Ensure security of the lines
- Implement aggregation of electric cooperatives

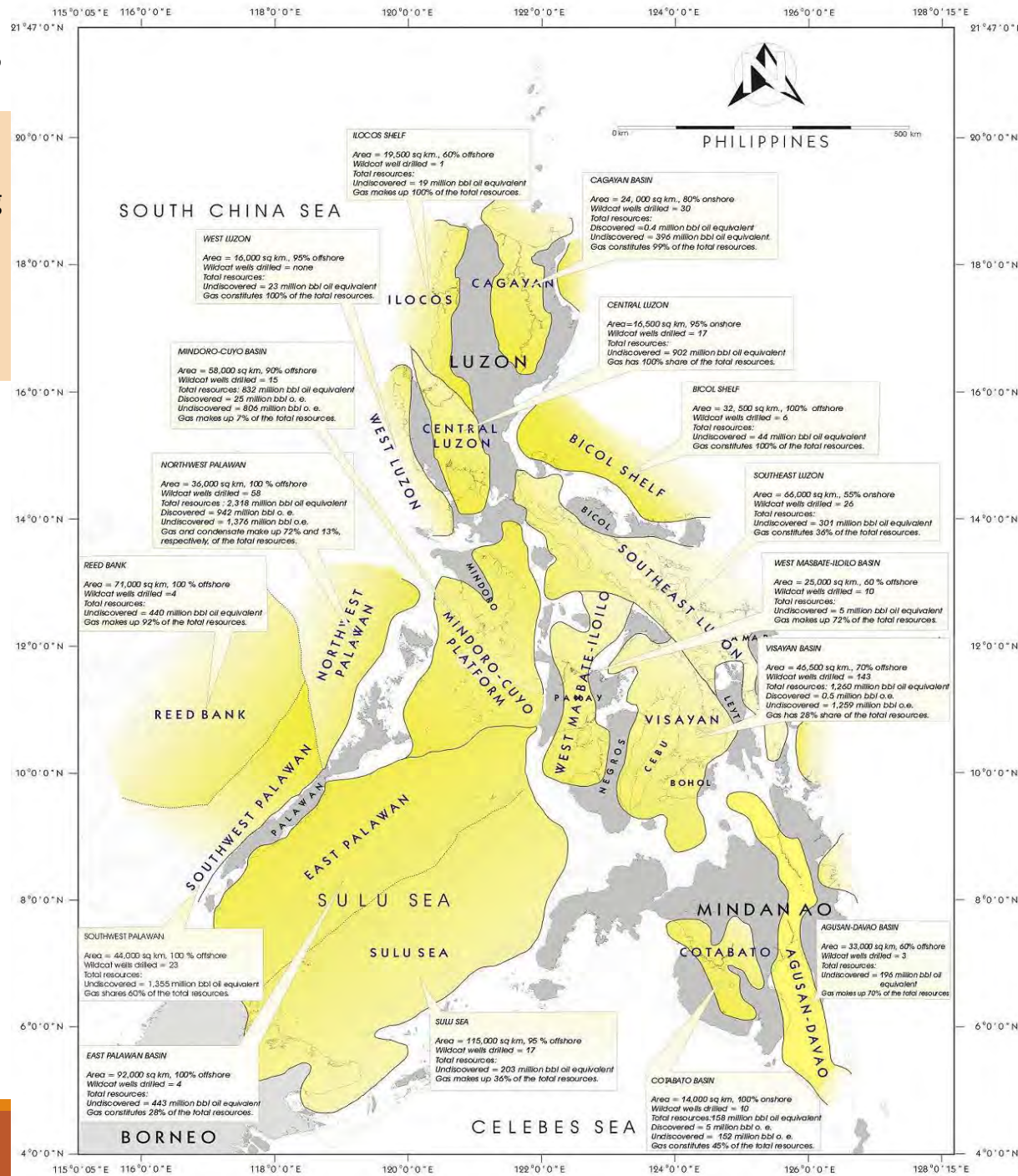
Oil & Gas

Areas of Opportunities

Philippines:

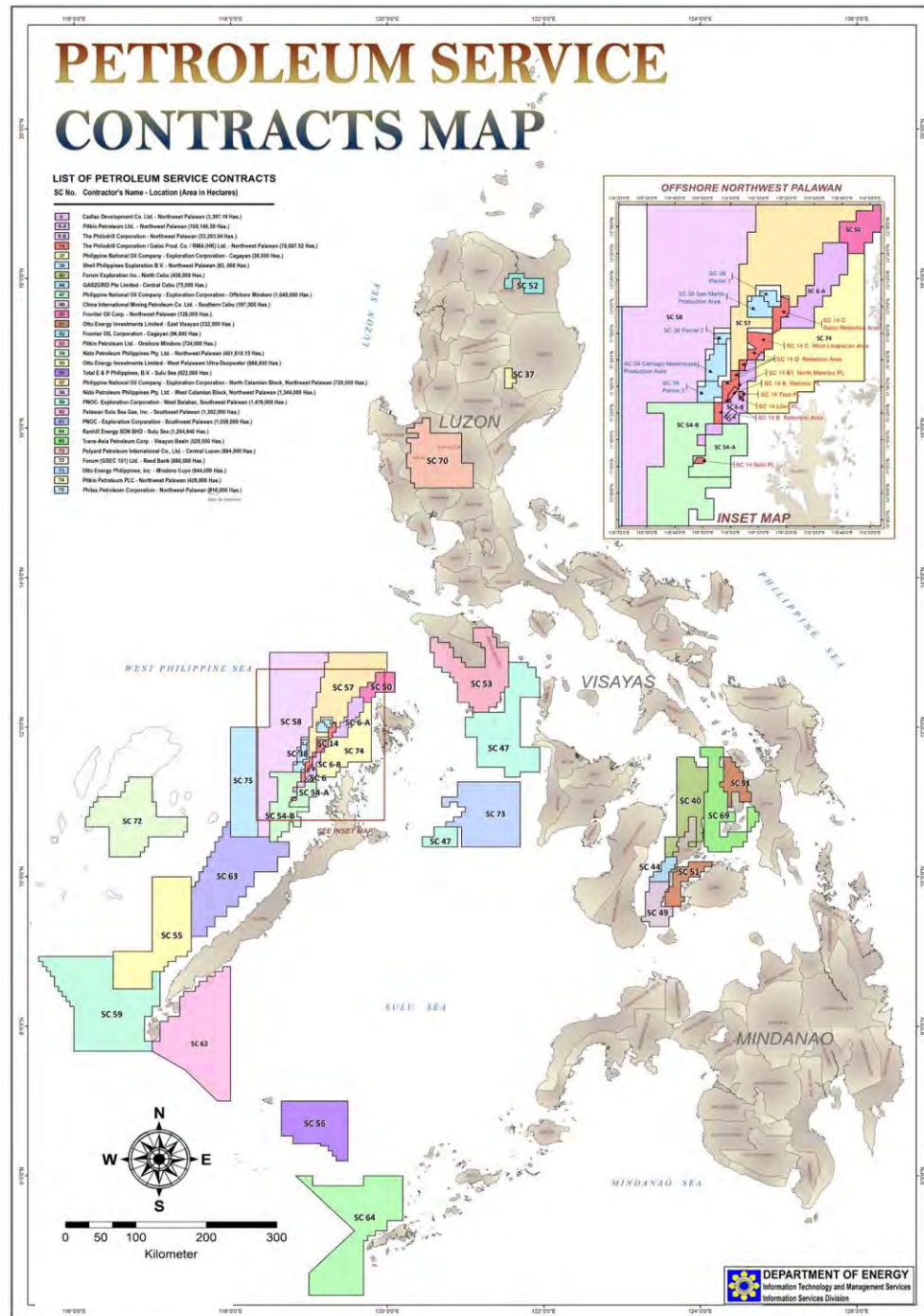
- 16 Sedimentary basins representing an area of 709,000 sq km
- Combined potential of 4,777 MMBFOE

1. Ilocos Shelf
2. Cagayan Basin
3. Central Luzon Basin
4. Bicol Shelf
5. Southeast Luzon Basin
6. Mindoro-Cuyo Basin
7. West Masbate-Iloilo Basin
8. Visayan Basin
9. Agusan-Davao Basin
10. Cotabato Basin
11. Sulu Sea Basin
12. East Palawan Basin
13. Southwest Palawan Basin
14. Reed Bank Basin
15. Northwest Palawan Basin
16. West Luzon Trough



Petroleum Service Contracts Exploration & Development

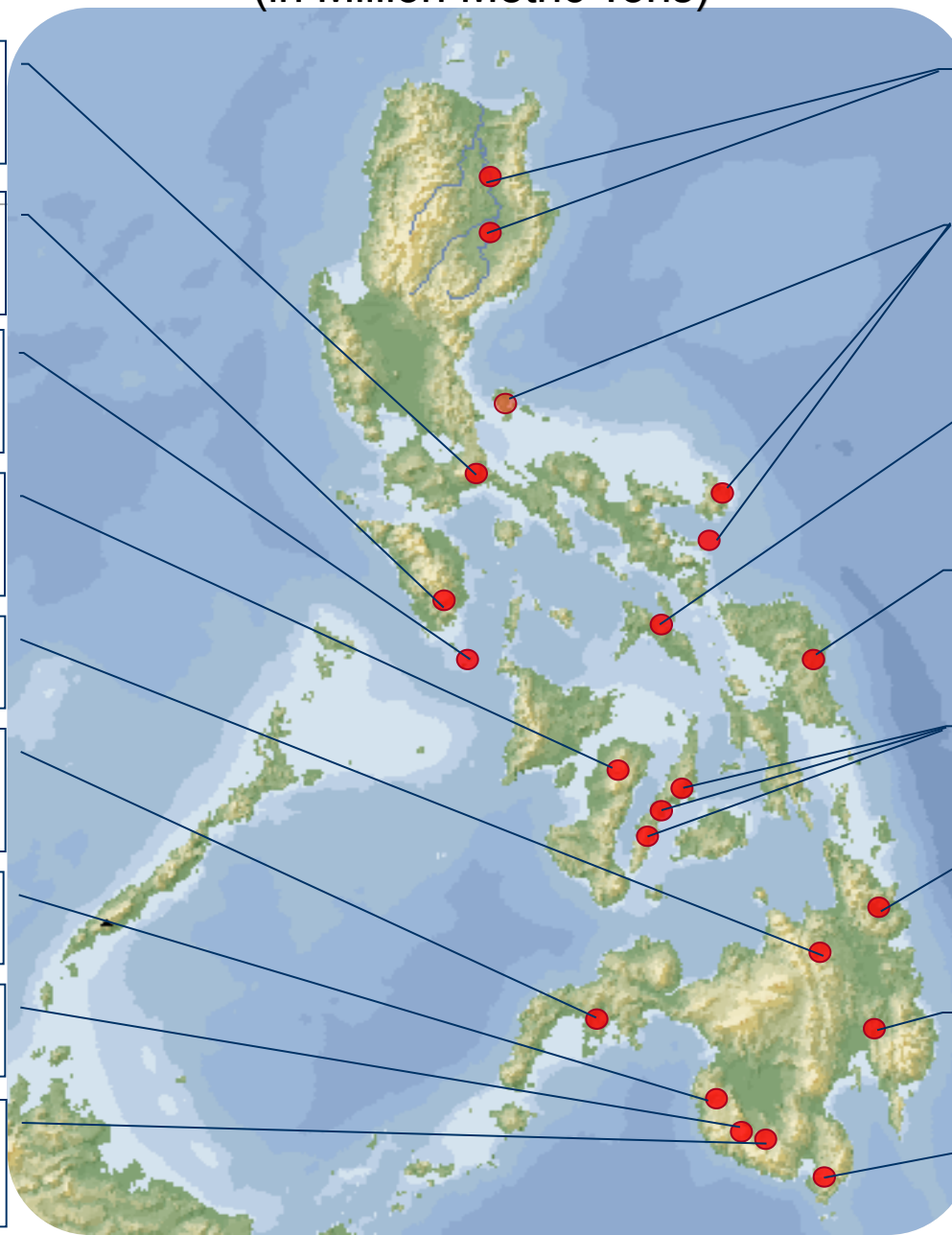
- 25 Petroleum Service Contracts (PSCs)



Coal

Summary of Regional Coal Reserves

(in Million Metric Tons)



QUEZON

Resource Potential - 2.00
In-situ Reserves - 0.09

MINDORO

Resource Potential - 100.00
In-situ Reserves - 1.44

SEMIRARA

Resource Potential - 570.00
In-situ Reserves - 112.32

NEGROS

Resource Potential - 4.50
In-situ Reserves - 2.01

BUKIDNON

Resource Potential - 50.00

ZAMBOANGA

Resource Potential - 45.00
In-situ Reserves - 37.99

MAGUINDANAO

Resource Potential - 108.00

SULTAN KUDARAT

Resource Potential - 300.30

SOUTH COTABATO

Resource Potential - 230.40
In-situ Reserves - 81.07

CAGAYAN VALLEY

Resource Potential - 336.00
In-situ Reserves - 82.57

BATAN-POLILLO-CATANDUANES

Resource Potential - 17.00
In-situ Reserves - 6.02

MASBATE

Resource Potential - 2.50
In-situ Reserves - 0.08

SAMAR

Resource Potential - 27.00
In-situ Reserves - 8.59

CEBU

Resource Potential - 165.00
In-situ Reserves - 11.63

SURIGAO

Resource Potential - 209.00
In-situ Reserves - 69.55

DAVAO

Resource Potential - 100.00
In-situ Reserves - 0.21

SARANGANI

Resource Potential - 120.00

Coal Operating Contracts Exploration & Development

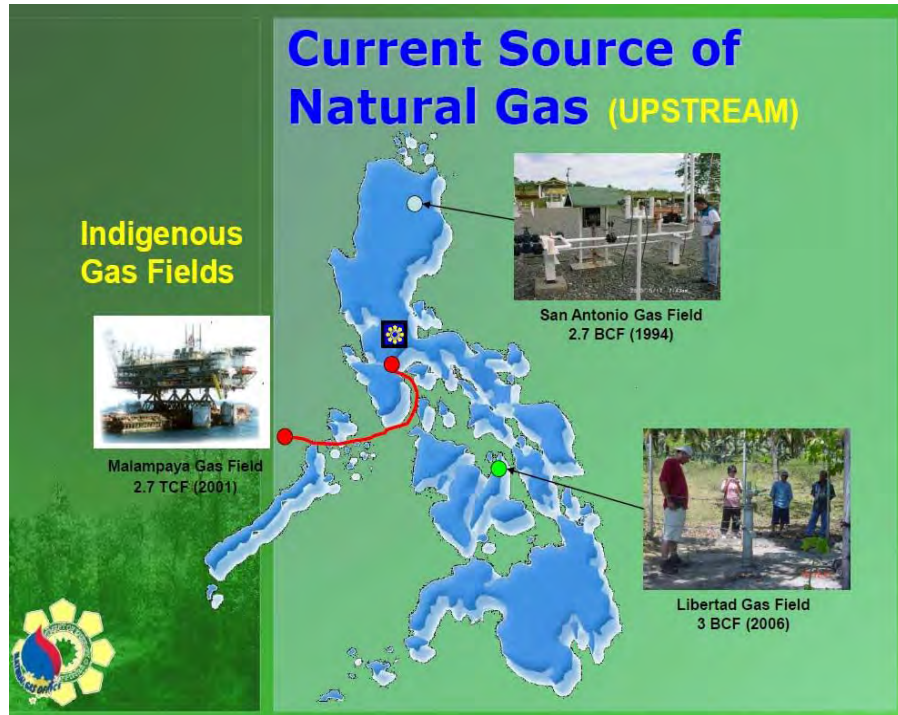
- 78 Active Coal Operating Contracts (COCs)
 - 48 COCs in the Exploration Stage
 - 30 COCs in the Development and Production Stage



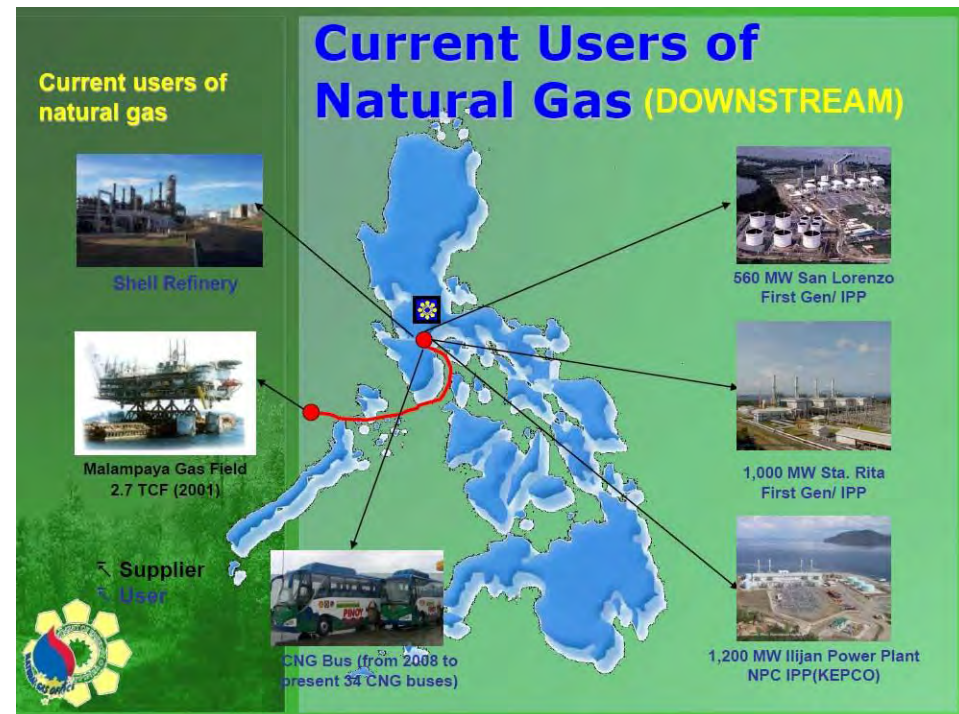
Natural Gas

Natural Gas Industry

Natural Gas Supply

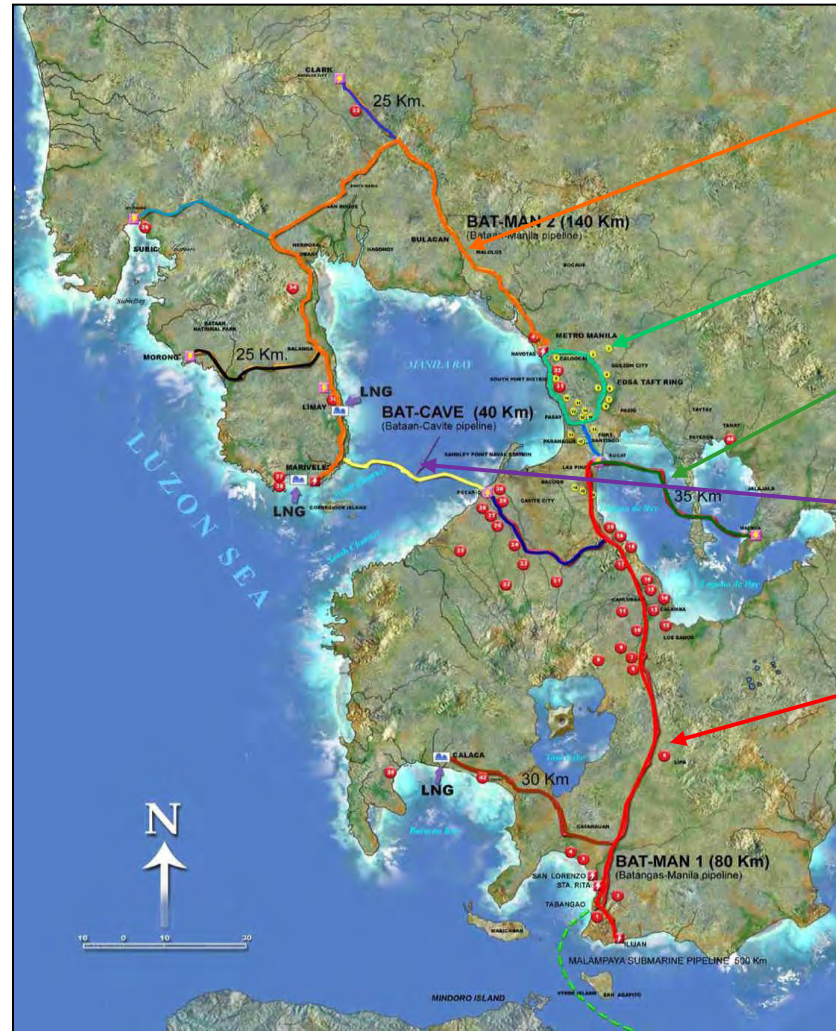


Natural Gas Demand



Natural Gas Infrastructure

- Develop strategic infrastructure for receiving, storage, transmission and distribution
- Promote use of natural gas beyond power
- Serve as major alternative fuel for transport especially public transport



BATMAN 2
(Bataan - Manila)
140 kms. (2020)

ET LOOP
(EDSA – Taft Loop)
40 kms. (2020)

SU-MA
(Sucat - Malaya)
35 kms. (2017)

BATCAVE
(Batangas – Cavite)
40 kms (2022)

BATMAN 1
(Batangas Manila)
80-100 kms. (2015-17)

Alternative Fuels

ALTERNATIVE FUELS



ALTERNATIVE TRANSPORT FUELS AND TECHNOLOGIES ROADMAP

OVERALL OBJECTIVE BY 2030

Short Term (2017-2019)

Medium Term (2020-2025)

Long Term (2026-2030)

Identification of Alternative Fuels and Technologies (AFTs) for Application

Preparation of the regulatory and infrastructure requirements of the identified AFTs

AF Vehicles Mainstreamed in the Transport Sector

STRATEGIES

STRATEGIES

STRATEGIES

- Legislate incentives on investment and use of AFTs
- Scale up use of alternative fuels and technologies
- Generate funds from grants
- Harmonize policies of concerned National Government Agencies (NGAs)

- Review, update, formulate energy-related policies, guidelines and standards
- Scale up the ecotown concept to include the use of AFTs
- Pursue the use of sustainable energy efficient technologies
- Collaborate with the stakeholders

- Collaborate with private sectors, LGUs, investors, funders, entrepreneurs, bus and taxi operators
- Deploy applicable AFTs for transport and non-transport purposes

- Continuous assessment of emerging AFTs
- Continuous conduct of relevant policy studies on emerging AFTs
- Continuous conduct of IEC on benefits of AFTs to engage the stakeholders

Ensuring Secure and Stable Supply of Energy through Fuel and Technology Diversification

AFTs being prioritized are: 1) electric vehicle, 2) Liquefied Petroleum Gas, 3) Compressed Natural Gas, 4) Liquefied Natural Gas, 5) Hybrid electric vehicle
 Assessment of non-transport energy technologies will be pursued

Energy Efficiency & Conservation

ENERGY EFFICIENCY & CONSERVATION ROADMAP

OVERALL OBJECTIVE BY 2030

TRANSPORT

Short Term (2014-2015)

- Fuel Efficiency Standards developed all vehicles
- Risk management on vehicle conversion, e-vehicle programs
- Re-formulated coordination mechanisms

Medium Term (2016-2020)

- Financial incentives for EE through vehicle taxes
- Promotion of key vehicle technologies
- Driver education and fleet management pro-grams

Long Term (2021-2030)

- EE programs beyond road transport (passenger and cargo ships, aviation fuels)
- Reintegration of urban planning and transport energy use

INDUSTRY

- Link existing training projects with ESCO capacity building
- Develop sectoral focus programs to facilitate EE in energy intensive industries (e.g. cement and construction, sugar)

- Develop standards for motors
- Facilitate example models including ESCOs, finance
- Implement demand response programs
- Review of energy pricing

- Review inward investment rules for EE to remove distortions

RESIDENTIAL BLDGS

- Enforceable minimum energy standards for appliances, with a focus on space cooling and refrigeration
- Building envelope measures – cool roofs and insulation

- Develop role of utilities as key implementation partners and information providers
- Specific EE programs for low-income house-holds

- Towards energy efficient housing precincts
- Inclusion of residential measures in Building Code

COMMERCIAL BLDGS

- Reformulate group to oversee EE measures in Building Code
- Retro-commissioning program for existing buildings
- Benchmarking and ratings for building information & reporting

- EE measures for inclusion in national building code
- Government demonstration retrofits to show-case ESCOs and financing models
- Promote green building ratings

- Incentive funds in place for EE, including private financiers
- Mandatory disclosure of commercial building performance

CROSS-SECTORAL

- Support passage of Enercon Bill
- Establish EE database, data collection regime, M&E framework
- Establish enforcement regimes
- Strengthen ESCO capacity
- Continue awareness-raising

- National strategy for efficiency in power supply sector
- Stronger coordination with other levels of government (LGUs)
- Regular reporting and monitoring to commence

- Energy Efficiency and Conservation Center mandated and established

Sending market signals to provide incentives for EE

Strengthening existing policy, advocacy, programs and institutional structures

Harnessing private sector /partner finance

Enabling innovation and new technologies

**40% reduction in energy intensity compared to 2010 baseline
Decreased energy consumption of 1.6% per year against baseline forecasts
Savings of approx. 10,665 KTOE p.a. (one-third of current demand) by 2030**

Renewable Energy

Renewable Energy Development

National Renewable Energy Program

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	550 MW	200 MW	800 MW (Aspirational target 1,528 MW)
Ocean Power	0	35.5	35	70.5
Total	1,088 MW	5,546.5 MW	3,746.80 MW	10,381.3 MW

Summary of Renewable Energy Projects

As of December 1, 2016

AWARDED PROJECTS UNDER THE RE LAW

RESOURCES	AWARDED PROJECTS		POTENTIAL CAPACITY MW		INSTALLED CAPACITY MW	
	Grid-Use	Own-Use	Grid-Use	Own-Use	Grid-Use	Own-Use
Hydro Power	427	-	9,296.82		822.00	-
Ocean Energy	7	-	26.00	-	-	-
Geothermal	43	-	610.00	-	1,906.19	-
Wind	59	1	1,180.80	-	426.90	0.006
Solar	161	17	4,453.06	4.679	538.45	3.218
Biomass	44	22	335.88	3.12	295.07	140.66
Sub-Total	741	40	15,902.56	7.799	3,988.61	143.88
TOTAL	781		15,910.36		4,132.49	

Note: Including Projects Awarded under OCSP (7 HSCs with 416.3MW and 2 GCSs)

BIOFUELS REGISTRATION / ACCREDITATION

RESOURCES	AWARDED	REGISTERED CAPACITY (million liters/year)	COR (with Notice to Proceed)	REGISTERED CAPACITY (million liters/year)
Bioethanol	10	282.12	3	149.00
Biodiesel	11	584.9	2	90.00
Total	21	867.02	5	239.00

Summary of Renewable Energy Projects

As of December 1, 2016

PENDING APPLICATIONS UNDER THE 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	86	-	1,447.02			
Ocean Energy	-	-	-	-	-	-
Geothermal	3	-	60.00	-	-	-
Wind	24	-	260.00	-	-	-
Solar	181	1	1,893.00	0.39312	-	-
Biomass	14	2	157.70	8.00	-	-
Sub-Total	308	3	3,817.72	8.39	-	-
TOTAL	311		3,826.11		0.00	

THANK YOU

Energy Investment Forum
6 December 2016
Makati Shangri-La Hotel