

BIOMASS SECTOR ROADMAP

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Biomass Energy Management Division

CAPACITY MIX

As of 31 December 2017

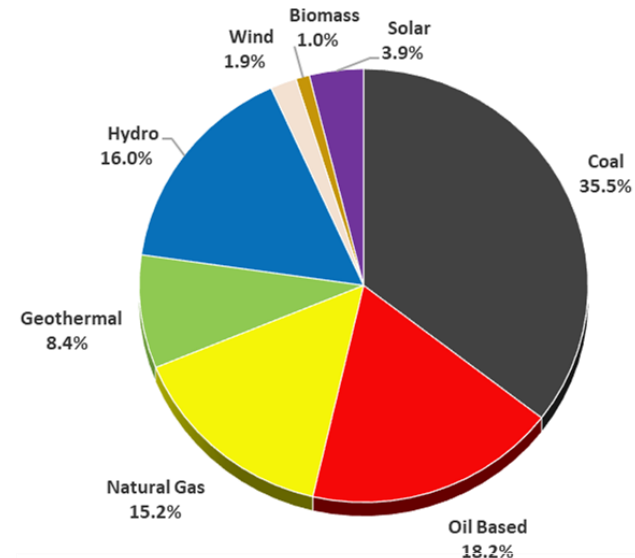
FUEL TYPE	PHILIPPINES			
	Capacity (MW)		Percent Share (%)	
	Installed	Dependable	Installed	Dependable
Coal	8,049	7,674	35.4	37.4
Oil Based	4,153	3,286	18.3	16.0
<i>Diesel</i>	2,682	2,216	11.8	10.8
<i>Oil Thermal</i>	650	530	2.9	2.6
<i>Gas Turbine</i>	822	540	3.6	2.6
Natural Gas	3,447	3,291	15.2	16.0
Renewable Energy	7,079	6,264	31.1	30.5
<i>Geothermal</i>	1,916	1,752	8.4	8.5
<i>Hydro</i>	3,627	3,269	16.0	15.9
<i>Wind</i>	427	383	1.9	1.9
Biomass	224	160	1.0	0.8
<i>Solar</i>	885	700	3.9	3.4
TOTAL	22,728	20,515	100.0	100.0

Note:

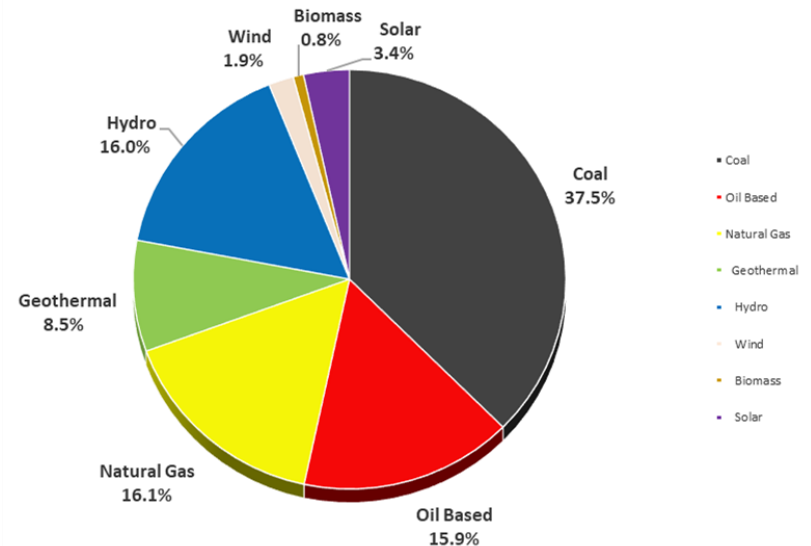
Generator nameplate capacity (installed): The maximum rated output of a generator, prime mover, or other electric power production equipment under specific conditions designated by the manufacturer. Installed generator nameplate capacity is commonly expressed in megawatts (MW) and is usually indicated on a nameplate physically attached to the generator.

Dependable capacity: The load-carrying ability of a station or system under adverse conditions for a specified period of time.

PHILIPPINES - Installed Capacity (MW)



PHILIPPINES - Dependable Capacity (MW)

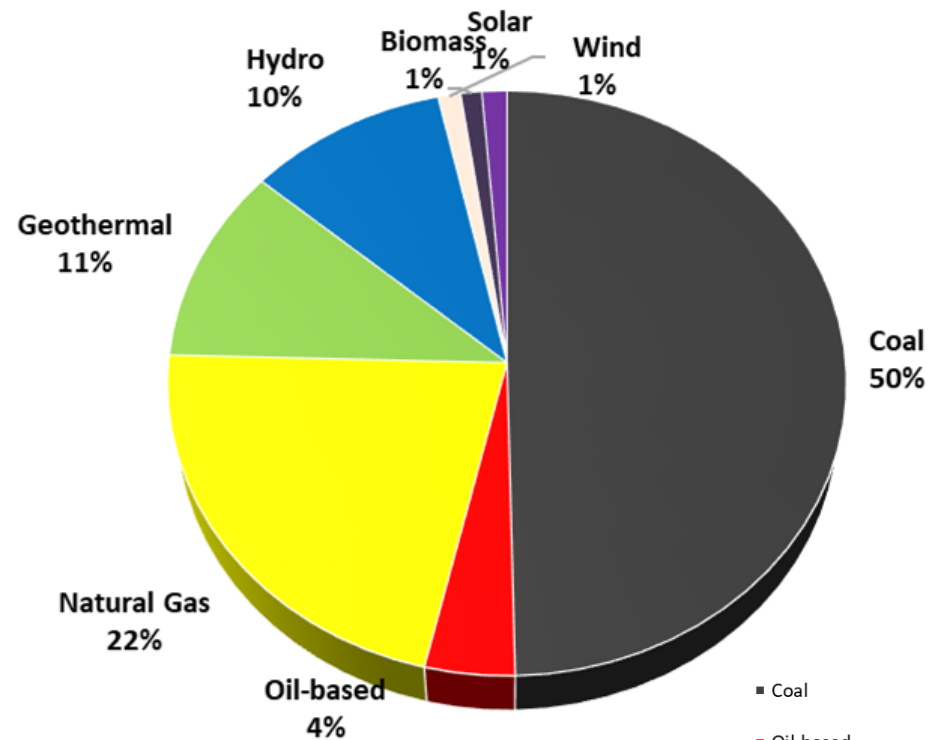


GENERATION MIX

As of 31 December 2017

Plant Type	Total Generation (MWh)	% Share
Coal	46,847,274	49.6%
Oil-based	3,787,093	4.0%
<i>Combined Cycle</i>	405,022	0.4%
<i>Diesel</i>	3,100,113	3.3%
<i>Gas Turbine</i>	0	0.0%
<i>Oil Thermal</i>	281,958	0.3%
Natural Gas	20,547,239	21.8%
Renewable Energy	23,188,735	24.6%
Geothermal	10,270,077	10.9%
Hydro	9,610,799	10.2%
Biomass	1,013,148	1.1%
Solar	1,201,152	1.3%
Wind	1,093,558	1.2%
Total Generation	94,370,341	100.0%

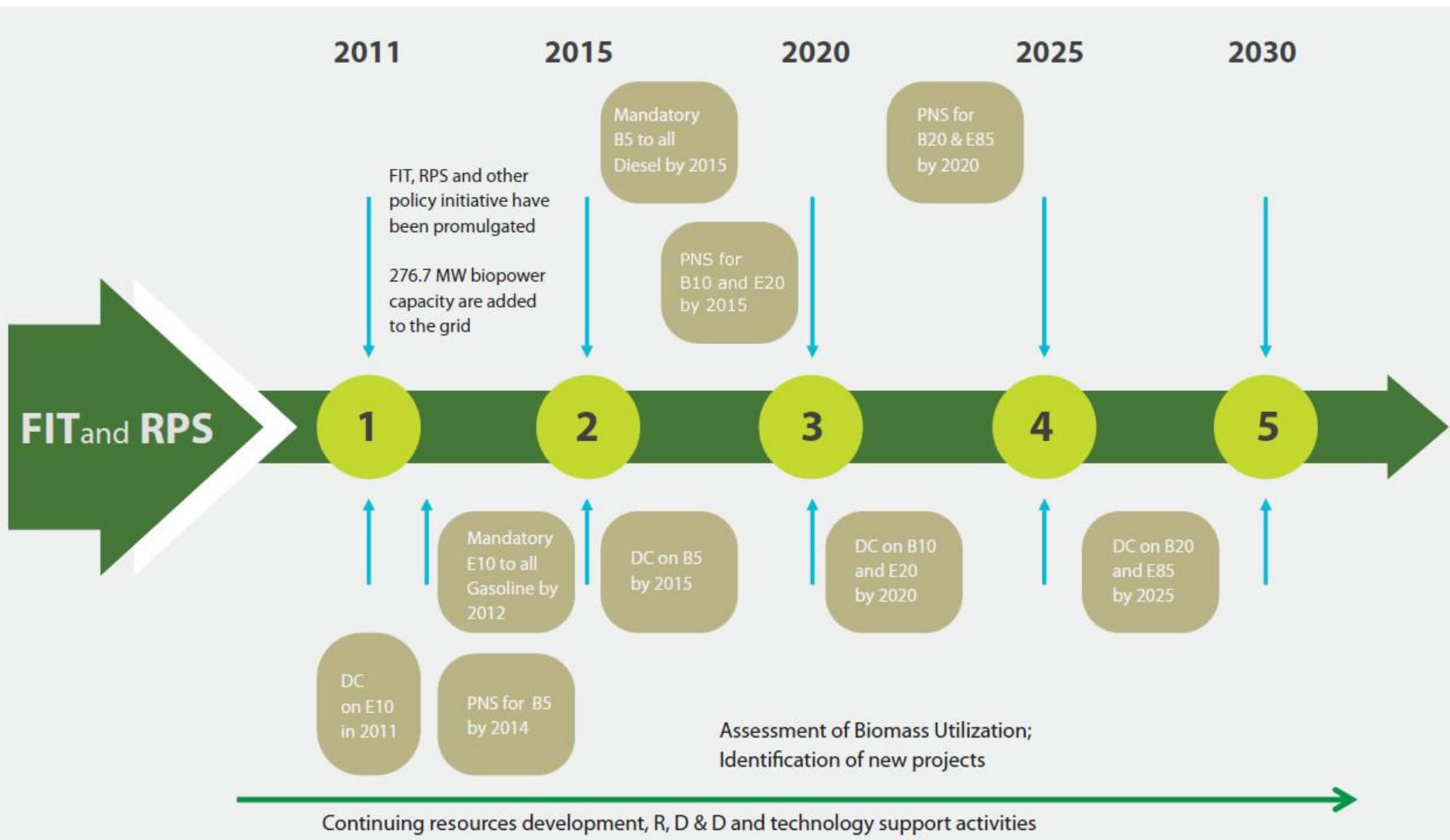
Note : **Gross Generation** - The total amount of electric energy produced by generating units and measured at the generating terminal in kilowatthours (kWh) or megawatthours (MWh).



By Grid	Total Generation (TWh)	% Share
Luzon	68.512	72.6
Visayas	14.054	14.9
Mindanao	11.804	12.5
Total Generation	94.370	100.0



BIOMASS SECTOR ROADMAP, 2011-2030



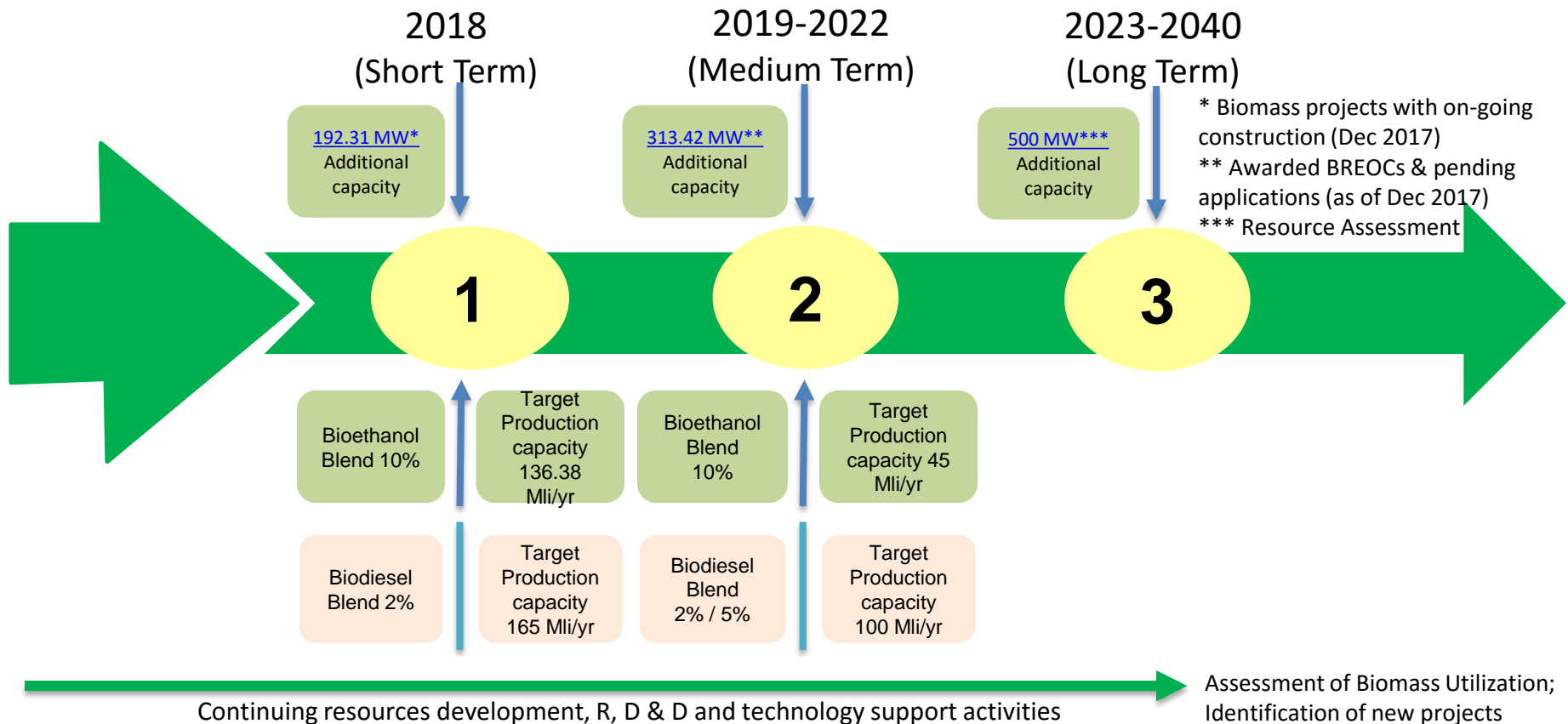
NREP Target 2011-2030 Assessment

	CAPACITY, MW
Target capacity addition	277
Capacity addition from 2011 to 2015 (based on awarded BREOCs)	401.48
Installed capacity from 2011 to 2015	211.276

- *Out of the 26 projects included in the indicative list of biomass power plant projects under NREP 2011-2030, 13 projects did not commence construction or was delayed in project implementation due to financial closing and land conversion.*

From 2016 to June 2018, the installed capacity increased by 58.924MW bringing the total capacity to 270.2MW. Twenty six (26) BREOCs were also awarded during the same period with a total indicative capacity of 346.645MW.

Biomass Sector Roadmap (2018-2040)



Biomass Resource Assessment

(USAID TECHNICAL ASSISTANCE 2012)

MAJOR ISLAND GROUP	POTENTIAL POWER GENERATION CAPACITY (MW)	Estimated CO ₂ Emission Reduced (tCO ₂)
<u>LUZON</u>	2,093.78 MW	11.00 M
<u>VISAYAS</u>	1,209.04 MW	3.71 M
<u>MINDANAO</u>	1,424.50 MW	4.75 M

TOTAL = 4,727.32 MW



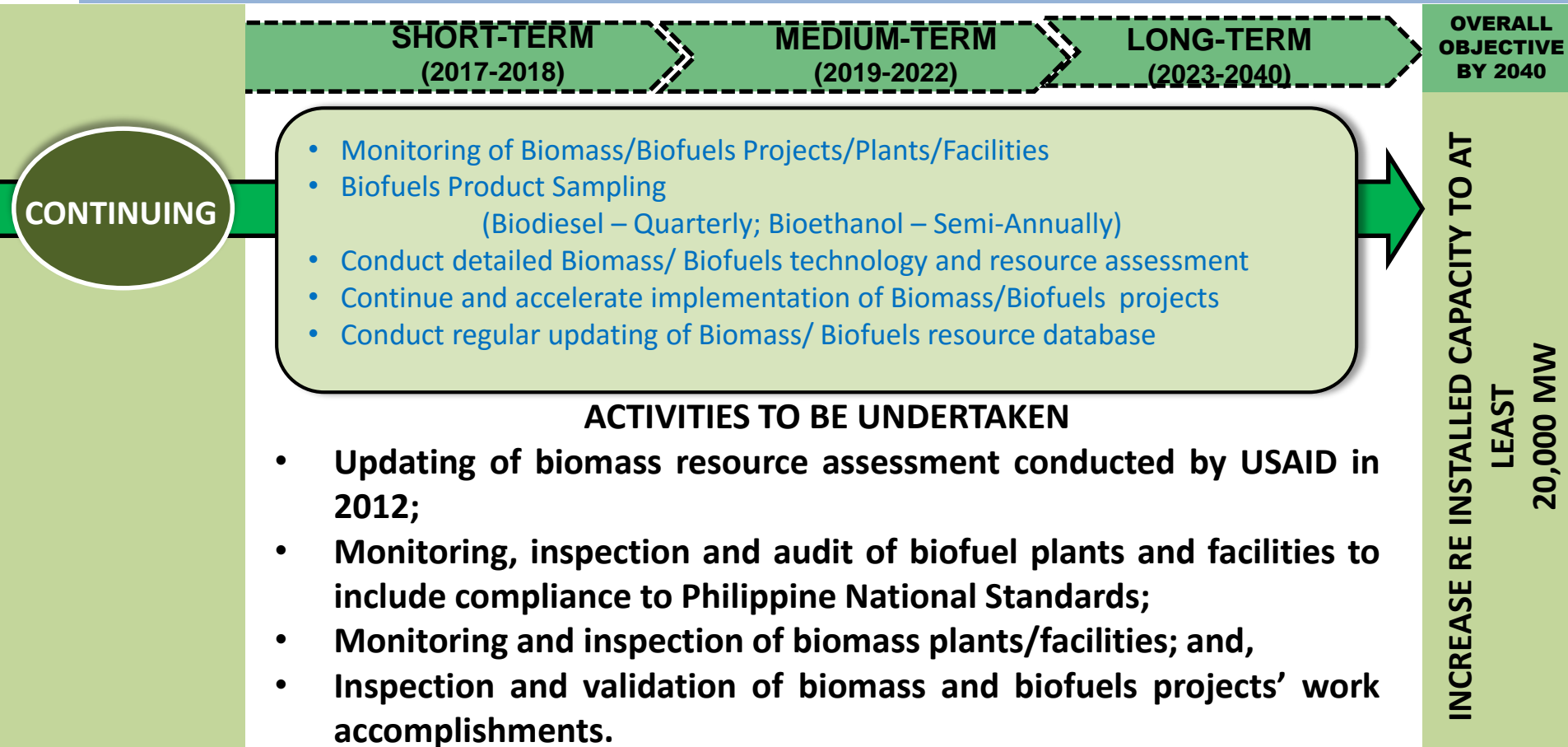
Waste-to-Energy Potential

Sanitary Land Fill (SLF) Locations

	Number of Sites	Potential Capacity (MW)
<u>LUZON</u>	<u>62</u>	145
<u>VISAYAS</u>	<u>13</u>	80
<u>MINDANAO</u>	<u>11</u>	53
TOTAL	86	278

Source: National Solid Waste Management Status Report 2015

Plans and Programs for 2018-2022



CONTINUING

- Monitoring of Biomass/Biofuels Projects/Plants/Facilities
- Biofuels Product Sampling
(Biodiesel – Quarterly; Bioethanol – Semi-Annually)
- Conduct detailed Biomass/ Biofuels technology and resource assessment
- Continue and accelerate implementation of Biomass/Biofuels projects
- Conduct regular updating of Biomass/ Biofuels resource database

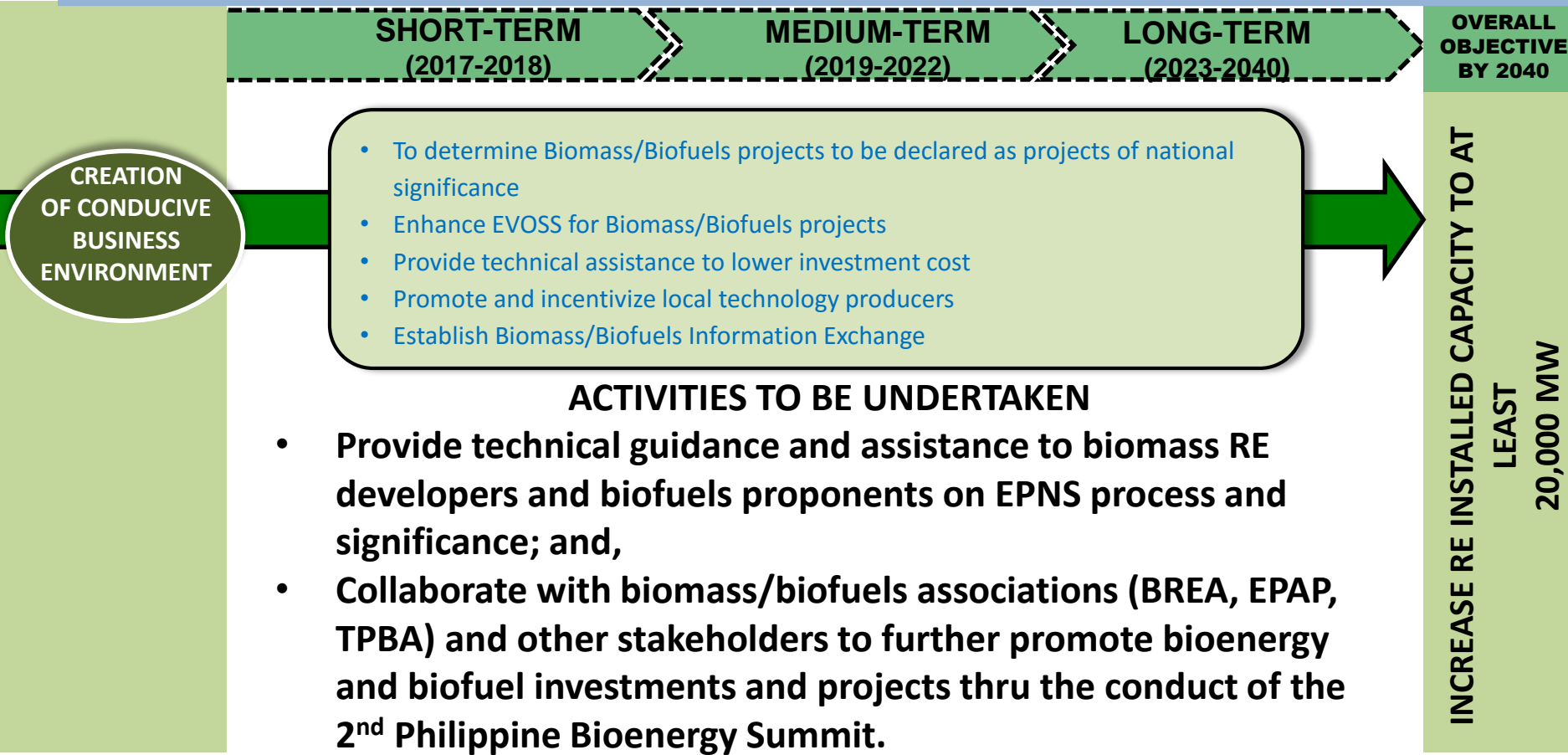
ACTIVITIES TO BE UNDERTAKEN

- Updating of biomass resource assessment conducted by USAID in 2012;
- Monitoring, inspection and audit of biofuel plants and facilities to include compliance to Philippine National Standards;
- Monitoring and inspection of biomass plants/facilities; and,
- Inspection and validation of biomass and biofuels projects' work accomplishments.

OVERALL
OBJECTIVE
BY 2040

INCREASE RE INSTALLED CAPACITY TO AT
LEAST
20,000 MW

Plans and Programs for 2018-2022



CREATION
OF CONDUCTIVE
BUSINESS
ENVIRONMENT

SHORT-TERM
(2017-2018)

MEDIUM-TERM
(2019-2022)

LONG-TERM
(2023-2040)

OVERALL
OBJECTIVE
BY 2040

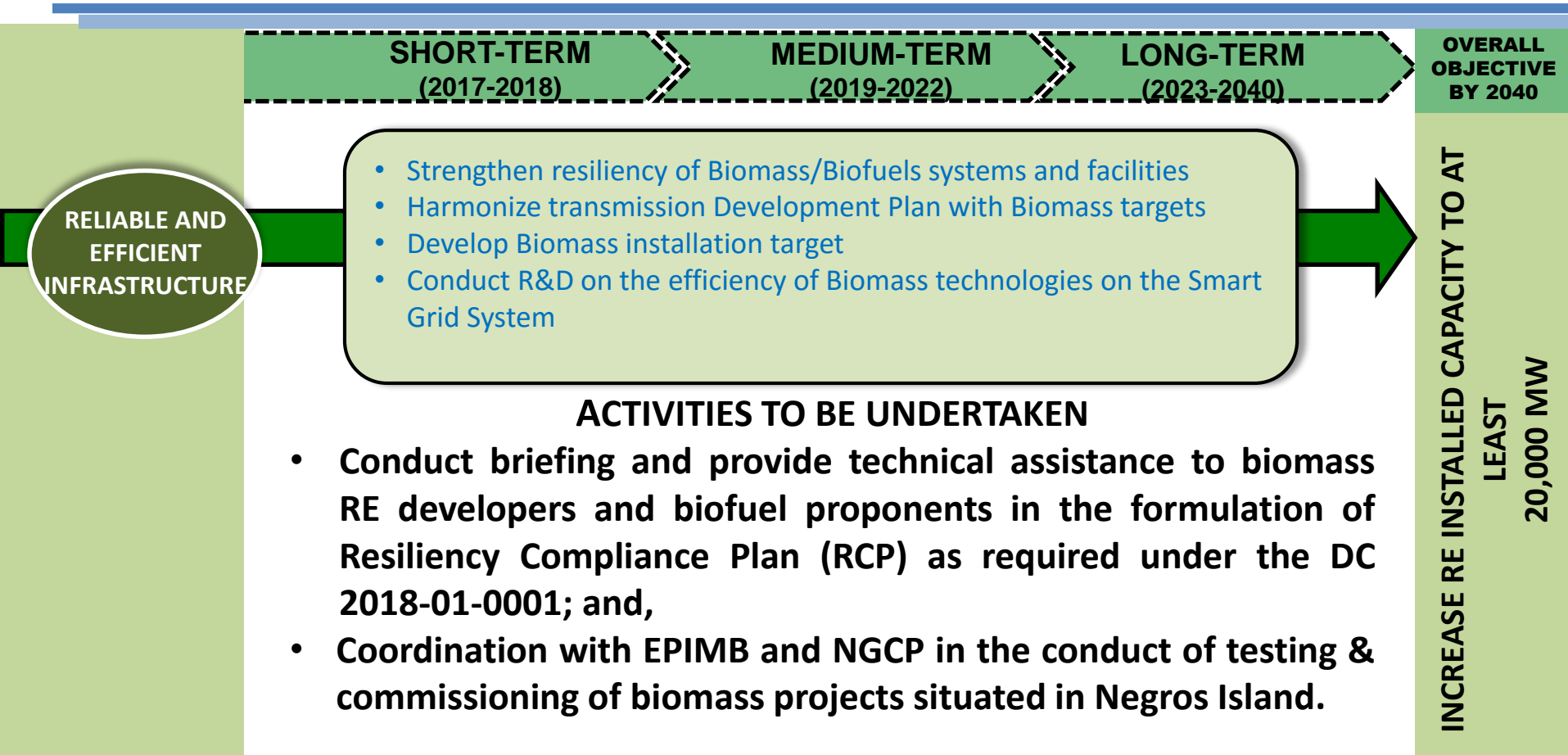
- To determine Biomass/Biofuels projects to be declared as projects of national significance
- Enhance EVOSS for Biomass/Biofuels projects
- Provide technical assistance to lower investment cost
- Promote and incentivize local technology producers
- Establish Biomass/Biofuels Information Exchange

ACTIVITIES TO BE UNDERTAKEN

- Provide technical guidance and assistance to biomass RE developers and biofuels proponents on EPNS process and significance; and,
- Collaborate with biomass/biofuels associations (BREA, EPAP, TPBA) and other stakeholders to further promote bioenergy and biofuel investments and projects thru the conduct of the 2nd Philippine Bioenergy Summit.

INCREASE RE INSTALLED CAPACITY TO AT
LEAST
20,000 MW

Plans and Programs for 2018-2022



Plans and Programs for 2018-2022

PROMOTE AND
ENHANCE
R&D AGENDA

SHORT-TERM
(2017-2018)

MEDIUM-TERM
(2019-2022)

LONG-TERM
(2023-2040)

OVERALL
OBJECTIVE
BY 2040

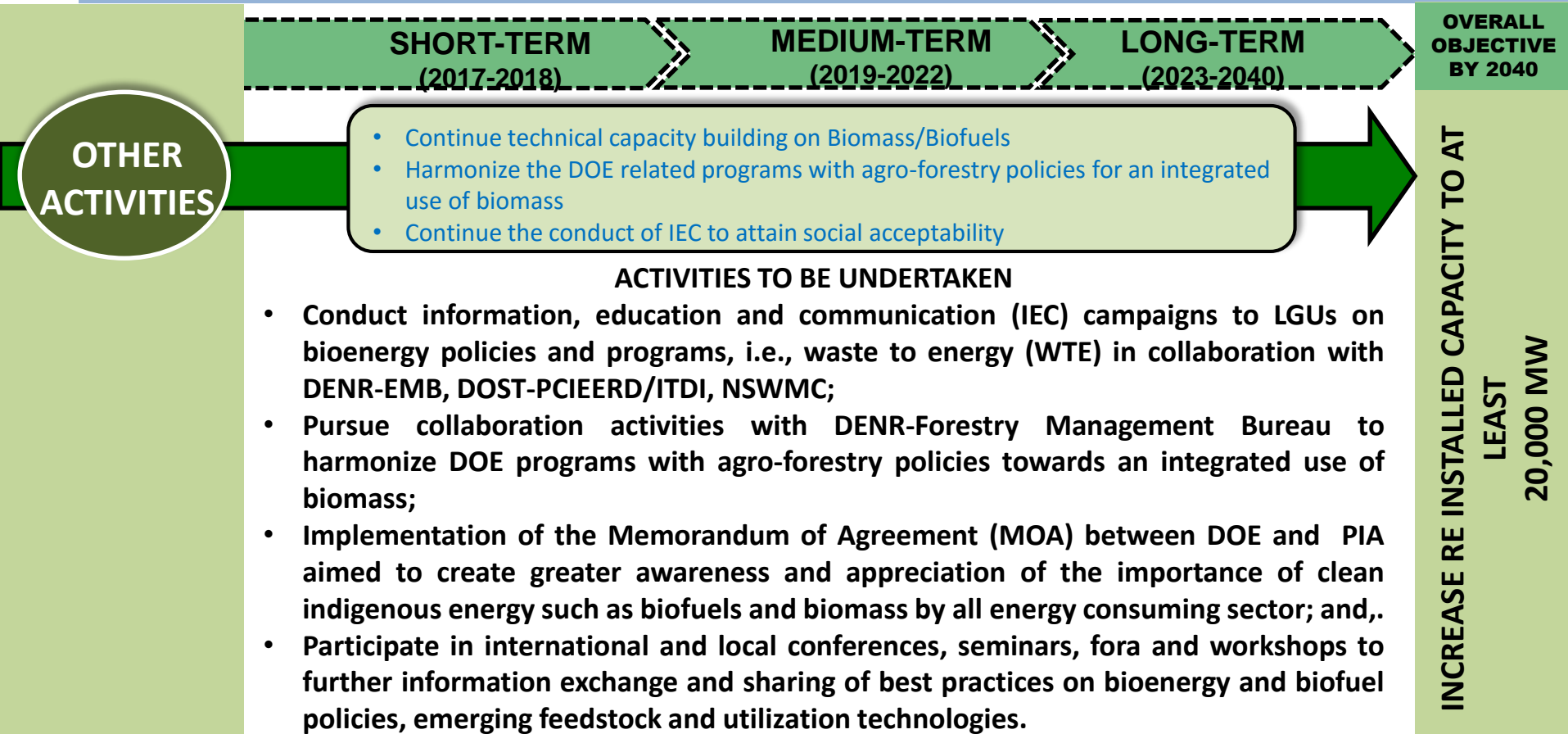
- Continue conduct of Biomass/Biofuels technology research and development studies
- Identify viability of new technologies
- Implement, monitor and evaluate pilot/demo projects for new Biomass/Biofuels technologies

ACTIVITIES TO BE UNDERTAKEN

- Revisit blending requirement for biodiesel and bioethanol with consideration on feedstock supply availability, sustainability and price, logistics & infrastructure requirements, economic benefits to farmers, final pump price (TRAIN), etc.;
- Conduct consultations and FGDs with bioethanol producers and oil companies on the optimum utilization of locally-produced bioethanol and compliance to DC 2011-12-0013;
- Completion of actual on-road test for B5 (15,000 kms.);
- Public consultation for B5;
- Continuous conduct of research and development (R&D) studies for non-food based feedstock;
- Monitoring of biofuel R&D projects undertaken by MMSU, UPLB and DOST-ITDI; and,
- Commissioning and demonstration run of the biomass gasifier project with energization of 42 households in Barangay Alad, Romblon.

INCREASE RE INSTALLED CAPACITY TO AT
LEAST
20,000 MW

Plans and Programs for 2018-2022



PROPOSED POLICY RECOMMENDATIONS

- 100% foreign ownership for biomass development and/or waste-to energy technology;
- Increase in biodiesel blend mandate from B2 to B5;
- Maintain the 10% bioethanol blend (E10);