

Hydropower Roadmap

Mr. Andresito F. Ulgado
Division Chief
Hydropower and Ocean Energy Management Division
Renewable Energy Management Bureau
Department of Energy

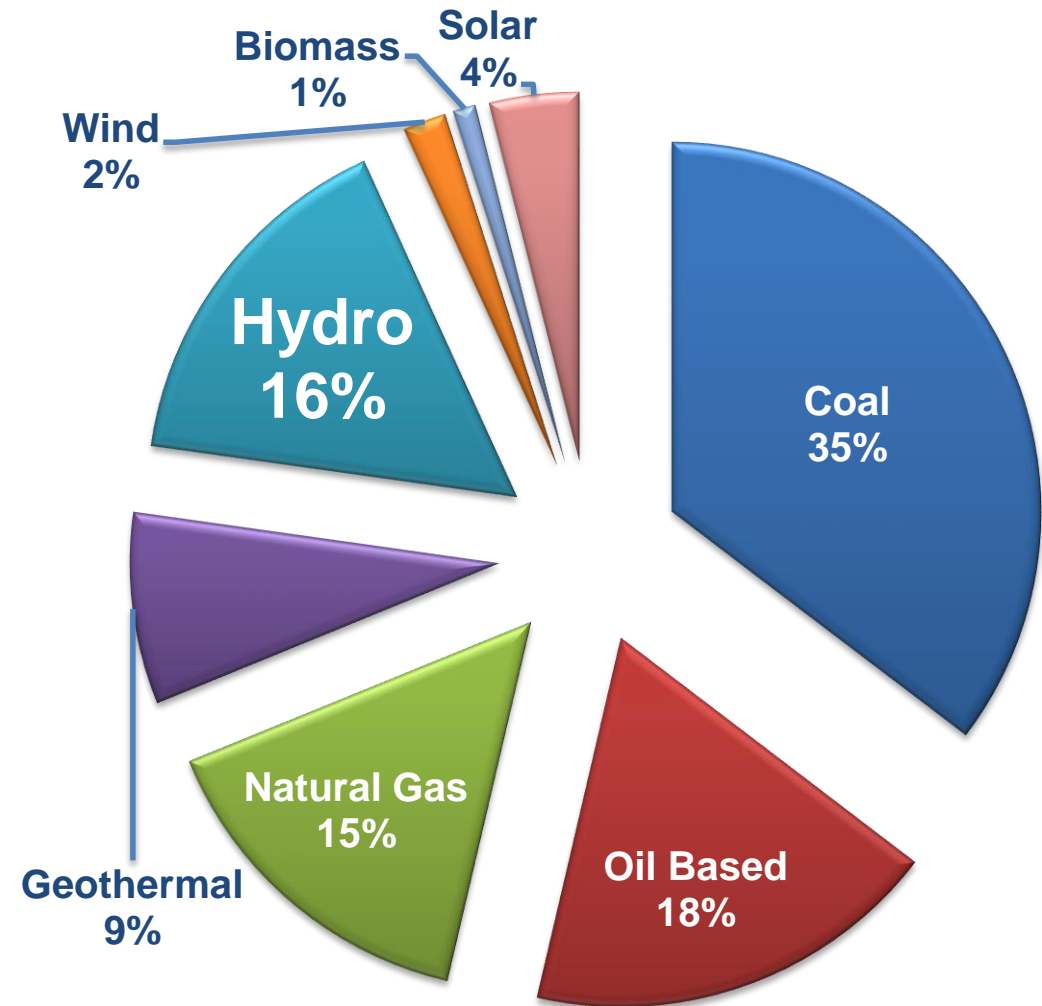


Current Performance/Status



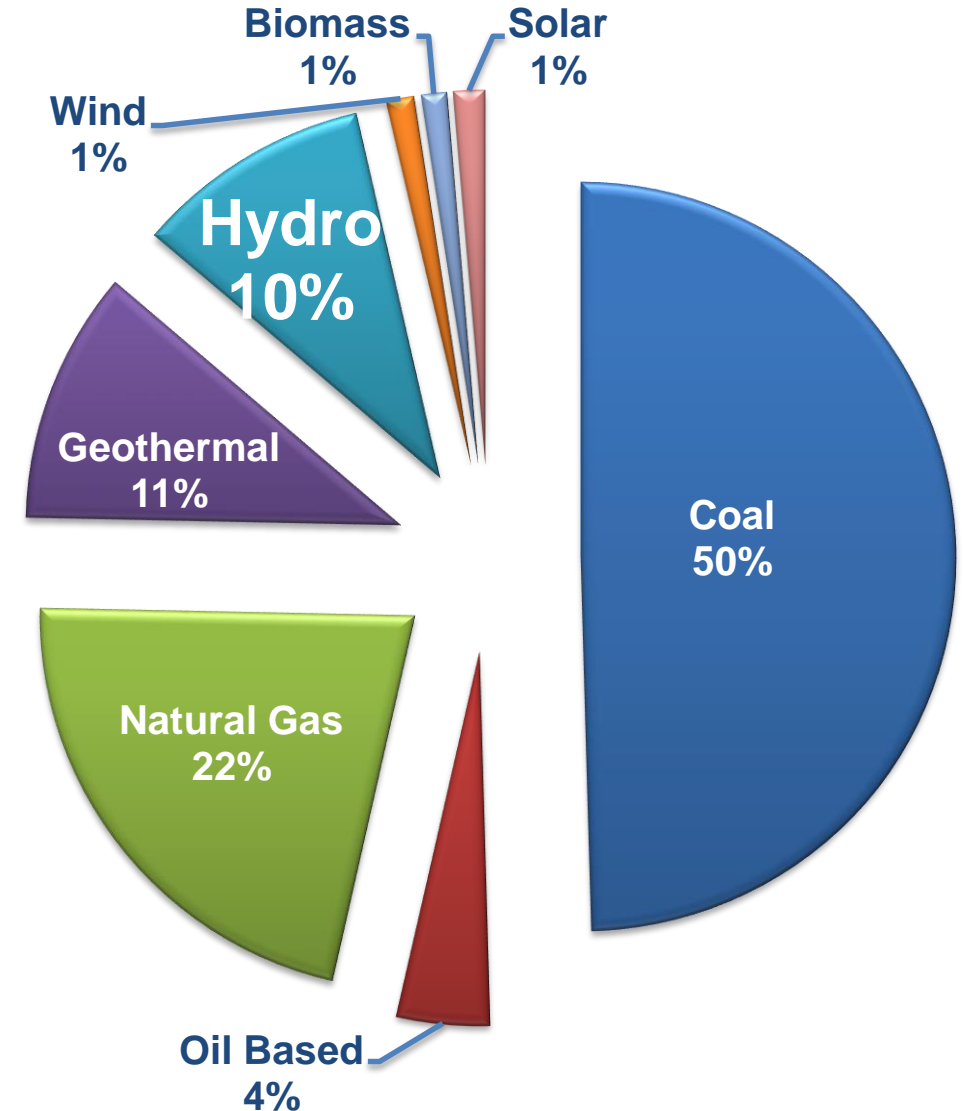
Hydro Share in Capacity Mix (December 2017)

Fuel Type	Installed Capacity (MW)	Percent Share (%)
Coal	8,049	35.4
Oil Based	4,153	18.3
Natural Gas	3,447	15.2
Renewable Energy	7,079	31.1
Geothermal	1,916	8.4
Hydro	3,618	16
Wind	427	1.9
Biomass	224	1.0
Solar	885	3.9
Total	22,728	100



Hydro Share in Generation Mix (December 2017)

Fuel Type	Installed Capacity (MWh)	Percent Share (%)
Coal	46,847,274	49.6
Oil Based	3,787,093	4
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
Wind	1,093,558	1.2
Biomass	1,013,148	1.1
Solar	1,201,152	1.3
Total	94,370,341	100



Distribution of Hydro Power Plants (December 2017)

Location	No. of Hydroelectric Power Plants	Capacity (MW)	%Share
Luzon	66	2,537.265	70.11%
Visayas	10	21.300	0.6%
Mindanao	27	1,060.076	29.29%
Total	103	3,618.469	100%



Energized Hydroelectric Power Plant*

Island	No. of Hydroelectric Power Plant	Installed Capacity (MW)
Luzon	9	34.27
Visayas	1	8.0
Mindanao	3	21.6
Total	13	63.87

*From 2011 - 2017

Year	No. of Hydroelectric Power Plants	Installed Capacity (MW)
2011	1	2.10
2012	2	11.8
2013	0	0
2014	4	16.65
2015	2	14.82
2016	3	10
2017	1	8.5
Total	13	63.87



Energized Hydroelectric Power Plant (Luzon)



1.0MW Bulanao Hydroelectric Power Plant in Tabuk, Kalinga



8.50MW Maris Main Canal 1 Hydroelectric Power Plant in Ramon, Isabela



0.045MW Lateral B Hydroelectric Power Plant in San Mateo, Isabela



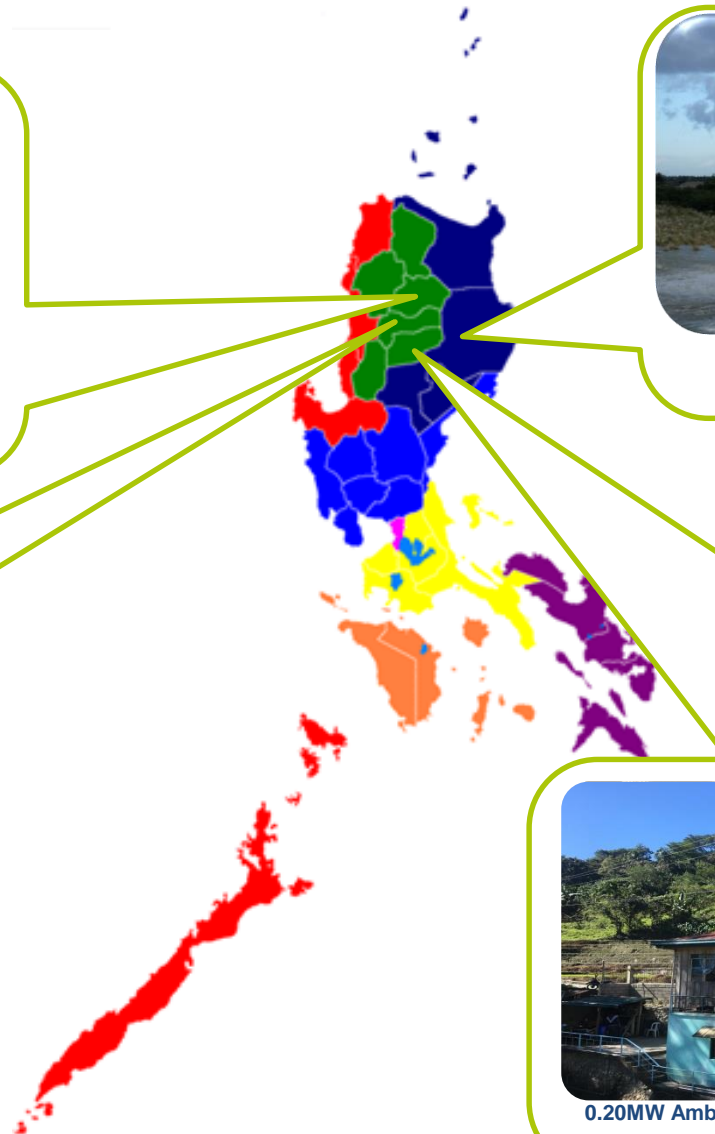
14.0MW Sabangan Hydroelectric Power Plant in Sabangan, Mt. Province



0.20MW Ambangal Hydroelectric Power Plant in Kiangan, Ifugao



0.82MW Likud Hydroelectric Power Plant in Asipulo & Kiangan, Ifugao



Energized Hydroelectric Power Plant (Luzon)



3.80MW Irisan 1 Hydroelectric Power Plant in Tuba, Benguet



1.0MW Prismc Hydroelectric Power Plant in Rizal, Nueva Ecija



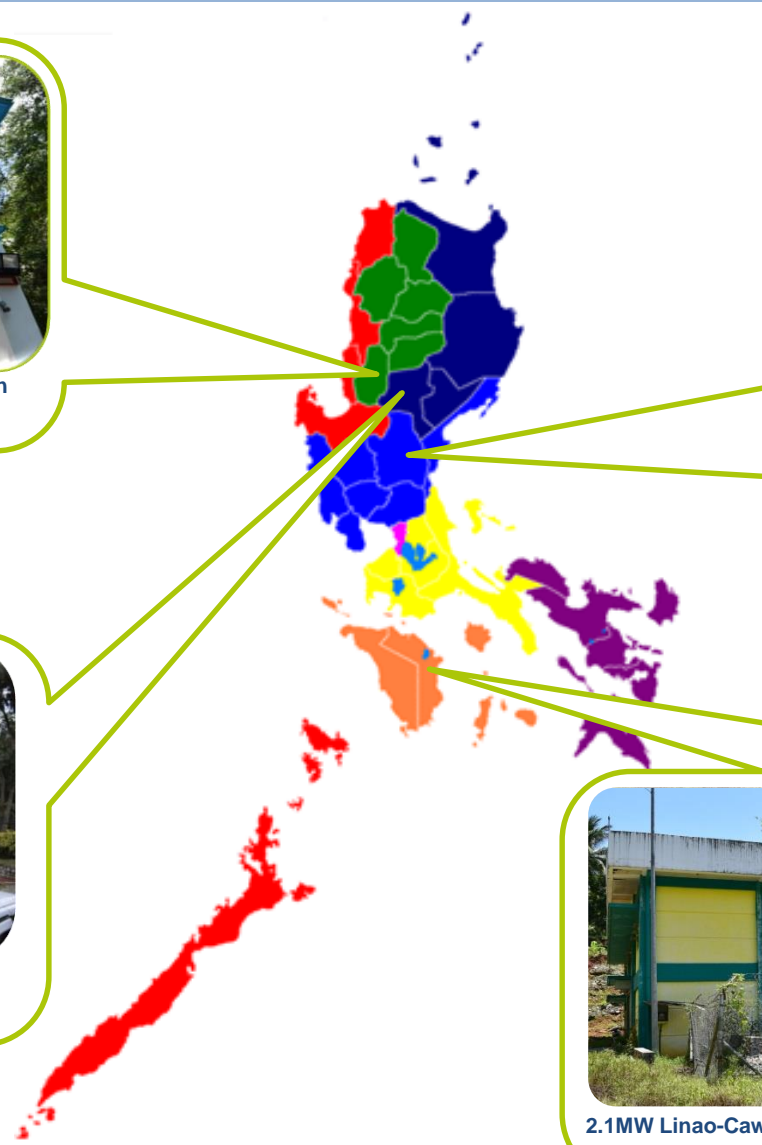
1.80MW Commonal-Uddiawan Hydroelectric Power Plant in Solano, Nueva Vizcaya



2.1MW Linao-Cawayan (Lower Cascade) Hydroelectric Power Plant in San Teodoro, Oriental Mindoro



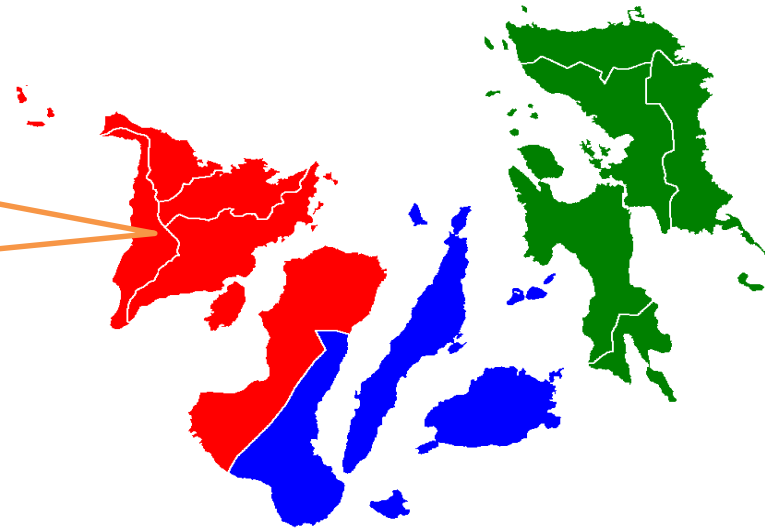
3.0MW Linao-Cawayan (Upper Cascade) Hydroelectric Power Plant in San Teodoro, Oriental Mindoro



Energized Hydroelectric Power Plant (Visayas)



8.0MW Villasiga Hydroelectric Power Plant in Bugasong, Antique



Energized Hydroelectric Power Plant (Mindanao)



3.0MW New Bataan Hydroelectric Power Plant in New Bataan, Compostela Valley



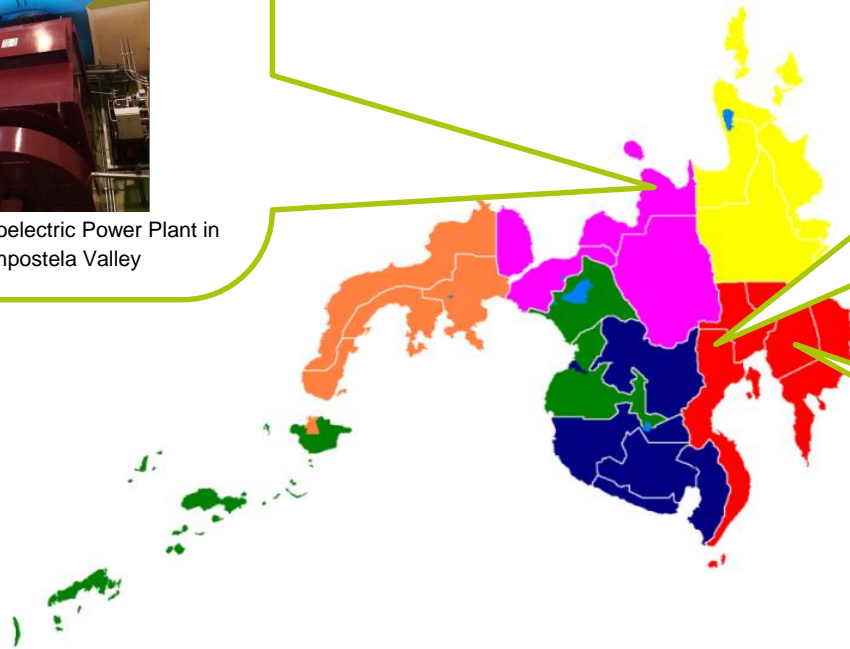
7.0MW Tudaya 2 Hydroelectric Power Plant in Sta. Cruz, Davao del Sur



6.6MW Tudaya 1 Hydroelectric Power Plant in Sta. Cruz, Davao del Sur



3.0MW New Bataan Hydroelectric Power Plant in New Bataan, Compostela Valley



Awarded Hydropower Service Contracts

	No. of Hydropower Service Contracts
Total Awarded	662
Operating	51
On-going Construction	18
Development Stage (excluding the on-going construction)	122
Relinquished/Terminated	193
Pre-Development Stage	278



Issues and Challenges

- Long and tedious process in the acquisition of the necessary permits and endorsements from concerned government agencies.
- Socio-cultural issues and security threats also added to the risks in developing hydropower projects.



Assessment of the Current Status vs. NREP 2011 Targets

Year	Target Installation MW (2011)	Actual Installation MW	Percentage Accomplishment
2011-2015	341.3	45.37	13.29%
2016-2020	3,161.0	21.5*	0.68%
2021-2030	1,891.8	0	0
Total	5,394.1	66.87	1.24%

* Actual installation from 2016 to June 2018



Targets



ROADMAP

Short term - 2022

- Big hydropower projects are in construction; other projects are in commissioning stage
- Additional 225.81 MW hydropower capacity by 2022

Medium Term – 2027

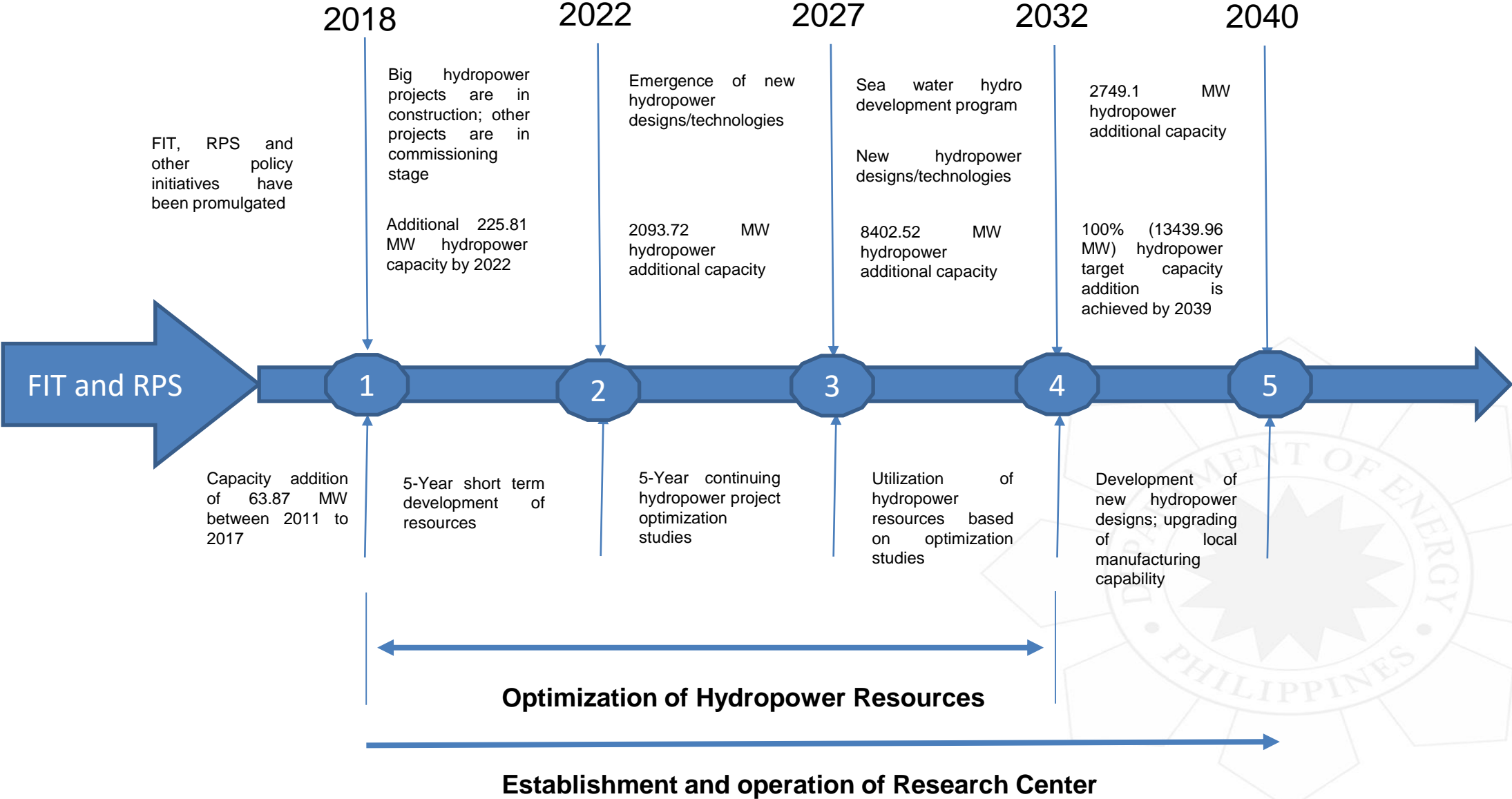
- Emergence of new hydropower designs/technologies
- 2,093.72 MW hydropower additional capacity
- Continuing hydropower optimization studies

Long Term - 2040

- Sea water hydro development program
- A total of 13,340MW hydropower additional capacity achieved by 2039
- Utilization of hydropower resources based on optimization studies
- Development of new hydropower designs; upgrading of local manufacturing capability



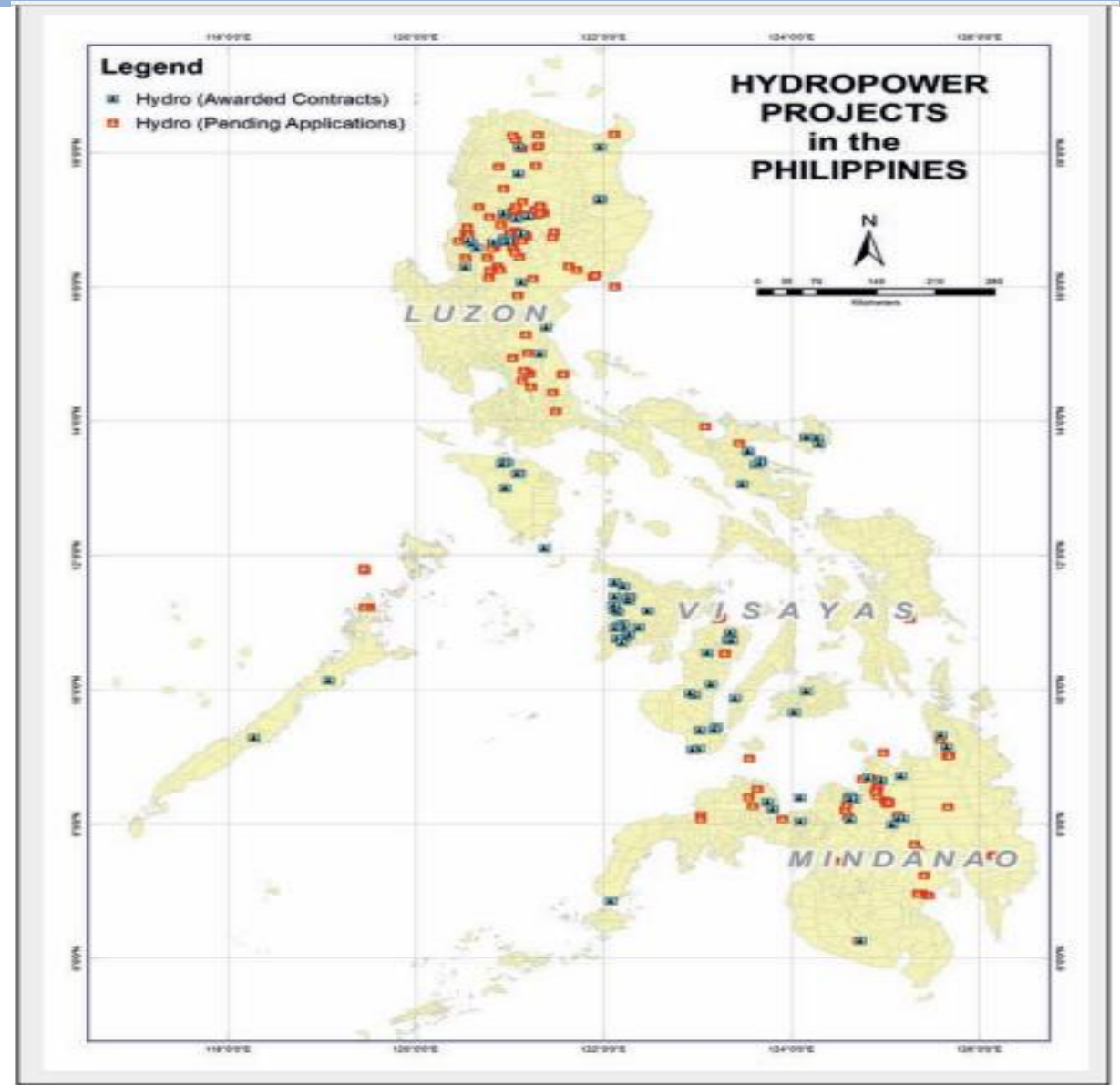
HYDROPOWER SECTOR ROADMAP



Potential Projects

Location	Hydropower Resource Potential (MW)	% Share
Large Hydro	11,233	85.7
Mini-Hydro	1,847	14.1
Micro-Hydro	27	0.2
Total	13,097	100

Table 1. Distribution of Hydro Resource Potential, by Plant Type



Actual Plans and Programs (with timelines)



Capacity and Energy Addition

Location	Commissioning Year			Total Capacity Addition (MW)	Total Energy Addition (MWhr)	% Share
	2018-2022	2023-2027	2028-2040			
Luzon	65.46	1,224.83	9,431.60	10,721.89	46,961,878.2	79.78
Visayas	23.10	205.86	664.84	893.80	3,914,844	6.55
Mindanao	136.05	633.03	1,055.18	1,824.26	7,990,258.8	13.80
Total	224.61	2,063.72	11,151.62	13,439.95	58,866,981	100.00

**Considering 50% Capacity Factor operating at 8,760 hours*



Policy Recommendations

- Amendment Section 3.1 (Term) of the RESC

To amend the pre-development term from two years to three years term under Section 3.1 of the RE Service Contract so as to accommodate the acquisition permits and endorsements from NCIP, NWRB, DENR and LGU. The said amendment will entail the revision of the work program activities, timeline, and corresponding financial commitment per activity.

- Abandonment and Termination Plan (Section 2.a)

To require the submission of ATP during the development stage instead under pre-development period. The activities under the pre-development period are the acquisition of permits and endorsements, conduct of feasibility study (topographic survey and monitoring of flow discharge) as such submission of ATP is not applicable.



Policy Recommendations

- Guidelines for blacklisting of RE Developer and Technical Consultants
To be able to establish guidelines on the blacklisting of non-performing RE Developers /s on its contractual obligations.



Thank you!

