

# Solar Sector Roadmap

**Fortunato S. Sibayan**

Division Chief

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# NREP 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"> <li>•DC on E10 in 2011</li> <li>•Mandatory E10 to all Gasoline by 2012</li> <li>•PNS for B5 by 2014</li> <li>•DC on B5 by 2015</li> <li>•Mandatory B5 to all Diesel by 2015</li> </ul>	<ul style="list-style-type: none"> <li>•PNS for B20 &amp; E85 by 2020</li> <li>•DC on B10 and E20 by 2020</li> </ul>	<ul style="list-style-type: none"> <li>•DC on B20 and E85 by 2025</li> </ul>	
Wind	400 MW	700 MW	1,445 MW	2,345 MW
Solar	500 MW*	100 MW	200 MW	800 MW (Aspirational target 1,528 MW)
Ocean Power	0	35.5	35	70.5
<b>Total</b>	<b>1,088 MW</b>	<b>5,096 MW</b>	<b>3,746.80 MW</b>	<b>9,931.3 MW</b>



# Solar Installed Capacity, June 2018

PARTICULARS	NO. OF PROJECTS	CAPACITY (MW)	% SHARE
<b><i>Under FIT System</i></b>	<b>23</b>	<b>525.94</b>	<b>58.43</b>
PhP9.68/kWH	6	108.9	13
PhP8.69/kWH	17	417.04	45.43
<b><i>Non-FIT System</i></b>	<b>18</b>	<b>374.23</b>	<b>41.57</b>
Under WESM	16	361.03	40.07
Under PPA	2	13.2	1.5
<b><i>Total</i></b>	<b>41</b>	<b>900.17</b>	<b>100</b>



# SEP Roadmap (2018-2040)

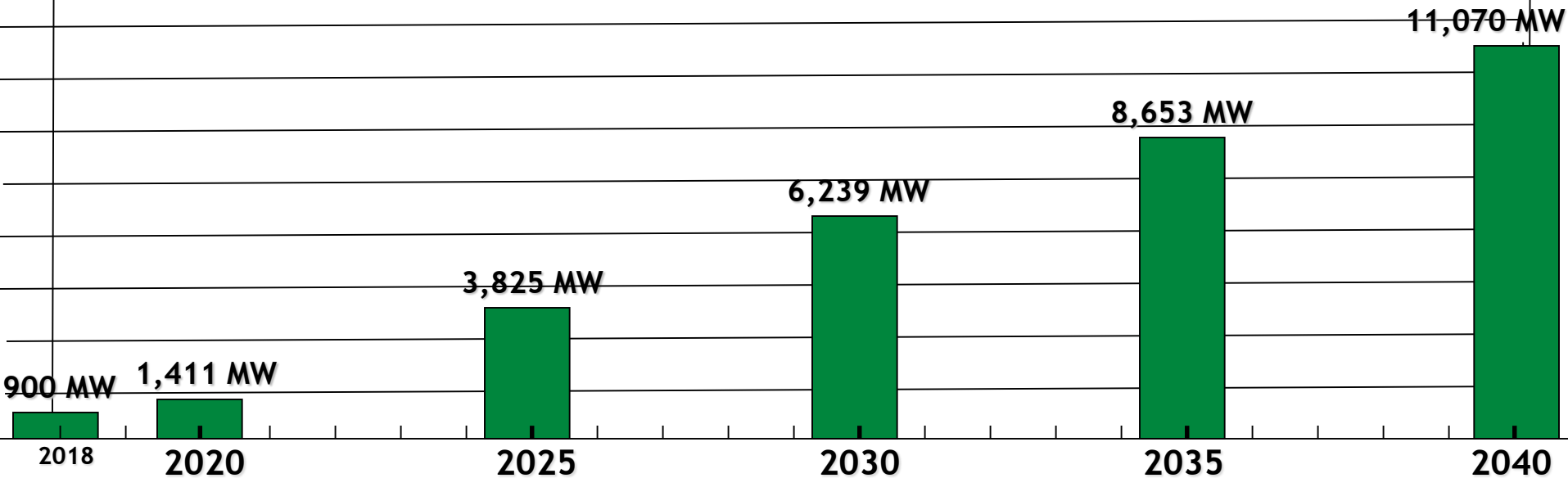
## Mainstreaming of 10,170 MW Solar Capacities

- 2020 - PV Training Program
  - IEC Program
- 2022 - PV Codes and Standards
  - RE Zoning Policy/Program
  - Smart Grid Policy/Program
  - Land-Use Policy

2018

## IMPLEMENTATION OF SEP PROGRAMS

2040



# SEP Roadmap Potential Capacities

## Awarded Solar Energy Service Contract, June 2018

<b>PARTICULARS</b>	<b>NO. OF PROJECTS</b>	<b>CAPACITY (MW)</b>	<b>% SHARE</b>
<b><i>Pre-Development</i></b>	<b>173</b>	<b>9,658.6</b>	<b>95</b>
Luzon	120	7,657.28	75.3
Visayas	22	1,030.13	9.55
Mindanao	31	971.19	10.15
<b><i>Development</i></b>	<b>17</b>	<b>511.52</b>	<b>5</b>
Luzon	8	304.07	2.96
Visayas	6	91.45	0.9
Mindanao	3	116	1.14
<b><i>Total</i></b>	<b>190</b>	<b>10,170.12</b>	<b>100</b>



# SEP Roadmap Potential Capacity

## Applications in Process as of June 2018

PARTICULARS	NO. OF PROJECTS	CAPACITY (MW)	% SHARE
Luzon	26	744.31	72
Visayas	7	1.82	19.7
Mindanao	3	161.5	8.3
<b><i>Total</i></b>	<b>36</b>	<b>907.63</b>	<b>100</b>



# Issues and Concerns

Issues and Concerns	Proposed Solutions
Lack or Limited Manpower Capacity of LGUs/DUs	Implement Training Program for PV Installers, Designers, Technicians
Awareness	Develop IEC Program on RE Markets (Net Metering, RPS on-grid/off-grid, GEOP)
Variability	Smart Grid Policy, Improved Forecasting, Storage of Electricity
Accessibility	RE Zoning/Land-use Policy
Market	Finalized the guidelines on REM Rules



# Solar Energy Roadmap Strategies

CRITICAL SYSTEM REQUIREMENTS	MAJOR AREAS	STRATEGIES	Y E A R										
			2018		2020					2025		2027	
MANPOWER CAPACITY (2018-2025)	PV MANPOWER	TRAINING PROGRAM											
		- PV Trainers											
		- PV Technicians											
		- PV Engineers											
		CURRICULUM											
AWARENESS (2018-2024)	ACCEPTABILITY	IEC PROGRAM											
	RELIABILITY	CODES & STANDARDS											
POLICY SUPPORT (2018-2023)	VARIABILITY	SMART GRID PROGRAM											
		FORECASTING											
		ENERGY STORAGE											
	ACCESSIBILITY	RE ZONING											
		LAND-USE ACT											
	MARKET	REM RULES											





# Wind Sector Roadmap

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# NREP Targets, 2011-2030

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	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"> <li>•DC on E10 in 2011</li> <li>•Mandatory E10 to all Gasoline by 2012</li> <li>•PNS for B5 by 2014</li> <li>•DC on B5 by 2015</li> <li>•Mandatory B5 to all Diesel by 2015</li> </ul>	<ul style="list-style-type: none"> <li>•PNS for B20 &amp; E85 by 2020</li> <li>•DC on B10 and E20 by 2020</li> </ul>	<ul style="list-style-type: none"> <li>•DC on B20 and E85 by 2025</li> </ul>	
<b>Wind</b>	<b>400 MW</b>	<b>700 MW</b>	<b>1,445 MW</b>	<b>2,345 MW</b>
Solar	500 MW*	100 MW	200 MW	800 MW (Aspirational target 1,528 MW)
Ocean Power	0	35.5	35	70.5
<b>Total</b>	<b>1,088 MW</b>	<b>5,096 MW</b>	<b>3,746.80 MW</b>	<b>9,931.3 MW</b>



# Wind Installed Capacity , June 2018

PARTICULARS	NO. OF PROJECTS	CAPACITY (MW)	% SHARE
<b><i>Under FIT System</i></b>	<b>6</b>	<b>393.90</b>	<b>92.3</b>
PhP9.68/kWH	3	249.90	58.5
PhP8.69/kWH	3	144.00	33.8
<b><i>Special FIT System</i></b>	<b>1</b>	<b>33</b>	<b>7.7</b>
PhP5.76/kWh	1	33.00	7.7
<b><i>Total</i></b>	<b>6*</b>	<b>426.90</b>	<b>100</b>

\* - One WPP has an additional investment, i.e. Northwind WPP

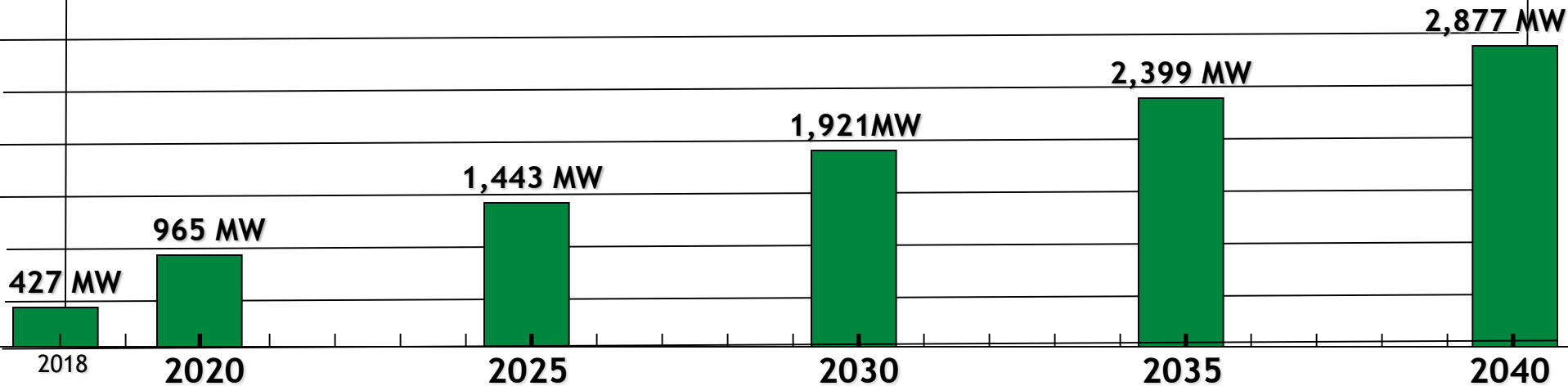


# WEP Roadmap (2018–2040)

## Mainstreaming of 2,450 MW Wind Capacities

- 2022 - Smart Grid Policy/Program
  - RE Zoning Policy/Program
  - Land-Use Policy
- 2024 - Wind IEC Program

## IMPLEMENTATION OF WEP PROGRAMS

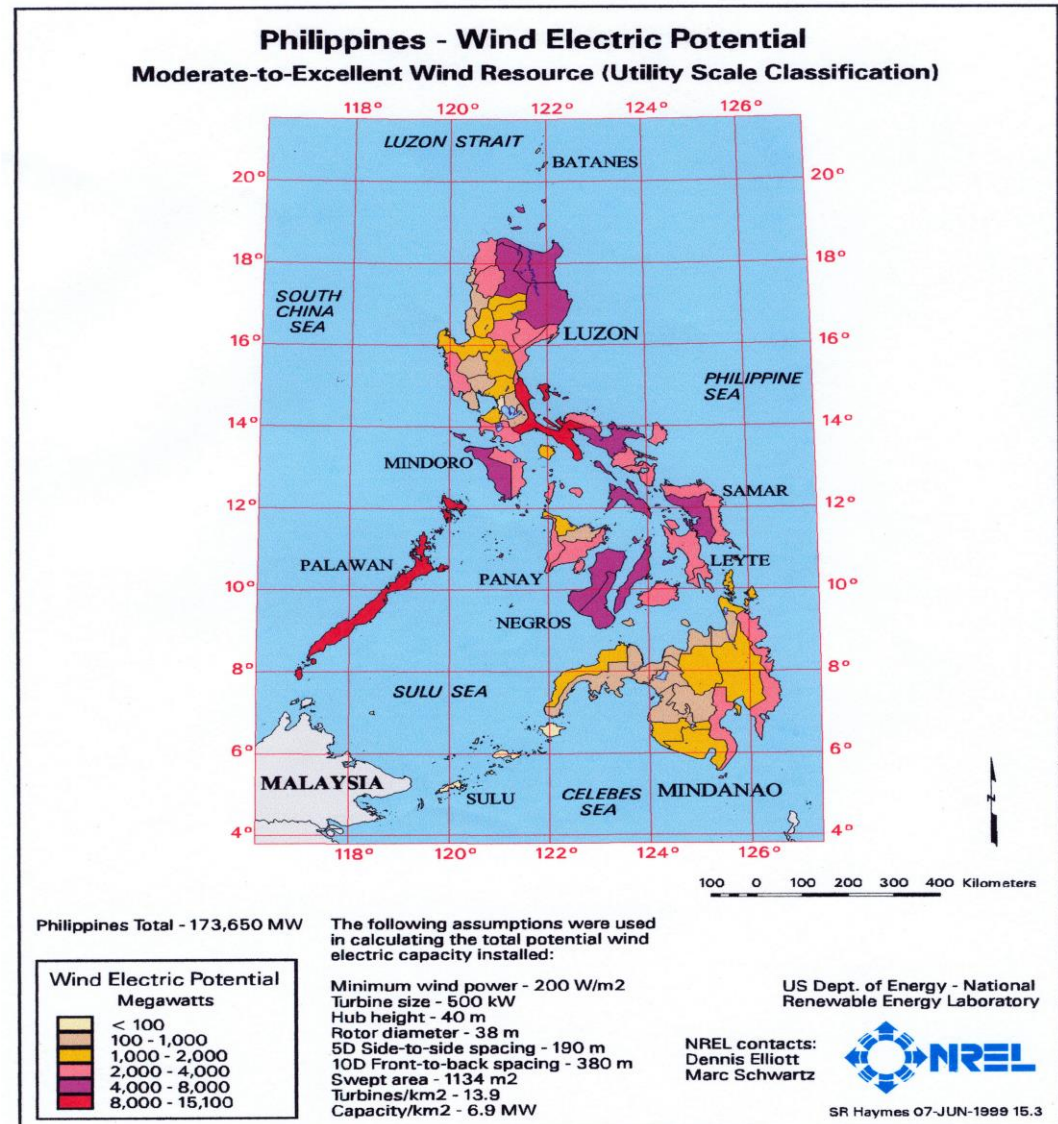


# Wind Energy Resource

Over 10,000 km<sup>2</sup> with 76,600 MW of potential capacity

1. Batanes and Babuyan Island
2. Northwest tip of Luzon (Ilocos Norte)
3. Higher interior terrain of Luzon, Mindoro, Samar, Leyte, Panay, Negros, Cebu, Palawan, Eastern Mindanao and adjacent islands
4. Well-exposed east-facing coastal locations from Northern Luzon southward to Samar
5. The wind corridors between Luzon and Mindoro (including Lubang Island)
6. Between Mindoro and Panay (including the Semirara & Cuyo Island)

Figure 10



# Awarded Wind Energy Service Contract, June 2018

<b>PARTICULARS</b>	<b>NO. OF PROJECTS</b>	<b>CAPACITY (MW)</b>	<b>% SHARE</b>
<b><i>Pre-Development</i></b>	<b>50</b>	<b>1,910.35</b>	<b>78</b>
Luzon*	32	917.55	37.5
Visayas**	18	992.80	40.5
Mindanao	0	0	0
<b><i>Development</i></b>	<b>7</b>	<b>537.15</b>	<b>22</b>
Luzon	5	462.40	18.9
Visayas	2	74.75	3.1
Mindanao	0	0	0
<b><i>Total</i></b>	<b>57</b>	<b>2,447.5</b>	<b>100</b>



# Wind Energy Roadmap (2011-2017)

## Applications in process : Wind Energy Service Contract, June 2018

PARTICULARS	NO. OF PROJECTS	CAPACITY (MW)
Luzon	3	TBD
Visayas	0	0
Mindanao	0	0
<b><i>Total</i></b>	<b>3</b>	<b>TBD</b>



# Issues and Concerns

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Awareness	Implement IEC Program on RE Markets (Net Metering, RPS on-grid/off-grid, GEOP)
Variability	Smart Grid Policy, Improved Forecasting, Storage of Electricity
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# Wind Energy Roadmap Strategies

CRITICAL SYSTEM REQUIREMENTS	MAJOR AREAS	STRATEGIES	Y E A R									
			2018		2020					2025		2027
MANPOWER CAPACITY (2018-2025)	TECHNICAL CAPABILITY	CURRICULUM										
AWARENESS (2018-2024)	ACCEPTABILITY	IEC PROGRAM										
POLICY SUPPORT (2018-2023)	VARIABILITY	SMART GRID PROGRAM										
		FORECASTING										
		ENERGY STORAGE										
	ACCESSIBILITY	RE ZONING										
		LAND-USE ACT										
	MARKET	REM RULES										



# Thank You!

