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BUILDING ENERGY SECURITY THROUGH INNOVATION

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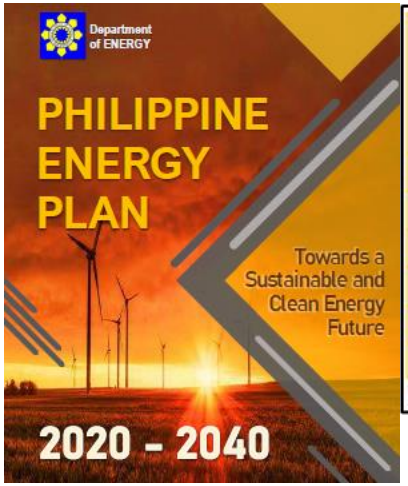
January 26, 2023



Philippine Energy Plan 2020 - 2040



Year	Luzon		Visayas		Mindanao		Philippines	
	Peak Demand (MW)	Electricity Sales (GWh)	Peak Demand (MW)	Electricity Sales (GWh)	Peak Demand (MW)	Electricity Sales (GWh)	Peak Demand (MW)	Electricity Sales (GWh)
2020	11,103	65,908	2,201	13,472	1,978	11,989	15,282	91,369
2025	14,978	92,171	3,160	19,934	2,881	17,083	21,019	129,188
2030	20,358	125,277	4,495	28,361	4,275	25,350	29,128	178,988
2035	27,532	169,425	6,387	40,296	6,290	37,293	40,209	247,014
2040	36,631	225,414	8,982	56,664	9,042	53,613	54,655	335,691
AAGR (%)*	**6.15**	**6.34**	**7.28**	**7.45**	**7.90**	**7.78**	**6.58**	**6.72**

**Average annual growth rates (AAGR) from 2020 to 2040*

- The International Energy Agency (IEA) defines energy security as the **uninterrupted availability** of energy sources at an **affordable** price.
- Peak demand (MW) doubles every 10 years
- Clean Energy Scenario under PEP
  - *35.0 percent by 2030 and 50.0 percent by 2040 RE share in the power generation mix;*
  - *Conversely, it means that 65% in 2030 and 50% in 2040 will come from imported fossil fuels where the availability of supply and price is not within our control*

CASE OF ENERGY SECURITY?

Odette damage to power co-ops hits P2.5 billion

By: Jordeene B. Lagare - @inquirerdotnet Philippine Daily Inquirer / 04:48 AM January 04, 2022



POWERLESS: Linemen of Visayan Electric Co. work 24/7 to restore electricity in Metro Cebu after the onslaught of Typhoon Odette. (Contributed photo)

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News Commentary Features Nation

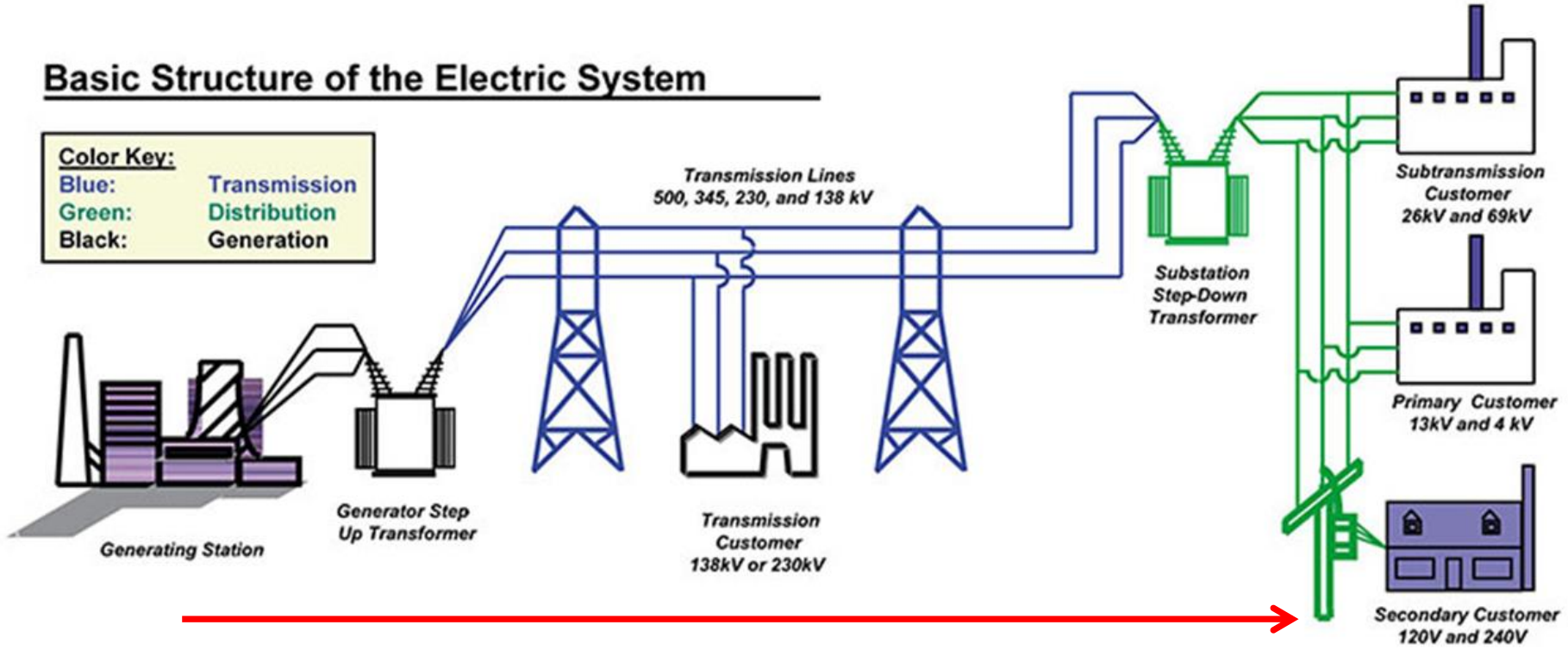
Power outage in Bohol as Leyte power cut off anew due to TD' Agaton'

Topic | News

April 11, 2022

Various risks to our energy supply…

CASE OF TYPHOON ODETTE IN BOHOL: A PERSONAL EXPERIENCE



- Local hydro plants in Bohol flooded
- Limited diesel plant power supply
- No supply of fuel for generators!

- Leyte-Bohol submarine cable severely damaged; non-operational for months
- Another typhoon (Agaton) damaged the NGCP lines in Leyte

- Thousands of DU electric posts and distribution facilities were damaged
- Power lines cut-off for months

VIOLA! AND WE HAD LIGHT!







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INNOVATION IN POWER GENERATION

We already have the technology; it is a matter of how best to use it.



Solar Farm



Rooftop Solar

Solar PV generation is predictable and very flexible in terms of location and size.

NO FUEL SUPPLY RISK!

Point for reflection: What will you do if tomorrow we cannot import oil and coal? Most likely we will look for alternatives – hydro, solar, wind, biofuels, etc.

INNOVATION IN POWER TRANSMISSION AND DISTRIBUTION

How to deliver or make power available to the consumers?





35.34 kWp, YAMAHA REVZONE, LIPA, BATANGAS



100 kWp, ST JOSEPH COLLEGE, MAASIN, SOUTHERN LEYTE







- Produce power near or at the place where it will be consumed; consider “community solar” as an option aside from home-solar
- Grid-forming microinverters can operate in off-grid mode even without batteries
- **TRANSMISSION AND DISTRIBUTION RISK**

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INNOVATION WILL LEAD TO DISRUPTION

The question is whether this would be encouraged or discouraged by our policy makers.



Photo credit: power.solapv.com/

DOES HOME SOLAR MAKE ECONOMIC SENSE?

FINANCIAL MODEL RESIDENTIAL - 2.76 KWP ENPHASE									
TOTAL SYSTEM SIZE		2.76 kWp		Grid-tie type		RENT-TO-OWN			
Year	Total System Yield KWH	DU Rate/KWH with 1.5% p.a. Increase*	Avoided Cost of Electricity	Fixed KWH Rate*	Payment for Loan**	O&M Cost (1% annual escalation)	Insurance Premium	Annual Energy Savings	Annual % Savings
0					(247,240)			0	
1	3,713	12.00	₱ 44,559	₱ 10.37	₱ 38,500			₱ 6,059	14%
2	3,687	12.18	₱ 44,911	₱ 10.44	₱ 38,500			₱ 6,411	14%
3	3,661	12.36	₱ 45,266	₱ 10.51	₱ 38,500			₱ 6,766	15%
4	3,636	12.55	₱ 45,623	₱ 10.59	₱ 38,500			₱ 7,123	16%
5	3,610	12.74	₱ 45,983	₱ 10.66	₱ 38,500			₱ 7,483	16%
6	3,585	12.93	₱ 46,346	₱ 10.74	₱ 38,500			₱ 7,846	17%
7	3,560	13.12	₱ 46,712	₱ 10.81	₱ 38,500			₱ 8,212	18%
8	3,535	13.32	₱ 47,081	₱ 10.89	₱ 38,500			₱ 8,581	18%
9	3,510	13.52	₱ 47,453	₱ 10.97	₱ 38,500			₱ 8,953	19%
10	3,486	13.72	₱ 47,827	₱ 11.04	₱ 38,500			₱ 9,327	20%
11	3,461	13.93	₱ 48,205			814	527	₱ 46,864	97%
12	3,437	14.14	₱ 48,586			814	527	₱ 47,245	97%
13	3,413	14.35	₱ 48,969			814	527	₱ 47,628	97%
14	3,389	14.56	₱ 49,356			814	527	₱ 48,015	97%
15	3,365	14.78	₱ 49,745			814	527	₱ 48,404	97%
16	3,342	15.00	₱ 50,138			814	527	₱ 48,797	97%
17	3,319	15.23	₱ 50,534			827	527	₱ 49,181	97%
18	3,295	15.46	₱ 50,933			839	527	₱ 49,567	97%
19	3,272	15.69	₱ 51,335			852	527	₱ 49,957	97%
20	3,249	15.92	₱ 51,740			864	527	₱ 50,349	97%
21	3,227	16.16	₱ 52,149			877	527	₱ 50,745	97%
22	3,204	16.40	₱ 52,561			890	527	₱ 51,143	97%
23	3,182	16.65	₱ 52,975			904	527	₱ 51,545	97%
24	3,159	16.90	₱ 53,394			917	527	₱ 51,950	97%
25	3,137	17.15	₱ 53,815			931	527	₱ 52,358	97%
TOTAL	85,437	14.35	₱ 1,226,197		₱ 385,000	12,788	7,899	₱ 820,510	67%
Total Project Cost/Cash Price with VAT			₱ 247,240	IRR	9.0%				
Cost per kWp with VAT			₱ 89,580	NPV	₱ 34,079				
				Disc. Rate	6%				

HOME ELECTRICITY SAVINGS: 2 SCENARIOS

SYSTEM PERFORMANCE AND FINANCIAL RETURNS	
Energy production of system (KWH)	85,437
DU Value of Solar Electricity	₱ 1,226,197
Less: O&M Expenses	₱ 12,788
Less: Inverter Replacement	₱ -
Less: Insurance Expenses	₱ 7,899
Gross Savings	₱ 1,205,510
Less: Total Contract Price	₱ 385,000
NET SAVINGS	₱ 820,510
% Net Savings (vs. DU rate)	67%
Levelized Cost of Electricity per kWH*	₱ 4.75
*Total Cost divided by Total KWH Yield	

Current rate = Php12/KWH
Payback period = 5.5 years

SYSTEM PERFORMANCE AND FINANCIAL RETURNS	
Energy production of system (KWH)	85,437
DU Value of Solar Electricity	₱ 1,634,929
Less: O&M Expenses	₱ 12,788
Less: Inverter Replacement	₱ -
Less: Insurance Expenses	₱ 7,899
Gross Savings	₱ 1,614,242
Less: Total Contract Price	₱ 385,000
NET SAVINGS	₱ 1,229,242
% Net Savings (vs. DU rate)	75%
Levelized Cost of Electricity per kWH*	₱ 4.75
*Total Cost divided by Total KWH Yield	

Current rate = Php16/KWH
Payback period = 4.2 years

Note: The Pambansang Pabahay para sa Pilipino under DHSUD has an interest subsidy where homebuyers only pay 1% interest! Can we do the same for home solar PV installations?

SAMPLE PROGRAM TO ENCOURAGE COMPANIES TO ASSIST EMPLOYEES OR MEMBERS OF ORGANIZATIONS





- Makes renewable energy accessible to employees.
- Example: Partner bank will finance the REAP for company employees under their Employee Loan Program
- Payment via salary deduction
- Can we encourage multi-purpose cooperatives to provide retail loans to their members using funds from GFIs like DBP or LBP?


THANK YOU!