



MURANG KURYENTE

Renewable Energy: Sources and Benefits



The intensifying effects of climate change underscores the urgent need to limit global warming to 1.5 degrees Celsius. But the world's continued reliance on fossil fuels, if not ceased, will push global warming past this climate threshold of survival.

The energy sector accounts for about 75% of the global greenhouse gas (GHG) emissions due to the use of dirty and expensive fossil fuels, such as coal, oil, and gas. Experts have already called for a widescale and accelerated transition to renewable energy to avert the worst of the climate crisis, as well as provide more access to cleaner and cheaper means to power households and industries.

For the Philippines, energy is likewise the highest contributing sector to the country's GHG emissions but has yet to fully unlock its massive potential in renewable energy. While the government recognizes the critical role of renewable energy in addressing climate change and achieving energy security as it set a target of increasing the share of renewables in the country's power generation mix to 35% by 2030 and 50% by 2040, more investments and actions from stakeholders are needed to enable this transformation.

In this *Murang Kuryente* series on renewable energy, we provide an overview of the country's renewable energy landscape and take stock of our progress thus far to advance its development.



WHAT IS RENEWABLE ENERGY?

Renewable energy (RE) comes from naturally replenished and rapidly regenerated resources—such as biomass, geothermal, solar, hydro, ocean, and wind; collectively called as the BIGSHOW—which can be converted into electricity. This means that energy harnessed from renewable resources is virtually limitless, compared to fossil fuels—such as coal, oil, and gas—which are finite resources that we mine from surfaces and underground.

Energy from renewable resources is cleaner and cheaper. RE produces little to no greenhouse gas (GHG) emissions and therefore crucial in limiting global warming and mitigating climate change. For the Philippines, which mostly imports fossil fuels for energy use, electricity generated from RE is cheaper because the resources are harnessed domestically.



WHERE CAN WE SOURCE RENEWABLE ENERGY?

Philippines possesses abundant indigenous RE resources, but needs many additional projects all over the country to further increase our capacity on renewable energy. Below is a breakdown of the installed and potential RE capacity of the country, as of December 2023.

TYPE	DESCRIPTION	CAPACITY*
Biomass	Biomass refers to biodegradable materials that come from the by-products and residues of agricultural and forest crops, organic waste, and aquatic biomass. The most common biomass resources in the country are rice hull, bagasse, coconut shell husk, and coconut coir. There are 37 registered off-grid and on-grid biomass power plants in the country, such as the Montalban Landfill Gas Recovery in Rizal, First Farmers Holding Co. in Negros Occidental (bagasse cogeneration plant), and Lamsan Power Corporation in Maguindanao (bagasse cogeneration plant). Additionally, there are 58 commercial and 18 own-use biomass power plant projects underway.	Installed Capacity: 581.799 MW Potential Capacity: 206.879 MW
Geo-thermal	Geothermal energy refers to the heat reserved and produced from the rocks and fluids at the center of the earth. The Philippines is among the countries rich in geothermal resources because of its location in the Pacific Ring of Fire. Seven off-grid and on-grid geothermal power plants are operating in the country, including Makban Geothermal Power Plant (GPP) in Laguna, Nasulo GPP in Negros Oriental, and Mindanao 3 Binary GPP in Cotabato. There are 39 commercial geothermal power plant projects.	Installed Capacity: 1,951.735 MW Potential Capacity: 1,063.200 MW

*Based on awarded projects under the Renewable Energy Act, Department of Energy.

Solar	Solar energy is generated by harnessing light from the sun through photovoltaic cells. Major solar farms in the Philippines are found in Cavite, Pampanga, Ilocos Norte, and Cagayan de Oro. The Philippines has 74 solar power plants (SPP), such as the YH Green Energy Inc. in Bataan, Soleq in Leyte, Kibawe SPP in Bukidnon, and Tumingad SPP in Romblon. Meanwhile, there are 434 commercial and 31 own-use solar power plant projects in the country.	Installed Capacity: 1,421.257 MW Potential Capacity: 28,913.784 MW
Hydro	Hydroelectric power is generated from the current of falling or running water resources. In the Philippines, hydropower plants are categorized into three, based on their power capacities: micro (1-100 kW), mini (101 kW - 10 MW), and large (more than 10 MW). There are 45 registered large, micro, and mini hydroelectric power plants. Examples are the Ambuklao Hydroelectric Power Plant (HEPP) in Benguet (dam type), Basak Mini HEPP in Cebu (run-of-river type), and New Bataan HEPP in Compostella Valley (run-of-river type). There are also 428 commercial and four (4) own-use hydroelectric power plant projects.	Installed Capacity: 1,187.908 MW Potential Capacity: 18,902.959 MW
Ocean	The sea can produce wave, tidal, and ocean thermal energy that can be converted into electricity. The Philippines, as an archipelago, has vast potential for ocean energy. The government has awarded nine (9) ocean energy projects in Zambales, Sorsogon, Northern Samar, and Surigao del Norte with a total potential capacity of 24 MW. The first tidal power generation plant in Southeast Asia was announced to be developed in Capul Island of Northern Samar by 2025.	Potential Capacity: 34 MW

Wind

Wind energy refers to the air in motion that can be captured and converted into electricity. The geographical location of the Philippines in the Asia-Pacific monsoon belt exhibits the potential and capacity of the country to harness wind energy sources.

There are seven (7) wind power plants in the country, such as the Bangui Wind Farm in Ilocos Norte (on-shore or on land), Pililla Wind Farm in Rizal (mountain range-installed wind turbine), and TRANS-ASIA Renewable Energy Corp. (TAREC) in Guimaras (on-shore).

Installed Capacity:
442.900 MW

Potential Capacity:
85,692.964 MW

WHAT ARE THE OPPORTUNITIES FROM RENEWABLE ENERGY?

Accelerating the development of renewable energy unlocks socioeconomic benefits for our country and people. These include:

- **Cheaper electricity.**

RE has the potential to lower generation charges in our monthly electricity bill since it incurs zero importation costs, compared to sourcing supply from fossil fuels which are heavily imported and therefore vulnerable to volatilities in the global market and foreign exchange, which are passed on as additional costs to consumers.

- **Cleaner air.**

As RE yields minimal to zero GHG emissions, it significantly contributes to improving air quality and promoting good health for our people and the environment.

- **More green jobs.**

RE has and will continue to provide employment opportunities for Filipinos as we accelerate RE operations in the country. According to DOE, an additional 845,208 jobs will be generated as we increase the share of RE in our country's power generation mix by 50% by 2040.

- **Safer planet.**

RE helps mitigate global warming and climate change by preventing the release of large additional amounts of greenhouse gases in the atmosphere. Accelerating RE is crucial in achieving the global climate goal of limiting global warming to 1.5 degrees Celsius, under the Paris Agreement.



WHAT MAKES RENEWABLE ENERGY PERFECT FOR THE JUST ENERGY TRANSITION?

With the price volatility, unreliability, and intermittence of coal, RE appears as flexible, cheap, and cost-efficient; therefore, key to achieving our climate and sustainable goals.

- **Renewable energy is more accessible.**

Fossil fuels dominate the Philippines' power generation mix.¹ In 2019, 81% of our coal consumption is imported and mostly came from Indonesia. However, the country shall realize its abundant and sustainable capacity to harness energy from RE resources.

RE is easily deployable to off-grid areas. RE does not require logistically complicated transmission networks to distribute power across the country, especially to remote areas not connected to the power grid. RE technologies, such as solar, have also powered communities after typhoons struck down transmission lines.

- **Renewable energy is more affordable.**

It is cheaper to generate power with RE. Generation costs from RE power plants bring down the average generation charge shown in our electricity bill. It has the capacity to reduce the WESM settlement price of electricity by 28% during peak hours even with less than a 3% share in the energy mix.² RE power plants also offer the lowest prices in the energy spot market where distribution utilities also buy energy from.

Variable RE technologies, such as solar and wind, are now among the cheapest to install and operate. A study reported that capital and fixed operating expenses of variable RE technologies are already currently cheaper than coal and are expected to go down further in 2030, compared to coal which is expected to maintain their price in the next decade.³

¹ Clean, Affordable and Secure Energy (CASE) for Southeast Asia, December 2021

² Independent Electricity Market Operator of the Philippines, 2019

³ CASE for Southeast Asia, December 2021

- **Renewable energy is more reliable.**

Coal power plants encounter frequent outages and are unavailable to supply power for 16-19% of the time. In 2021, the average coal power plant exceeded the limit on the maximum allowable duration of planned and unplanned outages set by the Energy Regulatory Commission (ERC).

Wind and solar operate on variable generation, but encounter less frequent outages and are only unavailable to supply power for 1.9% and 2.7% of the time, respectively. While the ERC has not set the limit on their outages, their average outage durations are significantly better than coal.⁴



⁴Independent Electricity Market Operator of the Philippines, 2019



