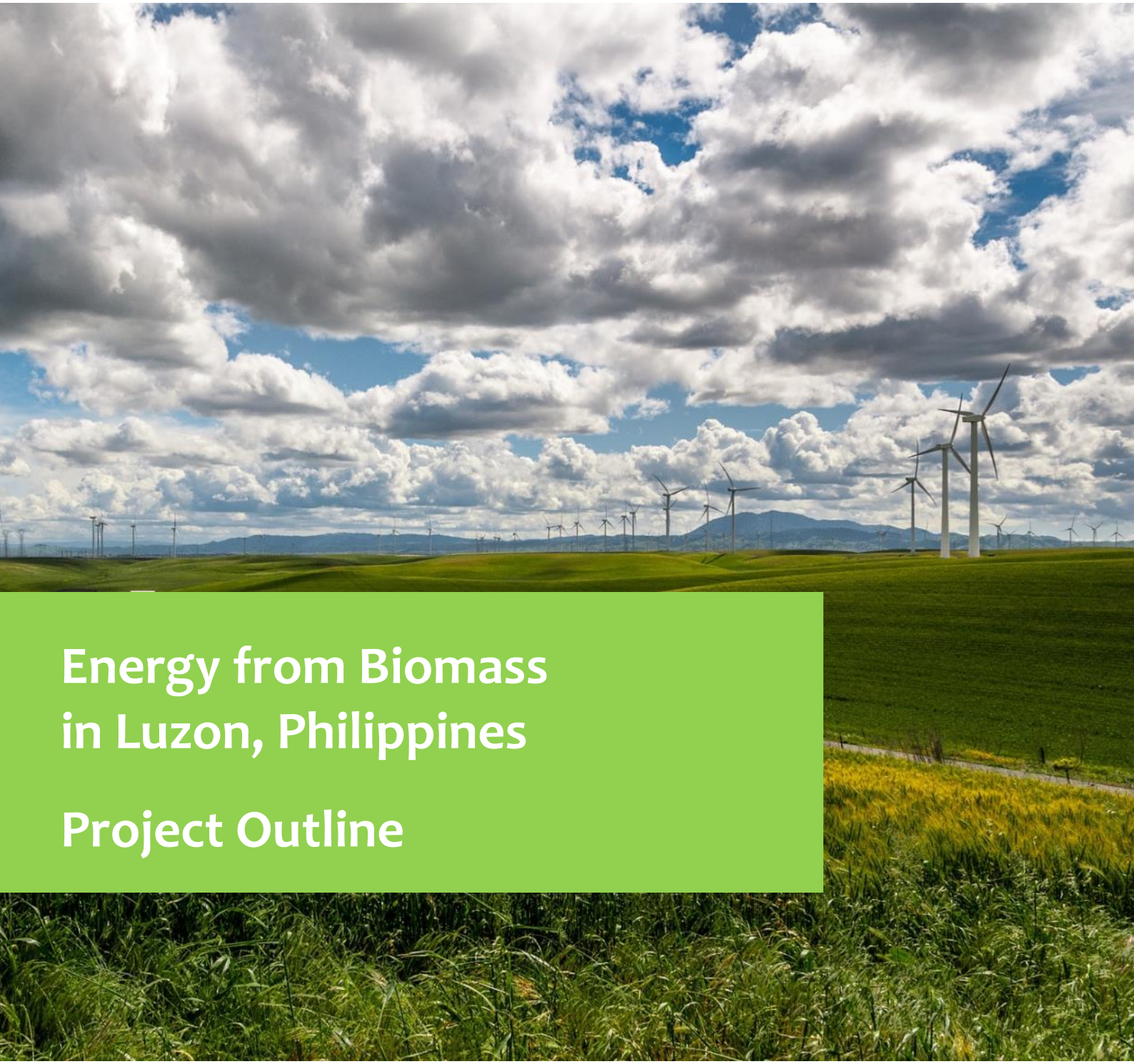
ECO-NATURE-PRODUCTS PLC



Energy from Biomass in Luzon, Philippines

Project Outline

SUSTAINABILITY REDEFINED.

In the Republic of the Philippines, ECO-NATURE-PRODUCTS PLC is developing a model project in the field of renewable energy. Unutilized biomass waste from agricultural operations is collected and converted to electricity using gasification technology. The electricity produced is fed into the local energy grid on site. A state-guaranteed feed-in tariff ensures long-term economic viability.

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The project

On the main island of the Philippines, Luzon, ENP is planning a sustainable energy project.

The principle is rather simple: Biomass materials such as coconut shells, rice husk, corn cobs, bamboo, agricultural and forestry waste are collected centrally. The materials get dried and pressed into uniform shape and are ultimately processed into electricity in a power plant unit.

The electricity generated in this way is fed into the public grid - a state-regulated, fixed feed-in-tariff guarantees a predictable and stable economic outlook. A by-product is charcoal, which can be sold locally.

This model can be scaled in accordance with available biomass and electricity demand within an area, as well as on available investment budgets. At the beginning, however, "proof of concept" is focusing on one selected location.

The ENP-Approach

Our concept combines three basic principles and can therefore be applied at numerous locations.

Ecological:

Consistent use of environmentally friendly, renewable biomass and the cleanest possible low-emission power plant technology.

Decentralized:

Electricity should be produced where it is needed to minimize transport losses and interruptions caused by inadequate infrastructure.

Independent:

Short supply routes, easy-to-maintain technology, and - in a later step - production of own biomass to increase security of supply.

Economic location Philippines

Despite having received much criticism in Western media for the countries fight against illegal drugs and corruption, the island archipelago of the Philippines with its strident President Rodrigo Duterte continues to offer attractive business opportunities.

Climate and weather

The climate of the Philippines can be described as mostly tropical, in higher altitudes of the mountains as subtropical. The average annual temperature in the Philippines is 26.5 °C, with only slight seasonal temperature fluctuations.

The amount of precipitation varies quite drastically in the course of a year, which is why a general distinction is made between the dry season and the rainy season. Occasional typhoons affect the entire country, but with varying degrees of intensity and at different times of the year.

Security and political stability

The country is a US-style presidential democracy with a bicameral system. The president enjoys extensive powers, but can only be elected for one single term of 6 years. The judiciary is largely independent. Although conflicts with the Muslim minority on the South Island of Mindanao continue to smolder; security & stability, especially on the main island of Luzon, are generally provided.

The magazine *"The Economist"* lists Vietnam and the Philippines as the healthiest economies in the region. Taking a closer look at the Philippines, it quickly becomes clear why the country has created one of the most dynamic economies within Southeast Asia in recent years.

There are many advantageous economic conditions: Stable and relatively low inflation rates, a comparatively low level of debts, a favorable cost structure and a young, English-speaking, and increasingly consume-oriented population. All these factors contribute to a steady economic growth of 6.54% on average over the last 5 years.

The gross domestic product at the end of 2018 was USD 330.9 billion. Compared to 2007 with the GDP rating at USD 149.36 billion, it has thus more than doubled over the past ten years. This positive development contributes to the fact that

The Philippines

Population:	106.512.000 (2018)
Population growth rate:	1,4 % (2018)
Currency:	Philippine Peso (PHP)
GDP:	330,9 Billion USD (2018)
Economic growth:	6,24% (2018)
	5,91% (2019)

the Philippines are now considered part of the same league as the emerging East and Southeast Asian tiger economies such as Taiwan, South Korea, Singapore, and Hong Kong.

This development is mainly due to the expansion of investment in construction and infrastructure, production increases in manufacturing, high consumer spending and the overall strong service sector. In 2017, 25.4 % of the total labor force was employed in agriculture, 18.3 % in industry and 56.3 % in services. The total number of employees was estimated at 42.8 million in 2017, whereas 39.9% of whom are women.

The unemployment rate in 2017 was 5.7%, but many jobs remain informal and underemployment is widespread.

For the foreseeable future, the strongest drivers of further economic growth will continue to be the expansion of the service sector (which includes the important tourism sector) and the local industry. The government has recognized that this growth must be supported by a steady expansion of the infrastructure, especially the expansion of the electricity supply.

Corruption and nepotism remain a challenge for economic development and the attractiveness of the Philippines as a business location.

According to Transparency International's Corruption Perceptions Index, the Philippines ranked 111th out of 180 countries in 2017, with 34 out of a maximum of 100 points.

Energy market of the Philippines

In the course of the further industrialization and urbanization of the country as well as the continuously ongoing growth of the population in general, the demand for energy continues to rise steadily.

The growth of the energy sector is enormous: in the period from 2003 to 2016 alone, energy production grew by 59.4% (source: AHK-Philippines).

The fact that this development will continue is reflected in the corresponding growth forecast for the energy market up to 2040: For the Philippines as a whole, the expected additional demand for production capacity amounts to a whopping 43,765 MW.

Luzon accounts for the largest share: here alone, the estimated additional demand for that time-period is estimated at 24,385 MW (Source: Electric Power Industry Management Bureau, Department of Energy).

This growth is mainly attributable to the expansion of investments in construction and infrastructure, production increases in the manufacturing industry, further rising consumer spending, and the strong service sector.

It is unlikely that capacity expansion at the current pace will be able to keep up with the rising demand. For years, economic growth has exceeded the expansion of the country's supply capacities, and since 2008 at the latest, this supply gap has become increasingly acute.

A solution of the energy question is therefore a fundamental prerequisite for the country's further economic development.

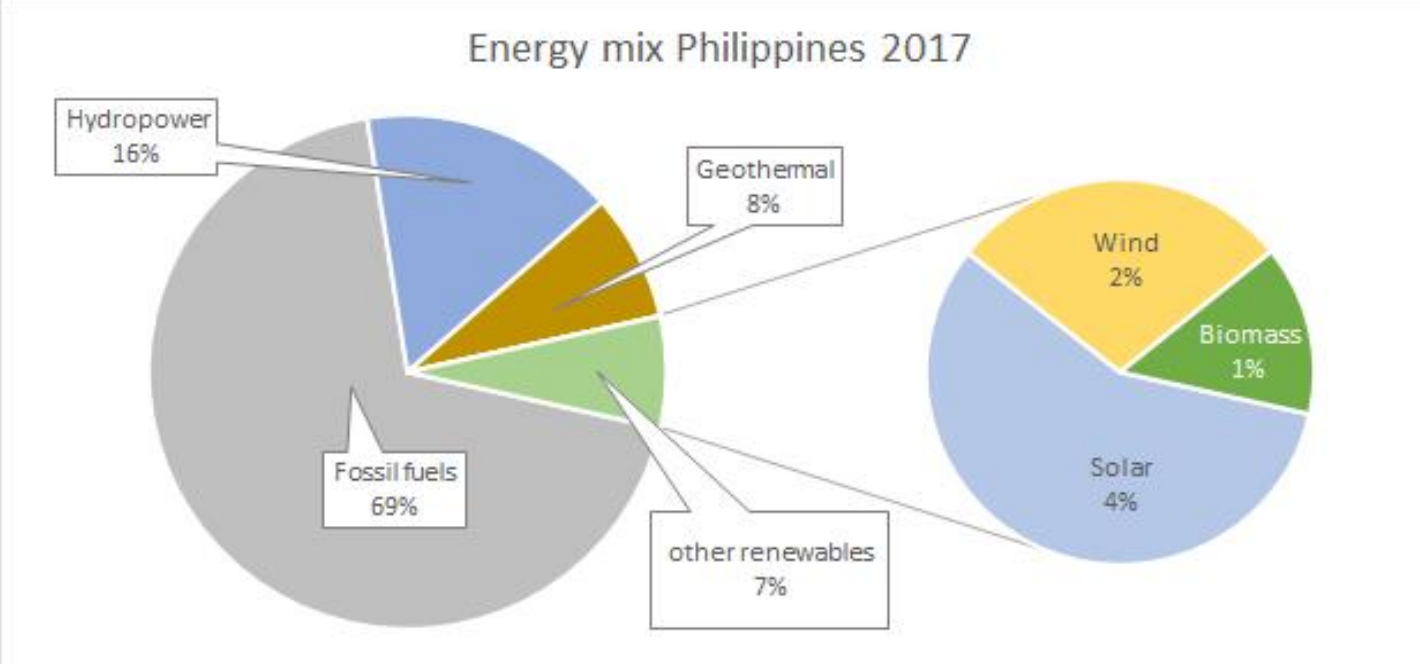
The power cuts known as "blackouts" cause immense economic damage every year and have the potential to seriously impede the country's further economic development.

Energy mix dominated by fossil fuels

So far, the country relies on an energy mix dominated by fossil fuels. More than three quarters of the country's electricity needs are met by burning coal, gas and oil. The largest shares of the remaining quarter are accounted for by geothermal and hydroelectric power. Solar, wind and biomass combined contribute merely 3 % to the total energy mix (source: Department of Energy).

In short and medium term, the country´s energy policy will continue to rely on coal-fired power plants as the backbone for covering energy requirements. However, President Duterte signed the Paris agreement on climate change, through which the Philippines committed itself to reducing greenhouse gas emissions. These are to be reduced by 70% by 2030. This target will hardly be achievable without greater use of renewable energies. Great market potential is becoming apparent for the private sector, including international corporations.

The price of electricity in the Philippines fluctuates strongly. This is partly due to the high dependence on fossil fuels such as coal, two-thirds of which has to be imported and is subject to price fluctuations on world markets. According to the largest electricity distribution company, Meralco ("Manila Electric Company"), the Philippines has the highest electricity price in the region at USD 0.19 per kilowatt hour. In Indonesia, the price is 0.09 USD per kilowatt hour, in Thailand it is 0.10 USD per kilowatt hour. Such a discrepancy can influence investment decisions.



State measures to support the energy sector

The diverse challenges in the energy sector cannot be solved within a few years, but require long-term commitment - combined with immense capital requirements. For this reason, the government is increasingly taking measures to counteract the investment backlog. In the course of this, foreign investors are also being offered favorable conditions in order to get active in the Philippine energy market.

Potentials for renewable energies

To facilitate private sector investment, the energy sector has been systematically privatized and liberalized since 2001 through the "Electric Power Industry Reform Act" (EPIRA). Already today, 60% of energy production capacity is in private hands.

The government has also recognized that renewable energies are playing an increasingly important role and is systematically promoting the expansion of this sector. The foundations for this were laid down in the "National Renewable Energy Program" (NREP) and are flanked at a higher level by the Duterte government's 10-point plan and the NEDA Development Plan 2017 - 2022.

The Philippine Department of Energy (DoE) puts the expected annual growth rate of renewable energy sources at 1.6%. The share of renewable energies in the energy mix of the Philippines would thus rise to over 35% by 2030.

The "Renewable Energy Act of 2008" and the "Executive Order 30" specifically promote the expansion of renewable energies in the Philippines. Bureaucratic and legal hurdles for energy projects have been removed, and investors are offered a whole range of additional incentives, such as tax benefits, tax and duty-free technology imports, simplified hiring of foreign specialists and accelerated application procedures for the necessary permits and operating licenses.

The "Renewable Portfolio Standard" (RPS) allocates a binding minimum quota to renewable energies in the energy mix, and the "Green Energy Option Program" is designed to ensure that consumers can actively choose at any time whether they want to purchase electricity from renewable sources.

Planning security for energy projects is provided by a government-fixed feed-in tariff, which varies depending on the energy source, but generally creates a stable, predictable economic environment for investors.

For biomass projects such as that of ECO-NATURE-PRODUCTS PLC, the feed-in tariff amounts to USD 0.12 per kilowatt hour. Preparations to contractually secure this rate are already ongoing. For this purpose, ECO-NATURE-PRODUCTS PLC is concluding a public-private partnership - a cooperation agreement - with the government.

Valuable biomass in the Philippines

We refer to the energy definition of biomass, whereas biomass of various sources can be used to generate electricity.

Generally speaking, biomass from three main sources can be considered for a sustainable energy project:

1. Fruit, vegetable and plant residues and wastes, mainly from agriculture, forestry, and bamboo industries
2. Animal wastes, excrements
3. Biological waste of other kinds, e.g. household waste

The Philippines have large biomass resources, mainly due to the natural climatic conditions and the extensive agriculture throughout the country. 47% of the Philippine land mass (30 million hectares) is used for agriculture. The area in total accounts to around 13 million hectares.

The ENP energy project collects and uses mainly the following types of biomass:

- Wood and bamboo wastes from forestry and bamboo industry
- Coconut shells and overaged coconut palm trees from the coconut industry
- rice husks remaining after drying of rice
- Bagasse from sugarcane processing, corn cobs

The EC-ASEAN COGEN program estimates the volume of available biomass from the rice, coconut, palm oil, sugarcane and timber industries alone in the Philippines at 16 million tons - per year. Biological waste and bamboo, for example, are not even considered here.

A large part of this existing and continuously accumulating biomass is not or only marginally economically exploited. Solely as fuel for cooking, biomass is often used in the rural provinces.

One of the biggest advantages of biomass is its low cost. In the Philippines - still largely an agricultural country - biomass resources are a cheap raw material for electricity generation. In addition, electricity can be produced from biomass at much lower costs, since required investment volumes are significantly smaller compared to geothermal or hydropower.

Location analysis Luzon

In general, electricity production from biomass can be considered wherever the following location factors are given:

- Long-term stable economic and legal conditions
- Long-term availability of sufficient biomass at economically favorable, short distance to site
- Sufficient energy demand in relative proximity to the project, steady growth forecasted
- Short proximity to infrastructure where generated electricity can be fed into the public grid ("on-grid")
- Alternatively: Production directly at the end-consumer with increased electricity consumption, e.g. manufacturing industry ("off-grid")

A number of factors speak in favor of central and northern Luzon as primary locations:

- Permanent availability of large quantities of different biomass, especially from rice, abaca, corn, and banana cultivation as well as the timber and bamboo industry
- Largest interconnected electricity market in the Philippines
- Largest growth in total electricity demand, both retrospectively and expected
- Best infrastructure conditions overall, compared with the southern provinces
- Higher economic and political stability compared to the southern provinces
- Relative proximity to the Metro Manila conurbation and other economic centers

Roadmap to success

ECO-NATURE-PRODUCTS PLC leaves nothing to chance, from the idea to feasibility study, project planning to the first day of operations. The further steps are as follows:

- Feasibility studies at selected locations within Luzon
- Preparation of long-term supply contracts with biomass suppliers
- Public-private partnership with the Philippine government
- Contractual, long-term assurance of the feed-in tariff (feed-in tariff)
- Fundraising for final preparation and implementation of the project
- Optional: Co-financing by Philippine bank if project size is appropriate

Planned project start with secured financing: **Q1 2022**

Note due to the current situation with COVID-19:

Due to the restrictions imposed by the global COVID-19 pandemic, delays may occur. ENP continuously reviews the overall situation, taking into account the health advice of local and international health authorities such as WHO, etc.

SWOT-Analysis

Strengths:

- Continuously growing economy and increasing consumption in the country
- Strong location within the boom region of Southeast Asia
- English speaking young population, relatively well educated
- Steady rise of demand for electricity
- Institutional support for investments in the energy sector
- Attractive framework conditions such as tax breaks
- Environment—friendly, sustainable concept
- Can be set up and operated at many locations

Weaknesses:

- Comparatively costly and inefficient authorities
- Partially inadequate infrastructure, resulting in high transport costs
- Time-consuming confidence building with partners necessary
- Corruption and nepotism in public administration and the private sector are not uncommon
- Comparatively little attention is paid to energy from biomass
- Deficits in payment morale
- Partially unreliable mentality, lack of discipline and punctuality

Opportunities:

- Successful proof of concept enables further projects at a variety of locations, both on-grid and off-grid
- In future, own biomass production through bamboo farming will also be possible
- Improving security of electricity supply gives new impetus to the country's economy
- Step towards more environmentally friendly energy supply stimulates public and media interest
- Extension of the BOI tax incentives from 5 to up to 8 years
- Co-financing through institutional support and environmental funds possible

Threats:

- Increasing competition when local companies discover the market niche
- Impairments due to poor infrastructure (road and energy network)
- Natural disasters such as typhoons, earthquakes, volcanism
- Long delivery routes and waiting times for obtaining spare parts
- Preference for large projects by energy suppliers and administration
- Long-term rising costs of biomass procurement
- Loss of raw materials due to insufficient protection against environmental influences

SWOT = Strengths, Weaknesses, Opportunities, Threats

Contact

Our partners:

For further information on the current status of the project and detailed investment conditions, please contact us:

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