Hamparan Project

Region	**Asia and the Pacific**
Award Scheme	**Dubai International Award**
Themes	**Climate Change** **Energy** **Environmental Resilience** **Water & Sanitation**
Sustainable Development Goals	**Goal 3 - Ensure healthy lives and promote well-being for all at all ages** **Goal 6 - Ensure availability and sustainable management of water and sanitation for all** **Goal 7 - Ensure access to affordable, reliable, sustainable and modern energy for all** **Goal 13 - Take urgent action to combat climate change and its impacts**
New Urban Agenda Commitments	**Environmentally Sustainable and Resilient Urban Development**

Summary

Gree Energy’s Hamparan Biogas project leverages renewable to reduce dependency on fossil fuels by treating industrial wastewater from a cassava starch factory. An anaerobic lagoon digester captures methane emissions to produce 3MW of clean electricity, which is then distributed by the national utility to 19 surrounding villages.

Background and Objective

In emerging countries, inadequate treatment of food industry wastewater is responsible for massive methane emissions and water pollution. In Indonesia alone, the agriculture and food industries generate water pollution equivalent to a population of 320 million. Methane emission contributes to 30 percent of global warming since pre-industrial times. This gas is a potent greenhouse gas and air pollutant, responsible for over 1 million pollution-related deaths annually. Tackling methane emissions is a critical and immediate way to limit global warming to 1.5° Celsius.

In Indonesia, the challenge is immense: over 90% of food processors still lack modern wastewater treatment and methane reduction systems. This shortfall leads to massive water pollution and generates greenhouse gas emissions comparable to those from 10 million cars each year.

Hamparan Bumi Mas Abadi is a large cassava starch factory, an essential ingredient in Indonesian cuisine. The production of cassava flour, however, generates volumes of polluted water, the equivalent of wastewater produced by a population of 280,000 daily. This wastewater is a significant source of methane emission, a hazardous gas and climate super-pollutant.

The Hamparan Biogas project not only helps tackle greenhouse gas emissions, but also creates numerous job opportunities, improves public health, and provides clean water and sustainable energy to underserved rural communities. The transformative impact of this project aligns with the UN Sustainable Development Goals (SDGs).

Actions and Implementation

At Gree Energy, biogas solutions treat industrial wastewater to remove pollutants and capture the methane produced. These facilities can generate more than 30 TWh per year of renewable energy, enough to provide reliable power and fuel solutions, year-round to over than 10 million people in underserved rural communities. To extract the tapioca flour - a key ingredient in Indonesian cuisine - from the cassava roots, the Hamparan cassava starch factory generates a water pollution of 300,000 population-equivalent which in turn, emits massive fugitive methane emissions.

Installing the anaerobic lagoon digester over the wastewater captures the methane emissions and converts it to produce electricity. Hamparan avoided 2,059 tons of CH4 in 2023. The expected verified emissions reduction is 30,327 tCO2 eq/year.

Outcomes and Impacts

The Hamparan Biogas project directly impacts four SDGs, showcasing the breadth and depth of its positive change:

- **Climate Action (SDG 13):** the project avoids a staggering 38,230 tonnes of CO2e emissions every year, making a significant contribution towards mitigating climate change and promoting a more sustainable future.
- **Clean Energy (SDG 7):** it generates an impressive 11,539,460 kWh of clean electricity annually, ensuring that rural communities have access to affordable, reliable, and sustainable energy sources.
- **Water and Sanitation (SDG 6):** Through the Hamparan Biogas project, 251,535. population-equivalent wastewater is treated, promoting clean water availability and sanitation practices in rural areas.
- **Good Health and Well-being (SDG 3):** Hamparan's desulphurization removes on average 99.3% of the H2S contained in the biogas before the biogas is combusted into the gas engines and avoids 4,162 tons of H2S emissions... Hamparan avoided 2,059 tons of CH4 in 2023.

Sustainability and Scalability

The Hamparan Project addresses the critical issue of wastewater management, which further contributes to attitude changes towards sustainable lifestyles. Gree Energy actively promotes the use of renewable energy sources to power vehicles and transportation systems associated with the Hamparan Biogas project. By including renewable energy in its transportation infrastructure, the reliance on fossil fuels is reduced and greenhouse gas emissions are minimized, further advancing the goal of a net-zero future.

The Hamparan project proof of concept is a testament to the potential scale to contribute towards decarbonizing food industries for emerging countries. More than 1,250 food processors in Indonesia have yet to be equipped with adequate wastewater treatment solutions. This untapped potential represents an opportunity to avoid 50 million tons of CO2eq emissions per annum and provide 40 TWh of clean energy. In parallel, by 2030, Indonesia aims to increase the share of renewable electricity from 13,5% in 2021 to 34% and reduce carbon emissions by almost 32% with its own efforts. Whilst biogas is a proven technology to meet Indonesia’s renewable energy mix, the opportunities to unlock its full potential are not yet fully tapped.

Gender and Social Inclusivity

The impact of the Hamparan Project's efforts goes beyond immediate environmental benefits. It serves as a practical demonstration of sustainable practices, inspiring food processors and local communities to adopt similar wastewater management systems. Through education and awareness campaigns, the project informs people about the consequences of improper wastewater disposal, encourages them to take responsibility for their own wastewater management, and preservation of water resources.

Furthermore, by involving local communities in the implementation and maintenance of the wastewater management systems, the project promotes a sense of ownership and empowerment. This community involvement reinforces the importance of sustainable practices and cultivates a cultural shift towards responsible wastewater management.

To ensure the integration of climate change measures into national and regional policies, strategies, and planning, stakeholders are closely involved at various levels. Partnerships with government institutions, local communities, and industry players allow to collaborate and co-create solutions that have a lasting positive impact.

Innovative Initiative

The biogas facility not only produces clean electricity but also harnesses heat energy in an efficient manner. by maximizing energy efficiency, buildings become more sustainable, contributing to a greener future. With the installation of anaerobic wastewater treatment technology, over 97% of the organic pollution contained in the wastewater had been removed.

In 2023, Gree energy initiated the feasibility study for recycling the sludge, a byproduct of the wastewater treatment and methane capture plant into natural fertilizer. The fertilizers have been tested revealing high nutrient and stable carbon content. When used on farms, the fertilizers support carbon sequestration.

Regenerative agriculture supports carbon sequestration and makes the agriculture and food supply chain more sustainable. Help local farmers exit poverty mines and promote a circular economy at local scale. Gree Energy partners with Yayasan FIELD, a leading Indonesian non-profit organization that works with farming communities to create projects for a sustainable local life. Gree Energy granted a US$ 100,000 grant to the Yayasan FIELD foundation in 2023.

Resources devoted to delivery

The project team is working with engineers, financiers, and sustainability experts with more than 50 years of collective experiences who share passions to leave a lasting impact on the people and the planet. The project emphasizes efficient wastewater management to preserve water resources, prevent pollution, and promote sustainable living. It incorporates innovative treatment methods, such as constructed wetlands and biofilters, to treat and recycle wastewater effectively.

They prioritize technological excellence by combining European technology design with local production. This results in cost-competitive and high-quality Biogas solutions that also deliver on performance. Offering two distinct Biogas bioreactor technologies; Ground-Integrated Bioreactors (GIBR) and Tank technology.

The Hamparan project was honored with prestigious awards and financial support that recognize its impactful contributions towards global sustainability goals.

Conclusion

The Hamparan innovative project leverages the power of biogas to generate clean energy. However, the project's impact goes beyond clean energy. It improves water quality, sanitation, and public health while creating jobs. By promoting renewable energy, sustainability, and community involvement, the Hamparan Biogas project offers a scalable and sustainable model for the food processor industry, fostering a circular economy and supporting regenerative agriculture practices. With an experienced team and cutting-edge technology, the project sets a high bar for environmental responsibility in the food sector. The project is one of the largest Biogas plants in South Sumatera, Indonesia.