Sustainable Biogas Production And Use in Indonesia

DIBICOO Web Seminar #5
“Sustainable Biogas Production and Use”
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THE REALIZATION AND TARGET OF NATIONAL ENERGY MIX

- 6.2% from NRE Power Plant
- 2.94% from Biofuels
- 0.01% from Biogas

REALIZATION 2019:
- 20.12%
- 37.15%

TARGET 2025:
- 23%
- 30%

13% – 15% NRE Power Plant
2% – 5% Bioenergy Power Plant
2% - 3% Biofuels
1% – 3% Pellet (Biomass/Waste)
BIOGAS DEVELOPMENT TARGET
Based on General Plan of National Energy

Biogas Development Program
- Biogas Power Plant
- Domestic Biogas
- Communal Biogas

Bio – CNG
- Power Plant
- LPG Substitution
- City Gas Distribution
- Transportation

(Million m³)

2019: 95.6
2020: 131.9
2021: 171.5
2022: 222.9
2023: 289.8
2024: 376.8
2025: 489.8

27.9 (October 2020), excl Biogas Power Plant
INSTALLED CAPACITY OF BIOENERGY POWER PLANT– SMT I 2020

BIOENERGY POWER PLANT
1896.5 MW

ON GRID
210.32 MW

OFF GRID
1686.18 MW

EXCESS POWER
151.07 MW

PALM WASTE
133.58 MW

PAPER INDUSTRY
1227.19 MW

BAGASSE
201.94 MW

POME
69.36 MW

OTHERS
54.1 MW

PALM WASTE
114.01 MW

POME
37.45 MW

OTHERS
58.86 MW

IPP
59.25 MW

BIOGAS PP : 112 MW

MSW PP : 16.5 MW

CPO – BASED PP : 5 MW

BIOMASS PP : 1763 MW
PT Austindo Nusantara Jaya. 
The first On-Grid Biogas Power Plant

POME Biogas Power Plant, PTPN V, Kebun Tandun, Riau. 
Biogas: 850 m³/hour (60% CH₄). Capacity 1 MW
DOMESTIC AND COMMUNAL BIOGAS

Domestic Biogas

• Up to October 2020, there are 47,754-unit of Domestic Biogas which produce 75,468.7 m³ gas/day or 27,89 million m³/year.

• The funding comes from Government Budget, Donor, Special Allocation Fund, other Ministries/institutional and private sectors.

Communal Biogas

• From 2015 – 2019, MEMR has built 38 unit Communal Biogas in Islamic Boarding Schools in 10 provinces (NAD, West Sumatra, Riau, Lampung, Banten, West Java, Central Java, East Java, East Kalimantan and Central Sulawesi).

• Communal biogas processes human waste into biogas as a substitute for LPG and lighting purposes.

Biogas Utilization
DISTRIBUTION OF DOMESTIC BIOGAS *)

**31 PROVINCES**

1. Aceh 303 unit
2. North Sumatera 166 unit
3. Riau 6 unit
4. Riau Island 2 unit
5. West Sumatera 291 unit
6. Jambi 736 unit
7. Bengkulu 7 unit
8. South Sumatera 108 unit
9. Bangka Belitung 46 unit
10. Lampung 1888 unit
11. Banten 40 unit
12. DKI Jakarta 3 unit
13. West Java 2091 unit
14. Central Java 2277 unit
15. DI Yogyakarta 3014 unit
16. East Java 9311 unit
17. Bali 1800 unit
18. NTB 7642 unit
19. NTT 1827 unit
20. West Kalimantan 5 unit
21. Central Kalimantan 248 unit
22. South Kalimantan 347 unit
23. East Kalimantan 604 unit
24. West Sulawesi 31 unit
25. South Sulawesi 4064 unit
26. Central Sulawesi 697 unit
27. SE Sulawesi 551 unit
28. Gorontalo 1195 unit
29. North Sulawesi 36 unit
30. North Maluku 2 unit
31. Papua 7 unit

**Total:** 47,754 unit

- MEMR : 3,361 unit
- Hivos : 14,074 unit
- Special Allocation Fund (DAK) : 13,610 unit
- Other Ministries / Local Govt : 8,088 unit
- SWEN and other private sectors : 8,621 unit

*) Status: 19 Oktober 2020.
Bio-CNG Project

• Bio-CNG, a methane rich compressed fuel, is also known as compressed biomethane. Bio-CNG is produced from pure biogas containing more than 95% methane at a pressure of 20–25 MPa.

• Bio-CNG is similar to the regular CNG in terms of its fuel properties, economy, engine performance, and emissions. Bio-CNG has high octane number which results in the high thermal efficiency and can be utilized for transportation, power generation, industrial and commercial purposes.

MEMR, GGGI, Local Government of Central and Regional Development Planning Agencies of Central and East Kalimantan conducted a Bio-CNG Market Assessment study.

Bio-CNG can be utilized if diesel machinery is converted into dual fuel, such as in electrical generator sets, trucks, or buses. Additionally, BioCNG can be used in the industries around the producers such as for cutting plant or direct combustion for drying in the plywood industry. BioCNG can also be sent through CNG pipes, supplying the gas needed by households, hotels and restaurants, as well as industries.

GIZ through the ExploRE Project, PT SMI, Kaltimex Energy and PTPN IV are preparing the Bio-CNG Pilot Project using corn waste and rice husks in Lombok.

PT Dharma Satya Nusantara Tbk (DSN Group”) commissioned its first Bio-CNG Plant in Muara Wahau, East Kalimantan. The Bio-CNG plant will generate electricity with a capacity of 1.2 MW and produce biomethane gas with a capacity of 280- meter3 / hour.

The remaining excess biogas will be compressed into Biomethane Compressed Natural Gas and then stored and contained in gas cylinders which then will be distributed by Bio-CNG-fueled trucks to emplacements (employee housing) and other Palm Oil Mills (POM) in Muara Wahau to replace the usage of conventional solar diesel.
For industrial scale / economic scale project requires a substantial initial capital.

An integrated study is needed for commercial scale bio-CNG development, which cover market assessment, sustainability of feedstock, regulatory framework including incentives.

Grant/subsidy scheme is considered counterproductive for the development of semi-commercial scale biogas programs carried out by NGOs / non-governmental organizations.

Lack of funding and incentives. The biogas installation costs are still considered high, especially for rural communities.

Lack of coordination among Ministries / Agencies & synergy between programs. Beside, most programs have not been optimally integrated with other productive activities.

The use of biogas installations is considered less practical when compared to LPG.
Strategic Plan

Development of Biogas as a Sustainable Energy Source

1. To improve investment climate for biogas development, including to revise regulations related to the electricity purchase from biogas power plant.

2. To coordinate and synchronize biogas program with related stakeholders (Ministries/Agency, Local Government, Donors and private sectors).

3. Develop biogas program which integrated with other productive activities to create new business opportunities.

4. Encourage public-private cooperation to invest in biogas development.


6. Conduct a joint study with related stakeholders regarding the regulatory framework and funding mechanism to support the development of sustainable biogas.

7. Conduct integrated studies for industrial scale biogas (Bio-CNG), including identification of feedstocks, supply chain mechanisms, regulations and incentives, infrastructure improvement and synchronization with related development programs (city gas distribution, grid network for biogas power plant, substitution of LPG and biogas for transportation sector).
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