

Executive Summary

A cogeneration system (CGS) is one of the energy efficiency technologies in the industry and commercial sectors. It shows high energy efficiency, defined as energy output (electricity and heat) divided by fuel input, especially natural gas, which usually achieves more than 70%. But CGS cannot be applied if there is no demand for electricity and heat in factories and commercial buildings. This is one reason CGS is not popular worldwide.

This project shows which industrial subsectors have applied CGS so far. In the case of Japan, the food, chemical, and machinery sub-industries are the top three in CGS installation. On the other hand, in Malaysia, chemical, palm oil/ oleochemical, and sugar processing are the three major sub-industries in CGS installation. Thus, the food and chemical sub-industries of Indonesia's industry sector might have considerable CGS potential. In addition, CGS can be installed in the machinery, steel and metal, textiles, ceramic, and cement subsectors.

CGS installation depends on economic incentive activities because CGS saves energy and reduces factories' energy costs. Thus, CGS installation cases in Malaysia indicate a short payback period, mainly less than 5 years. Decisions on CGS installation in Japan are based on three factors: (i) economic factors (saving energy consumption and cost), (ii) climate change issues (reduction of carbon dioxide [CO₂] emissions), and (iii) business continuity plan (BCP). If factories do not have a CGS, energy like electricity and heating fuel is supplied through public infrastructures, such as transmission lines and roads. The East Japan Great Earthquake and strong typhoons damaged public infrastructure. As a result, factories had to stop producing goods due to supply disruption of electricity and heating fuel. Thus, factories installed a CGS or self-energy supply system to continue production. This is the concept of the BCP.

CGS installation needs experts familiar with engineering issues and basic economics. They are called energy managers or energy service companies (ESCOs) who can estimate energy savings brought by CGS installation. In addition to energy saving calculation, they can propose the appropriate size of gas turbine, gas engine, and heat exchanger. Japan and Malaysia have many energy managers and ESCOs. This is why both countries have installed more CGS units than Indonesia. In this regard, growing energy managers and ESCOs are indispensable for Indonesia to increase CGS installation, urging institutions to develop energy managers.

CGS installation depends on an economic incentive. But Japan and Malaysia prepared a financial support system for CGS – a subsidy for CGS costs in Japan and a tax incentive in Malaysia. Thus, a financial support system for CGS installation could be appropriate in Indonesia's industry.