# Chapter 4

# Conclusions and Recommendations

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# Chapter 4

# Conclusion and Recommendations

## 4.1. Conclusions

Indonesia has a huge potential for energy conservation that can contribute significantly to meeting its nationally determined contribution target in 2030 and net-zero emission target in 2060. In the industrial sector alone, the energy saving potential is as high as 26%, or around 83 million barrels oil equivalent (BOE). In the power plant, the energy-saving potential may reach about 14 million BOE. As stipulated in Government Regulation No 79 of 2014 on the National Energy Policy, energy elasticity should be below 1 in 2025, and energy intensity should be reduced by 1% annually to 2025.

CGS is an available option to achieve energy conservation targets. CGS produces multiple forms of energy from a single form of energy simultaneously. CGS or CHP uses natural gas, oil, coal, geothermal, or other fuels to generate electricity with an engine or turbine and simultaneously recovers the waste heat generated during the process. CGS has several advantages. First, compared to the conventional electricity supply from the power grid and fuel consumption, using waste heat, CGS can save energy by around 22%. Secondly, natural gas–fueled CGS can reduce $CO_2$ emissions to 34% more than conventional power and fuel supply systems. Thirdly, CGS can conserve resources with less energy to produce the same value-added output.

CGS has been used in some industries in Indonesia. With all the advantages CGS can offer, its implementation needs to be enhanced. This effort can support Indonesia's NDC and net-zero emission targets. However, some challenges face CGS implementation, among others: (i) considerable project cost; (ii) subsidised fuel, gas, and electricity prices affecting the potentially optimum energy conservation efforts; (iii) no or limited market to sell excess power; (iv) lack of awareness of the industrial sector to implement CGS; and (v) limited access to adequate financial sources.

The introduction of CGS in Japan (33 cases) and Malaysia (24 cases) is a good reference for Indonesia to increase CGS installation in its industry sector to achieve the national energy efficiency and conservation target. The CGS cases of Japan and Malaysia suggest to Indonesia the following points: (i) potential industrial subsectors to install CGS, (ii) appropriate size of gas turbine or gas engine and heat exchanger, (iii) expected payback period, (iv) energy saving and $CO_2$ emissions reductions potential.

## 4.2. Recommendations

The role of gas in Indonesia's energy mix is still crucial, accounting for 22% in 2025 and 24% in 2050. With increased gas use, especially in power plants and the industrial sector, CGS implementation will be more significant given its advantages in increasing energy efficiency and reducing GHG emissions. The monitoring and evaluation of the target a 1% reduction in energy intensity in energy-producing and -consuming companies must be conducted in detail to gain

recommendations on better policies and support that can be provided.

The availability of data for all potential users of cogeneration needs to be improved, especially for medium and small industries and other potential consumers like commercial buildings, so that they can be promoted to install cogeneration facilities.

Fiscal and nonfiscal Incentives are much needed for industries to accelerate CGS implementation as they can help reduce project costs. In addition to the incentives provided for import duty exemption for materials and machinery supporting renewable energy and energy conservation and other tax allowances, support for investment loans with low interest and longer tenors from banking or other funding sources is also needed. These incentives will compensate for GHG emission reduction contributed by CGS implementation. Nonfiscal incentives are also very much needed, including streamlined licensing and other related processes that may involve local governments. A clear and consistent policy on energy conservation will help ease the possible policy risk for investors or financial institutions.

The possibility and simplicity of selling excess power from cogeneration power plants to electricity business licensing holders or the community will also help increase the interest in deploying cogeneration in industrial or other energy-intensive activities.

Planning a human development system to include growing energy managers and ESCOs is indispensable in achieving the national energy efficiency and conservation target. The energy managers should (i) master energy engineering, both electricity and heat; (ii) have a basic understanding of economics; (iii) compare energy consumption with CGS and without CGS, etc.