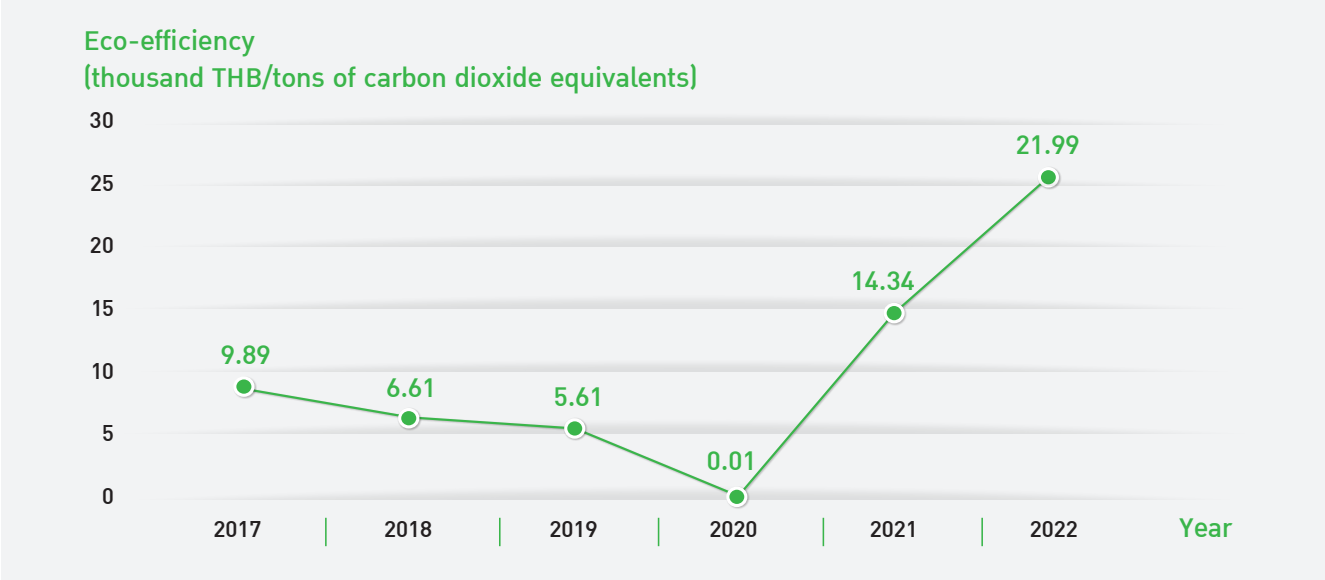

Remarks: EBITDA and greenhouse gases in Scopes 1 and 2 (tons of carbon dioxide equivalents) of the refinery business and the marketing business.

Energy Consumption and Climate Change

Energy Consumption

The refinery business is a highly energy-intensive industry. In the form of thermal energy, electrical energy and steam power. Therefore, the company realizes energy management to be efficient and in accordance with the standard energy management service system ISO 50001 to reduce environmental and social impacts from resource consumption and air pollution emissions from energy consumption. It has been operating continuously since 2014 and has short, medium, and long-term refinery development goals and plans as a goal to improve the refinery's energy efficiency. The short-term plan is to set energy consumption goals and increse the efficiency of existing system. The medium-term plan is to increase efficiency and effectiveness of the production process. In addition, the company has studied long-term projects that can significantly reduce energy consumption called Energy Improvement Project, as well as formulated an Energy Road Map to achieve energy reduction goals along with sustainable production process development.

The company has jointly announced the intention of the Energy Beyond Standard network with more than 70 leading government and private organizations related to energy consumption. It is expected to have an average energy saving of 10-20%.

2022 Energy Efficiency Target

The company defined refinery's energy consumption target by considering the energy consumption in the production unit of fuel oil equivalent barrels per production capacity (%FOEB), which was developed from 2021 (%FOEB 5.24) due to the improvement of the COVID-19 situation compared to 2021, domestic oil demand tends to be increased to response to this situation, the company has increased production capacity to approximate 102% in 2022. In 2022, the target is to reduce energy consumption within the production unit equal to 4.99% of fuel oil equivalent energy per production capacity (%FOEB).

2022 Performance

The company has implemented CCRU (Continuous Catalytic Regeneration Unit), which is a unit with better energy efficiency than the previous unit, resulting in better overall energy consumption. In addition, the company recognizes the technological changes that are evolving by leaps and bounds. Therefore, artificial intelligence (AI) systems are used in conjunction with human resource development to work efficiently and develop the company's refinery to be a leading refinery and keep pace with the world.

The company has continuously implemented refinery development projects and monitored the same projects that have been implemented since 2019 , which are aimed at improving energy efficiency. Examples of projects implemented include:

- Installation of coating materials to prevent heat loss at furnace walls to reduce energy consumption at the steam boiler 2.
- High pressure steam reduction project at Continuous Catalytic Regeneration Unit (CCRU).
- High pressure steam reduction project at Naphtha Light Oil Improvement Unit 2.
- High pressure steam reduction project at Sulfur Removal Tower in Process Water 4.
- Heat exchanger renovation project to recover waste heat at Crude Oil Distillation Unit 2.
- Inlet temperature reduction project at Continuous Catalytic Regeneration Unit (CCRU).

As a result of energy management and completed energy efficiency development projects, energy consumption within production units was equal to 4.83% of fuel oil equivalent energy per capacity (%FOEB) in 2022, better than the target of 4.99% of fuel oil equivalent energy per production capacity (%FOEB).

Refinery Business Results

Energy consumption within the production unit (Percentage of fuel oil equivalent barrel to Capacity %FOEB)

*Major annual maintenance

Future plans

For energy reduction plans, the company has collaborated with foreign experts to exchange technology and experience and use it as a guideline for future project development. This ensures the development of energy efficiency. In addition, the company has a project to commence operations in 2023, which is likely to increase energy efficiency after the project implementation, and the use of CCRU (Continuous Catalytic Regeneration Unit), which is a new high-efficiency unit, instead of the Catalytic reforming unit of the 2nd and 3rd distillation units, will result in a reduction in overall energy consumption. In addition, the company has other energy reduction projects such as:

- Catalyst reforming unit deactivation project of distillation unit 2.
- Gas engine generator installation project to replace gas turbine generator.