

## Energy Consumption

Energy is an essential input driving businesses and the production process of various industries. However, energy consumption contributes to climate change impacts from greenhouse gas (GHG) emissions. Global businesses are aware of this fact and determined to set up their target for sustainable development in alignment with SDG 7 & SDG 13 to help reduce the adverse impacts of energy consumption and GHG emissions.

Bangchak has recognized the importance and impacts of energy consumption in business operations and taken into consideration the establishment of energy management system in accordance with ISO 50001 for the refinery business and oil distribution terminal since 2014. In 2019, the company was the first company in Thailand certified by ISO 50001: 2018. This proves the true commitment of the company and its capability in energy management in line with international standards and to be the foundation for sustainable growth in the future.



To achieve continuous efficiency of energy conservation, the company has set targets and created refinery development plans. The targets are set into short-term, medium-term and long-term targets of energy efficiency. Development plans of each period are as follows:

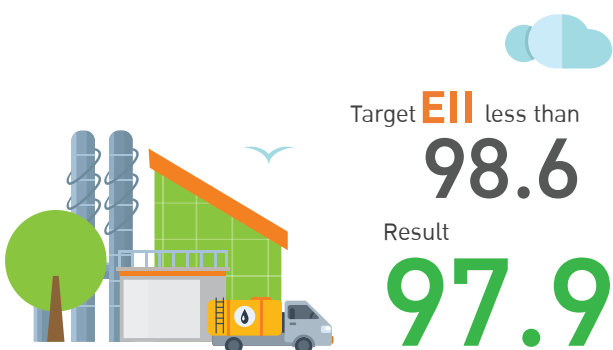
<b>Short-term plan:</b>	Set energy consumption targets and develop effectiveness of existing energy management systems
<b>Medium-term plan:</b>	Develop YES-R projects to improve yield optimization, energy efficiency, safety excellence and the reliability of the refinery enhancement.
<b>Long-term plan:</b>	Invest in long-term projects which reduce energy consumption significantly called “Efficiency, Energy and Environment Improvement Project” (3Es Project)

The company is also aware of the rapidly changes in technologies and innovations and decided to adopt artificial intelligence (AI) into use for refinery development as a leading and modern company.

### 2019 Energy Efficiency Target

The company set a target of energy consumption for the refinery by using Energy Intensity Index (EII), the international indicator for energy consumption, as the guideline. The EII can be used to compare with other oil refineries which have similar capacity. Another target of achievement was the percentage of energy consumption within the production unit of fuel oil equivalent production (Fuel Oil Equivalent Barrel: % FOEB). In 2019, the target of EII was less than 98.6 and % FOEB at 5.53%.

Energy Intensity Index (EII)



Energy consumption in the production unit



### 2019 Performance

In 2019, Bangchak was able to manage and invest in the projects for energy conservation under the “Rocket Project” which facilitates collaborative studies between Bangchak and expert consultants from overseas to develop the company’s projects on energy efficiency. The projects initiated in 2019 are as followings:



Project to reduce power production at the TG-3 steam generator



Project to reduce the steam utilization ratio to the oil quality improvement unit (DGO-HDSU)



Project to change the insulation of high pressure steam pipelines to reduce heat loss



Project for Utility Optimization (UO) system



Project to reduce steam usage by reducing pressure at the Naphtha separation tower, distillation unit, sequence 2 and 3



Project using the Power Management System (PMS)

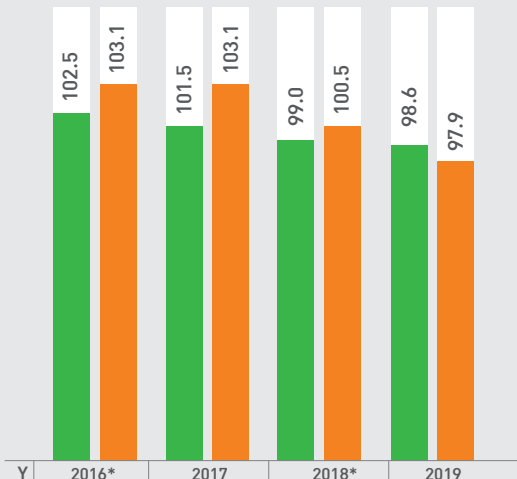


Project to reduce the use of high pressure steam by reducing the pressure of the refining plants No. 2 and 3.

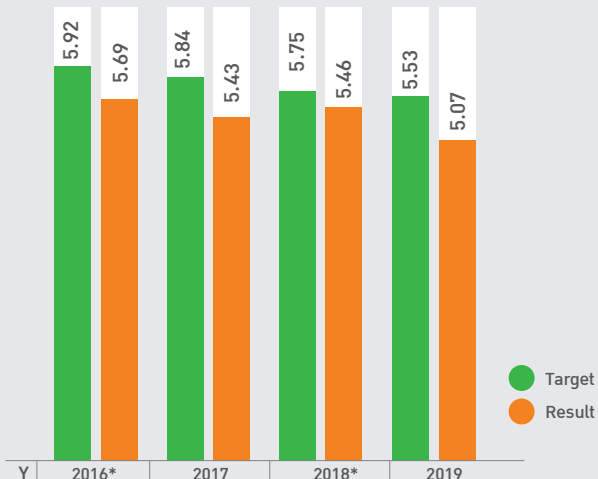
The completion of the development project in 2019 resulted in energy consumption at 5.07% FOEB better than the target at 5.53% FOEB and the Energy Consumption Index at (EII) is 97.9, better than the target of the year 2019 at 98.6.

### Results of the Refinery Business

Energy Intensity Index (EII)  
(Disclosure 302-3)



Energy used within the production unit  
(Percentage of energy equivalent to fuel oil per Production capacity: % FOEB)



\*There is major annual maintenance

### Future Plans

To ensure continuous improvement of energy efficiency, achieve the goal of being the leader in the energy industry and be sustainable in both the environment and the society, Bangchak plans to establish a partnership with COSMO Oil Refinery from Japan. This partnership is an exchange of technology and experience so we can use it as a guideline in formulating new projects for the future. In addition to the project that has been implemented in 2019 and plans to complete in 2020, the company is committed to developing the energy use of the refinery to become a refinery with rating Energy level 1 according to international standards (Solomon Energy Intensity Index).