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PT Heinz ABC Indonesia Karawang – West Java Energy Audit Report

21st Aug 2023



DIREKTORAT JENDERAL ENERGI BARU TERBARUKAN
DAN KONSERVASI ENERGI (EBTKE)

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Danish Energy
Agency



EMBASSY
OF DENMARK
Jakarta

Project no:	Mapping/benchmark on Energy Efficiency in Industries under the Energy Partnership Programme between Indonesia and Denmark (INDODEPP)
Report:	Energy Audit Report PT Heinz ABC Indonesia
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Approved by:	Nadeem Niwaz, Danish Energy Agency

Executive Summary

1.1 Introduction

The Directorate of Energy Conservation (DEC) under the Ministry of Energy, Mineral and Resources (MEMR) in Indonesia has embarked on a mapping of energy intensive industries which is in its early phase. The aim is to update information on energy consumption in a selection of industries starting with a focus on the food and beverage sector (F&B). This will support work on developing national industry benchmarks for energy efficiency and set a future direction for industries with high energy consumption. MEMR coordinates with the Ministry of Industry (MOI) on existing available data and is the key partner for this activity. This activity will specifically support empirical data gathering through review of available information on energy consumption and conducting energy audits within the selected F&B sub-sector.

The first objective of this project supported by INDODEPP is to conduct a relevant number of energy audits to get an empirical reference for energy consumption as well as the potential value of implementing energy efficiency measures in the food and beverage sector. The potential will be highlighted for reduction of energy consumption, reduction of energy costs and reduction of CO₂ emissions.

The second objective of the project is to share findings from the energy audits through a workshop/seminar with the public and private sector and other relevant stakeholders from food and beverage sector.

The outcome of this project will provide input to the efforts of strengthening national and regional focus on energy efficiency at energy intensive industries and at the same time provide valuable suggestions and ideas for specific energy saving projects to be implemented in selected industries.

This energy audit report for PT Heinz ABC Indonesia (HAI) documents the main findings and results for the energy audit that was carried out in Jul 2023 with great assistance from PT HAI.

1.2 Plant description

PT Heinz ABC Indonesia (HAI) was established in 1999, an affiliation of The Kraft Heinz Company, which has the vision to Proudly Make Delightful Food Available for Every Indonesian Family. The Company is a proud owner of the ABC Brands – an Indonesian household staple brand with products ranging from sauces, drinks, to canned foods since 1975. In 2015, to create an unparalleled portfolio of powerful and iconic brands, H.J. Heinz Company and Kraft Foods Group signed a merger agreement to form The Kraft Heinz Company. This merger led PT Heinz ABC Indonesia (HAI), which was a subsidiary of H.J. Heinz Company, into The Kraft Heinz Company. The Company's Head Office is located in Jakarta, with factories and distribution centers located in Jakarta, Karawang, Surabaya, and Pasuruan. Karawang plant was selected to be audited object due to location in West Java and total energy consumption above 4000 TOE that is mandatory to implement Government Regulation Number 33 Year 2023.. Factory layout is shown in Figure 1.

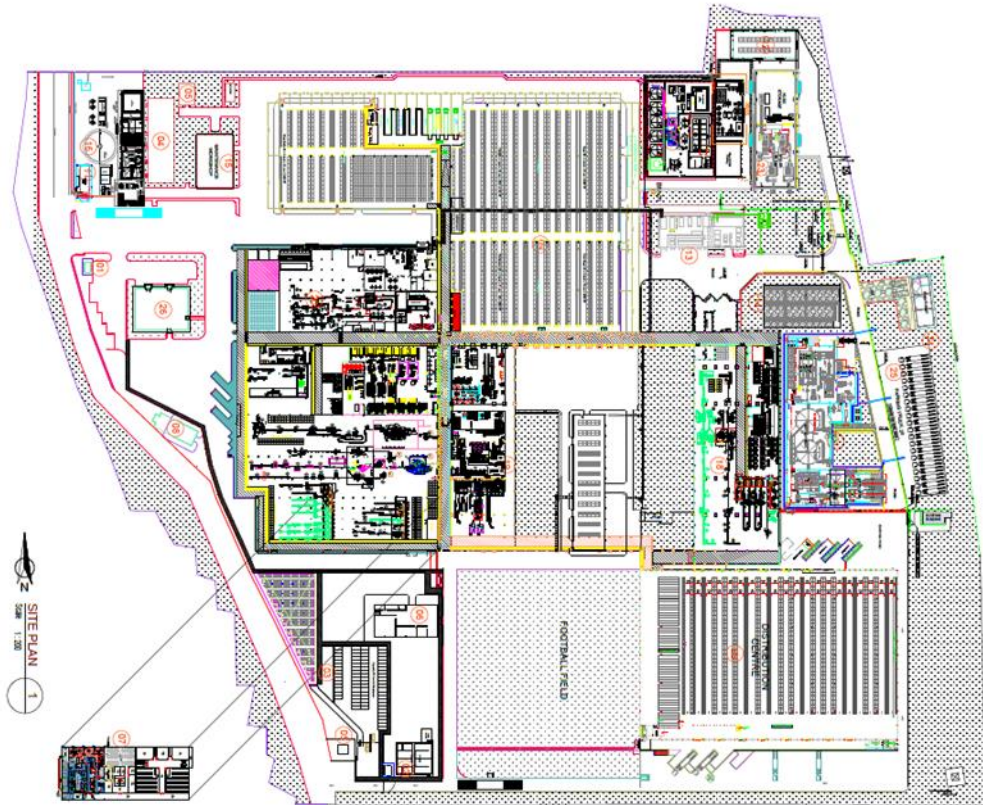


Figure 1. HAI Factory Layout in Karawang Plant

1.3 Operation

The Heinz ABC facility operation is 24 hours per day in 281 days per year resulting in 6,744 operation hours per year. Each day 3 working shifts are present 8 hours. The production has historically amounted as shown in Table 1.

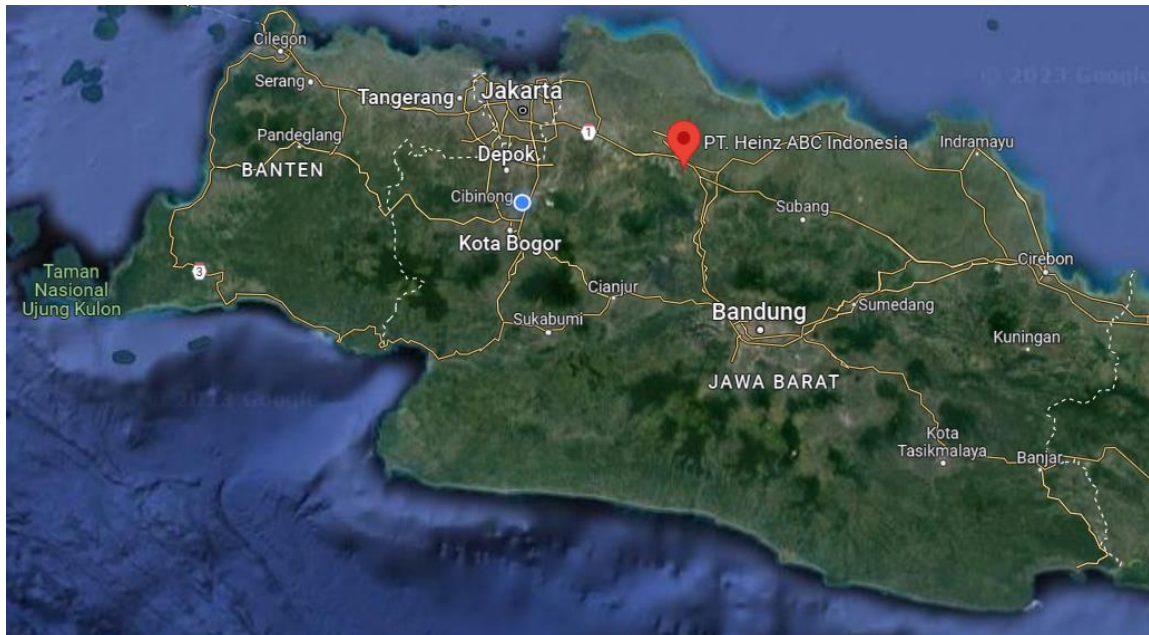
Table 1. Production in 2022

Years	Production, ton
2022	122,420
2023 (Jan-May)	67,639

1.4 Location

Address:

Jl. Bend. Walahar, Kecamatan Klari
 Karawang, Jawa Barat (West Java) 40256
 Indonesia



1.5 Methodology

The objective of the energy audit is both to provide the data necessary to establish the baseline for the energy consumption for HAI and to estimate the potentials for increasing energy efficiency in the F&B sector. The site visit was prepared with main data collected in a questionnaire.

A three-day site visit was planned and conducted from the 5th to 7th of July 2023. In the site visit the local consultant PT. Langgeng Ciptalindo fielded seven people, five engineers and two technicians under the leadership of Pak Rusmanto.

The site visit was commenced with a meeting between the HAI management and team, representatives from EBTKE and the auditing team. At the meeting, information was given about HAI as well as the EBTKE and DEA cooperation and the objective of the audit.

The auditing started with a line walk for understanding the process and get an overview. During the audit information was gathered from HAI, data was taken from meters and measurements was conducted when needed. Every morning and evening a status meeting was held with the HAI team to coordinate the next steps. The site visit was concluded with a common recapitulation.

1.6 Overall findings

1.6.1 Specific energy consumption

The Heinz ABC Indonesia - Karawang plant can be divided into 4 processing lines, as follows:

- Soy processing line with production mass unit using ton.
- Chilli processing line with production mass unit using ton
- Cordial (bottle syrup) processing line with production mass unit using ton
- Ready to Drink (RTD) processing line with production mass unit ton.

Total energy distribution for the plant based on Year 2022 is shown in Table 1. By relating the total energy consumption with the ton production, the specific energy consumption is found. Therefore, specific energy consumption (SEC) is divided by each processing line, is shown in Table 2 based on 2022, while Table 2 shows SEC in the last 2 years. During Jan-May 2023, SEC was increased a little bit against 2022. This indicates that there is a room for improvement in 2023 and later to reduce SEC by means of energy

management and conservation programme. Total energy consumption of PT HAI is 60,905 MWh or 5,236 TOE (TOE) that is mandatory to implement energy management referred to Government Regulation Number 33 Year 2023.

Table 2. Total Energy Distribution to Production and SEC in every lines in 2022

Remarks	Production Lines				Others (Utility& Building)
	Soy	Chilli	Cordial	RTD	
Electricity, MWh					16,371
Thermal, MWh					44,533
Total Energy, MWh	3,233	14,898	7,168	4,740	30,863
Production mass, ton	9,548	63,982	42,721	6,167	
SEC, MWh/ton	0.34	0.23	0.17	0.77	

Total energy distribution for the plant based on Year 2022 is shown in Table 3. Total accumulation of SEC in year 2022 was found to be 0,50 MWh/ton production. This SEC can be analysed further in the future using Energy Performance Indicator (EnPI) to get better view in how EnPI is a function of production volume only or other variables such as utility performance and etc.

Table 3. Specific energy consumption SEC

Year	Total Energy (MWh)	Total Production (Ton)	SEC (MWh/Ton)
2022	60,905	122,420	0.50
2023 (Jan-May)	35,260	67,639	0.52

*) Total Energy is sum of electricity and thermal energy

1.6.2 Energy saving potential

The energy savings are assessed in relation to Best Available Technology (BAT) and will therefore also include savings that are not financially profitable with current energy prices, but which may become so in the future.

The subsequent energy saving proposals are based on estimations. As an example, the energy efficiency for all motors compared with the BAT motor with the same rated power and a standardised investment per motor has been used. The feasibility of a replacement shall be examined with the actual conditions of the individual motor. In case of replacement due to break down it is always advisable to substitute with a motor according to BAT as motors have a long lifetime.

Thermal energy

Saving potential for thermal energy from boiler delivered into the plant are included in the Table 4. Estimated CO2 emission can be considered zero due to mostly boiler using biomass as carbon neutral fuel.

Electricity

Saving potential for electricity consumption delivered into plant is included in the Table 5.

Table 4. Thermal energy distribution to production line and saving potential

THERMAL ENERGY	Estimated Consumption, MWh	Share of consumption, %	Saving potential, MWh	Estimated CO ₂ -emission reduction, ton	Estimated Investment, mill. IDR	Estimated payback period, years
Supply Side (Steam Generation)						
Boiler Alstom (palm oil shell and woodchips mixture)	8.625	19.4	1,102	-	588	1.7
Gas Boiler 8T (gas, standby)	9.354	21.0	509	93	500	6,0
Boiler Basuki (rice husk)	26,555	59.6	277	-	200	1.3
IN TOTAL	44,533	100				
Demand Side (Steam User)						
Chilli	15,450	34.9	-	-	-	-
Soy	8,308	18.7	2,380	-	1,520	7,1
Ready to Drink (RTD)	9,862	22.3	2,544	-	1,610	7,0
Cordial (Bottle Syrup)	10,699	24.1	4,752	-	2,840	6,6
IN TOTAL	44,319	100				
Distribution Losses						
<i>Insulation</i>	97	45.3	97	-	200	1,4
<i>Leak Trap</i>	117	54.7	117	-	40	1,1
IN TOTAL	214	100				
TOTAL SAVINGS	44,533	100	11,778	93	7,498	5,7

Table 5. Electricity distribution to production line and saving potential

ELECTRIC ENERGY	Estimated Consumption, MWh	Share of consumption, %	Saving potential, MWh	Estimated CO ₂ -emission reduction, ton	Estimated Investment, mill. IDR	Estimated payback period, years
Compressor	2,177	13%	228	186	565	1.9
Chilli	1,844	12%	-	-	-	-
Wastewater Treatment Plant 1	1,621	10%	-	-	-	-
<i>Fan CT at WWTP 1</i>			149	122	1,368	7.2
<i>Fan CT at WWTP 2</i>			86	70	580	5.3
Ready to Drink (RTD)	1,613	10%	-	-	-	-
Cordial (Bottle Syrup)	1,596	10%	-	-	-	-
Wastewater Treatment Plant 2	1,044	6%	-	-	-	-
<i>CT pump in WWTP 2</i>			87	71	393	2.7
Soy	1,012	6%	-	-	-	-
Water Treatment Plant New	932	6%	-	-	-	-
<i>Distribution pump in WTP new</i>			114	93	437	2.3
<i>CT pump 1 in WTP new</i>			23	19	83	2.1
Others	4,492	27%	-	-	-	-
<i>FWP Boiler Basuki</i>			27	22	108	2.4
<i>Transformer</i>			64	52	500	6.1
IN TOTAL	16,371	100	778	635	2,667	4.7

1.7 Electrification and renewable energy

1.7.1 Present situation

Currently, PT HAI used electricity from the PLN grid meanwhile for thermal energy resource is coming from biomass and gas pipeline as backup. The use of electricity reached 27% of total energy demand of the plant, while biomass and gas was the 73% remaining. Electricity is used for main equipment of production line from raw material to packaging, utilities, and office, while biomass and gas are used for steam generation of boiler at 8 barg distributed to Chilli, Soy, Ready To Drink (RTD), and Cordial (Bottle Syrup) production lines.

1.8 Electrification of the processes

All thermal energy consumption is allocated mainly to 2 units of biomass boiler and 2 units of gas boiler as backup to generate saturated steam at 8 barg for production line. Steam users are mainly for Chilli, Soy Process, Ready To Drink (RTD) and Cordial (bottle syrup) processing lines. The hot water generation of each processes were operated at temperature of 70 - 90 oC, while cooling or chilled water is generated from chiller or cooling tower. To replace the use of steam as heating medium and chilled water as cooling medium, heat pump can be introduced in which it can produce hot and chilled water simultaneously with single electric energy source. The hot product is cooled by the evaporator of the heat pump while the cold raw material is heated by the condenser of the heat pump. The measured COP of the heat pump is ranged from 2.3 to 3.1. Today commercial heat pumps can deliver up to 90 oC output on the hot side, but different vendors have heat pumps that can deliver 120 oC or more in operation in industrial applications. It will be reasonable to assume that the entire thermal energy demand in the hot water generation process can be covered by heat pumps in the future.

1.9 Different ways of electrification

Currenty PT HAI is still using gas pipeline as fossil fuel to generate steam at their boiler. To achieve net zero emission beside biomass boiler, electrification of gas boiler can be proposed since PT HAI will upgrade later to non-fossil power generation by using Renewable Energy Certificate (REC) issued by PLN (state electricity provider). Therefore, in this case electrodes boiler can be considered instead of gas boiler.

However, cost of steam using electrodes boiler will be approximately double againts gas boiler due to double energy cost. To compensate on increasing energy bill in case of using electric steam boiler applied, it can be explored to do further steps such as follows:

- energy conservation program such as steam and heat distribution losses reduction, steam trap monitoring, and etc.,
- conversion from steam used hot water generator to commercial heat pump hot water generator.
- Installation of solar PV panels with supply from the grid to further reduce the overall electrical consumption per annum.