

# Environmental Performances (Thailand)

## Energy

GRI Standards	Performance	Unit	2017	2018	2019	2020
GRI 302-1	Total energy consumption within the organization	million GJ	10.35	10.92	11.06	11.07
	Non-renewable energy	million GJ	3.51	3.48	3.43	3.35
	- Coal	million GJ	0.89	0.76	0.65	0.55
	- Fuel oil	million GJ	0.55	0.72	0.86	0.81
	- Diesel	million GJ	0.35	0.33	0.29	0.25
	- Gasoline	million GJ	0.02	0.02	0.02	0.01
	- LPG	million GJ	0.30	0.27	0.27	0.28
	- Natural gas	million GJ	1.40	1.38	1.36	1.44
	Renewable energy	million GJ	2.21	2.69	2.88	2.85
	- Biodiesel	million GJ	0.00	0.00	0.01	0.00
	- Rice husk	million GJ	0.00	0.01	0.00	0.01
	- Corn cob	million GJ	0.18	0.19	0.05	0.07
	- Palm kernel shells	million GJ	0.02	0.15	0.07	0.05
	- Fire wood/ scrap wood/ woodchips	million GJ	1.18	1.47	1.58	1.55
	- Sawdust	million GJ	0.13	0.11	0.07	0.08
	- Charcoal	million GJ	0.00	0.01	0.05	0.00
	- Cashew nutshell	million GJ	0.01	0.00	0.01	0.02
	- Biogas	million GJ	0.59	0.71	1.02	1.04
	- Solar Energy	million GJ	0.00	0.00	0.00	0.02
	- Others	million GJ	0.07	0.04	0.01	0.02
GRI 302-1	Electricity purchased	million kWh	1,285	1,319	1,317	1,353
		million GJ	4.63	4.75	4.74	4.87
GRI 302-3	Energy per production unit	GJ/ton of products	1.23	1.30	1.32	1.34

Remark:

- **ND = No Data**
- **The calculation is in accordance with CPF SHE&En Key Performance Indices (CPF SHE&EN KPIs) (GRI 302-1)**
  - o Total fuel consumption = the sum of (the consumption of each fuel type X net calorific value)  
Unit: *GJ per month (the conversion factors are based on Thailand Energy Efficiency Situation report 2018 by Department of Alternative Energy Development and Efficiency)*
  - o Electricity consumption = the sum of electricity consumption (in kWh) X 3.6  
Unit: *GJ per month*
  - o Total energy consumption = total fuel consumption + total electricity consumption  
Unit: *GJ per month*
- **Energy types included in the calculation of intensity per production ton are non-renewables including coal, fuel oil, diesel, gasoline, LPG, and natural gas as well as renewables including biogas, biomass (such as rice husk, corn cob, palm kernel shells, fire wood/ scrap wood/ woodchips, sawdust, charcoal and cashew nutshell, etc.) and biodiesel, and electricity within the organization only (GRI 302-3)**

# Environmental Performances (Thailand)

## Greenhouse Gas Emissions

GRI Standards	Performance	Unit	2017	2018	2019	2020
-	Direct and Indirect GHG emissions (Scope 1 + 2)	tons CO <sub>2</sub> e	924,999	919,691	843,217	884,782
GRI 305-1	Direct GHG emissions (Scope 1)	tons CO <sub>2</sub> e	256,820	253,350	249,036	238,282
GRI 305-2	Indirect GHG emissions (Scope 2)	tons CO <sub>2</sub> e	668,179	666,341	594,181	646,501
GRI 305-2	Indirect GHG emissions (Scope 2) - Gross location-based Energy	tons CO <sub>2</sub> e	ND	ND	559,260	601,923
GRI 305-2	Indirect GHG emission (Scope 2) - Gross market-based Energy	tons CO <sub>2</sub> e	ND	ND	34,920	44,577
GRI 305-4	Direct and Indirect GHG emissions per production unit (Scope 1 + 2)	kg CO <sub>2</sub> e/ton of products	110	109	101	107
GRI 305-1	Biogenic GHG emissions	tons CO <sub>2</sub> e	202,722	252,601	260,715	253,914

Remark:

- **ND = No Data**
- **The chosen consolidation approach for greenhouse gas emissions is operational control (GRI 305-1 and GRI 305-2)**
- **Reporting of the greenhouse gas emissions covers CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O.** The Global Warming Potential (GWP) used in the calculation is referred to the given values of IPCC, while the greenhouse gas emission factors are based on the information from the Thailand Greenhouse Gas Management Organization (Public Organization) and Energy Policy and Planning Office, Ministry of Energy, which is available at the time of disclosure of this Sustainability Report. (GRI 305-1, GRI 305-2, and GRI 305-4)
- **GHG scope 1 includes GHG emissions from fuel combustion only, but excludes biogas combustion from flaring (GRI 305-1 and GRI 305-4)**
- **Reporting scope of GHG intensity includes only GHG scopes 1 and 2 (GRI 305-4)**

# Environmental Performances (Thailand)

## Water

GRI Standards	Performance	Unit	2017	2018	2019	2020	
						Total	
						Freshwater	Other Water
GRI 303-3	Total water withdrawal from all areas	million m <sup>3</sup>	174.20	154.77	145.70	142.45	
						48.89	93.56
	- Surface water	million m <sup>3</sup>	109.71	95.15	90.55	28.79	
						16.24	12.56
	- Groundwater	million m <sup>3</sup>	15.98	19.50	21.69	20.97	
						20.49	0.48
	- Seawater	million m <sup>3</sup>	28.2	24.74	18.40	80.44	
						0.00	80.44
	- Rainwater	million m <sup>3</sup>	10.85	7.62	6.79	4.88	
						4.88	0.00
	- Produced water	million m <sup>3</sup>	ND	ND	ND	0.00	
						0.00	0.00
	- Third-party water	million m <sup>3</sup>	9.46	7.76	8.27	7.37	
						7.28	0.09
	- Municipal water supply	million m <sup>3</sup>	6.49	6.65	7.31	6.67	
						6.67	0.00
	- Purchased water (excluded drinking water)	million m <sup>3</sup>	2.97	1.11	0.95	0.70	
						0.61	0.09
	Total water withdrawal from water stressed areas	million m <sup>3</sup>	ND	ND	ND	37.43	
						33.44	3.99
	- Surface water	million m <sup>3</sup>	ND	ND	ND	13.97	
						12.01	1.96
	- Groundwater	million m <sup>3</sup>	ND	ND	ND	13.71	
						13.65	0.06
	- Seawater	million m <sup>3</sup>	ND	ND	ND	1.94	
						0.00	1.94
	- Rainwater	million m <sup>3</sup>	ND	ND	ND	3.53	
					3.53	0.00	
- Produced water	million m <sup>3</sup>	ND	ND	ND	0.00		
					0.00	0.00	
- Third-party water	million m <sup>3</sup>	ND	ND	ND	4.28		
					4.24	0.04	
- Municipal water supply	million m <sup>3</sup>	ND	ND	ND	4.11		
					4.11	0.00	
- Purchased water (excluded drinking water)	million m <sup>3</sup>	ND	ND	ND	0.17		
					0.13	0.04	
Third-party water withdrawal from water stressed areas					3.98		
- Surface water	million m <sup>3</sup>	ND	ND	ND	3.98		
- Groundwater	million m <sup>3</sup>	ND	ND	ND	0.27		
- Seawater	million m <sup>3</sup>	ND	ND	ND	0.04		
- Produced water	million m <sup>3</sup>	ND	ND	ND	0.00		
Water withdrawal per production unit	m <sup>3</sup> /ton of products	20.71	18.40	17.40	17.30		

# Environmental Performances (Thailand)

## Water

GRI Standards	Performance	Unit	2017	2018	2019	2020	
						Total	
						Freshwater	Other Water
GRI 303-4	Total water discharge to all areas	million m <sup>3</sup>	100.86	93.17	68.56	70.39	
						19.16	51.22
	- Surface water	million m <sup>3</sup>	73.86	69.85	55.72	16.77	
	- Groundwater	million m <sup>3</sup>	0	0	0	0.09	
	- Seawater	million m <sup>3</sup>	27.00	23.32	12.84	52.19	
	- Third-party water sent to use to others organizations (discharged water from swine farms used in farmer's agricultural areas)	million m <sup>3</sup>	ND	ND	ND	1.34	
	Total water discharge to water stressed areas	million m <sup>3</sup>	ND	ND	ND	9.83	2.40
Number of incidents of non-compliance with discharge limits.	case	ND	ND	ND	ND		
GRI 303-5	Total water consumption from all areas	million m <sup>3</sup>	ND	ND	ND	72.06	
	Total water consumption from water stressed areas	million m <sup>3</sup>	ND	ND	ND	25.21	
		million m <sup>3</sup>	24.15	27.64	30.39	59.62	
	Recycled and reused water	percentage of total water withdrawal	13.86	17.86	20.86	41.85	
GRI 303-4	Quality of discharged water						
	BOD value						
	- Livestock feed business	mg/L	ND	24.75	10.25	ND	
	- Aquatic feed business	mg/L	ND	10.41	3.92	ND	
	- Broiler business	mg/L	ND	9.11	12.28	18.72	
	- Poultry business	mg/L	ND	ND	31.54	ND	
	- Duck business	mg/L	ND	14.09	19.12	17.72	
	- Swine business	mg/L	ND	14.81	21.00	40.87	
	- Aquatic animal farm business	mg/L	ND	4.68	4.31	3.99	
	- Food business	mg/L	ND	7.60	7.18	9.31	
	- Processing business	mg/L	ND	ND	11.25	11.47	
	- Five star and restaurant business (Production plants)	mg/L	ND	30.23	12.75	13.05	
	Nitrogen value						
	- Livestock feed business	mg/L	ND	29.35	9.00	ND	
	- Aquatic feed business	mg/L	ND	49.43	4.81	ND	
	- Broiler business	mg/L	ND	24.37	40.82	44.21	
	- Poultry business	mg/L	ND	ND	33.40	ND	
	- Duck business	mg/L	ND	6.84	8.23	15.63	
	- Swine business	mg/L	ND	31.74	15.38	137.22	
	- Aquatic animal farm business	mg/L	ND	2.14	1.95	2.19	
	- Food business	mg/L	ND	5.18	12.59	14.99	
- Processing business	mg/L	ND	ND	3.70	9.10		

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## Water

GRI Standards	Performance	Unit	2017	2018	2019	2020	
						Total	
						Freshwater	Other Water
	- Five star and restaurant business (Production plants)	mg/L	ND	14.35	9.67	23.25	
	- BOD quantity	thousand tons	1.18	0.49	0.38	0.38	
	- Nitrogen quantity	thousand tons	0.55	0.45	0.56	0.73	

### Remarks:

- **ND = No data**
- **Water-stressed areas** are areas in which the ratio of the total annual water withdrawal to the total available annual renewable water supply is 40% and higher as assessed by Aqeduct Water Risk Atlas following the GRI Standards.
- **Freshwater** is the water containing Total Dissolved Solids :TDS  $\leq$  1,000 mg/L
- **Other water** is the water containing Total Dissolved Solids :TDS  $>$  1,000 mg/L
- **Total water consumption** is calculated using data from water meters, water bills, flow rates of water pumps, and average volume of rainwater from Meteorological Department (GRI 303-3: 2018)
- **Total reused / recycled water volume** is calculated using the data from water meters and flow rates of water pumps
- **Biochemical Oxygen Demand (BOD)** value measures the amount of oxygen required or consumed for the microbiological decomposition of organic material in water, used for measuring water quality (GRI 303-4: 2018)
- **BOD and Total Kjeldahl Nitrogen (TKN)** values are derived from the results from sources of wastewater, analyzed by a laboratory certified by ISO/IEC 17025 (GRI 303-4: 2018)
- **BOD quantity** = volume of discharged water X average BOD intensity (GRI 303-4: 2018)
- **TKN quantity** = volume of discharged water X average nitrogen intensity (GRI 303-4: 2018)
- **Wastewater data** is collected from water meters for business units with Online BOD installed, and from wastewater volume assessment from the efficiency of wastewater pumps, for business units without water meters (GRI 303-4: 2018)
- **Approaches to treating wastewater include: (GRI 303-4: 2018)**
  - o In Feed business, wastewater from aquatic feed mills is treated using activated sludge process
  - o In Farm business, wastewater from swine farms is treated by anaerobic digestion, followed by in oxidation ponds, while wastewater from aquatic animal farms is treated in oxidation ponds
  - o In Food business, wastewater from food factories is treated using activated sludge process.
- **In 2016-2017, the amount of discharged water from swine farms used in farmers' agricultural areas was reported as water discharge to others.** Since 2018, this discharged water is defined as waste for composting.

# Environmental Performances (Thailand)

## Waste

GRI Standards	Performance	Unit	2017	2018	2019	2020
GRI 306-2	Total waste generated	million tons	0.51	0.93	0.92	0.46
	Total non-hazardous waste generated	thousand tons	513.29	928.10	917.89	462.51
	- Reused	thousand tons	2.81	2.86	0.40	0.11
	- Recycled	thousand tons	20.49	21.74	26.45	26.74
	- Composting	thousand tons	367.10	799.50	813.17	367.24
	- Used as animal feed	thousand tons	73.33	62.92	54.33	47.89
	- Used as composite materials	thousand tons	0.26	5.48	2.25	0.29
	- Incineration	thousand tons	2.07	1.59	1.08	0.97
	- Landfill	thousand tons	28.38	24.06	18.71	17.04
	- Stored in packaging containers	thousand tons	0.44	0.07	ND	ND
	- Used as fuel blending	thousand tons	0.26	0.08	1.50	2.24
	- Stored in the operation units	thousand tons	0.05	0.00	ND	ND
	- Stored in the operation units to be disposed	thousand tons	18.10	9.80	ND	ND
	Total hazardous waste generated	thousand tons	1.81	1.12	0.66	0.94
	- Reused	thousand tons	0.28	0.06	0.02	0.02
	- Recycled	thousand tons	0.69	0.75	0.51	0.48
	- Incineration	thousand tons	0.07	0.07	0.02	0.01
	- Secured Landfill	thousand tons	0.37	0.24	0.11	0.29
	- Used as fuel blending	thousand tons	ND	ND	ND	0.14
	- Stored in the operation units to be disposed	thousand tons	0.40	0.00	ND	ND
	Waste disposed by landfill and incineration	thousand tons	30.89	25.96	19.92	18.31
	Waste disposed by landfill and incineration per production unit	kg/ton of products	3.67	3.08	2.38	2.23

Remark:

- **ND = No Data**
- **Non-hazardous and hazardous waste stored within our facilities was cumulative sum from previous years (GRI 306-2)**
- **Total waste generated was the sum of total non-hazardous and hazardous waste generated during the year.**  
Amount of waste stored within our facilities during the year = cumulative waste stored during the current year – cumulative waste stored during the previous year (GRI 306-2)
- **Waste disposal information was obtained from disposal method or waste manifest provided by waste disposer (GRI 306-2)**
- **In 2016-2017, the amount of discharged water from swine farms used in farmers' agricultural areas was reported as water discharge to others.**  
Since 2018, this discharged water is defined as waste for composting.
- **The amounts of waste disposed by others method in 2016 at 54.32 thousand tons had not been reported in the table**  
since it cannot be specified as disposal method listed in the table.
- **The amounts of waste stored in the operation units to be disposed in 2016-2017 had been re-calculated.**
- **Landfilling is carried out by a local government agency or a dispatcher assigned by a local government agency.**