

Environmental Performances (Thailand Operations)



Energy

GRI Standards	Performance	Unit	2018	2019	2020	2021
GRI 302-1	Total energy consumption within the organization	PJ	10.92	11.06	11.07	11.27
	Non-renewable energy	PJ	3.48	3.43	3.35	3.18
	- Coal	PJ	0.76	0.65	0.55	0.42
	- Fuel oil	PJ	0.72	0.86	0.81	0.83
	- Diesel	PJ	0.33	0.29	0.25	0.23
	- Gasoline	PJ	0.02	0.02	0.01	0.01
	- LPG	PJ	0.27	0.27	0.28	0.35
	- Natural gas	PJ	1.38	1.36	1.44	1.34
	Renewable energy	PJ	2.69	2.88	2.85	3.07
	- Biodiesel	PJ	0.00	0.01	0.00	0.00
	- Rice husk	PJ	0.01	0.00	0.01	0.01
	- Corn cob	PJ	0.19	0.05	0.07	0.09
	- Palm kernel shells	PJ	0.15	0.07	0.05	0.05
	- Fire wood/ scrap wood/ woodchips	PJ	1.47	1.58	1.55	1.78
	- Sawdust	PJ	0.11	0.07	0.08	0.06
	- Charcoal	PJ	0.01	0.05	0.00	0.00
	- Cashew nutshell	PJ	0.00	0.01	0.02	0.01
	- Biogas	PJ	0.71	1.02	1.04	1.02
	- Solar Energy	PJ	0.00	0.00	0.02	0.04
	- Others	PJ	0.04	0.01	0.02	0.00
	Electricity purchased	million kWh	1,319	1,317	1,353	1,395
		PJ	4.75	4.74	4.87	5.02
GRI 302-3	Energy per production unit	GJ/ton of products	1.30	1.32	1.34	1.27

Energy Consumption of CPF (Thailand) Plc.

GRI Standards	Performance	Unit	2018	2019	2020	2021
GRI 302-1	Total energy consumption within the organization	PJ	ND	ND	7.75	8.00
	Renewable energy	PJ	ND	ND	2.62	2.75
	Proportion of renewable energy consumption per total energy consumption	%	ND	ND	33.79%	34.34%

Remark:

- ND = No Data
- PJ equal to 10¹⁵ Joules
- 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: PJ per month (the conversion factors are based on Thailand Energy Efficiency Situation report 2020 by Department of Alternative Energy Development and Efficiency)



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o Electricity consumption = the sum of electricity consumption (in kWh) X 3.6

Unit: *PJ per month*

o Total energy consumption = total fuel consumption + total electricity consumption

Unit: *PJ 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)

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Greenhouse Gas Emissions

GRI Standards	Performance	Unit	2018	2019	2020	2021
-	Direct and indirect GHG emissions (Scope 1 + 2)	tons of CO ₂ e	919,691	843,217	884,782	863,046
GRI 305-1	Direct GHG emissions (Scope 1)	tons of CO ₂ e	253,350	249,036	238,282	221,960
GRI 305-2	Indirect GHG emissions (Scope 2)	tons of CO ₂ e	666,341	594,181	646,501	641,085
GRI 305-2	Indirect GHG emissions (Scope 2) - Gross location-based Energy	tons of CO ₂ e	ND	559,260	601,923	596,390
GRI 305-2	Indirect GHG emission (Scope 2) - Gross market-based Energy	tons of CO ₂ e	ND	34,920	44,577	44,696
GRI 305-4	Direct and indirect GHG emissions per production unit (Scope 1 + 2)	kg of CO ₂ e/ ton of products	109	101	107	97
GRI 305-1	Biogenic GHG emissions	tons of CO ₂ e	252,601	260,715	253,914	279,231

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 CO₂, CH₄, and N₂O. 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)

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Water

GRI Standards	Performance	Unit	2018	2019	2020		2021	
					Total		Total	
					Freshwater	Other Water	Freshwater	Other Water
GRI 303-3 (2018)	Total water withdrawal from all areas	million m ³	154.77	145.70	142.45		136.04	
					48.89	93.56	58.27	77.77
	- Surface water	million m ³	95.15	90.55	28.79		73.00	
					16.24	12.56	23.86	49.14
	- Groundwater	million m ³	19.50	21.69	20.97		22.70	
					20.49	0.48	21.86	0.84
	- Seawater	million m ³	24.74	18.40	80.44		27.67	
					0.00	80.44	0.00	27.67
	- Rainwater	million m ³	7.62	6.79	4.88		5.95	
					4.88	0.00	5.95	0.00
	- Produced water	million m ³	ND	ND	0.00		0.00	
					0.00	0.00	0.00	0.00
	- Third-party water	million m ³	7.76	8.27	7.37		6.73	
					7.28	0.09	6.60	0.13
	- Municipal water supply	million m ³	6.65	7.31	6.67		6.03	
					6.67	0.00	6.03	0.00
	- Purchased water (excluded drinking water)	million m ³	1.11	0.95	0.70		0.70	
					0.61	0.09	0.57	0.13
	Total water withdrawal from water stressed areas	million m ³	ND	ND	37.43		41.35	
					33.44	3.99	39.35	2.00
	- Surface water	million m ³	ND	ND	13.97		19.20	
					12.01	1.96	17.55	1.65
	- Groundwater	million m ³	ND	ND	13.71		14.57	
					13.65	0.06	14.29	0.28
	- Seawater	million m ³	ND	ND	1.94		0.00	
					0.00	1.94	0.00	0.00
	- Rainwater	million m ³	ND	ND	3.53		4.04	
					3.53	0.00	4.04	0.00
	- Produced water	million m ³	ND	ND	0.00		0.00	
					0.00	0.00	0.00	0.00
	- Third-party water	million m ³	ND	ND	4.28		3.54	
					4.24	0.04	3.48	0.06
	- Municipal water supply	million m ³	ND	ND	4.11		3.24	
					4.11	0.00	3.24	0.00
	- Purchased water (excluded drinking water)	million m ³	ND	ND	0.17		0.30	
					0.13	0.04	0.24	0.06
	Third-party water withdrawal from water stressed areas							
	- Surface water	million m ³	ND	ND	3.98		3.48	
	- Groundwater	million m ³	ND	ND	0.27		0.00	
	- Seawater	million m ³	ND	ND	0.04		0.06	
	- Produced water	million m ³	ND	ND	0.00		0.00	

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GRI Standards	Performance	Unit	2018	2019	2020		2021		
					Total		Total		
					Freshwater	Other Water	Freshwater	Other Water	
	Water withdrawal per production unit	m ³ /ton of products	18.40	17.40	17.30		15.28		
GRI 303-4 (2018)	Total water discharge to all areas	million m ³	93.17	68.56	70.39		70.74		
					19.16	51.22	15.80	54.93	
	- Surface water	million m ³	69.85	55.72	16.77		47.57		
	- Groundwater	million m ³	0	0	0.09		1.21		
	- Seawater	million m ³	23.32	12.84	52.19		20.39		
	- Third-party water sent to use to others organizations (discharged water from swine farms used in farmers' agricultural areas)	million m ³	ND	ND	1.34		1.58		
	Total water discharge to water stressed areas	million m ³	ND	ND	12.23		12.21		
					9.83	2.40	10.34	1.88	
GRI 303-5 (2018)	Total water consumption from all areas	million m ³	ND	ND	72.06		65.30		
	Total water consumption from water stressed areas	million m ³	ND	ND	25.21		29.14		
		million m ³	27.64	30.39	59.62		59.68		
	Recycled and reused water	% of total water withdrawal	17.86	20.86	41.85		43.87		
GRI 303-4 (2018)	Quality of discharged water								
	BOD value								
		- Livestock feed business	mg/L	24.75	10.25	ND		ND	
		- Aquatic feed business	mg/L	10.41	3.92	ND		ND	
		- Broiler business	mg/L	9.11	12.28	18.72		13.55	
		- Poultry business	mg/L	ND	31.54	ND		13.64	
		- Duck business	mg/L	14.09	19.12	17.72		10.35	
		- Swine business	mg/L	14.81	21.00	40.87		45.46	
		- Aquatic animal farm business	mg/L	4.68	4.31	3.99		4.20	
		- Food business	mg/L	7.60	7.18	9.31		11.97	
		- Processing business	mg/L	ND	11.25	11.47		12.00	
		- Five star and restaurant business (Production plants)	mg/L	30.23	12.75	13.05		12.23	
	Nitrogen value								
		- Livestock feed business	mg/L	29.35	9.00	ND		ND	
		- Aquatic feed business	mg/L	49.43	4.81	ND		ND	
		- Broiler business	mg/L	24.37	40.82	44.21		33.34	
		- Poultry business	mg/L	ND	33.40	ND		21.61	
		- Duck business	mg/L	6.84	8.23	15.63		13.28	
		- Swine business	mg/L	31.74	15.38	137.22		131.22	
		- Aquatic animal farm business	mg/L	2.14	1.95	2.19		1.88	
		- Food business	mg/L	5.18	12.59	14.99		17.53	
		- Processing business	mg/L	ND	3.70	9.10		17.94	
		- Five star and restaurant business (Production plants)	mg/L	14.35	9.67	23.25		6.85	
	- BOD quantity	thousand tons	0.49	0.38	0.38		0.46		
	- Nitrogen quantity	thousand tons	0.45	0.56	0.73		0.92		

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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 Aqueduct 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)
 - In Feed business, wastewater from aquatic feed mills is treated using activated sludge process
 - 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
 - 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.
- The discharged water from swine farms used in farmers' agricultural areas contained TDS $>$ 3,000 mg/L

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Waste

GRI Standards	Performance	Unit	2018	2019	2020	2021
GRI 306-3 (2020)	Total waste generated	thousand tons	929.10	918.55	463.45	456.07
	Total non-hazardous waste generated	thousand tons	927.97	917.89	462.51	455.52
	Total hazardous waste generated	thousand tons	1.12	0.66	0.94	0.55
GRI 306-4 (2020)	Total waste diverted from disposal	thousand tons	893.33	897.14	442.76	433.04
	Total non-hazardous waste diverted from disposal	thousand tons	892.52	896.60	442.26	432.67
	Non-hazardous waste recovery onsite	thousand tons	0.00	0.00	0.00	0.00
	- Reused	thousand tons	0.00	0.00	0.00	0.00
	- Recycled	thousand tons	0.00	0.00	0.00	0.00
	- Composting	thousand tons	0.00	0.00	0.00	0.00
	- Used as animal feed	thousand tons	0.00	0.00	0.00	0.00
	- Other recovery operation	thousand tons	0.00	0.00	0.00	0.00
	Non-hazardous waste recovery offsite	thousand tons	892.52	896.60	442.26	432.67
	- Reused	thousand tons	2.86	0.40	0.11	0.15
	- Recycled	thousand tons	21.74	26.45	26.74	24.28
	- Composting	thousand tons	799.53	813.17	367.24	343.63
	- Used as animal feed	thousand tons	62.92	54.33	47.89	61.26
	- Other recovery operation	thousand tons	5.48	2.25	0.29	3.34
	Total hazardous waste diverted from disposal	thousand tons	0.81	0.54	0.50	0.37
	Hazardous waste recovery onsite	thousand tons	0.00	0.00	0.00	0.00
	- Reused	thousand tons	0.00	0.00	0.00	0.00
	- Recycled	thousand tons	0.00	0.00	0.00	0.00
	- Other recovery operation	thousand tons	0.00	0.00	0.00	0.00
	Hazardous waste recovery offsite	thousand tons	0.81	0.54	0.50	0.37
	- Reused	thousand tons	0.06	0.02	0.02	0.01
	- Recycled	thousand tons	0.75	0.51	0.48	0.36
	- Other recovery operation	thousand tons	0.00	0.00	0.00	0.00
GRI 306-5 (2020)	Total waste directed to disposal	thousand tons	26.11	21.41	20.69	23.03
	Total non-hazardous waste directed to disposal	thousand tons	25.80	21.29	20.25	22.85
	Non-hazardous waste disposal onsite	thousand tons	0.08	0.00	0.00	0.47
	- Incineration with energy recovery	thousand tons	0.00	0.00	0.00	0.00
	- Incineration without energy recovery	thousand tons	0.00	0.00	0.00	0.25
	- Landfill	thousand tons	0.00	0.00	0.00	0.22
	- Other disposal operations	thousand tons	0.08	0.00	0.00	0.00
	Non-hazardous waste disposal offsite	thousand tons	25.73	21.29	20.25	22.38

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GRI Standards	Performance	Unit	2018	2019	2020	2021
	- Incineration with energy recovery	thousand tons	0.08	1.50	2.24	1.23
	- Incineration without energy recovery	thousand tons	1.59	1.08	0.97	0.52
	- Landfill	thousand tons	24.06	18.71	17.04	20.63
	- Other disposal operations	thousand tons	0.00	0.00	0.00	0.00
	Total hazardous waste directed to disposal	thousand tons	0.31	0.12	0.44	0.18
	Hazardous waste disposal onsite	thousand tons	0.00	0.00	0.00	0.00
	- Incineration with energy recovery	thousand tons	0.00	0.00	0.00	0.00
	- Incineration without energy recovery	thousand tons	0.00	0.00	0.00	0.00
	- Secured landfill	thousand tons	0.00	0.00	0.00	0.00
	- Other disposal operations	thousand tons	0.00	0.00	0.00	0.00
	Hazardous waste disposal offsite	thousand tons	0.31	0.12	0.44	0.18
	- Incineration with energy recovery	thousand tons	0.00	0.00	0.14	0.11
	- Incineration without energy recovery	thousand tons	0.07	0.01	0.01	0.05
	- Secured landfill	thousand tons	0.24	0.11	0.29	0.02
	- Other disposal operations	thousand tons	0.00	0.00	0.00	0.00
	Waste disposed by landfill and incineration per production unit	kg/ton of products	3.08	2.38	2.23	2.44

Remark:

- ND = No Data
- Waste disposal information was obtained from disposal method or waste manifest provided by waste disposer (GRI 306-2)
- Data on waste volumes from manufacturing units is collected from quantities reported to the Department of Industrial Works and data on waste volumes from other business units is collected from monthly waste weighing of each business unit.
- 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.
- Offsite landfill is carried out by a local government agency or a dispatcher assigned by a local government agency.
- In 2018, non-hazardous and hazardous wastes of 9.65 and 0.01 thousand tons, respectively, were stored at the operation sites. In combination with total waste from disposal, recovery and storage, the total waste generation is 929.10 thousand tons.
- In 2021, the amount of hazardous waste generated was assumed to be equal to the amount of hazardous waste utilized and the amount of hazardous waste disposed of. In 2022, a plan will be put in place to collect the actual amount of hazardous waste generated in the organization.

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Food Loss

DJSI	Performance	Unit	2018	2019	2020	2021	Target for 2021
2.6.2	Total weight food loss	tons	132,628	123,855	117,303	126,069	127,000
	Total weight of food loss used for alternative purposes	tons	130,207	121,501	115,225	124,114	125,000
	Total discarded	tons	2,421	2,354	2,078	1,955	2,000
	Food loss intensity	kg/ton of products	2.9	3.0	2.8	2.6	2.7
	Coverage	%	17	18	16	17	

Remarks:

- The total weight of food loss covered fresh chicken meat and egg products, collected from enterprise resource planning (ERP) system.
- The calculation of the food loss intensity is based on weight of total food loss discarded divided by weight of total edible food sale.
- Quantity of food loss intensity in 2018-2019 has been adjusted due to re-calculation of the database.
- The coverage is calculated by the sales revenue of fresh chicken meat and egg products divided by the total sales revenue covering revenue of farm-primary processing and food businesses in Thailand operations.

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Packaging for Food Products

DJSI	Performance	Unit	2018	2019	2020	2021	Target for 2021
2.8.2	Total weight of wood/paper fiber packaging	tons	ND	26,088	32,566	25,261	
	Recycled and/or certified wood/paper fiber	% of total weight	ND	85	85	85	85
	Total weight of metal packaging	tons	ND	68,557.57	101	71	
	Recycled metal	% of total weight	ND	0	100	100	100
	Total weight of glass packaging	tons	ND	485	988	860	
	Recycled glass	% of total weight	ND	60	60	60	60
2.8.3	Total weight of plastic packaging	tons	20,769	21,193	20,560	18,687	23,000
	Percentage of recycled content within the plastic packaging	% of the total weight of all plastic packaging	0	0	1.7	2.2	2.0
	Percentage of recyclable plastic packaging	% of the total weight of all plastic packaging	99.00	99.50	99.50	99.43	99.50
	Percentage of compostable plastic packaging	% of the total weight of all plastic packaging	0.08	0.12	0.20	0.21	0.20

Remark:

- Quantity of plastic packaging in 2020 has been adjusted from the data disclosed in Sustainability Report 2020 due to re-calculation.