

PERFORMANCE SUMMARY

IRPC's 2021 Performance Summary to
disclose our sustainability related performance
i.e. economic, social, and environmental aspects

Economic

Financial Performance

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 201-1 (2016)	Sale Revenues ⁽¹⁾	THB Million	280,551	239,315	174,463	255,115
	Operating Costs	THB Million	264,637	236,569	174,491	228,989
	Operating Profit (Loss)	THB Million	10,197	(356)	(6,115)	17,914
	Employee Wages and Benefits	THB Million	9,270	10,171	9,088	9,285
	Payments to Providers of Capital	THB Million	9,920	3,768	3,943	4,600
	Payment to Governments ⁽²⁾	THB Million	21,850	21,568	20,727	19,778
	Dividend payments for the performance of the year	THB Million	7,959	1,837	1,837	2,857
GRI 201-4 (2016)	Tax Privileges from the Board of Investment, Thailand	THB Million	479	324	43	889
	Tax Compensation from Export	THB Million	79	106	78	63

Remarks: (1) Sales revenue includes petroleum sales (including excise tax), petrochemical sales, power and utilities sales, sales of storage tank and port service, etc.

(2) Taxes paid to government agencies and local officials such as corporate income taxes, local taxes, building taxes, and specific business taxes are paid directly to Thai government agencies and local officials as all IRPC operations are located only in Thailand.

(3) Revise Tax Privileges from the Board of Investment, Thailand 2018-2020 by multiply income tax 20%

Production

GRI Standard	Data	Unit	2018	2019	2020	2021
N/A	Annual Production	Ton	12,442,052	12,059,756	11,886,924	11,997,254

Remarks: IRPC decrease production rate in 2020 and 2021 to optimize economic value according to the changing of market factors.

Supply Chain Management

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 308-1 (2016)	Percentage of new suppliers that were screened using environmental criteria	%	100	100	100	100
GRI 414-1 (2016)	Percentage of new suppliers that were screened using labour practices criteria	%	100	100	100	100
	Percentage of new suppliers that were screened using human right criteria	%	100	100	100	100
	Percentage of new suppliers that were screened using criteria impacts on society	%	100	100	100	100
GRI 204-1 (2016)	Spending on purchasing of products and services from suppliers and contractors in Rayong	THB Million	2,568	2,470	1,931	2,644
	Percentage of spending in Rayong comparing to the total general procurement budget	%	18.90	21.46	18.00	11

Customer Relationship Management

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 102-43 (2016) GRI 102-44 (2016)	Annual customer satisfaction survey results ⁽¹⁾	%	89	91	93	94
GRI 416-2 (2016)	Incidents of non-compliance concerning the health and safety impacts of products and services	Case	0	0	0	0
GRI 417-3 (2016)	Incidents of non-compliance concerning marketing communications	Case	0	0	0	0
GRI 418-1 (2016)	Number of substantiated complaints received concerning breaches of customer privacy	Case	0	0	0	0
	Total number of identified leaks, thefts, or losses of customer data	Case	0	0	0	0
GRI 419-1 (2016)	Non-compliance with laws and regulations in the social and economic area	Case	0	0	0	0

Remark: (1) Only Petroleum and Petrochemical business included

People

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 102-8 (2016)	Employee (1)	Person	5,466	5,467	5,452	4,640
	Male	Person	4,524	4,524	4,509	3,947
	Female	Person	942	943	943	693
	Total employees by area					
	Bangkok	Person	695	702	706	579
	Male	Person	291	295	298	239
	Female	Person	404	407	408	340
	Rayong	Person	4,478	4,480	4,473	3881
	Male	Person	3,963	3,966	3,958	3,543
	Female	Person	515	514	515	338
	Other	Person	293	285	273	180
	Male	Person	270	263	253	165
	Female	Person	23	22	20	15
GRI 405-1 (2016)	Female shares of total workforce	% of total workforce	17.23	17.25	17.30	14.93
	Employees by level					
	Executive (Level 13-18)	Person	78	70	69	59
	Male	Person	57	53	53	44
	Female	Person	21	17	16	15
GRI 405-1 (2016)	Middle Management (Level 9-12)	Person	810	806	815	649
	Male	Person	619	623	622	497
	Female	Person	191	183	193	152
	Supervisory (Level 6-8)	Person	3,125	3,199	3,252	2,643
	Male	Person	2,531	2,622	2,672	2,196

	Female	Person	594	577	580	447
	Operation (Level 1-5)	Person	1,453	1,392	1,303	1,250
	Male	Person	1,317	1,226	1,155	1,173
	Female	Person	136	166	148	77
GRI 405-1 (2016)	Employees by age					
	Over 50 years old	Person	763	917	1,051	772
	Male	Person	615	734	843	646
	Female	Person	148	183	208	126
	30-50 years old	Person	4,086	3,968	3,822	3,131
	Male	Person	3,366	3,281	3,155	2,645
	Female	Person	720	687	667	486
	Below 30 years old	Person	617	582	566	737
	Male	Person	543	509	505	656
	Female	Person	74	73	61	81
GRI 401-1 (2016)	New employees					
	Total new employees	Person	63	97	96	312
		% of total employees	1.15	1.77	1.76	6.72
	Male	Person	41	73	79	252
		% of total employees	0.75	1.3	1.45	5.00
	Female	Person	22	24	17	60
		% of total employees	0.4	0.44	0.31	1.72
	New employees by area					
	Person	11	18	4	58	

	Bangkok	% of total employees	0.2	0.33	0.07	1.25	
	Male	Person	3	8	2	19	
		% of total employees	0.05	0.15	0.04	0.41	
	Female	Person	8	10	2	39	
		% of total employees	0.15	0.18	0.04	0.84	
	GRI 401-1 (2016)	Rayong	Person	52	79	92	244
			% of total employees	0.95	1.45	1.69	5.26
		Male	Person	38	65	77	224
% of total employees			0.7	1.19	1.41	4.83	
Female		Person	14	14	15	20	
		% of total employees	0.26	0.26	0.28	0.43	
Others		Person	0	0	0	10	
		% of total employees	0	0	0.00	0.22	
Male		Person	0	0	0	9	
		% of total employees	0	0	0.00	0.19	
Female		Person	0	0	0	1	
		% of total employees	0	0	0.00	0.03	
New employees by age							
Over 50 years old		Person	2	3	3	2	
		% of total employees	0.04	0.05	0.06	0.04	
		Person	0	1	1	1	

	Male	% of total employees	0	0.02	0.02	0.02
	Female	Person	2	2	2	1
		% of total employees	0.04	0.04	0.04	0.02
	30-35 years old	Person	11	13	14	41
		% of total employees	0.2	0.24	0.26	0.88
	Male	Person	5	5	3	26
		% of total employees	0.09	0.09	0.06	0.56
	Female	Person	6	8	11	15
		% of total employees	0.11	0.15	0.20	0.32
	Below 30 years old	Person	50	81	8	269
		% of total employees	0.91	1.48	0.16	5.80
	Male	Person	36	67	4	225
		% of total employees	0.66	1.23	0.08	4.85
	Female	Person	14	14	4	44
		% of total employees	0.26	0.26	0.07	0.95
Employee turnover						
	Total employee turnover	Person	55	71	126	307
		% of total employees	1.01	1.3	2.31	6.62
	Male	Person	44	52	100	259
		% of total employees	0.8	0.95	1.83	5.58
	Female	Person	11	19	26	48

		% of total employees	0.2	0.35	0.48	1.03
GRI 401-1 (2016)	Turnover employees by area					
	Bangkok	Person	10	17	16	65
		% of total employees	0.18	0.31	0.29	1.40
	Male	Person	4	8	6	31
		% of total employees	0.07	0.15	0.11	0.67
	Female	Person	6	9	10	34
		% of total employees	0.11	0.16	0.18	0.73
	Rayong	Person	40	50	99	218
		% of total employees	0.73	0.91	1.82	4.70
	Male	Person	35	41	85	206
		% of total employees	0.64	0.75	1.56	4.44
	Female	Person	5	9	14	12
		% of total employees	0.09	0.16	0.26	0.26
	Others	Person	5	4	11	24
		% of total employees	0.09	0.07	0.20	0.52
	Male	Person	5	3	9	22
		% of total employees	0.09	0.05	0.17	0.47
	Female	Person	0	1	2	2
		% of total employees	0	0.02	0.04	0.04

Turnover employees by age						
	Over 50 years old	Person	11	20	83	215
		% of total employees	0.2	0.37	1.52	4.63
	Male	Person	9	13	68	176
		% of total employees	0.16	0.24	1.25	3.79
	Female	Person	2	7	15	39
		% of total employees	0.04	0.13	0.28	0.84
	30-50 years old	Person	32	33	31	53
		% of total employees	0.59	0.6	0.57	1.14
	Male	Person	26	23	21	46
		% of total employees	0.48	0.42	0.39	0.99
	Female	Person	6	10	10	7
		% of total employees	0.11	0.18	0.18	0.15
	Below 30 years old	Person	12	18	12	39
		% of total employees	0.22	0.33	0.22	0.84
	Male	Person	9	16	11	37
		% of total employees	0.16	0.29	0.20	0.80
	Female	Person	3	2	1	2
		% of total employees	0.05	0.04	0.02	0.04
GRI 401-3 (2016)	Parental leave					
	Employees entitled for parental leave	Person	5,466	5,467	5,452	4,640

	Male	Person	4,524	4,524	4,509	3,947
	Female	Person	942	943	943	693
	Number of employees taking parental leave	Person	131	118	107	98
	Male	Person	115	97	91	86
	Female	Person	16	21	16	12
	Number of employees return to work after parental leave	Person	131	118	107	98
	Male	Person	115	97	91	86
		% of employees taking parental leave	100	100	100	100
	Female	Person	16	21	16	12
		% of employees taking parental leave	100	100	100	100
	Employees entitled for parental leave who are still employed for the next 12 months	Person	110	135	119	98
		% of employees returning to work after parental leave	96	103	88	100
	Male	Person	98	121	102	86
		% of employees returning to work after parental leave	98	105	84	100
	Female	Person	12	14	17	12
		% of employees returning to work after parental leave	86	88	121	100
GRI 102-41 (2016)	Total employees covered by collective bargaining	%	75	75	77	77

GRI 404-1 (2016)	Employees entitled to training and development	%	100	100	100	100
	Average hours of training per employee	Hour/ employee	46	41	14	27
	Average amount spent per employee on training and development	THB/ employee	27,281	18,507	5,960	653
	Percentage of open positions filled by internal candidates	%	100	100	100	100
	Training hours of male employees based in Bangkok	Hour	13,212	9,529	4,392	3,953
	Executive (Level 13-18)	Hour	1,100	185	42	40
	Middle Management (Level 9-12)	Hour	5,256	4,958	2,364	1,984
	Supervisory (Level 6-8)	Hour	6,350	3,858	1,783	1,580
	Operation (Level 1-5)	Hour	507	528	203	349
	Training hours of female employees based in Bangkok	Hour	17,560	15,861	4,791	4,312
	Executive (Level 13-18)	Hour	1,154	606	63	60
	Middle Management (Level 9-12)	Hour	6,450	6,689	2,436	2,130
	Supervisory (Level 6-8)	Hour	9,278	8,116	2,112	1,760
	Operation (Level 1-5)	Hour	678	450	180	362
	Training hours of male employees based in Rayong	Hour	194,056	168,853	61,465	55,319
	Executive (Level 13-18)	Hour	1,629	348	54	48
	Middle Management (Level 9-12)	Hour	24,141	22,174	15,795	13,920
	Supervisory (Level 6-8)	Hour	122,578	105,868	19,868	15,460
	Operation (Level 1-5)	Hour	45,708	40,463	25,748	25,891
	Training hours of female employees based in Rayong	Hour	15,590	17,535	5,266	4,739
	Executive (Level 13-18)	Hour	0	0	0	0
	Middle Management (Level 9-12)	Hour	2,647	2,275	1,547	1,350
	Supervisory (Level 6-8)	Hour	10,757	13,020	2,882	2,570
	Operation (Level 1-5)	Hour	2,186	2,240	837	819
Training hours of male employees based in other areas	Hour	11,298	11,031	1,941	1,747	

	Executive (Level 13-18)	Hour	0	0	0	0
	Middle Management (Level 9-12)	Hour	816	982	384	346
	Supervisory (Level 6-8)	Hour	7,548	6,719	972	894
	Operation (Level 1-5)	Hour	2,934	3,330	585	507
	Training hours of female employees based in other areas	Hour	813	754	30	26
	Executive (Level 13-18)	Hour	0	0	0	0
	Middle Management (Level 9-12)	Hour	0	0	0	0
	Supervisory (Level 6-8)	Hour	537	501	21	18
	Operation (Level 1-5)	Hour	276	253	9	8
GRI 201-1 (2016)	Human Capital Return on Investment (HCROI) (according to DJSI definition)	HCROI	2.72	1.27	1.00	3.80
GRI 404-3 (2016)	Performance Appraisal [Management by objectives]	% of total employees	100	100	100	100

Remarks: (1) IRPC does not employ any part-time employees.

(2) Training hours of employee decrease in 2020 -2021 cause of covid-19 pandemic.

Safety

Process Safety

GRI Standard	Data	Unit	2018	2019	2020	2021
N/A	Number of tier 1 process safety events	Case	0	3	2	0
	Number of tier 2 process safety events	Case	2	0	1	2
	Total number of hours worked	Million hours	20.35	19.88	18.06	19.21
	Employees	Million hours	11.25	11.20	11.14	9.59
	All workers	Million hours	9.10	8.68	6.92	9.62
	Total Recordable Injury Rate (TRIR) ⁽²⁾	Case/ Million hours	0.39	0.25	0.39	0.10
	Employees ⁽³⁾	Case/ Million hours	0.36	0.18	0.36	0.10

All workers (4)	Day/ Million hours	0.44	0.35	0.43	0.10
Total Recordable Injuries Case (TRIC)	Person	8	5	7	2
Employees	Person	4	2	4	1
All workers	Person	4	3	3	1
Lost Time Injuries Frequency Rate (LTIFR)	Case/ Million hours	0.25	0.20	0.17	0.00
Employees	Case/ Million hours	0.27	0.18	0.09	0.00
All workers	Case/ Million hours	0.22	0.23	0.29	0.00
Total Recordable Occupational Illness Rate (TROIR) (5)	Case/ Million hours	0	0	0	0
Employees	Case/ Million hours	0	0	0	0
All workers	Case/ Million hours	0	0	0	0
Lost Day Rate (LDR) (6)	Day/ Million hours	5.26	1.31	1.27	0.00
Employees	Day/ Million hours	8.18	1.43	0.54	0.00
All workers	Day/ Million hours	1.65	1.15	2.46	0.00
Lost Workday Case (LWC)	Person	5	4	3	0
Employees	Person	3	2	1	0
All workers	Person	2	2	2	0
Fatalities	Person	0	0	0	0
Employees	Person	0	0	0	0
All workers	Person	0	0	0	0
Near Misses - Employee and all workers	Case	256	116	79	257

Remarks: (1) Health and safety statistics are based on OSHA and measured per million working hours. Employees of IRPC Public Company Limited, including its subsidiaries with more than 50% of the shares held by IRPC. All workers exclude Employees.

(2)TRIR does not include first aid cases.

(3)Types of work-related injury for employees are fatalities, permanent total disabilities, lost workday case, restricted workday case, and medical treatment case.

(4)Types of work-related injury for workers are fatalities, permanent total disabilities, lost workday case, restricted workday case, and medical treatment case.

(5)TROIR is obtained from the results of annual employee health check-ups and diagnosed by occupational medicine doctor.

(6)LDR accounts injuries or sickness causing inability to work on the next working day.

Environment

Materials Consumption

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 301-1 (2016)	Crude Oil	Ton	9,943,352	9,383,905	9,191,312	9,232,776
	Naphtha	Ton	961,415	1,026,692	946,987	813,408

Energy Consumption ⁽¹⁾

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 302-1 (2016)	Total energy consumption ^{(2), (3)}	GJ	59,020,452	58,719,745	57,519,116	60,044,448
	Total direct energy consumption	GJ	59,221,327	59,072,047	57,760,248	60,174,826
	Fuel Oil	GJ	2,429,764	2,349,064	2,445,972	2,468,057
	Natural Gas	GJ	21,783,924	21,908,700	22,821,990	22,174,781
	LPG	GJ	684,881	638,187	919,616	975,582
	Diesel	GJ	295,826	269,792	244,276	265,690
	Fuel Gas	GJ	20,214,853	19,547,018	18,599,283	18,936,615
	Coke	GJ	6,269,004	5,745,860	5,669,729	6,251,554
GRI 302-1 (2016)	H ₂	GJ	297,061	309,563	261,721	191,967
	H ₂ S	GJ	298	0	0	0
	Purge Gas	GJ	1,030,912	1,038,258	741,998	1,330,537
	Recycle monomer	GJ	0	0	0	33,423
	Coal	GJ	30,361	30,929	32,892	7,546,619

	H ₂ S	GJ	6,184,444	7,234,675	6,022,770	4,721,574
	Total indirect energy consumption	GJ	4,502,344	4,549,128	4,798,143	251,294
	Electricity purchased from PEA (3)	GJ	301,578	308,166	220,933	1,260,532
	Electricity purchased from IRPC Clean Power	GJ	1,505,209	1,520,670	1,403,656	3,209,748
	Steam purchased by IRPC Clean Power	GJ	2,695,557	2,720,292	3,173,553	60,044,448
	Total electricity sold	GJ	2,242,431	2,365,088	2,336,467	2,359,033
	Total steam sold	GJ	2,460,788	2,536,342	2,725,214	2,563,054
	Total renewable (wind, solar, biomass, hydroelectric, geothermal, etc.) purchased or generated	GJ	0	0	22,406	70,135
GRI 302-3 (2016)	Energy intensity (4)	GJ/ Ton of production	4.75	4.87	4.84	19,482
GRI 302-4 (2016)	Energy saved due to conservation and efficiency improvements	GJ	604,997	422,120	167,898	5.00

Remarks: (1) The calculation standards and methodologies are based on relevant laws and regulations.

(2) The energy consumption in 2020 decreased from preventive maintenance of UHV as plan

(3) Electricity purchased from the Provincial Electricity Authority and the Metropolitan Electricity Authority (Bangkok office has been included since 2015).

(4) Renewable energy that has been used since September 2020.

Flared and Vented Hydrocarbon ⁽¹⁾

GRI Standard	Data	Unit	2018	2019	2020	2021
G4-OG6 (GRI-G4)	Volume of flared hydrocarbon (1), (4)	Million M ³	57.44	62.67	38.89	39.15
	Volume of continuously flared hydrocarbon	Million M ³	55.37	52.8	33.24	29.29
	Volume flared hydrocarbon for oil & gas production in relation to volume produced	M ³ / Ton of production	4.61	5.20	3.27	3.29
	Volume of Vented hydrocarbon	Million M ³	4.54	3.83	3.97	3.54
	Production process (2)	Million M ³	1.42	1.28	1.41	1.19
	Tank & Marketing & Terminal (3)	Million M ³	3.12	2.55	2.56	2.35
	Volume Vented hydrocarbon for oil & gas production in relation to volume produced	M ³ / Ton of production	0.11	0.11	0.33	0.30

N/A	Methane Emission of flared hydrocarbon	Ton	74.52	81.30	50.45	50.79
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Remarks: (1) The volume of vented hydrocarbon is calculated in accordance with IRPC's Hydrocarbon Management Manual, in reference to HM31: Guide to HC Management in Petroleum Refinery Operation and HM32: Guide to Product HC Management at Petroleum Product Marketing and Distribution.

(2) The volume of hydrocarbon released from production process includes ABC data (HC calculated from the difference of feed to product as stored in SAP) and EPS data (calculated from feed to reactor in each 7.5% batch and products with 6.6% pentane I each month).

(3) The volume of hydrocarbon released from storage tanks and product and raw material handling is collected from VOC report. The unit is converted to cubic meter.

(4) The volume of vented hydrocarbon in 2019 was greater than in 2018 due to equipment improvements at DCC and improvements to the data collection process from the digital database program iMass.

(5) In 2020, the UHV plant transported gas which was originally vented to be used as energy in the production process resulting in reducing the volume of hydrocarbon released when compared to 2019.

(6) In 2021, volume of hydrocarbon increased from 2020 because of unplanned shut down from plant.

Greenhouse Gas ⁽¹⁾

GRI Standard	Data	Unit	2018	2019	2020	2021
	Operational Control					
GRI 305-1 (2016)	Direct emissions of greenhouse gas (Scope 1) (2), (3)	Million tCO ₂ e	3.846	3.784	3.721	3.946
	CO ₂	Million tCO ₂ e	3.837	3.776	3.710	3.938
	CH ₄	Million tCO ₂ e	0.004	0.003	0.003	0.003
	N ₂ O	Million tCO ₂ e	0.004	0.004	0.004	0.004
	HFC	Million tCO ₂ e	0.001	0.001	0.004	0.000
	SF ₆	tCO ₂ e	372	351	520	684
	Biogenic CO ₂ Emissions	tCO ₂ e	242	352	386	299
GRI 305-2 (2016)	Indirect emissions of greenhouse gas (Scope 2) (3)	Million tCO ₂ e	0.338	0.341	0.341	0.402
	Location Based ⁽⁴⁾	Million tCO ₂ e	0.029	0.031	0.025	0.036
	Market Based ⁽⁵⁾	Million tCO ₂ e	0.308	0.310	0.316	0.366
GRI 305-3 (2016)	Other indirect emissions of greenhouse gas (Scope 3) ⁽⁶⁾	Million tCO ₂ e	20.377	16.544	16.560	14.906
	Equity Basis					
GRI 305-1 (2016)	Direct emissions of greenhouse gas (Scope 1)	Million tCO ₂ e	4.327	4.266	4.197	4.405

GRI 305-2 (2016)	Indirect emissions of greenhouse gas (Scope 2) (3)	Million tCO ₂ e	0.338	0.341	0.341	0.402
GRI 305-4 (2016)	GHG Emission Intensity ⁽⁷⁾	tCO ₂ e/ Ton of production	0.336	0.342	0.342	0.362

Remarks: (1)The GHG calculations are based to API 2009, IPCC 2006, ISO14064-1, The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition), while GWP is based to the IPCC Fourth Assessment Report (AR4-100 year) are the reports of the following subsidiaries: IRPC PCL, IRPC Oil Co., Ltd., IRPC Polylol Co.,Ltd.,UBE Chemicals (Asia) Co., Ltd., and IRPC Clean Power Co., Ltd.

(2)This does not include GHG emission from process vents.

(3) GHG emission from electricity purchased from the Provincial Electricity Authority is calculated in reference to PDP 2015 Conversion Factors Calculation.

(4) GHG emission from electricity and steam purchased from (local) private power plant is calculated in reference to Allocation of GHG Emission from Combined Heat and Power (CHP) Plant Guide to Calculation Worksheet V.10 (A WRI/WBCSD GHG Protod. Initiative Calculation Tod).

(5) GHG emission intensity was calculated from Scope 1 and Scope 2.

(6) GHG emission had been changed because of revise emission factor from CHP2.

Air Emissions ⁽¹⁾

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 305-7 (2016)	Total NOx	Ton	1,759	1,592	1,495	1,607
	NOx Intensity	Ton/ Thousand Tons of production	0.141	0.132	0.126	0.134
	Total SOx ^{(2), (3)}	Ton	1,566	1,800	1,377	1,147
	SOx Intensity ⁽³⁾	Ton/ Thousand Tons of production	0.126	0.149	0.116	0.096
	Total Suspended Particulate (TSP)	Ton	270	338	259	294
	TSP Intensity	Ton/ Thousand Tons of production	0.022	0.028	0.022	0.024
	Total VOCs	Ton	2,107	1,897	1,822	1,696
	VOCs Intensity ⁽⁴⁾	Ton/ Thousand Tons of production	0.169	0.157	0.153	0.141

Remarks: (1)This comes from direct measurements or calculation based on relevant standards and regulations.

(2)The amount of sulfur's oxide is in the form of sulfur dioxide.

(3)The NOx Emission in 2021 increased from 2020 due to the CFBC Boiler (Power Plant) Operate after the renovation.

Water Consumption and Wastewater

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 303-3 (2018) a	Total water withdrawal ⁽¹⁾	Million M ³	42	40	40	40
	Fresh water (Water with total dissolved solids less than 1,000 Milligram/ liter)	Million M ³	29	28	27	27
	Surface water ⁽⁵⁾	Million M ³	29	28	27	27
	Ground water	Million M ³	0	0	0	0
	Third-party water	Million M ³	0	0	0	0
	Other water (Water with total dissolved solids more than 1,000 Milligram/ liter)	Million M ³	13	12	13	13
	Sea water	Million M ³	13	12	13	13
	Total third-party water withdrawal by withdrawal source	Million M ³	0	0	0	0
GRI 303-3 (2018) b	Water consumption in risk area	Million M ³	0	0	0	0
	Surface water	Million M ³	0	0	0	0
	Ground water	Million M ³	0	0	0	0
	Water quantity usage from other departments separate by water source	Million M ³	0	0	0	0
	Surface water	Million M ³	0	0	0	0
	Ground water	Million M ³	0	0	0	0
	Other water (Water with total dissolved solids more than 1,000 Milligram/ liter)	Million M ³	0	0	0	0
	Sea water	Million M ³	0	0	0	0
GRI 303-4 (2018)	Total volume of water discharge by type and destination ⁽²⁾	Million M ³	23	25	25	25
	Fresh water (Water with total dissolved solids less than 1,000 Milligram/ liter)	Million M ³	6	8	8	8

	Surface water	Million M ³	0	0	0	0
	Third-party water sent for use to other organizations	Million M ³	6	8	8	8
	Other water (Water with total dissolved solids more than 1,000 Milligram/ liter)	Million M ³	17	17	17	17
	Surface water	Million M ³	2	2	2	2
	Sea water	Million M ³	15	15	16	16
	Fresh water withdrawal intensity ⁽³⁾	M ³ /Ton of production	2.33	2.32	2.24	2.28
GRI 303-5 (2018)	Total water consumption	Million M ³	19	15	15	15
	Results of water volume in Reservoir at 1st January and 31st December of that year ⁽⁴⁾	Million M ³	3.18	1.45	0.64	-0.093

Remarks: (1) Water usage from various sources, including the distribution to third parties.

(2) Volume of water discharged includes seawater used for sulfur scrubbing which is treated before being released to the sea. The volume of wastewater is measured from the sewage sent to wastewater treatment system (except seawater that the volume of process water is equal to that of wastewater according to process design) and the volume of water distributed to third parties (the communities surrounding IRPC Industrial Zone and other third-parties businesses within IRPC Industrial Zone).

(3) The difference of water volume in reservoirs in 2019 was less than in the previous year. The process water was reserved for drought. Therefore, the water was not taken from the reservoir.

(4) The surface water from natural sources is calculated from the receipts issued by Royal Irrigation Department (Khlong Yai River Basin) and rainwater in the reservoirs within IRPC Industrial Zone

(5) Fresh water withdrawal intensity = volume of freshwater / volume of production

(6) Total water consumption = total volume of water withdrawal - total volume of water discharged by type and destination

Solid Waste

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 306-2 (2016)	Total waste disposal ^{(1), (2), (3)}	Ton	55,598	51,275	41,752	61,260
	Waste from routine operations	Ton	55,129	51,009	41,616	61,238
	Non-hazardous waste	Ton	38,460	39,383	33,909	51,389
	Composition	Ton	0	0	0	0
	Export	Ton	0	0	0	0
	Incineration	Ton	65	1,937	2,654	1,850
	Landfilling	Ton	97	0	0	0

Wastewater Treatment	Ton	0	0	0	0
Recovery	Ton	1,298	1,052	1,306	932
Recycling	Ton	27,689	35,590	29,511	40,897
Reuse	Ton	0	318	0	0
On-site storage	Ton	0	486	437	1,712
Land reclamation	Ton	9,312	0	0	5,998
Hazardous waste	Ton	16,669	11,626	7,707	9,849
Composition	Ton	0	0	0	0
Export	Ton	1,054	266	64	346
Incineration	Ton	12,620	3,392	1,876	2,111
Landfilling	Ton	57	0	0	1
Wastewater Treatment	Ton	0	0	0	236
Recovery	Ton	2,707	5,747	4,886	6,185
Recycling	Ton	156	2,168	843	942
Reuse	Ton	37	31	13	5
On-site storage	Ton	38	21	26	23
Land reclamation	Ton	0	0	0	0
Waste from non-routine operations	Ton	469	266	135	22
Non-hazardous waste	Ton	78	145	0	0
Incineration	Ton	0	0	0	0
Landfilling	Ton	0	0	0	0
Export	Ton	0	0	0	0
Recovery	Ton	5	145	0	0
Recycling	Ton	73	0	0	0
Hazardous waste	Ton	390	121	135	22
Incineration	Ton	201	0	0	0

	Landfilling	Ton	33	0	0	0	
	Export	Ton	0	121	0	0	
	Recovery	Ton	115	0	135	22	
	Recycling	Ton	41	0	0	0	
GRI 306-3 (2020)	Total waste generated	Ton	55,598	51,275	41,752	61,260	
	Hazardous waste generated	Ton	17,019	11,747	7,842	9,871	
	Non-hazardous waste generated	Ton	38,579	39,529	33,909	51,389	
GRI 306-4 (2020)	Total waste diverted from disposal	Ton	32,121	45,051	36,694	48,983	
	Total Hazardous waste diverted from disposal	Ton	3,056	7,946	5,877	7,154	
	Total Non-hazardous waste diverted from disposal	Ton	29,065	37,105	30,818	41,829	
	Onsite						
	Hazardous waste diverted from disposal	Ton	0	0	0	0	
	Preparation for reuse	Ton	0	0	0	0	
	Recycling	Ton	0	0	0	0	
	Other recovery operations	Ton	0	0	0	0	
	Non-hazardous waste diverted from disposal	Ton	0	0	0	0	
	Preparation for reuse	Ton	0	0	0	0	
	Recycling	Ton	0	0	0	0	
	Other recovery operations	Ton	0	0	0	0	
	Offsite						
	Hazardous Waste diverted from disposal	Ton	3,056	7,946	5,877	7,154	
	Preparation for reuse	Ton	37	31	13	5	
Recycling	Ton	197	2,168	843	942		
Other recovery operations	Ton	2,822	5,747	5,021	6,207		
Non-hazardous waste diverted from disposal	Ton	29,065	37,105	30,818	41,829		
Preparation for reuse	Ton	318	0	0	0		

	Recycling	Ton	27,762	35,590	29,511	40,897	
	Other recovery operations	Ton	1,303	1,197	1,306	932	
GRI 306-5 (2020)	Total waste directed to disposal	Ton	14,165	6,223	5,057	12,277	
	Total Hazardous waste directed from disposal	Ton	14,003	3,800	1,966	2,717	
	Total Non-hazardous waste directed from disposal	Ton	162	2,423	3,092	9,560	
	Onsite						
	Hazardous waste directed to disposal	Ton	0	0	0	0	
	Incineration (with energy recovery)	Ton	0	0	0	0	
	Incineration (without energy recovery)	Ton	0	0	0	0	
	Landfilling	Ton	0	0	0	0	
	Other disposal operations	Ton	0	0	0	0	
	Non-hazardous waste directed to disposal	Ton	0	0	0	0	
	Incineration (with energy recovery)	Ton	0	0	0	0	
	Incineration (without energy recovery)	Ton	0	0	0	0	
	Landfilling	Ton	0	0	0	0	
	Other disposal operations	Ton	0	0	0	0	
	Offsite						
	Hazardous waste directed to disposal	Ton	14,003	3,800	1,966	2,717	
	Incineration (with energy recovery)	Ton	n/a	n/a	293	490	
	Incineration (without energy recovery)	Ton	12,821	3,392	1,583	1,621	
	Landfilling	Ton	0	0	0	1	
	Other disposal operations	Ton	1,092	408	90	605	
Non-hazardous waste directed to disposal	Ton	162	2,423	3,092	9,560		
Incineration (with energy recovery)	Ton	n/a	n/a	564	1,850		

	Incineration (without energy recovery)	Ton	65	1,937	2,090	0
	Landfilling	Ton	97	0	0	0
	Other disposal operations	Ton	0	486	437	7,710
GRI 306-4 (2016)	Hazardous waste transportation	Ton	17,019	11,747	7,842	9,871
	Hazardous waste import to IRPC	Ton	0	0	5	0
	Hazardous waste export from IRPC	Ton	17,019	11,747	7,842	9,871
	Hazardous waste treated	Ton	24	42	5	11
	Hazardous waste shipped internationally	Ton	1,054	266	64	346

Remarks: (1) Waste management data from service providers certified by the Department of Industrial Works.
(2) Non-routine Hazardous waste are acid leaked from ETP plant
(3) In 2021 nonhazardous waste for Land reclamation are soil from Utility Ban-Kai plant
(4) Waste on site in 2021 increased from 2020 because of cleaning office building.
(5) In 2021 non-hazardous waste increased from fly ash

Oil and Chemical Spills

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 306-3 (2016)	Significant Oil & Chemical Spills	Case	0	0	0	0
		M3	0	0	0	0

Environmental Protection Expenditures and Investment Fines

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 201-1 (2016)	Environmental protection expenditures and investments (e.g. operation related costs, etc.) (1)	THB Million	194	311	435	538
N/A	Benefit from environmental investment (2)	THB Million	2,616	1,427	381	1,005
GRI 307-1 (2016)	Monetary value of significant fines	THB Million	0	0	0	0
	Number of non-monetary sanctions	Case	0	0	0	0
	Case brought through dispute resolution mechanisms	Case	0	0	0	0

Remarks: (1) Expenditures of environmental protection investment are calculated.
(2) Benefits from environmental investment, such as investment returns, tax incentives from the Board of Investment of Thailand (BOI).

Philanthropy

GRI Standard	Data	Unit	2018	2019	2020	2021
GRI 102-43 (2016)	Community satisfaction	%	88.50	91.40	97.45	98.63
GRI 307-1 (2016)	Number of violations of legal obligations/ regulations	Case	0	0	0	0
	Amount of fines/ penalties related to the above (more than \$10,000 USD)	THB	0	0	0	0
	Environmental liability accrued at year end	THB	0	0	0	0