PERFORMANCE SUMMARY

FY 2022

IRPC Public Company Limited

Economic

Financial Capital

GRI Standard	Data	Unit	2019	2020	2021	2022
GRI 201-1 (2016)	Sale Revenues (1)	THB Million	239,315	174,463	255,115	324,800
	Operating Costs	THB Million	236,569	174,491	228,989	314,892
	Operating Profit (Loss)	THB Million	(356)	(6,115)	17,914	(3,912)
	Employee Wages and Benefits	THB Million	10,171	9,088	9,285	8,417
	Payments to Providers of Capital	THB Million	3,768	3,943	4,600	3,760
	Payment to Governments (2)	THB Million	21,568	20,727	19,778	5,705
	Dividend payments for the performance of the year	THB Million	1,837	1,837	2,857	3,674
GRI 201-4 (2016)	Tax Privileges from the Board of Investment, Thailand	THB Million	324	43	889	
	Tax Compensation from Export	THB Million	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%

Return on Environmental Investment

GRI Standard	Data	Unit	2019	2020	2021	2022
2-5 (2021)	Total expenditures	THB Million	310.99	453.00	537.50	595.29
	Capital investments	THB Million	242.26	409.00	502.25	564.61
	Operating Expenses	THB Million	68.73	26.00	35.25	30.69
	Saving, cost aviodance, income, tax incentives, etc.	THB Million	444.00	190.00	1,005.00	
	Operation covered (by revenue, production volume, or employees, etc)	% of operation covered	100	100	100	100

Production

GRI Standard	Data	Unit	2019	2020	2021	2021
N/A	Annual Production	Ton	12,059,756	11,886,924	11,997,254	11,070,331
	Annual Production	Mmboe	78.28	75.28	73.22	72.04

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	2019	2020	2021	2022
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	2,470	1,931	2,644	3,017
	Percentage of spending in Rayong comparing to the total general procurement budget	%	21.46	18.00	11	21

Customer Relationship Management

GRI Standard	Data	Unit	2019	2020	2021	2022
GRI 102-43 (2016) GRI 102-44 (2016)	Annual customer satisfaction survey results (1)	%	91	93	94	95
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

Social

People

GRI Standard	Data	Unit	2019	2020	2021	2022
GRI 102-8 (2016)	Employee (1)	Person	5,467	5,452	4,640	5,342
	Male	Person	4,524	4,509	3,947	4,497
	Female	Person	943	943	693	845
	Total employees by area					
	Bangkok	Person	702	706	579	683
	Male	Person	295	298	239	283
	Female	Person	407	408	340	400
	Rayong	Person	4,480	4,473	3881	4403
	Male	Person	3,966	3,958	3,543	3,975
	Female	Person	514	515	338	428
	Other	Person	285	273	180	256
	Male	Person	263	253	165	239
	Female	Person	22	20	15	17
GRI 405-1 (2016)	Female shares of total workforce	% of total workforce	17.25	17.30	14.93	15.82
GRI 405-1 (2016)	Employees by level					
	Executive (Level 13-18)	Person	70	69	59	64
		% of total employees	1.28	1.26	1.27	1.20
	Male	Person	53	53	44	50
		%	0.97	0.97	0.95	0.94
	Female	Person	17	16	15	14
		%	0.31	0.29	0.32	0.26
	Middle Management (Level 9-12)	Person	806	815	649	898

GRI Standard	Data	Unit	2019	2020	2021	2022
		% of total employees	14.74	14.95	13.99	16.81
	Male	Person	623	622	497	704
		%	11.40	11.41	10.71	13.18
	Female	Person	183	193	152	194
		%	3.35	3.54	3.28	3.63
	Supervisory (Level (6-8)	Person	3,199	3,252	2,643	3,047
		% of total employees	58.51	59.65	56.96	57.04
	Male	Person	2,622	2,672	2,196	2,488
		%	47.96	49.01	47.33	46.57
	Female	Person	577	580	447	559
		%	10.55	10.64	9.63	10.46
	Operation (Level 1-5)	Person	1,392	1,303	1,250	1,300
		% of total employees	25.46	23.90	26.94	24.34
	Male	Person	1,226	1,155	1,173	1,222
		%	22.43	21.18	25.28	22.88
	Female	Person	166	148	77	78
		%	17.60	15.69	11.11	9.23
GRI 405-1 (2016)	Employees by age					
	Over 50 years old	Person	917	1,051	772	1,345
		% of total employees	16.77	19.28	16.64	25.18
	Male	Person	734	843	646	1,099
		%	13.43	15.46	13.92	20.57
	Female	Person	183	208	126	246
		%	3.35	3.82	2.72	4.61
	30-50 years old	Person	3,968	3,822	3,131	3,275

GRI Standard	Data	Unit	2019	2020	2021	2022
		% of total employees	72.58	70.10	67.48	61.31
	Male	Person	3,281	3,155	2,645	2,759
		%	60.01	57.87	57.00	51.65
	Female	Person	687	667	486	516
		%	12.57	12.23	10.47	9.66
	Below 30 years old	Person	582	566	737	719
		% of total employees	10.65	10.38	15.88	13.46
	Male	Person	509	505	656	636
		%	9.31	9.26	14.14	11.91
	Female	Person	73	61	81	83
		%	1.34	1.12	1.75	1.55
GRI 401-1 (2016)	New employees					
	Total new employees	Person	97	96	312	141
		% of total employees	1.77	1.76	6.72	2.64
	Male	Person	73	79	252	111
		% of total employees	1.3	1.45	5.00	2.08
	Female	Person	24	17	60	30
		% of total employees	0.44	0.31	1.72	0.56
	New employees by area					
	Bangkok	Person	18	4	58	26
		% of total employees	0.33	0.07	1.25	0.49
	Male	Person	8	2	19	11
		% of total employees	0.15	0.04	0.41	0.21

GRI Standard	Data	Unit	2019	2020	2021	2022
	Female	Person	10	2	39	15
		% of total employees	0.18	0.04	0.84	0.28
GRI 401-1 (2016)	Rayong	Person	79	92	244	113
		% of total employees	1.45	1.69	5.26	2.12
	Male	Person	65	77	224	98
		% of total employees	1.19	1.41	4.83	1.83
	Female	Person	14	15	20	15
		% of total employees	0.26	0.28	0.43	0.28
	Others	Person	0	0	10	2
		% of total employees	0	0.00	0.22	0.04
	Male	Person	0	0	9	2
		% of total employees	0	0.00	0.19	0.04
	Female	Person	0	0	1	0
		% of total employees	0	0.00	0.03	0.00
	New employees by age					
	Over 50 years old	Person	3	3	2	0
		% of total employees	0.05	0.06	0.04	0.00
	Male	Person	1	1	1	0
		% of total employees	0.02	0.02	0.02	0.00
	Female	Person	2	2	1	0
		% of total employees	0.04	0.04	0.02	0.00
	30-35 years old	Person	13	14	41	7
		% of total employees	0.24	0.26	0.88	0.13

GRI Standard	Data	Unit	2019	2020	2021	2022
	Male	Person	5	3	26	3
		% of total employees	0.09	0.06	0.56	0.06
	Female	Person	8	11	15	4
		% of total employees	0.15	0.20	0.32	0.07
	Below 30 years old	Person	81	8	269	129
		% of total employees	1.48	0.16	5.80	2.41
	Male	Person	67	4	225	104
		% of total employees	1.23	0.08	4.85	1.95
	Female	Person	14	4	44	25
		% of total employees	0.26	0.07	0.95	0.47
	Employee turnover					
	Total employee turnover	Person	71	126	307	99
		% of total employees	1.3	2.31	6.62	1.85
	Male	Person	52	100	259	77
		% of total employees	0.95	1.83	5.58	1.44
	Female	Person	19	26	48	22
		% of total employees	0.35	0.48	1.03	0.41
GRI 401-1 (2016)	Turnover employees by area					
	Bangkok	Person	17	16	65	27
		% of total employees	0.31	0.29	1.40	0.51
	Male	Person	8	6	31	13
		% of total employees	0.15	0.11	0.67	0.24
		Person	9	10	34	14

GRI Standard	Data	Unit	2019	2020	2021	2022
	Female	% of total employees	0.16	0.18	0.73	0.26
	Rayong	Person	50	99	218	70
		% of total employees	0.91	1.82	4.70	1.31
	Male	Person	41	85	206	63
		% of total employees	0.75	1.56	4.44	1.18
	Female	Person	9	14	12	7
		% of total employees	0.16	0.26	0.26	0.13
	Others	Person	4	11	24	2
		% of total employees	0.07	0.20	0.52	0.04
	Male	Person	3	9	22	1
		% of total employees	0.05	0.17	0.47	0.02
	Female	Person	1	2	2	1
		% of total employees	0.02	0.04	0.04	0.02
	Turnover employees by age					
	Over 50 years old	Person	20	83	215	27
		% of total employees	0.37	1.52	4.63	0.51
	Male	Person	13	68	176	21
		% of total employees	0.24	1.25	3.79	0.39
	Female	Person	7	15	39	6
		% of total employees	0.13	0.28	0.84	0.11
	30-50 years old	Person	33	31	53	30
		% of total employees	0.6	0.57	1.14	0.56

GRI Standard	Data	Unit	2019	2020	2021	2022
	Male	Person	23	21	46	22
		% of total employees	0.42	0.39	0.99	0.41
	Female	Person	10	10	7	8
		% of total employees	0.18	0.18	0.15	0.15
	Below 30 years old	Person	18	12	39	37
		% of total employees	0.33	0.22	0.84	0.69
	Male	Person	16	11	37	29
		% of total employees	0.29	0.20	0.80	0.54
	Female	Person	2	1	2	8
		% of total employees	0.04	0.02	0.04	0.15
GRI 401-3 (2016)	Parental leave					
	Employees entitled for parental leave	Person	5,467	5,452	4,640	5,342
	Male	Person	4,524	4,509	3,947	4,497
	Female	Person	943	943	693	845
	Number of employees taking parental leave	Person	118	107	98	
	Male	Person	97	91	86	
	Female	Person	21	16	12	
	Number of employees return to work after parental leave	Person	118	107	98	
	Male	Person	97	91	86	
		% of employees taking parental leave	100	100	100	
	Female	Person	21	16	12	
		% of employees taking	100	100	100	

GRI Standard	Data	Unit	2019	2020	2021	2022
		parental leave				
	Employees entitled for parental leave who are still employed for the next 12 months	Person	135	119	98	
		% of employees returning to work after parental leave	103	88	100	
	Male	Person	121	102	86	
		% of employees returning to work after parental leave	105	84	100	
	Female	Person	14	17	12	
		% of employees returning to work after parental leave	88	121	100	
GRI 102-41 (2016)	Total employees covered by collective bargaining	%	75	77	77	75
GRI 404-1 (2016)	Employees entitled to training and development	%	100	100	100	100
	Average hours of training per employee	Hour/ employee	41	14	27	41
	Average amount spent per employee on training and development	THB/ employee	18,507	5,960	653	12,563
	Percentage of open positions filled by internal candidates	%	100	100	100	100
	Training hours of male employees based in Bangkok	Hour	9,529	4,392	3,953	6,473
	Executive (Level 13-18)	Hour	185	42	40	90
	Middle Management (Level 9-12)	Hour	4,958	2,364	1,984	2,729
	Supervisory (Level 6-8)	Hour	3,858	1,783	1,580	3,015
	Operation (Level 1-5)	Hour	528	203	349	639
	Training hours of female employees based in Bangkok	Hour	15,861	4,791	4,312	11,766

GRI Standard	Data	Unit	2019	2020	2021	2022
	Executive (Level 13-18)	Hour	606	63	60	144
	Middle Management (Level 9-12)	Hour	6,689	2,436	2,130	3,447
	Supervisory (Level 6-8)	Hour	8,116	2,112	1,760	6,871
	Operation (Level 1-5)	Hour	450	180	362	1,304
	Training hours of male employees based in Rayong	Hour	168,853	61,465	55,319	119,361
	Executive (Level 13-18)	Hour	348	54	48	490
	Middle Management (Level 9-12)	Hour	22,174	15,795	13,920	14,754
	Supervisory (Level 6-8)	Hour	105,868	19,868	15,460	51,150
	Operation (Level 1-5)	Hour	40,463	25,748	25,891	52,967
	Training hours of female employees based in Rayong	Hour	17,535	5,266	4,739	11,185
	Executive (Level 13-18)	Hour	0	0	0	30
	Middle Management (Level 9-12)	Hour	2,275	1,547	1,350	1,183
	Supervisory (Level 6-8)	Hour	13,020	2,882	2,570	7,882
	Operation (Level 1-5)	Hour	2,240	837	819	2,090
	Training hours of male employees based in other areas	Hour	11,031	1,941	1,747	3,267
	Executive (Level 13-18)	Hour	0	0	0	0
	Middle Management (Level 9-12)	Hour	982	384	346	388
	Supervisory (Level 6-8)	Hour	6,719	972	894	2,387
	Operation (Level 1-5)	Hour	3,330	585	507	492
	Training hours of female employees based in other areas	Hour	754	30	26	361
	Executive (Level 13-18)	Hour	0	0	0	0
	Middle Management (Level 9-12)	Hour	0	0	0	0
	Supervisory (Level 6-8)	Hour	501	21	18	280
	Operation (Level 1-5)	Hour	253	9	8	81
GRI 201-1 (2016)	Human Capital Return on Investment (HCROI) (according to DJSI definition)	HCROI	1.27	1.00	3.80	49.49

GRI Standard	Data	Unit	2019	2020	2021	2022
GRI 404-3 (2016)	Performance Appraisal [Management by objectives]	% of total employees	100	100	100	100
	Total Employees by Nationality					
	Thai nationality	% of total employees	-	-	-	99
	Japanese nationality	% of total employees	-	-	-	0.05
	Singapore nationality	% of total employees	-	-	-	0.03
	German nationality	% of total employees	-	-	-	0.03
	Other nationality	% of total employees	-	-	-	-
	People with Disability					
		Person	-	-	1	4
	Type of Performance Appraisal					
	Management by objectives	% of total employees	100	100	100	100
	Multidimensional performance appraisal	% of total employees	100	100	100	100
	Agile conversations	% of total employees	100	100	100	100
	Employee engagement					
	Employee engagement result		82	79	85	87
	Employee engagement target		80	80	80	80
	Coverage	% of total employees	95	82	82	90

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	2019	2020	2021	2022
N/A	Employee	Person	5,467	5,452	4,640	5,342
	Covered by OH&S management system	%	100	100	100	100
	Covered by such system that has been internally audited	%	100	100	100	100
	Covered by such system that has been audited or certified by third party	%	100	100	100	100
	Worker	Person				
	Covered by OH&S management system	%	100	100	100	100
		Person				
	Covered by such system that has been internally audited	%	100	100	100	100
		Person				
	Covered by such system that has been audited or certified by third party	%	100	100	100	100
		Person				
	Process Safety					
	Number of Tier 1 Process Safety Events	Case	3	2	0	1
	Target of Tier 1 Process Safety Events	Case	0	0	0	0
	Number of Tier 2 Process Safety Events	Case	0	1	2	2
	Target of Tier 2 Process Safety Events	Case	0	0	0	0
	Data coverage	% of revenue	100	100	100	100
	Occupational Health and Safety					
	Total number of hours worked	Million hours	19.88	18.06	16.49	26.34
	Employees	Million hours	11.20	11.14	9.59	9.79
	All workers	Million hours	8.68	6.92	6.90	16.55
	Total Recordable Injury Rate (TRIR) (2)	Case/ Million hours	0.25	0.39	0.12	0.30
	Employees (3)	Case/ Million hours	0.18	0.36	0.10	0.10
	All workers (4)	Day/ Million hours	0.35	0.43	0.14	0.42

GRI Standard	Data	Unit	2019	2020	2021	2022
	Total Recordable Injuries Case (TRIC)	Person	5	7	2	8
GRI 403-9 (2018)	Employees	Person	2	4	1	1
	All workers	Person	3	3	1	7
	Lost Time Injuries Frequency Rate (pr)	Case/ Million hours	0.20	0.17	0.00	0.23
	Employees	Case/ Million hours	0TRIF.18	0.09	0.00	0.10
	All workers	Case/ Million hours	0.23	0.29	0.00	0.30
	Total Recordable Occupational Illness Rate (TROIR) (5)	Case/ Million hours	0	0	0	0
	Employees	Case/ Million hours	0	0	0	0
GRI 403-10 (2018)	All workers	Case/ Million hours	0	0	0	0
	Lost Day Rate (LDR) (6)	Day/ Million hours	1.31	1.27	0.00	5.55
	Employees	Day/ Million hours	1.43	0.54	0.00	0.11
GRI 403-9 (2018)	All workers	Day/ Million hours	1.15	2.46	0.00	8.64
	Lost Workday Case (LWC)	Person	4	3	0	6
	Employees	Person	2	1	0	1
	All workers	Person	2	2	0	5
	Fatalities (as a result of work related ill health)	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	116	79	257	20
	Absentee Rate					
	Male	%	0.838	1.950	0.945	1.265
	Female	%	0.253	0.421	0.287	0.357

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.

Environmental

Natural Capital

Materials Consumption

GRI Standard	Data	Unit	2019	2020	2021	2022
GRI 301-1 (2016)	Crude Oil	Ton	9,383,905	9,191,312	9,232,776	9,105,514
		Barrel	73,668,153	71,173,423	70,192,393	71,173,423
	Naphtha	Ton	1,026,692	946,987	813,408	1,569,734
		Barrel	2,001,229	1,308,913	741,268	1,308,913
	Biodiesel (B100)	Barrel	821,570	918,729	748,666	918,729
	Ethanol	Barrel	341,468	290,552	278,831	290,552
	LS ATB	Barrel	474,400	246,366	259,324	246,366
	Benzene	Barrel	756,743	1,103,647	773,668	1,103,647
	Acrylonitrile	Barrel	222,285	246,847	228,891	246,847
	Total material used	Ton	78,285,847	75,288,477	73,223,041	75,288,477

Energy Consumption [1]

GRI Standard	Data	Unit	2019	2020	2021	2022
GRI 302-1 (2016)	Total energy consumption [2], [3]	GJ	58,719,745	57,519,116	60,044,448	47,092,748
	Total direct energy consumption	GJ	59,072,047	57,760,248	60,174,826	51,651,612
		MWh	16,311,040	15,977,532	16,679,013	14,347,670
	Fuel Oil	GJ	2,349,064	2,445,972	2,468,057	1,908,982
	Natural Gas	GJ	21,908,700	22,821,990	22,174,781	21,854,4335
	LPG	GJ	638,187	919,616	975,582	889,980
	Diesel	GJ	269,792	244,276	265,690	217,615
GRI 302-1 (2016)	Fuel Gas	GJ	19,547,018	18,599,283	18,936,615	17,109,875
	Coke	GJ	5,745,860	5,669,729	6,251,554	5,101,972
	H_2	GJ	309,563	261,721	191,967	150,972

GRI Standard	Data	Unit	2019	2020	2021	2022
	H_2S	GJ	0	0	0	0
	Purge Gas	GJ	1,038,258	741,998	1,330,537	815,725
	Recycle monomer	GJ	0	0	33,423	28,765
	Coal	GJ	30,929	32,892	7,546,619	3,284,592
	H_2S	GJ	7,234,675	6,022,770	4,721,574	4,787,069
	Total indirect energy consumption	GJ	4,549,128	4,798,143	251,294	413,415
	Electricity purchased from PEA (3)	GJ	308,166	220,933	1,260,532	1,358,703
	Electricity purchased from IRPC Clean Power	GJ	1,520,670	1,403,656	1,260,532	1,358,703
	Steam purchased by IRPC Clean Power	GJ	2,720,292	3,173,553	3,209,748	3,014,951
	Total electricity sold	GJ	2,365,088	2,336,467	2,359,033	2,101,881
	Total steam sold	GJ	2,536,342	2,725,214	2,563,054	2,456,983
	Total renewable (wind, solar, biomass, hydroelectric, geothermal, etc.) purchased or generated	GJ	0	22,406	70,135	61,135
		MWh	0	6,224	19,482	16,982
GRI 302-3 (2016)	Energy intensity (4)	GJ/ Ton of production	4.87	4.84	5.00	4.60
GRI 302-4 (2016)	Energy saved due to conservation and efficiency improvements	GJ	422,120	167,898	774,337	181,028

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	2019	2020	2021	2022
G4-OG6 (GRI-G4)	Volume of flared hydrocarbon (1), (4)	Million M^3	62.67	38.89	39.15	38.97
	Volume of continuously flared hydrocarbon	Million M^3	52.8	33.24	29.29	
	Volume flared hydrocarbon for oil & gas production in relation to volume produced	M^3 / Ton of production	5.20	3.27	3.29	3.28
	Volume of Vented hydrocarbon	Million M^3	3.83	3.97	3.54	1.04
	Production process (2)	Million M^3	1.28	1.41	1.19	1.04

GRI Standard	Data	Unit	2019	2020	2021	2022
	Tank & Marketing & Terminal (3)	Million M^3	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	0.33	0.30	0.09
N/A	Methane Emission of flared hydrocarbon	Ton	81.30	50.45	50.79	50.56

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 improvents 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 unplaned shut down from plant.

Greenhouse Gas (1)

GRI Standard	Data	Unit	2019	2020	2021	2022
GRI 305-1 (2016)	Operational Control					
	Direct emissions of greenhouse gas (Scope 1) (2), (3)	Million tCO_2e	3.784	3.721	3.946	3.271
	CO_2	Million tCO_2e	3.776	3.710	3.938	3.265
	CH_4	Million tCO_2e	0.003	0.003	0.003	0.002
	N_2O	Million tCO_2e	0.004	0.004	0.004	0.002
	HFC	Million tCO_2e	0.001	0.004	0.000	0.000
	SF_6	tCO_2e	351	520	684	520
	Biogenic CO_2 Emissions	tCO_2e	352	386	299	288
GRI 305-2 (2016)	Indirect emissions of greenhouse gas (Scope 2) (3)	Million tCO_2e	0.341	0.341	0.402	0.418
	Location Based (4)	Million tCO_2e	0.031	0.025	0.036	0.053
	Market Based (5)	Million tCO_2e	0.310	0.316	0.366	0.364
GRI 305-3 (2016)	Other indirect emissions of greenhouse gas (Scope 3) (6)	Million tCO_2e	16.544	16.560	14.906	13.298
	Equity Basis					

GRI Standard	Data	Unit	2019	2020	2021	2022
GRI 305-1 (2016)	Direct emissions of greenhouse gas (Scope 1)	Million tCO_2e	4.266	4..97	4.405	3.718
GRI 305-2 (2016)	Indirect emissions of greenhouse gas (Scope 2) (3)	Million tCO_2e	0.341	0.341	0.402	0.418
GRI 305-4 (2016)	GHG Emission Intensity (7)	tCO_2e/ Ton of production	0.342	0.342	0.362	0.333

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 Polyol 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	2019	2020	2021	2022
GRI 305-7 (2016)	Total NOx	Ton	1,592	1,495	1,607	993
	NOx Intensity	Ton/ Thousand Tons of production	0.132	0.126	0.134	0.090
	Total SOx (2), (3)	Ton	1,800	1,377	1,147	1,349
	SOx Intensity (3)	Ton/ Thousand Tons of production	0.149	0.116	0.096	0.122
	Total Suspended Particulate (TSP)	Ton	338	259	294	213
	TSP Intensity	Ton/ Thousand Tons of production	0.028	0.022	0.024	0.019
	Total VOCs	Ton	1,897	1,822	1,696	1,862
	VOCs Intensity (4)	Ton/ Thousand Tons of production	0.157	0.153	0.141	0.168

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	2019	2020	2021	2022
GRI 303-3 (2018) a	Total water withdrawal (1)	Million M^3	40	40	40	33
	Fresh water (Water with total dissolved solids less than 1,000 Milligram/liter)	Million M^3	28	27	27	27
	Surface water (5)	Million M^3	28	27	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	12	13	13	6
	Sea water	Million M^3	12	13	13	6
	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	25	25	25	18
	Fresh water (Water with total dissolved solids less than 1,000 Milligram/liter)	Million M^3	8	8	8	8
	Surface water	Million M^3	0	0	0	0
	Third-party water sent for use to other organizations	Million M^3	8	8	8	8
	Other water (Water with total dissolved solids more than 1,000 Milligram/liter)	Million M^3	17	17	17	10
	Surface water	Million M^3	2	2	2	2

GRI Standard	Data	Unit	2019	2020	2021	2022
	Sea water	Million M^3	15	16	16	8
	Fresh water withdrawal intensity (3)	M^3 /Ton of production	2.32	2.24	2.28	2.97
GRI 303-5 (2018)	Total water consumption	Million M^3	15	15	15	16
	Results of water volume in Reservoir at 1st January and 31st December of that year (4)	Million M3	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	2019	2020	2021	2022
GRI 306-2 (2016)	Total waste disposal (1), (2), (3)	Ton	51,275	41,752	61,260	46,142
	Waste from routine operations	Ton	51,009	41,616	61,238	46,142
	Non-hazardous waste	Ton	39,383	33,909	51,389	27,223
	Composition	Ton	0	0	0	0
	Export	Ton	0	0	0	0
	Incineration	Ton	1,937	2,654	1,850	1,777
	Landfilling	Ton	0	0	0	0
	Wastewater Treatment	Ton	0	0	0	0
	Recovery	Ton	1,052	1,306	932	2,502
	Recycling	Ton	35,590	29,511	40,897	22,945
	Reuse	Ton	318	0	0	0
	On-site storage	Ton	486	437	1,712	0

GRI Standard	Data	Unit	2019	2020	2021	2022
	Land reclamation	Ton	0	0	5,998	0
	Hazardous waste	Ton	11,626	7,707	9,849	18,918
	Composition	Ton	0	0	0	0
	Export	Ton	266	64	346	1,604
	Incineration	Ton	3,392	1,876	2,111	5,472
	Landfilling	Ton	0	0	1	0
	Wastewater Treatment	Ton	0	0	236	2,236
	Recovery	Ton	5,747	4,886	6,185	7,269
	Recycling	Ton	2,168	843	942	2,332
	Reuse	Ton	31	13	5	6
	On-site storage	Ton	21	26	23	0
	Land reclamation	Ton	0	0	0	0
	Waste from non-routine operations	Ton	266	135	**22**	0
	Non-hazardous waste	Ton	145	0	**0**	0
	Incineration	Ton	0	0	0	0
	Landfilling	Ton	0	0	0	0
	Export	Ton	0	0	0	0
	Recovery	Ton	145	0	0	0
	Recycling	Ton	0	0	0	0
	Hazardous waste	Ton	121	135	22	0
	Incineration	Ton	0	0	0	0
	Landfilling	Ton	0	0	0	0
	Export	Ton	121	0	0	0
	Recovery	Ton	0	135	22	0
	Recycling	Ton	0	0	0	0
	Total waste generated	Ton	51,275	41,752	61,260	46,142

GRI Standard	Data	Unit	2019	2020	2021	2022
GRI 306-3 (2020)	Hazardous waste generated	Ton	11,747	7,842	9,871	18,918
	Non-hazardous waste generated	Ton	39,529	33,909	51,389	27,223
GRI 306-4 (2020)	Total waste diverted from disposal	Ton	45,051	36,694	48,983	35,053
	Total Hazardous waste diverted from disposal	Ton	7,946	5,877	7,154	9,606
	Total Non-hazardous waste diverted from disposal	Ton	37,105	30,818	41,829	25,447
	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	7,946	5,877	**7,154**	6,044
	Preparation for reuse	Ton	31	13	5	6
	Recycling	Ton	2,168	843	942	4,238
	Other recovery operations	Ton	5,747	5,021	6,207	1,800
	Non-hazardous waste diverted from disposal	Ton	37,105	30,818	**41,829**	22,651
	Preparation for reuse	Ton	0	0	0	0
	Recycling	Ton	35,590	29,511	40,897	22,651
	Other recovery operations	Ton	1,197	1,306	932	0
	Total waste directed to disposal	Ton	6,223	5,057	**12,277**	20,860

GRI Standard	Data	Unit	2019	2020	2021	2022
GRI 306-5 (2020)	Total Hazardous waste directed from disposal	Ton	3,800	1,966	2,717	16,518
	Total Non-hazardous waste directed from disposal	Ton	2,423	3,092	9,560	4,279
	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	3,800	1,966	2,717	12,766
	Incineration (with energy recovery)	Ton	n/a	293	490	7,317
	Incineration (without energy recovery)	Ton	3,392	1,583	1,621	5,449
	Landfilling	Ton	0	0	1	0
	Other disposal operations	Ton	408	90	605	0
	Non-hazardous waste directed to disposal	Ton	2,423	3,092	9,560	4,574
	Incineration (with energy recovery)	Ton	n/a	564	1,850	2,798
	Incineration (without energy recovery)	Ton	1,937	2,090	0	1,777
	Landfilling	Ton	0	0	0	0

GRI Standard	Data	Unit	2019	2020	2021	2022
	Other disposal operations	Ton	486	437	7,710	0
GRI 306-4 (2016)	Hazardous waste transportation	Ton	11,747	7,842	9,871	18,810
	Hazardous waste import to IRPC	Ton	0	5	0	0
	Hazardous waste export from IRPC	Ton	11,747	7,842	9,871	17,206
	Hazardous waste treated	Ton	42	5	11	0
	Hazardous waste shipped internationally	Ton	266	64	346	1,604

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	2019	2020	2021	2022
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	2019	2020	2021	2022
GRI 201-1 (2016)	Environmental protection expenditures and investments (e.g. operation related costs, etc.) (1)	THB Million	311	435	538	450
N/A	Benefit from environmental investment (2)	THB Million	1,427	381	1,005	1,167
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	2019	2020	2021	2022
GRI 102-43 (2016)	Community satisfaction	%	91.40	97.45	98.63	99.00
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