

ENVIRONMENT⁽¹⁾

GRI Standards	Required Data	Unit	Data Collection Period							
			2016 ⁽²⁾		2017 ⁽³⁾		2018		2019	
			Thailand	International	Thailand	International	Thailand	International	Thailand	International
Hydrocarbon Production										
-	Production from operating asset	BOE	102,888,543	25,116,412	98,043,001	22,343,237	91,292,879	22,492,872	102,239,625	19,949,083
		Tonnes	15,112,236	3,339,866	14,936,612	2,855,571	14,040,323	2,574,323	14,874,273	2,223,853
GRI:302 Energy Consumption										
302-1	Total direct energy consumption	GJ	20,909,807	5,301,953	20,096,714	4,555,825	19,585,720	4,757,786	22,006,804	3,737,819
302-1	Total indirect energy consumption by primary energy source (electricity purchased) ⁽⁴⁾	GJ	106,908	6,828	141,785 ⁽⁴⁾	2,578 ⁽⁴⁾	149,390	1,955	153,314	1,860
302-3	Total energy intensity	GJ/tonnes production	1.39	1.59	1.35	1.60	1.41	1.85	1.49	1.68
GRI:305 Greenhouse Gas Emissions (GHGs) ^{(5) (6) (7)}										
305-1	Direct total GHGs	Tonnes CO ₂ equivalent	4,048,528	582,963	4,083,327	561,541	3,660,334	467,283	3,662,275	251,958
305-2	Indirect total GHGs	Tonnes CO ₂ equivalent	5,283	383	5,239	532	5,406	229	5,601	68
305-3	Other relevant indirect GHG emissions ⁽⁸⁾	Tonnes CO ₂ equivalent	17,181	41,649	16,534	20,658	19,421	13,434	20,463	0
305-4 G4-EN18	GHG intensity	Tonnes CO ₂ equivalent/ thousand tonnes production	269	187	275	204	262.47	186.82	247.97	113.33
OGSD Flare										
OG6	Total flaring	MMscf	40,152	3,283	42,854	2,911	36,458	2,106	35,725	96
OG6	Hydrocarbon flaring	Tonnes	982,161	77,194	1,043,084	68,809	886,178	49,613	894,610	1,910
OG6	Hydrocarbon flaring intensity	Tonnes/ thousand BOE	9.55	3.07	10.64	3.08	9.71	2.21	8.75	0.10
GRI:305 Emissions										
305-7	Volatile organic compounds (VOCs)	Tonnes VOC	14,865	1,198	15,755	1,049	13,385	776	13,508	42
-	VOC intensity	Tonnes VOC/ thousand tonnes production	0.984	0.359	1.055	0.367	0.953	0.302	0.908	0.019
305-7	Nitrogen oxides (NOx)	Tonnes NO ₂	8,746	2,115	7,868	1,253	7,122	1,655	6,926	832
-	NOx intensity	Tonnes NO ₂ / thousand tonnes production	0.579	0.633	0.527	0.439	0.507	0.643	0.466	0.374
305-7	Sulfur oxides (SOx)	Tonnes SO ₂	460	150	374	44	298	118	286	43
-	SOx intensity	Tonnes SO ₂ / thousand tonnes production	0.030	0.045	0.025	0.015	0.021	0.046	0.019	0.019
305-6	Ozone-depleting substances (hydrochlorofluorocarbon: HCFC) ⁽⁹⁾	Kg of CFC11 equivalent	3.7	NA	12.9	NA	6.8	16.8	33.4	19.1

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GRI:306	Spills ⁽¹⁰⁾									
306-3	Spills	Cases	9	7	9	4	8	1	10	0
		Tonnes	0.51	0.23	4.29	0.36	9.70	0.29	10.854	0
306-3	Hydrocarbons	Cases	9	7	8	3	8	1	9	0
		Tonnes	0.51	0.23	4.29	0.36	9.77	0.29	10.853	0
306-3	Non-hydrocarbons	Cases	0	0	1	1	0	0	1	0
		Tonnes	0.00	0.00	0.00	0.00	0.00	0.00	0.001	0
GRI: 303 (2018)	Water Withdrawal									
303-3	Total water withdrawal from all areas ⁽¹¹⁾	Cubic meters	50,420,020	362,098	47,921,070	350,924	49,675,463	52,062	46,677,376	118,050
	Freshwater ⁽¹²⁾	Cubic meters	NA ⁽¹³⁾	NA	NA	NA	523,421	33,745	586,352	29,759
	Freshwater from areas with water stressed ^{(14) (15)}	Cubic meters	NA	NA	NA	NA	441,936	0	517,097	0
	Surface water	Cubic meters	NA	NA	NA	NA	0	0	0	0
	Groundwater	Cubic meters	NA	NA	NA	NA	425,022	0	498,552	751
	Municipal water supply	Cubic meters	NA	NA	NA	NA	16,914	0	18,545	0
	Water withdrawal excluding once through cooling water	Cubic meters	1,944,573	362,098	2,492,540	350,924	2,550,562	52,062	2,875,675	118,050
GRI: 303 (2018), OGSD	Water Discharge ^{(16) (17)}									
303-4 OG5	Total water discharge to all areas	Cubic meters	7,281,782	939,108	7,813,693	1,057,173	7,927,061	500,526	8,232,243	33,744
	Produced water	Cubic meters	7,281,782	939,108	7,760,171	1,057,173	7,892,085	500,526	8,094,276	33,744
	Injection	Cubic meters	7,276,263	0	7,755,653	0	7,885,638	0	8,085,622	0
	Disposed by evaporation	Cubic meters	4,823	103,679	2,601	0	2,915	0	493,608	0
	Treated & discharged	Cubic meters	0	835,429	0	1,057,173	0	500,526	0	33,744
	Disposed by waste processor	Cubic meters	696	0	1,917	0	3,532	0	4,673	0
	Process wastewater	Cubic meters	NA	NA	53,522	0	34,976	0	137,967	0
	Injection	Cubic meters	NA	NA	53,522	0	34,944	0	137,967	0
	Disposed by waste processor	Cubic meters	NA	NA	0	0	32	0	0	0
	Treated & discharged	Cubic meters	NA	NA	0	0	0	0	0	0
GRI: 306	Waste Generation ^{(18) (19)}									
306-2	Hazardous waste	Tonnes	28,243	499	38,477	451	57,558	267	83,354	186
306-2	Non-hazardous waste	Tonnes	149,018	220	104,251	3,361	80,680	42,275	65,177	10,420
GRI:306, OGSD	Waste Disposal ^{(19) (20)}									
-	Hazardous waste	Tonnes	27,668	541	39,517	555	58,971	261	83,194	184
OG7	Drilling mud and cutting waste	Tonnes	25,348	0	36,571	0	54,811	0	58,219	0
306-2	Other hazardous waste	Tonnes	2,320	541	2,946	555	4,159	261	24,975	184
-	Non-hazardous waste	Tonnes	148,953	199	104,253	3,361	80,599	42,275	65,201	10,419
OG7	Drilling mud and cutting waste	Tonnes	143,139	0	100,871	2,809	78,859	41,859	59,266	10,029
306-2	Other non-hazardous waste	Tonnes	5,814	199	3,382	552	1,741	416	5,935	390

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306-4	Exported hazardous waste under the Basel Convention	Tonnes	0	0	1,169	0	1,055	0	871	0
GRI:304, OGSD Biodiversity and Ecosystem Services										
OG4	Significant operating sites where biodiversity risks has been assessed	Number of sites	8	3	8	2	8	2	8	1
		%	100	100	100	100	100	100	100	100
304-1	Significant operating sites exposed to significant biodiversity risks	Number of sites	0	0	0	0	0	0	0	0
		%	0	0	0	0	0	0	0	0
- Environmental Management ^{(21) (22)}										
-	Investing in managing environmental impacts	Million USD	39.56	0.98	38.016	1.36	21.30 ⁽¹⁸⁾	1.89	7.36	0.88
-	Treatment and disposal expenses	Million USD	4.85	0.69	10.22	0.28	4.76 ⁽¹⁸⁾	0.10	2.05	0.08
-	Protection, management and investments	Million USD	34.71	0.29	27.80	1.08	16.55 ⁽¹⁸⁾	1.80	5.32	0.80
-	Percentage of prevention cost in total environment expense	%	88	30	73	79	78	95	72	90
GRI: 307 Legal Compliance										
307-1	Significant fines, penalties and settlements	Cases	0	0	0	0	0	0	0	0
		Million USD	0	0	0	0	0	0	0	0

Remarks:

- ⁽¹⁾ PTTEP revised the category for environmental data to Thailand and international from 2016 onwards.
- ⁽²⁾ International column includes Australia, Myanmar and Oman assets in 2016.
- ⁽³⁾ Since 2017, international column includes Australia and Myanmar assets as PTTEP completed sales agreement of Oman asset.
- ⁽⁴⁾ Revised 2017 data due to consistency of calculation methodology.
- ⁽⁵⁾ Total direct GHG emissions (Scope 1) based on equity basis is not included in this report.
- ⁽⁶⁾ GHG emissions from well service venting is not included.
- ⁽⁷⁾ In 2019, methane (CH4) emission is equivalent to 10,298 and 2,142 tonnes CH4 for Thailand and International assets respectively.
- ⁽⁸⁾ Other relevant indirect GHG emissions (Scope 3) is comprised of transportation and air travel.
- ⁽⁹⁾ Ozone-depleting substances (ODS) includes Hydrochlorofluorocarbon (HCFC) only.
- ⁽¹⁰⁾ 2015 reported spills includes production phase of operating assets in Thailand and International assets.
- ⁽¹¹⁾ Total water withdrawal from all areas excluded produced water.
- ⁽¹²⁾ Refer to PTT Group Procedure, total dissolved solid < 2,000 mg/L.
- ⁽¹³⁾ NA (not available)
- ⁽¹⁴⁾ Water stress area classified by IPIECA Global Water Tool.
- ⁽¹⁵⁾ Since 2018, water risk assessment for water stress area has been conducted to covers the operation in Myanmar asset.
- ⁽¹⁶⁾ In 2019, hydrocarbon discharged within produced water is equal to 0 and 0.04 tonnes for Thailand and International assets respectively.
- ⁽¹⁷⁾ Since 2017, injected process wastewater was reported to include in water discharge.
- ⁽¹⁸⁾ In 2019, hazardous and non-hazardous waste disposal subtracted by reuse/recycling/recovery are 62,025 and 564 tonnes.
- ⁽¹⁹⁾ Waste generation and disposal included both production and drilling activities.
- ⁽²⁰⁾ The difference between waste generation and disposal amount is accounted for on-site storage.
- ⁽²¹⁾ Refer to 2017 environmental management expenses for S1.
- ⁽²²⁾ In 2019, environmental expenditure is based on new systematic environmental management accounting methodology as PTT Group Guideline, which is has been implemented in Q3, 2019.