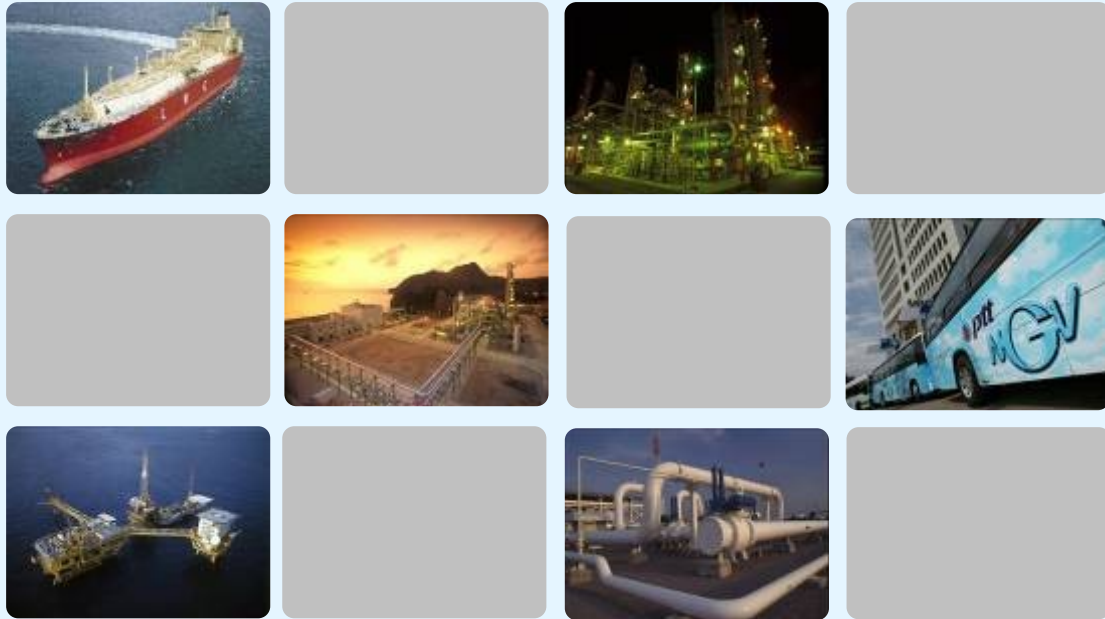


Natural Gas Transmission System

Contents

- Natural gas transmission system
- Main natural gas transmission of PTT
- Present transmission system and the future expansion of Master Plan, Phase III
- Operations of the natural transmission system
- Major responsibilities of operations centers
- Care for communities and environment
- Contact information of PTT Operation Divisions





PTT Public Company Limited is fully integrated natural gas company in Thailand which conducts upstream petroleum exploration and production activities, procurement, natural gas transmission, separation and marketing. Exploration and production is undertaken by PTT Exploration and Production Public Company Limited (PTTEP) which plays a vital role in natural gas exploration and production activities in Thailand.

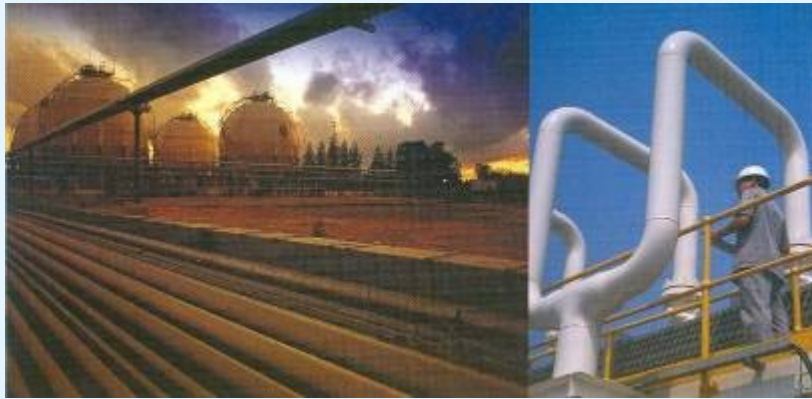
As a core business group of PTT, Gas Business Group is tasked with natural gas procurement, transmission, distribution of natural gas and products from gas separation plants in order to meet demand of both private and state sectors. PTT enhance the efficiency and deliverability of gas transmission system by taking into account the value optimization of natural gas.

Natural Gas Pipeline System



Natural Gas Pipeline System

After the discovery of Erawan natural gas field, the first commercial field in Thailand, PTT laid the pipeline from the gas field to come ashore at Ban Nong Fab, Mab Ta Phut, Rayong Province. The gas was first developed for utilization in 1981. To satisfy the rising demand of natural gas, the Gas Business Group thus laid pipeline to respond to such expansion.



PTT's Transmission gas pipeline

	Pipeline system	Length (kilometers)	Diameter (inch)	Deliverability (MMscfd)	Year of commencement
1.	Offshore pipeline				
	▪ Erawan-Rayong Gas Separation Plant (the first transmission gas pipeline)	415	34	860	1981
	▪ Plathong Field - The first pipeline	42	24	250	1984
	▪ Bongkot Field - Erawan Pipeline (the master pipeline)	171	32	635	1996
	▪ Erawan - Khanom Power plant	161	24	250	1996
	▪ Erawan - Rayong Gas Separation Plant (the second pipeline)	418	36	1,150	1996-1997
	▪ Tantawan Field - the second pipeline	54	24	300	1997
	▪ Benchamas Field - the second pipeline	55	18	100	1999
	▪ Pailin Field - Erawan Field	53	24	200	1999
	▪ N.Pailin to existing Pailin Pipeline	10	24	300	2001
	▪ Erawan-Rayong Gas Separation Plant (the third transmission gas pipeline)	414	42	1,900	2007
	▪ Arthit Field to Arthit PLEM	18.5	42	700	2008
	▪ Arthit PLEM to Erawan	173	42	1,750	2008
	2.	Onshore pipeline			
▪ Rayong Gas Separation Plant - Bangpakong (the first pipeline)		104	28	540	1981
▪ Bangpakong - South Bangkok Power Plant		57	28	-	1981
▪ Bangplee - Saraburi		99	14	270	1983
▪ Namphong Field - Namphong Power Plant		3.5	16	140	1990
▪ Rayong Gas Separation Plant - Bangpakong (the second pipeline)		105	28	660	1996
▪ Bangpakong - Wangnoi Power Plant		100	36	500	1996
▪ Pipeline from Thai - Myanmar border - Rachburi Power Plant		238	42	1,265	1998
▪ Ratchaburi - Wangnoi		154	30	400	2000
▪ Rayong Gas Separation Plant - Bangpakong (the third pipeline)		110	36	350	2006
▪ Wangnoi - Kaeng Khoi		73	36	520	2006
▪ Sai Noi - South Bangkok Power Plant		66.5	30	470	2006
▪ Phuhom field - Namphong Power Plant		0.25	30	160	2006
▪ Trans Thai - Malaysia Gas Separation Plant - Chana Power Plant		7.6	20	290	2007

The existing Transmission Gas pipeline and Expansion plan





PTT Gas Pipeline Operation Centers divide into 6 regions

Chonburi Operations Center

This center is the centralized operation center for both offshore and onshore, controls receiving and transmitting natural gas from producers to customers along the pipeline. The mission of the center are to control and plan receiving-delivering of natural gas, engineering support, maintenance, control of safety and environment of the pipeline and control of metering stations. The center also prevents and ceases emergency of the pipeline through Supervisory Control and Data Acquisition System or SCADA by using all kinds of communication tools.



Chonburi Operation Center is located on 146 rai area which consists of:

- **Office compound** The center has a 2-storey office building and other surrounding buildings e.g. a maintenance building, an inventory building, a gas quality control building (Laboratory), an electrical repair building, gauge and oil.
- **Resident compound** 260 units of employees accommodation, football ground, tennis court, petanque court, playground, health park, in-house stadium and clubs.

PTT has divided the areas to be in charge of operation as follows:

Offshore Pipeline Operation and Station Division

The Center is responsible for pipeline operation and maintenance, dewpoint and block valve station to ensure safety of nearby community and environment. The areas under responsibility cover Pattani, Songkla, Nakhon Si Thammarat, Suratthani, Coomporn, Prachuab Kririkhan and Rayong.

Region I Gas Pipeline Operation Division

59 Moo 8, By pass Road, Tambon Napa, Amphur Mueng, Chonburi

The Division is responsible for gas delivering-receiving and maintenance of onshore pipeline system covering areas of Rayong, Chonburi, Chachoengsao, Samutprakarn, and some parts of Bangkok. The work covers a 275 kilometer- pipeline.

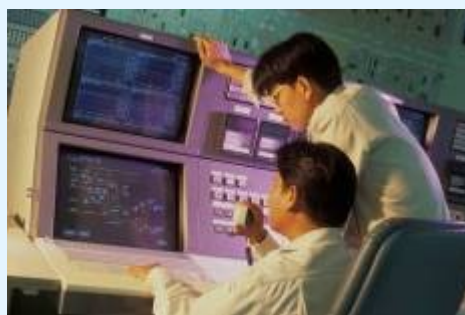
Region II Gas Pipeline Operation Division

71 Moo 2, 79.5 Kilometer Post, Phaholyothin, Sanubteub, Amphur Wangnoi, Ayutthaya Province. The Division is responsible for gas delivering-receiving and maintenance of onshore pipeline system covering areas of Nonthaburi, Phatumthani, Ayutthaya, Saraburi and some parts of Bangkok. The work covers a 216 kilometer-pipeline.

Region III Gas Pipeline Operation Division

555 Moo 2, Sukhumvit, Tambon Mab Ta Phut, Amphur Mueng, Rayong

The Division is responsible for gas delivering-receiving and maintenance of onshore pipeline system covering areas of Rayong and Chonburi from the Gas Separation Plant from Rayong to Laem Chabang Industrial Estate. The Division is tasked with natural gas delivery to Rayong Power Plant and industries in Mab Ta Phut Industrial Estate. The work covers a 58 kilometer-pipeline.



Region IV Gas Pipeline Operation Division

222 Mittaphab Road, National Highway No.209, at the kilometer post 3+500, of Tambon Kood Namsai, Amphur Namphong, Khonkean.

The Division is responsible for gas delivering-receiving and maintenance of onshore pipeline system of the natural gas pipeline from Exxon Mobil Exploration and Production Korat Inc.'s Namphong Field from Khon Kean to the Nam Phong Power Plant, Electricity Generating Authority of Thailand (EGAT). The work covers a 3.5 kilometer-pipeline.

Region V Gas Pipeline Operation Division

111 Moo 7, Phetkasem Road, Tambon Samroen, Amphur Meung, Ratchaburi

The Division is responsible for gas delivering-receiving and maintenance of onshore pipeline system covering areas of the western grid i.e. Kanchanaburi, Ratchaburi and Nakorn Pathom. The work covers a 358 kilometer-pipeline.

Region VI Gas Pipeline Operation Division

The Division is responsible for gas delivering - receiving and maintenance of onshore pipeline system covering an area of Metropolitan. The work covers a 66.5 kilometer-pipeline.



Responsibilities of the Pipeline Operation Division

Every Pipeline Operation Division is tasked with the following responsibilities:

- Control and formulate operational plan
- Support pipeline engineering work
- Maintain pipeline system
- Monitor and control pipeline safety and environment
- Supervise M&R station
- Prevent and respond to emergency of the pipeline through Supervisory Control Data Acquisition System or SCADA using microwave, optic fiber cable and satellite telecommunication



Block Valve station

Each block valve station has a gas transmission control system which is commanded through SCADA from Chonburi Operation Center and other pipeline operation divisions, Chonburi Operation Center is the main operation center working around the clock.





Communication system

To accomplish this task of monitoring and ensuring the natural gas that is traveling through the pipeline, sophisticated technology is required. PTT puts in place the following systems:

- Microwave is the main communication medium for Chonburi Center and the Region Gas Pipeline Operations Division II and III.
- Optic fiber cable is buried above pipeline as a major communication medium for the pipeline in the west. The expansion of the cable to cover all areas is underway.
- Satellite telecommunication is a back up system used to communicate when the main communications medium cannot be used.
- UHF (Ultra High Frequency) and VHF (Very High Frequency) are communication medium for PTT staff covering all along the pipeline.
- PTT's in house telephone system and TAT's telephone system.

Our proud awards

Every Gas Pipeline Operation Division receive best operators' awards under QSHE categories and are certified with many standards e.g. ISO 9001, ISO 9002, ISO 18001 and ISO IEC 17025 or TIS 17025-2543. These awards reflect the inherent social and community mission of PTT in upholding the practices in safety, quality and environment.



Care for community and environment

Apart from energy mission, the Gas Business Unit has regarded the development of community and well being of public as the key mission. Therefore, number of activities to promote and support the benefit of communities have been created as follows:



Broadening outlook and knowledge

- 5S to School and communities
- Library, books and educational material sponsorship
- School Building construction
- “Open Up the natural gas world” Mobile Bus and mobile exhibition at the schools along the pipeline
- Educational Scholarships and educational materials, and sport equipments sponsorship
- Petroleum, natural gas, pipeline safety education program for community, media and foundations

Environment and community development

- Forest rehabilitation along along Thai-Myanmar Pipeline from 1998-2002
 - ...Forest and cover crop in the forest of around 50 kilometers, 625 rais
 - ...10,000 rai forestation in the nearby area
 -30,000 rai forest conservation
- Mobile medical care
- Lunch project for the school student at the schools along the pipeline

Promotion of community participation according to the constitution

- Community / press tour to PTT





Contact information of PTT Operation Divisions

Chonburi Operations Center

59 Moo 8 By - pass Road Napa Muang District, Chonburi 20000
Tel 0 2537 2000 ext 5000; 0 3827 4390-5
Fax 0 2537 2000 ext 5014; 0 3827 4398, 0 3827 6390

Offshore Pipeline Operations Department

59 Moo 8 By - pass Road Napa Muang District, Chonburi 20000
Tel 0 2537 2000 ext 5270 ; 0 3827 4390 - 5 ext 5270
Fax 0 2537 2000 ext 5274 ; fax 0 3827 4390 - 5 ext 5274

Region I Gas Pipeline Operations Division, Chonburi Operations Center

59 Moo 8 By - pass Road Napa Muang District, Chonburi 20000
Tel 0 2537 2000 ext 5050 - 58 ; 0 3827 4390 - 5 ext 5050-5058
Fax 0 2537 2000 ext 5058 ; 0 3827 4390 - 5 ext 5058

Region II Pipeline Operations Division

71 Moo 2, Phaholyothin Road Sanubtub Wangnoi District, Ayutthaya 13170
Tel 0 3572 2000 ext 5802 ; 0 2537 3273 ; 0 3572 3022-32
Fax 0 3572 3039 ext 5809 ; 0 3572 3039

Region III Pipeline Operations Division

271 Moo2, Sukhumvit, Tambon Mab Ta Phut, Amphur Mueng, Rayong 21150
Tel 0 2537 2000 ext 6040 ; 0 3868 5021
Fax 0 3868 5016

Region IV Pipeline Operations Division

222 Ubolrattanadam Road, Kudnamsie Namphong District, Khon Kaen 40310
Tel 0 2537 2000 ext 5121 ; 0 4343 1522
Fax 0 2537 2000 ext 5121-2 ; 0 43434 1522

Region V Pipeline Operations Division

111 Moo 7 Petchkasem Road Samruan Muang District, Ratchaburi 70000
Tel 0 2537 2000 ext 5901 ; 0 3231 7371
Fax 0 2537 2000 ext 5930 ; 0 3231 7385

Region VI Pipeline Operations Division

555 Kallapraphruk Road Bangwah Phasricharoen District, Bangkok 10160
Tel 0 2537 1606
Fax 0 2537 1605

Region VII Pipeline Operations Division

1/6 Moo 2, Talingchun, Chana District, Songkhla 90130

Tel 0 7449 6089 ; 0 7449 6091

Fax 0 7449 6090

Region VIII Pipeline Operations Division

Moo 6, Ban Sai Thong, Loom Soom, Saiyok, Kanchanaburi 71150

Tel 0 2537 2000 ext 5990

Fax 0 2537 2000 ext 4683