Continuous Emission Monitoring System (CEMS)

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History of CEMS implementation in Thailand

Air quality problem in Mab Ta Phut area, Rayong Province

Ministry of Industry issued the first Notification in 2001, ordering environmentally high-risk-factories located in 4 Industrial Estate in Mab Ta Phut Sub-district to install CEMS.

- Mab Ta Phut Industrial Estate
- Pha Daeng Industrial Estate
- Eastern Seaboard Industrial Estate (Now WHA Eastern IE)
- Asia Industrial Estate

Later, in 2007, Department of Industrial Works established a data center and ordered factories to send CEMS data to the data center.

In 2010, Industrial Estate Authority of Thailand (IEAT) ordered all power plants located in IEs throughout the country to install CEMS and send data to EMCC.

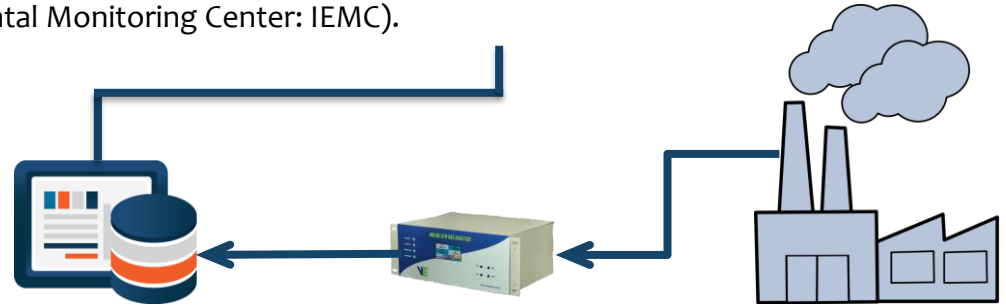
CEMS requirement

CEMS components consist of

1. Sampling system
2. Analyzer
3. Data acquisition

Factories located inside the Industrial Estate Area shall submit emission monitoring data to IEAT Data Center (Environmental Monitoring & Control Center: EMCC).

Factories located outside the Industrial Estate Area shall submit emission monitoring data to DIW Data Center (Industrial Environmental Monitoring Center: IEMC).



In 2009, National Environmental Board declared the whole area of Mab Ta Phut and its vicinity as the Pollution Control Zone, which includes Mab Ta Phut, Hauy Pong, Nern Pra, Tab Ma, Mab Kha, Ban Chang Sub-district, and its shoreline.

CEMS compliance

Complied under	Number of factories	Number of stacks
MOI Notification	**29**	**36**
Others	109	270
Total	138	306

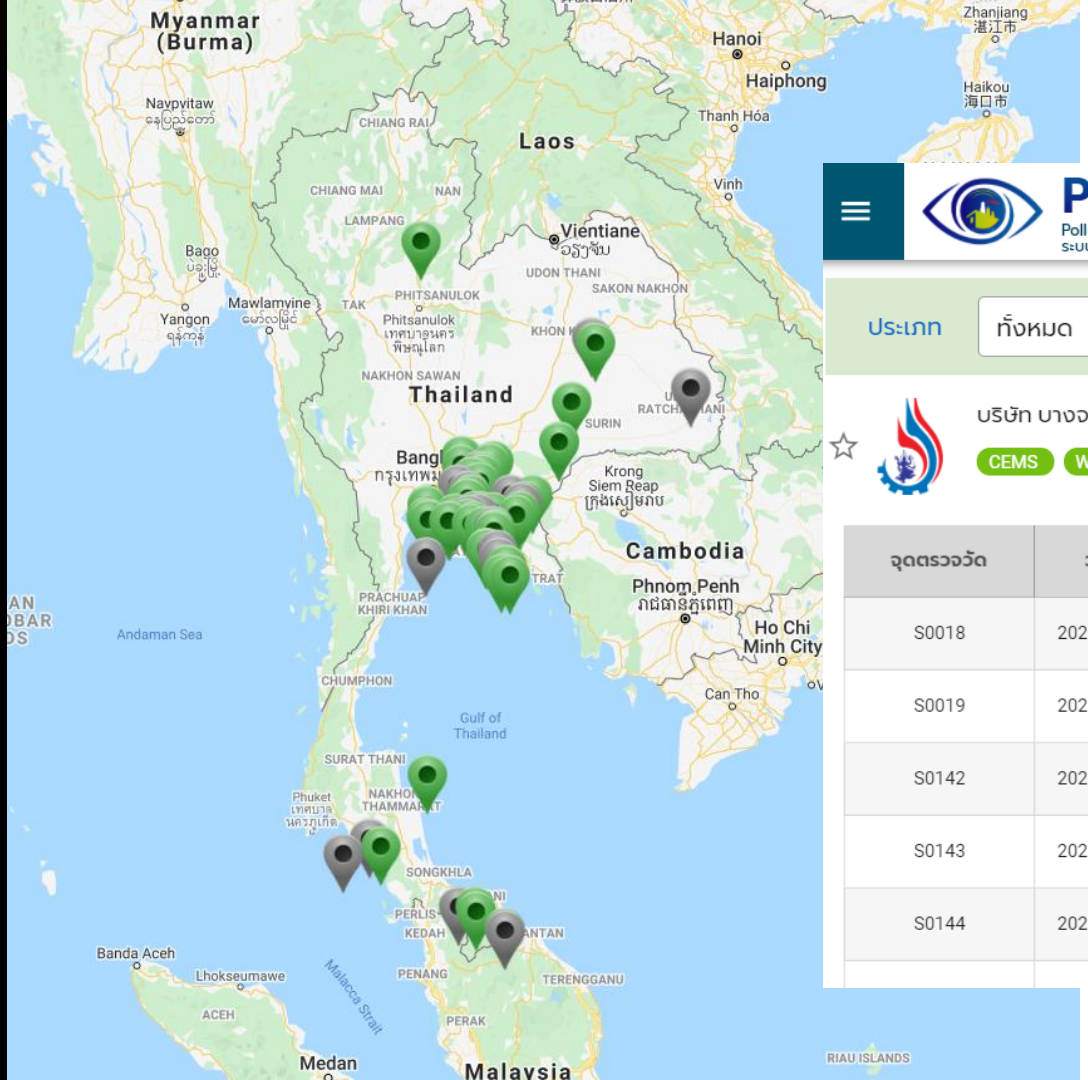
In 4 IEs in Mab Ta Phut area

Industry	Number of factories	Number of stacks
Petrochemical	17	21
Oil Refinery	1	1
Gas separation	1	1
Steel plant	3	4
Power plant	5	7
Others	2	2
Total	**29**	**36**

CEMS compliance

- IEAT requirement
- EIA and factory permit condition
- Voluntary monitoring

Industry	Number of factories	Number of stacks
Oil refinery	6	26
Petrochemical	3	6
Chemical	1	3
Rubber	1	1
Pulp and paper	3	4
Metal	1	2
Power plant	91	224
Steam generator	1	1
Waste incinerator	2	3
Total	**109**	**270**



POMS

Pollution Online Monitoring System
ระบบเฝ้าระวังและเตือนภัยมลพิษระยะไกล

ชื่อหรือเลขทะเบียนโรงงาน

ประเภท: ทั้งหมด

จัดเรียงตาม: จากพิกัดอ้างอิง

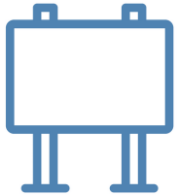
บริษัท บางจาก คอร์ปอเรชั่น จำกัด (มหาชน)

CEMS WPMS 8.7 กม. จากตำแหน่งอ้างอิง

จุดตรวจวัด	วันที่	เวลา	NOx (ppm)	SO2 (ppm)	O2 (%)
S0018	2021-09-07	18:00 น.	*	1	8.61
S0019	2021-09-07	18:00 น.	*	13	9.64
S0142	2021-09-07	18:00 น.	18	*	12.7
S0143	2021-09-07	18:00 น.	21	*	4.08
S0144	2021-09-07	18:00 น.	12	*	15.86

Benefits of CEMS

- Self-monitoring for process optimization and early warning
- Better compliance
- Reducing pressure from community by means of information disclosure
- Gaining trust from community and
  increasing Communication effectiveness



Stack sampling by 3rd party is still required twice a year

Draft CEMS proposal

- Expand effective area to the entire country
- Recognize CEMS as a standard method. Quality Assurant is required.

No.	Current	Proposed draft	Parameters
1	Power plant, capacity ≥29 MW	Power plant, capacity ≥29 MW	Opacity or PM, SO2, NOx, CO, O2, air flow rate
2	Boiler capacity ≥30 tons of steam per hour or heat source capacity ≥100 MMBTU per hour	Boiler, capacity ≥30 tons of steam per hour	Opacity or PM, SO2, NOx, CO, O2, air flow rate
3	-	Heat source, capacity ≥100 MMBTU per hour	Opacity or PM, SO2, NOx, CO, O2, air flow rate
4	Cement or Lime production, all sizes, at kiln and clinker cooler	Cement production, ≥3,000 ton/day, at kiln and clinker cooler	Opacity or PM, SO2, NOx, CO, O2, air flow rate

Draft CEMS proposal (cont.)

No.	Current	Proposed draft	Parameters
5	Pulp or paper production, at recovery furnace, lime kiln, digester brown stock washer, evaporator and condensate stripper system	Pulp production, capacity ≥ 50 ton per day, at recovery furnace, lime kiln	Opacity or PM, SO_2, NOx, O_2, TRS or H_2S, air flow rate
6	Petroleum refineries, at fluid catalytic cracking unit (FCCU), fuel oil combustion unit, sulfur recovery unit (SRU)	Petroleum refineries, at fluid catalytic cracking unit (FCCU), deep catalytic cracking unit (DCCU), fuel oil combustion unit, sulfur recovery unit (SRU)	Opacity or PM, SO_2, NOx, CO, O_2, air flow rate
7	Production of iron and steel ≥ 100 tons per day, at electric arc furnace, or blast furnace, or any preheat unit using oil or coal as heat source	Production of iron and steel ≥ 100 tons per day, at smelter, furnace, or any preheat unit using oil or coal as heat source	Opacity or PM, SO_2, NOx, CO, O_2, air flow rate

Draft CEMS proposal (cont.)

No.	Current	Proposed draft	Parameters
8	Production of other metals, all sizes, at roaster dryer of copper smelter or sintering machine of zinc smelter	Production of other metals, total capacity ≥ 50 tons per day, at smelter, furnace	Opacity or PM, SO_2, NOx, CO, O_2, air flow rate
9	Lead smelter of all sizes using furnace sintering machine or converter	Production of lead ≥ 10 tons per day, at furnace	Opacity or PM, SO_2, NOx, CO, O_2, air flow rate
10	Waste incinerator, all sizes	Waste incinerator : all sizes of industrial waste incinerator, capacity ≥ 10 tons per day for municipal waste or infectious waste incinerator	Opacity or PM, SO_2, NOx, CO, O_2, air flow rate, HCl, Hg, temperature

Draft CEMS proposal (cont.)

No.	Current	Proposed draft	Parameters
11	Sulfuric acid production, all sizes	Sulfuric acid production, total capacity ≥ 100 ton/day	SO_2
12	-	Glass production, heat input ≥ 100 MMBTU, exclude unit utilizing heat from electric booster and heat recovery	Opacity or PM, SO_2, NOx, CO, O_2, air flow rate
13	-	Other units required by EIA	According to EIA

Thank you for your attention!

Q & A