

Methane to Markets (M2M)

Mexico. Oil and Natural Gas Country Profile

**Tomsk, Russia
September 13th., 2005**

Agenda

1. Mexico. Oil and Natural Gas Industry Overview

2. Key Barriers and Needs to Reduce Methane

3. Current Projects

4. Project Opportunities

1. Mexico. Oil and Natural Gas Industry Overview

México. Oil and Natural Gas Industry Overview

- **Petróleos Mexicanos (PEMEX), a state- owned company, is in charge of the exploration for and extraction of petroleum and the processing and distribution of oil and gas industry activities in Mexico.**
- **PEMEX represents Mexico in the Oil and Natural Gas Industry's Subcommittee for the Methane to Market Initiative, due to the agreement between the Ministry of Energy and the Ministry of the Environment and Natural Resources.**
- **In terms of sales and assets, Petróleos Mexicanos is the most important company in Mexico and Latin America. In addition to its strategic contribution to the economy and national development, its current hydrocarbons production levels place it in an outstanding position at the international level. PEMEX was ranked ninth in the oil and natural gas industry and fifteenth as natural gas world producer.**
- **To carry out its operations, PEMEX has impressive infrastructure facilities for onshore and off-shore hydrocarbons production, an extensive pipeline network, compression stations and gas processing centers throughout the Mexican territory.**

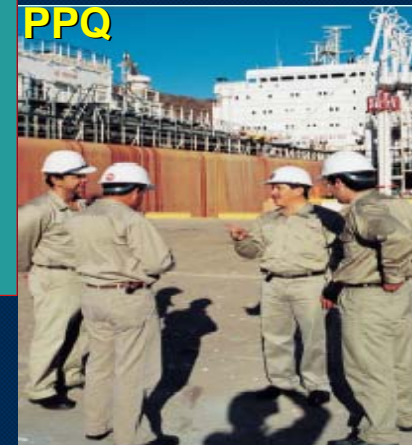
Petróleos Mexicanos. Subsidiaries

Pemex Exploración y Producción: Oil and gas Production



Pemex Gas y petroquímica Básica: Oil and gas Production

Pemex Refinación: Refining



Integrated oil and gas company	9°
Oil reserves	9°
Gas reserves	28°
Crude oil production	3°
Gas production	15°
Refining capacity	13°

* *Petroleum Intelligence Weekly*

Pemex Petroquímica: Petrochemicals

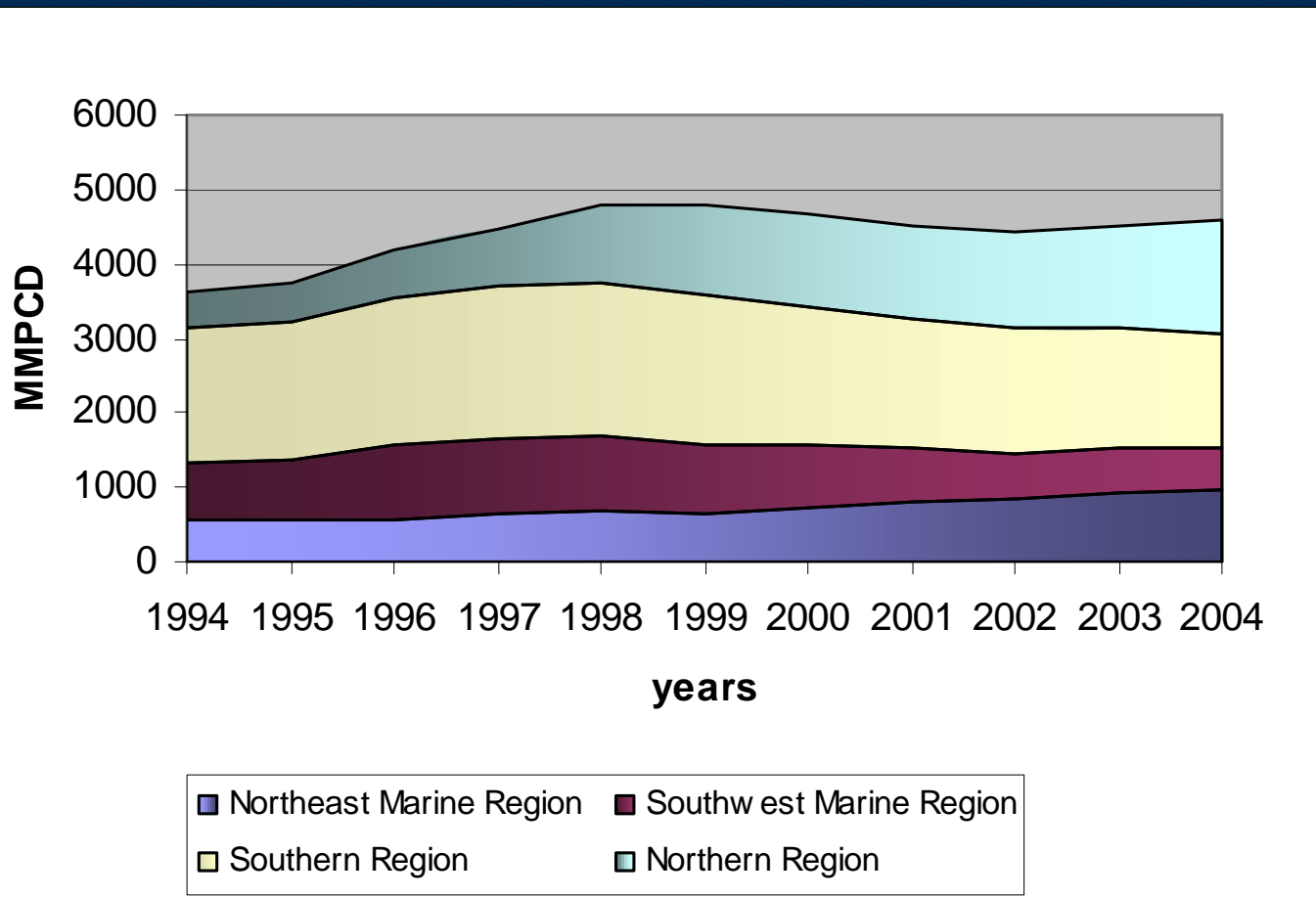
México. Oil and Natural Gas Industry Overview

Main indicators, 2004:

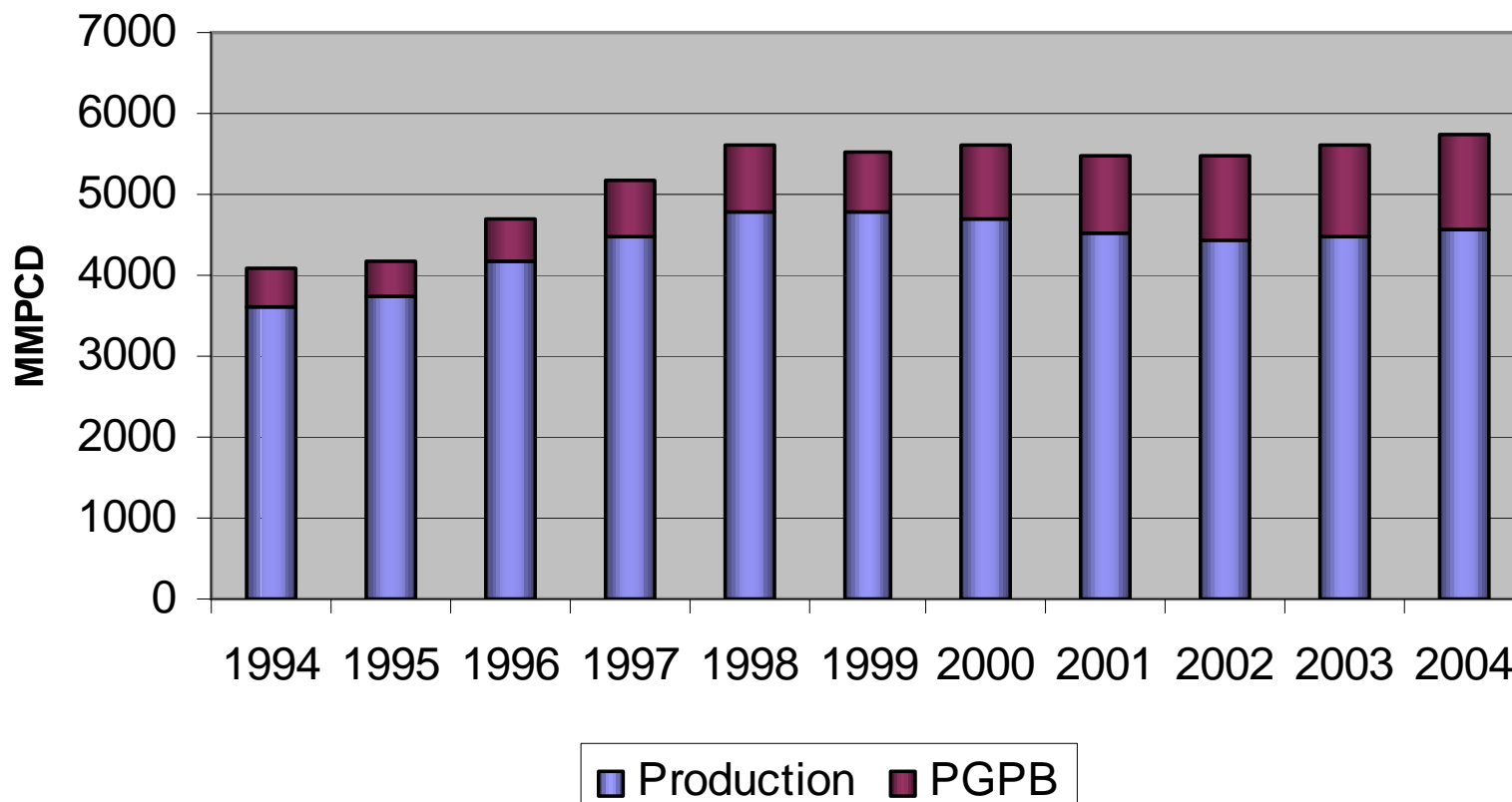
• Natural gas production	4,573 MMpcd
• Gas pipelines	15,554 Kms.
• Gas processing centers	12

• Crude oil production	3,824 Mbd
• Crude oil processing	1,303 Mbd
• Gasoline production	467 Mbd
• Fuel oil production	368 Mbd
• Diesel production	325 Mbd
• Ethylene production	1,007 Mt
• Ammonia production	681 Mt
• Aromatic production	594 Mt

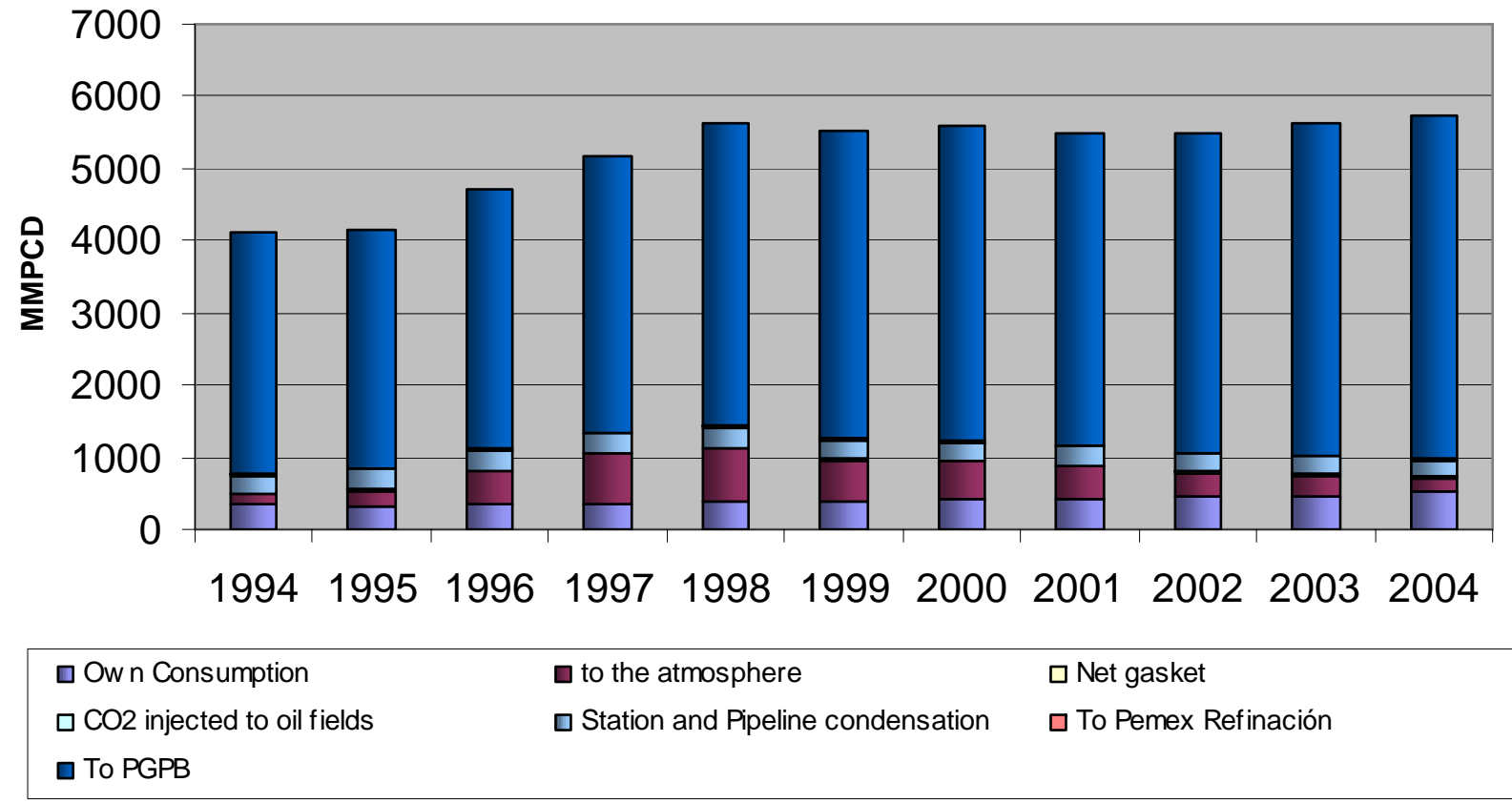
Natural Gas Production by Region



Natural Gas Availability



Natural Gas Distribution



Petróleos Mexicanos: infrastructure

PEMEX industrial activities are developed in more than 3 thousand facilities located throughout the national territory.



México. Oil and Natural Gas Industry Overview

Methane emissions in the oil and natural gas infrastructure (MMTCO_{2e})

Country	1990	2000	2010
Russia	335.3	252.9	273.5
United States	147.6	138.2	144.8
Ucrania	71.6	60.2	39.4
Venezuela	40.2	52.2	68.0
Uzbekistán	27.2	33.7	42.9
India	12.9	24.4	54.9
Canadá	17.1	23.3	23.8
<i>México</i>	<i>11.1</i>	<i>15.4</i>	<i>22.1</i>
Argentina	8.0	13.7	30.5
Thailand	2.9	8.6	15.9
China	0.9	1.5	4.9

- In 2000, estimates in Mexico for methane emissions from oil and natural gas infrastructure were 15.4 MMTCO_{2e}* (1.2 % of world emissions), and may increase to 22.1 MMTCO_{2e}* in 2010.

*Source: US EPA

2. Key Barriers and needs to reduce methane

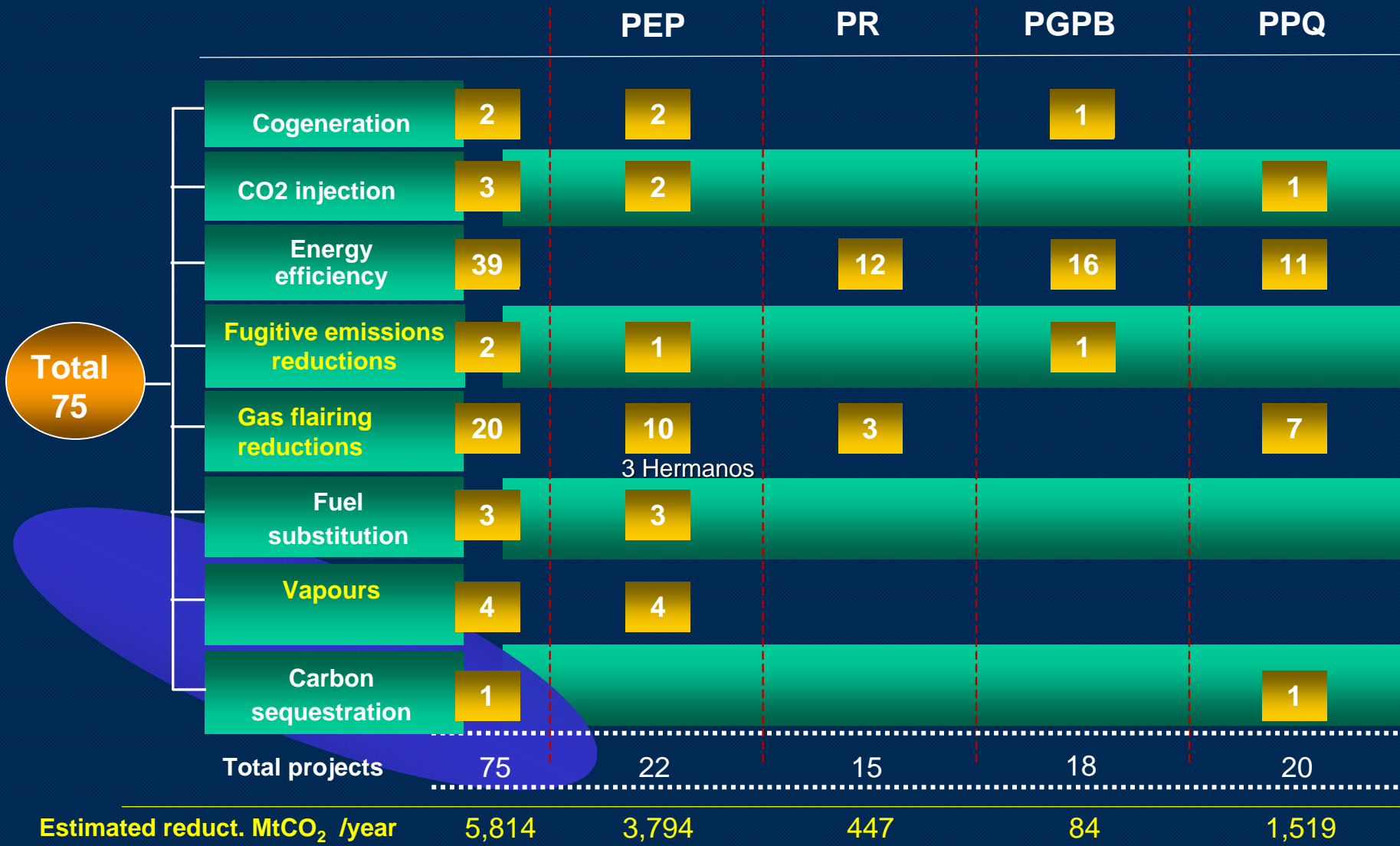
2. Key Barriers and needs to reduce methane

- **PEMEX suffers budget restrictions that delay projects to save methane gas in his facilities.**
- **We assume that the Methane to Market Initiative can help to addresses this barrier by providing economic and technical resources.**

III. Existing Projects

GHG reductions. Opportunity areas in PEMEX 2005-2008

PEMEX has identified projects in each opportunity area:



IV. Project Opportunities

IV. Project Opportunities

- **To improve the current methodology to estimate methane emissions in gas processing facilities and pipelines.**

(SISPA/AP-42)

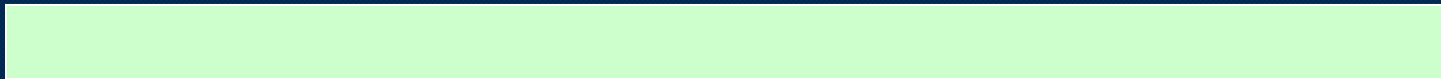
- **Methane emissions measurement to identify sources of emissions and leakages**

- **Implementation of specific projects devoted to eliminate emissions and leakages.**

- **Natural Gas Star Program implementation**

1 Fugitive emissions opportunity

Region	Opportunity name



Upgrading of compression stations RN

Location

Compression facilities in Burgos, located at Tamaulipas state.

Objective

To reduce fugitive emissions from measurement, control valves and operation processes in the stream gas of the compression stations.

Annual Reduction

Emission reduction range MtCO ₂ e*	Investment MMpesos	Starting date
91 - 62	80	2007

Emission
estimates
and
analysis

*Thousand tons of carbon dioxide equivalent



4 Vapour opportunities

Region **Opportunity name**

RS Bateria Samaria II optimization

RS Bateria Giraldas vapour recovery

Batería Iride optimization

Location

Batería Íride is located in the Southern region, in Cunduacán municipality at the ejidos area of Santa Isabel, Los Cedros, Dos Ceibas and Gregorio Mendez, in the state of Tabasco.

Objective

To properly separate and stabilize oil production through the operation of a tower with plates operated at atmospheric pressure to minimize vapour releases during the atmospheric tanks storage stage that are vented to the atmosphere.

Annual Reduction

Emission reduction range MtCO ₂ e*	Investment MMpesos	Starting date
172 - 117	80	2007

**Project Idea
Note in
Process**

*Thousand tons of carbon dioxide equivalent

Batería Iride´s stability crude oil tanks

200 000 BLS capacity



Batería Samaria II optimization

Location

It is located in the Southern region in the Ranchería Cumuapa of Cunduacán municipality, in Tabasco state, 17 kilometers west of Villahermosa city.

Objective

To properly separate and stabilize oil production through the operation of a tower with plates operated under empty pressure, to minimize vapour releases during the atmospheric tanks storage stage.

Annual Reduction

Emission reduction range MtCO ₂ e*	Investment MMpesos	Starting date
150 - 102	90	2007

**Project Idea
Note in
Process**

*Thousand tons of carbon dioxide equivalent

Batería Samaria II stability crude oil tanks

200 000 BLS Capacity



Low pressure motocompressors installation for vapour handling

Location

Compression station at the hydrocarbons transport and distribution office of the Southeast Marine Region .

Objective

To avoid flaring of vapours that produce black smoke due to high liquid content.

Annual Reduction

Emission reduction range MtCO ₂ e*	Investment MMpesos	Starting date
210 - 143	186	2006

*Thousand tons of carbon dioxide equivalent

Emission
estimates
and
analysis

Batería Girdaldas vapour recovery

Location

It is located near Girdaldas field from Activo Integral Muspac, at Reforma Chiapas municipality .

Objective

To have a stability crude oil system through elevated tanks and vapour recovery operated at operation pressure. To have vapour recovery and compress it to send it to the compression station.

Annual Reduction

Emission reduction range MtCO ₂ e*	Investment MMpesos	Starting date
168 - 114	90	2007

*Thousand tons of carbon dioxide equivalent

Costs update
and validation

Batería Giraldas vapour recovery



Potential CO₂ emission reduction projects Pemex Gas y Petroquímica Básica

LPG	Description	Operation start up	Investment total (MM\$)	Benefits	CO ₂ reduction (thousands ton/year)
Matapionche	Amina heater upgrade .- Substitute the actual heater for a more efficient one, avoiding NOx and COx emissions to the atmosphere to comply with current regulation.	2006	6.1	2 MM\$ anual from fuel consumption	1.63
Matapionche	Purchasing of elevated and pit burners.- Substitute the pit and elevated burner to make more efficient the hydrocarbon flaring and thus reducing NOx and COx emissions to the atmosphere.	2007	10.0	1 MM\$ anual from fuel consumption	0.72
Pipelines	Industrial Safety, Physical and Environmental Protection .- Evaluate the fugitive emissions from organic compounds, quantitative and qualitative analysis from internal combustion gases of compression equipment.	2005	4.8	To update the universe of possible emission sources, to establish inspection plans, monitoring, corrective maintenance and prevention and update the statistics SISPA control.	4.40