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ASOCIACION REGIONAL DE EMPRESAS DE PETROLEO Y GAS NATURAL EN LATINOAMERICA Y EL CARIBE

Benchmarking on Environmental Performance in the Oil and Gas Industry in Latin America and the Caribbean – Information of ARPEL Member Companies for 2008

ARPEL ENVIRONMENTAL REPORT

Benchmarking on Environmental Performance in the Oil and Gas Industry in Latin America and the Caribbean – Information of ARPEL Member Companies for 2008

CONFIDENTIAL

For exclusive use of ARPEL Member Companies

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This is a document developed within the context of the activities of the **ARPEL Environment, Health and Safety Committee.**

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Objectives of ARPEL Environment, Health and Safety Committee

- To promote the exchange of information and experiences among Member Companies as well as with regional and international organizations to strengthen their environment, health and safety management and disseminate and encourage the implementation of best environment, health and safety practices.
- To identify regional/international environment, health and safety and social-environmental issues and trends and propose strategies and actions to address them.
- To consolidate the condition of Latin American and Caribbean forum with worldwide recognition that represents and disseminates the opinion of the industry operating in the Region, in issues concerning environment, health and safety, developing the synergy between ARPEL and other regional and international associations and organizations.

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- Periodically measuring environmental performance is an important management strategy to accomplish continuous improvement. By comparing (benchmarking) their environmental performance, oil and gas companies will be able to:
    - Compare company performance to industry trends and to other companies in the sector.
    - Identify companies doing particularly well in improving their environmental performance.
    - Promote the improvement of environmental management through the exchange of experiences.
- The ARPEL Environment, Health and Safety Committee (CASYSIA) has identified key environmental indicators for which an annual environmental benchmarking exercise could be useful for the above mentioned purposes. The indicators agreed by CASYSIA in this stage are described in the "Users Manual – ARPEL Database – Benchmarking on Environmental Performance in the Oil and Gas Industry in Latin America and the Caribbean" (1st edition, 2008).
- The Manual provides definitions, procedures, and instructions for those in the oil and gas industry who collect and report environmental data to ARPEL, among which we find:
    - The indicators are classified in 6 functions: Exploration and Production, Pipelines, Terminals, Distribution/Transport, Refining and Petrochemical. The scope of these functions is defined in the Manual.
    - Indicators are normalized according to the magnitude of operations of each company for each Function.
    - The information shown is of operations in Latin America and the Caribbean as regards oil and natural gas.
    - Companies report data of their environmental performance by consolidating 100 percent of the data or information of indicators or information of operations over which they have management control and NOT data from operations they do not manage. For the purposes of this Manual, oil and gas companies define the operated boundary as all of those facilities where the company´s management has accountability and authority for sustainability policies, systems and performance (health, safety, environmental, social and/or economic) related to the facility.
- Indicators reported in this report are:
    - Hydrocarbons´ spills in all the functions
    - Discharges and Produced Water re-injection in Exploration and Production activities
    - Water and oil discharged as process effluents in all the functions
    - Disposal of hazardous and non-hazardous solid wastes in all the functions
- This is the first environmental benchmarking report of ARPEL. In the future, it is expected to improve the information processed as well as to continue adding more indicators that can be agreed on and that are useful for the objectives of continuous improvement of the environmental performance of ARPEL Member Companies and the oil and natural gas industry in general.

2. Introduction

The Member Companies that reported data for this report are the ones shown in Table 1. It should be pointed out that:

- some companies reported data of more than one country (of the Region), resulting in a total of 17 "companies-country", which were codified so that confidentiality of the information is kept.
- not all the companies have activity in all the functions or reported data for all the indicators, so not all the indicators that appear in the following chapters contain the 17 "companies-country".
- as a whole, the magnitude of the activities of these companies represent 55.5 % of the refining activity, 63 % of the oil production activity and 41.6 % of the gas production activity of Latin America and the Caribbean[1].

Table 1: Companies that participate in the 2008 Report

ANCAP	PEMEX
PETROBRAS	RepsolYPF
ECOPETROL	Total
ENAP	Recope

Table 2 details the number of "companies-country" and the consolidated magnitude of the activities reported for each function[2].

Table 2: Data consolidation (in 10^3 Tonnes)

[1] According to BP Statistics (2009) the total of ALC is 336.060x10^3 tonnes of products refined, 493x10^6 tonnes of oil produced, and 213,8x10^9 cubic meters of gas produced. The information on gas production reported by the companies used a conversion factor of 0.9 Tonnes per 1,000 cubic meters.

[2] If in a mixed operation, the quantities are not collected separately for onshore and offshore, the quantities are entered as ***Undefined***

ARPEL Environmental Benchmarking

Total reported data

		Number of companies that reported data	Total
Gross Hydrocarbon Production	Offshore	5	228.000
	Onshore	9	175.152
	Undefined	4	5.896
	Total	**13**	**409.048**
Pipelines' Transportation		**7**	**13.856.653**
Terminals' Movement		**7**	**30.321**
Distribution / Transport		**6**	**219.605**
Refining Activity		**9**	**188.417**
Petrochemicals' Activity		**2**	**7.719**

3. Environmental Indicators

3.1 Hydrocarbon spills

Spills represent a very important environmental performance indicator for the oil and natural gas industry as they have a visible impact on the environment. The degree of environmental impact is highly dependent on the nature of the spill, where it happened and how it was handled.

The graphics included in this sub-chapter show the number of spills and the volume spilled in barrels, both normalized by the magnitude of the activity in each Function.

For the purpose of this report, spills include all the releases from the facilities operated by the company, but they do NOT include primary and/or secondary containment or other impermeable surfaces if they do not reach the environment.

Table 3 details the number of "companies-country" and the consolidated magnitude of the activities reported for each function in the "Hydrocarbon spills" indicator. The "Hydrocarbon spills" indicator is classified by:

- the destination of the spill, in which case the information is classified by spill into "In land", "In water" and "Total".
- in the case of Exploration and Production, it is –also- divided by the source of the activity, i.e., "E&P offshore", "E&P onshore" and "E&P undefined". There are no spills in land from offshore operations; therefore, Table 3 includes NR (Not Relevant). "E&P undefined" spills show that the companies that report do not differentiate (in their own environmental information management systems) the source of the E&P activity that caused the spill reported.

Table 3: "Companies-country" that reported for the "Spills" indicator

Arpel

ARPEL Environmental Benchmarking

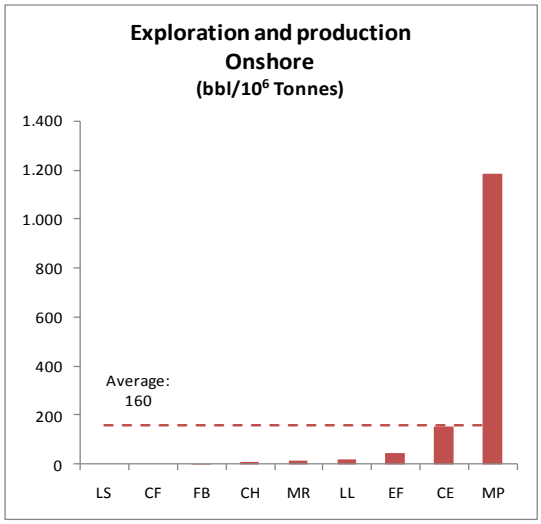
Data Consolidation (in 10^3 Tonnes)
Total reported data

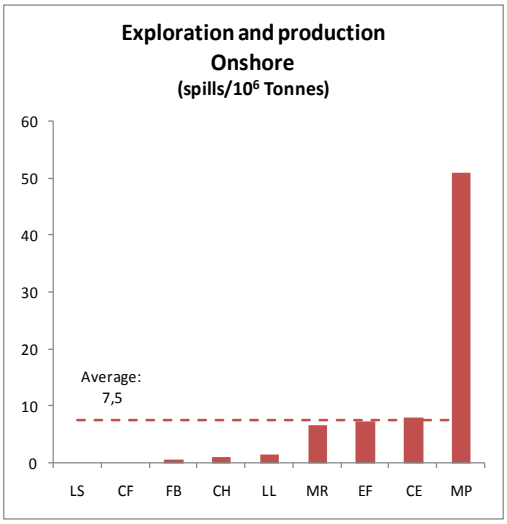
				Quantity of spills (barrels)						Number of spills					
				In land		In water		Total		In land		In water		Total	
		Number of companies that reported data of operation	Total	Number of companies that reported data	Total	Number of companies that reported data	Total	Number of companies that reported data	Total	Number of companies that reported data	Total	Number of companies that reported data	Total	Number of companies that reported data	Total
Gross Hydrocarbon Production	Offshore	5	228.000	NP	NP	5	228.000	5	228.000	NP	NP	5	228.000	5	228.000
	Onshore	9	175.152	9	175.152	9	175.152	9	175.152	9	175.152	9	175.152	9	175.152
	Undefined	4	5.896	4	5.896	4	5.896	4	5.896	4	5.896	4	5.896	4	5.896
	Total	13	409.048	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Pipelines' Transportation		7	13.856.653	7	13.856.653	7	13.856.653	7	13.856.653	7	13.856.653	7	13.856.653	7	13.856.653
Terminals' Movement		7	30.321	7	30.321	7	30.321	7	30.321	7	30.321	7	30.321	7	30.321
Distribution / Transport		6	219.605	6	219.605	6	219.605	6	219.605	6	219.605	6	219.605	6	219.605
Refining Activity		9	186.124	9	186.124	9	186.124	9	186.124	9	186.124	9	186.124	9	186.124
Petrochemicals' Activity		2	7.719	2	7.719	2	7.719	2	7.719	2	7.719	2	7.719	2	7.719

3.1.1 Exploration and Production Spills

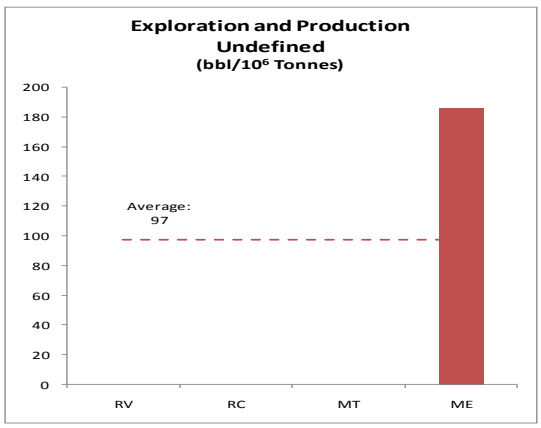
In sub-chapters 3.1.1.1. up to 3.1.1.8., the information is shown in pairs of tables, the ones on the left corresponding to spilled barrels, and the ones on the right to the number of spills per million tonnes of hydrocarbon produced in 2008.

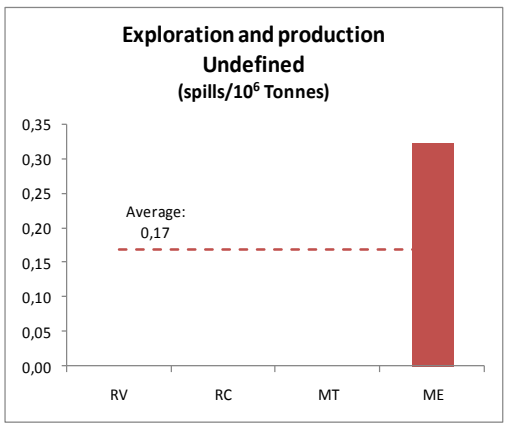
3.1.1.1 In land spills from Onshore Exploration and Production



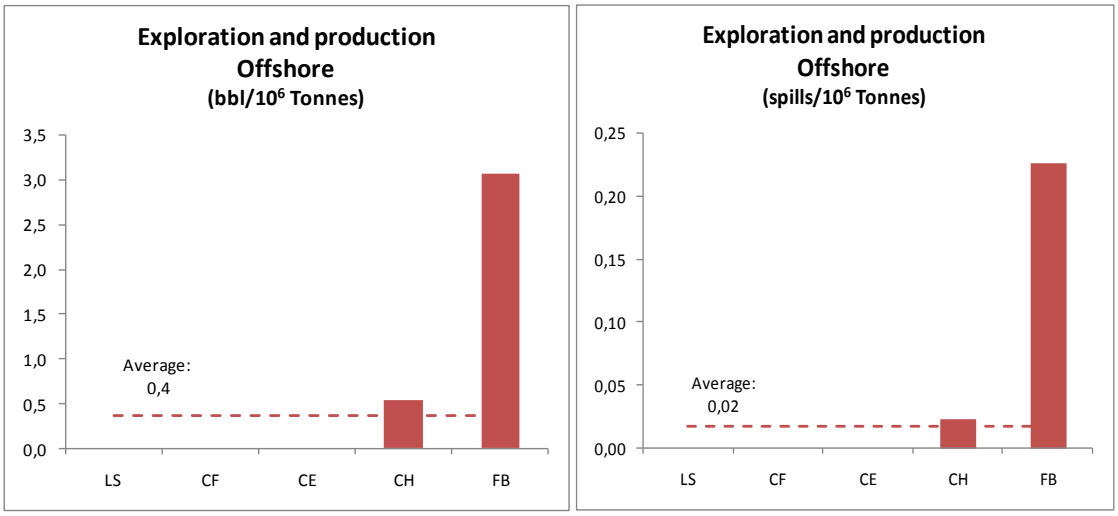


3.1.1.2 In land spills from undefined Exploration and Production

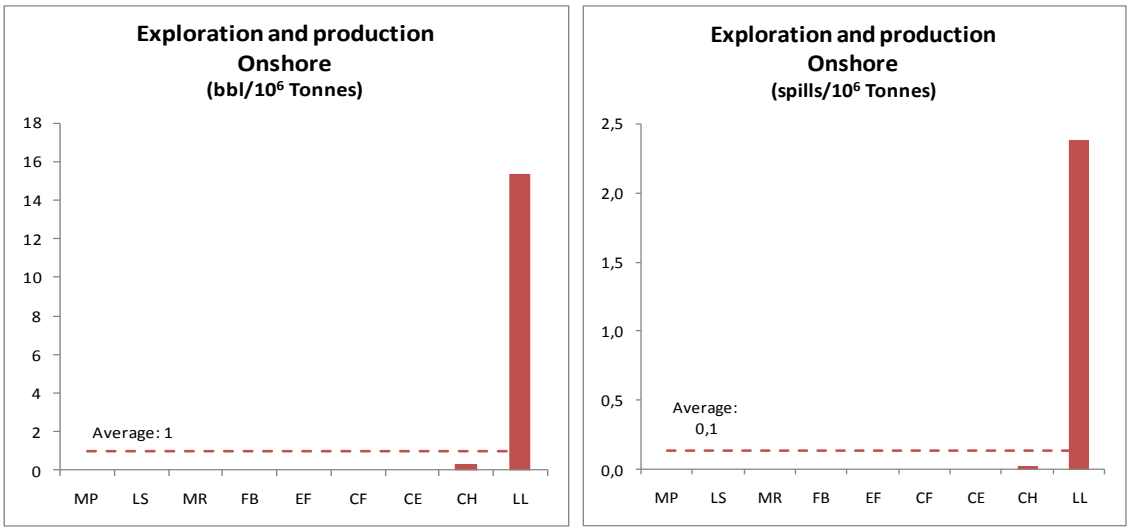




3.1.1.3 In water spills from offshore Exploration and Production



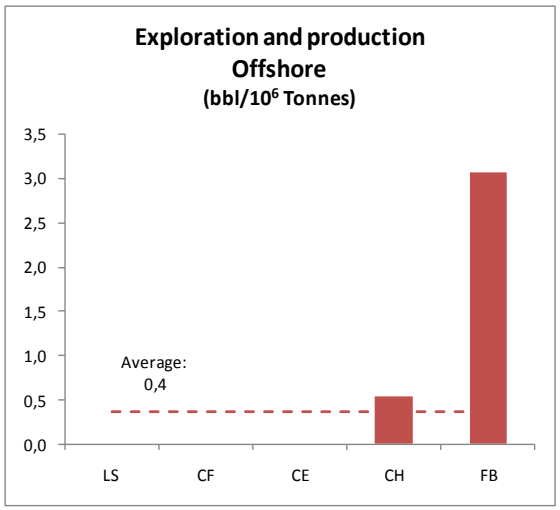
3.1.1.4 In water spills from onshore Exploration and Production

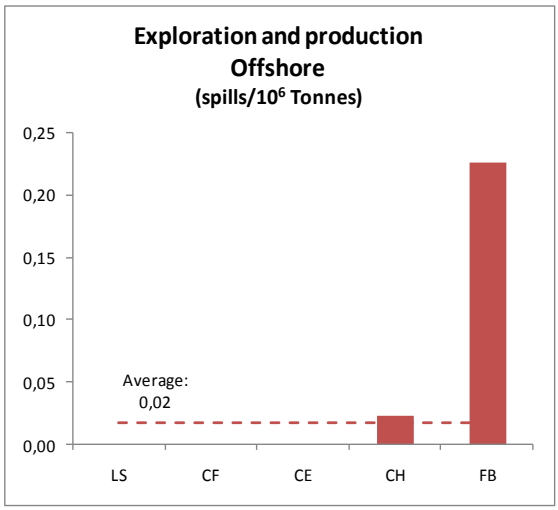


3.1.1.5 In water spills from undefined Exploration and Production

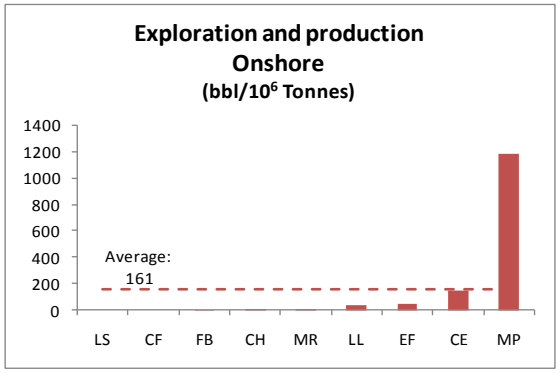
No spills on watercourses were registered from undefined E&P.

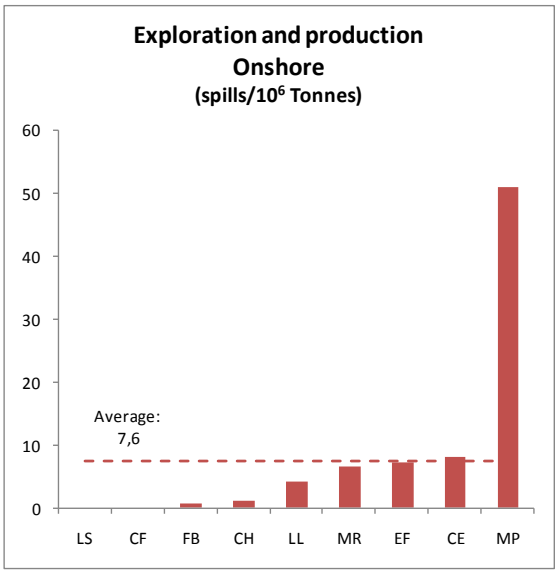
3.1.1.6 Total spills from offshore Exploration and Production





3.1.1.7 Total spills from onshore Exploration and Production





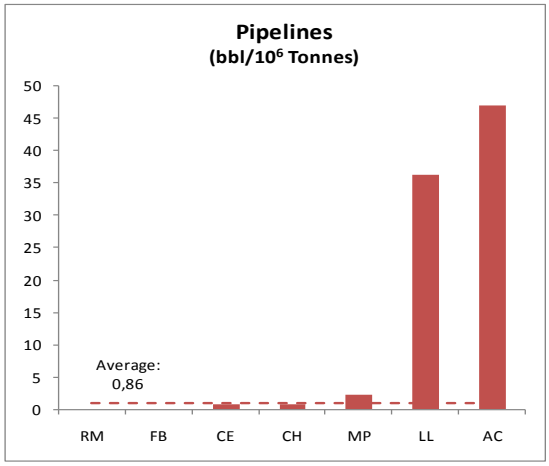
3.1.1.8 Total spills from undefined Exploration and Production

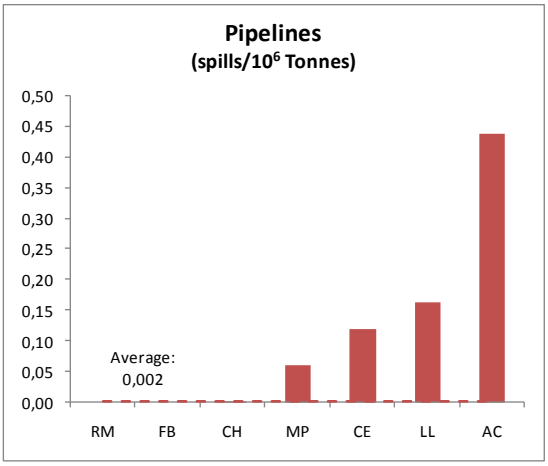
As there were no watercourse spills from undefined E&P registered, the total spills are the same as onshore spills (see tables above 3.1.1.2.).

3.1.2 Pipelines´ Spills

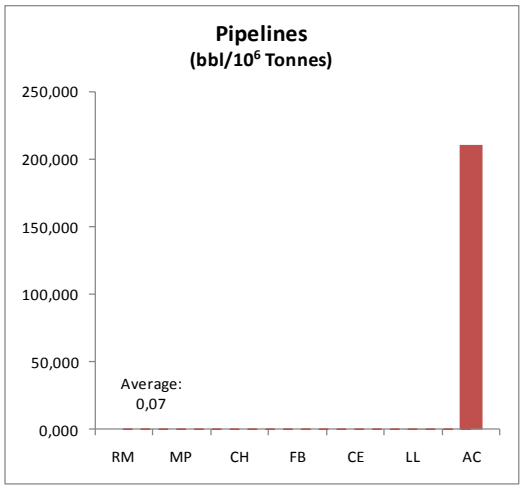
In sub-chapters 3.1.2.1. up to 3.1.2.3, the information is shown in pairs of tables, the ones on the left corresponding to spilled barrels, and the ones on the right, to the number of spills by million tonnes of product transported by pipelines among the different Functions in 2008.

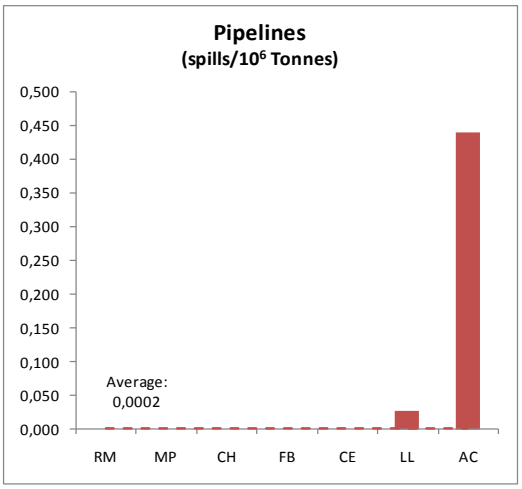
3.1.2.1 In land spills from Pipelines



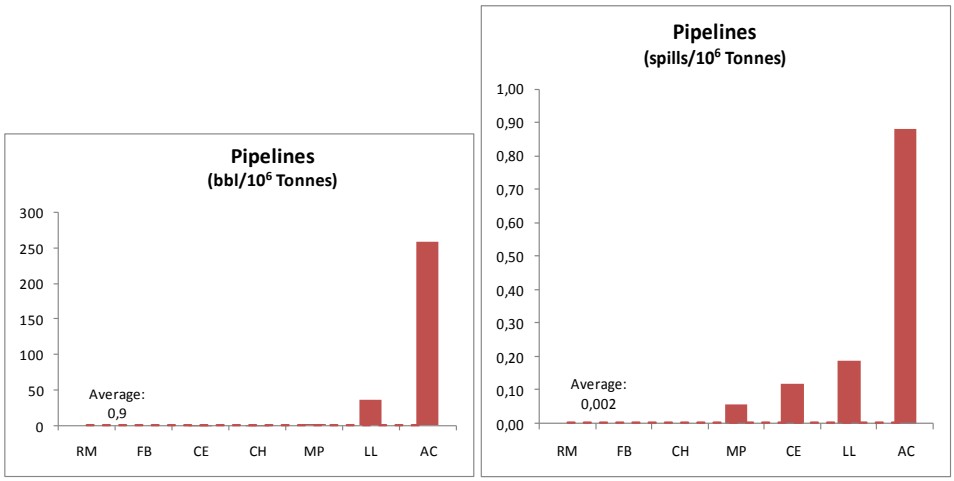


3.1.2.2 In water spills from Pipelines





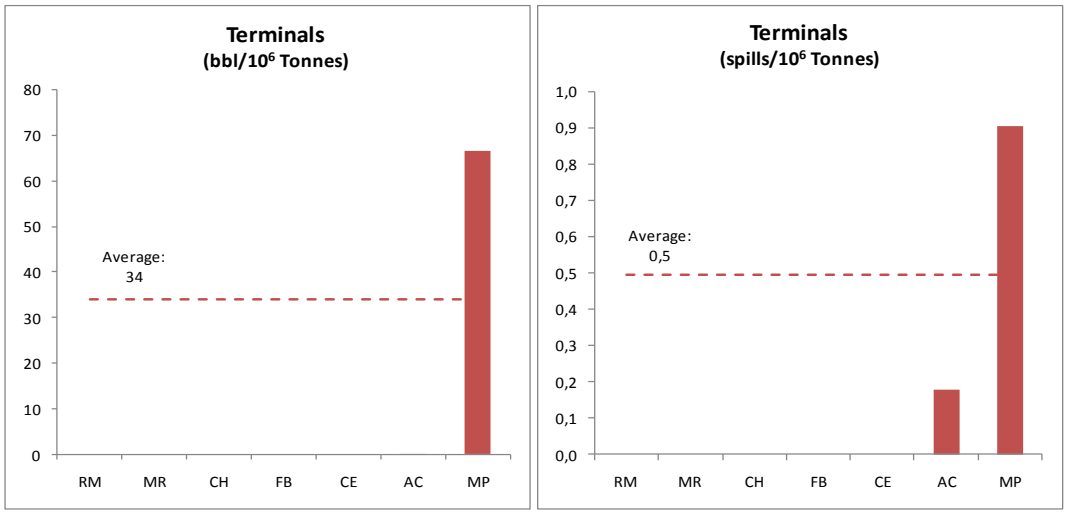
3.1.2.3 Total spills from Pipelines



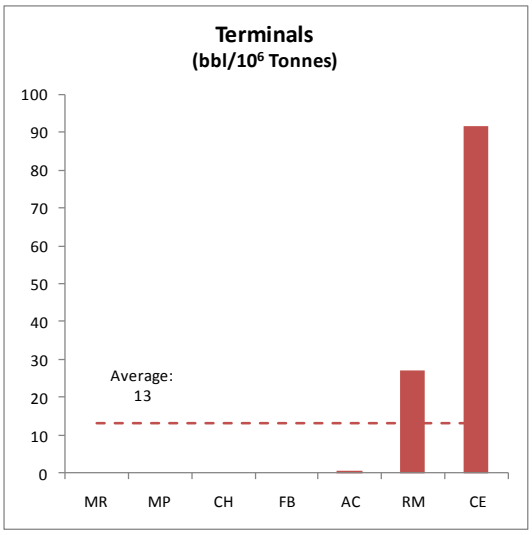
3.1.3 Spills in Terminals

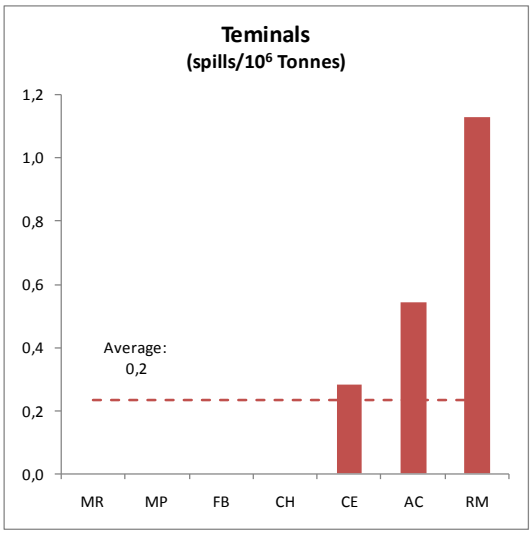
In sub-chapters 3.1.3.1. up to 3.1.3.3, the information is shown in pairs of tables, the ones on the left corresponding to spilled barrels, and the ones on the right, to the number of spills by million tonnes of product transferred from Terminals to other Functions in 2008.

3.1.3.1 In land spills from Terminals

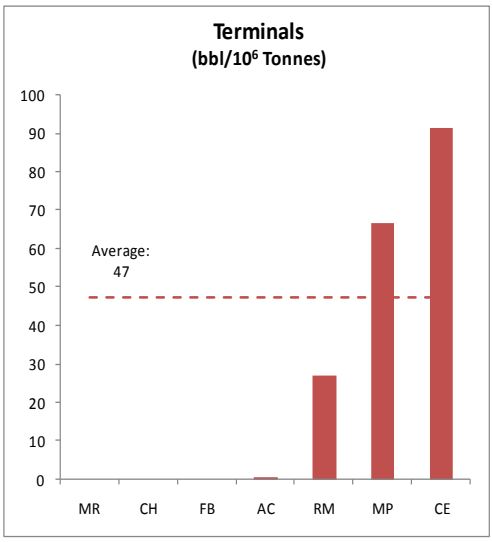


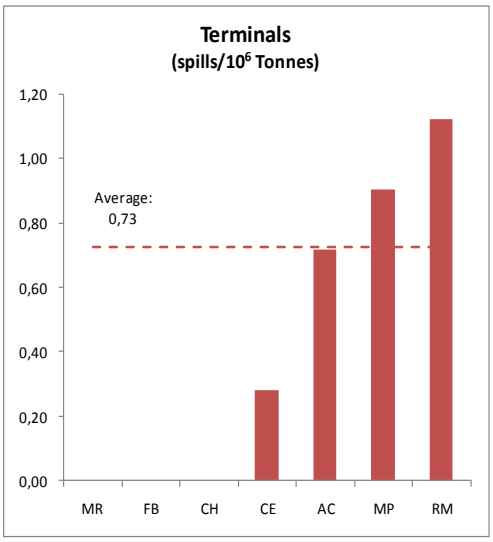
3.1.3.2 In water spills from Terminals





3.1.3.3 Total spills from Terminals

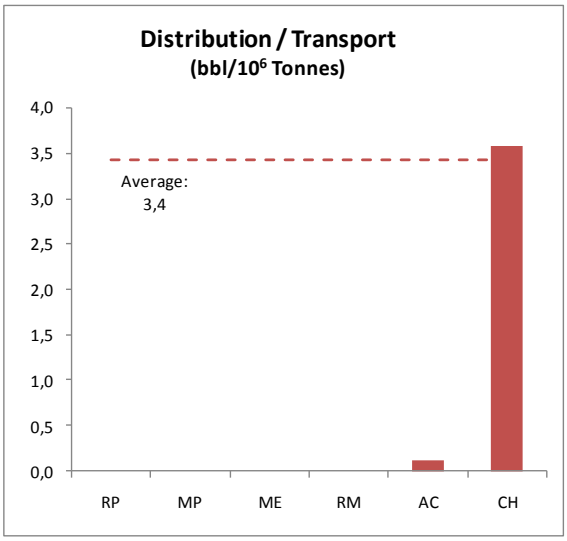


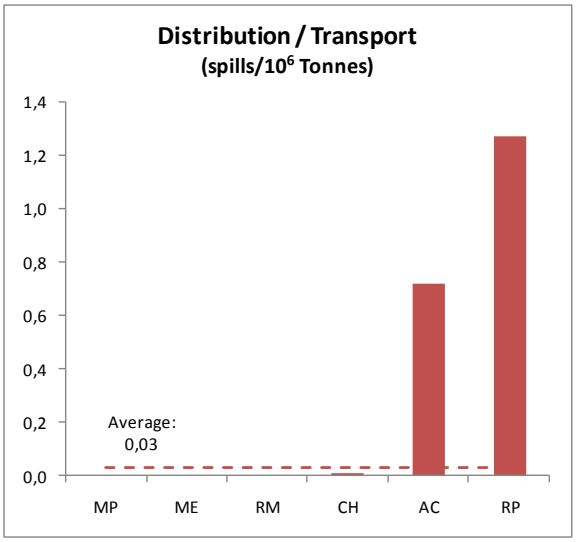


3.1.4 Distribution and Transport Spills

In sub-chapters 3.1.4.1. up to 3.1.4.3, the information is shown in pairs of tables, the ones on the left corresponding to spilled barrels, and the ones on the right to the number of spills by million tonnes of product transferred to, from or within the company´s facilities, excluding pipelines, but including tankers, barges, trucks, trains and retail service stations in 2008.

3.1.4.1 In land spills from Distribution and Transport





3.1.4.2 In water spills from Distribution and Transport

There were no watercourse spills from Distribution and Transport registered.

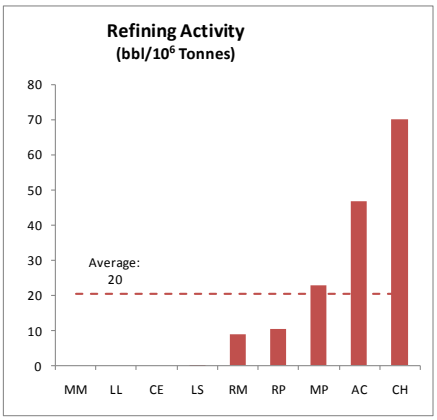
3.1.4.3 Total spills from Distribution and Transport

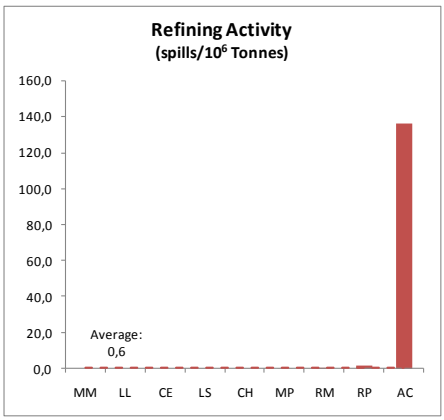
As there were no watercourse spills from Distribution and Transport registered, the total spills are the same as onshore spills (see tables above 3.1.4.1.).

3.1.5 Refining Spills

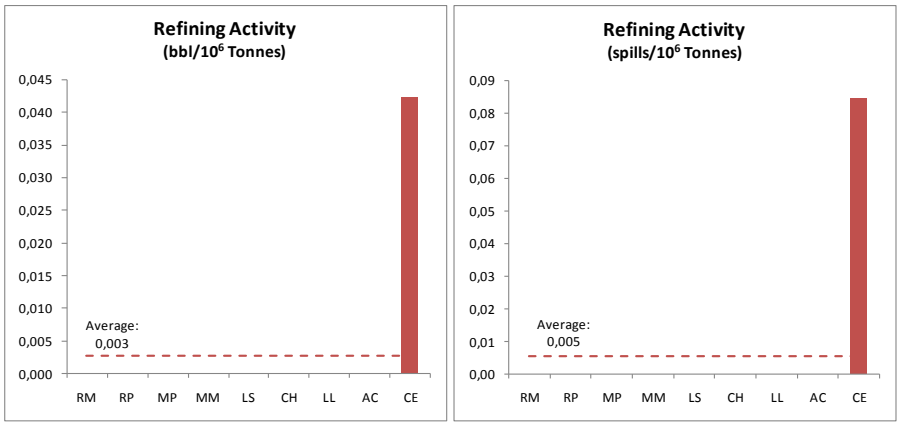
In sub-chapters 3.1.5.1. up to 3.1.5.3, the information is shown in pairs of tables, the ones on the left corresponding to spilled barrels, and the ones on the right to the number of spills by million tonnes fed to produce LPG, gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, and other products in 2008.

3.1.5.1 In land spills from Refining

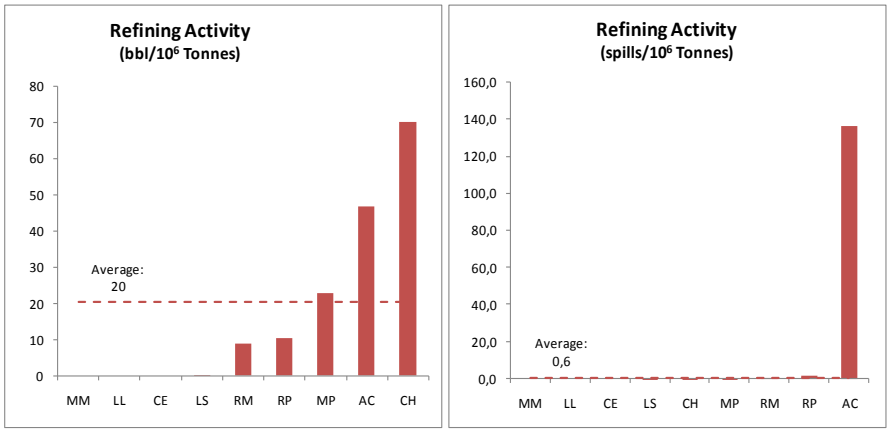




3.1.5.2 In water spills from Refining



3.1.5.3 Total spills from Refining



3.1.6 Petrochemicals´ Spills

In sub-chapters 3.1.6.1. up to 3.1.6.3. information on spilled barrels and the number of spills as a function of the quantity of petrochemicals produced or manufactured in which the chemicals are derived from petroleum or petroleum products in 2008 is provided.

3.1.6.1 In land spills from Petrochemicals

As an average, 200 barrels were spilled and there was 1 spill per 10 million tonnes of petrochemicals produced or manufactured where the chemicals are derived from petroleum or petroleum products in 2008.

3.1.6.2 In water spills from Petrochemicals

No watercourse spills were registered from Petrochemical.

3.1.6.3 Total spills from Petrochemicals

As there were no watercourse spills from Petrochemical registered, the total spills are the same as in land spills (see 3.1.6.1. above).

SUGGESTIONS FOR COMPANIES IN RELATION TO INDICATORS ASSOCIATED WITH SPILLS:

- Separate in your environmental information management systems:
  - The source of Exploration and Production spills. Some companies report onshore and offshore E&P, but they cannot report the spill source and they do it in Undefined E&P and the information processed in this way is not useful.
  - The destination of spills for all the functions. Some companies cannot inform if the spill was in land or in water and they load it in "Total". Environmental impact implications, as well as for the environmental, social and economic management are different if the spill was in land than if it was in water.
  - The size of the spills. Some companies do not classify the spills by its size and they report a total of spilled barrels. The decisions to be taken by the company in the future are different if they had 100 spills of 1 barrel than if they had 1 spill of 100 barrels.

3.2 Produced water discharges and re-injection

The hydrocarbons´ production implies the extraction of water, usually called "produced water". This produced water can be discharged to the environment as it is extracted, or it can be previously treated. Whatever the treatment is, there is always some dissolved hydrocarbon in the produced water. The discharge of produced water to the surrounding environment can have a negative impact on the environment. Produced water can also be re-injected to the production well. The "produced water re-injection" is key for showing the environmental operative excellence during the hydrocarbons´ production.

The indicators presented in this chapter include:

- the quantity of produced water discharged (including the water that is treated and discharged on land)
- the quantity of hydrocarbon discharged in the produced water, and
- the quantity of water re-injected as a disposal management method.

Table 4 details the number of "companies-country" and the consolidated magnitude of the activities reported for Exploration and Productions in the following indicators: "Produced water discharge", "Oil discharged in produced water" and "Produced water re-injection". These indicators are classified by the source of the activity, that is: "E&P offshore", "E&P onshore" and "E&P undefined".

Table 4: "Companies-country" that reported for "Produced water discharge", "Oil discharged in produced water" and "Produced water re-injection" indicators.

ARPEL Environmental Benchmarking

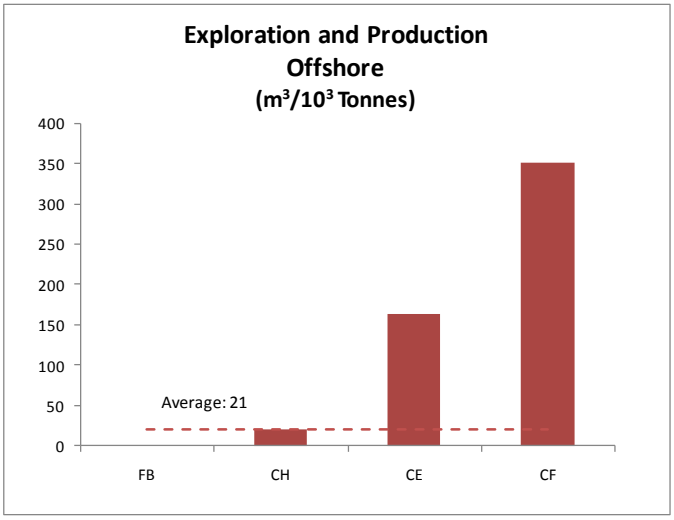
Data Consolidation (in 10^3 Tonnes)
Total reported data

				Produced water discharge		Oil discharged in produced water		Produced water re-injection	
		Number of companies that reported data of operation	Total	Number of companies that reported data	Total	Number of companies that reported data	Total	Number of companies that reported data	Total
Gross Hydrocarbon Production	Offshore	5	228.000	4	134.390	1	4.415	4	134.390
	Onshore	9	175.152	5	126.472	3	12.112	8	158.721
	Undefined	4	5.896	0	0	0	0	4	5.896
	Total	**13**	**409.048**	--------	--------	--------	--------	--------	--------

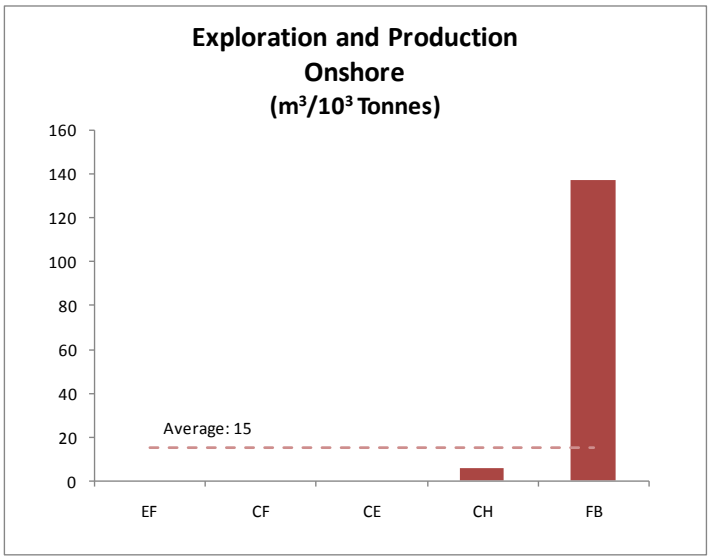
3.2.1 Produced water discharge

In sub-chapters 3.2.1.1. up to 3.2.1.3. the tables show the cubic meters of produced water discharged to the environment per thousand tonnes of hydrocarbon produced in 2008.

3.2.1.1 Produced water discharge from offshore Exploration and Production



3.2.1.2 Produced water discharge from onshore Exploration and Production



3.2.1.3 Produced water discharge from Undefined Exploration and Production

There was no produced water data reported from Undefined Exploration and Production operations.

3.2.2 Oil discharged in produced water

This indicator measures the tonnes of oil in produced water discharged to the environment per each million tonnes of hydrocarbons produced in 2008.

3.2.2.1 Oil discharged in produced water from offshore Exploration and Production

Five companies reported offshore E&P activity. From them, only 4 companies reported the quantity of produced water discharged (see 3.2.1.1.). Of these 4 companies, the only one that reported the quantity of oil in discharged water was the one that does not discharge produced water (it re-injects all of it); the other 3 companies did not measure the oil in water discharged during their operations.

3.2.2.2 Oil discharged in produced water from onshore Exploration and Production

From the two companies that reported produced water discharges onshore in E&P (see 3.2.1.2.), only one measured the oil content.

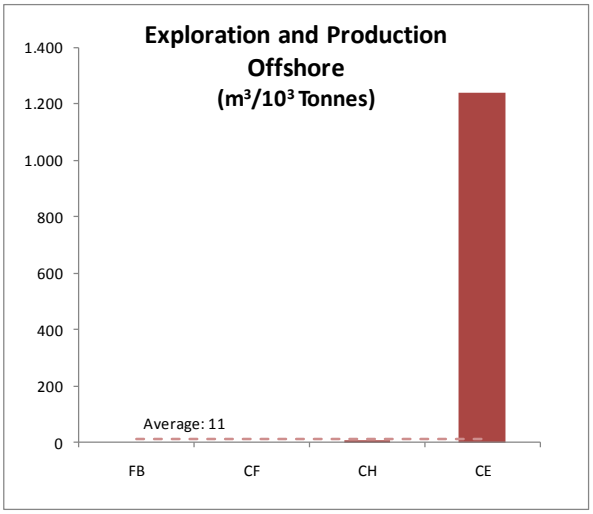
3.2.2.3 Oil discharge in produced water from Undefined Exploration and Production

There was no produced water data reported from Undefined Exploration and Production operations (see 3.2.1.3.) and, therefore, there is no associated oil information.

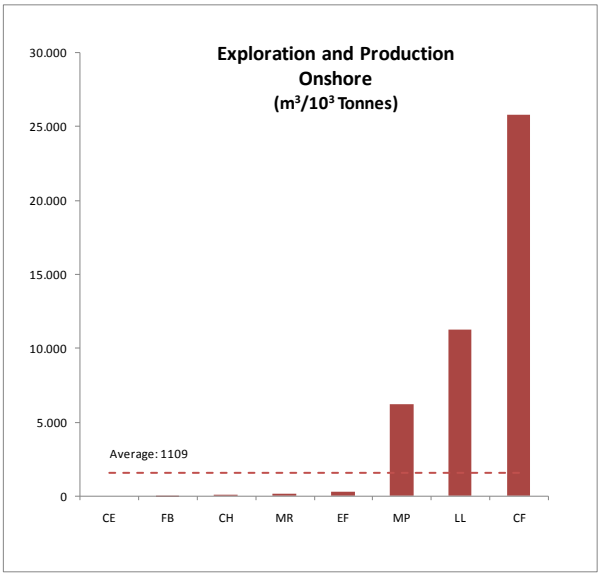
3.2.3 Produced water re-injected

In sub-chapters 3.2.3.1. up to 3.2.3.3. the tables show the cubic meters of produced water re-injected per thousand tonnes of hydrocarbon produced in 2008.

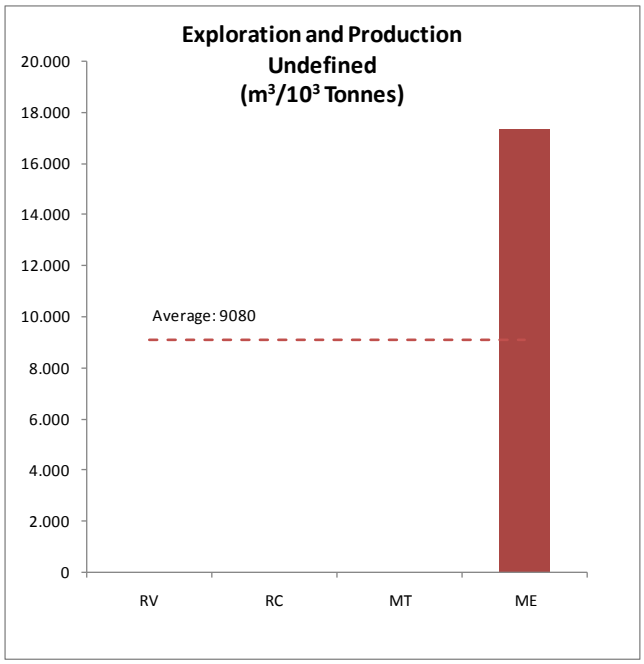
3.2.3.1 Produced water re-injected in offshore Exploration and Production



3.2.3.2 Produced water re-injected in onshore Exploration and Production



3.2.3.3 Produced water re-injected in undefined Exploration and Production



SUGGESTIONS FOR COMPANIES IN RELATION TO INDICATORS ASSOCIATED WITH PRODUCED WATER:

- When analyzing the information on indicators associated with produced water, aspects that are not analyzed in this report should be taken into account. For example: a mature production field can have a great quantity of water associated to its production.
- Measure and/or discriminate -in the environmental information management systems the quantity of oil associated with the produced water discharge in the onshore and offshore E&P operations.

3.3 Controlled water and hydrocarbons discharges in process effluents

The use of water in the industry processes determines the possible environmental impact, due to the consumption of fresh water as well as to the quantity of dissolved or discharged hydrocarbons associated with the effluents. This indicator refers to the Exploration and Production, Pipelines, Terminals, Refining, Petrochemical and Distribution/Transport functions and it is used to establish the quantity of hydrocarbon discharged as effluent of facility processes- including onshore discharges to drain structures that connect to watercourses – for the reporting year. It has two elements:

- The quantity of water discharged (in m^3) normalized by the magnitude of the activity in each Function;
- The quantity of hydrocarbon discharged (in tonnes) normalized by the magnitude of the activity in each Function;

The ratio between the second and the first element is the concentration of hydrocarbons in the water discharged and the table calculates it automatically in the last column.

For the Exploration and Production function, these indicators DO NOT include produced water discharges as they were already registered in chapter 3.2.1.

Table 5 details the number of "companies-country" and the consolidated magnitude of the activities reported for each function in the following indicators: "Water discharged as process effluent" and "Hydrocarbon discharges in process effluents". The "Concentration of hydrocarbons in process effluents" indicator, is automatically calculated for those companies that reported information for the two first indicators[3].

Table 5: "Companies-country" that reported for "Water discharged as process effluent", "Hydrocarbons discharge in process effluent" and "Concentration of hydrocarbons in process effluent" indicators

ARPEL Environmental Benchmarking

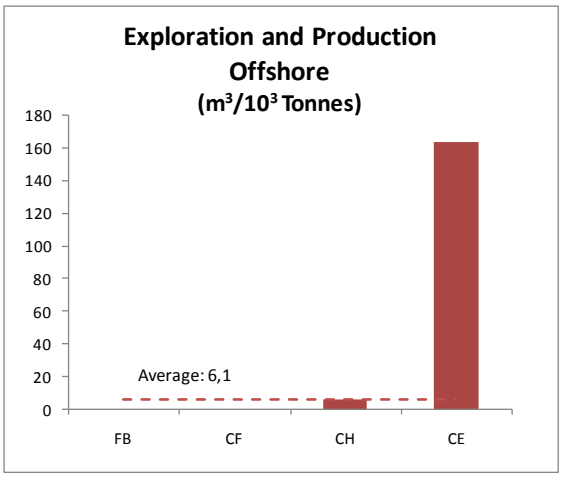
Data Consolidation (in 10^3 Tonnes)
Total reported data

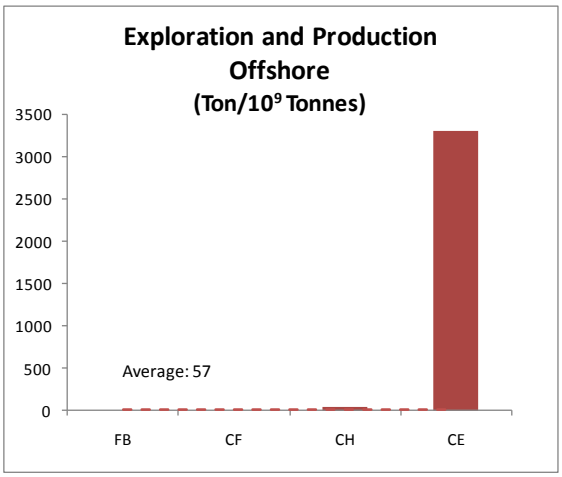
				Water discharged as process effluent		Hydrocarbons discharge in process effluent		Concentration of hydrocarbons in process effluent	
		Number of companies that reported data of operation	Total	Number of companies that reported data	Total	Number of companies that reported data	Total	Number of companies that reported data	Total
Gross Hydrocarbon Production	Offshore	5	228.000	4	134.390	4	134.390	2	129.560
	Onshore	9	175.152	8	158.721	7	136.691	3	124.125
	Undefined	4	5.896	4	5.896	4	5.896	4	5.896
	Total	13	409.048	13	409.048	11	276.977	8	259.581
Pipelines' Transportation		7	13.856.653	5	13.843.798	4	13.810.946	2	13.794.081
Terminals' Movement		7	30.321	6	24.760	6	24.760	5	24.218
Distribution / Transport		6	219.605	6	219.605	5	218.801	4	217.229
Refining Activity		9	186.124	9	186.124	9	186.124	9	186.124
Petrochemicals' Activity		2	7.719	2	7.719	2	7.719	2	7.719

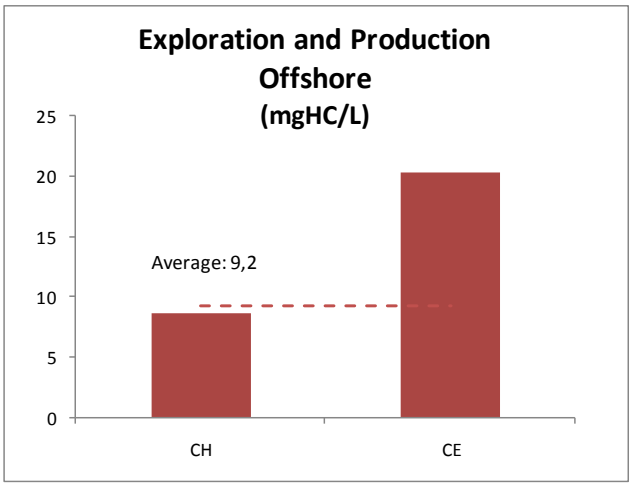
[3] If companies report (zero) in "Water discharged as process effluent", then the "Concentration of hydrocarbons in process effluents" is not calculated.

3.3.1 Water and hydrocarbons – Offshore Exploration and Production

The tables in this sub-chapter show the quantity of discharged water (in m^3) per thousand tonnes (above on the left) and the quantity of hydrocarbon discharged (in tonnes) per thousand million tonnes (above on the right) of offshore produced hydrocarbons in 2008. The third table shows the concentration of hydrocarbons in discharged water in milligrams of hydrocarbon per litre.

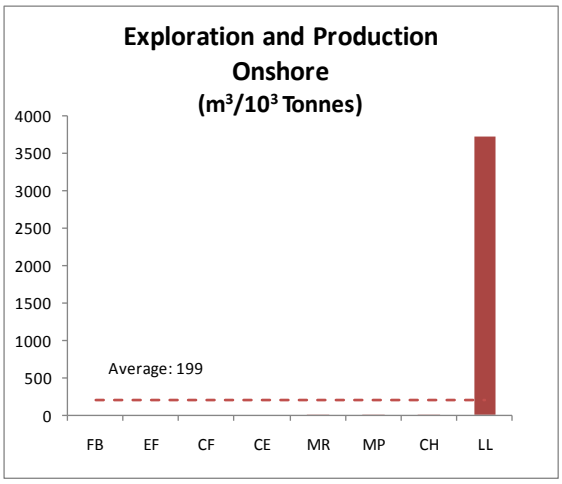


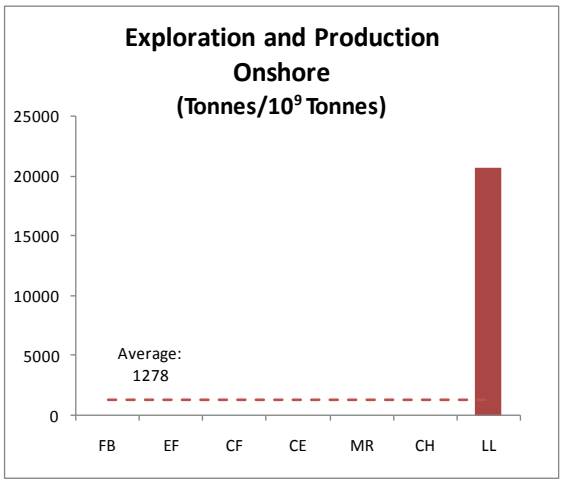


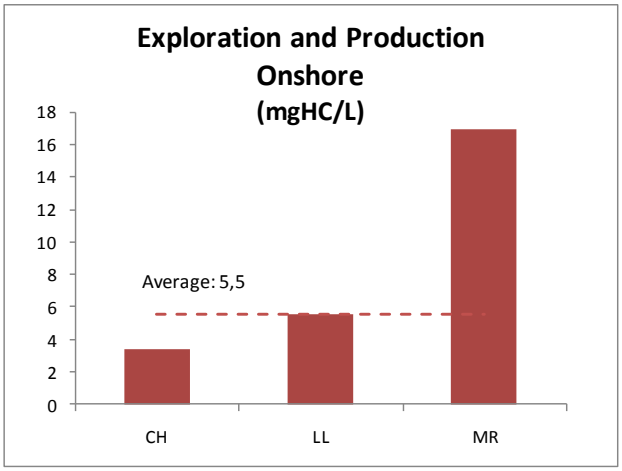


3.3.2 Water and hydrocarbons – Onshore Exploration and Production

The tables in this sub-chapter show the quantity of discharged water (in m^3) per thousand tonnes (above on the left) and the quantity of hydrocarbon discharged (in tonnes) per thousand million tonnes (above on the right) of onshore produced hydrocarbons in 2008. The third table shows the concentration of hydrocarbons in discharged water in milligrams of hydrocarbon per litre.

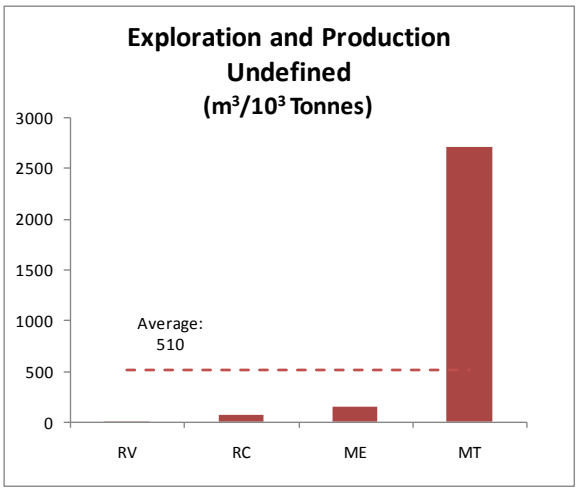


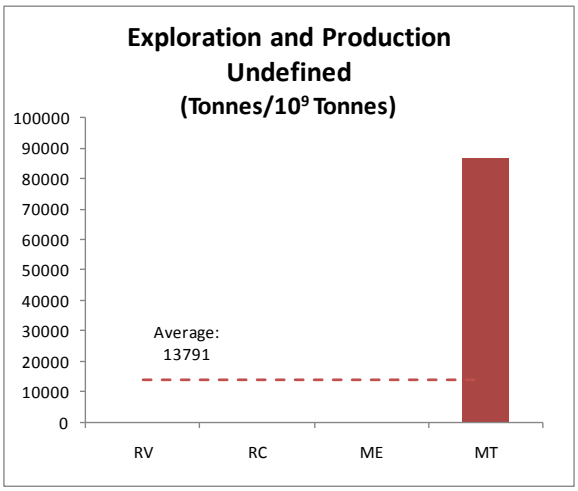


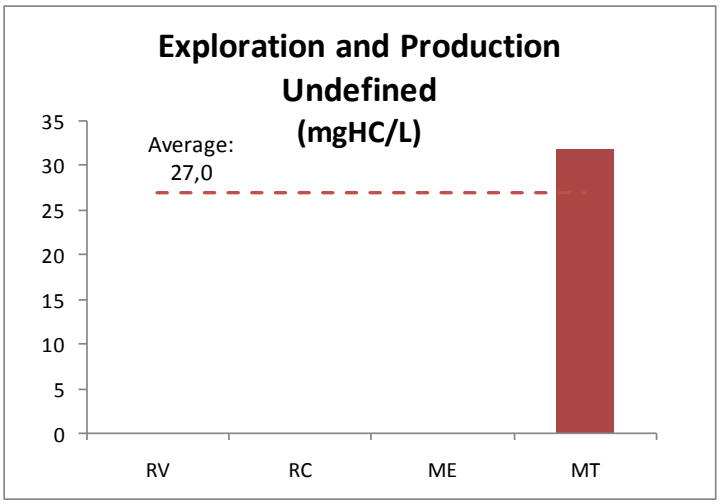


3.3.3 Water and hydrocarbons – Undefined Exploration and Production

The tables in this sub-chapter show the quantity of water discharged (in m^3) per thousand tonnes (above on the left) and the quantity of hydrocarbons discharged (in tonnes) per thousand million tonnes (above on the right) of hydrocarbons produced in 2008 with undefined source. The third table shows the concentration of hydrocarbons in discharged water in milligrams of hydrocarbons per litre.

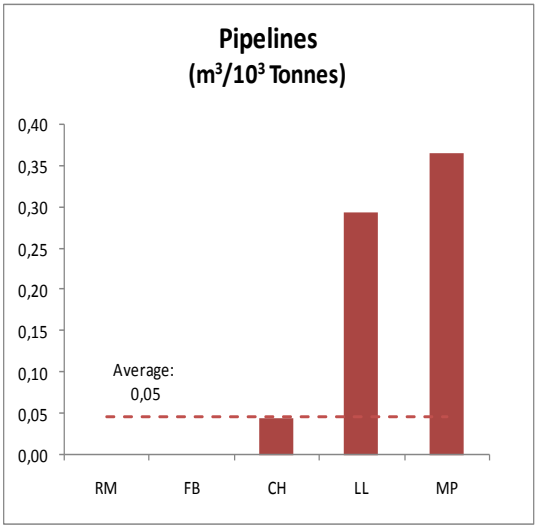


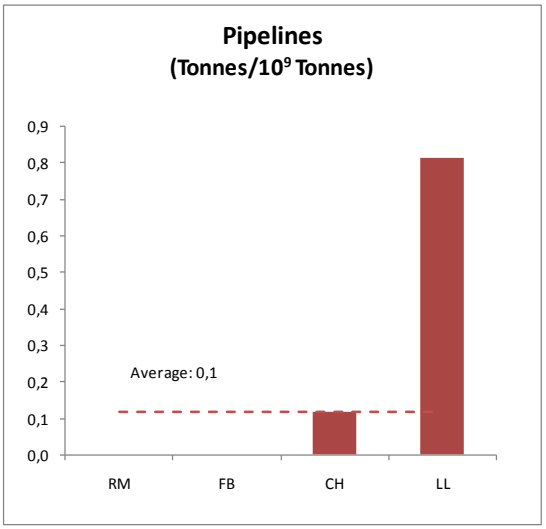


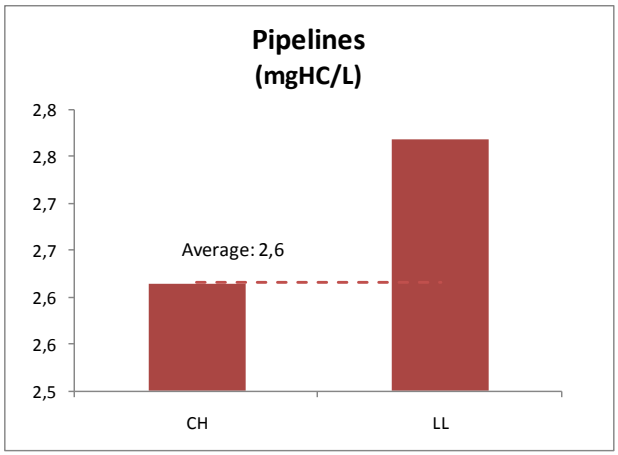


3.3.4 Water and hydrocarbons - Pipelines

The tables in this sub-chapter show the quantity of discharged water (in m^3) per thousand tonnes (above on the left) and the quantity of hydrocarbons discharged (in tonnes) per thousand million tonnes (above on the right) of products transported by pipelines within the different Functions in 2008. The third table shows the concentration of hydrocarbons in discharged water in milligrams of hydrocarbon per litre.

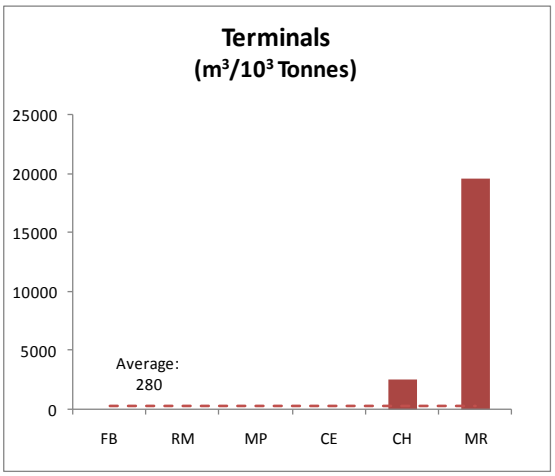


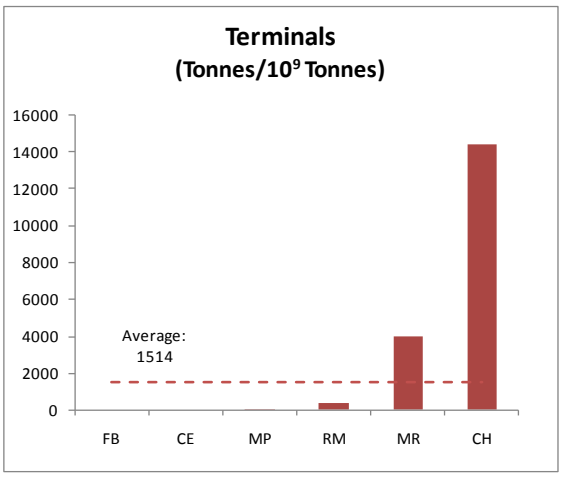


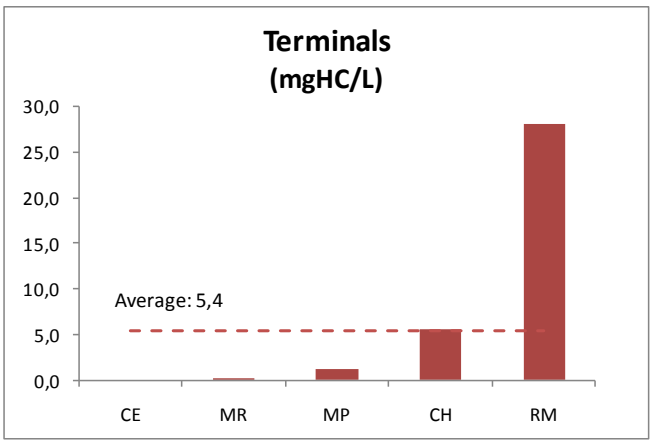


3.3.5 Water and hydrocarbons - Terminals

The tables in this sub-chapter show the quantity of discharged water (in m^3) per thousand tonnes (above on the left) and the quantity of hydrocarbons discharged (in tonnes) per thousand million tonnes (above on the right) of products transferred from the Terminals to other Functions in 2008. The third table shows the concentration of hydrocarbons in discharged water in milligrams of hydrocarbon per litre.

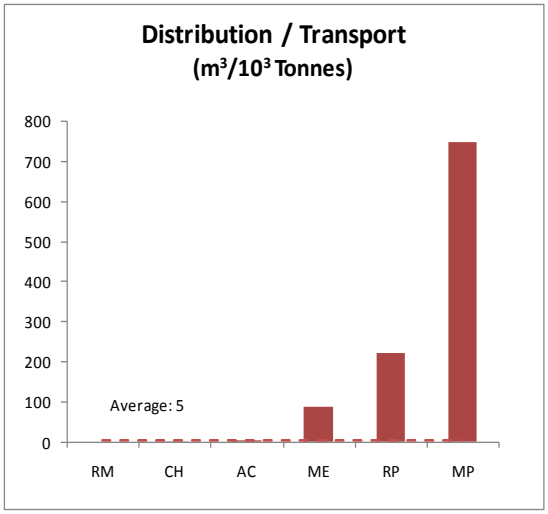


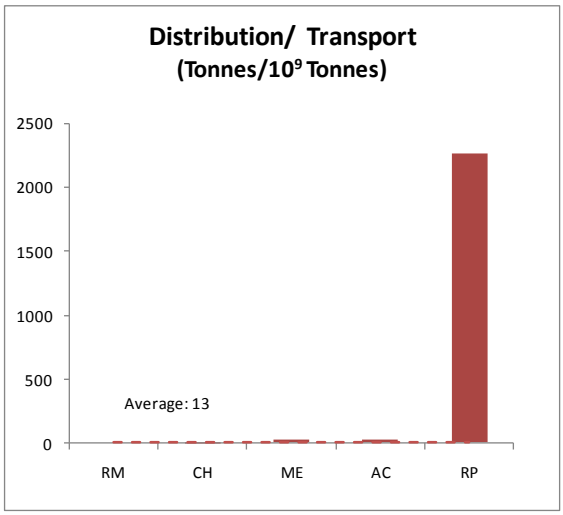


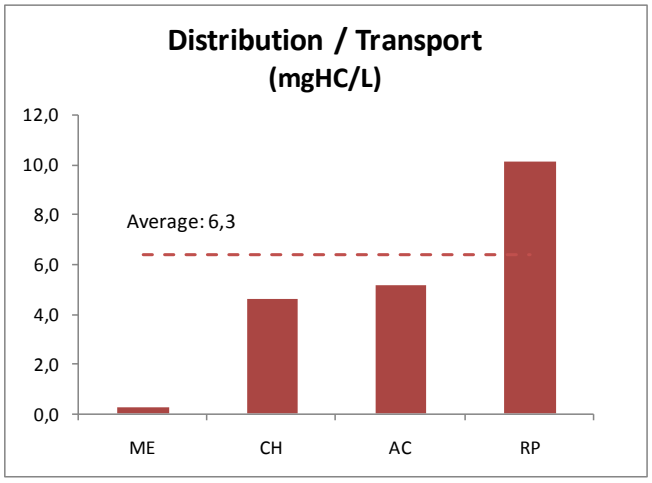


3.3.6 Water and hydrocarbons – Distribution/Transport

The tables in this sub-chapter show the quantity of discharged water (in m^3) per thousand tonnes (above on the left) and the quantity of hydrocarbons discharged (in tonnes) per thousand million tonnes (above on the right) of products transferred to, from or within the company´s facilities, excluding pipelines, but including tankers, barges, trucks, trains and retail service stations in 2008. The third table shows the concentration of hydrocarbons in discharged water in milligrams of hydrocarbon per litre.

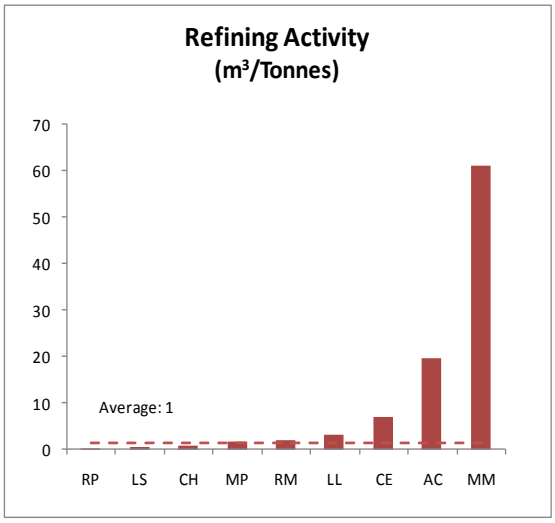


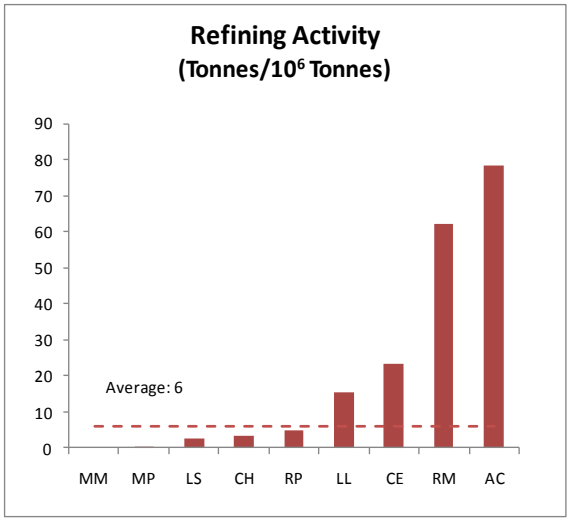


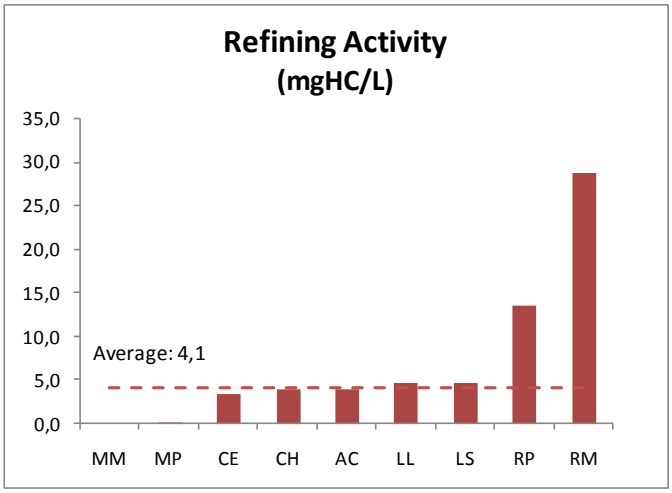


3.3.7 Water and hydrocarbons - Refining

The tables in this sub-chapter show the quantity of discharged water (in m^3) per ton (above on the left) and the quantity of hydrocarbons discharged (in tonnes) per million tonnes (above on the right) fed to produce LPG, gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants and other products in 2008. The third table shows the concentration of hydrocarbons in discharged water in milligrams of hydrocarbon per litre.







3.3.8 Water and hydrocarbons - Petrochemicals

As an average, 3.1 m^3 of water per ton and 12 tonnes of hydrocarbons per million tonnes of petrochemicals produced or manufactured where the chemicals are derived from petroleum or petroleum products in 2008 were discharged. The average concentration of hydrocarbons in water discharged was of 3.8 milligrams of hydrocarbons per litre.

SUGGESTIONS FOR COMPANIES IN RELATION TO INDICATORS ASSOCIATED WITH WATER AND HYDROCARBONS IN PROCESS EFFLUENTS:

- When analyzing the information on indicators associated with water and hydrocarbons in process effluents, aspects that are not analyzed in this report should be taken into account. For example: a more complex refinery may require a greater process water consumption than one that is less complex.
- Measure and/or discriminate the concentration of hydrocarbons in process effluents in all the Functions in the environmental information management system.
- Process effluents CAN NOT have 0 (zero) concentration of hydrocarbons.

3.4 Disposal of hazardous and non-hazardous solid wastes

Effective waste management is an indicator of operational efficiency. Some hazardous wastes, when not properly managed, can have significant environmental, social and economic impacts. For the purpose of this report, "hazardous wastes" includes all waste that is defined as hazardous, toxic, listed, priority, special, or some other similar term as defined by an appropriate local regulatory agency or authority. "Local" refers to the point of waste generation. Disposal can then include: land filling or burning without waste recovery for energy; and/or management of waste other than with reuse purposes, recycling, reclamation or other beneficial use.

Operating sectors will have significantly different regulated hazardous waste streams with different treatment and management options available. In downstream operations, major shutdowns and periodic maintenance activities can result in short term increases in hazardous waste generated. Large one-time construction projects, remediation activities, and high-volume aqueous wastes are not reported here. For upstream operations, drilling operations, large one-time construction projects, remediation activities, and high-volume aqueous wastes can result in large variations in hazardous wastes generated. Although individual (and separate) reports of these waste streams may enable companies –individually- to better understand and explain year-to-year fluctuations of hazardous waste data, they are NOT part of the results reported by companies for this report.

Table 6 details the number of "companies-country" and the consolidated magnitude of the activities reported for each Function in the "Disposal of hazardous wastes" and "Disposal of non-hazardous wastes" indicators.

Table 6: "Companies-country" that reported for "Disposal of hazardous wastes" and "Disposal of non-hazardous wastes" indicators

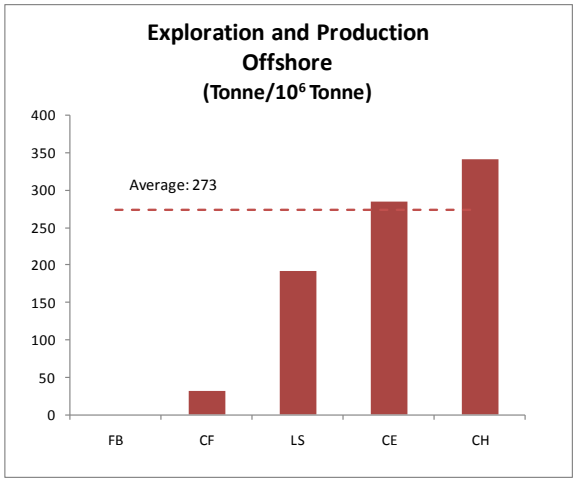
ARPEL Environmental Benchmarking

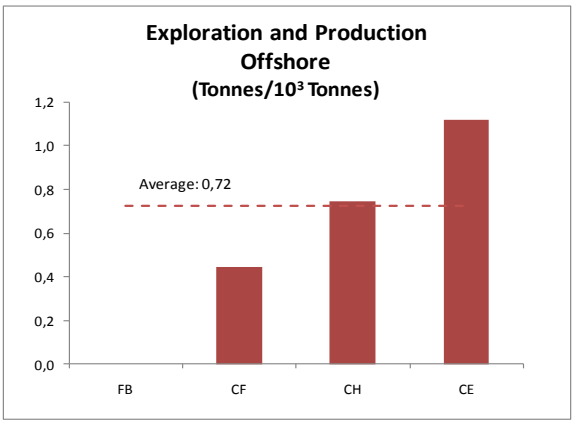
Data Consolidation (in 10^3 Tonne)
Total reported data

				DISPOSAL OF HAZARDOUS WASTES		DISPOSAL OF NON-HAZARDOUS WASTES	
		Number of companies that reported data of operation	Total	Number of companies that reported data	Total	Number of companies that reported data	Total
Gross Hydrocarbon Production	Offshore	5	228.000	5	228.000	4	134.390
	Onshore	9	175.152	9	175.152	8	158.721
	Undefined	4	5.896	4	5.896	4	5.896
	Total	**13**	**409.048**	**13**	**409.048**	**12**	**299.007**
Pipelines' Transportation		**7**	**13.856.653**	**6**	**13.852.103**	**6**	**13.852.103**
Terminals' Movement		**7**	**30.321**	**6**	**24.760**	**6**	**24.760**
Distribution / Transport		**6**	**219.605**	**6**	**219.605**	**6**	**219.605**
Refining Activity		**9**	**186.124**	**9**	**186.124**	**8**	**97.945**
Petrochemicals' Activity		**2**	**7.719**	**2**	**7.719**	**2**	**7.719**

3.4.1 Hazardous and non-hazardous wastes – Offshore Exploration and Production

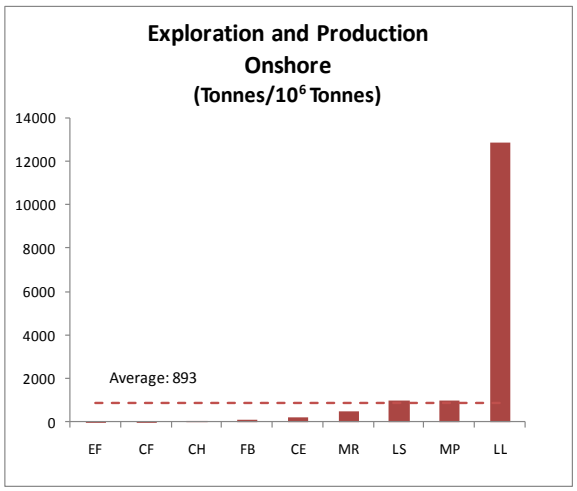
The tables in this sub-chapter show the quantity of hazardous wastes (in metric tonnes) per million tonnes (on the left) and the quantity of non-hazardous wastes (in metric tonnes) per thousand tonnes (on the right) of hydrocarbons produced offshore in 2008.

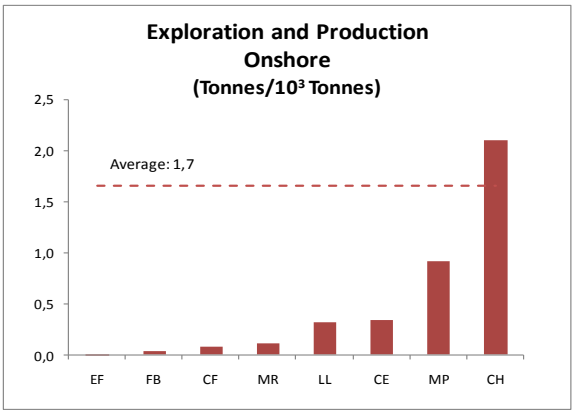




3.4.2 Hazardous and non-hazardous wastes – Onshore Exploration and Production

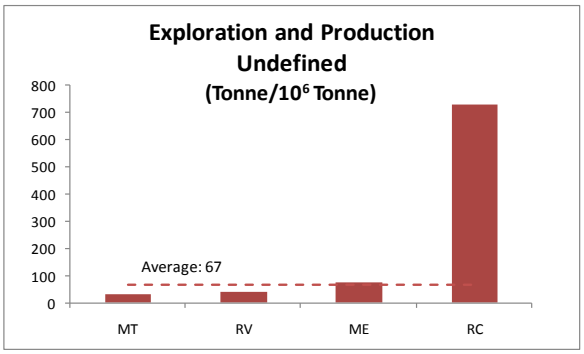
The tables in this sub-chapter show the quantity of hazardous wastes (in metric tonnes) per million tonnes (on the left) and the quantity of non-hazardous wastes (in metric tonnes) per thousand tonnes (on the right) of hydrocarbons produced onshore in 2008.

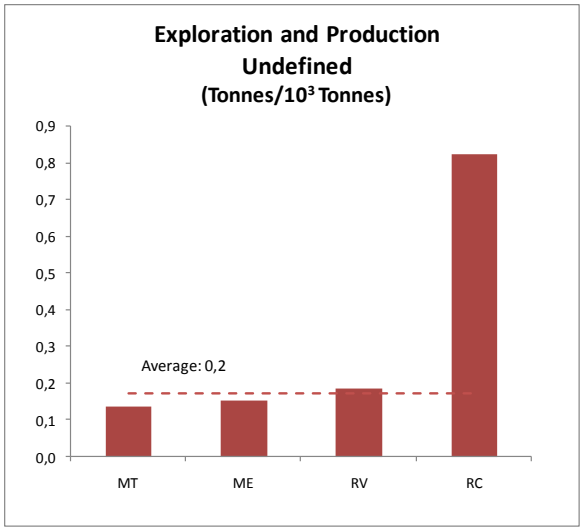




3.4.3 Hazardous and non-hazardous wastes – Undefined Exploration and Production

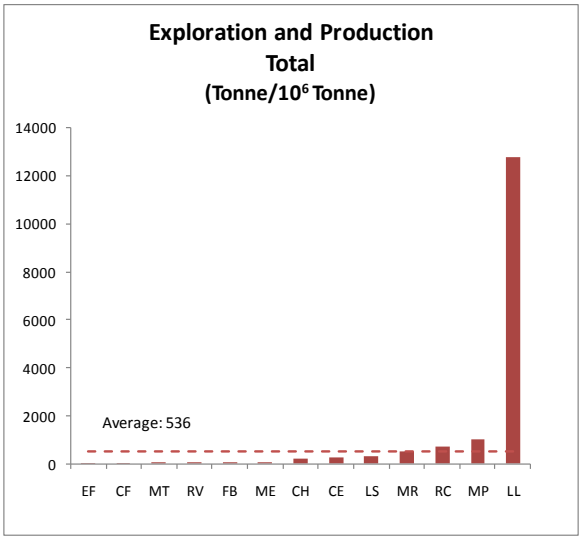
The tables in this sub-chapter show the quantity of hazardous wastes (in metric tonnes) per million tonnes (on the left) and the quantity of non-hazardous wastes (in metric tonnes) per thousand tonnes (on the right) of hydrocarbons produced in 2008 from undefined source.

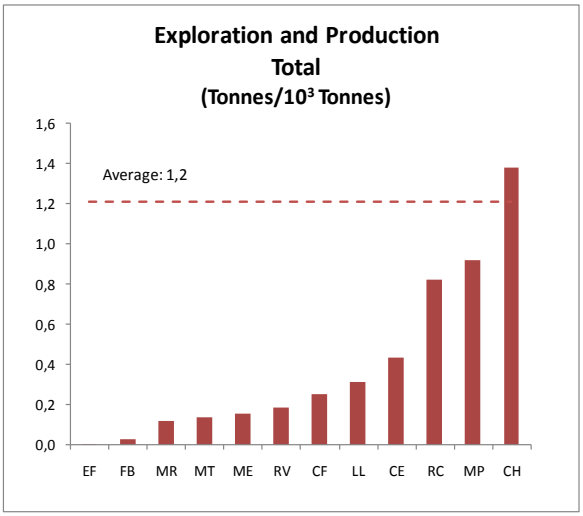




3.4.4 Hazardous and non-hazardous wastes – Total Exploration and Production

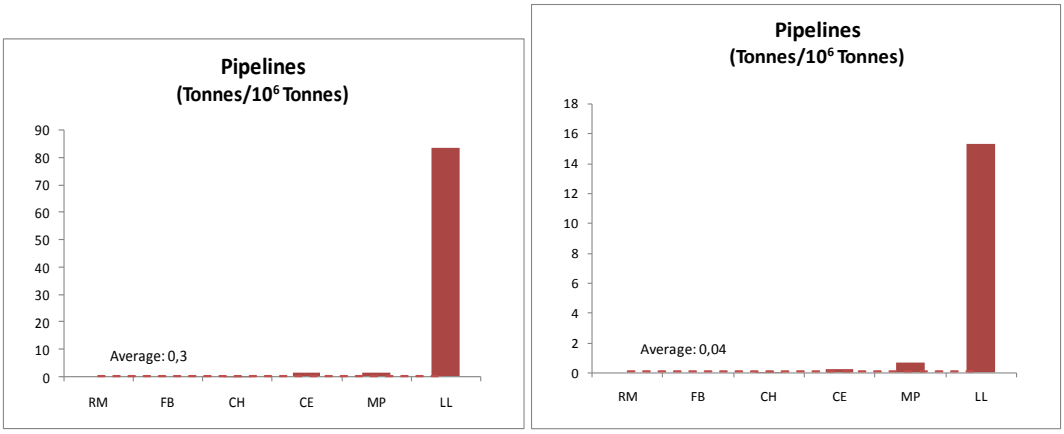
The tables in this sub-chapter show the quantity of hazardous wastes (in metric tonnes) per million tonnes (on the left) and the quantity of non-hazardous wastes (in metric tonnes) per thousand tonnes (on the right) of total hydrocarbons produced in 2008.





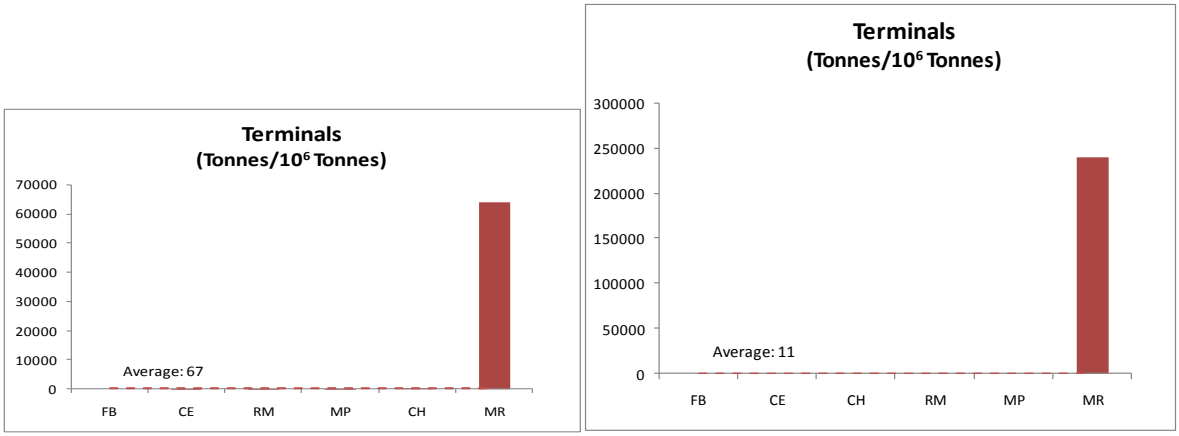
3.4.5 Hazardous and non-hazardous wastes - Pipelines

The tables in this sub-chapter show the quantity of hazardous wastes (in metric tonnes) per million tonnes (on the left) and the quantity of non-hazardous wastes (in metric tonnes) per million tonnes (on the right) of product transported by pipelines among the different Functions in 2008.



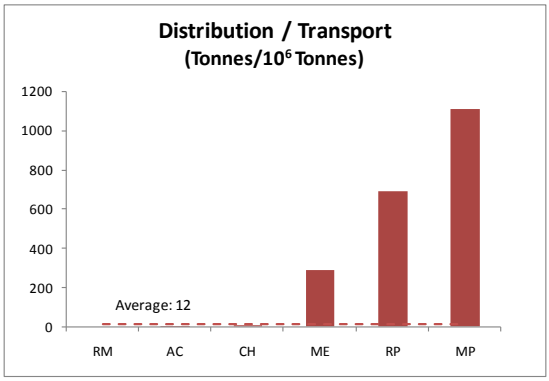
3.4.6 Hazardous and non-hazardous wastes - Terminals

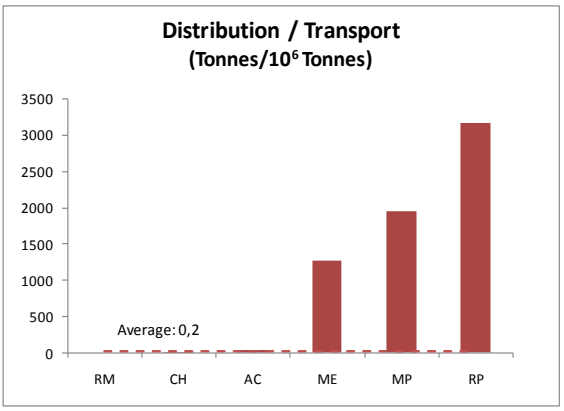
The tables in this sub-chapter show the quantity of hazardous wastes (in metric tonnes) per million tonnes (on the left) and the quantity of non-hazardous wastes (in metric tonnes) per million tonnes (on the right) of products transferred from the Terminals to other Functions in 2008.



3.4.7 Hazardous and non-hazardous wastes – Distribution/Transport

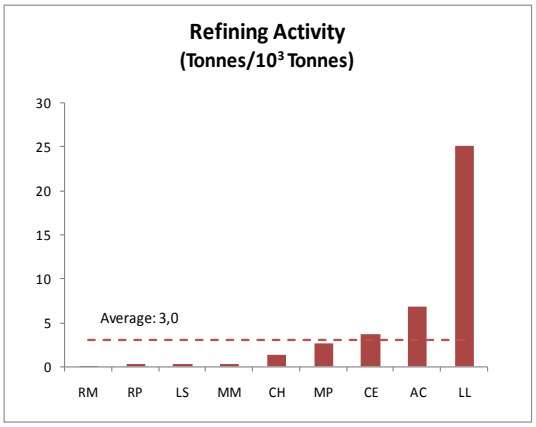
The tables in this sub-chapter show the quantity of hazardous wastes (in metric tonnes) per million tonnes (on the left) and the quantity of non-hazardous wastes (in metric tonnes) per million tonnes (on the right) of products transferred to, from of within the company´s facilities, excluding pipelines, but including tankers, barges, trucks, trains and retail service stations in 2008.

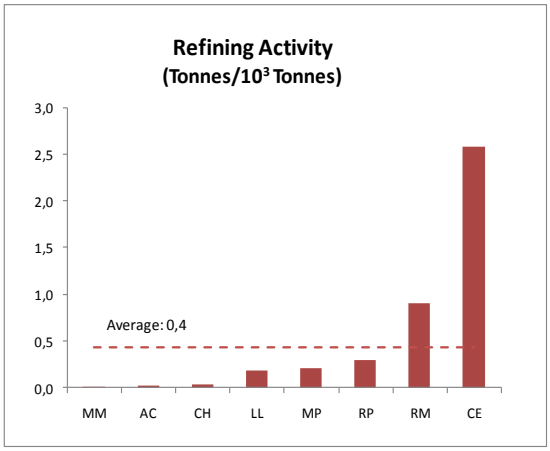




3.4.8 Hazardous and non-hazardous wastes - Refining

The tables in this sub-chapter show the quantity of hazardous wastes (in metric tonnes) per thousand tonnes (on the left) and the quantity of non-hazardous wastes (in metric tonnes) per thousand tonnes fed to produce LPG, gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, and other products in 2008.





3.4.9 Hazardous and non-hazardous wastes - Petrochemical

As an average, 3.4 metric tonnes of hazardous wastes and 1.7 metric tonnes of non-hazardous wastes were disposed per thousand tonnes of petrochemicals produced or manufactured where the chemicals are derived from petroleum or petroleum products in 2008.

SUGGESTIONS FOR COMPANIES IN RELATION TO HAZARDOUS AND NON-HAZARDOUS WASTES INDICATORS:

- When analyzing the benchmarking information on solid wastes in operations, aspects that are not analyzed in this report should be taken into account. For example: a more complex refinery may generate fewer wastes than one that is less complex.
- Do not report the "exceptional" generation of solid wastes (see pages 21 and 22 of the 1st edition of the User´s Manual – ARPEL Database "Benchmarking on Environmental Performance in the Oil and Gas Industry in Latin America and the Caribbean", 2008)

ARPEL

Regional Association of Oil and Natural Gas Companies in Latin America and the Caribbean

Established in 1965, ARPEL is an association of 26 oil and natural gas state owned and private companies and institutions with operations in Latin America and the Caribbean, which represent more than 90 percent of the Region's upstream and downstream operations. ARPEL works on three main areas defined in its Strategic Plan:

- *Economic area:* competitive and sustainable industry growth and regional energy integration.
- *Socio-environmental area:* Environmental protection, occupational health and safety, and relations with communities in the industry´s areas of influence. Said approach is facilitated through management systems such as the environment, health and safety one, which helps to prevent, remove, and manage risks from operations promoting the reduction of incidents with high impact on facilities and people. Another example is the relations with communities' management system, which establishes guidelines for a sensitive and responsible socio-cultural interaction.
- *Eco-efficiency area:* the priority is focused on greenhouse gases emissions reduction and a more effective use of non-renewable resources.

To accomplish its objectives, ARPEL works together with its Members on issues of common interest to the industry through its 7 Committees. Three Operational Committees: Refining, Pipelines and Terminals and Exploration and Production. Four Corporate Committees: Environment, Health and Safety; Social Responsibility; Climate Change and Energy Efficiency and Energy Agenda.

ARPEL organizes regional workshops, seminars and symposia focused in promoting the sustainable development of the sector through the exchange of information and best practices, and develops technical documentation that contribute with its member companies to improve their management, operations, and products. ARPEL has an interactive Portal for its Members in which all documents developed by ARPEL Committees or through its Events, are available. The Portal facilitates the virtual interaction of the ARPEL community and with its stakeholders.

On 2005, on the occasion of the 40th Association anniversary, its members signed a binding Statement of Commitments in which they convey to actively contribute to the sustainable development of the sector by conducting their operations under a framework of environmental, occupational, and social responsibility, acting with respect for human rights and cultural diversity, searching for the continuous improvement of their management, operations, and products, conducting their businesses under a framework of ethics and respect for the applicable laws, and actively supporting the efforts for regional energy integration.

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