



REGIONAL ASSOCIATION OF
OIL, GAS AND BIOFUELS SECTOR COMPANIES
IN LATIN AMERICA AND THE CARIBBEAN

Environmental Performance Benchmarking Report (2016 data)

ARPEL Publication BE01-2018

Benchmarking on Environmental Performance in the Oil and Gas Industry in Latin America and the Caribbean – Information of ARPEL Member Companies for 2016

Report BE 01-2018 - April 2018

Author

- Pablo Ferragut, ARPEL Project Manager – pferragut@arpel.org.uy
- Reviewed by: ARPEL Environmental Benchmarking Project Team

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Introduction

The Environmental Benchmarking Annual Report is a compilation of environmental statistics of ARPEL member companies that has been performed since 2008.

- The report analyzes indicators on:
 - Oil spills in water and land
 - Produced water discharges and re-injection
 - Hydrocarbons discharges and concentration in process effluents
 - Hazardous and non-hazardous waste generation
 - Freshwater withdraw and use
 - Direct greenhouse gases (GHG) emissions

Scope

- In 2016, 23 companies or subsidiaries coming from 12 different countries shared their data. Company's countries business units or subsidiaries are considered separately
- Companies and countries

ANCAP (Uruguay)	AXION ENERGY (Argentina)	COGA (Peru)
ECOPETROL (Colombia)	ENAP (Chile)	EP PETROECUADOR (Ecuador)
EQUION (Colombia)	OCENSA (Colombia)	OLDELVAL (Argentina)
PEMEX (Mexico)	PETROPERU (Peru)	PETROTRIN (Trinidad & Tobago)
PLUSPETROL (Argentina, Bolivia y Peru)	RECOPE (Costa Rica)	REPSOL (Bolivia, Ecuador y Peru)
STAATSOLIE (Suriname)	TECPETROL (Argentina)	YPF (Argentina)
YPFB Transporte (Bolivia)		

Scope

- Data are reported voluntarily by companies
- In 2016, the reported information comes from approximately:
 - 951 offshore production wells
 - 32.000 onshore production wells
 - 731 unconventional production
 - 70,000 kilometers of pipelines
 - 151 terminals
 - 24 refineries

Scope

- Below is shown the table with the total amount of hydrocarbons considered in the report for each business line

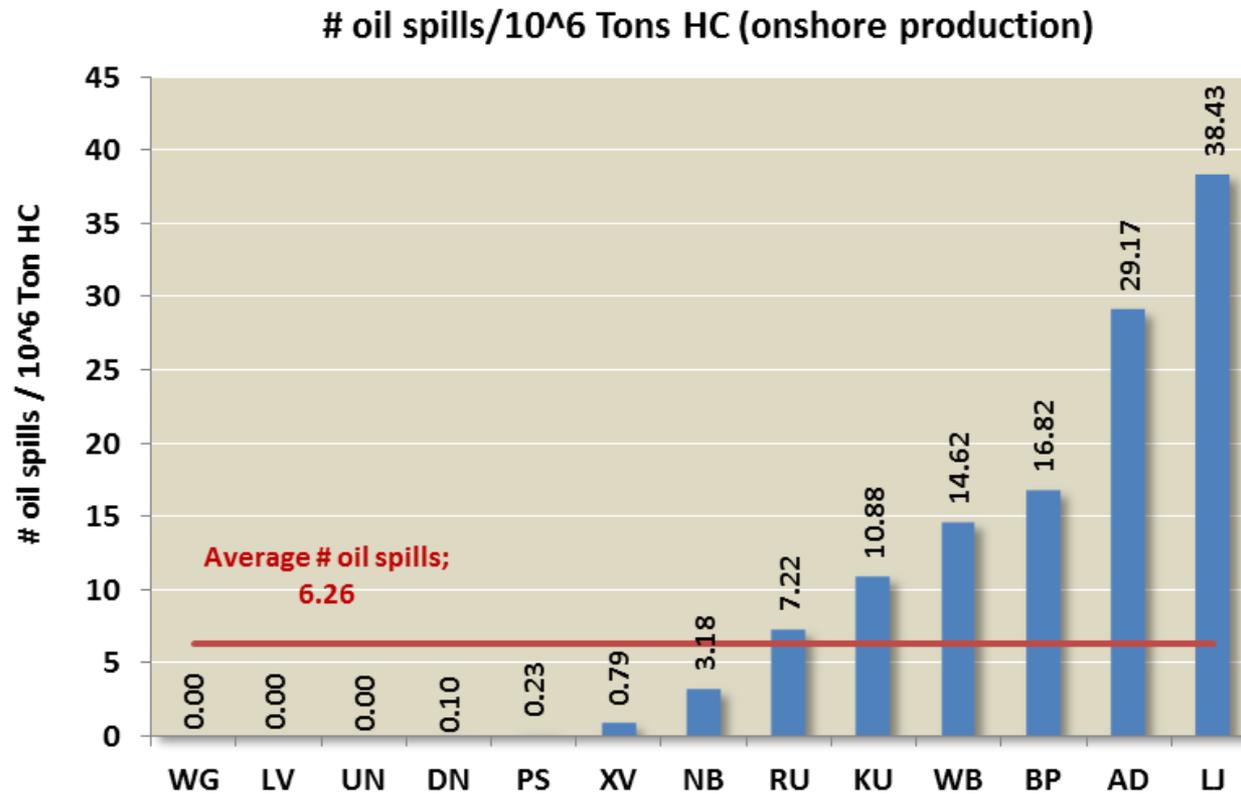
Business line	Thousand tons of hydrocarbons operated
Offshore production	117,249
Onshore production	138,651
Unconventionals production	4,013
Pipelines	317,620
Terminals	112,787
Refineries	118,383
Distribution / Transport	37,995

Oil spills indicators

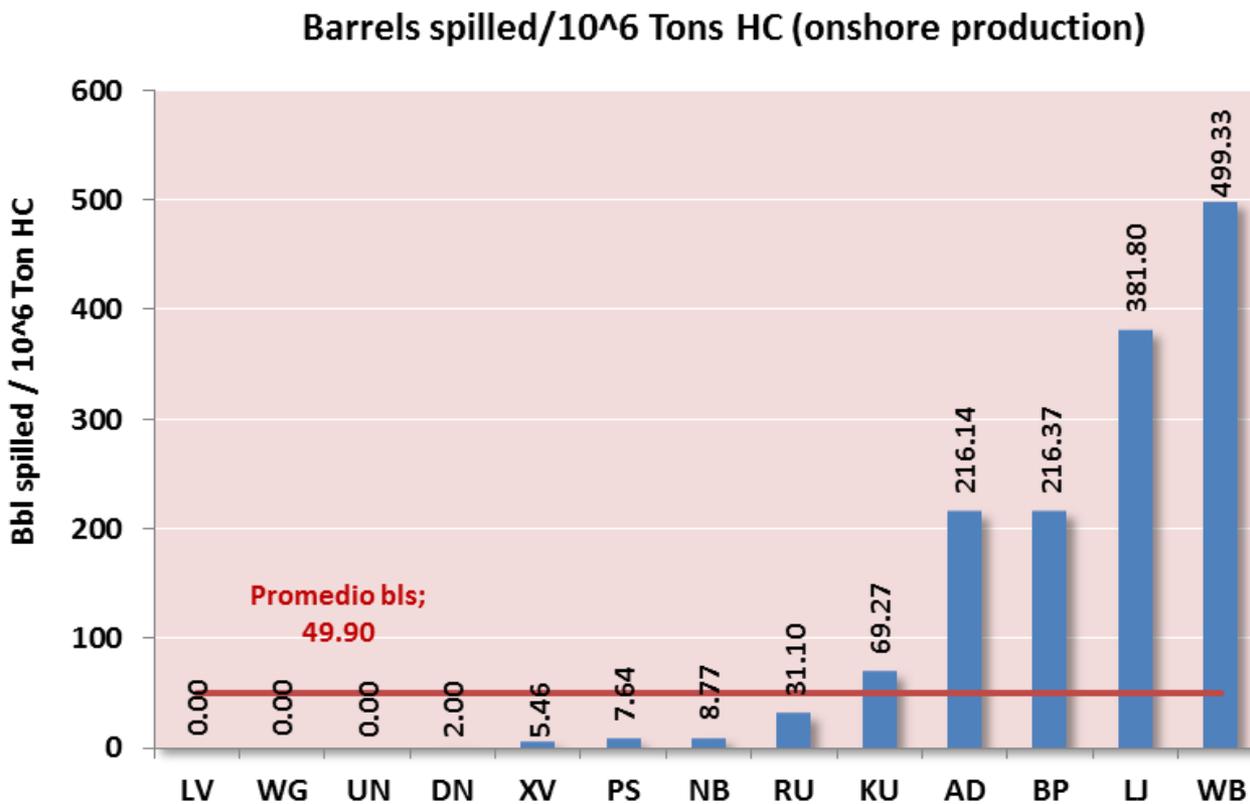
- Indicators
 - Amount of Oil Spills
 - Spilled Volume (barrels)
 - Detailed table of oil spills by business line
- Business Lines
 - Onshore production
 - Pipelines
 - Terminals
 - Refineries

Oil Spills Indicators – Onshore Production

Oil Spills – Onshore Production

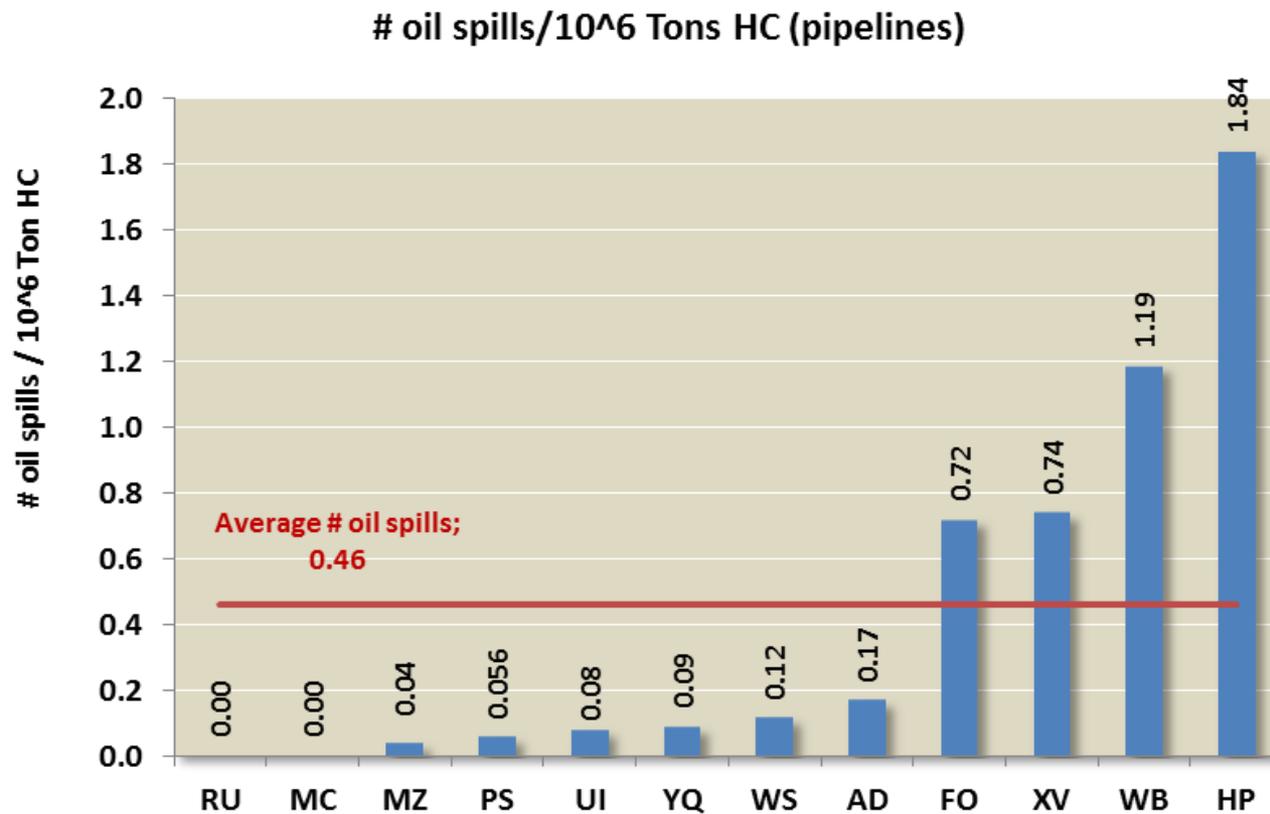


Barrels Spilled – Onshore Production

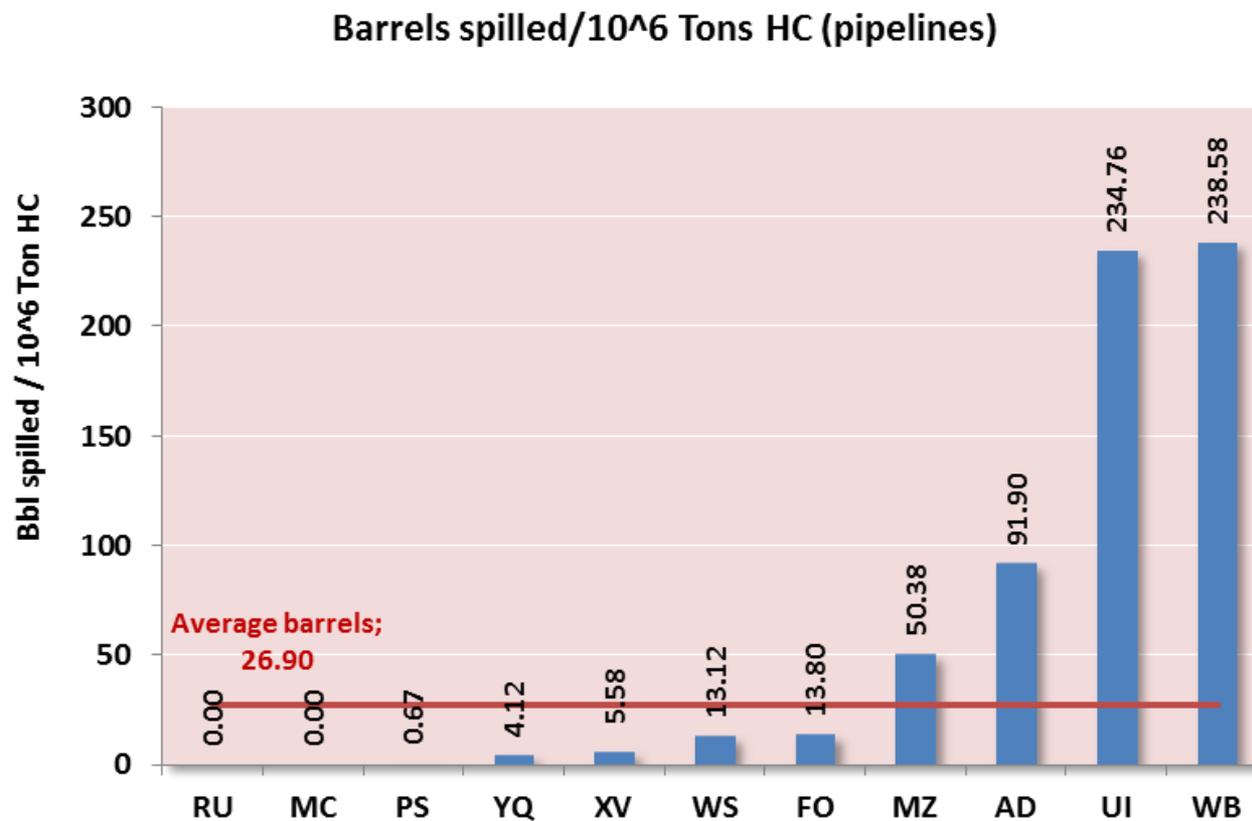


Oil Spills Indicators - Pipelines

Oil Spills – Pipelines

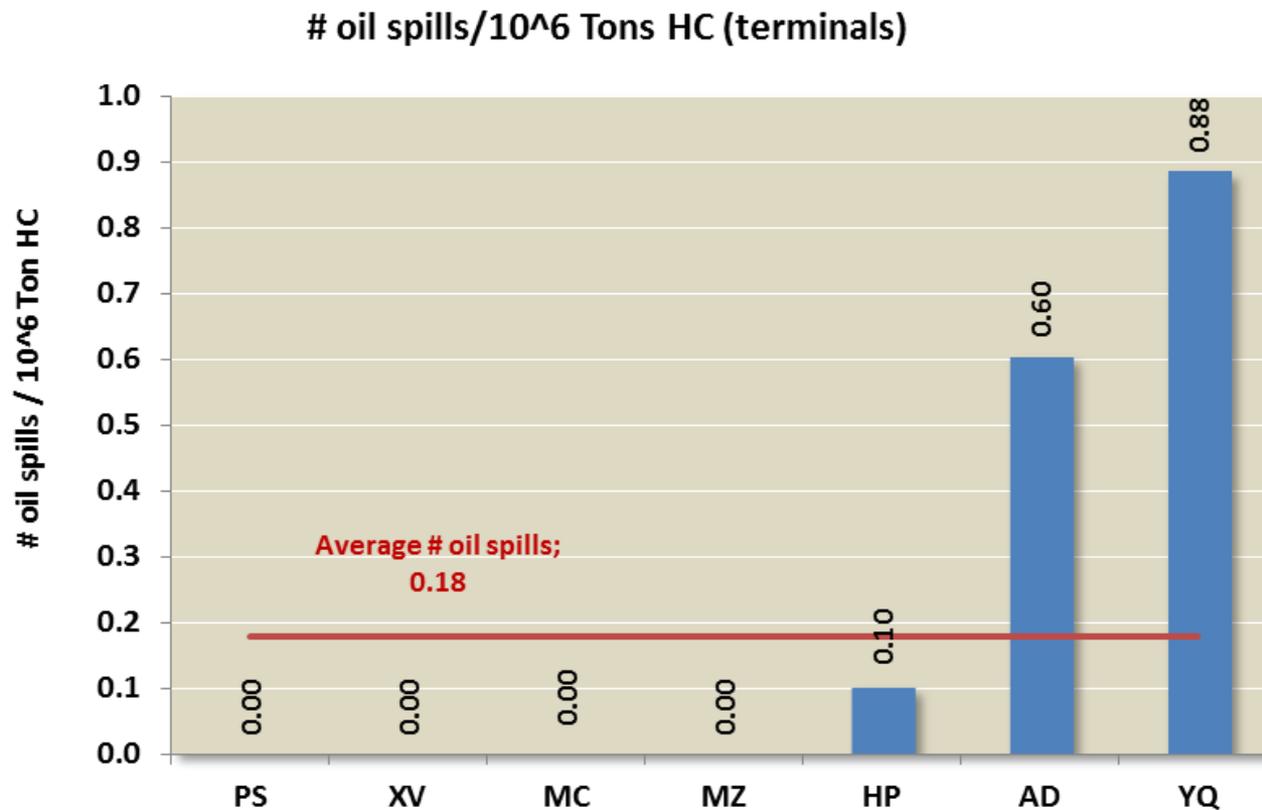


Barrels Spilled – Pipelines

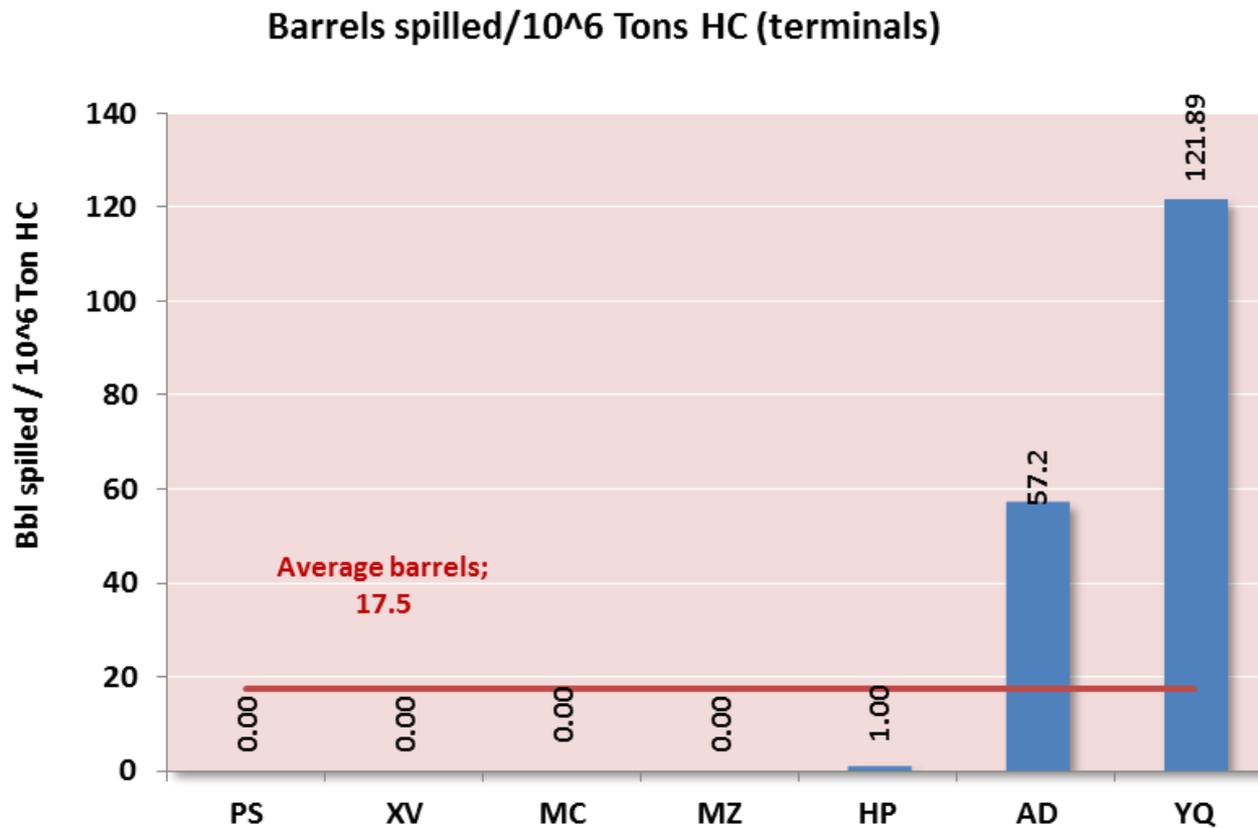


Oil Spills Indicators - Terminals

Oil Spills – Terminals

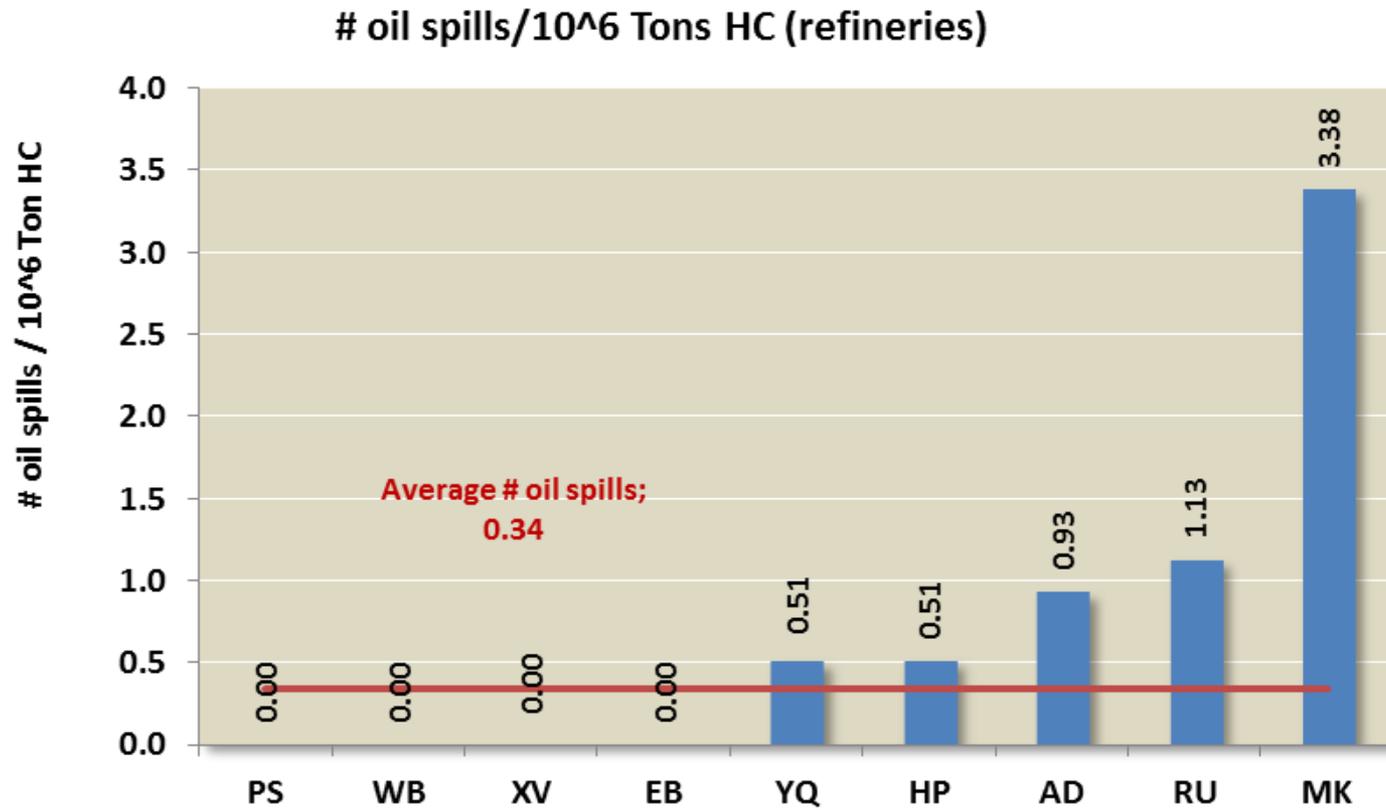


Barrels Spilled – Terminals



Oil Spills Indicators - Refining

Oil Spills – Refining



Barrels Spilled – Refining

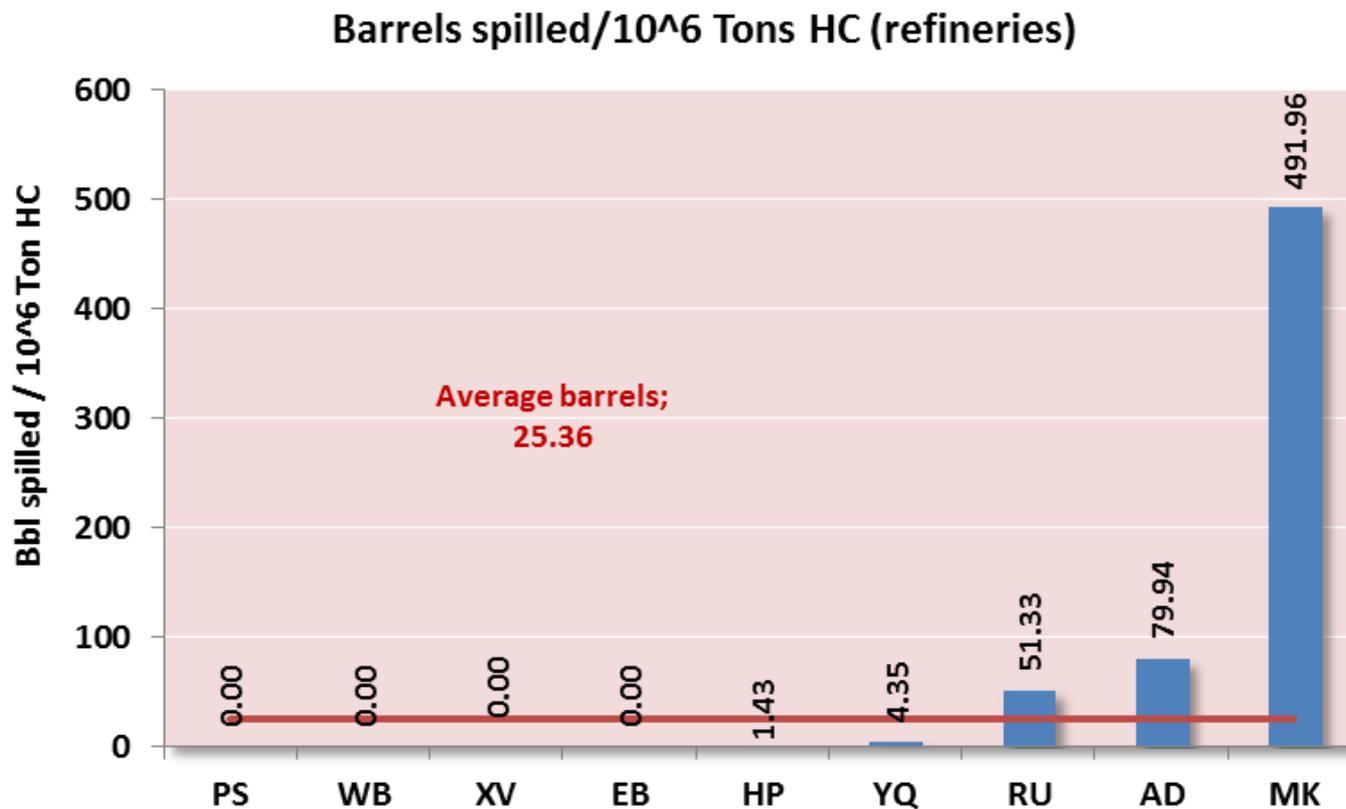


Table of spills by business line

Oil Spills by Business Line

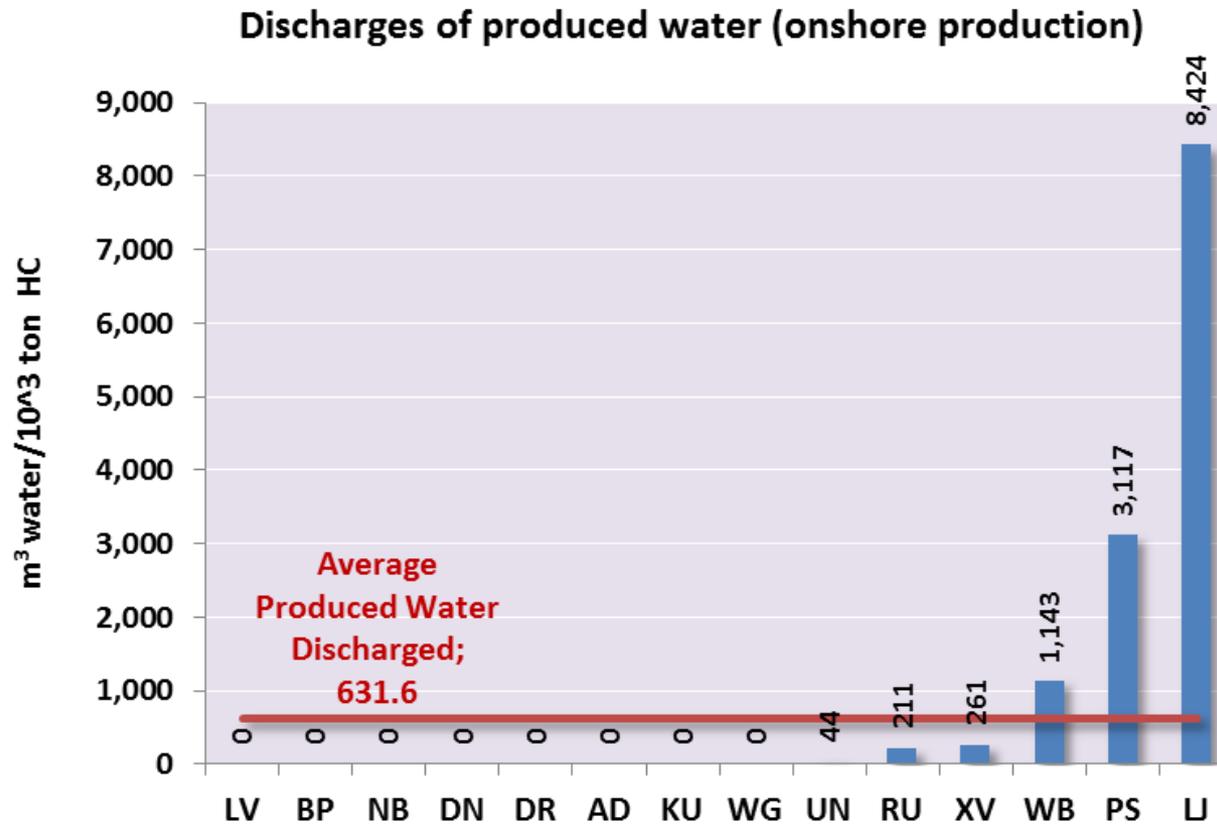
	# oil spills in land	# oil spills in water	# total oil spills	Vol spilled in land (bbl)	Vol spilled in water (bbl)	Total vol spilled (bbl)
Offshore production	0	12	12	0.0	67.5	67.5
1-10		10	10		20	20
10-100		2	2		48	48
+ 100		0	0		0	0
# spills or bbls. / 10 ⁶ Ton of HC		0.10	0.10		0.6	0.6
bbl/spills					5.6	5.6
Onshore production	851	11	862	6,822	45	6,867
1-10	705	10	715	2,153	30	2,183
10-100	136	1	137	3,088	15	3,103
+ 100	10	0	10	1,581	0	1,581
# spills or bbls. / 10 ⁶ Ton of HC	6.18	0.08	6.26	49.58	0.32	49.90
bbl/spills				8.02	4.05	7.97
Pipelines	131	14	145	8,103	202	8,305
1-10	110	1	111	137	1	138
10-100	11	0	11	360	0	360
+ 100	10	13	23	7,606	201	7,807
# spills or bbls. / 10 ⁶ Ton of HC	0.41	0.04	0.46	26.25	0.65	26.90
bbl/spills				61.85	14.44	57.27
Terminals	14	6	20	1,812	158	1,970
1-10	10	4	14	44	22	66
10-100	2	1	3	47	0	47
+ 100	2	1	3	1,721	136	1,857
# spills or bbls. / 10 ⁶ Ton of HC	0.12	0.05	0.18	16.06	1.40	17.47
bbl/spills				129.40	26.39	98.50
Dist/Transp	10	0	10	952	0	952
1-10	5	0	5	5	0	5
10-100	0	0	0	0	0	0
+ 100	5	0	5	947	0	947
# spills or bbls. / 10 ⁶ Ton of HC	0.27	0.00	0.27	25.6	0.0	25.6
bbl/spills				95.2	-	95.2
Refineries	35	3	38	2,693	168	2,861
1-10	17	0	17	61	0	61
10-100	13	2	15	464	43	507
+ 100	5	1	6	2,168	125	2,293
# spills or bbls. / 10 ⁶ Ton of HC	0.31	0.03	0.34	23.87	1.49	25.36
bbl/spills				76.94	56.00	75.28

Produced Water Indicators

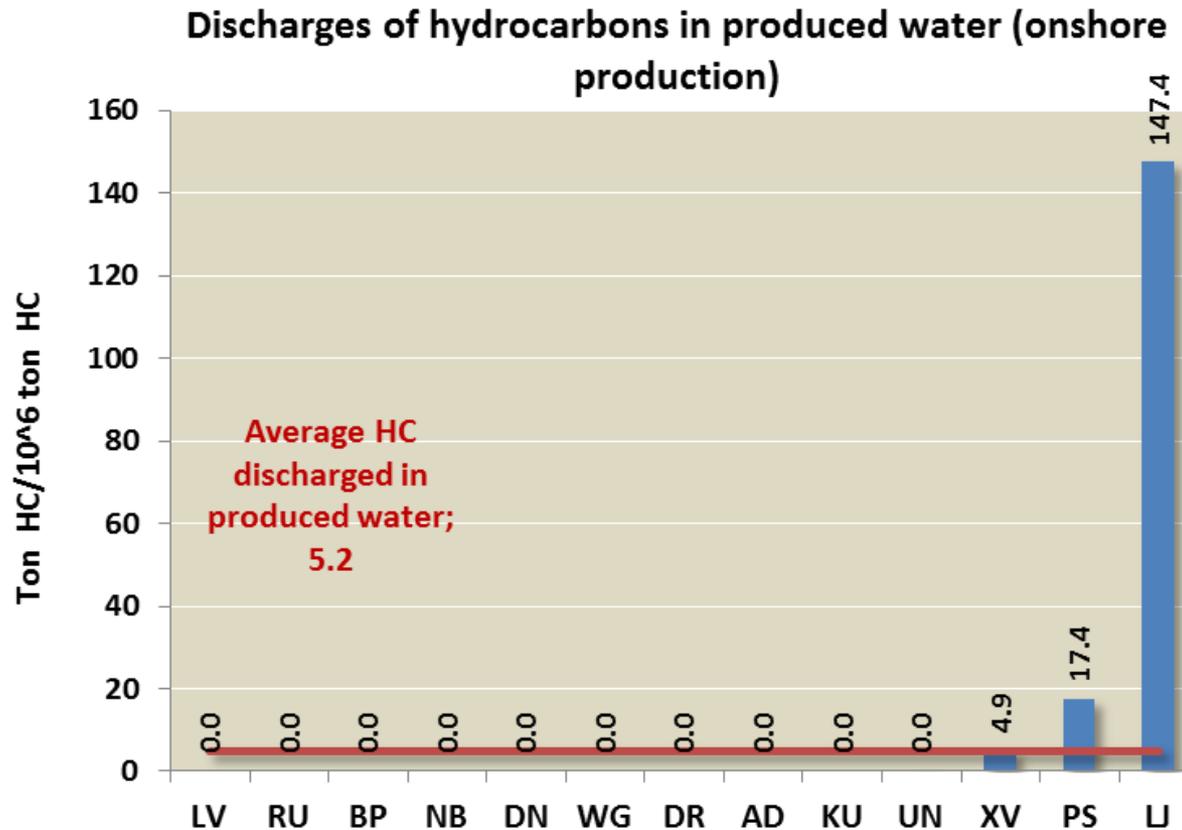
- Indicators
 - Discharges of produced water
 - Discharges of hydrocarbons in produced water
 - Re-injection of produced water
- Business lines
 - Onshore production

Produced water indicators – Onshore production

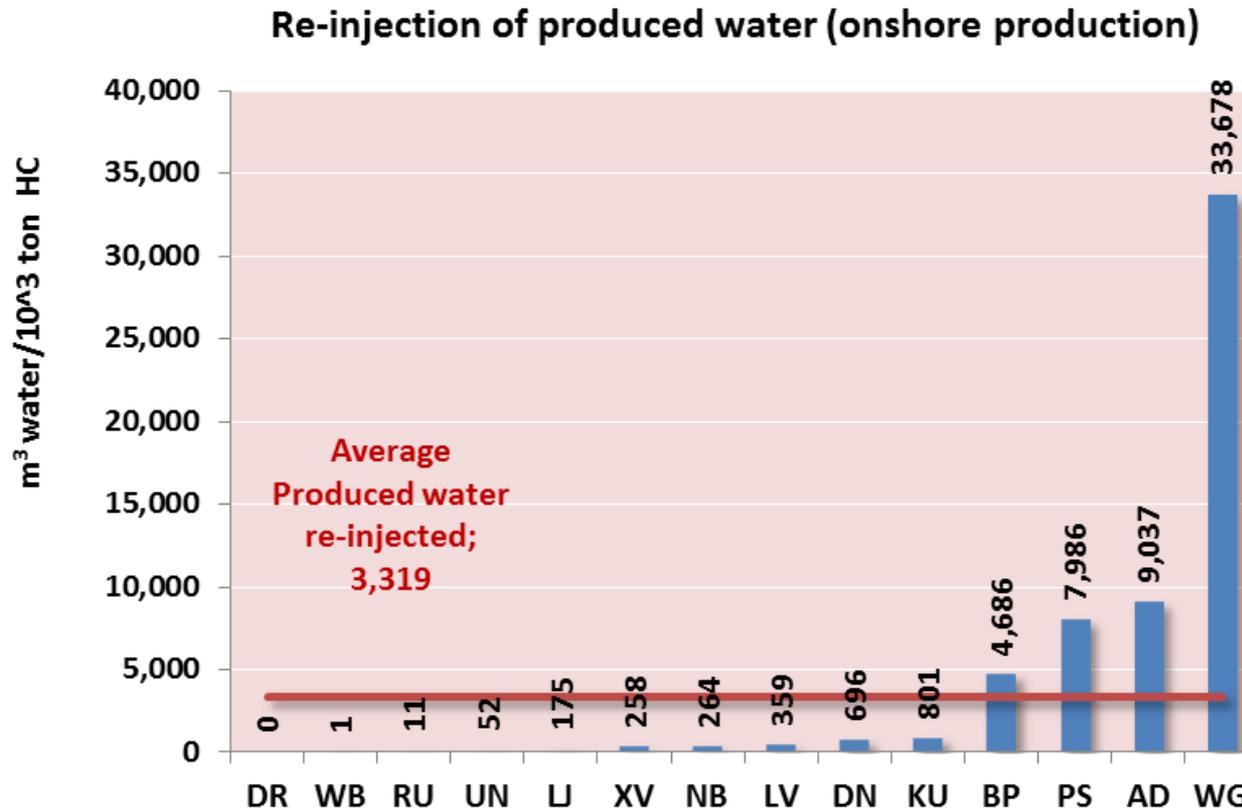
Discharges of produced water – onshore production



Discharges of hydrocarbons in produced water – onshore production



Re-injection of produced water – Onshore production

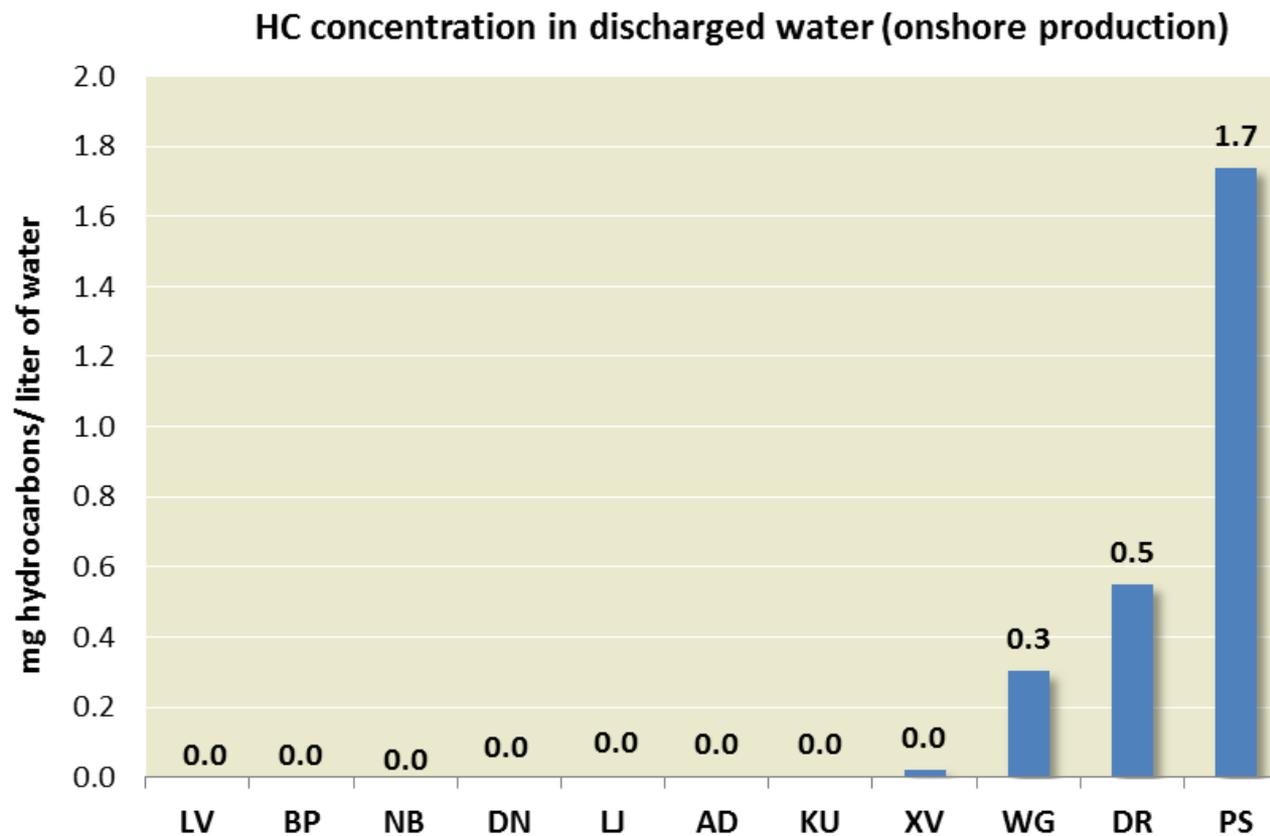


Effluents Indicators

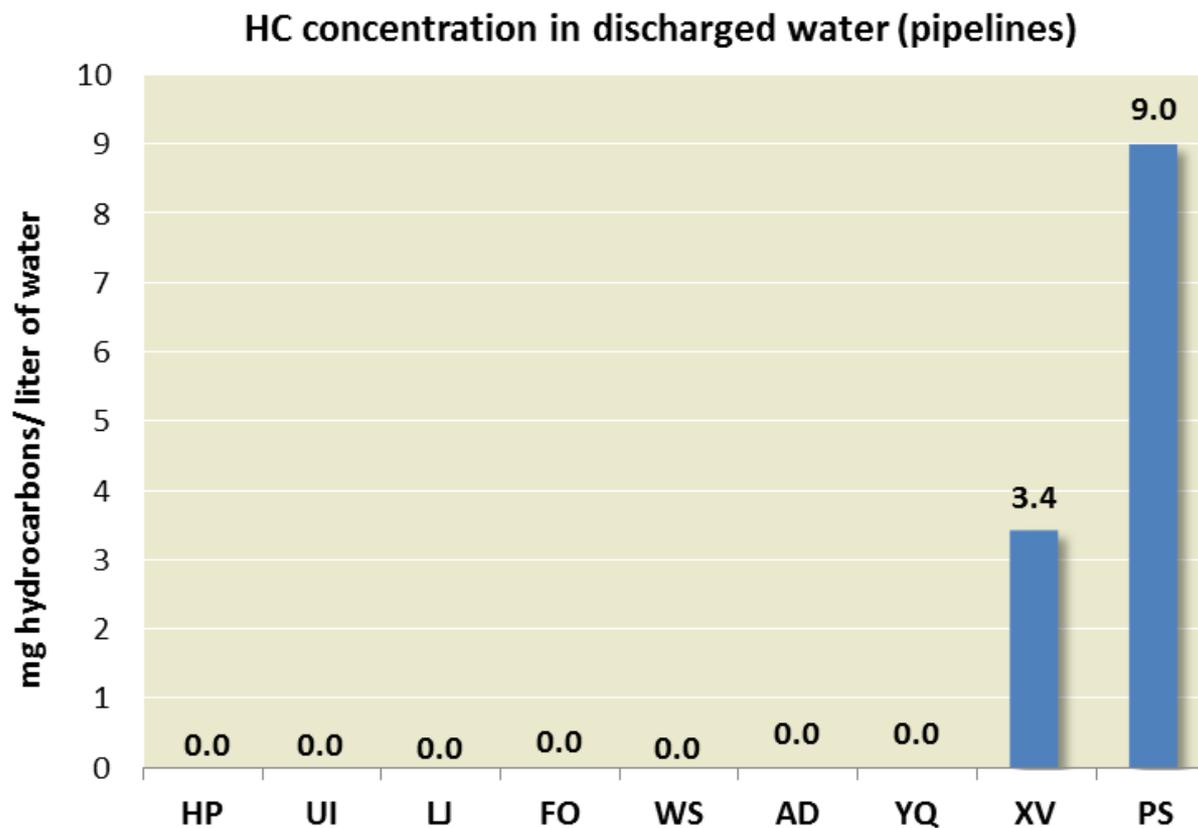
- Indicators
 - Volume of hydrocarbons in water discharged as process effluents
 - Hydrocarbons concentration in water discharged as process effluents
- Business Lines
 - Onshore production
 - Pipelines
 - Terminals
 - Refineries

Process Effluents Indicators

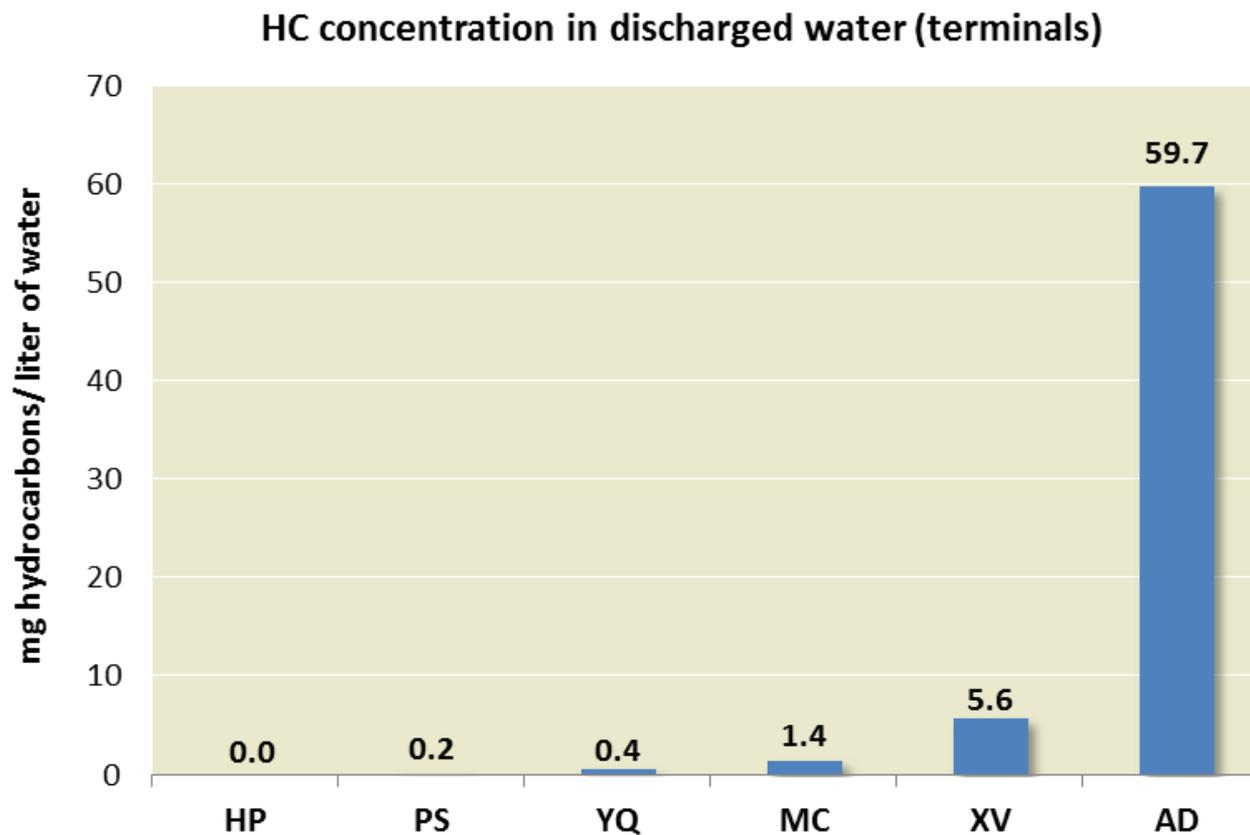
Concentration of hydrocarbons in effluent water discharged – Onshore production



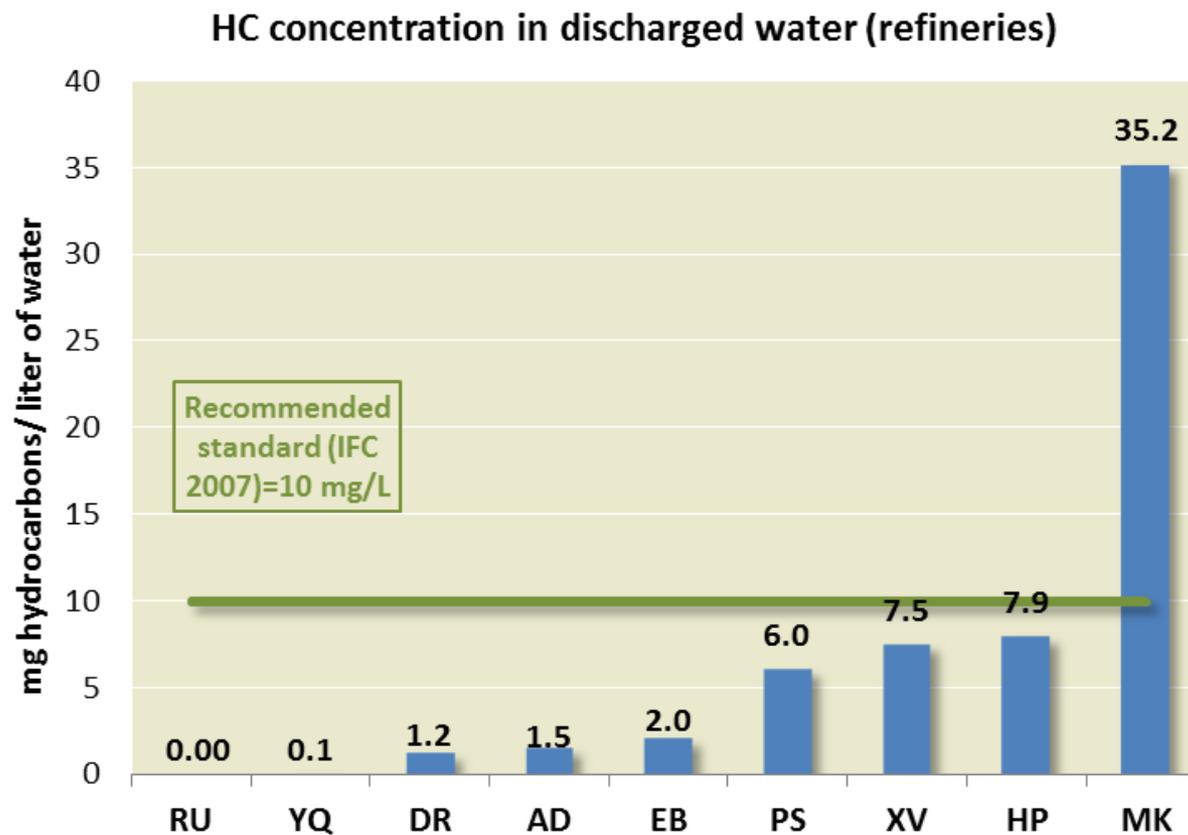
Concentration of hydrocarbons in effluent water discharged – Pipelines



Concentration of hydrocarbons in effluent water discharged – Terminals



Concentration of hydrocarbons in effluent water discharged – Refineries

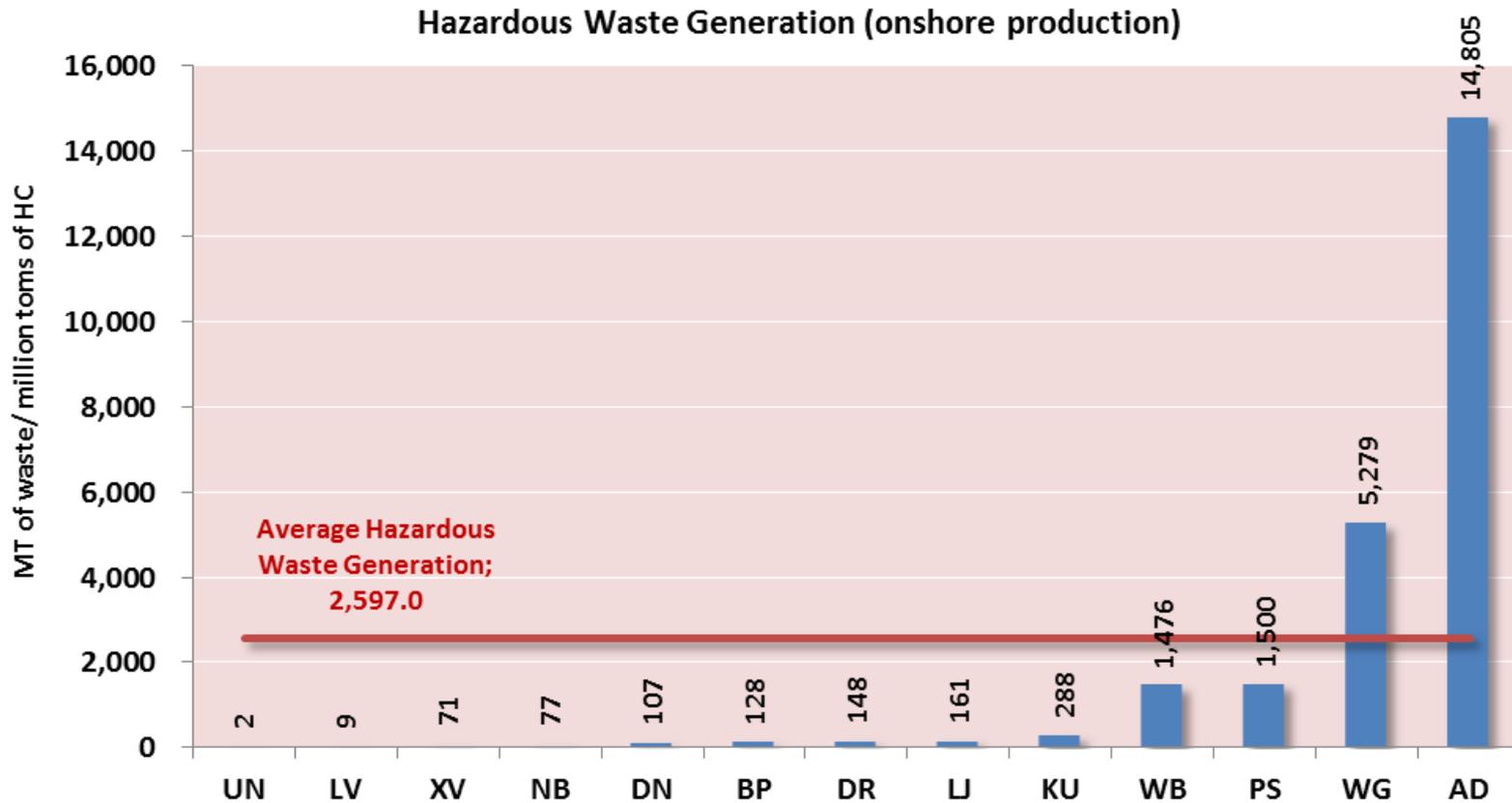


Waste Generation Indicators

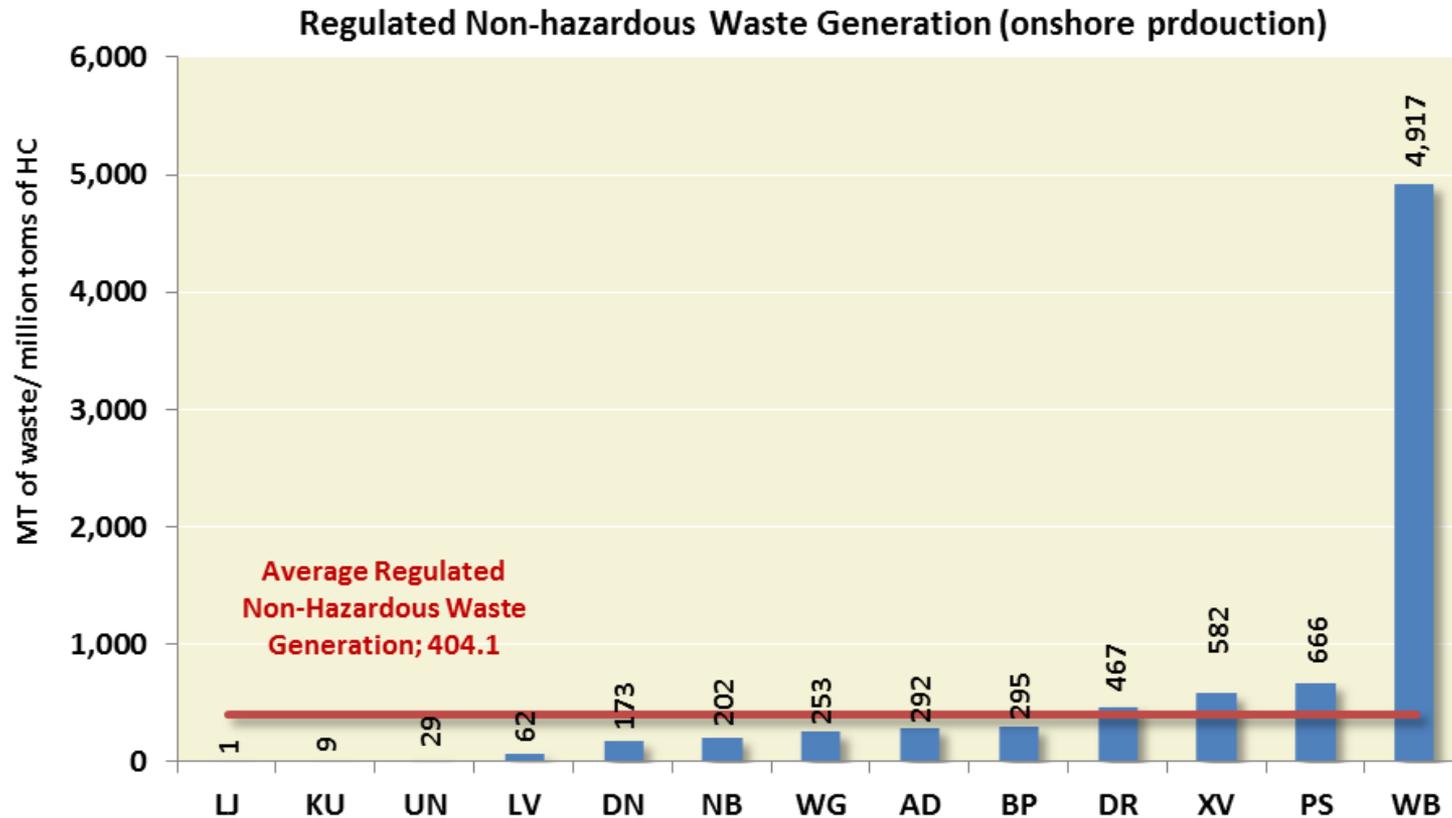
- Indicators
 - Hazardous waste generation
 - Non-hazardous waste generation
- Business Lines
 - Onshore production
 - Pipelines
 - Terminals
 - Refineries

Waste Generation Indicators – Onshore production

Hazardous Waste Generation – Onshore production

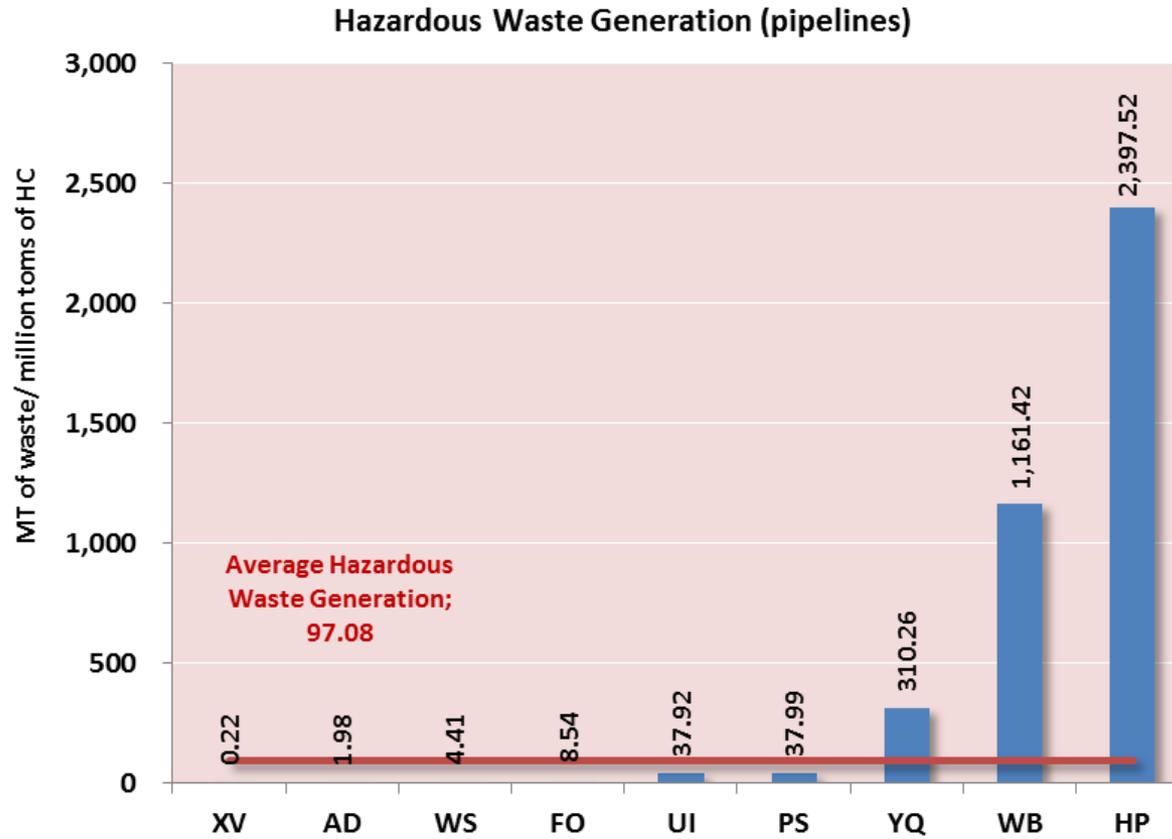


Regulated Non-Hazardous Waste Generation – Onshore Production

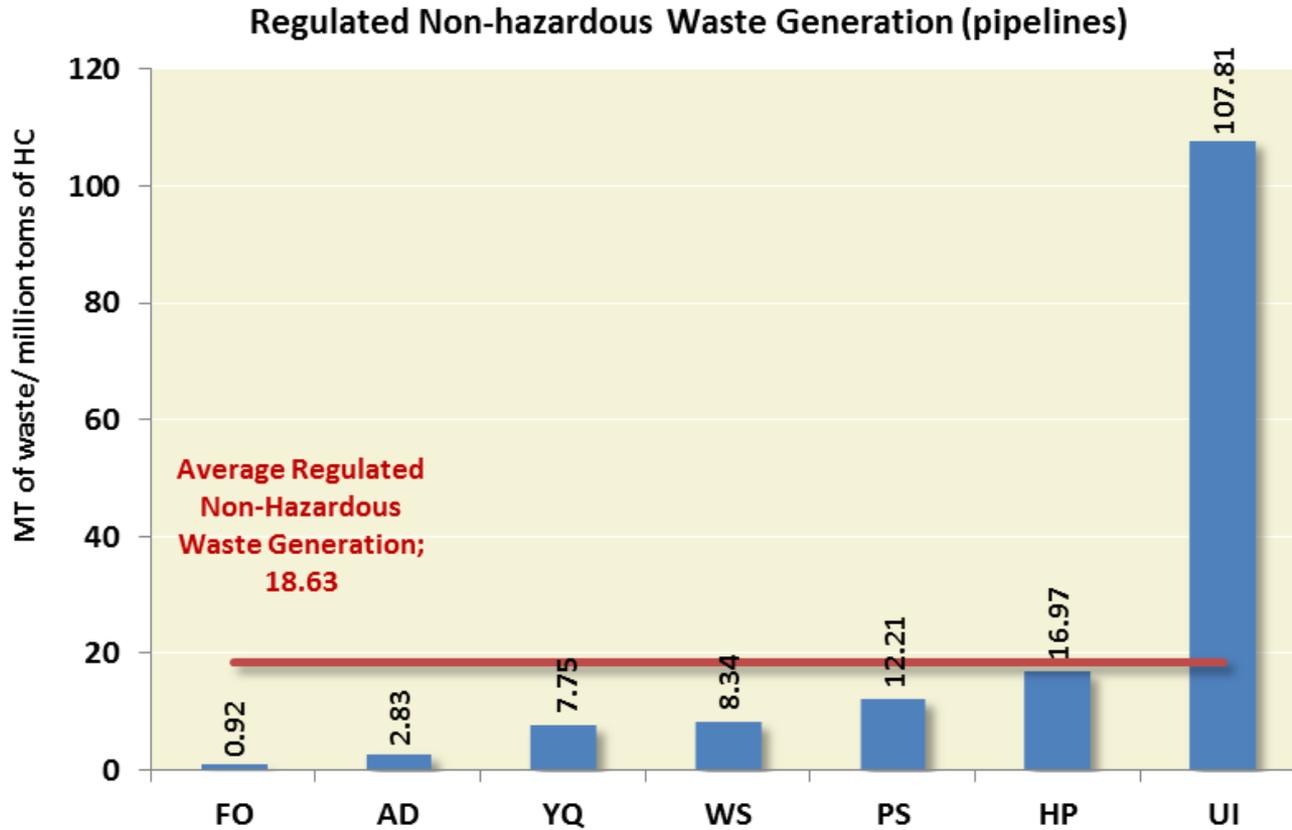


Waste Generation Indicators – Pipelines

Hazardous Waste Generation – Pipelines

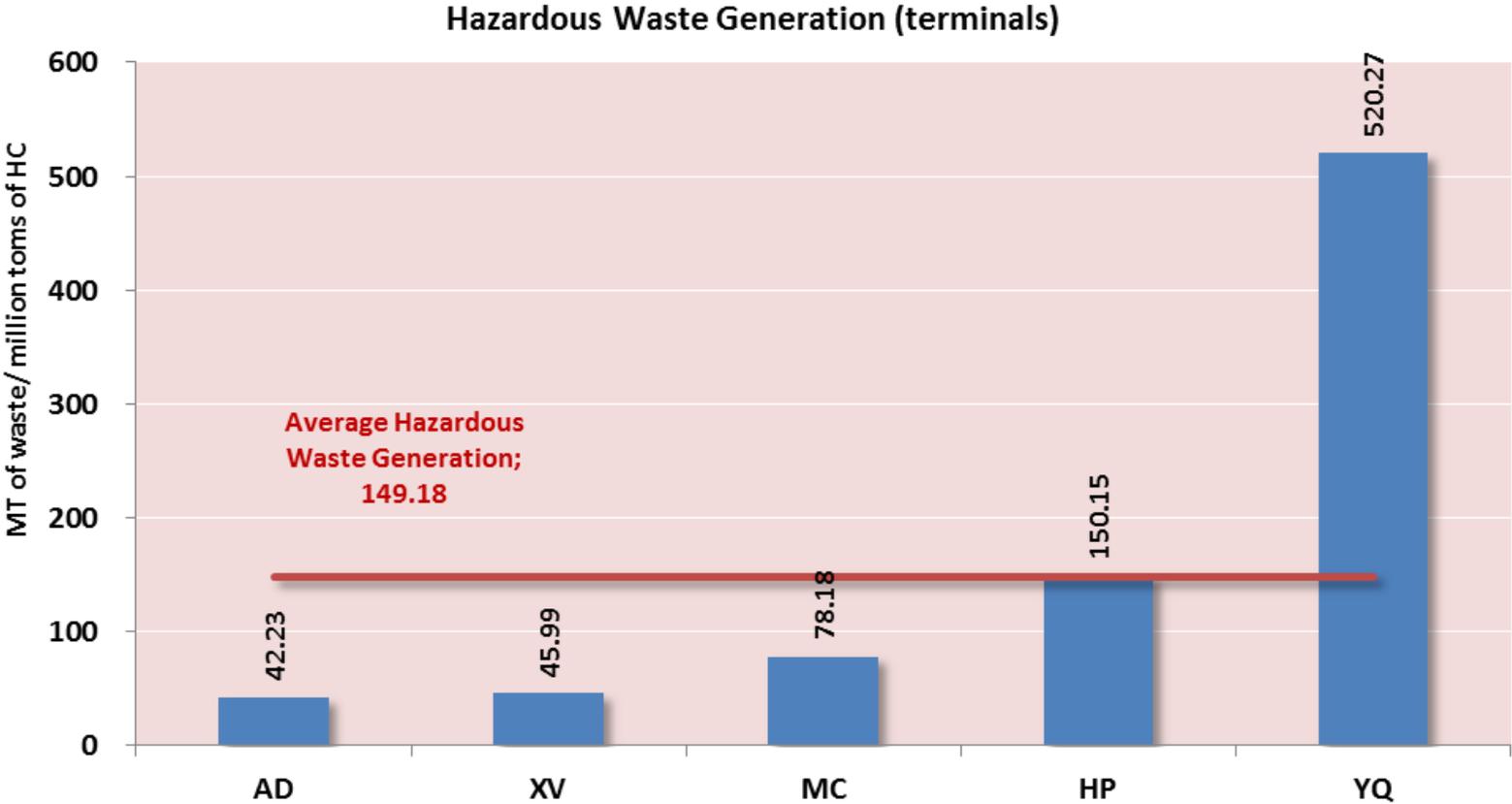


Regulated Non-Hazardous Waste Generation – Pipelines

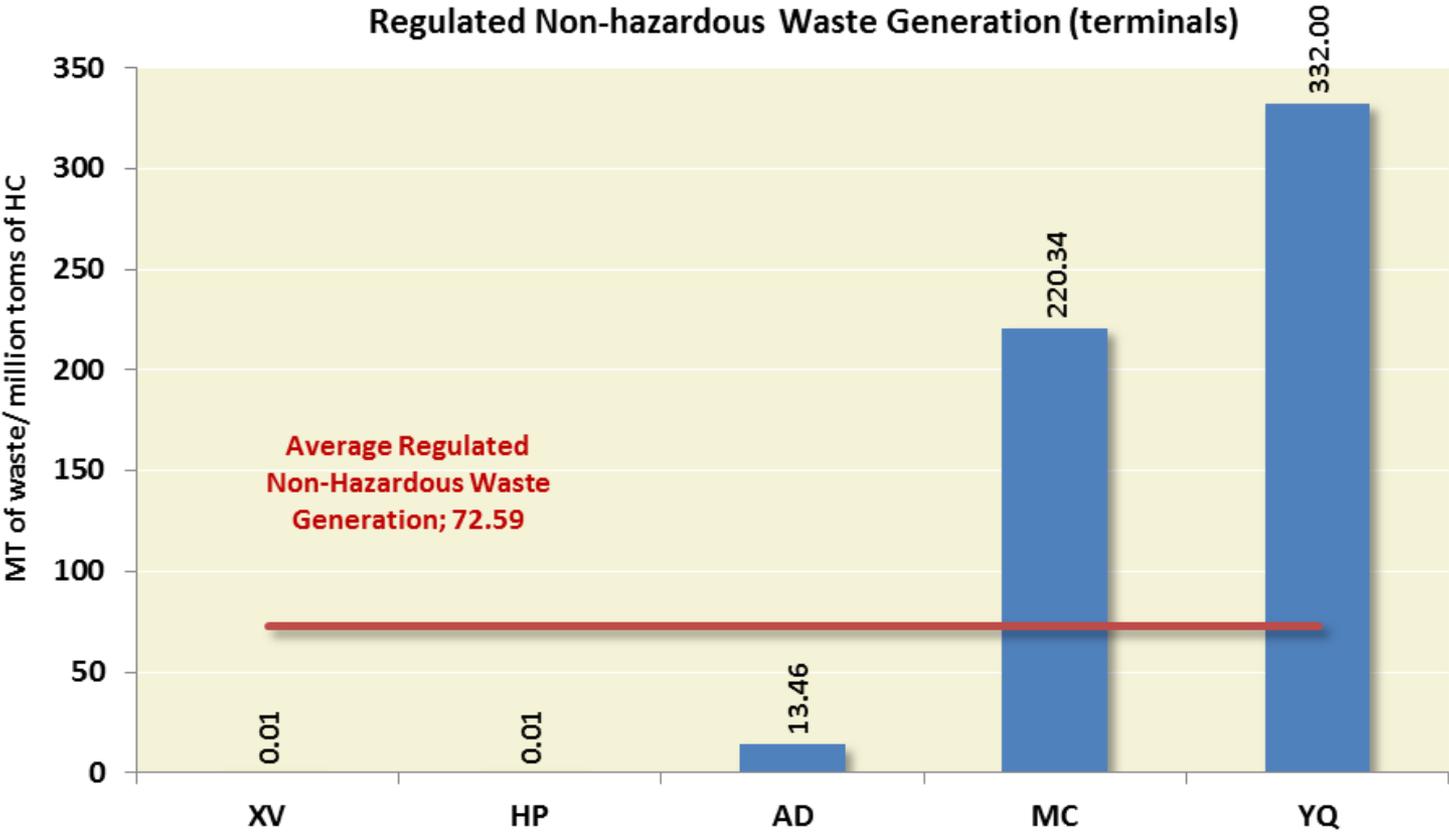


Waste Generation Indicators – Terminals

Hazardous Waste Generation – Terminals



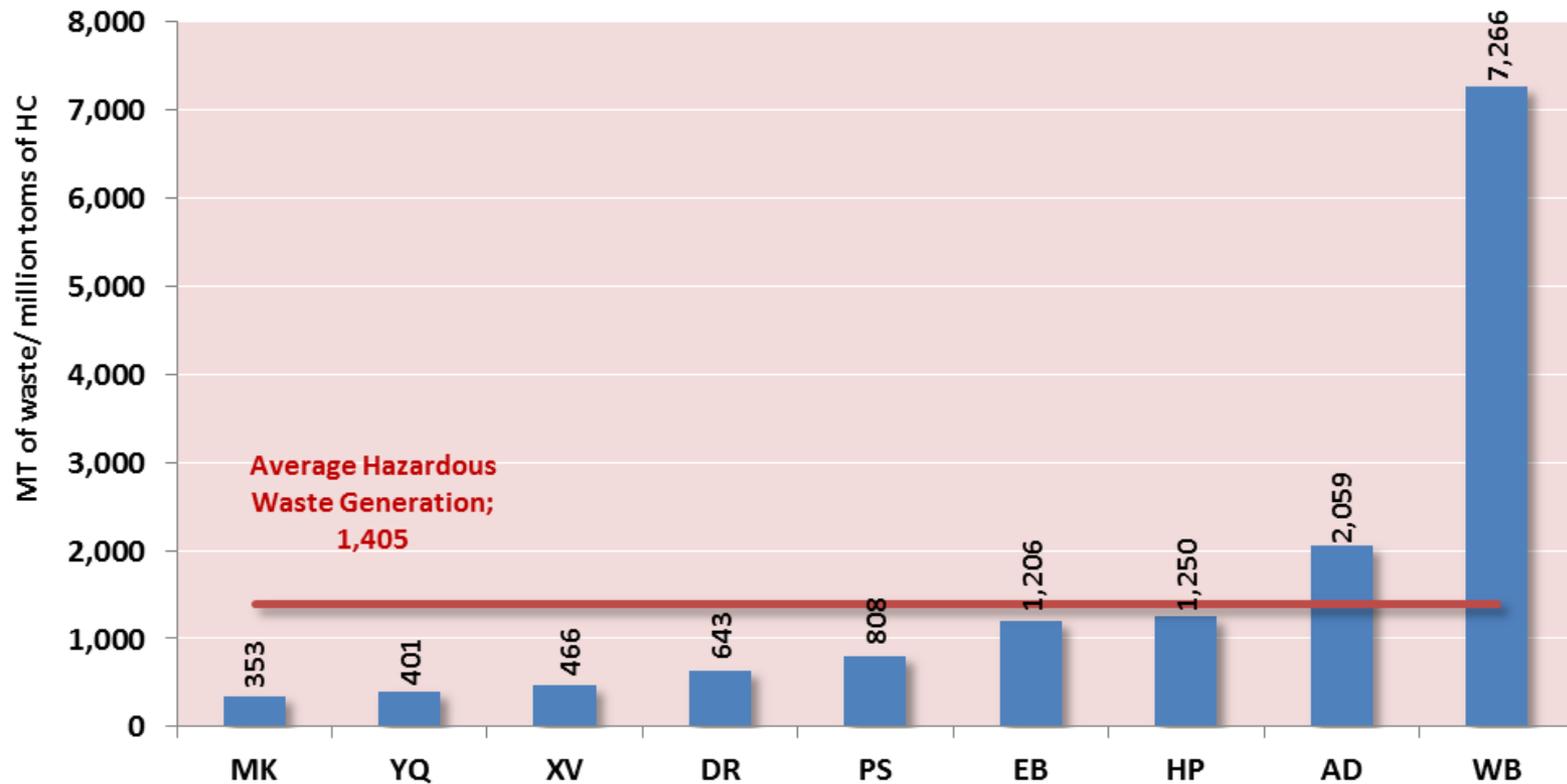
Regulated Non-Hazardous Waste Generation – Terminals



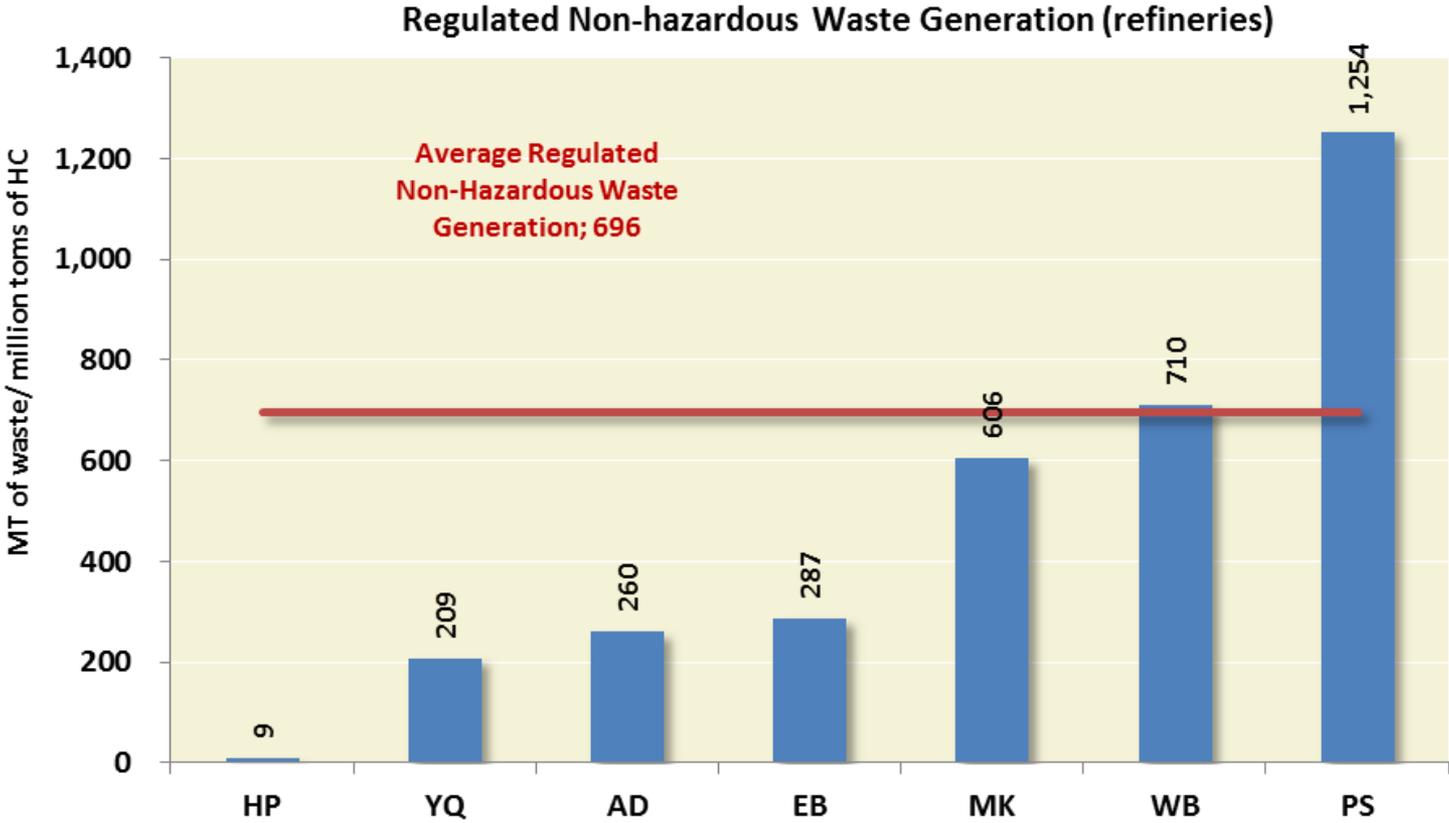
Waste Generation Indicators – Refineries

Hazardous Waste Generation – Refineries

Hazardous Waste Generation (refineries)



Regulated Non-Hazardous Waste Generation – Refineries



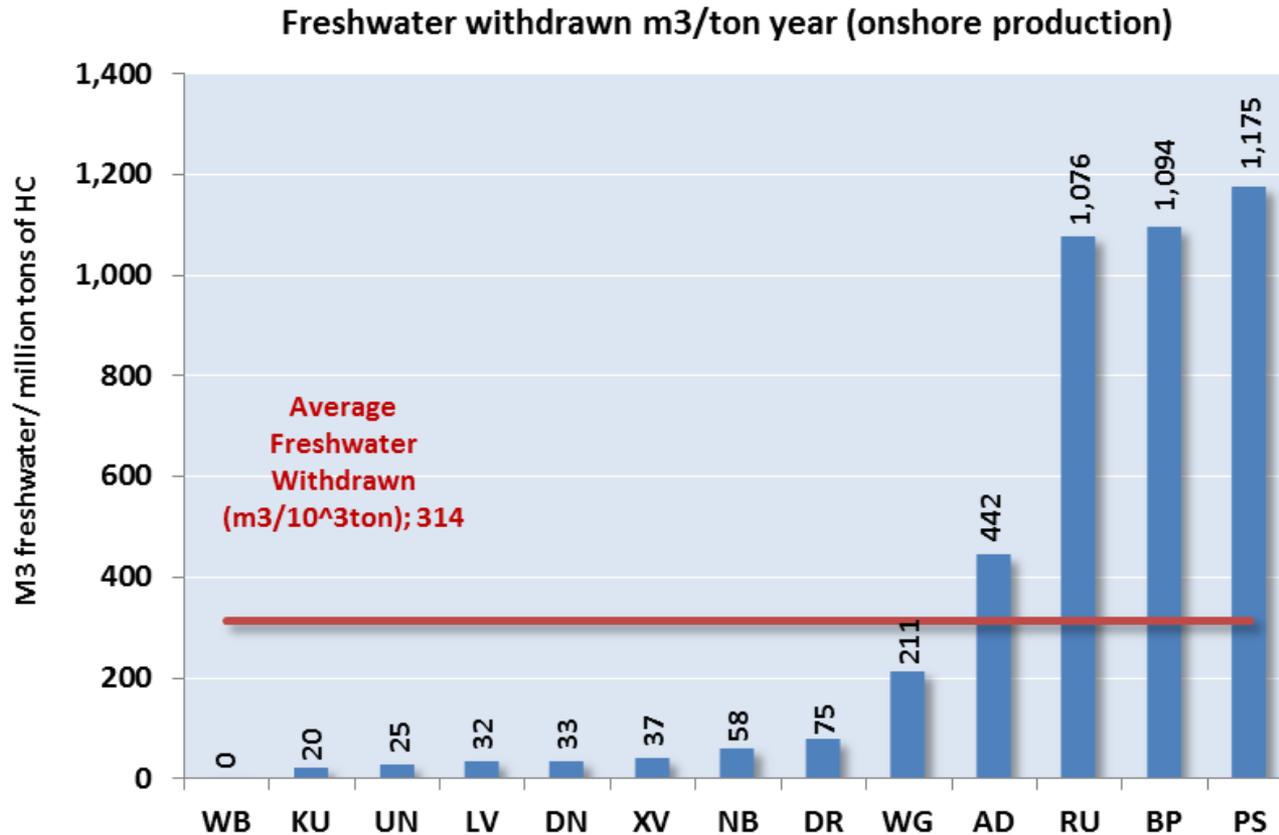
Freshwater Indicators

- Freshwater withdrawn
- % Freshwater withdrawn from indirect sources
- % Water re-use

- Business Lines
 - Onshore Production
 - Pipelines
 - Terminals
 - Refineries

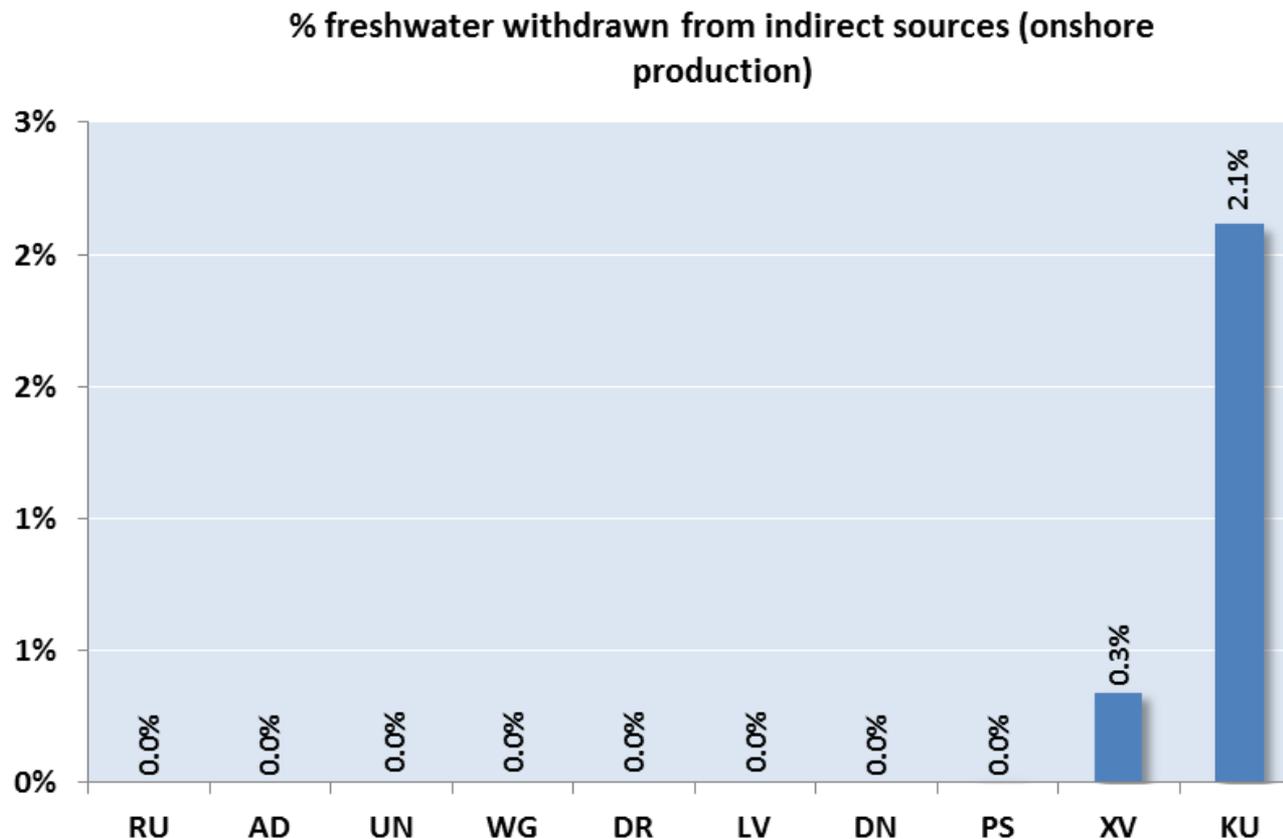
Freshwater Indicators – Onshore production

Freshwater Withdrawn– Onshore production

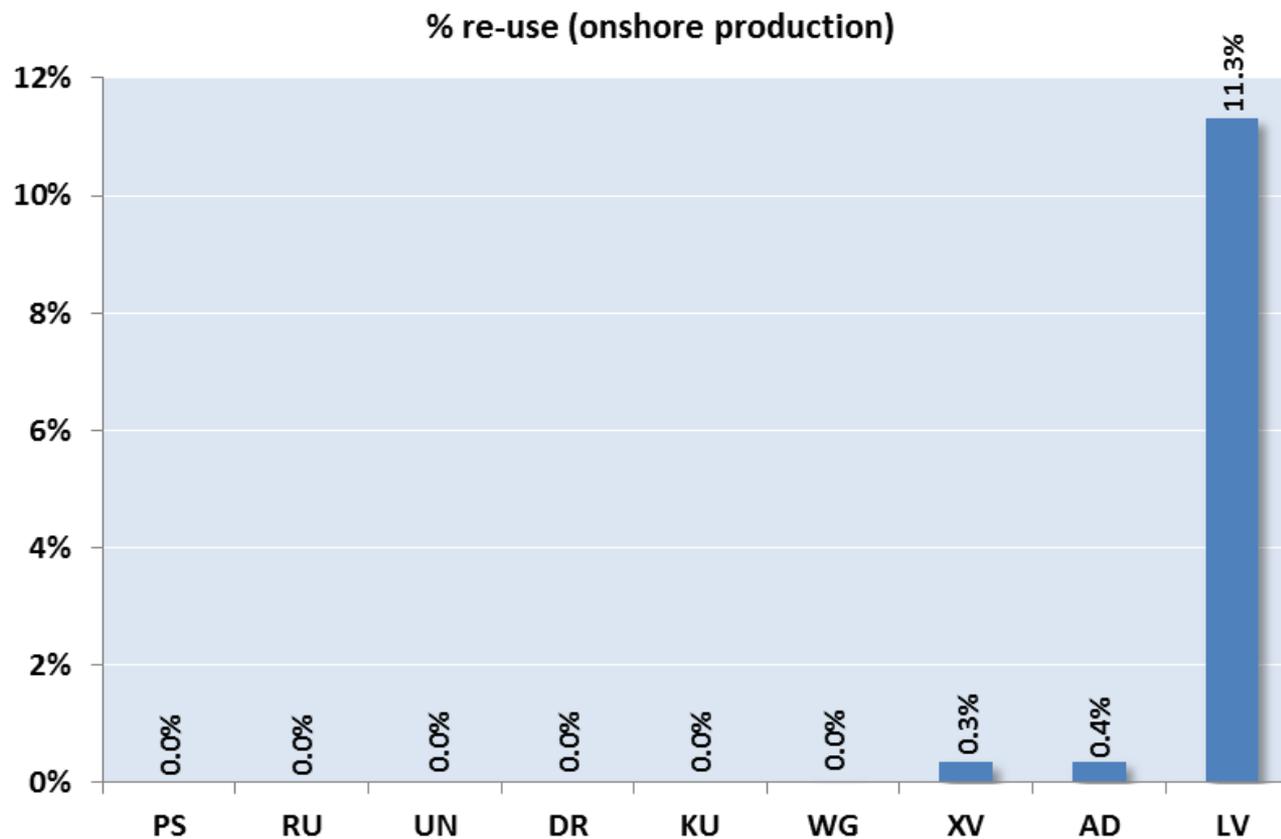




% freshwater withdrawn from indirect sources – Onshore production

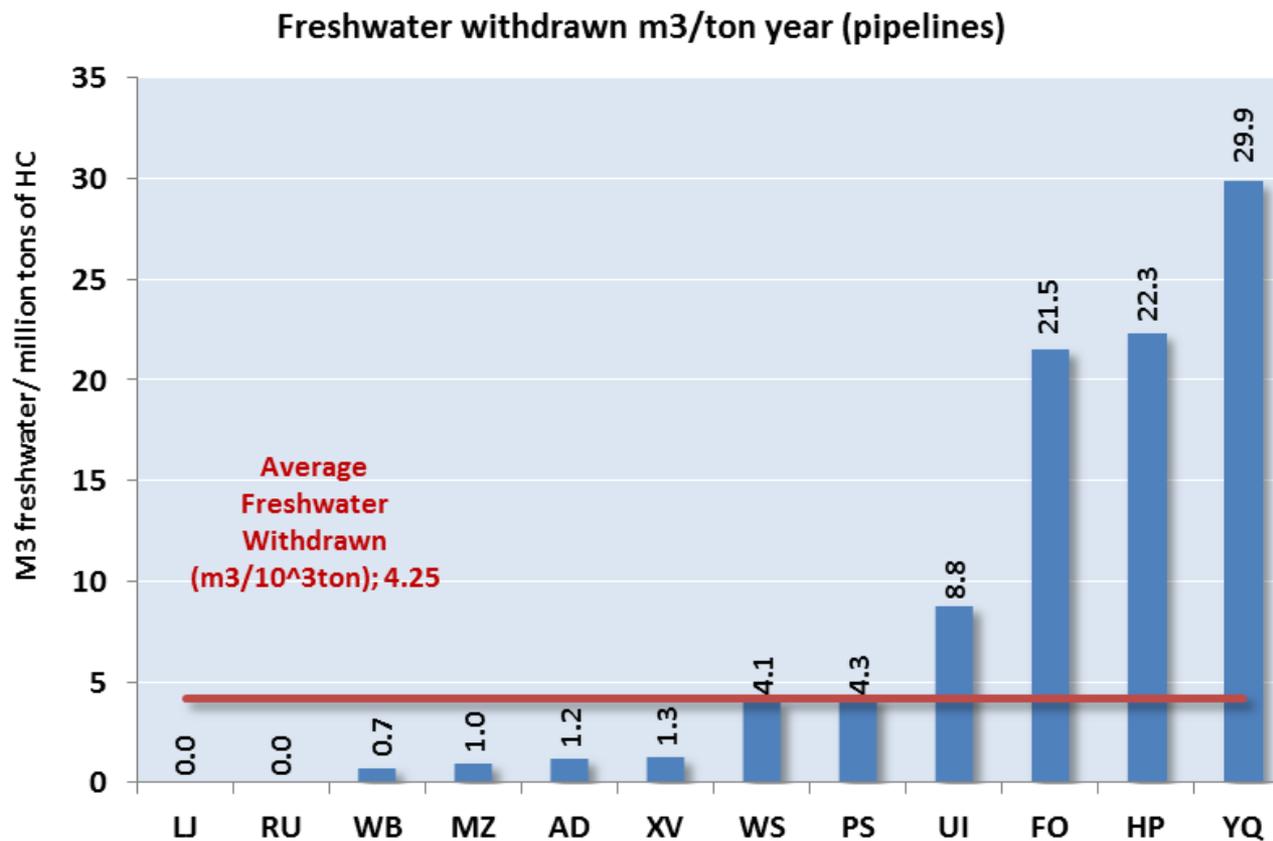


% re-used water – Onshore production

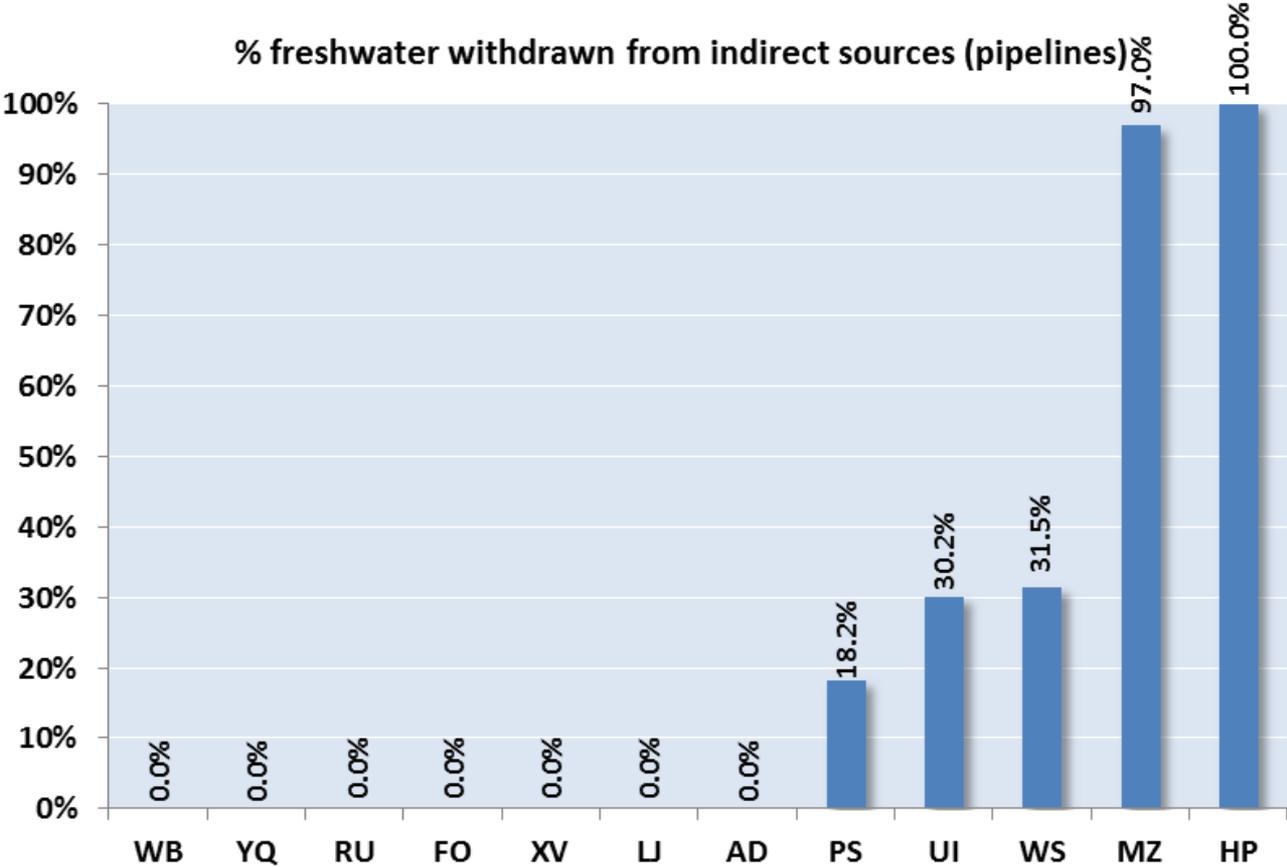


Freshwater Indicators – Pipelines

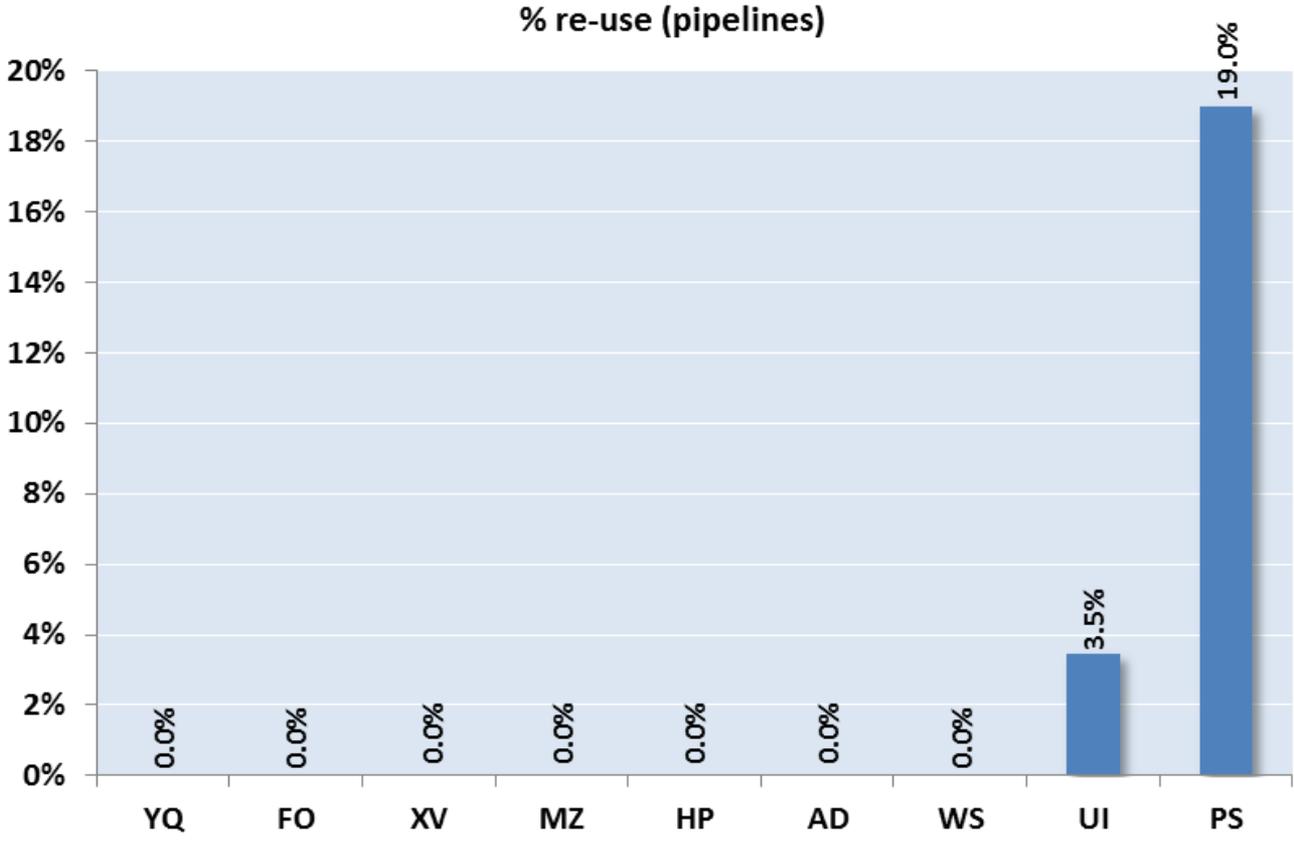
Freshwater Withdrawn– Pipelines



% freshwater withdrawn from indirect sources – Pipelines

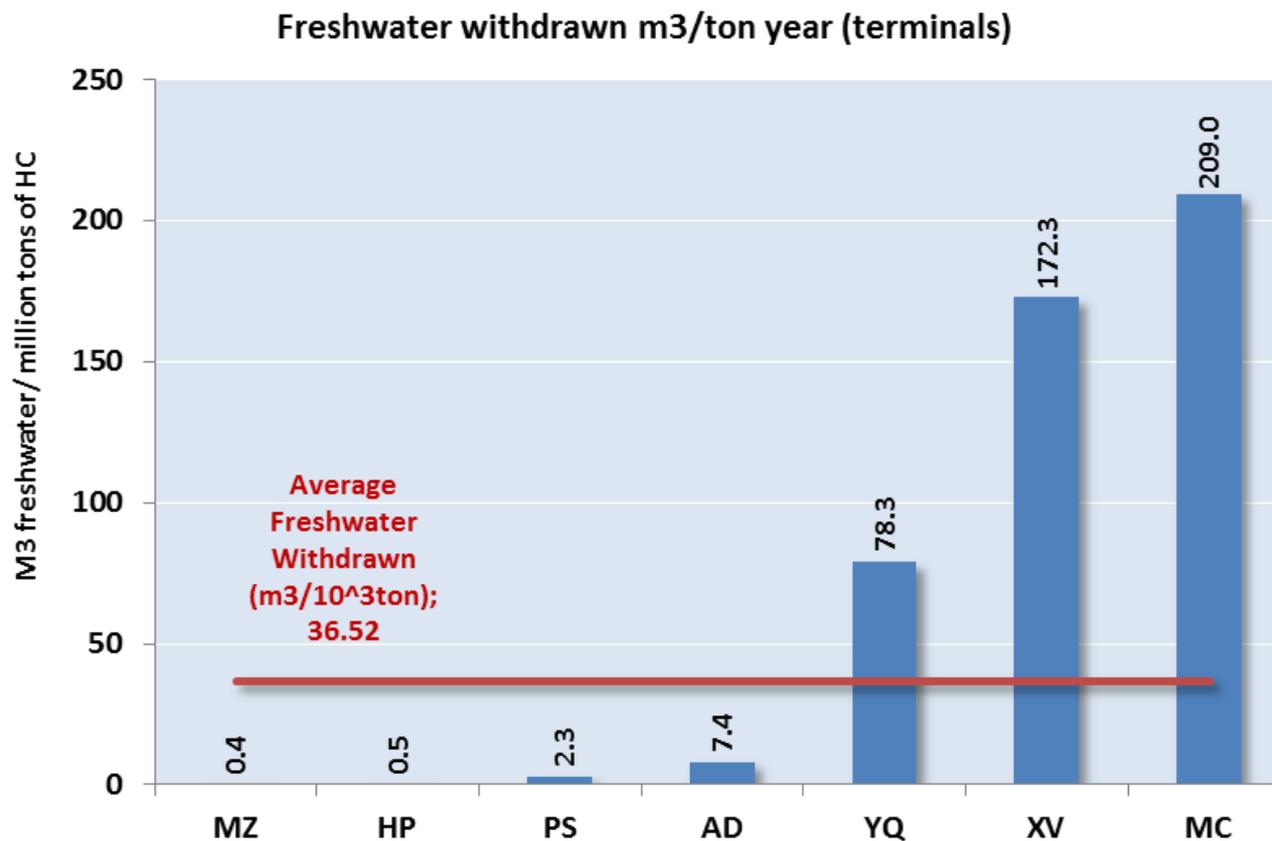


% re-used water – Pipelines

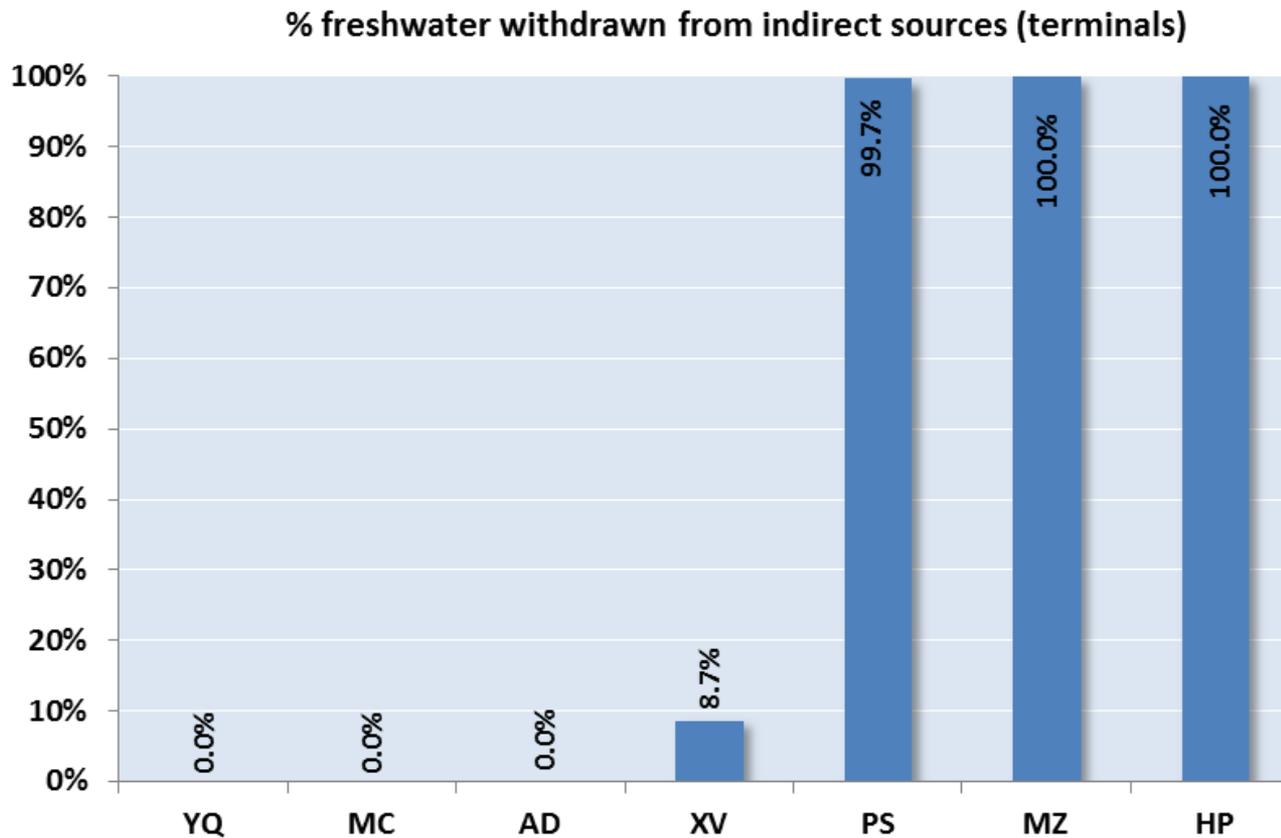


Freshwater Indicators – Terminals

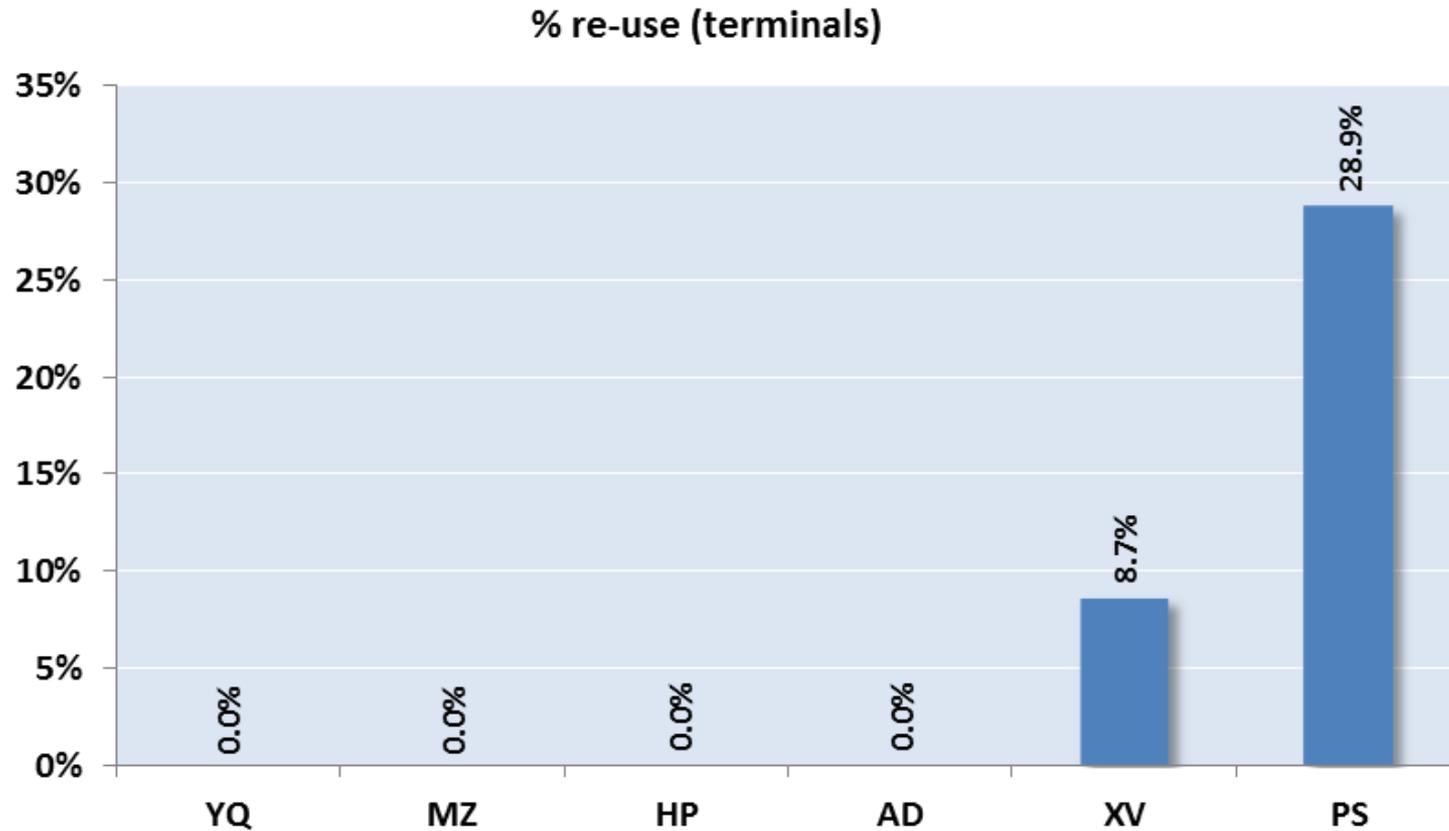
Freshwater Withdrawn– Terminals



% freshwater withdrawn from indirect sources – Terminals

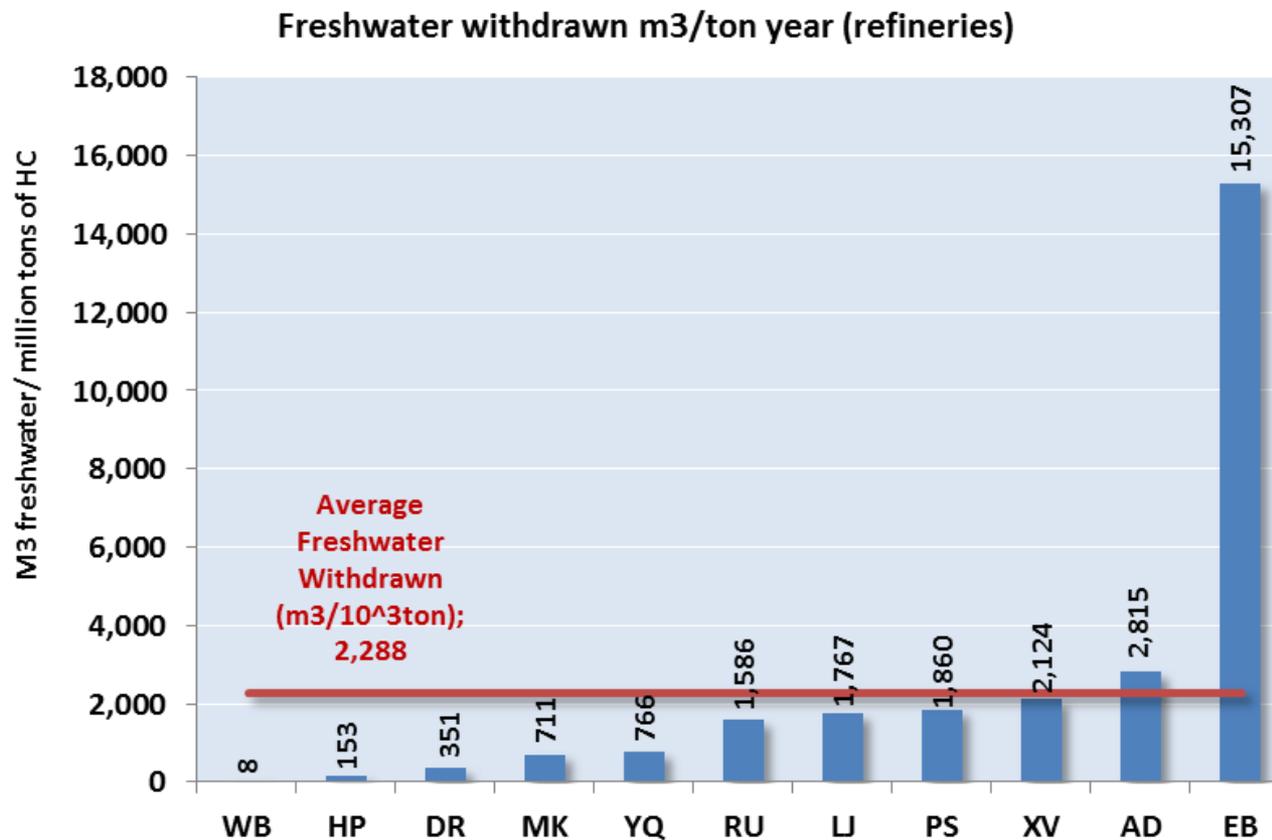


% re-used water – Terminals

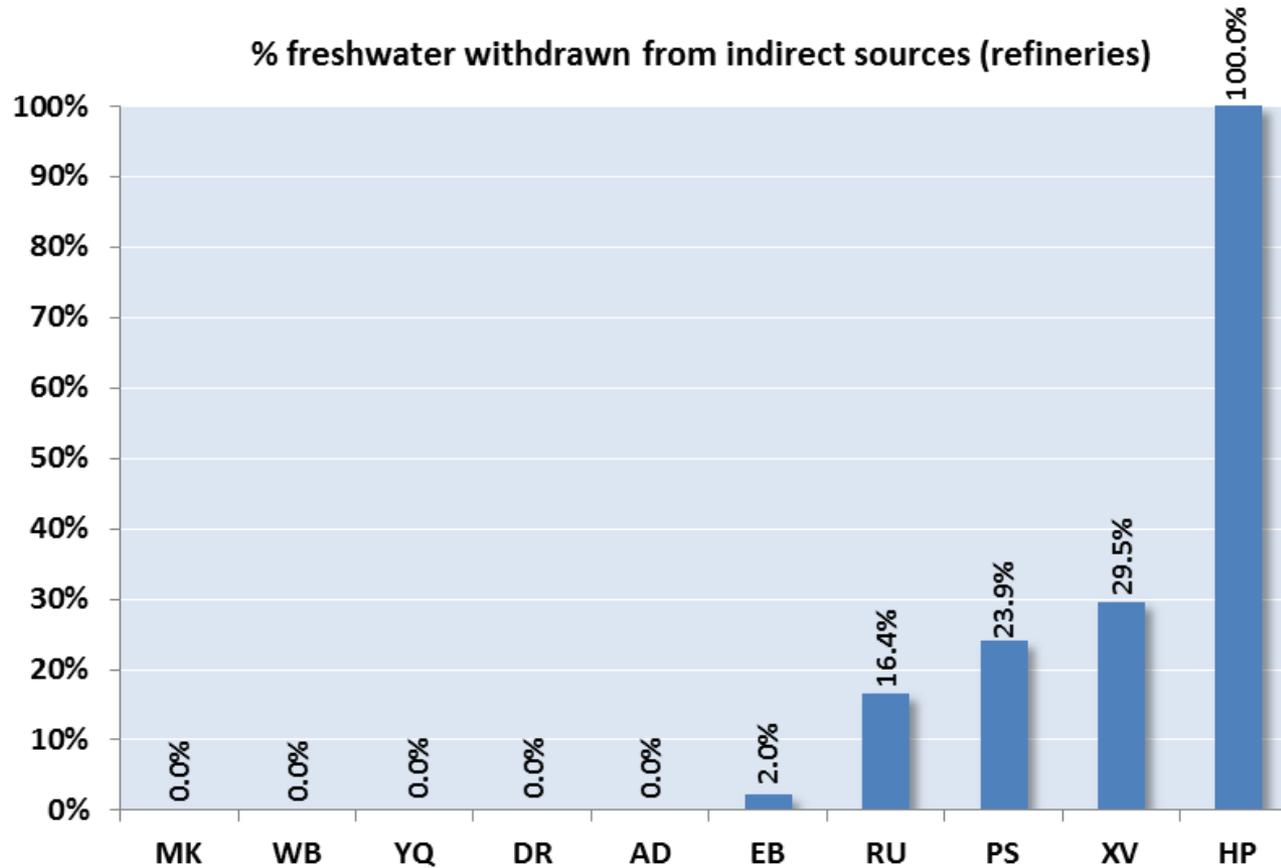


Freshwater Indicators – Refineries

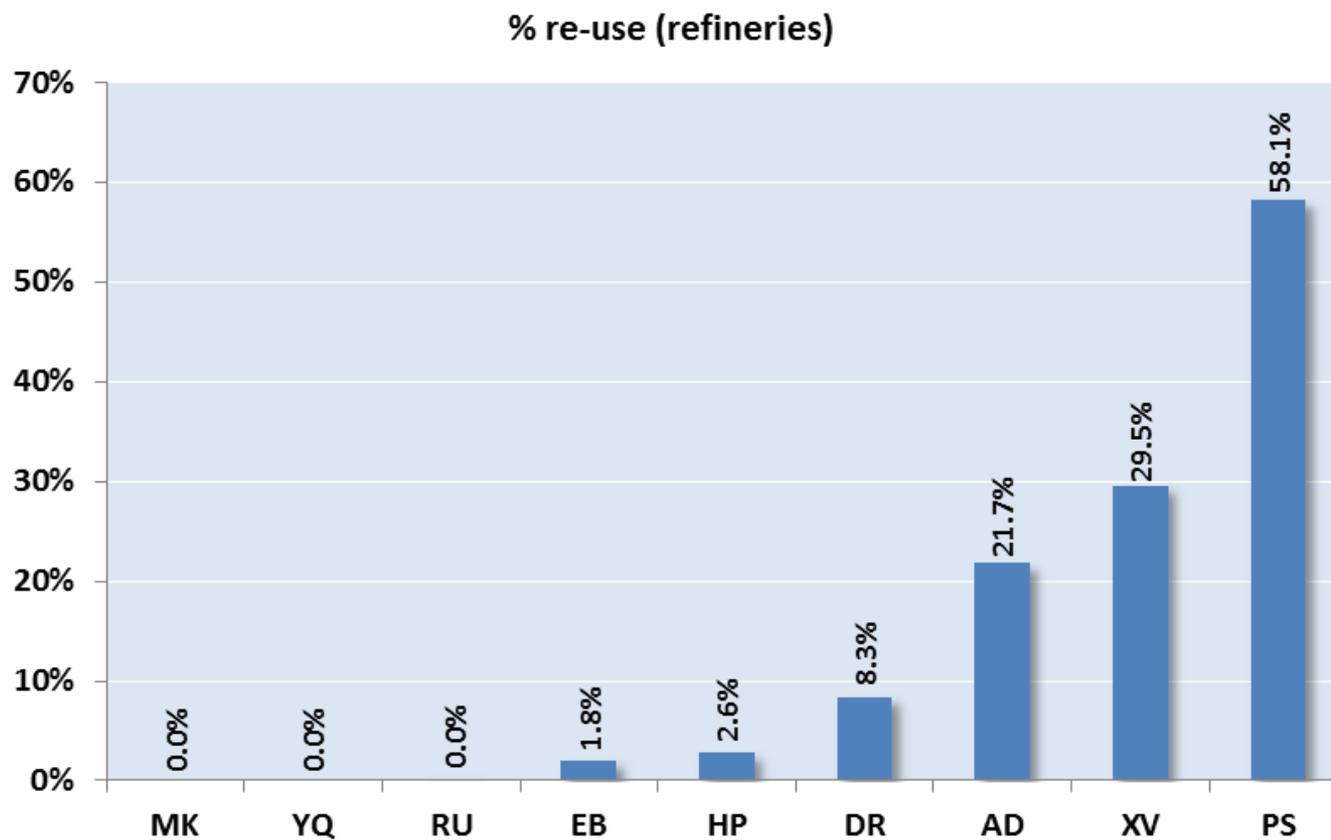
Freshwater Withdrawn– Refineries



% freshwater withdrawn from indirect sources – Refineries



% re-used water – Refineries

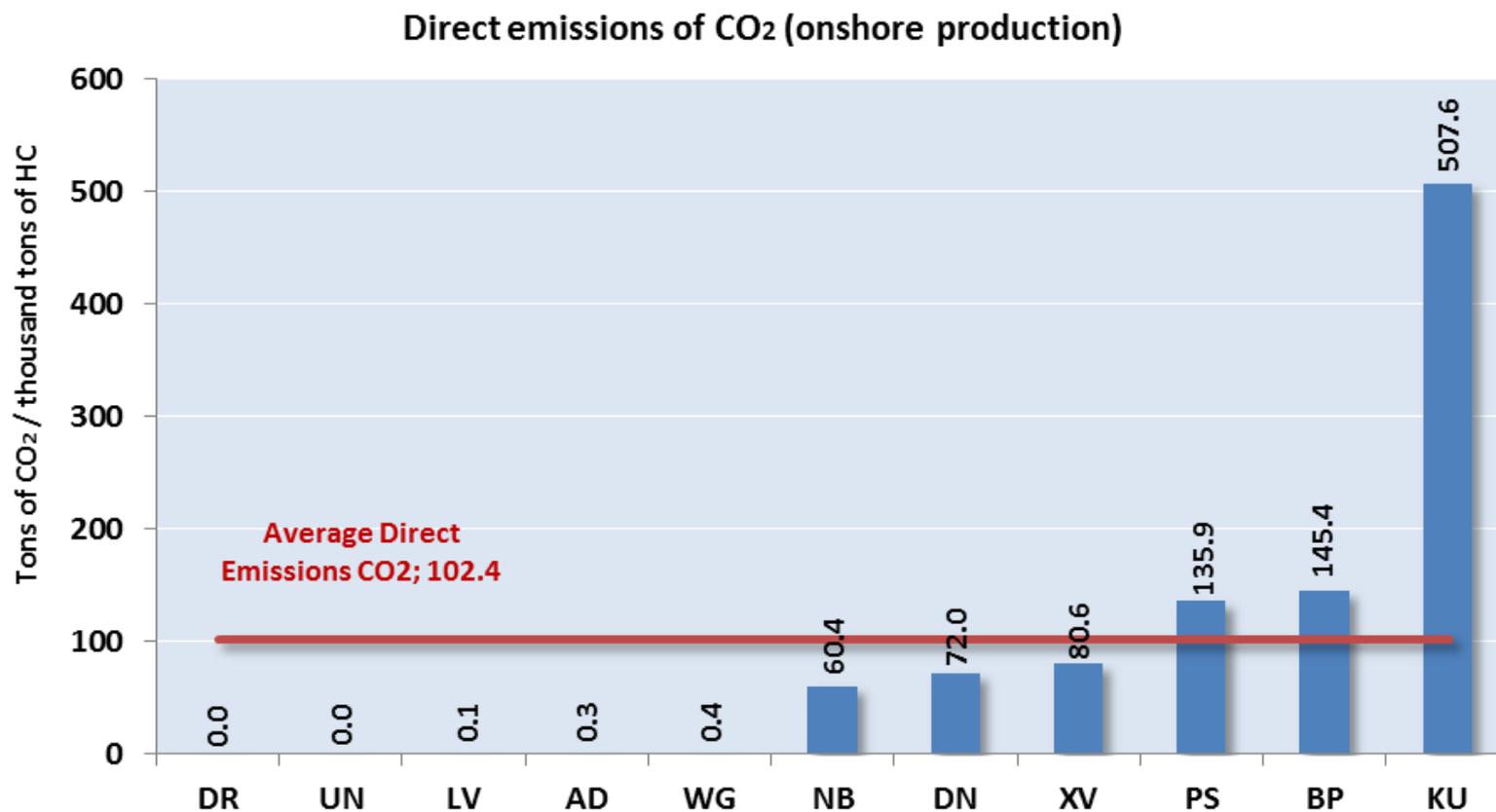


GHG Emissions Indicators

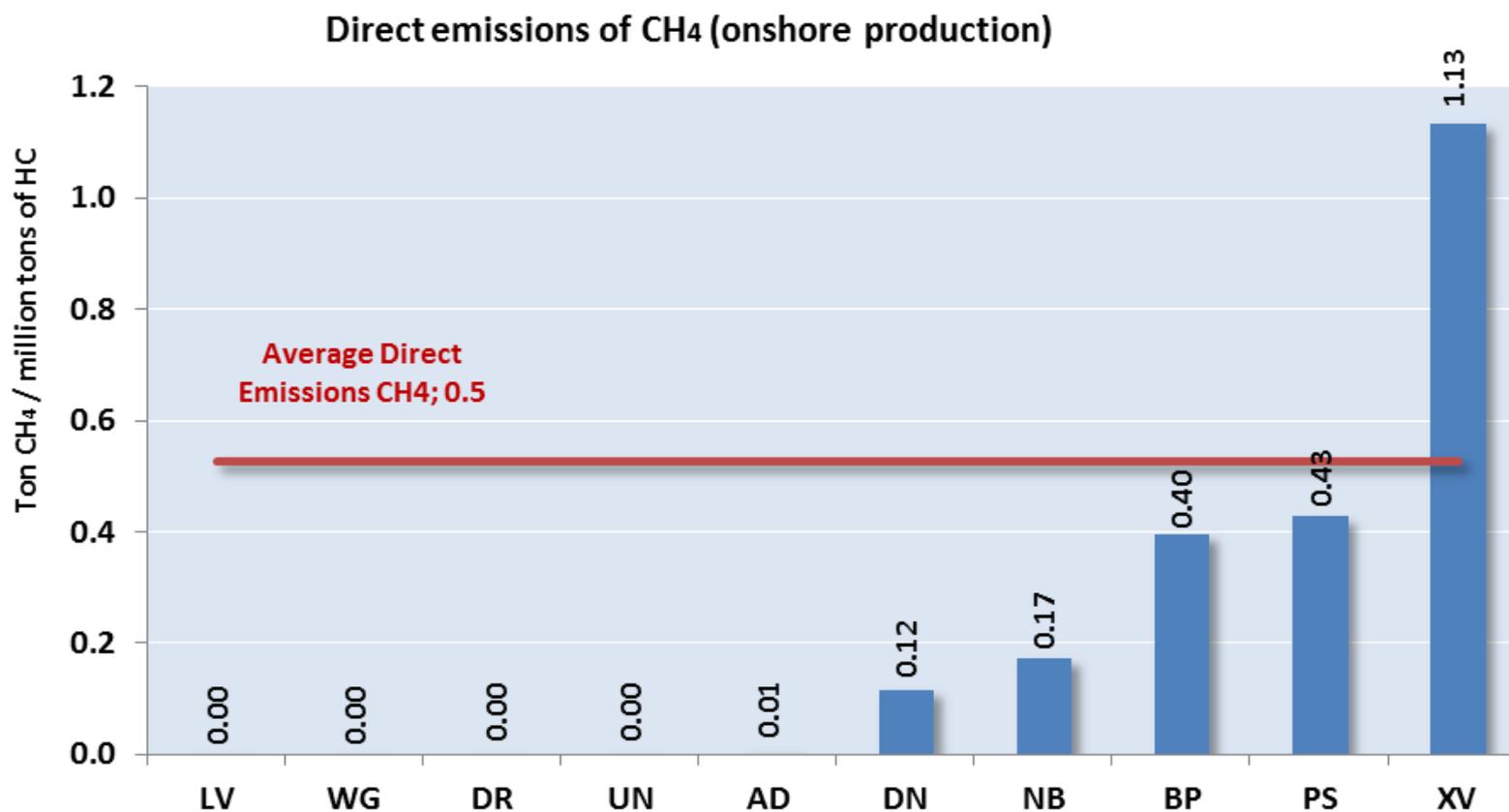
- Indicators
 - Direct Emissions (CO₂; CH₄; N₂O y CO₂e)
- Business Lines
 - Onshore production
 - Pipelines
 - Refineries

GHG Emissions – Onshore production

Direct Emissions of CO₂ – Onshore production

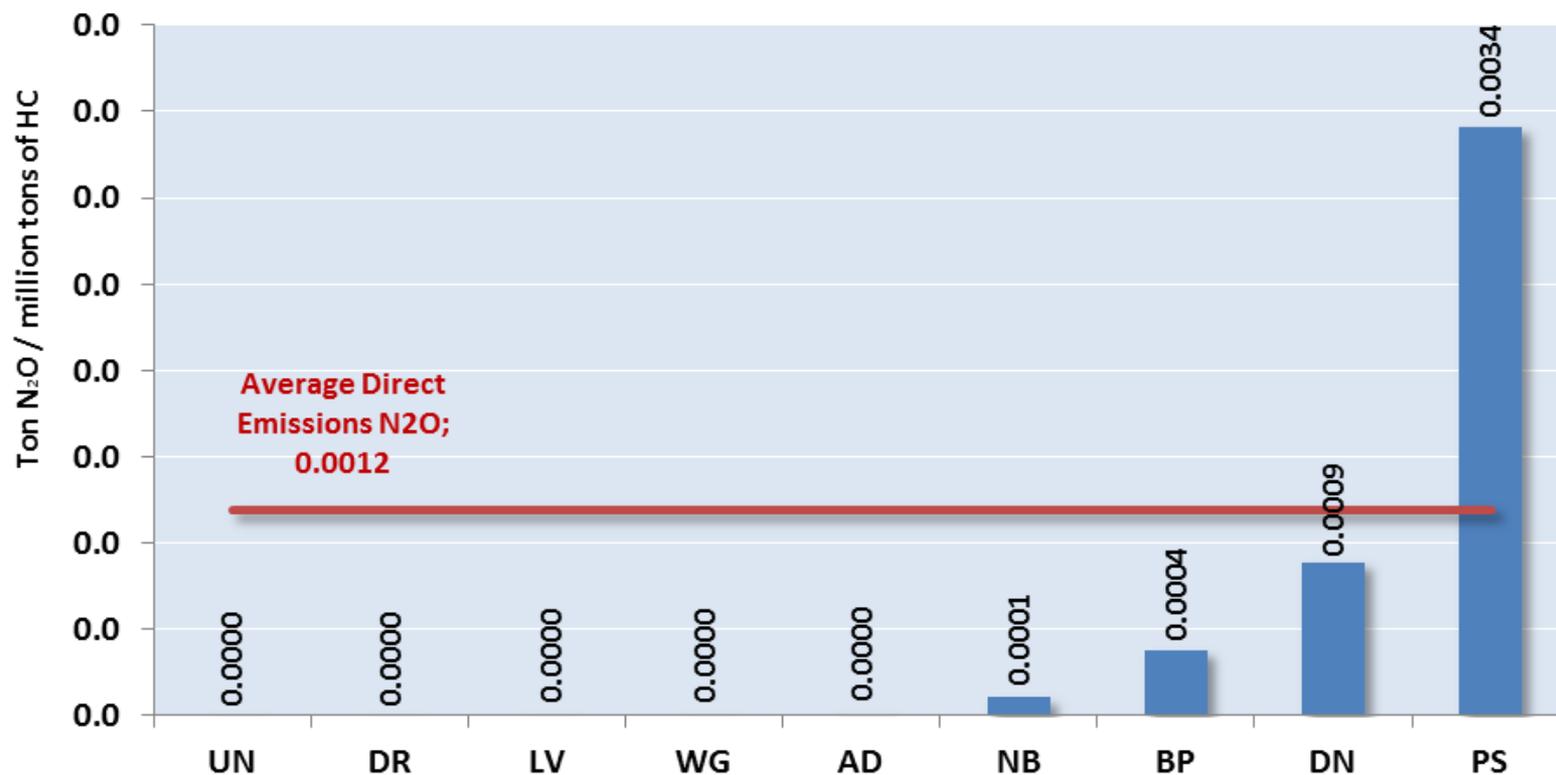


Direct Emissions of CH₄ – Onshore Production

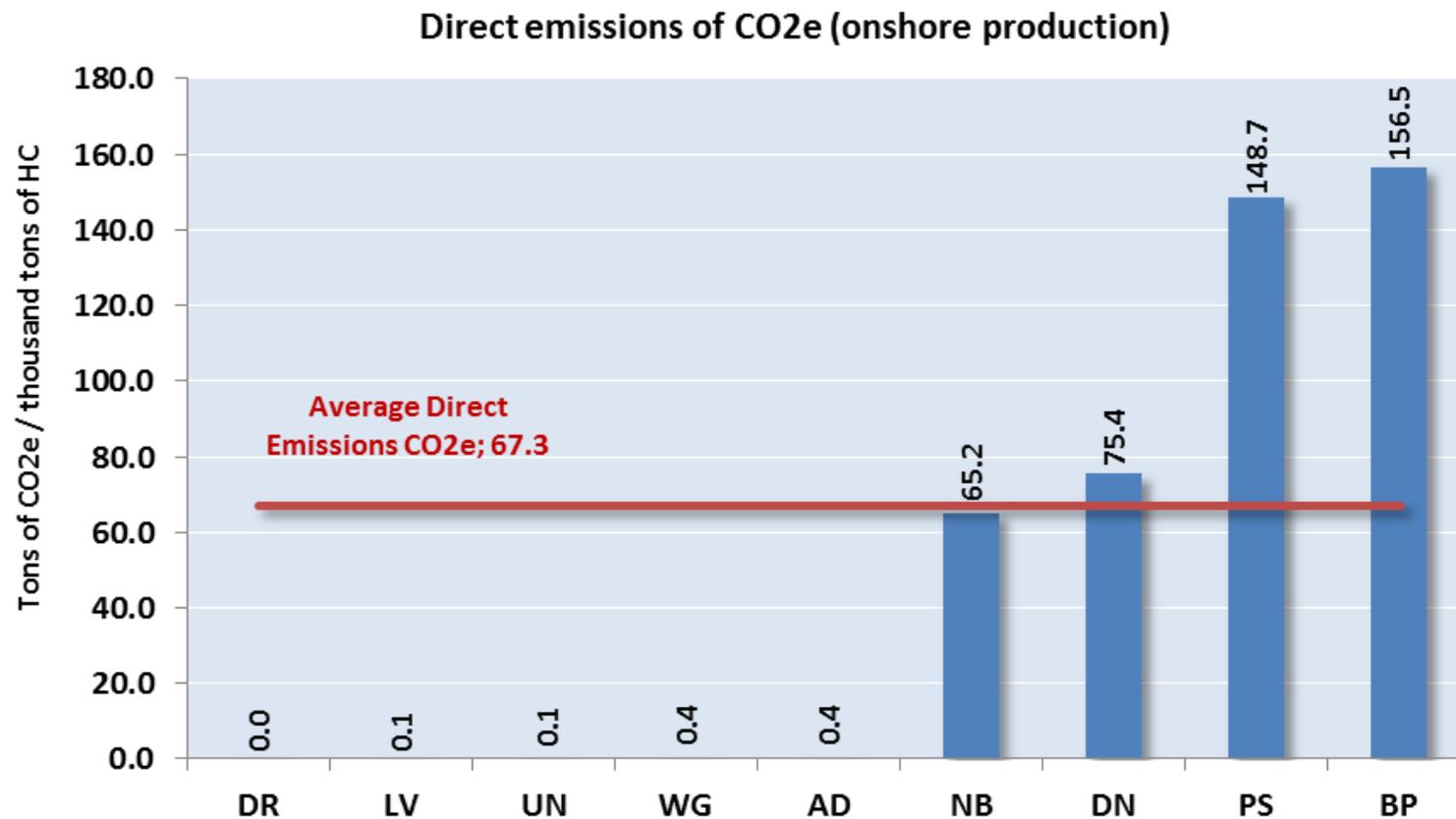


Direct emissions of N₂O – Onshore production

Direct emissions of N₂O (onshore production)

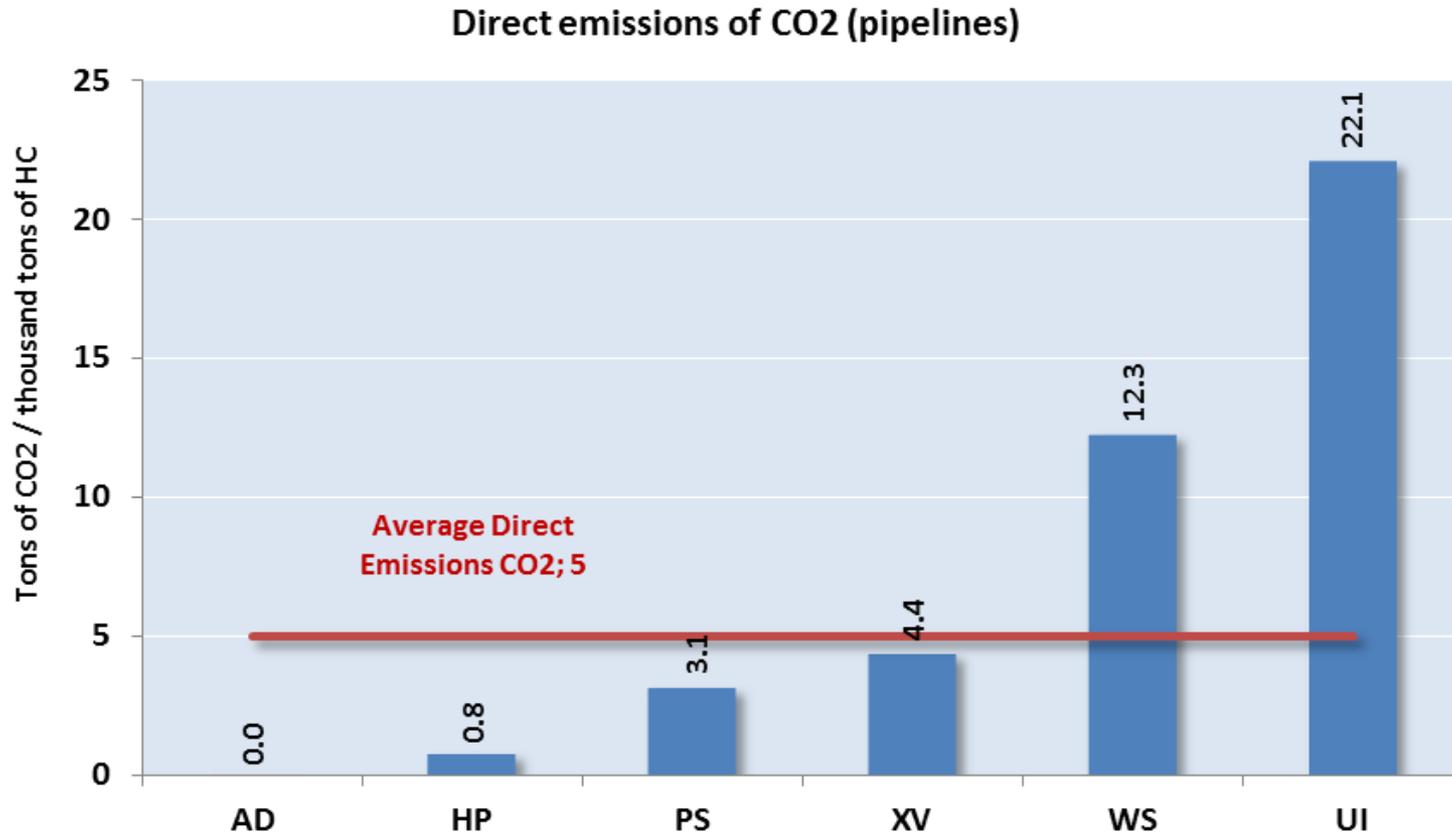


Direct Emissions of equivalent CO₂ – Onshore production

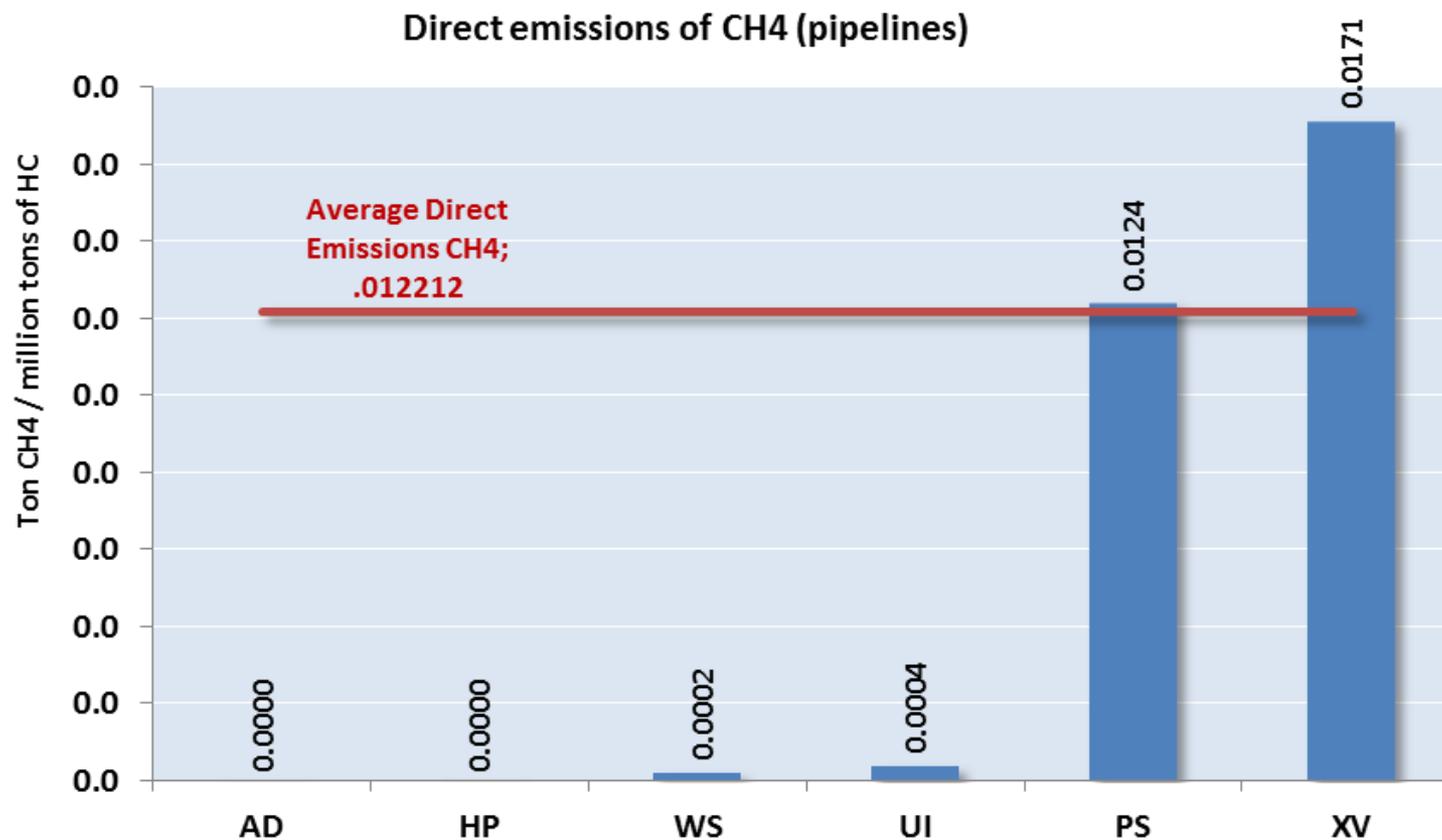


GHG Emissions – Pipelines

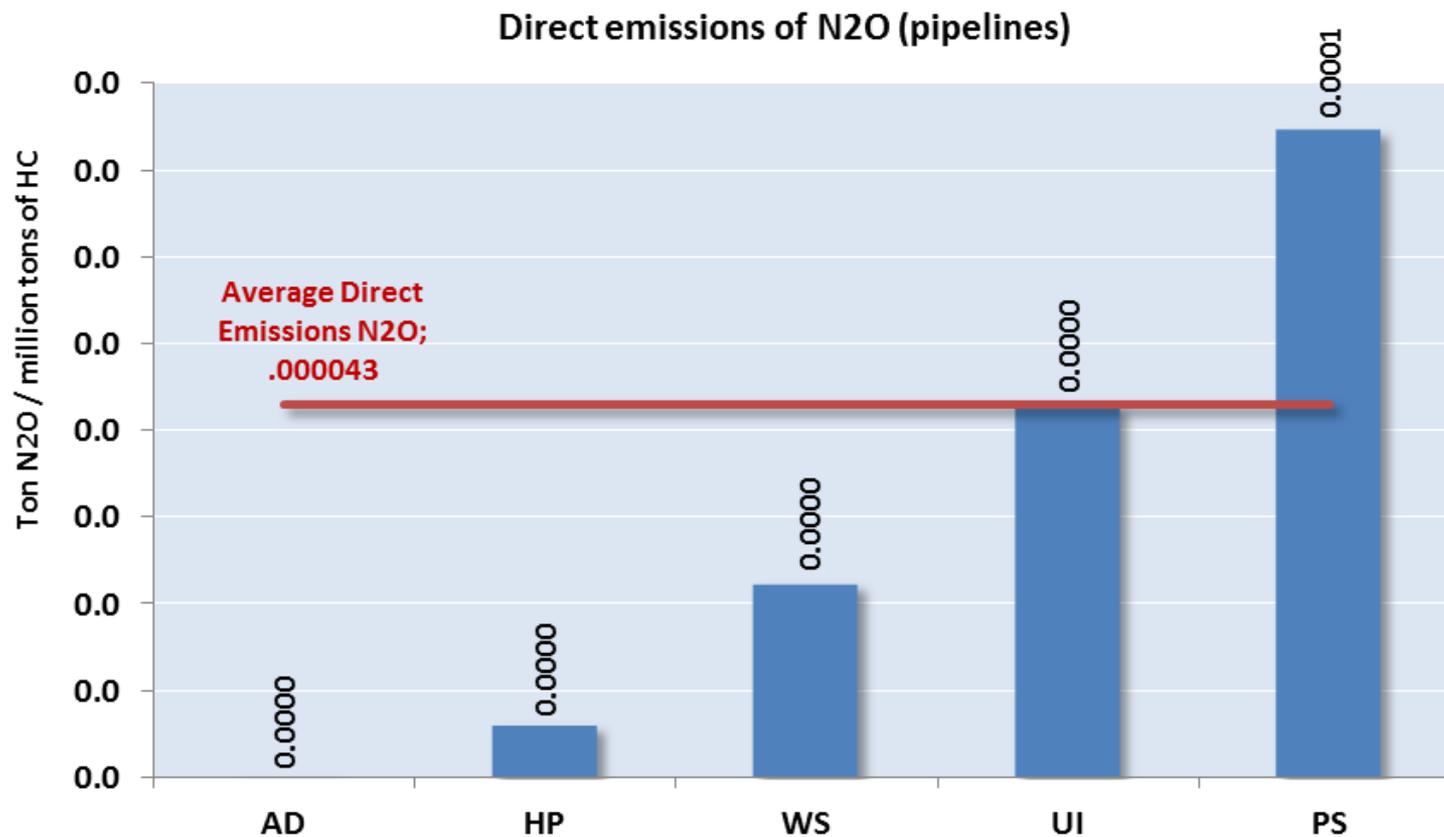
Direct Emissions of CO₂ – Pipelines



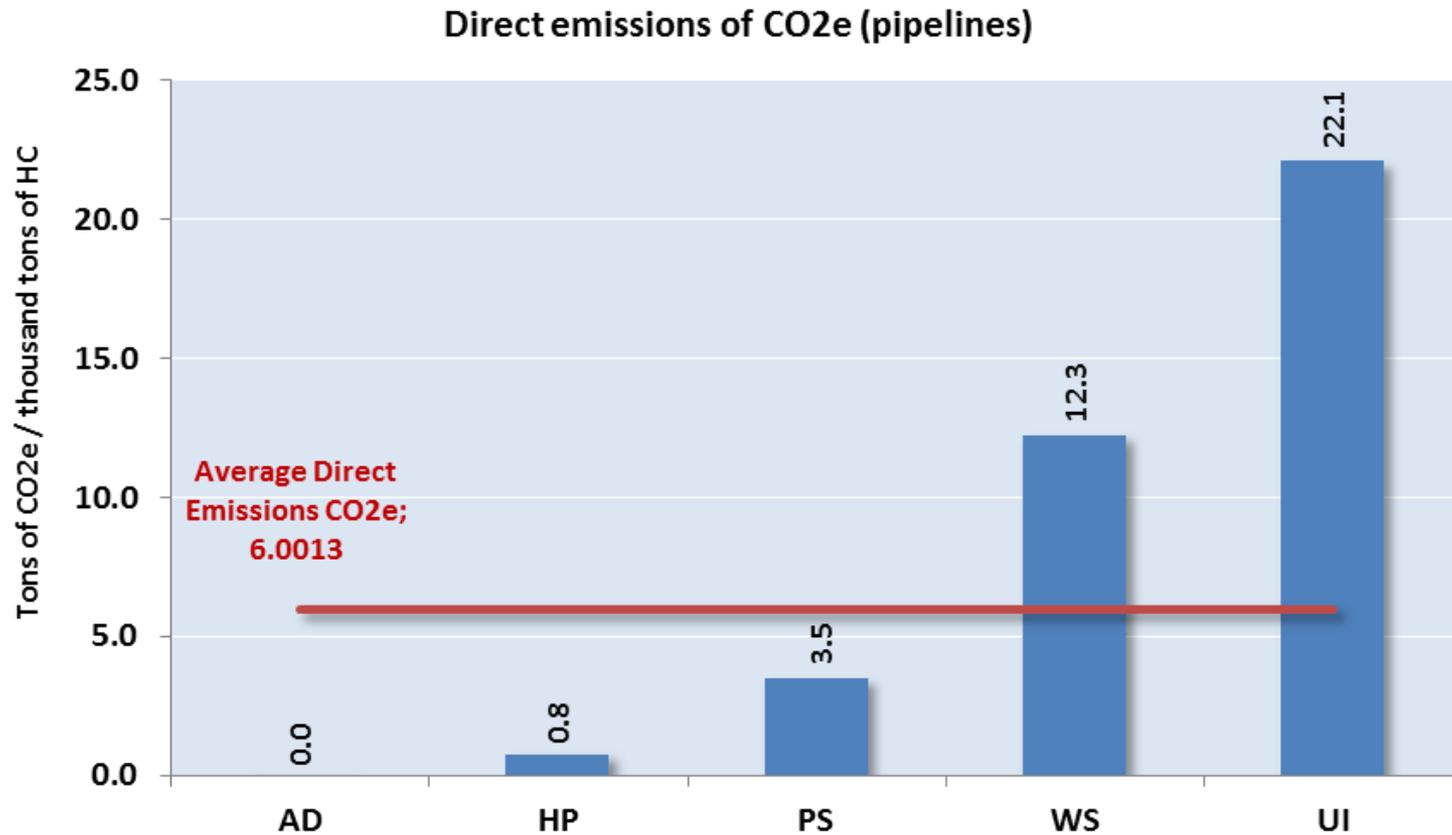
Direct Emissions of CH₄ – Pipelines



Direct Emissions of N₂O – Pipelines

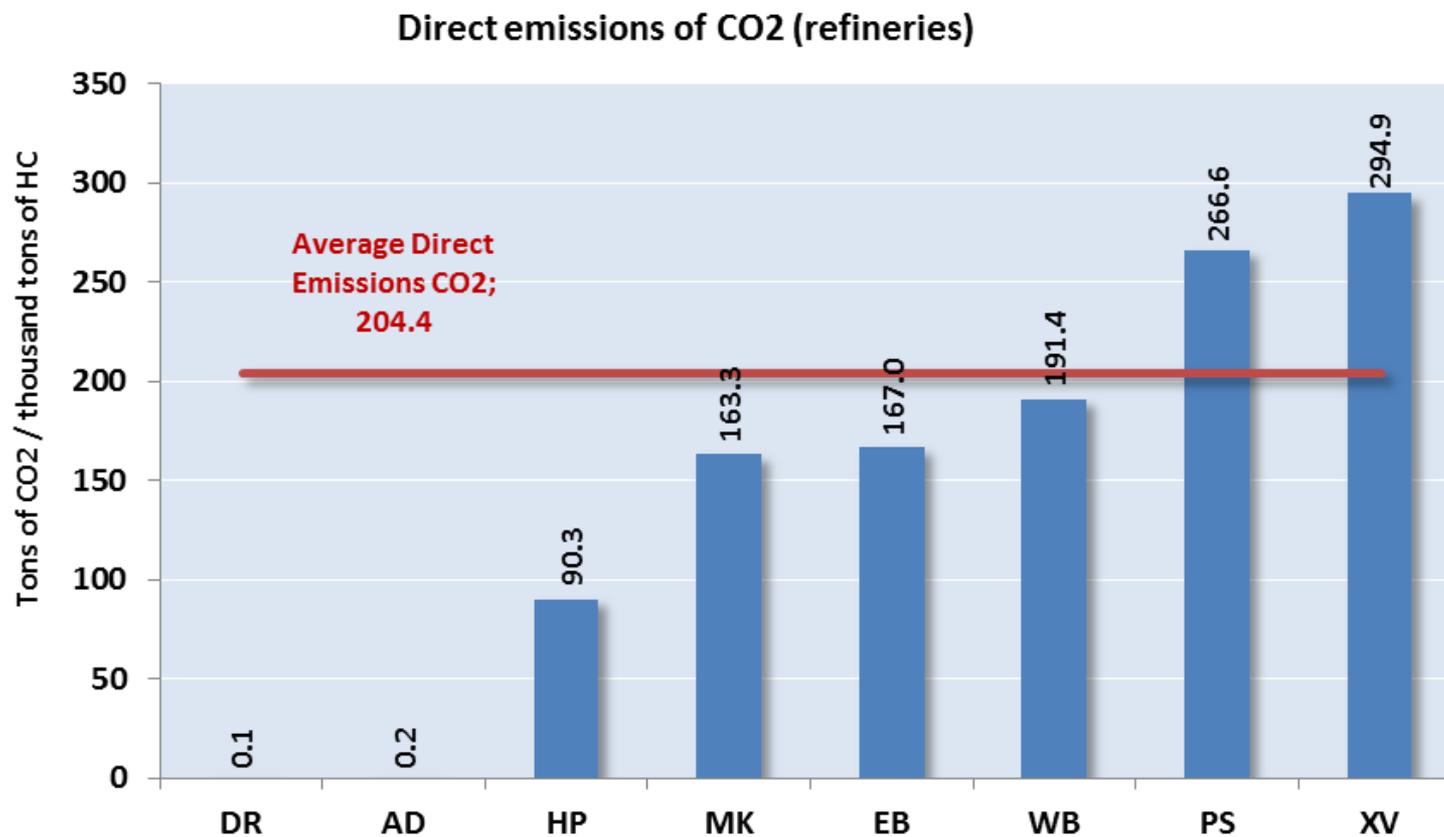


Direct Emissions of equivalent CO₂ – Onshore production

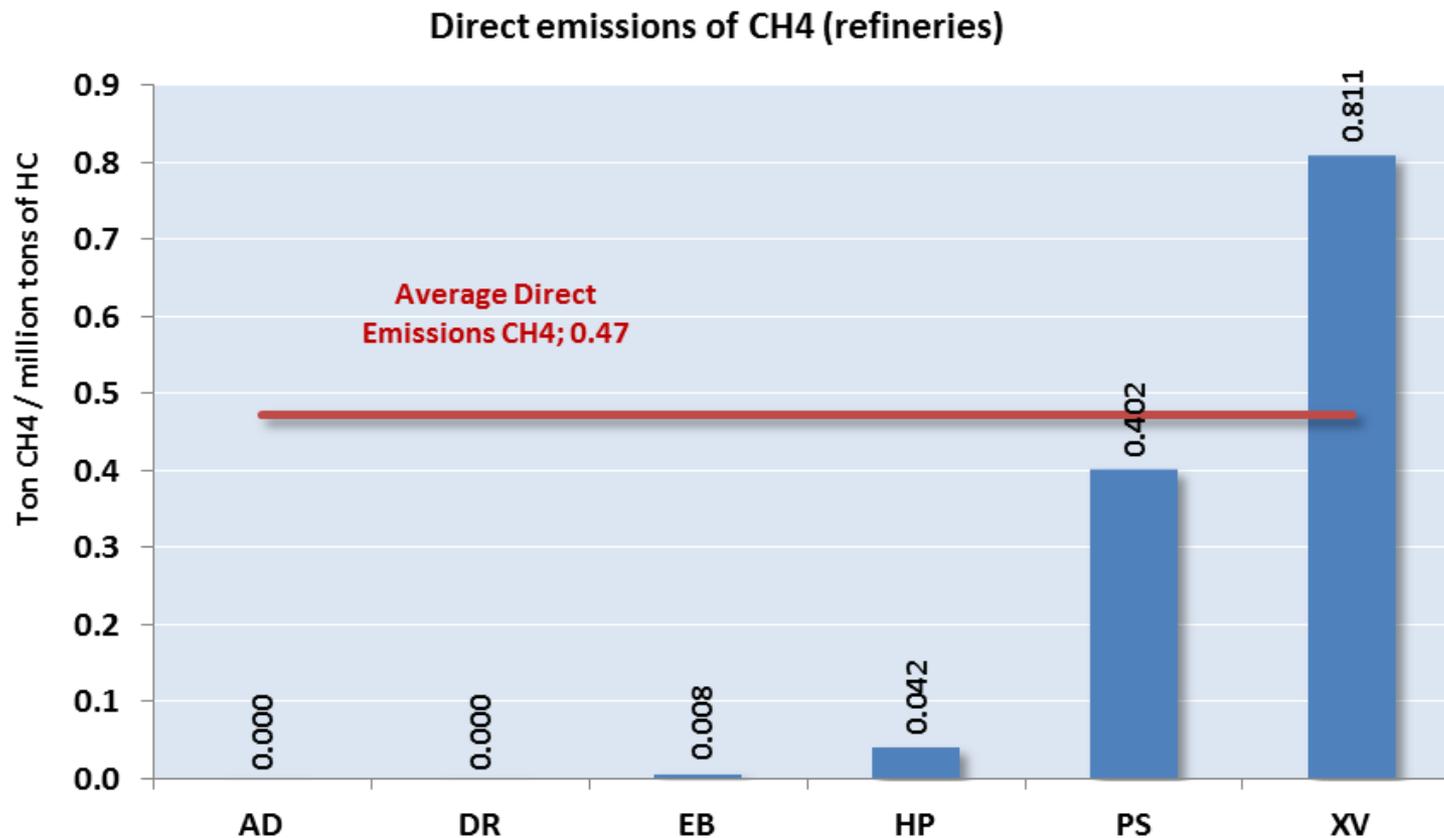


GHG Emissions – Refineries

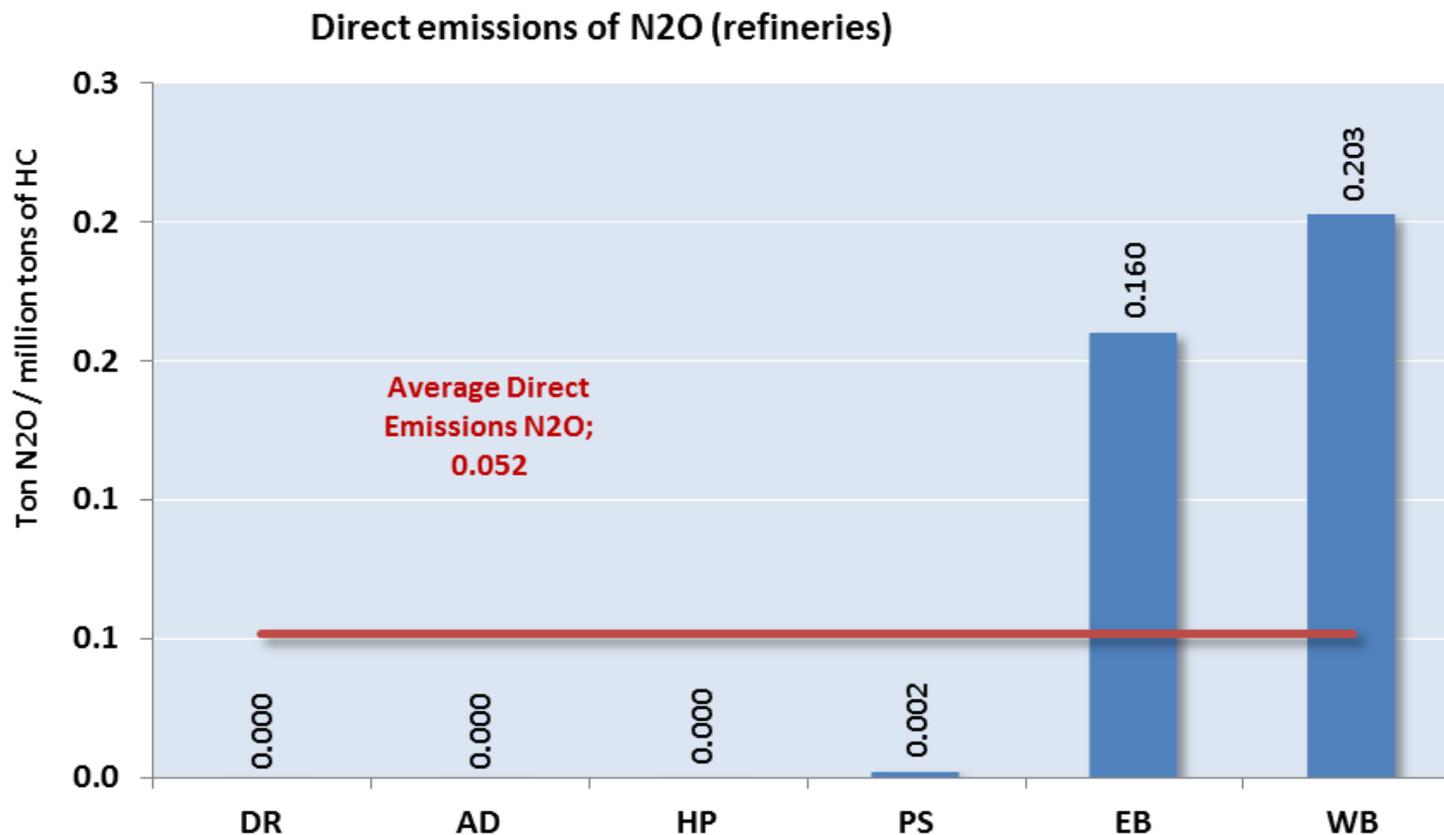
Direct Emissions of CO₂ – Refineries



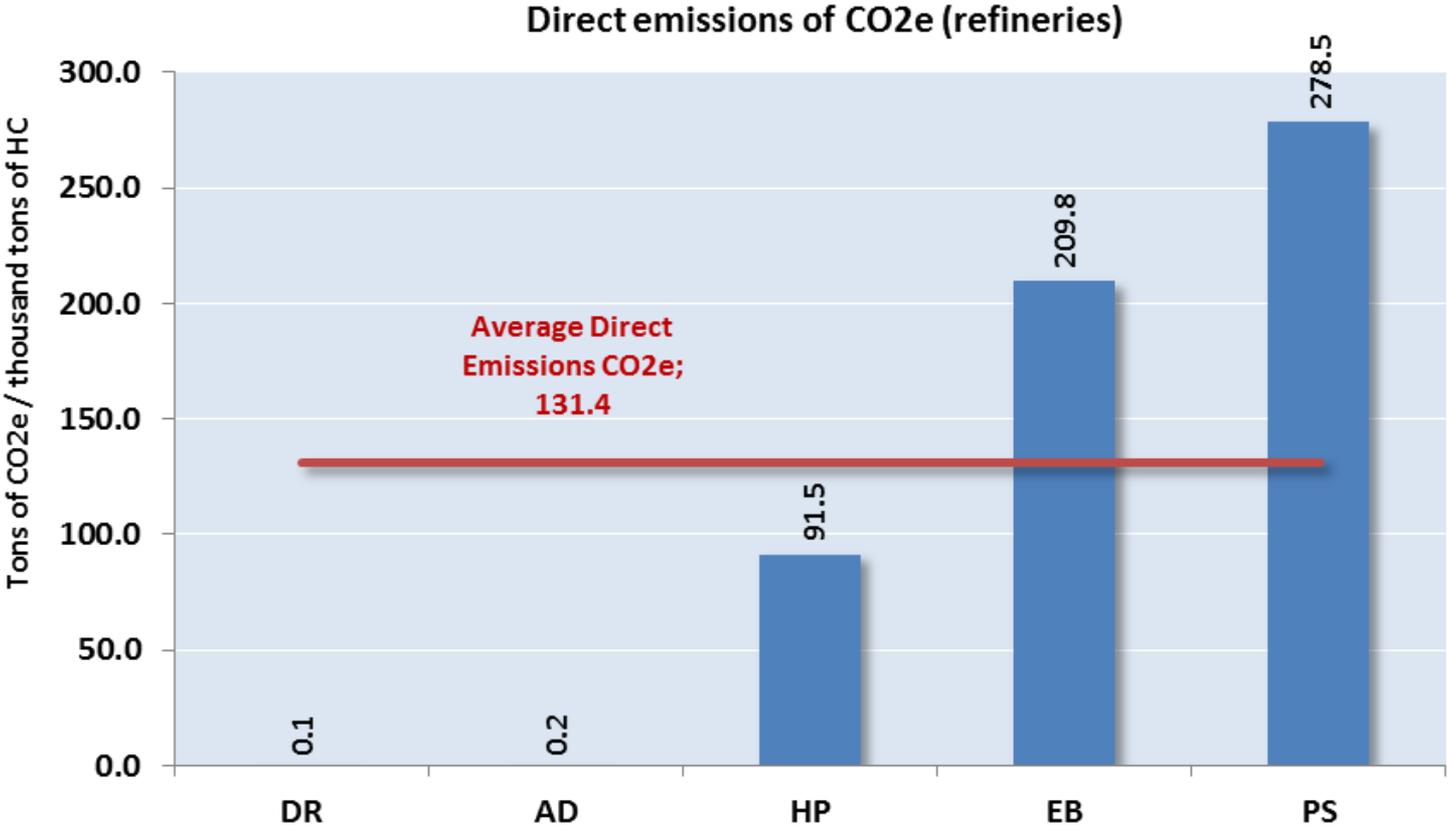
Direct Emissions of CH₄ – Refineries



Direct Emissions of N₂O – Refineries



Direct Emissions of equivalent CO₂ – Refineries



Environmental Performance Benchmarking Report (2016 data)

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