

REEDEREI F. LAEISZ

Environmental Report 2010



ENVIRONMENTAL REPORT

2010



Rostock, 20. July 2011

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## Environmental Report 2010

### INDEX

- 1. GENERAL
  - 1.1 Environmental Management Documents
  - 1.2 External Environmental Audits
  - 1.3 Port State Controls
  - 1.4 Internal Environmental Audits
  - 1.5 Environmental Accidents
  
- 2. ENVIRONMENTAL ASPECTS
  - 2.1 Environmental Aspects - Ship
    - 2.1.1 Comparison to previous years
    - 2.1.2 Details
  - 2.2 Environmental Aspects - Shore
  
- 3. ENVIRONMENTAL OBJECTIVES
  - 3.1 Environmental Objectives closed in the year 2010
  - 3.2 Further too processing Environmental Objectives
  - 3.3 Postponed Environmental Objectives
  - 3.4 Costs for the realization of the Environmental Objectives in 2010
  
- Anhänge
  - Definitions
  - Table 1 : Basic data
  - Table 2a : Specific fuel consumption
  - Figure 1 : Development of specific fuel consumption 2006 - 2010
  - Table 2b : Fuel- and engine dependent gas emissions
  - Figure 2 : Development of CO<sub>2</sub> emissions (total + relative)
  - Table 3 : Oily Waters / Sewage / Ballast water
  - Figure 3 : Sludge
  - Figure 4 : Ballast Water
  - Table 4 : Garbage
  - Figure 5 : Garbage - Quantity and disposal (Category 1 to 6 + specific waste)
  - Table 5 : Writing and copy paper
  - Figure 6 : Consumption of writing and copy paper
  - Table 6 : Cars supplied by the company - Fuel consumption + Emissions

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## Environmental Report 2010

### 1. GENERAL REMARKS

#### 1.1 Environmental Management Documents

- The environmental report 2009 was published together with the environmental policy on the Internet homepage of the shipping company. The environmental report 2009 was sent to all vessels for evaluation by the Master and their crew.
- Assistance in quantifying the environmental aspects was provided by the vessels in accordance with Directive RL NTM 06-01, Annex 2 (RFL Formsmanager - Form No. 06-02). The results form the basis of part 2 - Environmental aspects - of this report.
- The SOPEP Annex 2 was updated by four revisions.
- All vessels were supplied twice with information on maritime environmental protection.
- Revision of the EMS documentation and implementation of EMMA

#### 1.2 External Environmental Audits

In the year under review no NC was identified during 28 external shipboard audits.

#### 1.3 Port State Controls

During port state controls (total 107) only two Non-conformities were determined:

- one violation of MARPOL Annex I regulations (Oil spill equipment) and
- one violation of MARPOL Annex V regulations (Garbage Record Book).

All violations were corrected by crew immediately.

#### 1.4 Internal Environmental Audits

In the year 2010 altogether 44 internal audits were executed. In relation to ISO14001 34 NC's were determined on that occasion. The details are part of the Mangement Review of the shipping company.

#### 1.5 Environmental Accidents

In the year under review occured two small incidents with oil.

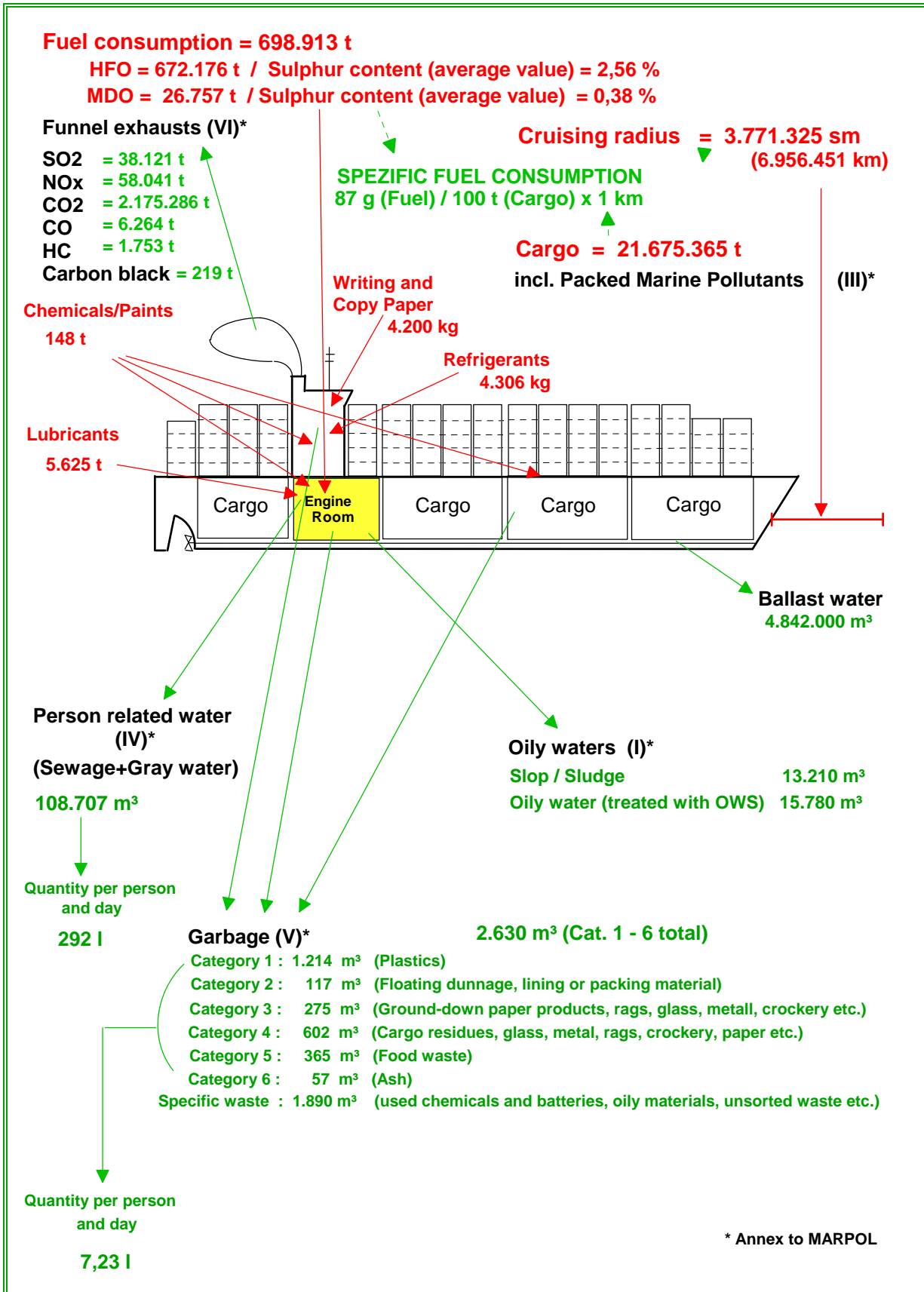
Caused by constructive and technical defects aboard of 19 vessels higher quantities (more than 100 kg) of refrigerants were exhausted into the atmosphere. It's global warming potential is equivalent to approx. 9.150 t Carbon dioxide.

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## Environmental Report 2010

### 2. ENVIRONMENTAL ASPECTS

#### 2.1 Environmental Aspects - Ship



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### 2.1.1 Comparison to previous years

Aspect	2006 (40 vessels)	2007 (44 vessels)	2008 (43 vessels)	2009 (43 vessels)	2010 (47 vessels)
<b>Basic data</b>					
Cruising radius (km)	7.909.988	8.386.849	7.876.568	6.131.730	6.956.451
Cargo (t)	20.629.242	20.912.091	24.344.538	16.747.898	21.675.365
TK * 10 <sup>9</sup> (km * t)	4.137	4.082	4.556	2.889	3.628
<b>Fuel consumption</b>					
HFO (t)	839.594	828.735	767.662	585.403	672.176
MDO (t)	18.345	22.167	22.587	22.688	26.757
Specific fuel consumption (g/100TK)	26,0	22,1	18,8	33,1 <sup>2)</sup>	87,0
Bulk vessels	9,67	11,84	11,65	16,86	13,4
Container vessels	24,47	24,87	21,94	49,22	24,3
Ro/Ro vessels	11,08	15,73	17,26	33,27	150,7
PCTC					658,9
<b>Average sulphur concentration (%)</b>					
HFO	2,80	2,61	2,67	2,52	2,56
MDO	0,76	0,57	0,56	0,46	0,38
<b>Gas emissions (t)</b>					
Sulphur dioxide - SO <sub>2</sub> (t)	56.325	48.821	46.467	33.425	38.121
specific - g/100 TK	1,3	1,2	1,1	1,1	1,1
Nitric oxide - NO <sub>x</sub> (t)	71.608	70.921	65.816	50.512	58.041
specific - g/100 TK	1,73	1,74	1,44	1,74	1,6
Carbon dioxide - CO <sub>2</sub> (t)	2.704.374 <sup>1)</sup>	2.647.636 <sup>1)</sup>	2.459.033 <sup>1)</sup>	1.892.527 <sup>1)</sup>	2.175.286 <sup>1)</sup>
specific - g/100 TK	65	65	54	65	60
Carbon monoxide - CO (t)	7.703	7.636	7.090	5.450	6.264
HC - unburned hydrocarbons (t)	2.156	2.131	1.980	1.525	1.753
Soot (t)	269	266	248	191	219
<b>Waste water containing oil (m<sup>3</sup>)</b>					
Sludge/Slop	13.763	18.191	17.567	13.690	13.248
Discharge on shore	12.559	17.167	16.760	12.902	12.389
amount in %	91,3	94,4	95,4	94,2	93,5
Incineration on board	1.204	1.024	792	786	859
amount in %	8,7	5,6	4,6	5,8	6,5
Discharge via OWS (m <sup>3</sup> )	20.412	22.906	21.136	15.698	15.783

<sup>1)</sup> Calculated according MEPC/Circ.471

<sup>2)</sup> without PCTC

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## Environmental Report 2010

Aspect	2006 (40 vessels)	2007 (44 vessels)	2008 (43 vessels)	2009 (43 vessels)	2010 (47 vessels)
<b>Person related waste waters (m³)</b>					
Sewage (Black water) + Gray water	115.153	118.485	119.653	111.185	108.707
Persons on board (average)	1.080	1.193	1.190	1.010	1.187
Liter per person and day	292	305	315	329	292
<b>Garbage</b>					
Category 1 - 6 (total - m³)	2.451	2.223	2.475	2.300	2.631
Discharge into the sea (m³)	626	580	561	670	788
Discharge on shore (m³)	1.825	1.643	1.914	1.630	1.843
Specific waste (kg) - (only shore disposal)	977	2.324	2.345	2.241	1.891
<b>Other environmental aspects</b>					
Waste disposal costs (€)	140.000	165.000 <sup>3)</sup>	250.000 <sup>3)</sup>	320.000 <sup>3)</sup>	381.000 <sup>6)</sup>
Ballast water (m³)	7.216.550	5.532.151	6.729.586	4.550.497	4.841.937
Lubricants (t)	8.158	8.257	6.585	4.593	5.786
Quantity per vessel (kg)	204	187,7	153,1	106,8	123
Chemicals/Paints (t)	268,4 <sup>4)</sup>	168,1	194	156	148
Quantity per vessel (kg)	4.347 <sup>5)</sup>	3.820,5	4.512	3.632	3.146
Paper consumption (kg)	5.645	7.340	4.120	4.121	4.860
Quantity per vessel (kg)	141,1	166,8	96	96	101
<b>Refrigerants (kg)</b>					
R22	3.147	2.669	2.266	1.709	1.190
Substitutes (R134A, R404A, ...)	2.614	2.875	2.662	2.077	3.117

<sup>3)</sup> Last revision 01.05.2011

<sup>4)</sup> thereof 94,5 t paint + thinner from MV Chrismir

<sup>5)</sup> without paint + thinner from MV Chrismir

<sup>6)</sup> Last revision 01.07.2011

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### 2.1.2 Details

The vessel-specific detail statements as well as the values resultant from it for the total fleet are in the tables situated in the appendices:

Table 1	:	Basic Data
Table 2a	:	Specific fuel consumption
Table 2b	:	Fuel- and engine dependent gas emissions
Table 3	:	Water - Oily waters / Sewage / Ballast water
Table 4	:	Garbage
Table 5	:	Writing and Copy Paper

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### 2.2 Environmental Aspects - Shore

Aspect	2006	2007	2008	2009	2010
<b>Cars supplied by the company</b>					
Mileage (km)	584.000	428.500	576.830	578.600	578.700
<b>Fuel consumption</b>					
Petrol (l)	36.644,97	24.087,67	31.526,86	33.860	39.933
Diesel (l)	15.216,56	13.131,07	18.307,92	16.801	19.510
Consumption on 100 km (l)	10 / 7 <sup>1)</sup>				
Emissions	See Annex Tab. 6				
<b>Garbage</b>					
Garbage collection and segregation in the offices	yes	yes	yes	yes	yes
Collection of used batteries	yes	yes	30 kg	30 kg	30 kg
Collection and disposal electronic scrap	regulated through contract for services				
<b>Paper</b>					
Paper consumption (kg)	4.096	3.318	3.410	3.146	3.145
Waste paper collection	yes	yes	yes	yes	yes
<b>Refrigerant</b>					
Air conditioner	regulated through contract for services				

1) - average consumption petrol / average consumption diesel

Further details to the essential environmental aspects in the shore area of the shipping company are in the tables situated in the appendix:

Table 5 : Writing and copy paper

Table 6 : Cars supplied by the company - Fuel consumption + Emissions

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### 3. ENVIRONMENTAL OBJECTIVES

#### 3.1 Environmental Objectives closed in the year 2010 (Examples)

No. (acc. EMMA, Chapter 1, Annex 3)	Environmental Objective	Remarks
02	Retrofitting of 16 vessels with KITTIWAKE Linerscan	Realization of a significant saving of lubrication oils
05	Revision of the EMS documentation and implementation of EMMA	Finished end of June
07	Replacing of R22 refrigerant in the air condition system of MV PARADISE N	Finished end of the year
10	Introduction of new central multifunctional office equipment (printer, scanner, copier)	
14	Replacing of R22 refrigerant in the remaining air condition system of MV POLARSTERN	
15	Replacing of R22 refrigerant in the provision cooling plants an other small cooling devices aboard of MV METEOR	

#### 3.2 Further too processing Environmental objectives

No. (in acc. EMMA, Chapter 1, Annex 3)	Environmental Objective	Remarks
01	Optimization of the number and quantity of hazardous working materials used on board	Reduction was realized, however it remains a continuous task.
04	Periodical publication of an internal environmental information	Continuous task
06	Waste recycling in the company office	Continuous task
09	Voluntary work according IMO Guideline for Carbon Dioxide indexing acc. MEPC.Circ.471	Continuous task
11	ELO - Introduction and practical application	A significant saving of paper was realized., but furthermore it will be a continuous task.

#### 3.3 Postponed Environmental Objectives

No. (in acc. EMMA, Chapter1, Annex 3)	Environmental Objective	Remarks
	None	

#### 3.4 Costs for the realisation of the Environmental Objectives in 2010 (Selection)

The most cost-intensive positions were:

- 250.000 € for the replacing of R22 refrigerant in the remaining air condition system of MV POLARSTERN
- 600.000 € for thereplacing of R22 refrigerant in the provision cooling plants an other small cooling devices aboard of MV METEOR
- 540.000 € for the retrofitting of 16 vessels with KITTIWAKE Linerscan

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APPENDICES

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### Appendix : Definitions / Abbreviations

GLC	Germanischer Lloyd Certification GmbH	
NC	Non-Conformity	
HFO	Heavy Fuel Oil	
MDO	Marine Diesel Oil	
SO <sub>2</sub>	Sulphur dioxide; Formed through the oxidation in the fuel contained sulphur	
NO <sub>x</sub>	Nitric oxides	
CO <sub>2</sub>	Carbon dioxide	
CO	Carbon monoxide; Cause is the incomplete combustion of the fuel	
HC	Unburned hydrocarbons; Cause is the incomplete combustion of the fuel	
TBT	Tri- Butyl-Tin - Biozid in the underwater Antifouling-Paints for ships	
Sewage („Black water“)	Sewage from the toilet installations and the medicated treatment room	
Gray water	Sewage from galley, laundry, showers, wash-basins etc.	
Specific Fuel Consumption	Statement which amount of fuel to the transportation of a certain freight quantity over a certain distance is required	
TK	Ton-Kilometer = Size of the transportation performance (Cargo weight times distance)	
nm	nautical miles; 1 nm = 1,852 km	
OWS	Oily Water Separator	
ppm	parts per million - Concentration statment without dimension	
Passengers	Each person, who doesn't belong the crew	
MARPOL	International Convention for the Prevention of Pollution from Ships	
Garbage	Cat. 1	Plastics
	Cat. 2	Floating dunnage, lining and packing materials
	Cat. 3	Ground paper products, rags, glass, metal, bottles, crockery etc.
	Cat. 4	Cargo residues,paper products, rags, glass, metal, bottles, crockery etc.
	Cat. 5	Food waste
	Cat. 6	Incinerator ash
	other	Specific waste (used batteries and chemicals, solvent and paint residues, oil filters, empty oil drums etc.)

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**Environmental Aspects - Year : 2010**

**Table 1 : Basic data**

Vessels	Cruising radius (sm)	Transported cargo (t)	Crew incl. Passengers average on board
<b>Bulker+Tanker</b>			
BW Havlys	44.974	457.940	20
BW Hesiod	91.132	291.618	22
BW Herdis	91.306	262.380	22
Pasadena	79.752	1.333.718	26
Patagonia	75.331	606.068	23
Peene Ore	74.801	2.056.058	32
Pequot	77.957	307.880	26
Piro	71.752	681.334	20
Powhatan	76.240	692.426	24
Premnitz	85.732	339.731	21
<b>Container vessels</b>			
Pembroke	84.236	325.725	20
Perla	16.046	54.642	19
Pontremoli	60.197	324.922	21
Philadelphia	137.438	598.177	21
Phoenix	133.046	577.038	21
Praha	145.227	660.351	21
Pretoria	147.713	623.810	21
Potsdam	87.732	418.852	22
Pommern	81.244	339.787	22
Pona	98.215	545.842	20
Porto	103.578	299.735	21
Posen	113.862	837.913	21
Priwall	46.087	489.901	20
Pontresina	103.319	437.406	21
Port Said	54.286	393.497	19
Palermo	87.548	640.433	23
Paradip	86.453	587.555	24
Peking	90.673	376.075	23
Penang	82.305	322.734	19
Pohang	99.776	666.596	22
Portland	81.382	377.362	23
Portugal	100.442	712.078	22
Pudong	93.535	768.811	25
Pugwash	104.833	692.844	22
Punjab	102.549	759.672	21
Pusan	98.939	1.142.547	22
Cove Island	39.018	90.485	20
Shippan Island	21.689	145.770	18
<b>Ro/Pax vessels</b>			
Transeuropa	83.254	535.326	45
Translubeca	79.036	221.725	38
Transrussia	38.376	125.948	37
<b>PCTC</b>			
Paganella	114.051	31.611	20
Paganino	160.918	32.376	20
Paglia	21.347	4.884	24
Pagna	10.961	4.578	27
<b>Research vessels</b>			
Polarstern	51.319	0	82
Meteor	43.301	0	64
<b>Total values</b>	<b>3.872.908</b>	<b>22.196.161</b>	<b>1.187</b>

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**Environmental Aspects - Year : 2010**

**Table 2a: Specific fuel consumption**

Vessels	Cruising radius		Transported cargoes		Fuel consumption	
	Nautical miles (nm)	Kilometer (km)	Tons (t)	Tons per kilometer (TK = t * km)	Total (t)	Specific per vessel (g /TK)
<b>Bulker + Tanker (total)</b>	<b>768.977</b>	<b>1.424.145</b>	<b>7.029.153</b>	<b>984.801.756.002</b>	<b>105.792</b>	<b>0,1338</b>
BW Havlys	44.974	83.292	457.940	38.142.702.190	3.975	0,1042
BW Hesiod	91.132	168.776	291.618	49.218.216.060	9.559	0,1942
BW Herdis	91.306	169.099	262.380	44.368.120.055	9.766	0,2201
Pasadena	79.752	147.701	1.333.718	196.991.087.537	14.879	0,0755
Patagonia	75.331	139.513	606.068	84.554.365.181	14.802	0,1751
Peene Ore	74.801	138.531	2.056.058	284.828.700.136	21.176	0,0743
Pequot	77.957	144.376	307.880	44.450.568.961	7.350	0,1653
Piro	71.752	132.885	681.334	90.538.866.915	7.796	0,0861
Powhatan	76.240	141.196	692.426	97.768.113.860	7.575	0,0775
Premnitz	85.732	158.776	339.731	53.941.015.106	8.916	0,1653
<b>Container vessels (total)</b>	<b>2.501.368</b>	<b>4.632.534</b>	<b>14.210.560</b>	<b>2.605.584.414.332</b>	<b>521.761</b>	<b>0,2429</b>
Pembroke	84.236	156.005	325.725	50.814.752.077	11.424	0,2248
Perla	16.046	29.717	54.642	1.623.806.805	664	0,4092
Pontremoli	60.197	111.485	324.922	36.223.878.482	11.033	0,3046
Philadelphia	137.438	254.535	598.177	152.257.087.974	36.354	0,2388
Phoenix	133.046	246.401	577.038	142.182.851.029	32.714	0,2301
Praha	145.227	268.960	660.351	177.608.379.326	37.440	0,2108
Pretoria	147.713	273.564	623.810	170.652.255.774	38.901	0,2280
Potsdam	87.732	162.480	418.852	68.054.932.226	16.047	0,2358
Pommern	81.244	150.464	339.787	51.125.673.112	18.887	0,3694
Pona	98.215	181.894	545.842	99.285.483.000	10.343	0,1042
Porto	103.578	191.826	299.735	57.497.102.789	15.536	0,2702
Posen	113.862	210.872	837.913	176.692.745.411	16.044	0,0908
Prwall	46.087	85.353	489.901	41.814.580.801	6.905	0,1651
Pontresina	103.319	191.347	437.406	83.696.233.152	19.945	0,2383
Port Said	54.286	100.538	393.497	39.561.272.319	5.970	0,1509
Palermo	87.548	162.139	640.433	103.839.099.582	13.055	0,1257
Paradip	86.453	160.111	587.555	94.073.992.753	12.792	0,1360
Peking	90.673	167.926	376.075	63.152.919.376	26.090	0,4131
Penang	82.305	152.429	322.734	49.193.975.703	21.695	0,4410
Pohang	99.776	184.785	666.596	123.177.043.183	22.221	0,1804
Portland	81.382	150.719	377.362	56.875.798.374	20.501	0,3605
Portugal	100.442	186.019	712.078	132.459.741.258	22.206	0,1676
Pudong	93.535	173.227	768.811	133.178.684.711	27.582	0,2071
Pugwash	104.833	194.151	692.844	134.516.158.676	23.653	0,1758
Punjab	102.549	189.921	759.672	144.277.474.475	23.789	0,1649
Pusan	98.939	183.235	1.142.547	209.354.631.536	24.649	0,1177
Cove Island	39.018	72.261	90.485	6.538.566.988	3.774	0,5772
Shippan Island	21.689	40.168	145.770	5.855.293.442	1.547	0,2642
<b>Ro/Pax vessels (total)</b>	<b>99.083</b>	<b>183.502</b>	<b>362.203</b>	<b>21.345.281.019</b>	<b>29.980</b>	<b>1,5073</b>
Transeuropa	39.018	72.261	90.485	6.538.566.988	13.749	2,1028
Translubeca	21.689	40.168	145.770	5.855.293.442	10.257	1,7517
Transrussia	38.376	71.072	125.948	8.951.420.590	5.974	0,6674
<b>PCTC (total)</b>	<b>307.277</b>	<b>569.076</b>	<b>73.449</b>	<b>16.611.580.101</b>	<b>27.972</b>	<b>6,5886</b>
Paganella	114.051	211.222	31.611	6.677.016.297	11.335	1,6976
Paganino	160.918	298.020	32.376	9.648.544.246	13.320	1,3806
Paglia	21.347	39.535	4.884	193.087.201	2.223	11,5119
Pagna	10.961	20.300	4.578	92.932.356	1.093	11,7645
<b>Research vessels</b>						
Polarstern 1) 2)	51.319	83.957	0	0	9.464	n.a.
Meteor 1) 2)	43.301	63.237	0	0	2.441	n.a.
<b>Total values</b>	<b>3.771.325</b>	<b>6.956.451</b>	<b>21.675.365</b>	<b>3.628.343.031.454</b>	<b>697.410</b>	<b>0,87</b>

Legend:

1) - only MDO

2) - no cargo transported, therefor reference value for specific consumption = Fuel per driven route unit (kg/km)

3) - without research vessels      3.676.704,69      **6.809.257**      **21.675.365**      3.628.343.031.454      **685.505**

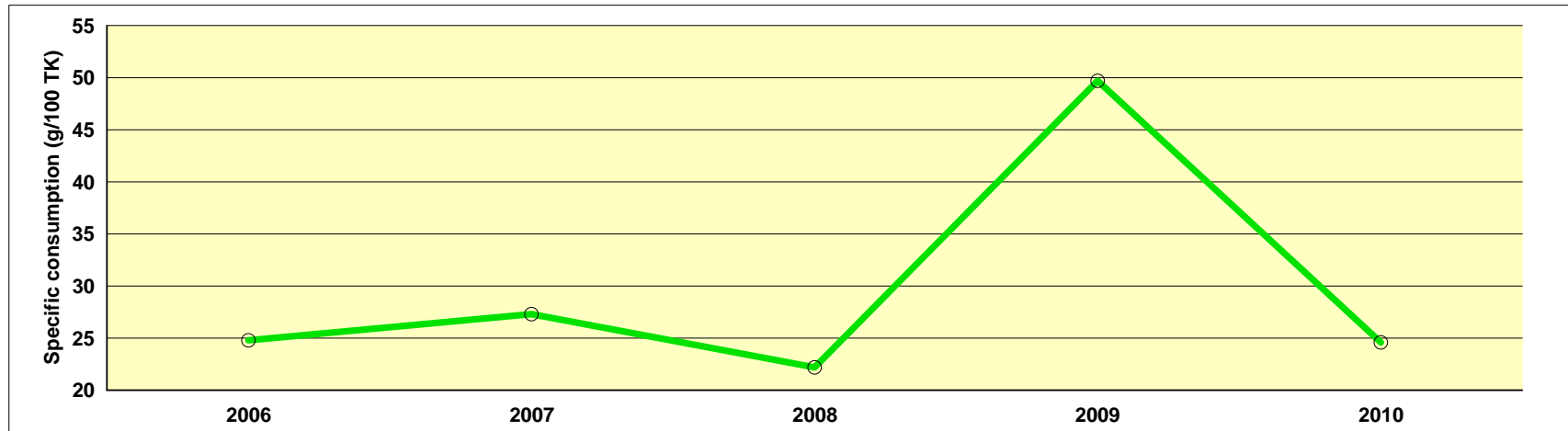
3)

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Environmental Aspects - Year : 2010

Figure 1 : Development of the specific fuel consumption 2006 - 2010

Year	Specific consumption (g/100TK) (1)
2006	24,8
2007	27,3
2008	22,2
2009	49,7
2010	24,6

(1) - Container + Bulk vessels only



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**Environmental Aspects - Year : 2010**

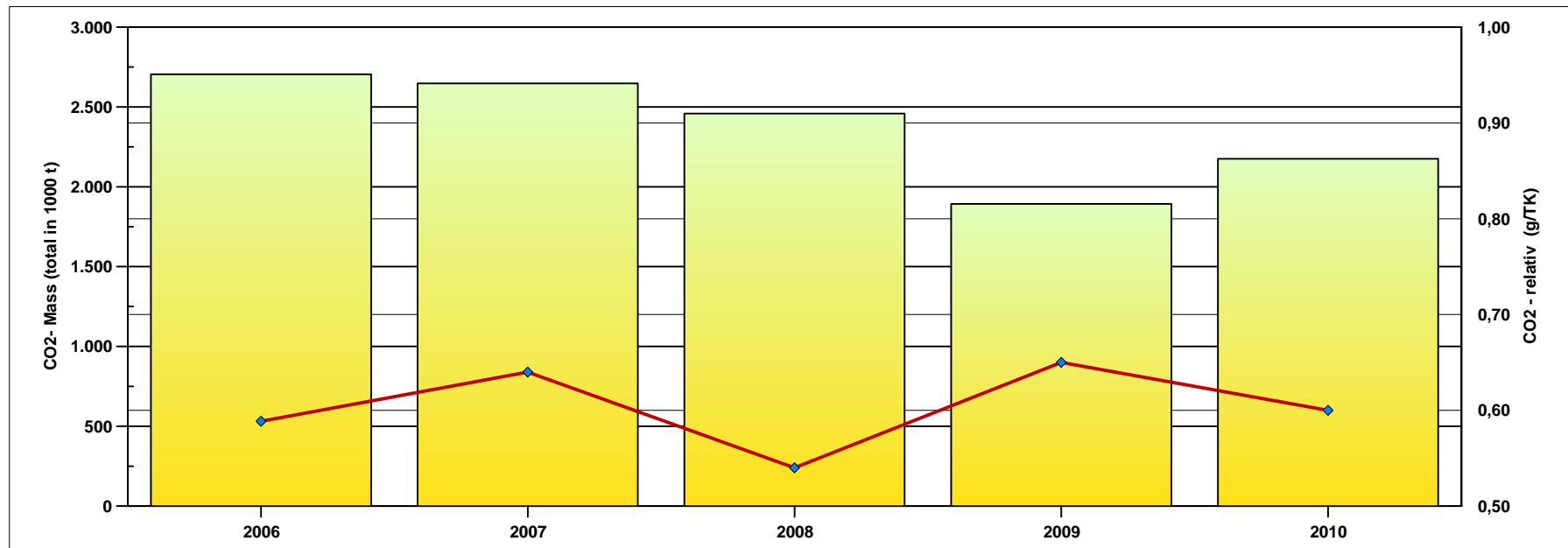
**Table 2b: Fuel and engine dependent gas emissions**

Vessels	Fuel consumption					Gas emission - kind and quantity (t)					
	Total (in t)	HFO (in t)	Sulphur content (in %)	MDO (in t)	Sulphur content (in %)	SO2	NOx	CO2	CO	HC	Soot
<b>Bulker + Tanker</b>											
BW Havlys	3.974,90	3.196,20	1,00	778,70	0,10	68,76	314,42	12.408,66	35,00	10,09	1,26
BW Hesiod	9.558,60	9.331,00	2,19	227,60	0,10	429,61	797,23	29.740,90	85,80	23,94	2,99
BW Herdis	9.766,00	9.618,00	2,60	148,00	0,10	525,45	816,64	30.381,14	87,75	24,44	3,06
Pasadena	14.878,60	14.813,60	2,28	65,00	0,10	709,41	1.248,18	46.276,35	133,84	37,21	4,65
Patagonia	14.801,50	14.784,70	2,70	16,80	0,36	838,42	1.242,91	46.033,67	133,20	37,01	4,63
Peene Ore	21.175,70	20.896,30	2,18	279,40	0,08	957,10	1.771,77	65.873,19	190,30	53,00	6,62
Pequot	7.349,70	7.324,20	3,10	25,50	0,88	477,28	616,74	22.859,10	66,12	18,38	2,30
Piro	7.795,70	7.772,80	2,93	22,90	1,00	478,74	654,27	24.246,00	70,14	19,49	2,44
Powhatan	7.575,30	7.433,60	2,60	141,70	0,28	406,71	632,78	23.567,69	68,04	18,97	2,37
Premnitz	8.915,90	8.901,50	2,76	14,40	0,80	516,17	748,58	27.729,31	80,23	22,29	2,79
<b>Container vessels</b>											
Pembroke	11.423,70	10.449,60	2,30	974,10	0,33	511,47	935,24	35.586,15	101,84	28,75	3,59
Perla	664,40	625,40	2,60	39,00	0,40	34,47	54,83	2.068,62	5,94	1,67	0,21
Pontremoli	11.032,50	10.979,00	2,50	53,50	0,10	576,51	925,39	34.314,29	99,24	27,59	3,45
Philadelphia	36.354,00	35.543,50	3,17	810,50	0,33	2.371,75	3.033,47	113.109,57	326,38	91,05	11,38
Phoenix	32.713,80	32.316,70	2,82	397,10	0,59	1.918,72	2.738,03	101.763,74	294,03	81,86	10,23
Praha	37.440,20	36.817,90	2,80	622,30	0,54	2.171,95	3.129,42	116.476,36	336,34	93,72	11,72
Pretoria	38.901,00	38.343,00	3,40	558,00	0,80	2.747,06	3.253,73	121.015,59	349,55	97,36	12,17
Potsdam	16.047,00	15.970,30	2,60	77,00	0,20	872,30	1.346,05	49.911,72	144,35	40,13	5,02
Pommern	18.886,72	18.832,72	2,79	54,00	0,47	1.103,94	1.585,13	58.740,94	169,93	47,23	5,90
Pona	10.343,00	12.066,30	2,76	312,70	0,04	699,63	1.032,02	38.517,45	111,10	31,01	3,88
Porto	15.536,20	15.293,20	2,30	243,00	0,09	739,12	1.298,97	48.332,16	139,58	38,89	4,86
Posen	16.044,00	16.033,00	2,60	11,00	1,89	875,84	1.347,42	49.897,50	144,39	40,11	5,01
Priwall	6.904,60	6.369,70	1,34	534,90	0,10	180,37	566,61	21.505,40	61,61	17,37	2,17
Pontresina	19.945,00	19.942,00	2,64	3,00	0,57	1.105,62	1.675,31	62.029,13	179,50	49,86	6,23
Port Said	5.970,00	5.363,00	2,96	607,00	0,07	334,26	486,31	18.603,12	53,12	15,05	1,88
Palermo	13.055,10	13.004,20	2,63	50,90	1,00	719,29	1.095,36	40.604,42	117,45	32,65	4,08
Paradip	12.792,10	12.710,60	2,78	81,50	0,24	742,46	1.072,50	39.788,32	115,05	32,00	4,00
Peking	26.090,00	25.640,00	3,45	450,00	0,20	1.859,51	2.180,31	81.166,90	234,36	65,32	8,16
Penang	21.695,00	21.404,00	2,80	291,00	0,45	1.261,31	1.815,11	67.488,91	194,96	54,30	6,79
Pohang	22.221,10	21.971,30	2,61	249,80	0,10	1.204,77	1.860,33	69.122,61	199,74	55,60	6,95
Portland	20.501,10	20.494,90	3,41	6,20	0,45	1.467,70	1.721,94	63.758,79	184,50	51,25	6,41
Portugal	22.206,00	21.831,00	2,52	375,00	0,12	1.156,24	1.855,93	69.083,16	199,48	55,59	6,95
Pudong	27.582,00	22.284,20	2,32	435,70	0,10	1.086,60	1.897,58	70.685,03	204,04	56,89	7,11
Pugwash	23.653,00	23.347,00	2,55	306,00	0,10	1.250,87	1.979,20	73.579,19	212,57	59,19	7,40
Punjab	23.789,00	27.786,00	2,73	342,00	0,10	1.593,69	2.354,20	87.498,60	252,81	70,39	8,80
Pusan	24.649,20	24.395,20	2,81	254,00	0,03	1.439,72	2.064,18	76.674,25	221,59	61,67	7,71
Cove Island	3.774,00	3.500,00	2,90	274,00	0,10	213,73	310,17	11.753,58	33,69	9,49	1,19
Shippan Island	1.547,20	1.350,00	3,20	197,20	0,09	91,09	125,03	4.823,62	13,73	3,91	0,49
<b>Ro/Pax vessels</b>											
Transeuropa	13.749,10	11.869,10	1,14	1.880,00	0,07	286,91	1.107,92	42.872,50	121,86	34,75	4,34
Translubeca	10.257,00	8.235,00	0,98	2.022,00	0,07	172,45	811,04	32.020,59	90,29	26,05	3,26
Transrussia	5.974,00	5.498,00	0,90	476,00	0,09	104,81	489,92	18.607,70	53,29	15,03	1,88
<b>PCTC</b>											
Paganella	11.335,19	11.332,69	2,84	12,50	0,29	675,96	952,68	35.284,29	102,09	28,37	3,55
Paganino	13.320,40	13.209,30	2,93	111,10	0,20	813,23	1.116,14	41.433,11	119,77	33,32	4,17
Paglia	2.222,80	2.214,80	3,03	8,00	1,50	141,18	186,52	6.913,39	20,00	5,56	0,69
Pagna	1.093,30	1.081,30	2,68	12,00	1,50	61,23	91,54	3.400,88	9,83	2,74	0,34
<b>Research vessels</b>											
Polarstern	9.463,90	0	0	9.463,90	0,59	117,26	558,37	30.000,56	75,71	25,55	3,19
Meteor	2.441,00	0	0	2.441,00	0,20	10,25	144,02	7.737,97	19,53	6,59	0,82
<b>Total values</b>	<b>697.409,51</b>	<b>672.175,81</b>	<b>2,558</b>	<b>26.756,90</b>	<b>0,381</b>	<b>38.120,91</b>	<b>58.041,43</b>	<b>2.175.286,14</b>	<b>6.263,64</b>	<b>1.752,68</b>	<b>219,09</b>

**REEDEREI F. LAEISZ**  
 Environmental Aspects -Year : 2010

**Figure 2 : Development of CO2-Emissions 2006 - 2010 (total + relativ)**

Year	CO2 - total (t)	CO2 - relativ (g/TK)	Tons per kilometer (TK*10 <sup>9</sup> )
2006	2.704.374	0,59	4137
2007	2.647.636	0,64	4083
2008	2.459.033	0,54	4556
2009	1.892.527	0,65	2889
2010	2.175.286	0,60	3628



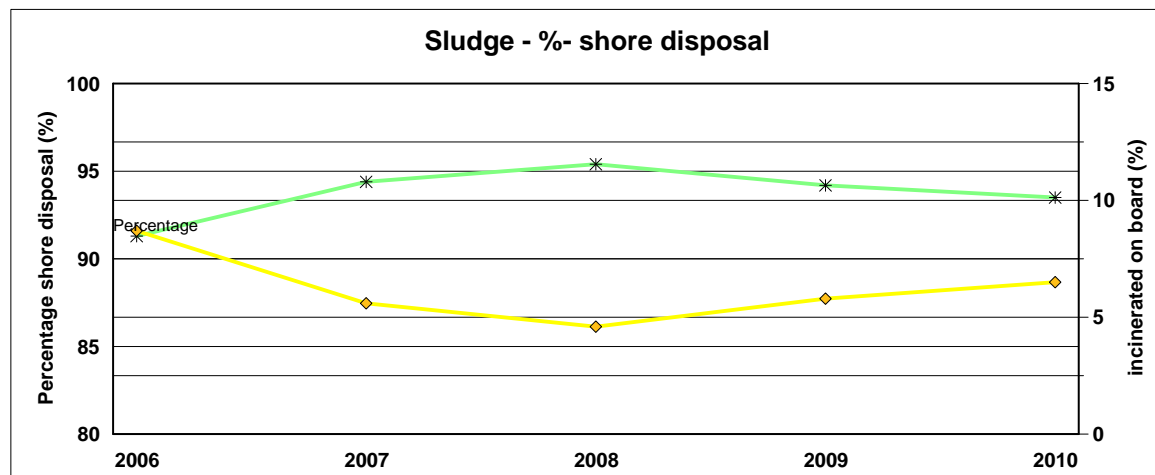
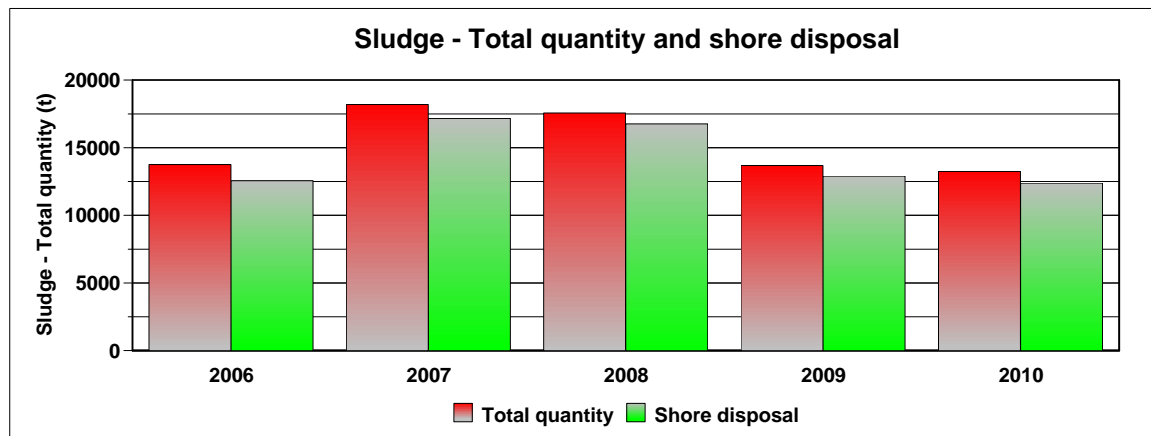
**REEDEREI F. LAEISZ**  
**Environmental Aspects - Year : 2010**

**Table 3 : Oily water / Sewage / Ballast water**

Vessels	Ölhaltiges Abwasser					Crew		Person related sewage (m³)			Ballast water (m³)
	Sludge/ Slop (m³)	%-Fuel content	incinerated (m³)	Disposal-Shore (m³)	Disposal OWS (m³)	incl. Passengers	Sewage (Black water)	Gray water	Sum Sewage + Gray Water	Litre per person and day (l)	
<b>Bulker + Tanker</b>											
BW Havlys	803,2	8,30	0	330,0	473,2	20	300	2.620	2.920	400,00	286.572
BW Hesiod	491,0	1,64	146,7	10,0	334,3	22	150	2.000	2.150	267,75	154.815
BW Herdis	561,3	1,23	103,7	16,5	441,1	22	140	1.800	1.940	241,59	206.330
Pasadena	405,7	0,92	47	90,0	268,7	26	227	2.676	2.903	305,90	636.253
Patagonia	448,2	1,00	148,2	0,0	300,0	23	1.165	2.850	4.015	478,26	340.000
Peene Ore	1295,0	1,87	20,23	376,0	898,8	32	150	2.900	3.050	261,13	1.226.052
Pequot	183,4	1,39	102,4	0,0	81,0	26	550	2.800	3.350	353,00	83.477
Piro	309,4	1,07	74,1	9,0	226,3	20	280	2.500	2.780	380,82	166.614
Powhatan	267,8	1,82	5,65	132,5	129,7	24	250	3.000	3.250	371,00	263.127
Premnitz	165,4	0,69	14,2	47,0	104,2	21	110	2.000	2.110	275,28	99.960
<b>Container vessels</b>											
Pembroke	480,3	2,91	0	332,5	147,8	20	183	1.820	2.003	274,32	41.272
Perla	22,8	0,87	0	5,8	17,0	19	27	250	277	383,66	4.964
Pontremoli	689,3	3,03	0	334,0	354,3	21	600	1.955	2.555	333,33	36.673
Philadelphia	823,4	0,58	0	210,8	612,6	21	585	2.236	2.821	368,04	40.233
Phoenix	1037,1	1,21	0	395,2	641,9	21	192	2.146	2.338	305,02	34.102
Praha	1012,4	0,89	0	332,8	689,6	21	140	2.980	3.120	407,05	64.604
Pretoria	723,0	0,76	0	295,0	428,0	21	340	1.400	1.740	227,01	34.880
Potsdam	782,5	2,25	0	361,0	421,5	22	570	1.680	2.250	280,20	68.000
Pommern	770,8	2,57	0	485,1	285,7	22	1.000	1.500	2.500	311,33	49.637
Pona	257,5	1,87	101	92,0	64,5	20	360	1.100	1.460	200,00	120.059
Porto	255,4	0,83	39,5	90,0	125,9	21	230	650	880	125,46	16.440
Posen	365,5	0,93	0	148,9	216,6	21	850	1.800	2.650	345,73	58.790
Priwall	610,9	7,09	8	481,9	121,0	20	1.125	2.880	4.005	548,63	38.771
Pontresina	875,6	2,44	0	486,0	389,6	21	470	930	1.400	182,65	28.800
Port Said	353,2	3,14	0	187,4	165,8	19	140	1.710	1.850	266,76	85.090
Palermo	798,4	2,65	0	346,6	451,8	23	365	2.500	2.865	341,27	29.586
Paradip	570,8	1,96	0	250,3	320,5	24	300	2.100	2.400	273,97	35.000
Peking	874,4	0,82	0	215,0	659,4	23	155	2.696	2.851	339,61	9.969
Penang	689,8	1,65	0	358,5	331,3	19	0	1.125	1.125	162,22	51.880
Pohang	844,0	1,92	0	426,0	418,0	22	250	2.625	2.875	358,03	47.564
Portland	748,9	1,78	0	364,2	384,7	23	600	1.380	1.980	235,85	4.927
Portugal	904,9	2,12	0	470,0	434,9	22	240	1.825	2.065	257,16	37.939
Pudong	1287,1	2,76	0	761,9	525,2	25	294	3.000	3.294	360,99	44.213
Pugwash	816,6	1,71	0	403,9	412,7	22	880	2.040	2.920	363,64	58.540
Punjab	1042,7	1,79	0	425,1	617,6	21	781	1.987	2.768	361,14	99.616
Pusan	885,6	1,12	0	277,0	608,6	22	510	2.650	3.160	393,52	59.696
Cove Island	138,7	1,70	0	64,2	74,5	20	160	640	800	434,78	3.939
Shippan Island	131,5	6,08	0	94,0	37,5	18	113	356	470	217,50	3.627
<b>Ro/Pax vessels</b>											
Transeuropa	1222,0	5,42	0	745,0	477,0	45	1.304	2.421	3.725	226,79	114.739
Translubeca	1134,0	11,06	0	1134,0	0,0	38	415	1.979	2.394	172,60	0
Transrussia	316,5	5,30	0	316,5	0,0	37	260	1.480	1.740	255,58	0
<b>PCTC</b>											
Paganella	693,6	1,15	3,04	127,5	563,0	20	70	1.900	1.970	269,86	19.471
Paganino	944,5	1,31	0	174,5	770,0	20	19	364	383	52,40	12.539
Paglia	90,4	1,75	1,7	37,3	51,4	24	70	375	445	264,88	4.802
Pagna	37,9	0,54	0,3	5,6	32,0	27	23	250	273	219,81	3.665
<b>Research vessels</b>											
Polarstern	428,6	1,05	0	99,0	329,6	82	0	6.364	6.364	212,63	13.330
Meteor	431,0	3,56	43	44,0	344,0	64	381	1.143	1.524	65,24	1.379
<b>Total values</b>	<b>29.021,91</b>	<b>2,35</b>	<b>858,72</b>	<b>12.389,37</b>	<b>15.782,82</b>	<b>1.187</b>	<b>17.323</b>	<b>91.384</b>	<b>108.707</b>	<b>292,20</b>	<b>4.841.937</b>

Figure 3 : Oily water / Sludge

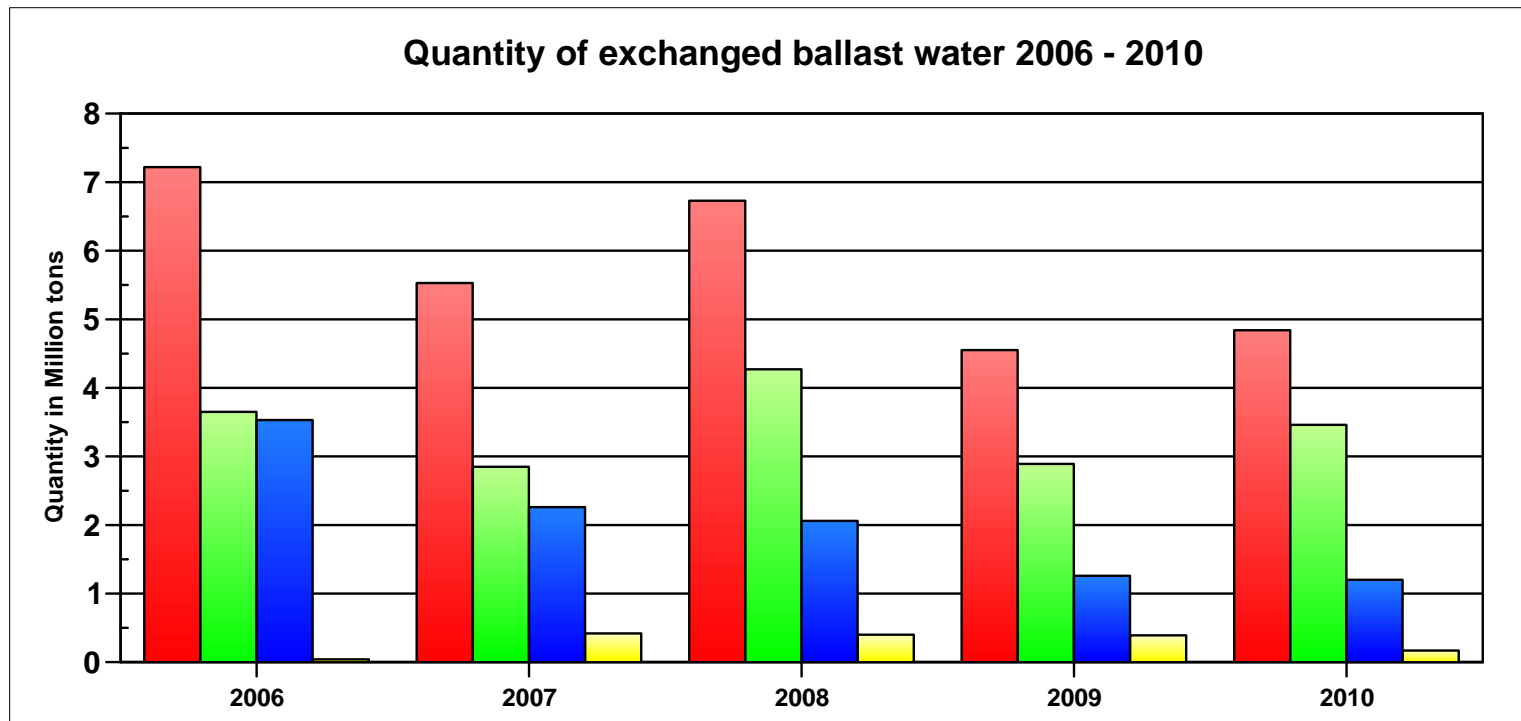
Year	Sludge quantity total (m <sup>3</sup> )	Shore disposal (m <sup>3</sup> )	Percentage	incinerated on board (%)
2006	13.763	12.559	91,3	8,7
2007	18.191	17.167	94,4	5,6
2008	17.567	16.760	95,4	4,6
2009	13.690	12.902	94,2	5,8
2010	13.248	12.389	93,5	6,5



**REEDEREI F. LAEISZ**  
Environmental Aspects - Year : 2010

**Figure 4 : Ballast water**

Year	Quantity (Mio. t)	Bulk vessels	VCS	Other
2006	7,22	3,65	3,53	0,04
2007	5,53	2,85	2,26	0,42
2008	6,73	4,27	2,06	0,4
2009	4,55	2,89	1,26	0,39
2010	4,84	3,46	1,2	0,17



**REEDEREI F. LAEISZ**  
**Environmental Aspects - Year : 2010**

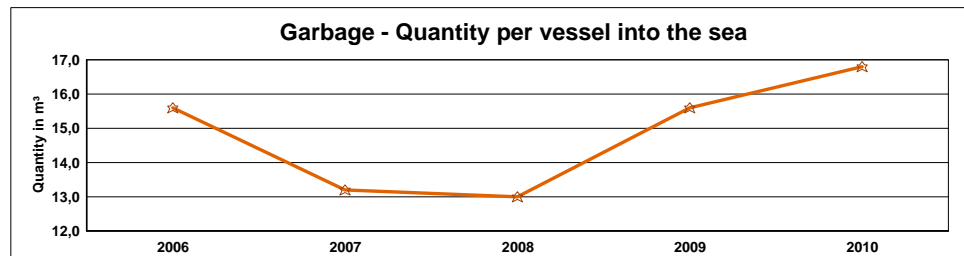
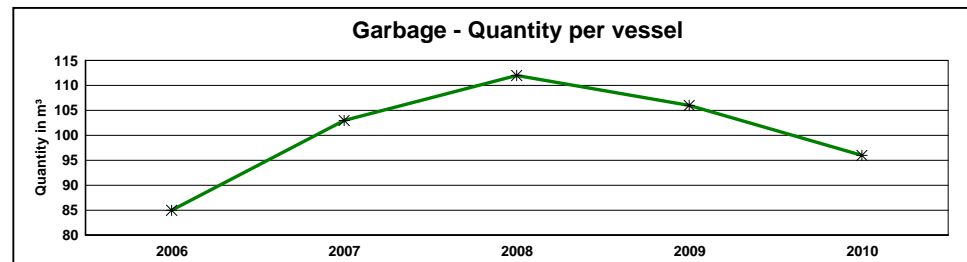
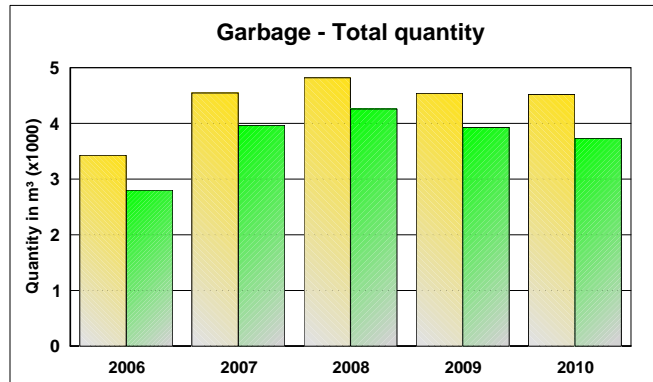
**Table 4 : Garbage**

Vessels	Garbage according MARPOL Annex V (m³)															
	Crew incl. passengers	Cat.1	Cat.2 / therefrom into the sea	Cat.3 / therefrom into the sea	Cat.4 / therefrom into the sea	Cat.5 / therefrom into the sea	Cat.6 / therefrom into the sea	Sum Cat 1-6 / therefrom into the sea (Cat. 2-6)	Quantity 1-6 per Person + day (t)	Specific waste						
<b>Bulker + Tanker</b>																
BW Havlys	20	26,20	0,00	0,00	0,00	0,00	3,40	0,00	1,50	0,70	0,00	0,00	31,1	0,70	4,26	73,30
BW Hesiod	22	39,90	1,00	0,00	10,45	7,20	0,00	0,00	11,30	7,15	4,30	4,30	66,95	18,65	8,34	1,00
BW Herdis	22	0,00	1,12	1,12	0,00	0,00	6,94	6,63	6,63	0,02	0,00	0,00	14,71	14,69	1,83	49,90
Pasadena	26	42,20	12,49	9,30	1,50	0,00	50,55	50,50	11,08	8,99	2,60	0,81	120,42	69,60	12,69	8,13
Patagonia	23	21,00	12,00	8,50	8,50	0,00	20,20	16,20	11,31	8,01	1,00	0,00	74,01	32,71	8,82	0,06
Peene Ore	32	41,60	0,00	0,00	10,00	8,50	42,00	42,00	18,20	4,50	5,50	1,60	117,3	56,60	10,04	16,70
Pequot	26	9,20	0,80	0,00	0,00	0,00	9,61	8,11	5,39	4,59	0,00	0,00	25	12,70	2,63	2,10
Piro	20	15,00	0,07	0,07	0,14	0,14	31,05	31,05	7,44	7,44	0,00	0,00	53,7	38,70	7,36	5,93
Powhatan	24	22,45	4,99	2,79	18,46	12,56	13,17	12,77	7,14	5,22	0,90	0,00	67,11	33,34	7,66	1,65
Premnitz	21	22,20	3,50	2,10	1,90	0,90	15,00	12,10	6,40	4,30	2,40	0,00	51,4	19,40	6,71	0,06
<b>Container vessels</b>																
Pembroke	20	17,85	5,60	0,40	6,00	0,00	32,51	1,51	10,53	3,55	0,13	0,00	72,62	5,46	9,95	15,03
Perla	19	5,00	0,00	0,00	0,00	0,00	0,00	0,00	0,33	0,33	0,00	0,00	5,33	0,33	7,58	2,71
Pontremoli	21	17,75	1,50	0,00	11,45	0,00	7,06	0,20	2,69	2,45	0,10	0,00	40,55	2,65	5,29	3,25
Philadelphia	21	6,53	0,00	0,00	0,20	0,00	13,20	0,00	6,53	6,53	0,47	0,00	26,93	6,53	3,51	2,97
Phoenix	21	13,50	0,00	0,00	0,00	0,00	39,21	12,11	3,50	3,50	0,28	0,00	56,49	15,61	7,37	0,29
Praha	21	13,80	2,45	0,00	11,70	1,80	2,65	0,85	7,48	6,82	1,36	0,00	39,44	9,47	5,15	2,52
Pretoria	21	25,00	0,00	0,00	4,50	0,00	2,96	0,00	5,08	5,08	0,04	0,00	37,58	5,08	4,90	16,48
Potsdam	22	37,80	20,10	0,00	20,00	0,00	0,00	0,00	8,43	5,93	0,00	0,00	86,33	5,93	10,75	5,00
Pommern	22	23,87	2,30	0,40	12,20	4,80	19,00	0,30	55,12	51,90	0,00	0,00	112,49	57,40	14,01	24,10
Pona	20	24,33	7,02	1,50	0,00	0,00	24,06	10,48	4,26	0,00	1,00	0,00	60,67	11,98	8,31	25,42
Porto	21	20,30	0,00	0,00	0,08	0,08	28,84	2,60	6,97	5,96	0,77	0,00	56,96	8,64	8,17	0,15
Posen	21	27,50	1,40	0,80	10,32	0,78	0,10	0,10	3,10	2,94	3,15	0,00	45,57	4,62	5,95	5,60
Prwall	20	29,71	0,00	0,00	0,00	0,00	0,63	0,63	1,83	1,83	0,00	0,00	32,17	2,46	4,41	68,30
Pontresina	21	23,55	0,00	0,00	1,30	0,50	6,10	5,60	9,88	8,58	0,00	0,00	40,83	14,68	5,33	15,35
Port Said	19	26,73	1,70	0,00	16,11	0,00	8,10	0,00	8,07	1,35	0,00	0,00	60,71	1,35	8,75	35,66
Palermo	23	50,10	0,90	0,90	0,00	0,00	50,63	26,13	2,91	2,22	0,00	0,00	104,54	29,25	12,45	14,00
Paradip	24	42,20	0,00	0,00	0,00	0,00	5,50	5,50	2,83	2,83	0,00	0,00	50,53	8,33	5,77	20,52
Peking	23	18,40	10,90	3,60	3,03	0,00	53,98	15,90	4,45	2,59	0,63	0,00	91,39	22,09	10,89	6,50
Penang	19	29,96	0,80	0,00	2,09	0,00	29,76	4,53	2,92	2,07	0,00	0,00	65,53	6,60	9,45	5,20
Pohang	22	46,50	9,63	9,63	21,97	21,97	3,30	3,30	3,50	3,50	10,80	0,50	95,7	38,90	11,92	20,86
Portland	23	53,00	0,00	0,00	0,00	0,00	0,00	0,00	3,46	3,46	2,80	2,80	59,26	6,26	7,06	64,51
Portugal	22	28,50	1,00	1,00	8,51	7,90	8,51	0,00	8,79	8,79	0,28	0,00	55,59	17,69	6,92	25,26
Pudong	25	48,00	0,00	0,00	30,20	30,20	0,00	0,00	7,20	7,20	0,00	0,00	85,4	37,40	9,36	60,00
Pugwash	22	41,50	5,00	0,00	24,60	4,60	0,00	0,00	5,10	5,10	0,40	0,00	76,6	9,70	9,54	2,00
Punjab	21	37,40	0,00	0,00	0,00	0,00	14,40	14,40	9,04	9,04	0,00	0,00	60,84	23,44	7,94	27,40
Pusan	22	36,30	0,00	0,00	1,80	1,80	2,90	2,90	5,99	5,99	0,00	0,00	46,99	10,69	5,85	30,09
Cove Island	20	15,00	0,50	0,50	1,00	1,00	0,00	0,00	15,25	14,25	1,73	0,00	33,48	15,75	18,20	0,30
Shippan Island	18	5,40	0,00	0,00	0,50	0,00	0,70	0,00	1,13	1,13	0,02	0,00	7,75	1,13	3,59	0,00
<b>Ro/Pax vessels</b>																
Transeuropa	45	28,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	28	0,00	1,70	315,00
Translubeca	38	52,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	52	0,00	3,75	596,00
Transrussia	37	2,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,5	0,00	0,19	194,50
<b>PCTC</b>																
Paganella	20	35,12	1,00	1,00	12,77	12,77	0,00	0,00	6,24	6,24	0,00	0,00	55,13	20,01	7,55	27,41
Paganino	20	27,50	4,80	4,80	0,00	0,00	9,15	9,15	8,56	8,56	0,00	0,00	50,01	22,51	6,85	2,85
Paglia	24	8,20	0,40	0,40	1,30	1,30	1,40	1,40	1,10	1,10	0,10	0,00	12,5	4,20	11,32	3,60
Pagna	27	3,50	0,00	0,00	0,10	0,10	0,23	0,23	0,30	0,30	0,05	0,00	4,18	0,63	2,21	3,20
<b>Research vessels</b>																
Polarstern	82	30,08	0,80	0,80	13,84	11,75	13,27	0,00	13,00	12,66	3,30	0,00	74,29	25,21	2,48	7,00
Meteor	64	22,00	3,40	0,40	8,80	0,80	31,60	26,60	43,50	0,50	12,90	10,70	122,2	39,00	5,23	83,20
<b>Total values</b>	<b>1.187</b>	<b>1.214,13</b>	<b>117,17</b>	<b>50,01</b>	<b>275,32</b>	<b>131,45</b>	<b>601,67</b>	<b>324,09</b>	<b>365,46</b>	<b>261,81</b>	<b>57,03</b>	<b>20,71</b>	<b>2.630,78</b>	<b>788,07</b>	<b>7,23</b>	<b>1.891,06</b>

**REEDEREI F. LAEISZ**  
**Environmental Aspects - Year : 2010**

**Figure 5 : Garbage - Quantity and disposal (Category 1 to 6 + Specific waste)**

Year	Quantity (total - m <sup>3</sup> )	therefrom shore disposal or incinerated on board (m <sup>3</sup> )	Quantity per vessel (m <sup>3</sup> )	Shore disposal or incinerated (%)	Quantity into the sea (m <sup>3</sup> )	into the sea per vessel (m <sup>3</sup> )
2006	3.429	2.803	85	81,3	626	15,6
2007	4.547	3.967	103	87,0	580	13,2
2008	4.820	4.259	112	88,4	561	13,0
2009	4.541	3.930	106	86,5	670	15,6
2010	4.522	3.734	96	82,6	788	16,8



**REEDEREI F. LAEISZ**  
**Environmental Aspect - Year : 2010**

**Table 5 : Writing and copy paper**

Shore

Packages (500 sheets DIN A4 per package)	1.345
DIN A4 sheets annual	<u>672.500</u>

Ship

Packages (500 sheets DIN A4 per package)	2.078
DIN A4 sheets annual	<u>1.039.000</u>

Calculation of the total consumption

Quality : SB 75 g/m<sup>2</sup> // Dimensions : 0,21 x 0,297 m // Area per sheet : 0,06237 m<sup>2</sup>  
Bleached without Chloro, Manufactures according ISO 14001 certified or alternatively with environmental marking FSC

Total area :

41.944 m<sup>2</sup> (Shore) + 64.802 m<sup>2</sup> (Ship) = **106.746 m<sup>2</sup> (approximately 21 Soccer fields)**

Total mass :

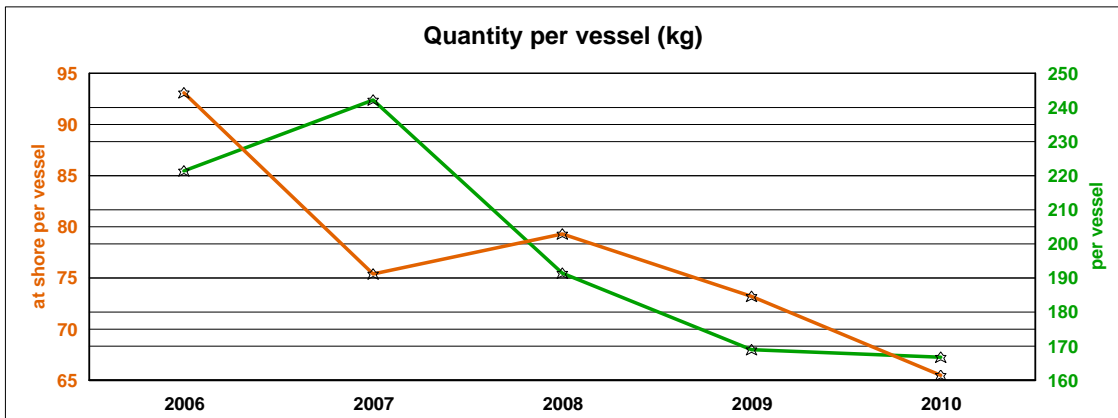
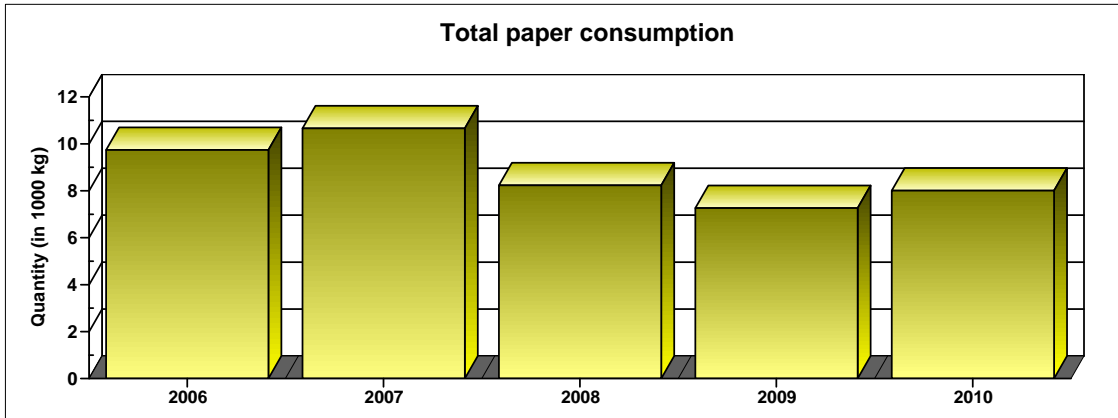
3.146 kg (Shore) + 4.860 kg (Ship) = **8.006 kg**

(Sources: Shore: monthly office materials orders / Ship: Purchasing department)

**REEDEREI F. LAEISZ**  
**Environmental Aspects - Year : 2010**

**Figure 6 : Paper consumption**

Year	2006	2007	2008	2009	2010
Vessels	44	44	43	43	48
Quantity (kg)					
total	9742	10658	8230	7267	8006
per vessel	<b>221,4</b>	<b>242,2</b>	<b>191,4</b>	<b>169</b>	<b>166,8</b>
at shore per vessel	<b>93,1</b>	<b>75,4</b>	<b>79,3</b>	<b>73,2</b>	<b>65,5</b>
at shore total	4096	3318	3410	3146	3146



**REEDEREI F. LAEISZ**  
Environmental Aspects - Year : 2010

**Table 6 : Cars supplied by the company - Fuel consumption + Emissions**

	Consumption Petrol (l)	Consumption Diesel (l)
Quantity - Year	<b>29.933</b>	<b>19.510</b>
Total quantity	<b>49.443</b>	

Sources: monthly tank settlements

Calculation of emissions

Fuel		Mileage 2010 (km)	Emissions (approx.)					
Kind	Consumption l / 100 km		CO <sub>2</sub> (kg)	NO <sub>x</sub> (kg)	CO (kg)	HC (kg)	Soot (kg)	Benzene (kg)
Petrol	10	300.000	94.300	18 <sup>(1)</sup>	13,5	162	4	4
Diesel	7	278.700	61.460	109 <sup>(2)</sup>				n.a.
<b>2010 total</b>		<b>578.700</b>	<b>155.760</b>	<b>127</b>	<b>13,5</b>	<b>162</b>	<b>4</b>	<b>4</b>
2009 total		578.600	162.110	113,9	13,5	162	4	4

<sup>(1)</sup> - per km emissions of approx. 0,06 g NO<sub>x</sub>

<sup>(2)</sup> - per km emissions of approx. 0,39 g NO<sub>x</sub>