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Proposals to the IMO for reducing GHG emissions from ships:

The Fuel Oil Reduction Strategy (FORS)

Nina Tavakkoli
Brussels, 12 September 2014

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In short …

FORS combines an individual ship‘s reference value with a uniform percentage reduction target for all ships.

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The reference values (baselines)

Fuel consumption of int'l shipping in 2007 as estimated by the Second IMO GHG Study 2009 (Appendix 1)

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2nd IMO GHG Study 2009
Table A1.8 – input data that have been used in the inventory

Table A1.8 *Summary table – input data that have been used in the inventory*

Category	Size / type	No. of ships (2007)	Ave. GT	Ave. ME kW	Ave. per engine Aux kW	AIS unique counts (4)	AIS coverage (5)	Days at sea (1) Modelled	Avg. ME load Modelled	Avg. AUX running days (2)	Avg. AUX load Modelled	Fuel type (3)
Crude oil tanker	200,000+ dwt	494	155,685	24,610	1,034	514	99%	274	73%	450	50%	HFO
Crude oil tanker	120,000–199,999 dwt	353	80,711	17,075	1,232	368	100%	271	80%	450	50%	HFO
Crude oil tanker	80,000–119,999 dwt	651	56,921	12,726	769	685	101%	254	80%	450	50%	HFO
Crude oil tanker	60,000–79,999 dwt	180	39,498	10,529	731	190	101%	238	70%	400	50%	HFO
Crude oil tanker	10,000–59,999 dwt	245	24,290	7,889	729	229	91%	238	70%	400	50%	HFO
Crude oil tanker	0–9,999 dwt	114	2,085	1,865	222	49	41%	180	65%	400	50%	MDO/HFO
Products tanker	60,000+ dwt	198	46,775	12,644	780	215	99%	171	80%	450	50%	HFO
Products tanker	20,000–59,999 dwt	456	24,262	8,482	736	455	96%	171	66%	450	50%	HFO
Products tanker	10,000–19,999 dwt	193	9,723	4,640	535	147	75%	183	70%	400	50%	HFO
Products tanker	5,000–9,999 dwt	466	4,264	2,691	291	306	63%	177	75%	400	50%	MDO/HFO
Products tanker	0–4,999 dwt	3,959	1,056	1,032	123	909	23%	175	65%	400	50%	MDO/HFO
Chemical tanker	20,000+ dwt	1,010	24,917	9,027	837	1,059	100%	251	80%	450	50%	HFO
Chemical tanker	10,000–19,999 dwt	584	9,357	5,161	623	621	95%	246	80%	400	50%	HFO
Chemical tanker	5,000–9999 dwt	642	4,651	3,252	416	615	92%	246	76%	400	50%	MDO/HFO
Chemical tanker	0–4,999 dwt	1,659	1,331	1,257	216	668	40%	180	65%	400	50%	MDO/HFO
LPG tanker	50,000+ cbm	138	43,784	13,494	1,004	147	103%	273	70%	450	50%	HFO
LPG tanker	0–49,999 cbm	943	4,834	3,225	436	697	72%	180	65%	400	50%	MDO/HFO
LNG tanker	200,000+ cbm	4	135,846	37,322	3,210	8	100%	260	70%	450	50%	HFO
LNG tanker	0–199,999 cbm	239	90,933	24,592	2,610	251	98%	274	70%	400	50%	HFO
Other tanker	Other	402	2,030	1,522	210	163	41%	180	65%	400	50%	MDO/HFO
Bulk	200,000+ dwt	119	114,519	17,224	794	101	97%	281	71%	450	60%	HFO
Bulk	100,000–199,999 dwt	686	83,619	15,108	697	695	99%	279	70%	450	60%	HFO
Bulk	60,000–99,999 dwt	1,513	39,568	9,912	549	1,509	98%	271	70%	450	60%	HFO
Bulk	35,000–59,999 dwt	1,864	27,596	8,209	533	1,859	96%	262	70%	425	60%	HFO
Bulk	10,000–34,999 dwt	2,090	15,351	6,436	458	1915	90%	258	70%	400	70%	HFO
Bulk	0–9,999 dwt	1,120	1,942	1,532	237	382	34%	180	65%	400	60%	MDO/HFO
General cargo	10,000+ dwt	674	11,382	5,914	414	491	71%	260	80%	410	60%	HFO
General cargo	5,000–9,999 dwt	1,528	4,704	2,939	235	1,171	76%	272	80%	410	60%	MDO/HFO
General cargo	0–4,999 dwt	11,006	1,061	868	90	3,553	32%	180	65%	380	50%	MDO/HFO
General cargo	10,000+ dwt, 100+ TEU	1,225	15,641	7,882	628	1,160	94%	240	65%	410	50%	HFO

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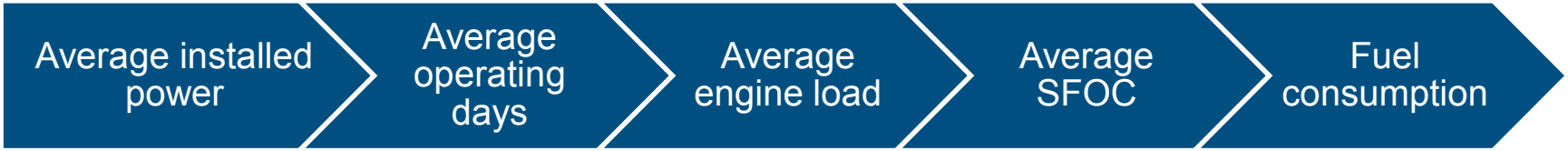
The calculation of the reference values in the IMO GHG Study 2009



Second IMO Greenhouse Gas Study 2009, Appendix 1, p. 137.

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Table A1.25 – Summary of results from consensus estimate fuel oil consumption (thousand tonnes) calculations

Table A1.25 *Summary of results from consensus estimate fuel oil consumption (thousand tonnes) calculations*

Category	Size/Type	*	Ship: Average fuel oil consumption (thousand tonnes) Main Engine	Aux Engine	Boiler	Total	Category: Total fuel oil consumption (thousand tonnes) Main Engine	Aux Engine	Boiler	Total
Crude oil tanker	200,000+ dwt	O	21.8	1.2	1.3	24.3	10,760.2	607.1	617.5	11,984.8
Crude oil tanker	120,000–199,999 dwt	O	16.5	1.5	0.9	18.8	5,810.8	516.6	317.7	6,645.1
Crude oil tanker	80,000–119,999 dwt	O	12.2	1.0	3.0	16.1	7,912.8	621.8	1,953.0	10,487.7
Crude oil tanker	60,000–79,999 dwt	O	8.2	0.8	3.0	12.0	1,480.2	145.3	540.0	2,165.5
Crude oil tanker	10,000–59,999 dwt	O	6.2	0.8	1.5	8.5	1,506.4	196.8	366.8	2,070.0
Crude oil tanker	0–9,999 dwt	C	1.1	0.2	0.5	1.8	122.4	27.9	57.0	207.3
Products tanker	60,000+ dwt	O	7.7	1.0	3.6	12.2	1,520.0	191.9	712.8	2,424.8
Products tanker	20,000–59,999 dwt	O	4.5	0.9	3.0	8.4	2,050.2	416.6	1,366.5	3,833.3
Products tanker	10,000–19,999 dwt	O	2.9	0.6	1.8	5.3	562.4	113.6	346.5	1,022.5
Products tanker	5,000–9,999 dwt	C	1.8	0.3	0.9	3.0	821.3	149.3	419.0	1,389.5
Products tanker	0–4,999 dwt	C	0.6	0.1	0.3	1.0	2,288.2	536.3	1,187.7	4,012.2
Chemical tanker	20,000+ dwt	O	8.5	1.0	0.0	9.5	8,574.1	1,004.0	0.0	9,578.1
Chemical tanker	10,000–19,999 dwt	O	4.7	0.7	0.0	5.4	2,771.6	401.7	0.0	3,173.3
Chemical tanker	5,000–9,999 dwt	C	3.0	0.5	0.0	3.5	1,924.4	294.6	0.0	2,219.0
Chemical tanker	0–4,999 dwt	C	0.7	0.2	0.0	1.0	1,199.7	395.1	0.0	1,594.8
LPG tanker	50,000+ cbm	O	12.1	1.2	0.0	13.3	1,666.3	164.7	0.0	1,830.9
LPG tanker	0–49,999 cbm	C	1.9	0.5	0.0	2.3	1,749.7	453.6	0.0	2,203.4
LNG tanker	200,000+ cbm	O	28.5	3.8	0.0	32.4	114.2	15.3	0.0	129.4
LNG tanker	0–199,999 cbm	O	31.1	2.8	0.0	33.8	7,411.6	657.3	0.0	8,068.9
Other tanker	Other	C	0.9	0.2	0.0	1.1	351.8	93.1	0.0	445.0
Bulk	200,000+ dwt	O	15.2	1.2	0.0	16.4	1,811.0	140.8	0.0	1,951.8
Bulk	100,000–199,999 dwt	O	13.1	1.0	0.0	14.1	8,982.5	712.4	0.0	9,694.9
Bulk	60,000–99,999 dwt	O	8.8	0.8	0.0	9.6	13,314.0	1,237.4	0.0	14,551.4
Bulk	35,000–59,999 dwt	O	7.0	0.8	0.0	7.8	13,122.5	1,397.3	0.0	14,519.8
Bulk	10,000–34,999 dwt	O	5.4	0.7	0.0	6.1	11,353.5	1,479.7	0.0	12,833.2
Bulk	0–9,999 dwt	C	0.9	0.3	0.0	1.2	987.1	350.9	0.0	1,338.0
General cargo	10,000+ dwt	O	5.8	0.6	0.0	6.3	3,877.2	378.2	0.0	4,255.5
General cargo	5,000–9,999 dwt	C	3.1	0.3	0.0	3.5	4,801.9	487.0	0.0	5,288.9
General cargo	0–4,999 dwt	C	0.5	0.1	0.0	0.6	6,036.4	1,038.3	0.0	7,074.7

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The individual ship‘s reference value in FORS

~~Average~~ Actual installed engine power x Average operating days

x Average engine load x Average specific fuel oil consumption

= Individual ship‘s reference value

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The specific reference values used in FORS

Why not use the 2007 - 2012 data set of the recent IMO GHG Study 2014?

➔ Fuel consumption in shipping dropped significantly between 2007 – 2012

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Measures to reduce fuel consumption

FORS incentivizes technical and operational measures equally, i.e.

- Changing fuel type (to fuel with lesser carbon content)
- Optimal use of available capacity
- Slow steaming

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Ship owner‘s/operator‘s obligations

Monitor and report

- Annual fuel consumption
- Annual CO_2 emissions

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Advantages of FORS

- applicable to all ships
- ship owners/operators need not report data that could be business-sensitive
- incentivizes both, technical and operational measures equally
- early movers are rewarded
- requires compliance with an absolute standard

Thank you for your attention!

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Robert-Schuman-Platz 1
D-53175 Bonn

www.bmvi.de