

The potential impact of *decarbonization measures in shipping* on States

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INTRODUCTION

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Background

- IMO negotiates a "short-term measure" to reduce CO2 emissions from ships
- The measure affects the cost and speed of existing ships by 2030 (not new fuels, not long-term, not new and different ships and technologies, also not any market based measure like levies)
- Before Members were willing to agree on this short-term measure, they insisted on having a comprehensive impact assessment undertaken
- By doing [a part of] the impact assessment, UNCTAD helped

 a) to include the perspective of developing countries, and
 b) IMO members to even consider/ agree on the measure

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A puzzle with many pieces





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SUPPORT FOR IMO IMPACT ASSESSMENT Cost impact of approved IMO **GHG** regulations

International Maritime Organization (IMO)

DNV

MEPC 76/7 Page 3

The Steering Committee noted that the draft workplan was structured in seven distinct but interrelated tasks, as follows:

Task 1	Literature review
Task 2	Assessment of the impact of the measure on the fleet
Task 3	Assessment of the impact of the measure on States
Task 4	Stakeholder analysis
Task 5	Identification of areas of missing data
Task 6	COVID-19 considerations
Task 7	Disproportionately negative impacts



DNV output is our input (a) change in shipping costs, and (b) change in speed, by vessel type



Figure 4-4 Relative cost intensity of ship categories compared to Current regulations in 2030. The cost intensity is set to 1 for each ship category based on Current regulations in 2030.

2) The ships and their journeys



Connect impact on ship types to

- More than 34 000 ships;
 27 420 ships w laden international journeys
- Several million journeys;
 489 241 laden international journeys (2019)

	А	В	С	D	E	F	G	н	I.	J	к	L	м	Ν	Q	R
1		ІМО	ТҮРЕ	DWT	PORT NAME	PORT COUNTRY	UN LOCODE	TIMESTAMP UTC	Move type	DRAUGHT	Distance travelled upon arrival	Distance	Destination country	Load condition	Days	Speed
2	1	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	10/01/2019 02:14	ARRIVAL	228	8627	8627		LADEN		
3	2	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	14/01/2019 10:03	DEPARTURE	140	0	8546	BR	PARTIALLY_LADEN	35.50	10.03
4	3	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	18/02/2019 22:04	ARRIVAL	103	8546	8546		IN_BALLAST	1.70	-
5	4	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	20/02/2019 14:52	DEPARTURE	229	0	8058	MO	LADEN	40.13	8.37
6	5	8420804	Ore Carrier	364767	SOHAR	OM	OMSOH	01/04/2019 18:04	ARRIVAL	228	8058	8058		LADEN	6.60	-
7	6	8420804	Ore Carrier	364767	SOHAR	OM	OMSOH	08/04/2019 08:26	DEPARTURE	118	0	7952	BR	NULL	29.32	11.30
8	7	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	07/05/2019 16:07	ARRIVAL	102	7952	7952		IN_BALLAST	2.07	-
9	8	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	09/05/2019 17:54	DEPARTURE	225	0	8332	MY	LADEN	49.46	7.02
10	9	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	28/06/2019 05:02	ARRIVAL	224	8332	8332		LADEN	4.66	-
11	10	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	02/07/2019 20:48	DEPARTURE	150	0	10211	BR	PARTIALLY_LADEN	37.90	11.22
12	11	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	09/08/2019 18:31	ARRIVAL	102	9226	9226		IN_BALLAST	1.75	-
13	12	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	11/08/2019 12:27	DEPARTURE	229	0	8952	MY	LADEN	32.95	11.32
14	13	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	13/09/2019 11:08	ARRIVAL	228	8952	8952		LADEN	3.99	-
15	14	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	17/09/2019 10:58	DEPARTURE	150	0	9130	BR	NULL	39.84	9.55
16	15	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	27/10/2019 07:10	ARRIVAL	103	9130	9130		IN_BALLAST	2.35	-
17	16	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	29/10/2019 15:27	DEPARTURE	227	0	8473	MY	LADEN	35.94	9.82
18	17	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	04/12/2019 13:56	ARRIVAL	227	8473	8473		LADEN	6.79	-



🗊 MarineTraffic

CONFERENCE ON TRADE

Change in cost intensity by ship segment, average size* and median distance travelled

s set to 1 for each ship cated



Source: UNCTAD compiled from DNV and MarineTraffic data

*: Size of the bubbles represents the average ship size per DWT

#: % change in total cost intensity in high reduction scenario compared to the current regulation scenario in 2030

(3) The trade carried by those ships



 Connect trade 185 x 184 countries x 11 sectors = 374 440, to 27 420 ships and their journeys.

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MDS Transmodal **

• Taking out zero maritime trade cases



4) Convert shipping costs to trade costs



For each one of the 130236 cases calculate

- Change in shipping costs
- Change in inventory holding costs (lower speed)

	Tonnes by sea	Unit value ('000s US\$) Tonnes by sea	Mean cost, 2030 Current regulations	Mean cost, New policies - EEXI only	Mean cost, New policies - high reduction	Mean cost, New policies - low reduction	Mean time at sea (hours), 2030 Current regulations	Mean time at sea (hours), New policies - EEXI only	Mean time at sea (hours), New policies - high reduction	Mean time at sea (hours), New policies - low reduction
Average	62 222.30	28.44	64.59	64.69	70.24	66.35	717.35	725.24	776.21	746.31
Median	126.93	2.25	26.66	26.77	28.47	27.21	753.73	765.57	814.81	786.24
Max	714 999 174.14	439 504.24	1 425.95	1 428.56	1 550.34	1 465.24	2 025.33	2 037.97	2 148.99	2 037.97
Min										
Average				0.10	5.65	1.76		7.89	58.86	28.96
Median				0.10	1.80	0.55		11.84	61.09	32.51
Max				2.61	124.40	39.29		12.64	123.66	12.64
Average				0.16%	8.75%	2.73%		1.10%	8.20%	4.04%
Median				0.39%	6.76%	2.05%		1.57%	8.10%	4.31%
Max				0.18%	8.72%	2.76%		0.62%	6.11%	0.62%
Variance	5 501 136 201 805	2 308 131	16 693	16 744	19 701	17 559	87 757	89 475	102 729	94 660



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5) Change in maritime trade costs





Combine (converted lower speed into more \$)

- 130236 changes in shipping costs and
- 130236 changes in inventory holding costs

Image: section of the sectio		A	В	С	D	E	F	G	н	1	J	K	L	M	N	0
Substitution Substitution<		Origin Country_Destination Country_EEF	Mean cost, current regulations 2030	Mean cost, New policies - EEXI only	Mean cost, New policies - high reduction	Mean cost, New policies - low reduction	Unitised Tonnes	Unit Value Unitised Tonnes ('000s US\$)	Mean Time at sea (hours), current regulations 2030	Mean Time at sea (hours), New policies - EEXI only	Mean Time at sea (hours), New policies - high reduction	Mean Time at sea (hours), New policies - low reduction	Value of time (US\$)	Current regulations 2030 vs New policies - EEXI only % chan	Current regulations 2030 vs New policies - high reduction	Current regulations 2030 vs New policies - low reduction
Source Source<	1	wi	405	400	520	400	00.24	20			020	000	•	0.10	0.10	2.02
Sold Relational Jook Marking Hold <	50595	Suatemala_South Korea_Textiles and Wearing App	485	486	529	498	35.34	30	80.	807	939	890		0.1%	9.1%	2.0%
Description Description <thdescription< th=""> <thdescription< th=""></thdescription<></thdescription<>	50596 0	Sustemala_South Korea_wood and Paper	485	486	529	498	5 055.10	0	80:	80/	939	890		0.1%	9.1%	2.0%
2009 Guennal John Tohney 140 140 131	50597 0	uatemala_spain_Agriculture	145	145	161	151	5 459.41	1	73	744	804	770		0.1%	11.2%	3./70
Decomposition Decompos	50596	Vatemala_spain_Electrical and Machinery	145	145	161	151	21 521 04	2	73	744	804	770		0.1%	11.2%	3.770
Speci Gutantal, Spin. Med Production 16 14 120 1 190 144 004 700 0.1% 11.2% 377 Speci Gutantal, Spin. More and Currying 145 145 145 151 141.0% 1779 744 004 770 0.1% 11.2% 377 Speci Gutantal, Spin. Other Mandfecturing 145 145 161 151 141.07.7 1 779 744 004 770 0.1% 11.2% 377 Speci Gutantal, Spin. Terbies and Waring Agertal 145 145 151 141.07.7 1 779 744 084 770 0.1% 11.2% 377 Speci Gutantal, Sriantal, Song and Steverages 155 152 127 25 0.441 0 899 905 980 995 0.1% 9.2% 2.6 K Speci Gutantal, Sriantal, Song and Currying 12 1 1 1 1 1 1 1 1 1 1 1 1 1 <td< td=""><td>50500 (</td><td>uatemala_spain_risning</td><td>143</td><td>143</td><td>101</td><td>151</td><td>21 321.54</td><td>2</td><td>73</td><td>744</td><td>804</td><td>770</td><td></td><td>0.1%</td><td>11.270</td><td>3.770</td></td<>	50500 (uatemala_spain_risning	143	143	101	151	21 321.54	2	73	744	804	770		0.1%	11.270	3.770
SPACE Constraint, Spain, Mining and Quanting 14 </td <td>50600 0</td> <td>iuatemala_spain_Foou & Beverages</td> <td>145</td> <td>145</td> <td>161</td> <td>151</td> <td>30 002.03</td> <td>1</td> <td>73</td> <td>744</td> <td>804</td> <td>770</td> <td></td> <td>0.1%</td> <td>11.270</td> <td>3.770</td>	50600 0	iuatemala_spain_Foou & Beverages	145	145	161	151	30 002.03	1	73	744	804	770		0.1%	11.270	3.770
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2000 Guernalis, Sain, Monter Marine, Ma	50602 0	Suatemala_spain_wining and Quarrying	145	145	161	151	213.23	2	73	744	804	770		0.1%	11.2%	3.7%
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boxel diatemain 1 <	50612	Suatemala_St Helena_Agriculture	12	12	10	14	32.34	2	653	000	/04	16		-0.3%	29.0%	12.5%
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Synthet Synthet <t< td=""><td>50622 0</td><td>uatemala_State of Palestine_Food & Beverages</td><td>145</td><td>145</td><td>161</td><td>151</td><td>4 016.63</td><td>1</td><td>735</td><td>744</td><td>804</td><td>770</td><td></td><td>0.1%</td><td>11.2%</td><td>3.7%</td></t<>	50622 0	uatemala_State of Palestine_Food & Beverages	145	145	161	151	4 016.63	1	735	744	804	770		0.1%	11.2%	3.7%
30824 Guatemala_Suriname_food & Beerrages 1 1 1 126.66 0 15 15 16 16 0.0% 20.3% 9.6% 30824 Guatemala_Suriname_food & Beerrages 1 1 13 88.65 0 15 15 16 16 0.0% 20.3% 9.6% 30825 Guatemala_Suriname_food & Beerrages 1 1 13 188.65 0 15 15 16 16 0.0% 20.3% 9.6% 30826 Guatemala_Suriname_forter Manufacturing 1 1 1 125.65 2 15 15 16 16 0.0% 20.3% 9.6% 30828 Guatemala_Suriname_frequent Clauguiant 1 1 1 0.30 1 15 15 16 16 0.0% 20.3% 9.6% 30828 Guatemala_Suriname_frequent Clauguiant 1 1 0.30 1 15 15 16 16 0.0% 20.3% 9.6% 30830 Guatemala_Suriname_Kood and Paper 1 1 1 0.16 15 15 16 16 0.0% 20.3%	50623	iuatemala_Sudan_Agriculture	39	39	42	40	490.30	4	888	8 890	965	921		0.1%	8.0%	2.0%
Splitz Splitz<	50624	uatemala_Suriname_Electrical and Machinery	1	1	1	1	126.66	0	15	5 15	16	16		0.0%	20.3%	9.6%
Systep Systep<	50625	uatemala_Suriname_Food & Beverages	1	1	1	1	13 688.65	0	15	5 15	16	16		0.0%	20.3%	9.6%
Store/E Store/E <t< td=""><td>50626 0</td><td>uatemala_Suriname_Metal Products</td><td>1</td><td>1</td><td>1</td><td>1</td><td>110.98</td><td>0</td><td>15</td><td>5 15</td><td>16</td><td>16</td><td></td><td>0.0%</td><td>20.3%</td><td>9.6%</td></t<>	50626 0	uatemala_Suriname_Metal Products	1	1	1	1	110.98	0	15	5 15	16	16		0.0%	20.3%	9.6%
Species Species <t< td=""><td>50627</td><td>uatemala_Suriname_Other Manufacturing</td><td>1</td><td>1</td><td>1</td><td>1</td><td>150.53</td><td>0</td><td>15</td><td>5 15</td><td>16</td><td>16</td><td></td><td>0.0%</td><td>20.3%</td><td>9.6%</td></t<>	50627	uatemala_Suriname_Other Manufacturing	1	1	1	1	150.53	0	15	5 15	16	16		0.0%	20.3%	9.6%
Solida Suntamella Surianam, Vondand Paper 1 1 1 0.30 1 15 15 16 16 0.0% 20.3% 9.6% Solida Suntamella Surianam, Vondand Paper 1 1 1 61.46 1 15 15 16 16 0.0% 20.3% 9.6% Solida Totalita Surianam, Vondand Paper 1 1 1 61.46 1 15 15 16 16 0.0% 20.3% 9.6% Solida Totalita Surianam, Vondand Paper 12 12 16 14 3.70 2 653 656 704 6827 -0.3% 29.0% 12.5% Solida Totalita Sweedin Ricitriza and Machinery 158 158 178 165 400.50 8 650 655 706 677 0.1% 12.8% 4.6% Solida Guatemala Sweedin Ricitriza and Machinery 158 158 178 165 276.44 8 650 655 706 677 0.1% 12.8% 4.6%	50628	uatemala_Suriname_Petroleum Chemical and No	1	1	1	1	215.65	2	15	5 15	16	16		0.0%	20.3%	9.6%
System System<	50629	uatemala_Suriname_Transport Equipment	1	1	1	1	0.30	1	15	5 15	16	16		0.0%	20.3%	9.6%
Storal Gustemals Sweeden Agriculture 12 12 16 14 3.70 2 653 656 704 682 -0.3% 29.0% 12.5% Storage Statemals Sweeden Agriculture 158 158 178 165 409.50 8 650 655 706 677 0.1% 12.8% 4.6% Storage Statemals Sweeden Exercical and Machinery 158 158 178 165 5.48 68 650 655 706 677 0.1% 12.8% 4.6% Storage Constrained Sweeden Food & Breverages 158 158 178 165 276.44 8 650 655 706 677 0.1% 12.8% 4.6% Storage Constraints Sweeden Heall Products 158 178 165 276.44 8 650 655 706 677 0.1% 12.8% 4.6% Storage Constraints Sweeden Heall Products 158 178 165 6306.98 5 650 655 706 677 0.1%	50630	uatemala_Suriname_Wood and Paper	1	1	1	1	61.64	1	15	5 15	16	16		0.0%	20.3%	9.6%
Stobel 2	50631	uatemala_Swaziland_Agriculture	12	12	16	14	3.70	2	653	656	704	682		-0.3%	29.0%	12.5%
Stores State State <t< td=""><td>50632</td><td>uatemala_Sweden_Agriculture</td><td>158</td><td>158</td><td>178</td><td>165</td><td>409.50</td><td>8</td><td>650</td><td>655</td><td>706</td><td>677</td><td></td><td>0.1%</td><td>12.8%</td><td>4.6%</td></t<>	50632	uatemala_Sweden_Agriculture	158	158	178	165	409.50	8	650	655	706	677		0.1%	12.8%	4.6%
Stote Stote <th< td=""><td>50633</td><td>uatemala_Sweden_Electrical and Machinery</td><td>158</td><td>158</td><td>178</td><td>165</td><td>5.48</td><td>68</td><td>650</td><td>655</td><td>706</td><td>677</td><td></td><td>0.1%</td><td>12.8%</td><td>4.6%</td></th<>	50633	uatemala_Sweden_Electrical and Machinery	158	158	178	165	5.48	68	650	655	706	677		0.1%	12.8%	4.6%
50635 Guatemala Sweden Metal Products 158 158 178 165 6 306.98 5 650 655 706 677 0.1% 12.8% 4.6%	50634	iuatemala_Sweden_Food & Beverages	158	158	178	165	276.44	8	650	655	706	677		0.1%	12.8%	4.6%
	50635	iuatemala Sweden Metal Products	158	158	178	165	6 306.98	5	650	655	706	677		0.1%	12.8%	4.6%

6) Change in total trade costs



MARITIME

CONSULTING



• For each one of the 130236 cases, provide share of maritime trade



📕 Sea 📕 Air 🗱 Railway 🎆 Road 🧱 Others



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NCIA













Input: Change in trade costs for 130236 cases

Output: the impact on States

- Change in trade (exports and imports)
- Change in GDP (plus change in participation in value chains)

for 185 countries

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Annexes/boxes

- I. Supply/demand balance
- II. Adaptation, substitution
- III. Modal shifts
- IV. Illustrative case studies



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Comprehensive Impact Assessment of IMO short-term measures

A) Methodology B) Results C) Conclusions



	Change	in time at	sea, %	Change in	transport	costs, %	Change in total maritime logistics costs, %			
EXPORTING ECONOMY	EEXI only	High case	Low case	EEXI only	High case	Low case	EEXI only	High case	Low case	
Vanuatu	1.6	8.5	2.6	-0.6	6.5	1.5	1.2	8.2	2.3	
Vatican City	0.9	8.0	3.7	0.2	9.0	2.8	0.6	8.5	3.4	
Venezuela	2.9	8.0	2.9	2.2	8.3	2.5	2.6	8.1	2.9	
Vietnam	2.4	7.6	3.5	-0.7	5.0	1.0	1.6	6.9	2.8	
Wallis & Futuna	0.8	8.7	4.0	0.3	9.9	3.0	0.5	9.4	3.5	
Yemen	2.7	8.3	3.1	1.2	4.3	1.7	2.1	7.0	2.8	
Zambia	1.9	8.4	2.6	-0.7	4.8	1.1	1.8	8.1	2.6	
Zimbabwe	2.1	8.3	3.0	-1.3	3.1	0.3	1.3	7.3	2.6	
World total	2.2	7.8	2.8	0.4	5.6	1.5	1.7	7.2	2.7	

Decline in trade (imports + exports) % change "Low" scenario



Source: UNCTAD, based on data from DTC (based on data generated by UNCTAD, MDST, MarineTraffic, EMC, DNV)

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Figure 38: Simulated change in income (per cent of GDP), different country groups



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Comprehensive Impact Assessment of IMO short-term measures

A) Methodology B) Results C) Conclusions Aggregate global impacts of the proposed IMO short-term measure on maritime logistics costs can be considered small when compared to typical market variability of freight rates. Also, the global impact on GDP and trade flows can be considered small when compared to the long-term impact of other disruptions such as a pandemic or climate change factors.

However, for some countries, the negative impacts of the IMO measure assessed in this report are relatively higher than for others. Aware of the resource constraints of some developing countries, including SIDS and LDCs, UNCTAD expects that some countries will likely require support to mitigate the increased maritime logistics costs and alleviate the consequent negative impact on their respective real income and trade flows.