Summary of major changes to SCC Trajectories V1.1

Sea Cargo Charter

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Maritime consultancy delivering applied solutions for a carbon constrained future

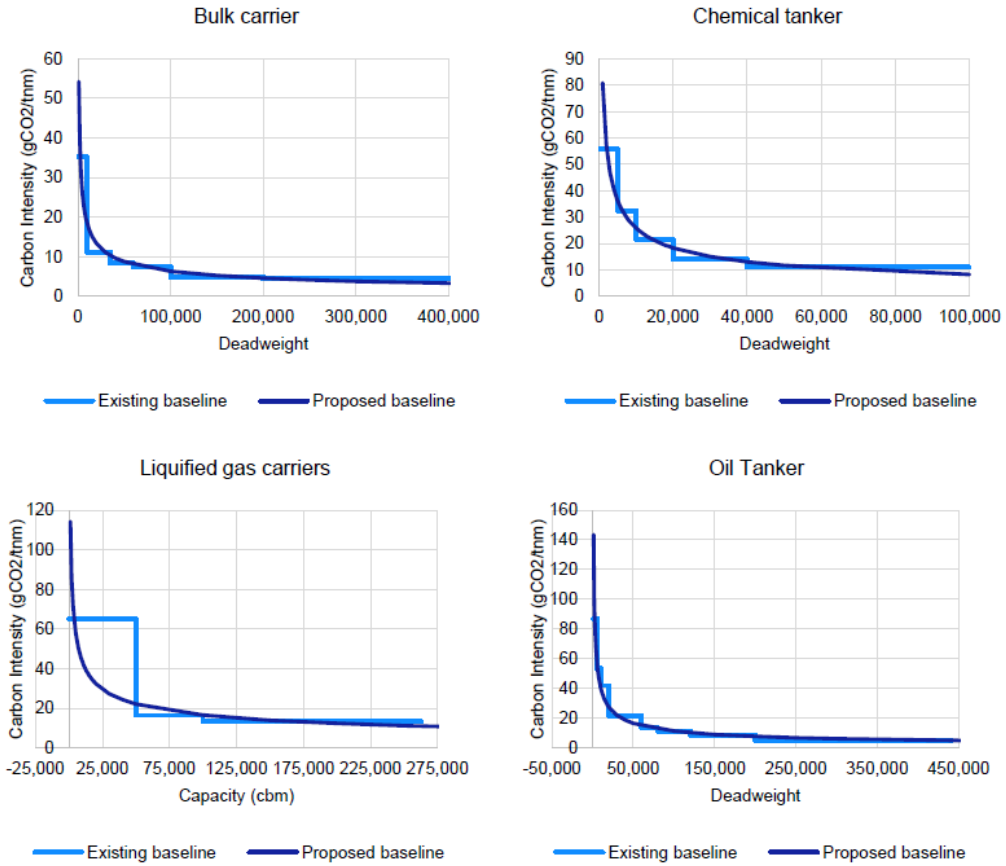
Summary of changes

- 2022 Reporting:
  - Incremental to continuous baselines
- 2023 Reporting:
  - MRV data for LNG and chemical tankers
- 2024 Reporting:
  - Updates based on 2023 IMO GHG Ambition
    - Continuous baseline definition updated from 2012 to 2018 data

2022 Reporting

In the reporting year of 2022, the SCC moved from an incremental baseline to a continuous baseline reporting methodology for the then four vessel categories (bulk carriers, chemical tankers, liquified gas carriers, and oil tankers).

- This change was made due to concerns raised by signatories that the discrete carbon intensity benchmark values per ship type/size were resulting in disproportionately challenging alignment targets for vessels at the lower end of the stepped size categories.
- The solution to this was the adoption of a required carbon intensity baselines that varies continuously with vessel size and hence avoids step changes in carbon intensity requirements.

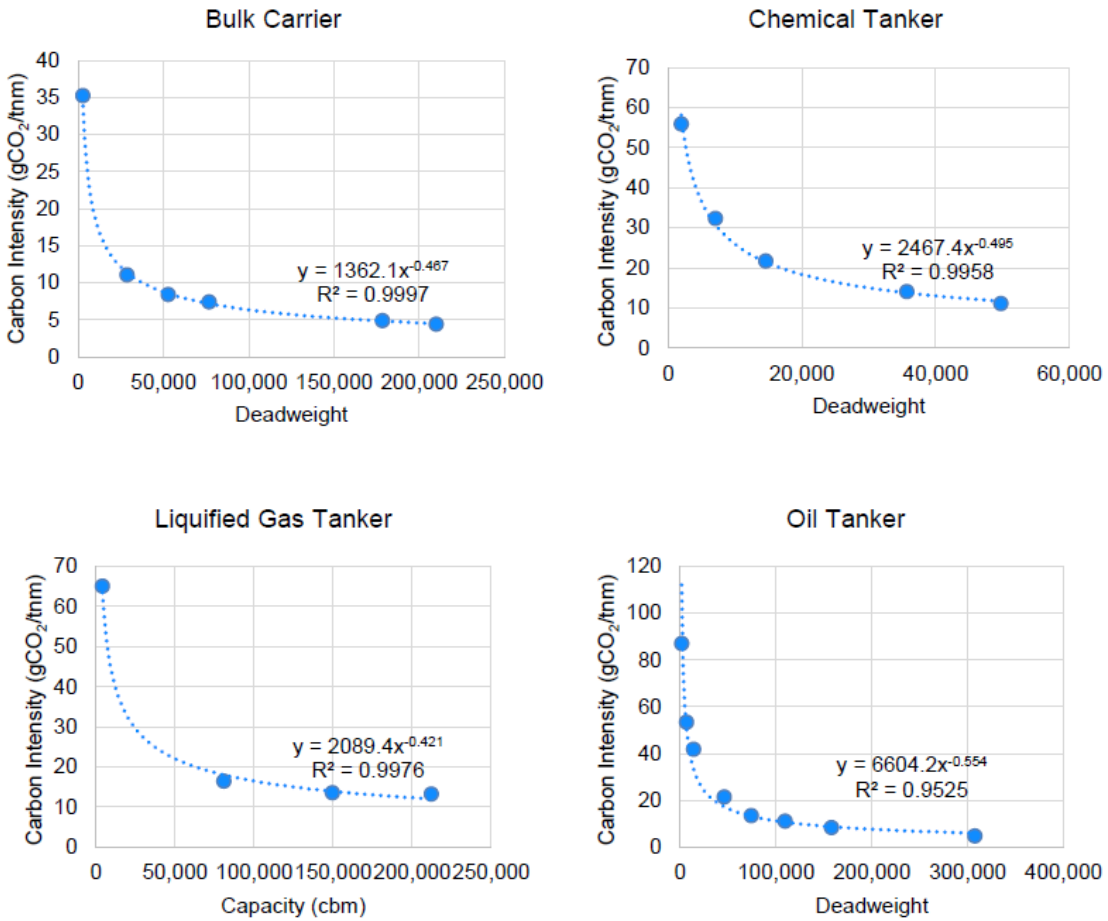


For Further details, please refer document titled: 'Sea Cargo Charter: Recommendations for continuous alignment benchmarks', shared Feb 2022.

2022 Reporting Continued…

- To obtain the continuous baseline, a curve is fit through a plot of the median carbon intensity of each vessel size bin against the median vessel capacity within that size bin, using on data published in the Fourth IMO GHG. A power law fit is used to model this relationship.
- The overall intensity trajectory is then applied to the continuous baseline to generate vessel type- and size-specific trajectories. Shown in the graphs on the left are the required carbon intensity continuous baselines for the four vessel categories in 2021. At the time, the SCC was aligned with the 2018 IMO Initial GHG Strategy (at least 50% reduction in GHG emissions by 2050 on 2008 levels). The resulting vessel type- and size-specific trajectories therefore took the following form with unique coefficients, a and b, for each vessel type.

$$r_s = (a.Year + b).Size^c$$



2023 Reporting

In the reporting year of 2023, the SCC started using 2021 EU MRV data for the generation of the continuous baselines for chemical tankers and liquefied gas tankers.

Reasons for changes:

- Following the first SCC reporting cycle, signatories raised concerns about the relevance of carbon intensity baselines for chemical and liquefied gas tankers.
- For chemical tankers, uncertainty in the method of cargo estimation used in the Fourth IMO GHG Study was identified. Analysis showed deviation from reported data was particularly high for chemical tankers when comparing to EU MRV data.
- For liquefied gas tankers, several factors were identified as contributing to the unrepresentative baseline, including uncertainty around assumptions used to estimate cargo on board and the fuel consumption of propulsion systems as well as differences in operating profile and vessel characteristics for smaller LPG tankers (size 1 and 2) and larger LNG tankers (size 3 and 4).

Results:

- A new continuous baseline constructed using 2021 EU MRV data was shown to be more representative of SCC reported data and was adopted for chemical tankers and liquefied gas tankers.
- New coefficients were provided to signatories for the calculation of their alignment score against the 50% reduction trajectory.
- The number of ship types increased from 4 (bulk carrier, chemical tanker, liquified gas tanker, and oil tanker) to 5 ship types (bulk carrier, chemical tanker, liquified gas tanker <= 100,000 m^3, liquified gas tanker >100,000 m^3, and oil tanker).

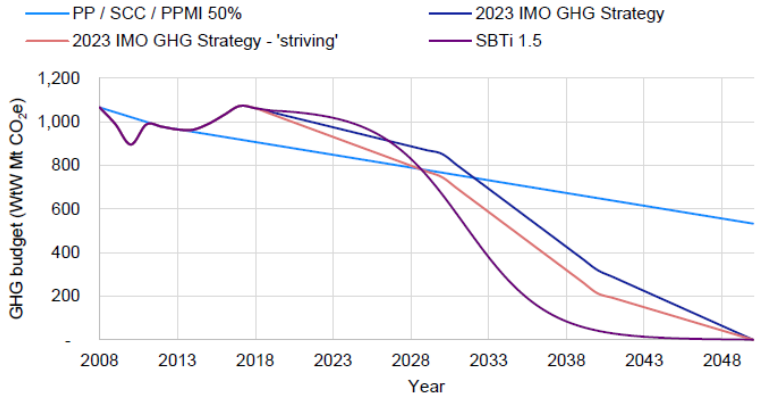
For further details, please refer document titled: 'Sea Cargo Charter: Recommendations addressing chemical and liquefied gas tanker baselines', shared Feb 2023.

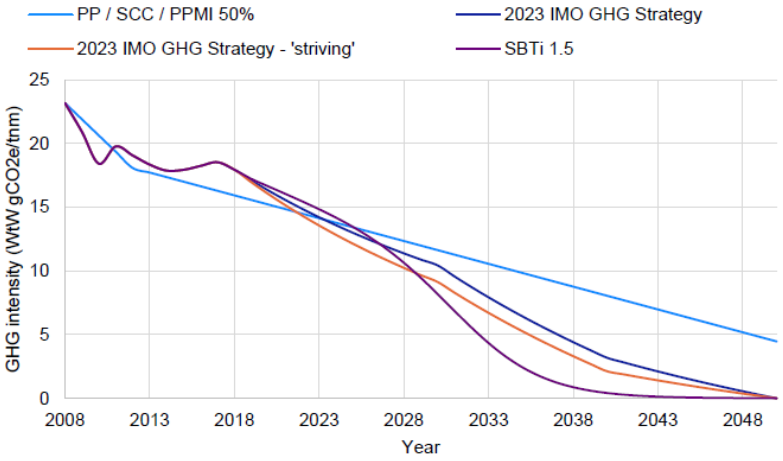
2024 Reporting

In the reporting year of 2024, the SCC will be adopting trajectories in line with the 2023 IMO GHG Strategy announced during MEPC80.

MEPC80 specifies the following three points, which now define the SCC's 2023 GHG trajectories:

- To reduce the total annual GHG emissions from international shipping by at least 20%, striving for 30%, by 2030, compared to 2008
- To reduce the total annual GHG emissions from international shipping by at least 70%, striving for 80%, by 2040, compared to 2008
- GHG emissions from international shipping to peak GHG emissions from international shipping as soon as possible and to reach net-zero GHG emissions by or around, i.e. close to 2050





For further details, please refer document titled: 'Outcomes of IMO MEPC 80 meeting relevant to the Sea Cargo Charter', shared 25th July 2023.

2024 Reporting Continued…

Based on the MEPC80 outcome the following updates were made to the reporting methodology:

2018 IMO Initial Strategy	2023 IMO GHG Strategy
Trajectory benchmarked using 2012 IMO data	Trajectories benchmarked using 2018 IMO data
CO2 reduction	CO2e reduction
Operational emissions (Tank-to-Wake – TTW) reduction	Full lifecycle emissions (Well-to-Wake – WTW) reduction
50% reduction target by 2050, in respect to 2008 emissions	100% reduction target by 2050 (with 2030 and 2040 interim targets)
Continuous Baseline set to 2012 IMO data*	Continuous Baseline set to 2018 IMO data*

*Except chemical tankers, LPG and liquefied gas tanker, which use 2021 EU MRV Data for both reporting methodologies, as expanded on in slide 5.

2024 Reporting Continued…

As such, the formula and coefficients used to calculate the continuous baseline have also been updated:

2018 IMO Initial Strategy	2023 IMO GHG Strategy
Formula used:	
$r_s = (a.Year + b).Size^c$	$r_s = (a.Year^3 + b.Year^2 + c.Year + d).Size^e$
Please refer to the Technical Guidance for the exact coefficients.	

2024 Reporting Continued…

Following are the Ship Size Vs Emission Intensity numbers, comparing continuous baseline data for current reported year, i.e., 2022, between '50% CO_2 TTW reduction' Vs "'Minimum' CO_2e WTW' Vs "'Striving' CO_2e WTW':

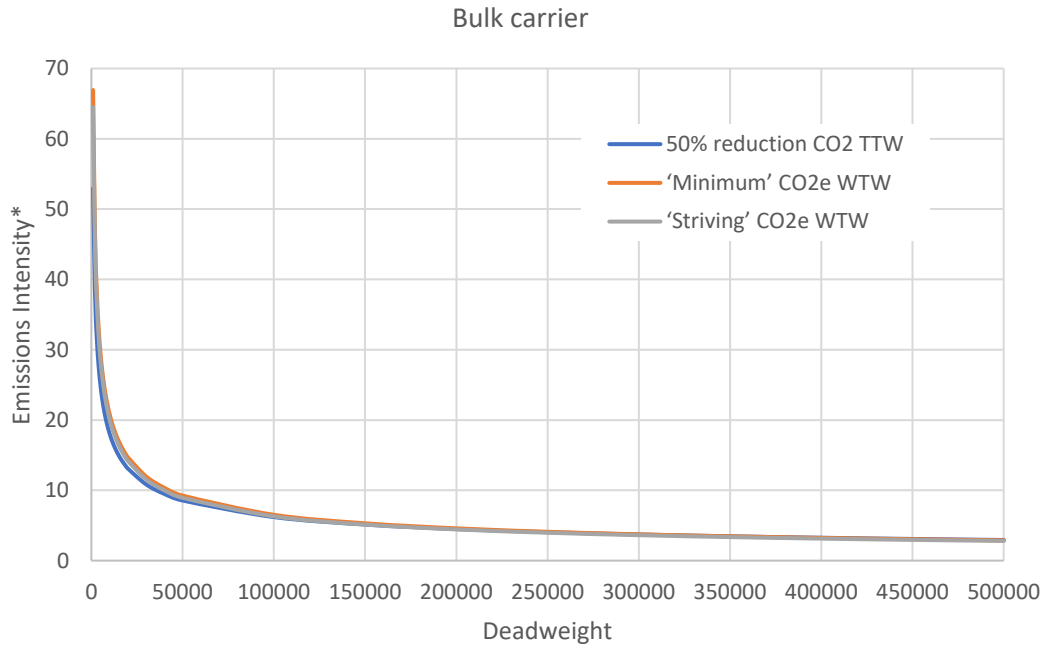
Ship Size	Bulk carrier (Deadweight)			Chemical tanker (Deadweight)			Liquefied gas tanker <= 100,000 m^3 (Capacity (cbm))			Liquefied gas tanker > 100,000 m^3 (Capacity (cbm))			Oil tanker (Deadweight)		
	50% reduction (gCO_2/tnm)	Minimum (gCO_2e/tnm)	Striving (gCO_2e/tnm)	50% reduction (gCO_2/tnm)	Minimum (gCO_2e/tnm)	Striving (gCO_2e/tnm)	50% reduction (gCO_2/tnm)	Minimum (gCO_2e/tnm)	Striving (gCO_2e/tnm)	50% reduction (gCO_2/tnm)	Minimum (gCO_2e/tnm)	Striving (gCO_2e/tnm)	50% reduction (gCO_2/tnm)	Minimum (gCO_2e/tnm)	Striving (gCO_2e/tnm)
1000	52.95	66.92	64.54	216.76	240.48	238.15	292.78	324.77	321.80	93.92	104.19	103.18	140.02	251.27	242.28
2000	38.32	47.13	45.45	128.71	142.79	141.41	187.04	207.48	205.58	76.37	84.72	83.90	95.35	158.88	153.19
3000	31.71	38.39	37.02	94.88	105.26	104.24	143.92	159.64	158.18	67.66	75.06	74.34	76.16	121.51	117.16
4000	27.73	33.19	32.01	76.42	84.78	83.97	119.49	132.55	131.34	62.10	68.89	68.22	64.93	100.46	96.86
5000	24.99	29.65	28.59	64.62	71.69	70.99	103.44	114.74	113.70	58.09	64.45	63.83	57.38	86.68	83.58
6000	22.95	27.04	26.07	56.34	62.50	61.90	91.94	101.99	101.05	55.02	61.04	60.45	51.86	76.83	74.08
7000	21.36	25.01	24.12	50.17	55.66	55.12	83.22	92.31	91.47	52.54	58.29	57.73	47.61	69.39	66.90
8000	20.07	23.38	22.54	45.38	50.34	49.86	76.34	84.68	83.91	50.49	56.02	55.47	44.22	63.52	61.25
9000	18.99	22.02	21.24	41.53	46.08	45.63	70.74	78.47	77.75	48.75	54.08	53.56	41.42	58.76	56.66
10000	18.08	20.88	20.14	38.37	42.57	42.15	66.08	73.31	72.63	47.24	52.41	51.90	39.07	54.81	52.85
11000	17.30	19.90	19.19	35.71	39.62	39.24	62.14	68.93	68.29	45.91	50.94	50.44	37.06	51.46	49.62
12000	16.61	19.04	18.36	33.45	37.11	36.75	58.74	65.16	64.56	44.74	49.63	49.15	35.32	48.58	46.84
13000	16.00	18.29	17.63	31.50	34.94	34.61	55.78	61.87	61.30	43.68	48.46	47.99	33.78	46.08	44.43
14000	15.46	17.61	16.98	29.79	33.05	32.73	53.17	58.98	58.44	42.73	47.40	46.94	32.42	43.87	42.30
15000	14.97	17.01	16.40	28.28	31.38	31.08	50.85	56.40	55.89	41.85	46.43	45.98	31.21	41.92	40.42
16000	14.52	16.46	15.88	26.94	29.89	29.60	48.77	54.10	53.60	41.06	45.55	45.11	30.11	40.17	38.73
17000	14.12	15.97	15.40	25.74	28.56	28.28	46.90	52.02	51.54	40.32	44.73	44.30	29.12	38.59	37.21
18000	13.75	15.51	14.96	24.66	27.36	27.09	45.19	50.13	49.67	39.64	43.97	43.55	28.21	37.16	35.83
19000	13.40	15.09	14.55	23.68	26.27	26.01	43.64	48.41	47.97	39.00	43.27	42.85	27.37	35.85	34.57
20000	13.09	14.71	14.18	22.78	25.27	25.03	42.22	46.83	46.40	38.41	42.61	42.20	26.61	34.66	33.41
30000	10.83	11.98	11.55	16.79	18.63	18.45	32.48	36.03	35.70	34.03	37.76	37.39	21.25	26.50	25.56
40000	9.47	10.36	9.99	13.53	15.01	14.86	26.97	29.92	29.64	31.23	34.65	34.32	18.12	21.91	21.13
50000	8.53	9.25	8.92	11.44	12.69	12.57	23.35	25.90	25.66	29.22	32.42	32.10	16.01	18.91	18.23
100000	6.18	6.52	6.28	6.79	7.53	7.46	14.92	16.55	16.39	23.76	26.36	26.11	10.90	11.95	11.53
150000	5.11	5.31	5.12							21.05	23.36	23.13	8.71	9.14	8.82
200000	4.47	4.59	4.42							19.32	21.43	21.23	7.42	7.56	7.29
250000	4.03	4.10	3.95							18.08	20.05	19.86	6.56	6.52	6.29
300000	3.70	3.74	3.60							17.12	18.99	18.81	5.93	5.78	5.57
350000	3.44	3.46	3.33										5.44	5.22	5.03
400000	3.23	3.23	3.12										5.06	4.78	4.61
450000	3.06	3.04	2.94										4.74	4.42	4.26
500000	2.91	2.89	2.78										4.47	4.12	3.98

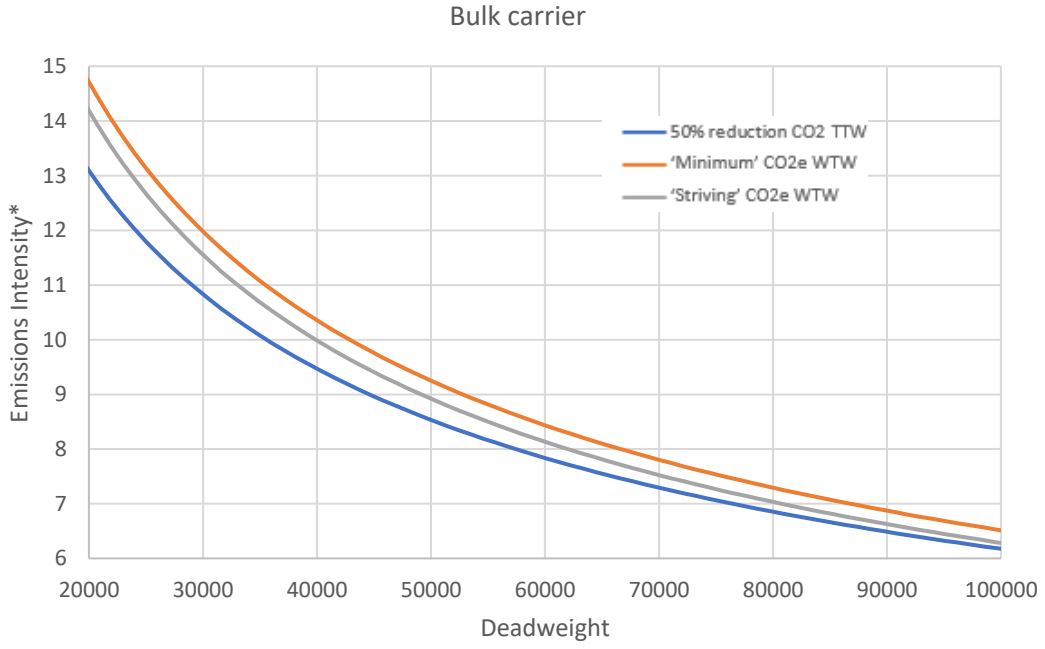
Please Note: graphical representation of these numbers can be found in the following slides.

2024 Reporting Continued…

Graphs depicting the 2022 data from the preceding slide's tables are presented in the following slides.

It is important to note that, due to scaling, variances amongst the trajectories are not readily apparent. Consequently, to highlight more nuanced distinctions amongst the trajectories the graph pertaining to each vessel type (bottom left of this and following slides) have been magnified (bottom right of this and following slides).



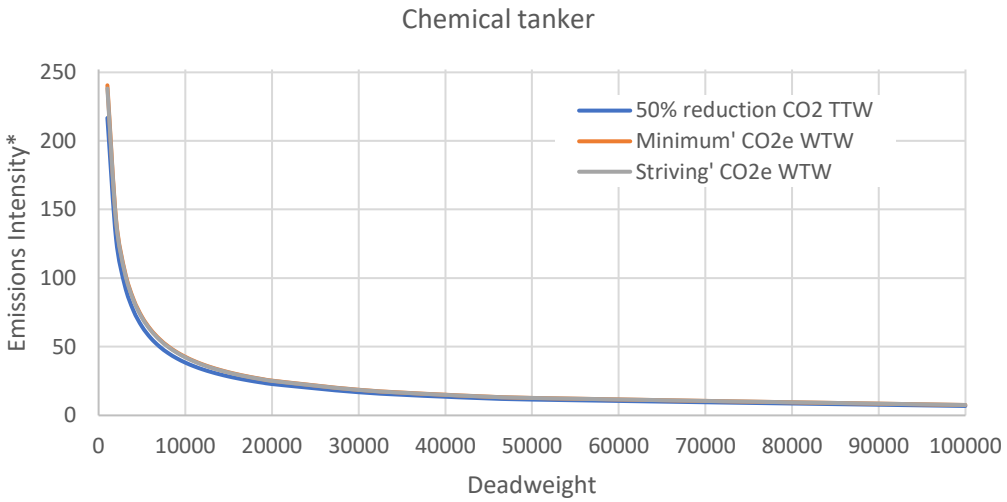


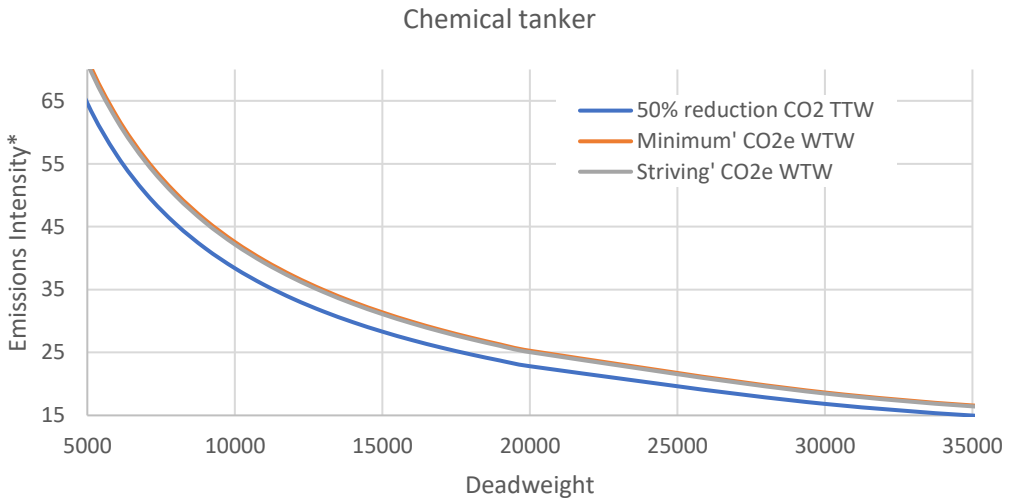
*Emissions Intensity units:

For 50% reduction CO_2 TTW is gCO_2/tnm

For 'Minimum' CO_2e WTW and 'Striving' CO_2e WTW is gCO_2e/tnm

2024 Reporting Continued…





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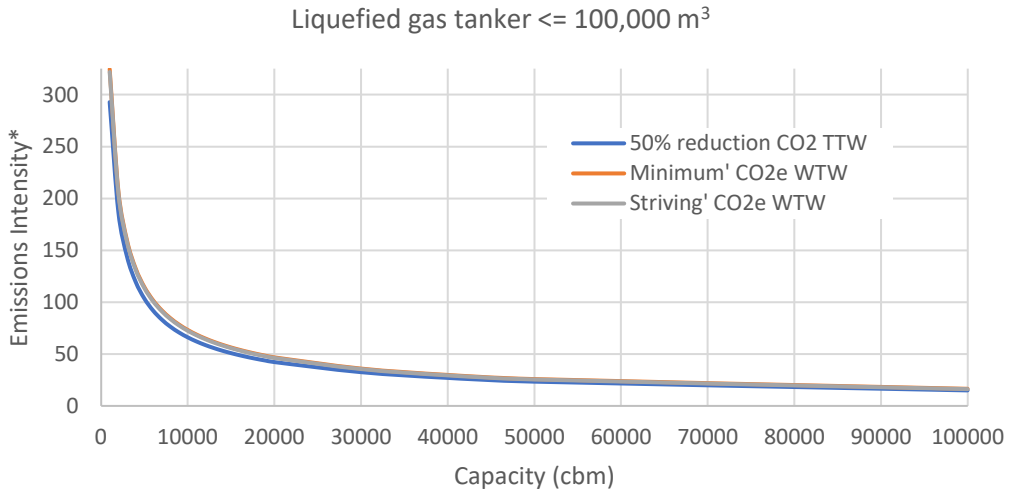
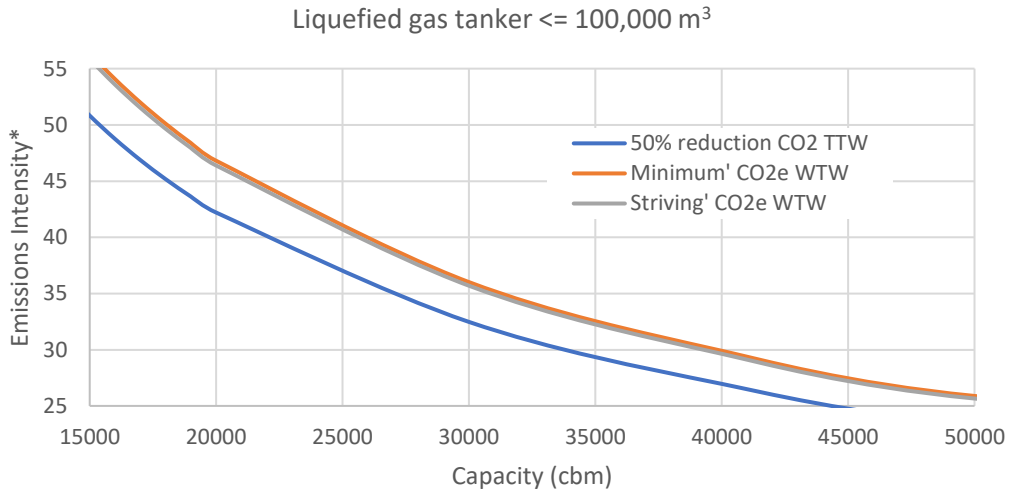
2024 Reporting Continued…





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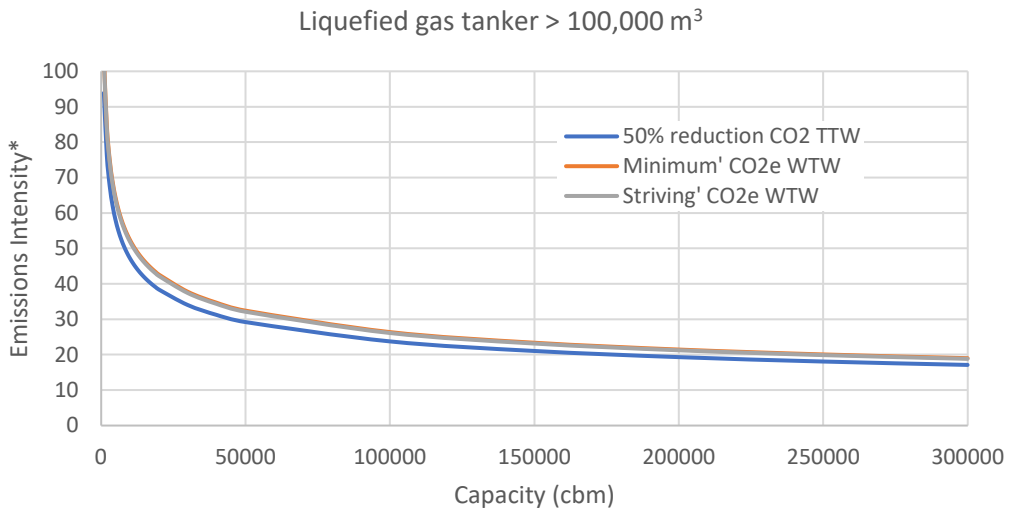
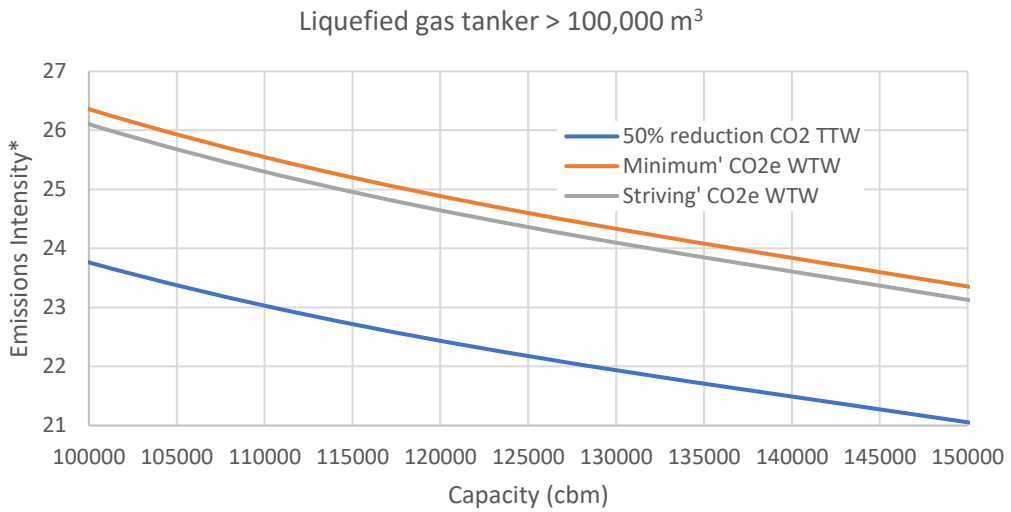
2024 Reporting Continued…





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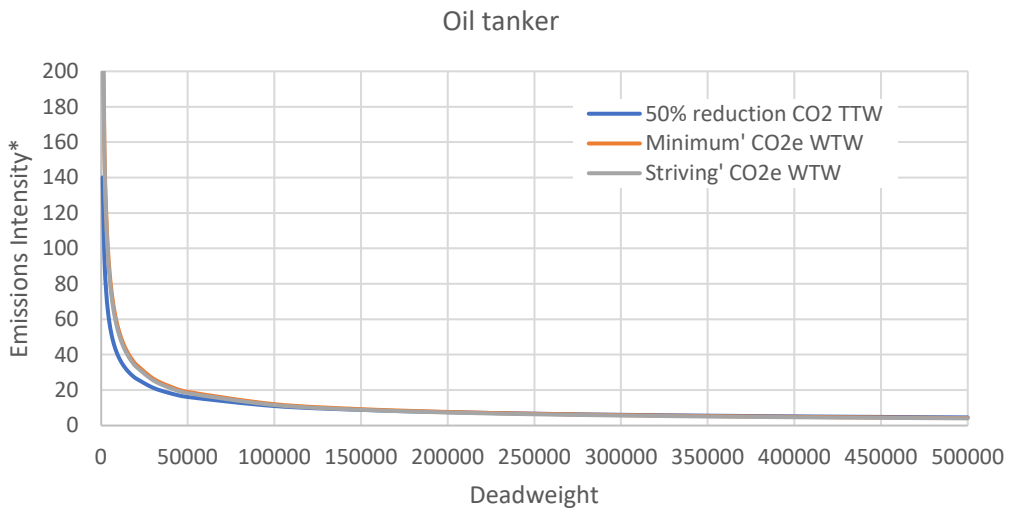
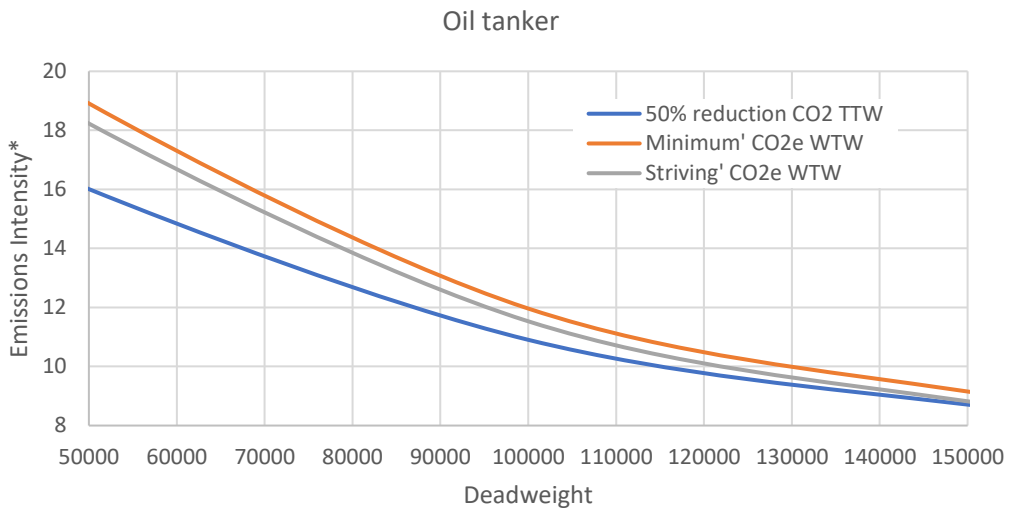
2024 Reporting Continued…





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For 'Minimum' CO_2e WTW and 'Striving' CO_2e WTW is gCO_2e/tnm