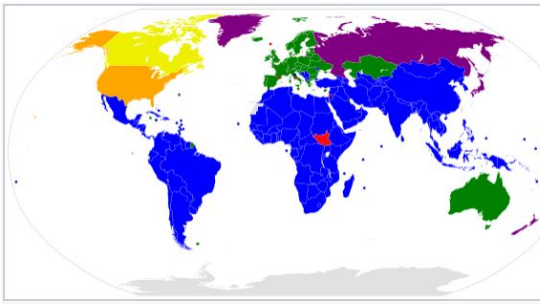
BERNHARD SCHULTE
EEXI: "Boon or Bane", "Carrot or Stick" with IMO-Regulations?
A shipowner's view.

IMO's strategic goals for reducing shipping's CO_2 emissions are ambitious. Ships shall reduce by 40% in 2030 respectively pursuing up to 70% by 2050. For the least, shipping shall lower its total annual GHG emissions by 50% in 2050 compared to 2008.

Ever since their definition these goals have seen increasing trade volumes and in all calculated scenarios (by IMO), shipping will – most likely – miss these targets by about 65% – at least[A].

Background:
Carbon Pricing as an "emission trading"-scheme – also known as "Cap and Trade (CAT)"-scheme – has been introduced as early as 1966 [A]. The basic concept goes back to Thomas Crocker, in those days PhD student at the University of Wisconsin-Milwaukee, who argued that optimal results for all interested stakeholders could be reached, if a fair trade on a clearly set goal is established. Based on true competition and most cost efficient, such trade would ensure an overall result with minimal cost for all parties involved[B]. According to economic theory such CAT-scheme is as cost effective as any other environmental taxation while from apolitical, organizational, economical and societies' perspectives it is considered to be much more efficient than "traditional" (= governmental) "command-and-control"-schemes.

In 1990 the first "Intergovernmental Panel on Climate Change (=> IPCC)" highlighted the imminent threat of climate change and "greenhouse gas" (=> GHG) emissions. Diplomatic efforts were started to find an international framework on how to regulate such emissions. Back in December 1997, the so called "Kyoto Protocol" was adopted, the first international treaty on GHG-emissions, which officially entered into force in February 2005.



Within this treaty most of the developed nations agreed on binding targets for their emissions of the six major greenhouse gases: Carbon dioxide (CO_2); methane (CH_4); nitrous oxide (N_2O); hydrofluorocarbons (HCFCs); perfluorocarbons (PFCs) and Sulphur hexafluoride (SF_6). From the "developed" countries, only the USA didn't ratify the treaty but all-in 84 countries signed and (almost) all UN members acknowledged the protocol accordingly. Besides the USA only Andorra, Canada and South Sudan decided to become "non-parties". The Kyoto Protocol can be considered as THE initiation of emission trading.

The first "large" (= biggest coverage) greenhouse gas emissions trading scheme worldwide is the "European Union Emissions Trading System" (EU ETS), launched in 2005. At that time 24 (publishing) member states confirmed emissions of 2,012 MT CO_2, of which Germany alone "contributed" 475 MT or 23.6% *[C]. The reason for specifically picking Germany in this context and as a "blueprint" example? The countries' current emissions are (more or less) on the level of international shipping: Almost 1,000 MT/yr., or roughly 3% of the world's CO_2 emissions, are originating from international shipping[D].

Emissionen in Millionen Tonnen CO_2[6]

Rang (2018)	Land	1950	1960	1970	1980	1990	2000	2010	2015	2016	2018	Anteil* %	2018 rel. 1990 %***
1	Volksrepublik China	79	798	796	1500	2490	3530	8900	10200	10200	11256	29,7	+352
2	Vereinigte Staaten	3140	3620	4840	5160	5250	6110	5780	5480	5360	5275	13,9	0
3	Indien	76	151	240	343	655	1050	1610	2110	2200	2622	6,9	+300
4	Russland	396	898	1540	2340	2610	1520	1680	1690	1690	1748	4,6	−33
5	Japan	111	258	831	1010	1160	1260	1210	1220	1210	1199	3,1	+3
6	Deutschland	525	847	1080	1150	1060	911	843	805	809	753	2,0	−29
7	Iran	1	38	93	123	213	378	584	655	659	728	1,9	+242
8	Südkorea	3	15	59	141	268	448	600	651	662	695	1,8	+159
9	Saudi-Arabien	4	2	41	143	140	255	468	547	551	625	1,6	+346
10	Kanada	149	199	342	430	465	574	558	567	560	594	1,6	+28
11	Indonesien	11	23	44	124	185	312	468	390	392	558	1,5	+202
12	Brasilien	26	61	116	201	225	361	451	505	472	500	1,3	+122

The average CO_2 emission over the last six decades caused by Germany was at 917 MT/yr., which actually ranks their emissions under the top 6 single sourced worldwide [E].

Development of the EU ETS:

In an initial phase from 2005-2007 the EU emission trade system (ETS) covered approx. 40% of the CO_2 emissions in the EU, based on some 12,000 installations for energy and power generation. In addition, large production and processing facilities (mainly metals), as well as mineral industry (glass, cement, bricks and clinker) and pulp, paper and (wooden) board "activities" were covered [C]. Officially starting 1 January 2005, within that very first year, 362 MT of CO_2 emissions were traded – at a volume of 7.2 Billion EUR and not considering futures and options. Directly from the start until April 2006, the CO_2/T-price climbed up to nearly 30 EUR until rumours arose that granted emissions for the 12,000 installations are actually below expectations (by 4%). In the following year and after a sharp drop directly in May 2006 (10 EUR) the prices continuously deteriorated down to 1.2 EUR/T (March 2007) to almost zero by the end of 2007, which also marked the end of phase I and the expiry of the initial pricing scheme.

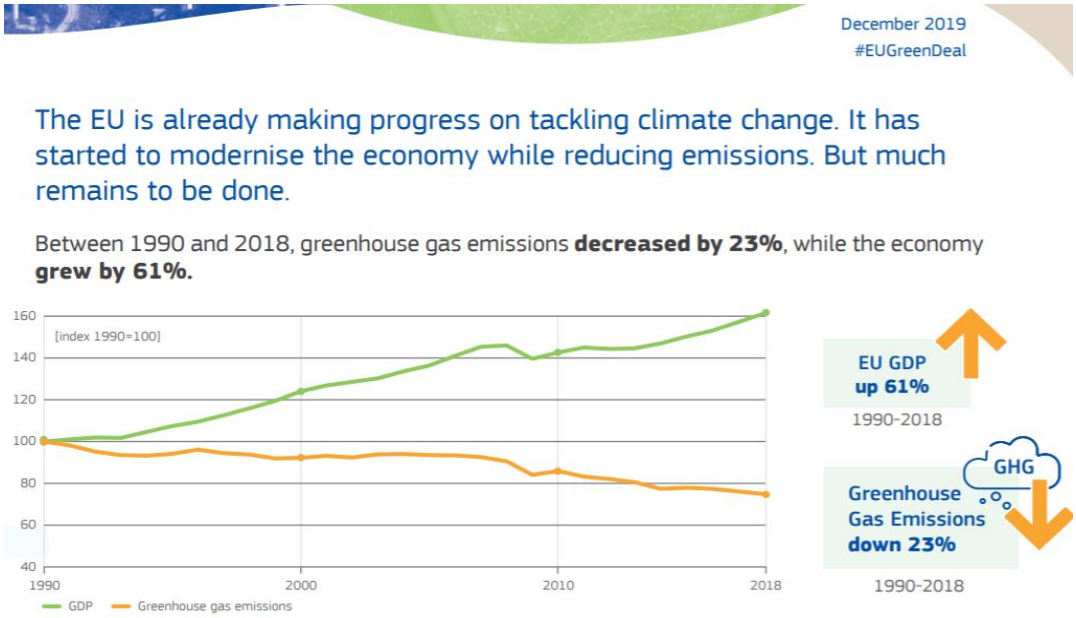
Phase II, from 2008 to 2012, significantly expanded the scope of the ETS, as it was even joined by non-EU-members (and in 2007 already): The first countries were Iceland, Liechtenstein and Norway. As in phase I, the first year saw a decent rise-up to 22 EUR/T until September 2008, which went back down to 13 EUR/T during the first half of 2009. Besides the worldwide recession and in the following lower expectations for future fuel prices the coming years saw an "oversupply" of EU allowances ("CO_2 emission permits"). Economical growth and CO_2 emissions stayed behind expected and by the EU already granted emissions. In late January 2013 the CO_2/T cost merely 2.8 EUR, a more than 5 years low.

Phase III, from 2013 until 2020, brought several changes and stricter rules:

- An overall EU cap was introduced (with limited allowances for each member state)
- Tighter limits for the use of offsets
- A move from allowances to auctioning
- Inclusion of more sectors (no aviation!) and gases (calculated as CO_2-equivalent)
- Limited banking of allowances from phase II and phase III

Towards the end of phase III, in 2019, and with increasing public pressure, the European Union launched the so called "European Green Deal". Main and ambitious goal: To be carbon neutral in the next three decades, by 2050.

Looking back at 1990 and the last three decades: We had economic growth of 61% while emitting 23% less green house gases (GHG)[F].



<u>"Results" of EU ETS and current status so far:</u>

Emissions in the EU have initially been reduced at costs that were significantly lower than originally projected. Overall, the estimated costs were only a fraction of 1% of GDP[G]. According to the European Commission the first five years of the ETS showed encouraging effects as the reduction in CO_2 emissions per covered installation was at 17,000 T (on avg.), which is an 8% reduction across the included sectors[H].

Critical research on these first five years, e.g. by UBS[J] in 2011, stated that EU ETS had cost EU countries as much as USD 287 billion. Such an investment would have caused a 40% reduction in CO_2 emissions if spent on technologies for power plants and other energy intense sectors directly. Indeed, the calculation and allocation of the CO_2-emissions´ reduction to specific installations and industry sectors are limiting the general effects. Considering aviation, transportation and worldwide shipping may help in judging on the "real" effects.

CO_2 pricing in shipping:

The European Commission decided to expand the GHG emission schemes and cover "international" shipping accordingly. With IMO declaring their GHG goals for ships by 2030 and 2050, the EU Commission criticized these as "not sufficiently ambitious" and decided on shipping's inclusion in the "European Green Deal" roadmap per 2023. Unfortunately, this regulation neither considers an existing fleet of >55,000 vessels[K] nor its infrastructure – worldwide... (the worldwide capacity for renewable energy (2,588 GW) would be absorbed considering the efficiency of alternative energies´ production and power installation in ships).

- Considering current levels of CO_2-prices, shipping would have to pay 30 USD/T CO_2
- Based on emissions of 900 MT this results in a "taxation" of 27 billion USD
- Considering 764 million TEU plus 3.21 billion T of bulk freight in 2018 this means (at 14 T homogeneous/TEU and w/o tankers) a total of almost 14 billion T in worldwide traded per year [T_{ty}]. Or in other words less than 2 USD / T_{ty} surcharge for CO_2
- Picking an assumed "worst-case" price level of 250 USD/T we would end up slightly above 16 USD / T_{ty}
- Combining this with other relevant GHG emissions (while these are converted into "impacting" T of CO_2) we would have NO_X with an impact-factor of 298 at an emission of almost 24 MT leading to 8,052 MT => 2,013 billion USD resulting in 144 USD / T_{ty}
  Please note in this context: Natural NO_X emissions are generated / contributing about 20 MT/year (and therefore pretty much at the same level as shipping with its 24 million MT)

Conclusion:

There is no "reasonable" level of carbon pricing with a "realistic" effect on shipping. Simply because the volume of worldwide trade is so high, the leverage on that is by the very same factor diminishing. In this context it is inevitable to consider other business sector's / emitters' leverage being totally different. Considering the reasonability of taxations, these must be benchmarked to common sense, to fairness and their social impact and (im-)balances. Since significant price effects / inflation is likely to accompany such regulations, their effect can certainly multiply.

So: What we learn from these calculations is that a carbon taxation for shipping has to shift from stick to carrot in order to be effective – otherwise it is just further increasing prices which in turn would again only affect end users and worldwide consumers and not lower emissions.

Consequentially one has to establish a bonus system, which rewards CO_2 savings instead of punishing emitters. As well being argued by the complexity of shipping: Charterer decides on how much cargo is placed on board. He decides on speed and therefore fuel consumption. He decides "what to burn", "where to go" and "when at all". He pays for the bunker but doesn't have to bear CAPEX or OPEX – so for him its only charter and fuel cost. Following a "costs-by-cause-principle", a bonus scheme which directly(!) "pays avoidance" would be best to REALLY lower emissions.

APPENDIX – List of References / Bibliography

[A] *ABS, American Bureau of Shipping (2021): Sustainability Outlook III, 2021 July 05*
Page 6, Figure 2: Scenarios of 2050 for emissions from shipping
© RMI

[B] *Newly Released Paper Details Origins of Cap-and-Trade.*
(Memento 12 August 2014, webarchive: *archive.today*);
In: *The Washington Independent.* 1 November 2010

[C] Wikipedia: "European Union Emission Trading Scheme"
https://en.wikipedia.org/wiki/European_Union_Emission_Trading_Scheme

[D] ABS, American Bureau of Shipping (2015): " IMO Green House Gas Study, 2014"
Scrubber Seminar at Palmaille 29; 20767 Hamburg; 22 January 2019

[E] Wikipedia: List of the largest carbon-dioxide-emitters worldwide (by country)
(= "Liste der größten Kohlenstoffdioxidemittenten weltweit")
https://de.wikipedia.org/wiki/Liste_der_gr%C3%B6%C3%9Ften_Kohlenstoffdioxidemittenten

[F] European Union / European Commission: "Home/Press Corner: The EU's track record on climate action"; Factsheet, 11 December 2019, Brussels
https://ec.europa.eu/commission/presscorner/detail/en/fs_19_6720

[G] Grubb, M.; et al. (3 August 2009); "Climate Policy and Industrial Competitiveness: Ten Insights from Europe on the EU Emissions Trading System"; Climate Strategies. Retrieved: 28 June 2010.

[H] "The EU ETS is delivering emission cuts" (PDF). European Commission, 2011. Retrieved: 8 August 2012.

[J] Maher, Sid (23 November 2011). "Europe's $287bn carbon 'waste': UBS report". The Australian. Archived from: "The original"; 28 November 2011.

[K] "Jahresbericht des Marinekommandos 2020": 2.3 Entwicklung der Welthandelsflotte, (S. 120 & 121); 4.1 "Globale Energieversorgung", Gesamtkapazitäten eneuerbarer Energien 2019 (S. 221)