BIOFUEL TRIAL 2022
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RENEWAL ENERGY DIRECTIVE

A reference to Directive (EU) 2018/2001 on Renewable Energy can be found at page 69 of RED II. This article explains how greenhouse gas emissions from biofuels should be calculated.

To promote renewable energy sources in the EU, a common framework was established. By 2030, the EU must set a binding target of 32% for the share of renewable energy in its gross final energy consumption.

In addition, the proposal establishes criteria for the sustainability and reduction of greenhouse gas emissions for biofuels, bioliquids, and biomass fuels, as well as rules for providing financial incentives for renewable energy.

Fit for 55 was released a year ago, and it includes a proposal to revise RED II and suggest higher targets (at least 40% instead of 32%).

BIOFUELS

Biofuels are renewable fuels derived from biological organisms (biomass) in which vegetable and animal fats are the primary raw material.

Generally speaking, biofuels are considered to be carbon neutral since most of the carbon dioxide (CO_2) released during combustion is absorbed by source plants. (overall life cycle of carbon dioxide (CO_2)).

IMO ON BIOFUEL

Despite the fact that biofuels emit CO_2 when they are burned, they are primarily considered to have zero CO_2 emissions.

The methodology set out in REDII assumes that biofuels and bioliquids will have zero emissions. By doing so, RED II sets a valuable foundation.

The IMO is currently developing a procedure for evaluating the CO_2 reduction effect of biofuel in life cycle accounting in order to take into account the reduction of GHG emissions (conversion factor in IMO EEDI and EEXI, as well as emission factor in IMO DCS and CII) from ships using biofuels.

STATUTORY REQUIREMENTS

Additionally to the requirements applicable to conventional petroleum-based fuel oils (e.g. SOLAS flash point requirements, MARPOL Annex VI sulphur content requirements, etc.),

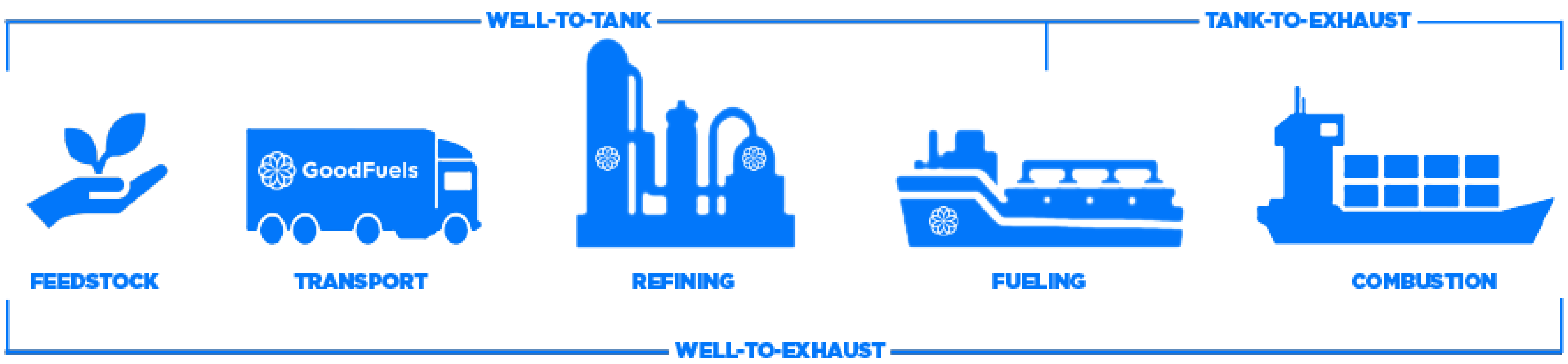
Regulations MARPOL Annex VI, Section 18.3.2, which relates to fuel oils produced by methods other than petroleum refining, applies to these oils.

Specifically, under 18.3.2.2, fuel oil derived from processes other than petroleum refining shall not cause an engine to exceed the applicable NOx emission limits.

Therefore, it is essential to demonstrate that NOx emissions from onboard diesel engines do not exceed the applicable NOx limit when using biofuel.

CARBON FACTOR ANALYSIS

WTE = WTT+TTE



CONCLUSION

Emissions from the carbon cycle or net carbon dioxide emissions cannot be calculated solely through the amount of carbon dioxide produced by burning fuel. It is calculated based on the entire life cycle of the product, including growth of biomass. Using only wastes and residues as feedstocks results in even greater reductions in CO_2 emissions. An analysis was made of the good fuel bunker delivery statement to determine how much CO_2 emissions were reduced. By using this value, we have already been able to determine how much CO_2 will be generated by the burning of biofuels in our engine.

Onboard testing and calculation results (TTE):

- Ef (t)-total emissions from fossil fuel (VLSFO) comparator for transport at 75% MCR = 602.1g/kwhr
- Eb(t)- total emissions from biofuel comparator for transport at 75% MCR = 566.9g/kwhr

Total CO2 emission reductions onboard:

- TTE= (602.1-566.9)/602.1 = 6.08%

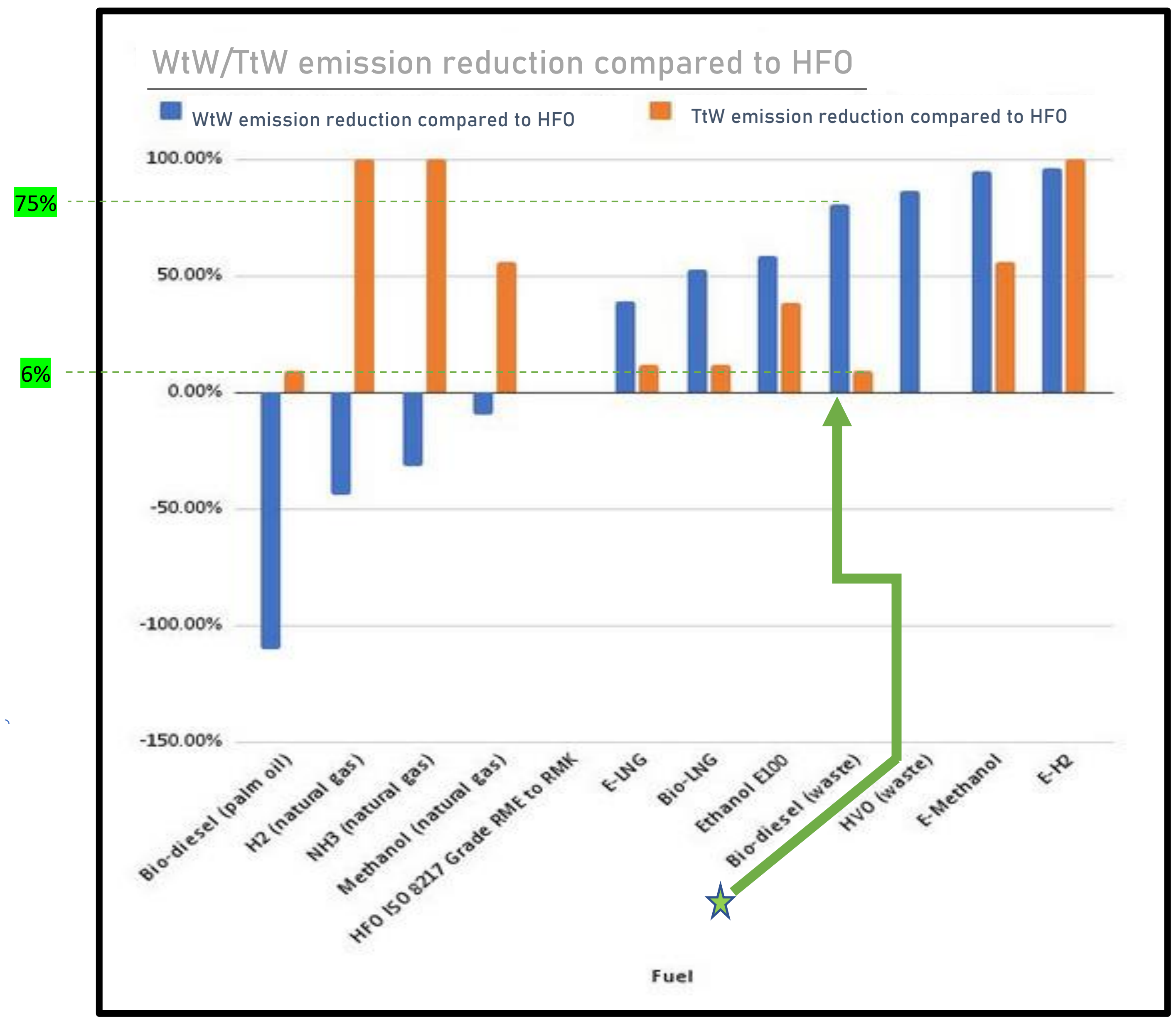
Overall savings for this trial in CO2 emission (WTE):

- When compared to VLSFO burning it is 75% (WTE=WTT+TTE).

Note: Direct calculation based on carbon factor EU MRV WTE.

(3.1510-O.77)/3.1510 = 75.5%

Fame-type biofuel blends (DENSITY 0.880 KG/M3) and (distillate) DM (DENSITY 0.9880 KG/M3) fuel grades produced similar NOx levels on average, an increased trend of NOx emissions was observed with 100% FAME type biofuel B-100 compared to the tested DM grade fuels at lower loads. On an average, the NOx levels of the fame type b100 are in the same range as the tested RM (residual) grade fuels at higher loads.



EMISSION TEST RESULTS

BIOFUEL	FAME – BIOMDF-100				
ENGINE	MAN B&W 6S50MC				
NOX RESULTS NOMINAL LOAD	25%	50%	64%	75%	FUEL CONSUMPTION MT/DAY
LSMGO	NA	13.53	13.80	14.08	33.2
BIO –MDF- 100	17.26	13.72	14.34	13.44	34.75
BIO-MDF-100+VLSFO	17.80	12.74	14.8	14.07	31.77
VLSFO	16.11	13.01		14.08	31.2
CO2 RESULTS NOMINAL LOAD	25%	50%	64%	75%	FUEL CONSUMPTION/DAY
LSMGO	NA	618.9	605.4	552	33.2
BIO –MDF- 100	669.6	606.9	570.2	566.9	34.75
BIO –MDF- 100 +VLSFO	690.1	634.4	602.4	574.0	31.77
VLSFO	680.7	631.1	602.4	602.1	31.2
SOX RESULTS NOMINAL LOAD	25%	50%	64%	75%	FUEL CONSUMPTION/DAY
LSMGO	17.2	19.03	44.92	NA	33.2
BIO –MDF- 100	6.44	7.69	7.77	12.15	34.75
BIO –MDF- 100 100+VLSFO	59.21	67.19	67.77	68.3	31.77
VLSFO	85.2	95.29	95.5	95.97	31.2