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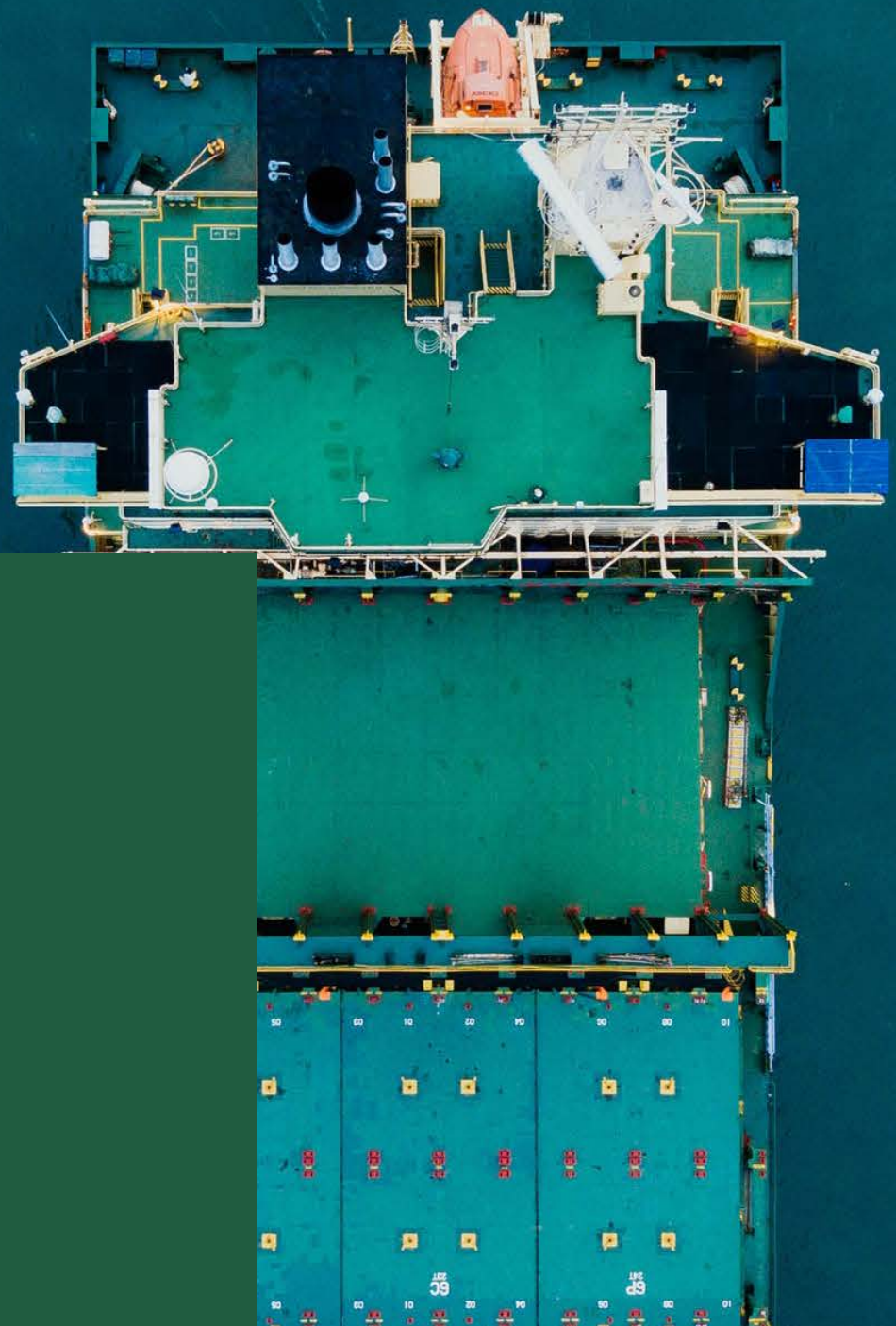
COMMON SENSE ABOUT 2020

PIRAEUS 31-05-2018

1 YEAR, 7 MONTH, 0 DAYS TO 01-01-2020



- Availablility.
- 2020 Product qualities.
- Fuel systems.
- ~~Scrubbers~~

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CRUDE OIL SOURCES

- Steady supply of sweet crude (not taking political turmoil, civil wars etc. into consideration)
- Increased availability of heavy-sour crude
- Improved technology for development of existing wells
- Improved technology for exploration of new sources such as ”deep water”, fracking etc.

- All in all - Increased supplies and sufficient reserves for next 30+ years

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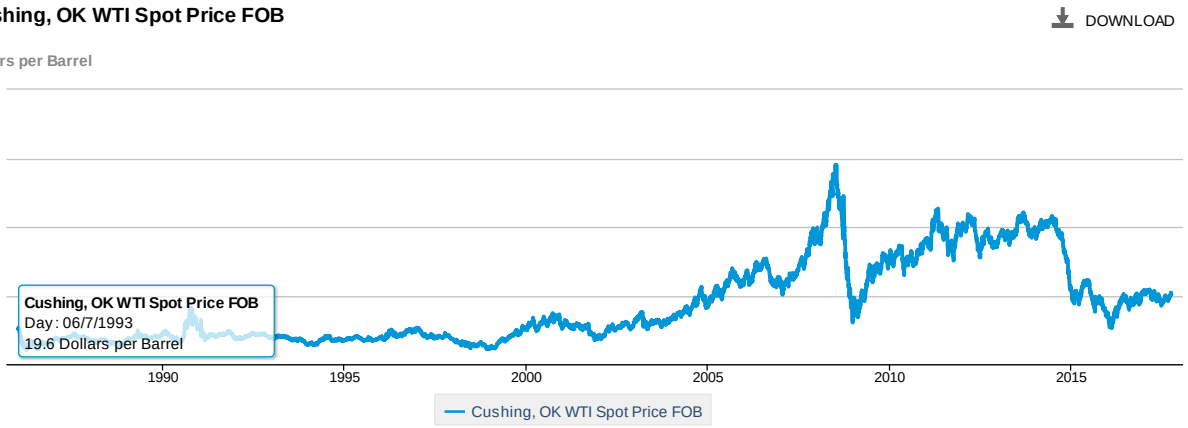
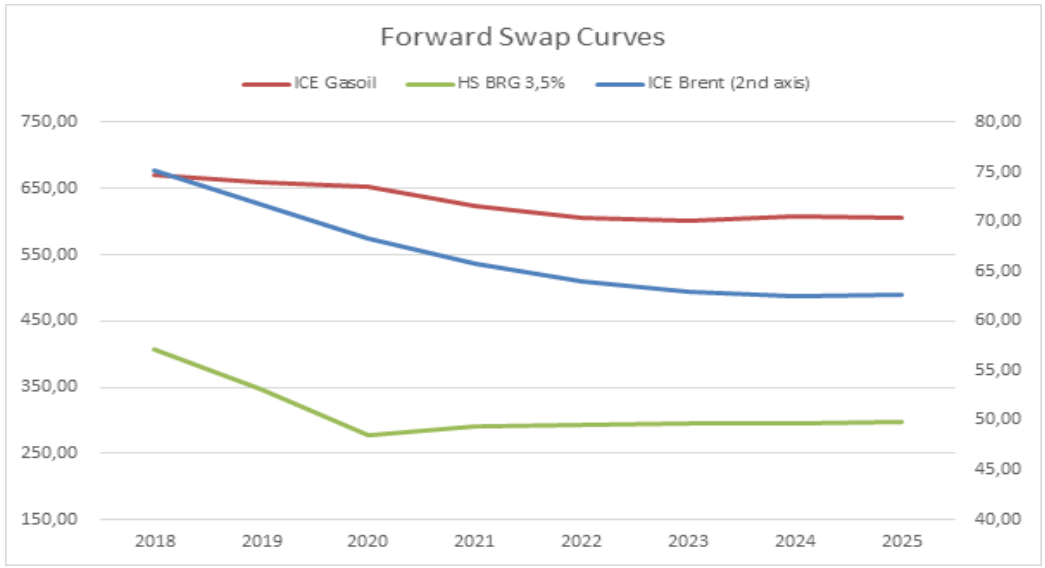
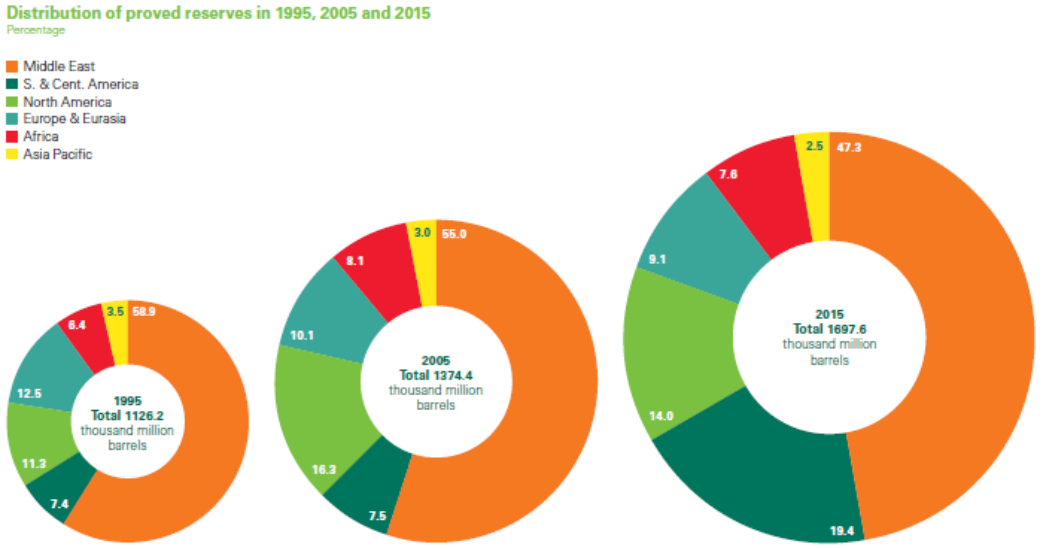
CRUDE OIL







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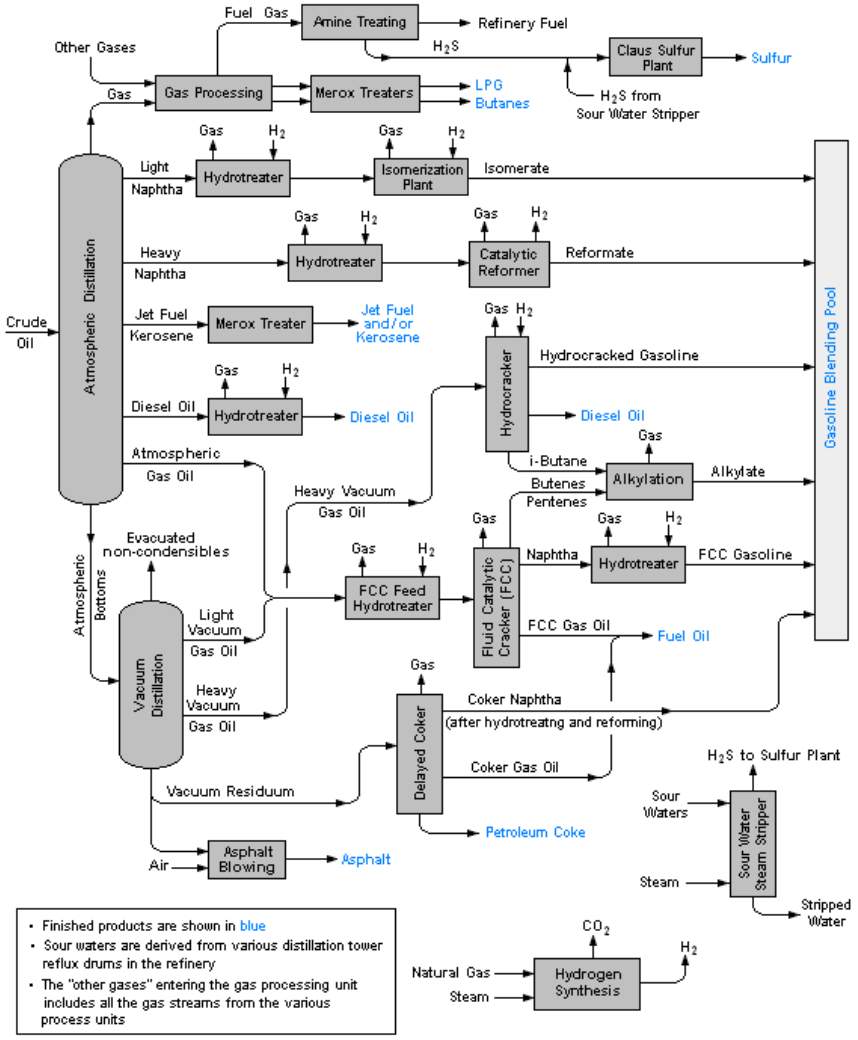
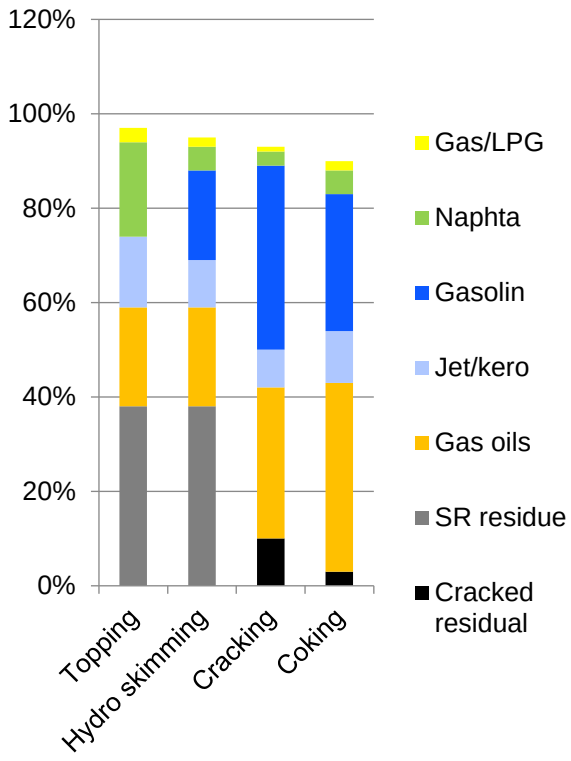
REFINERY DESTILLATION / ALCHEMY





The yield depends on the individual feed stock blend.

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DEMAND FOR RESIDUAL FUEL OIL - CONSUMERS

Supplies:

- Total volume of SR Residue is approx 5,0 MMT/d = 1.825MMT/A

Demand:

- Shipping 2018 - 0,6 MMT/d = 222 MMT/A
- Power generation plants - 0,5 MMT/d = 166 MMT/A
- Industy - 0,3 MMT/d = 113 MMT/A
- Refinery feed stock - 3,6 MMT/d = 1.327 MMT/A

→ 0,6/5 x 100 = 12%

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DEMAND FOR RESIDUAL FUEL OIL - CONSUMERS

Supplies:

- Total volume of SR Residue is approx 5,0 MMT/d = 1.825MMT/A

	mass	sulphur	
Low sulphur product:	85%	0,10	%
High sulphur product:	15%	2,80	%
	Target blend:	0,50	%

Demand:

- Shipping 2020 - 0,1 MMT/d = 33 MMT/A
- Power generation plants - 0,5 MMT/d = 166 MMT/A
- Industy - 0,3 MMT/d = 113 MMT/A
- Refinery feed stock - 3,6 MMT/d = 1.327 MMT/A

→ 0,1/5 x 100 = 1,8%

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DEMAND FOR RESIDUAL FUEL OIL - CONSUMERS

Supplies:

- Total volume of SR Residue is approx 5,0 MMT/d = 1.825MMT/A

Demand:

- Shipping 2020 - 0,1 MMT/d = 33 MMT/A → 0,1/5 x 100 = 1,8%
- Power generation plants - 0,5 MMT/d = 166 MMT/A ?
- Industy - 0,3 MMT/d = 113 MMT/A ? → 190 MMT/A
- Refinery feed stock - 3,6 MMT/d = 1.327 MMT/A ?

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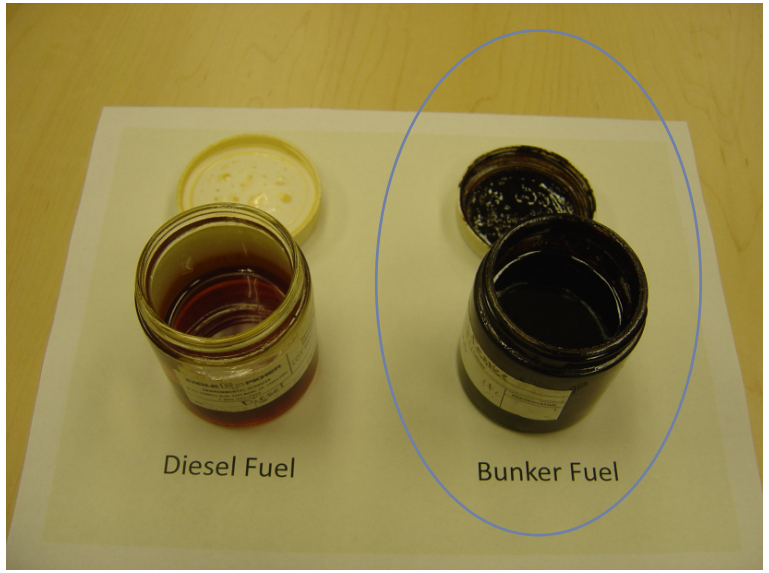
RESIDUAL FUEL OIL SUPPLIES

- There will be sufficient supply of residual high sulphur fuels (HFO) in foreseen future.
- The refiners will hardly invest in sulphur plants for shipping industry, meaning the spread residual- distillate's will widen.
- World wide Stagnation or Growth and Political interference with an environmental or climate agenda can change supply/demand balance dramatically (New ECAs – changed taxation – levy on CO2 - ETC)



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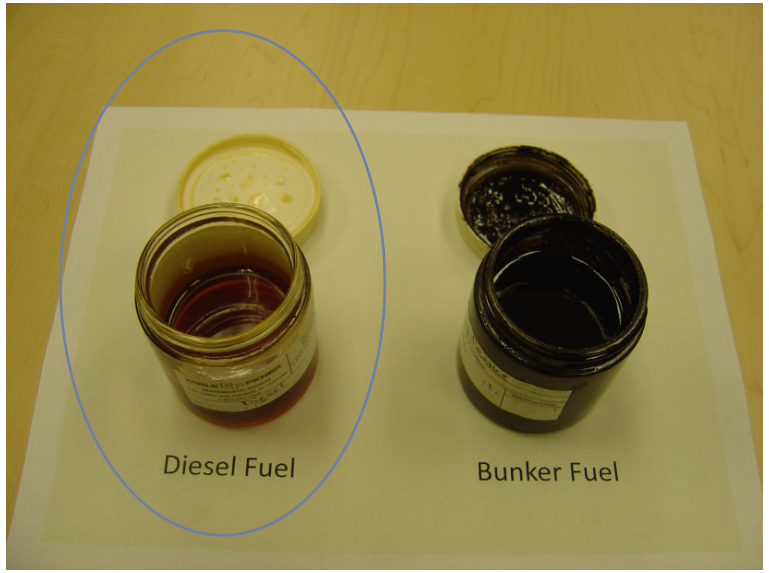
SHIPPING DEMAND FOR MIDDLE DISTILLATE'S

- Is purely politically driven by introduction of ECA 2015 and world cap 2020
- IMO - Estimated increase in 2015 was 30 MMT/A – It was more likely 20 MMT/T (excluding naval vessels)
- This corresponded roughly to 1% of the WW production

- But 2020 – Can be much different up to 200 MMT/A will change from residuels to refined products

	mass	sulphur	
Low sulphur product:	85%	0,10	%
High sulphur product:	15%	2,80	%
	Target blend:	0,50	%



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IMO AVAILIBILITY STUDIES 2020

- *The refinery sector has the capability to supply sufficient quantities of marine fuels* (Meaning 0,5%S)
- *Refineries will need to expand the capacity of their sulphur plants to fulfill 2020 demand*

Quotes from IMO availability study 2016

- *NOT ONE SINGLE WORD ON PRICES !!!*

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IMO AVAILIBILITY STUDIES 2020 VS BIMCO

- Depending of what availability is; both studies might be correct.
- BIMCO and IMO agrees that there is not sufficient sulphur plants at present or planned, where BIMCO see this as a fact which will create under-supply and increase prices. IMO assume the marked will adapt. "*Refineries will need to expand the capacity of their sulphur plants to fulfill 2020 demand*" Statement supporting my conclusion on the IMO study rely on the marked to adapt, which not ~~necessarily~~ will be the case.
- Yes, there will be sufficient 0,50% volumes, it is just a matter of pricing and interregional transportation of refined and crude products and then the marked will adapt. That Is my simple conclusion from the IMO study.
- The BIMCO study comes to a similar conclusion, but take the possibly huge price impact and negative environmental influence into consideration. Not only for shipping but for the total world economy.

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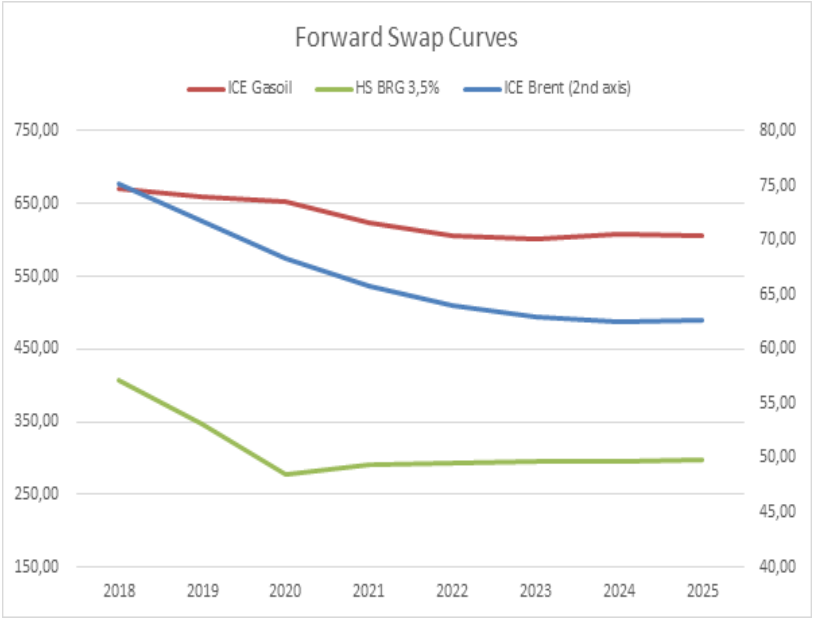
CONCLUSION ON SUPPLIES:

There will be sufficient supplies of High Sulphur Fuel Oil after 2020

There will come a significant increase in the demand for middle distillate's – Stressing the price structure



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Product quality 2020 onwards

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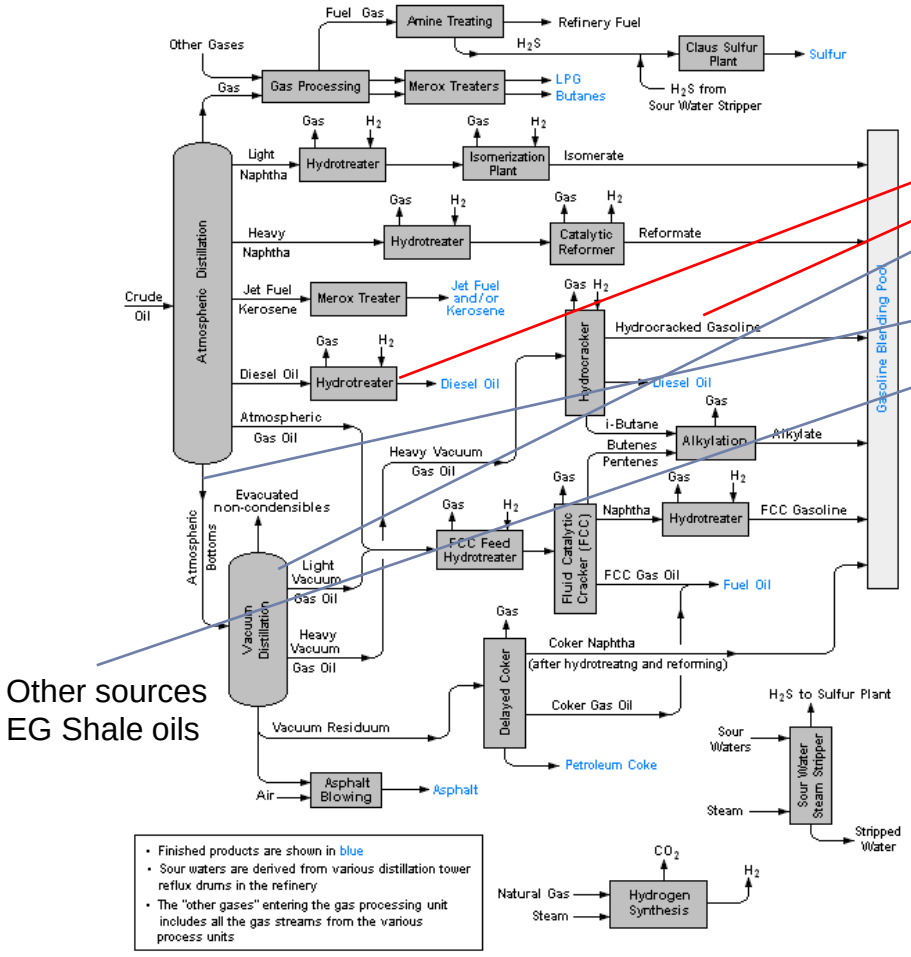
AVAILABLE BLEND COMPONENTS

- Straight run sweet residue
- Straight run sour residue
- Straight run diesel
- FCC Light-cycle oil
- Treated light cycle oil
- Treated light disillate
- Treated atmospheric gas oil
- Hydro treated gas oil
- H-oil bottoms
- Treated atmospheric residue
- Visbreaker tar
- Hydrotreated kerosine
- Desulfurized jet blend
- Vacuum residue
- Vacuum gas oil
- No 6 fuel oil
- M 100
- Slurry oil
- Shale oils
- Plus more
- All with individual characteristica, densities, sulfur content, viscosity, etc

WHAT WILL FUEL BLENDERS SUPPLY



Other sources
EG Shale oils

A

(ULTRA) LOW SULPHUR FUELS.
0,1 & 0,5%.
Main component - VGO

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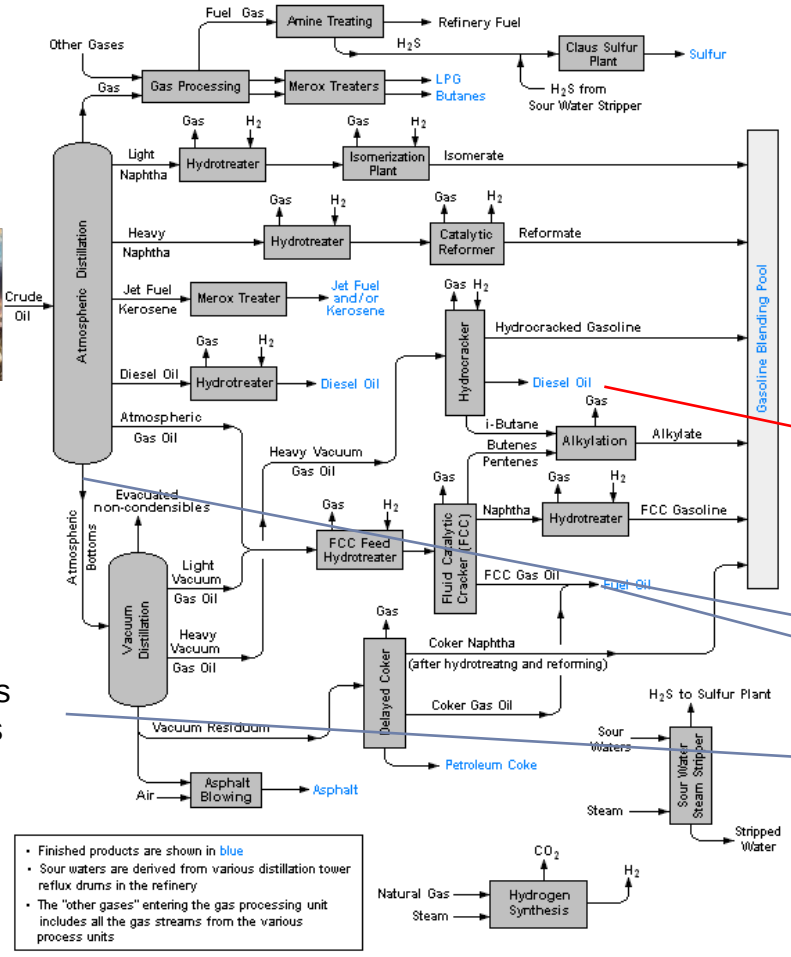
WHAT WILL FUEL BLENDERS SUPPLY



Other sources
EG Shale oils

LOW SULPHUR FUELS.
0,5%.
Main component – LCO, SR
HFO and cracked fuels

B

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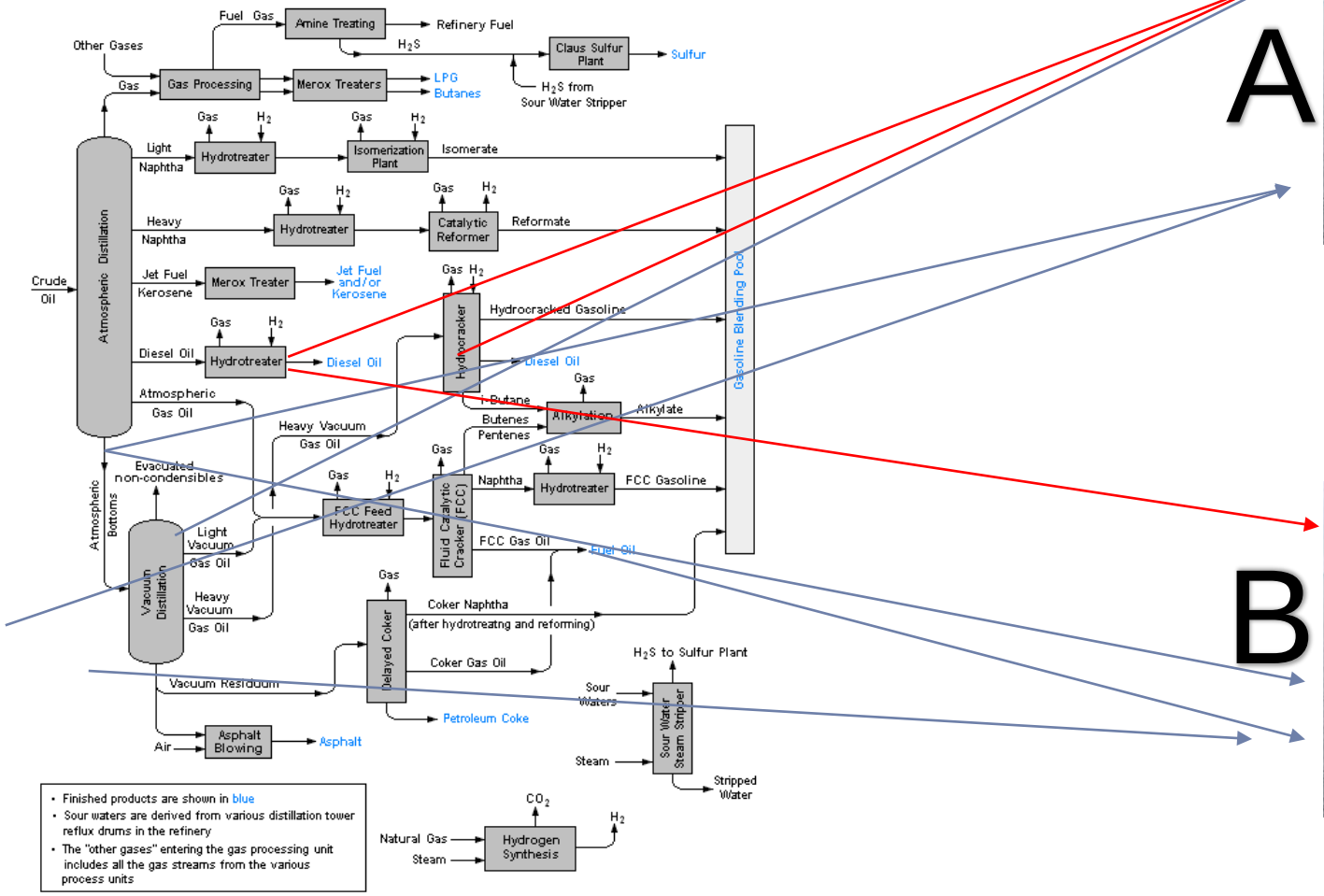
WHAT WILL FUEL BLENDERS SUPPLY

Other sources
EG Shale oils



A

B

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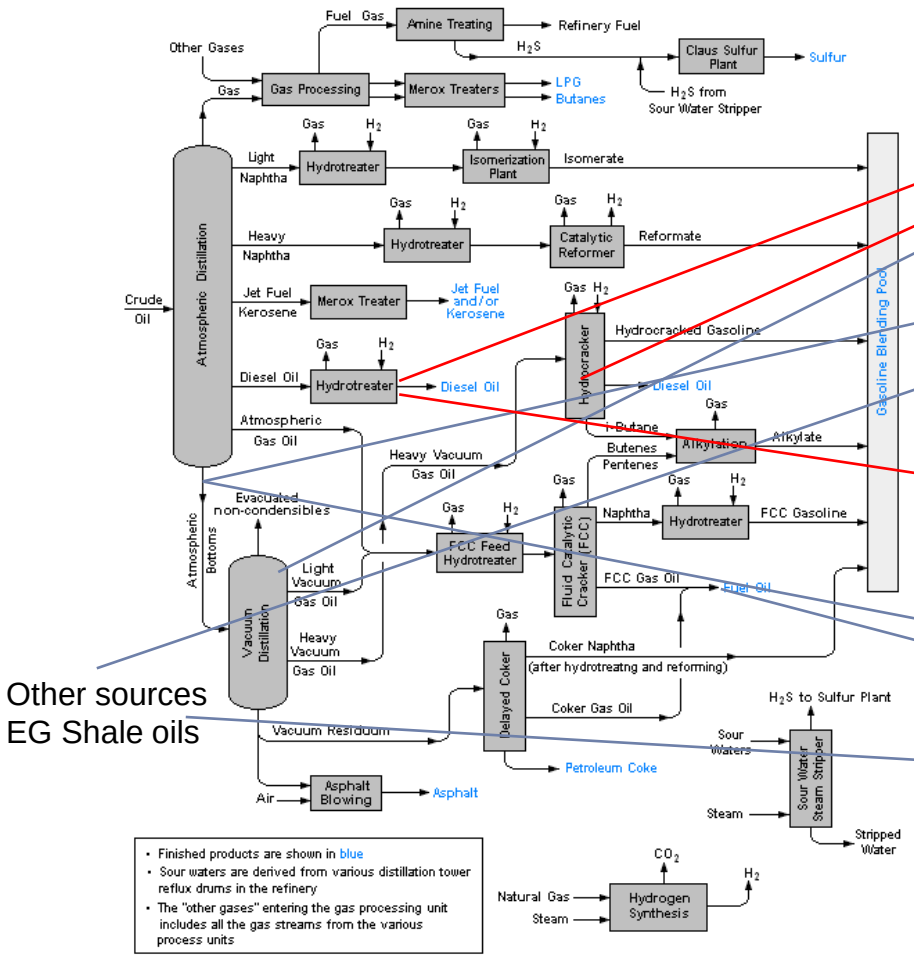
WHAT WILL FUEL BLENDERS SUPPLY



A≠B

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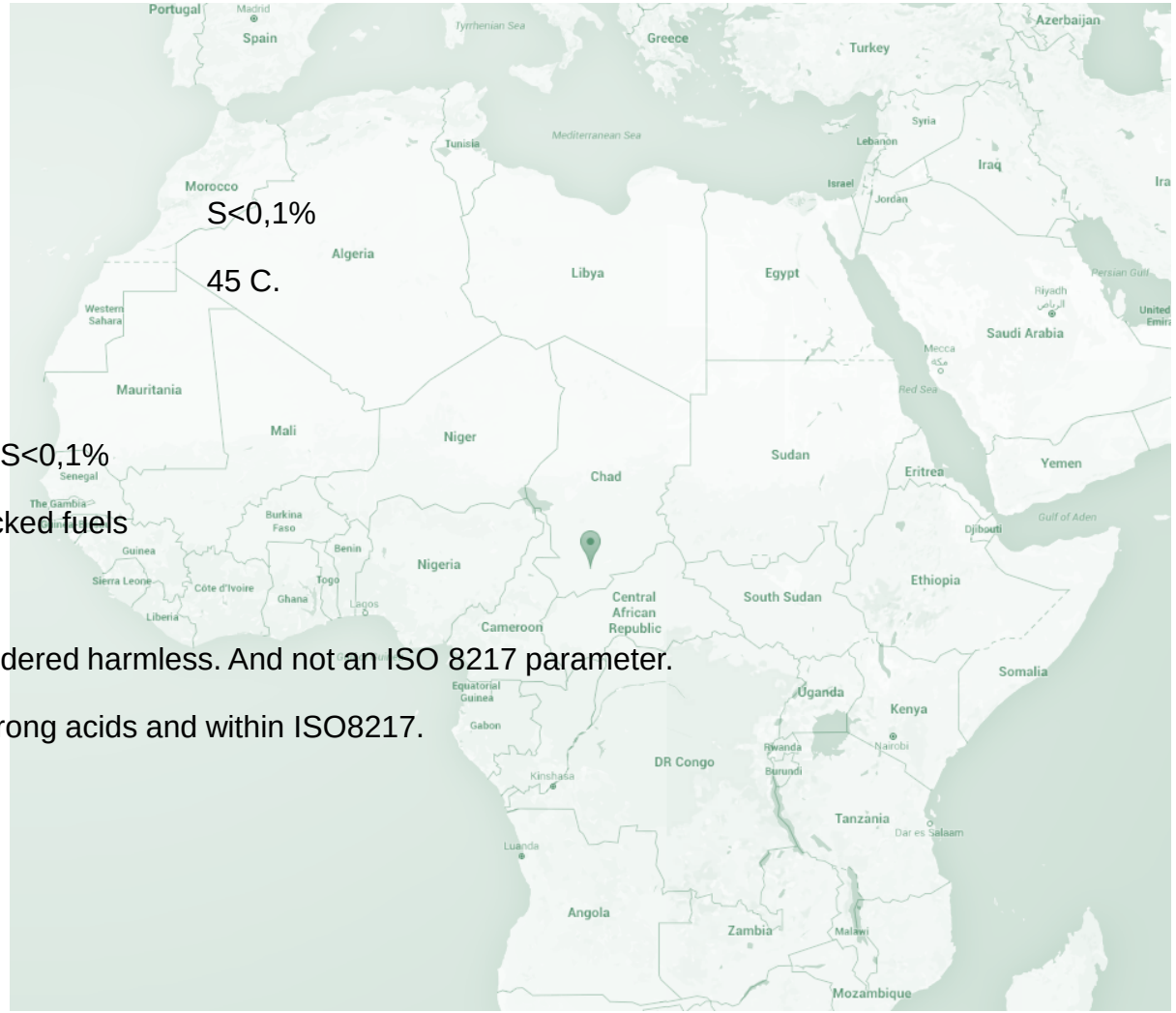
SWEET CRUDES, DOBA, DAR, CABINA, MINAS ETC.



AB

- Very sweet crude oil S<0,1%
- High Flash point 45 C.
- Simple refining
  - 5% Napha
  - 95% DOBA Staight run fuel oil S<0,1%
- Compatible with most fuels and cracked fuels
- Compatible with gas oils
- High Calcium content which is considered harmless. And not an ISO 8217 parameter.
- Relative high acidity however NO strong acids and within ISO8217.
- Very price attractive (-**$/mt)

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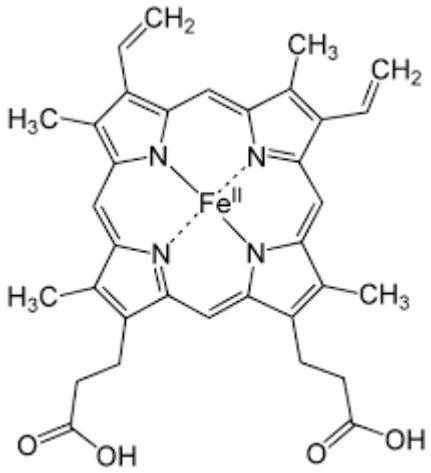
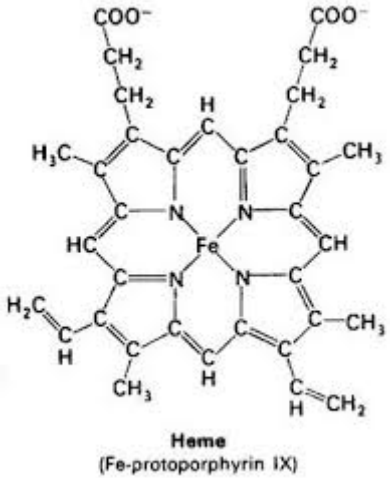
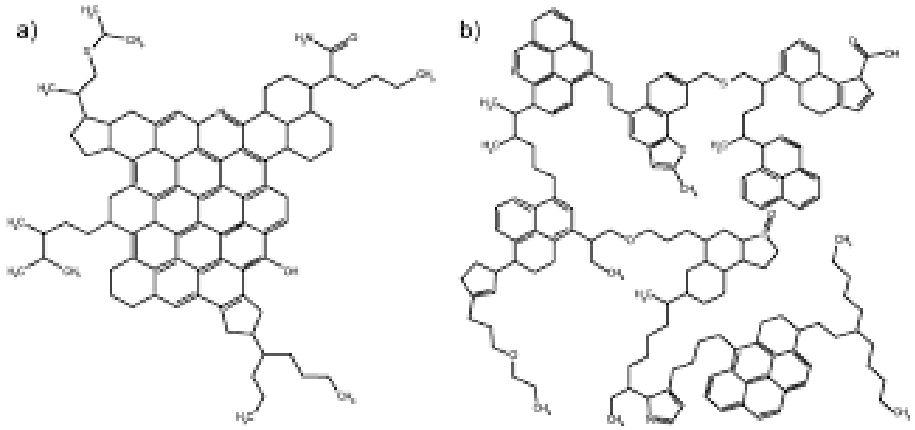
BLOOD TYPE MARKING.





Hemoglobin



Asphaltenes

3 years experience with high paraffin products - 20 years experience with cracked products – 50 years experience with SR products.

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US GULF COAST RECIPES

B A AB B A

RAI 2020 IMO 0.5 WT % SULFUR IFO380 RECIPES AT USGC*

Table 1

Blend component	Recipe 1, wt %	Recipe 2, wt %	Recipe 3, wt %	Recipe 4, wt %	Recipe 5, wt %
Atmospheric straight-run low-sulfur residue	73.95	71.43	31.82	72.95	0.00
Vacuum low-sulfur residue	0.00	0.00	31.82	0.00	47.25
Light-cycle oil, 0.5 wt % sulfur	2.14	9.93	29.15	3.33	18.54
No. 6 fuel oil, 1.0 wt %	6.81	0.00	7.20	0.00	4.77
No. 6 slurry oil	17.10	0.00	0.00	23.73	0.00
Low-sulfur vacuum gas oil	0.00	18.63	0.00	0.00	29.44
Blend results					
Sulfur, wt %	0.50	0.34	0.50	0.50	0.50
Vis. at 50° C., cst	380	80	101	337	120
Blend cost, $/tonne	307	379	335	308	389
Blend profit, $/tonne	78.0	5.8	50.0	77.0	-3.6

*Prices as of Aug. 4, 2017; IFO380 0.5 wt% sulfur is $385/tonne based on Platts methodology.

A - Paraffinic 0,10% 0,50%
A - Paraffinic ~~0,10%~~ 0,50%
B - Aromatic 0,50%
B - Naphthenic 0,50%
AB (sweet residues) 0,10% 0,50%
AB (sweet residues) ~~0,10%~~ 0,50%
Gasoils 0,10% 0,50%
Gasoils 0,10% 0,50%

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WHAT TO CONSIDER

- Detailed bunker planning.
- Crew awareness.
- Compatibility testing.
- Storage end service tank configuration.
- Proper storage planning.
- Fuel supply- and booster system.
- Switch over procedures.
- Treatment is that necessary in same degree as now

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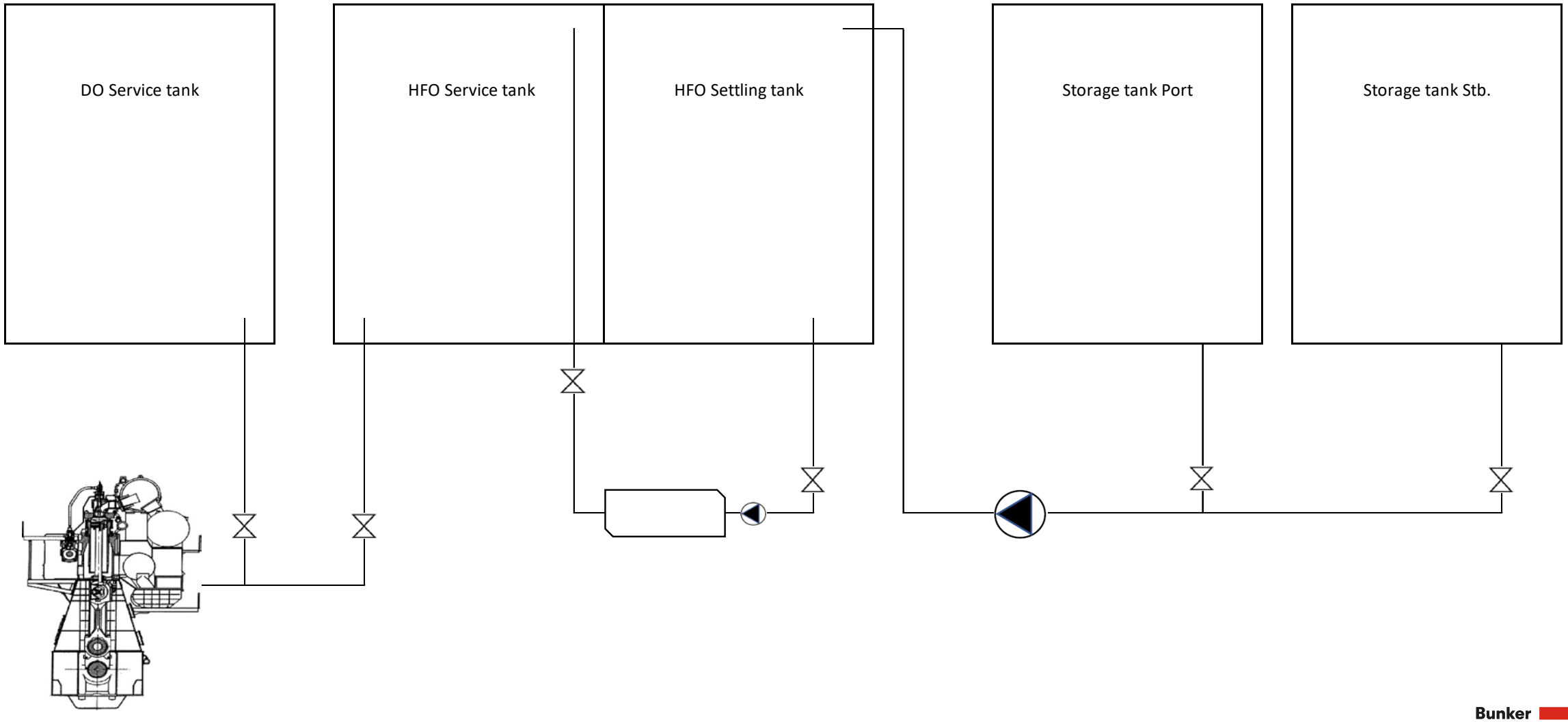
SIMPLIFIED FUEL SYSTEM



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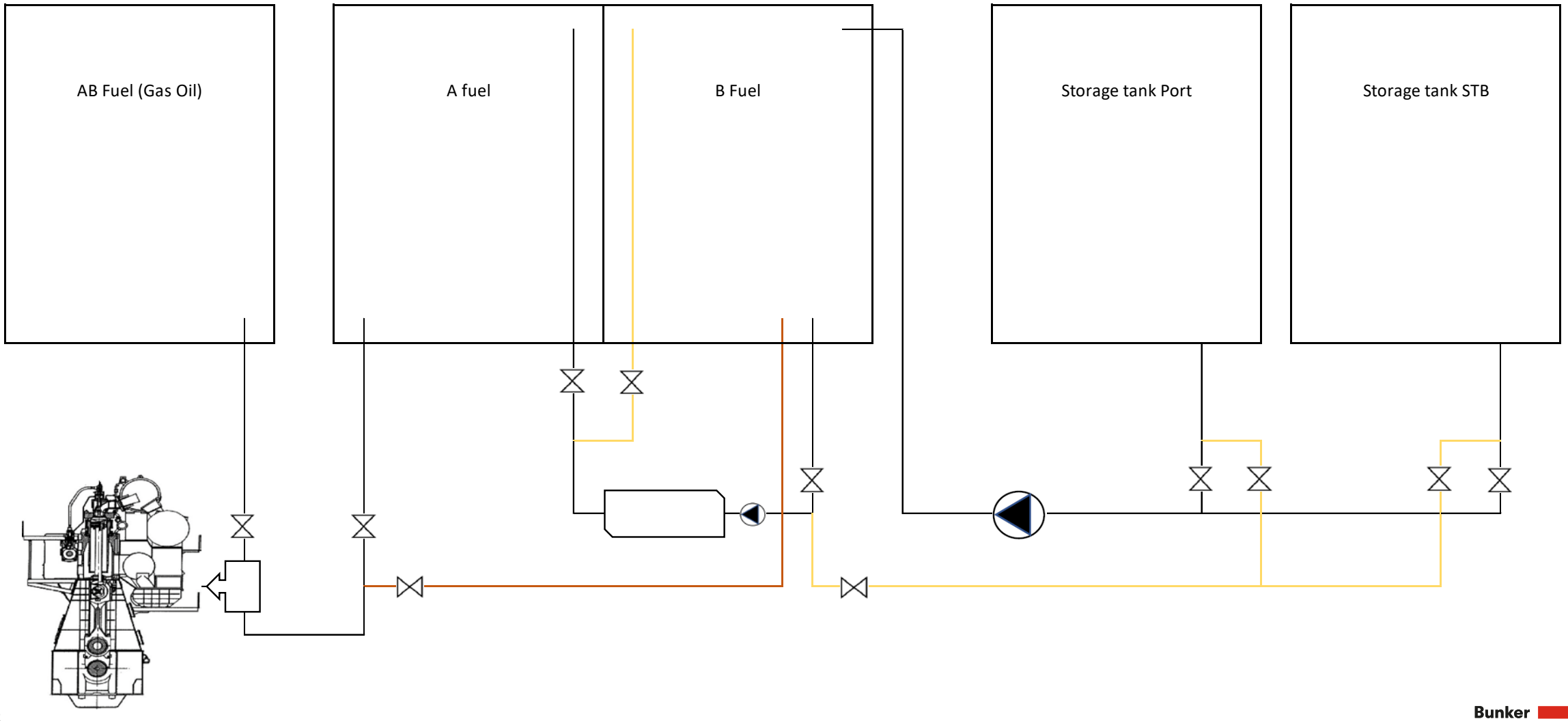
SIMPLIFIED FUEL SYSTEM



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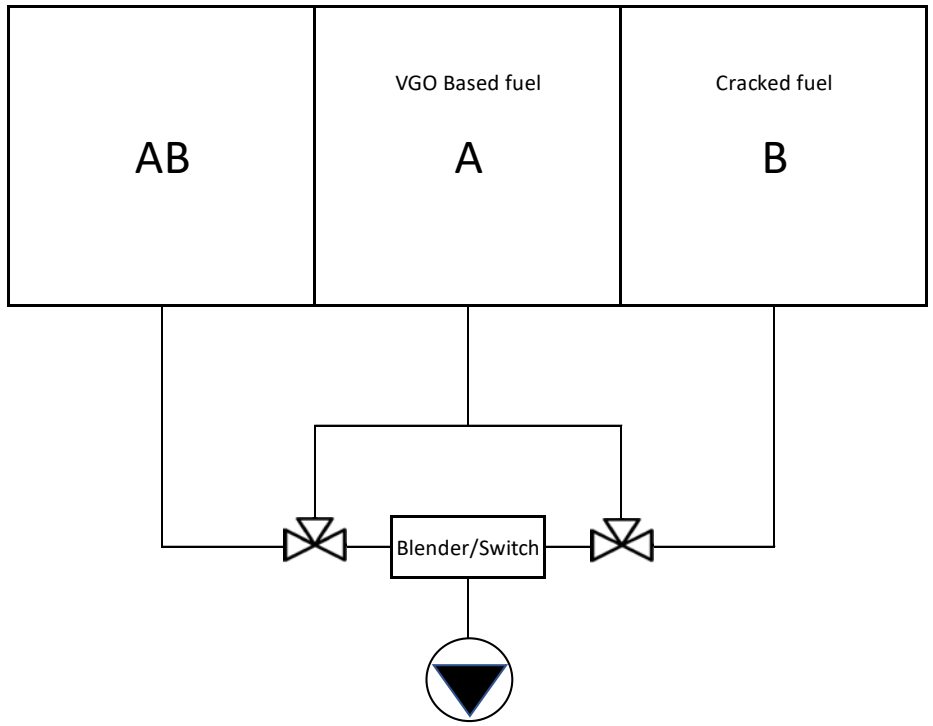
SWITCH OVER PROCEDURES



Sequential switch

FO 1 – GO – FO 2
FO 2 – GO – FO 1

Bunkercare Smart switch/blending unit

Design:
- Smart switch
- Frequency controlled Supply- and Booster pumps.
- Low volume booster system, no mixing tank.

Operation:
- High consumption during switching.

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Many thanks for listening…

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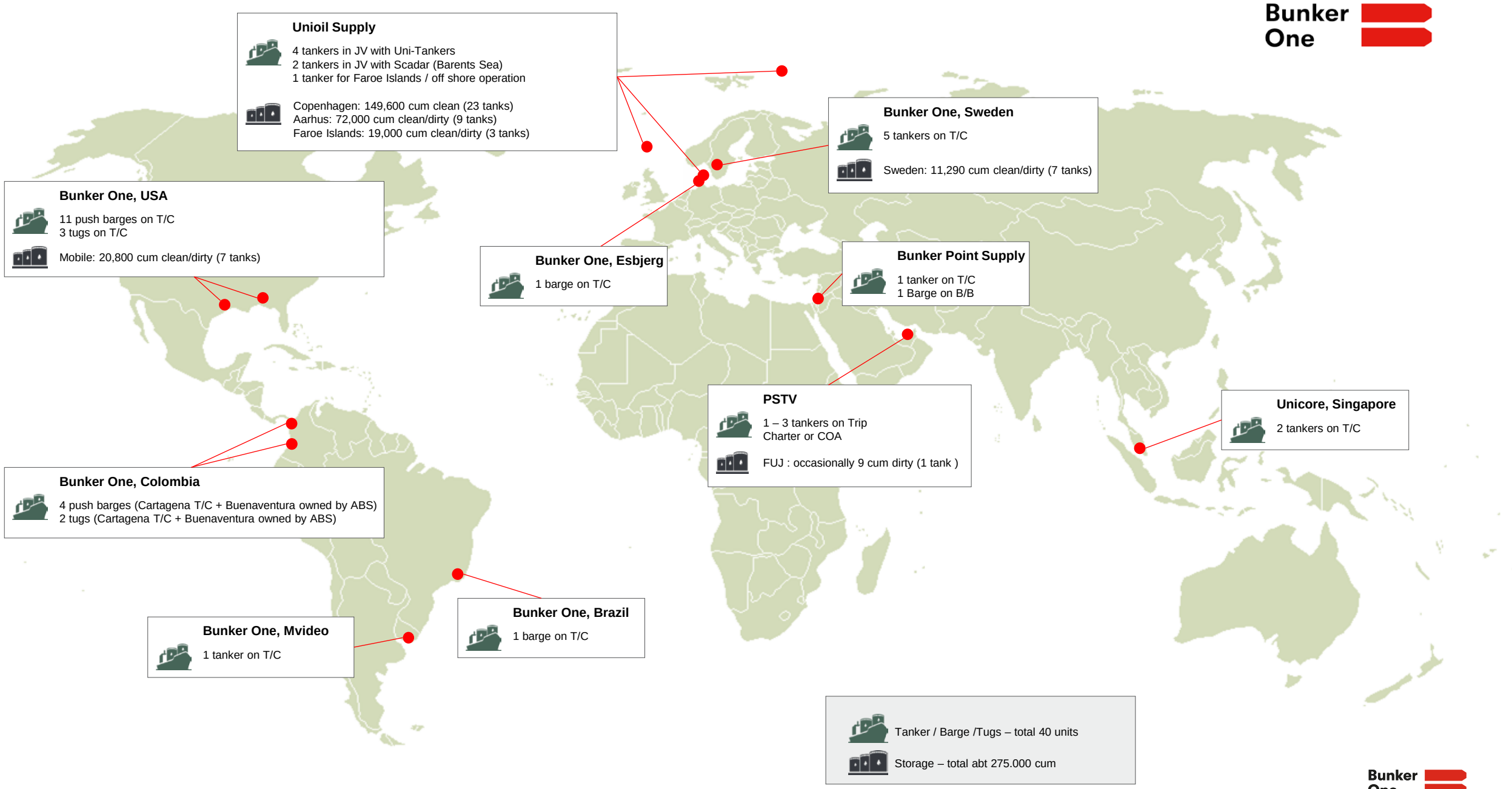
Unioil Supply
4 tankers in JV with Uni-Tankers
2 tankers in JV with Scadar (Barents Sea)
1 tanker for Faroe Islands / off shore operation
Copenhagen: 149,600 cum clean (23 tanks)
Aarhus: 72,000 cum clean/dirty (9 tanks)
Faroe Islands: 19,000 cum clean/dirty (3 tanks)
Bunker One, Sweden
5 tankers on T/C
Sweden: 11,290 cum clean/dirty (7 tanks)
Bunker One, USA
11 push barges on T/C
3 tugs on T/C
Mobile: 20,800 cum clean/dirty (7 tanks)
Bunker One, Esbjerg
1 barge on T/C
Bunker Point Supply
1 tanker on T/C
1 Barge on B/B
PSTV
1 – 3 tankers on Trip
Charter or COA
FUJ : occasionally 9 cum dirty (1 tank)
Unicore, Singapore
2 tankers on T/C
Bunker One, Colombia
4 push barges (Cartagena T/C + Buenaventura owned by ABS)
2 tugs (Cartagena T/C + Buenaventura owned by ABS)
Bunker One, Brazil
1 barge on T/C
Bunker One, Mvideo
1 tanker on T/C
Tanker / Barge /Tugs – total 40 units
Storage – total abt 275.000 cum