

Transport and Climate Change

***Research on the Reduction of Emission of
Greenhouse Gases from the Icelandic Fishing
Fleet and Environmental Friendly Sources of
Energy***

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National Transport Policy 2007 – 2010

- Goal of Environmentally Sustainable Transport
 - Use of Environmental Friendly Main Engines in Fishing Vessels
- Transport Program for Research and Development
 - Environmental friendly Sources of Energy and Research on Reducing Energy in Fishing Vessels

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Greenhouse Gases

- Carbon dioxide (CO₂)
 - 1 kg of MDO gives 3.16 kg of CO₂ after combustion
- Other chemical substances
 - Nitrogen oxides (NO_x)
 - Volatile organic compounds (VOC)

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3 methods to reduce the emission of CO₂

- Reduction of fuel oil consumption
 - Catch methods, fishing gears and ship design
- Exhaust gas cleaning system
 - Facilities to separate and clean the exhaust gas
- Bio-Diesel (RME)
 - Carbon offsetting

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MDO Consumption 1972 - 2007

Tons MDO		Tons CO ₂
• 1972 ≈ 120,000	->	(380,000)
• 1988 ≈ 220,000	->	(695,000)
• 1996 ≈ 285,000	->	(900,000)
• 2004 ≈ 265,000	->	(835,000)
• 2007 ≈ 255,000	->	(800,000)

MDO = Marine Diesel Oil

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Reduction of Fuel Oil Consumption

- Fishing gears
 - Bottom and pelagic trawl (energy intensive)
 - Long lines and nets (energy efficient)
 - Seine (energy efficient)
- Ship types and design
 - Boats, purse seiners, small and large trawlers
- Main engines
 - Types, line and V-engines

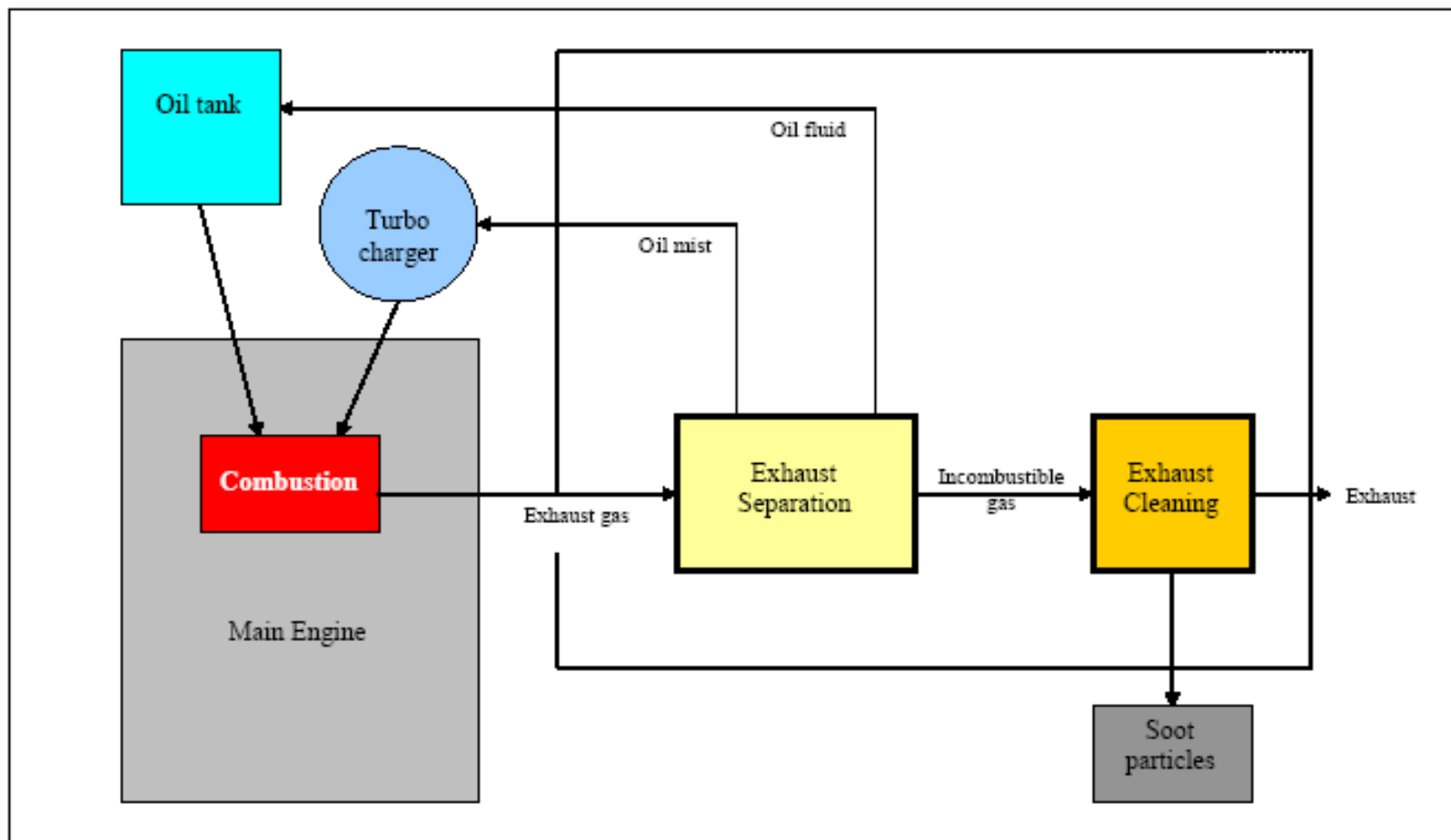
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Exhaust Gas Cleaning System

Facilities to separate and clean the exhaust gas

- Exhaust Gas Separator
 - Oil mist and oil fluid
 - NO_x treatment
 - Water drops system
- Exhaust Gas Cleaner
 - Scrubbing with chemical solution
 - Collection of soot particles
 - End cleaning of exhaust gases

EXHAUST GAS CLEANING SYSTEM

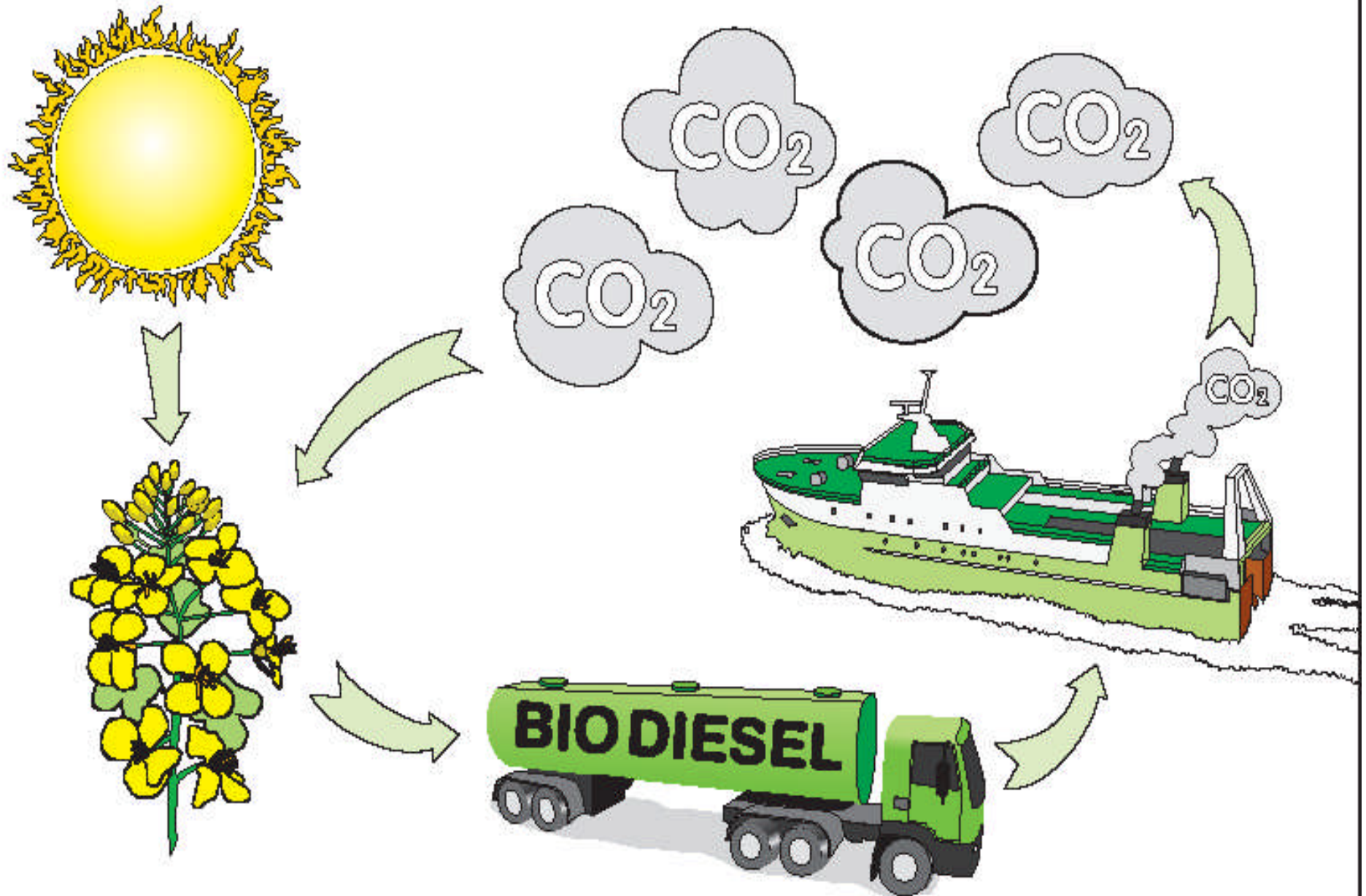


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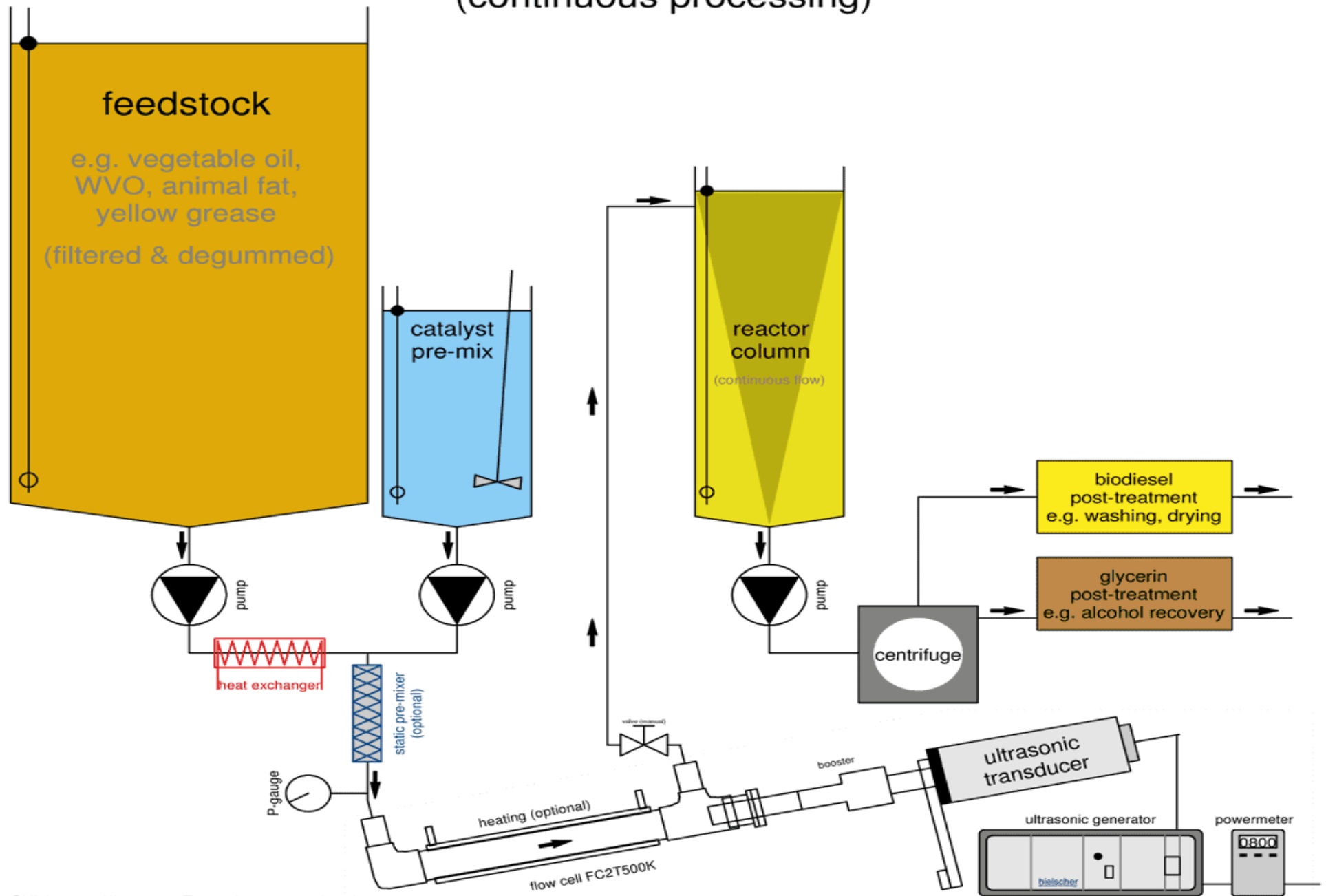
Bio Diesel (RME)

- Made of raps oil
 - Raps (Winter raps) can be cultivated in Iceland
 - One hectare gives 1,200 kg of raps oil
 - Byproduct is rich in protein for animal fodder
- Same quality as fossil fuel
 - Can be used for all diesel engines
 - Low sulphur, CO₂ and NO_x
- Carbon offsetting
 - Carbon sequestration

Biodiesel's Closed Carbon Cycle



Biodiesel Conversion Using Ultrasonication (continuous processing)



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Atmosphere on board fishing vessels

- Research work at IMA
 - Fishing vessel as working space
 - Pollution
 - Measuring of CO₂, H₂S, CO
 - Measuring of oil mist and oil particles
- Lubricating oil mist separation
 - Main problem
- Publication 2009



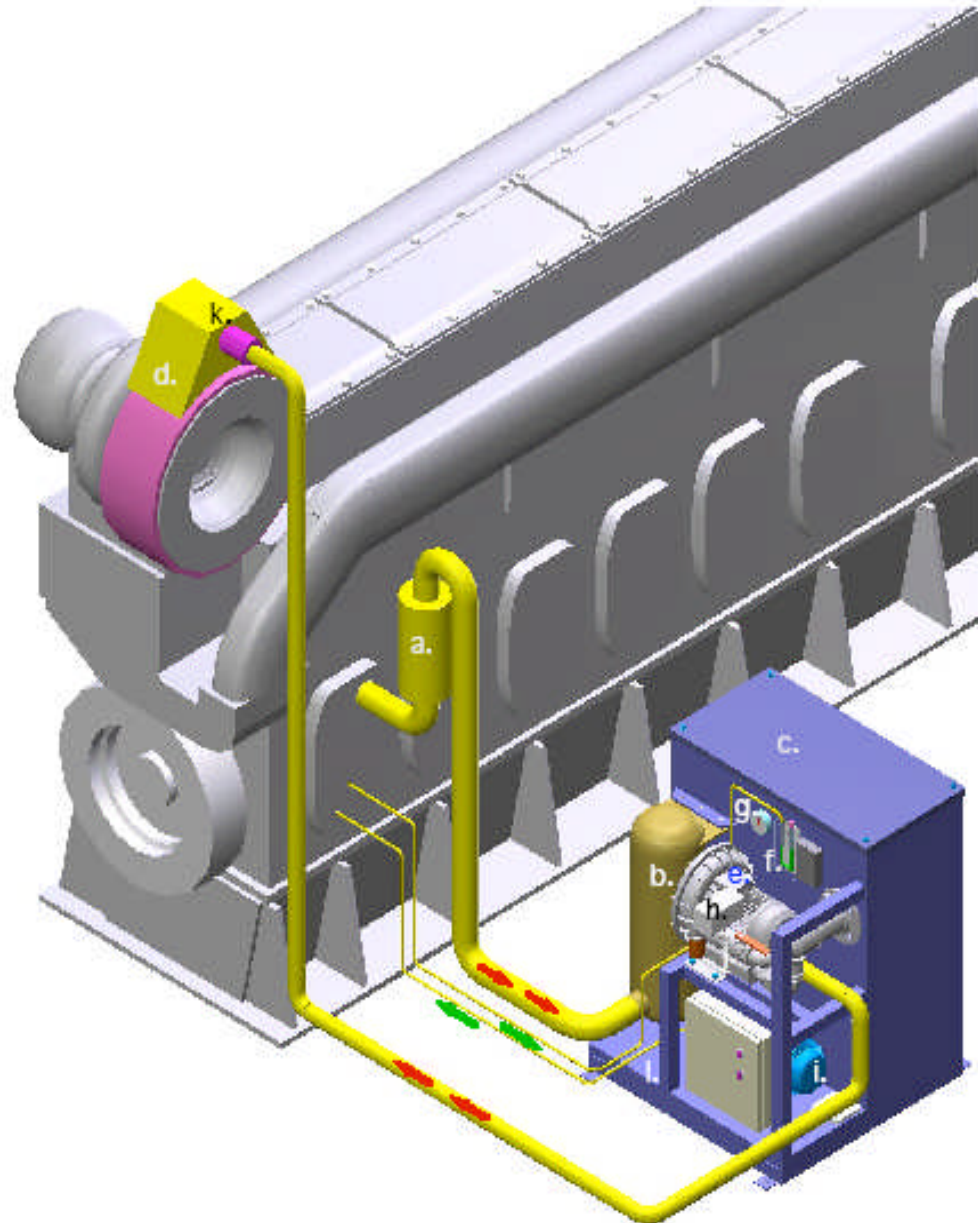
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MANUFACTURERS OF
MARINE ENGINES
AND
MOTOR VEHICLES
100, NEWBURY ROAD, READING, RG2 9AT, ENGLAND
TELEPHONE: 0494 373111

CRANKCASE EXPLOSIONS
1. NEVER OIL CRANKCASES UNTIL LIGHTS ARE OFF
2. NEVER OIL CRANKCASES UNTIL THE ENGINE IS STOPPED
3. NEVER OIL CRANKCASES UNTIL THE OIL LEVEL IS CHECKED
4. NEVER OIL CRANKCASES UNTIL THE OIL LEVEL IS CHECKED
5. NEVER OIL CRANKCASES UNTIL THE OIL LEVEL IS CHECKED
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10. NEVER OIL CRANKCASES UNTIL THE OIL LEVEL IS CHECKED

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Lub-oil separation

- Separation of lub-oil-mist from crank case (>90%)
- Separated lub-oil is returned again in to the crank case
- Cleaned air/gas returned to the turbo charger



4T- VT- OGS2

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Conclusions

- Changes in oil consumption
 - Oil consumption is decreasing due to lower allowed fish-catches
 - Oil prices are increasing and focus will be on more energy efficient fishing methods
- Exhaust cleaning system
 - Cleaning exhaust gas from existing engines
 - Cleaning lub-oil-mist out of the engine room.
- Bio-Diesel (RME)
 - Carbon offsetting
 - Made of raps which can grow in Iceland as winter raps
 - Sustainable development in oil production

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Thank you