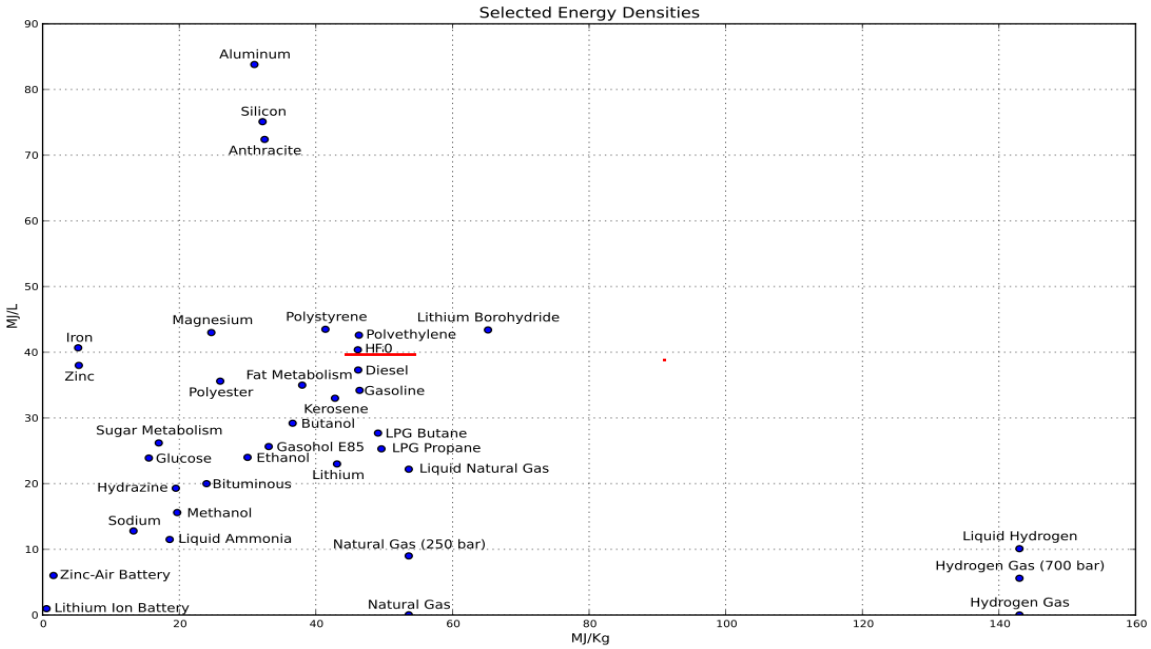
Post Oxidizer an MW-sized hyper heat exchanger (700°C heat pump) driven by exhaust fumes of wood, HFO/Diesel engine, a converter recuperating up to 30% of the non burned fuel

Our highest yield “Post-Oxidizer Mixcoatl” delivers you 700°C of heat from exhausts. It is a hyper heat-exchange and filter, a kind of 700°C heat pump insulated against corrosion with Vortexed Supercement stable up to -1pH and 800°C. It is designed to clean up exhausts green-retrofitting MW-sized wood operated thermal-gens, co-generators of choice running on HFO (Fuel #5), or Diesel. In addition to the thermal portion, it is typically recuperating up to 30% of energy/fuel previously contained in these exhausts also via SOFC (solid oxide fuel cell).

However, while HFO versus Diesel has one of the highest energy contains among fossil fuels (see chart below), wood is very low in energy contain. In all 4 types of exhausts, energy-contain must be very efficiently recuperated, properly completing, balancing, and shifting fuel’s oxidation. It means, more thermal energy in fumes is available and collectible @700°C for example as water gas, as hydro thermal-cracking of wood remains, plastic and food-leftovers or food-surplus to gas or HFO, or in case extra energy is collected via (Archimede), post-running a CO_2 to CH_4 conversion or a cryo-segregation is possible. We aim NO FUMES exiting the chimney.



It must be noted:

1) -Since carbon monoxide and hydrocarbons fumes in wood thermal-gen, HFO/Diesel-after-combustion are themselves combustible, their combustion (further oxidation) yields are an increase to the energy output with a consequential reduction in the

greenhouse gas emissions when compared to the same energy output produced with conventional combustion.

2) -Combustion is based on a high-temperature ignition and other principles causing non-complete combustion (oxidation and cracking) of fossil fuels, which are including appreciable COx and hydrocarbons in the exhausts. We are properly balancing them from COx+CHx toward CO_2 while having water gas in excess (10% of H_2, O_2), and we use them internally as a fuel source on a **Solid Oxides Fuel Cell** also. However, the excessive gas-fed (~40% remains) is used to sustain.

In our case, a catalytic converter and/or a conventional exhaust scrubbing device is suppressed. In principle, Cryo and non-Cryo CO_2 can be stored aside for industrial use (eg: enhanced growth in greenhouses).

Modus Operandi:
Our “Post-Oxidizer Mixcoatl“ allows a real and economically affordable green ecology operating of multi-MW large thermal-gen or electric co-generators running green-clean on wood, HFO/Diesel fuel. The so green-generated extra-thermal heat and electrical power is the key to run the day and night stable cycle for example of a ship's electrical propulsion and in addition any chemical process up to 700°C.

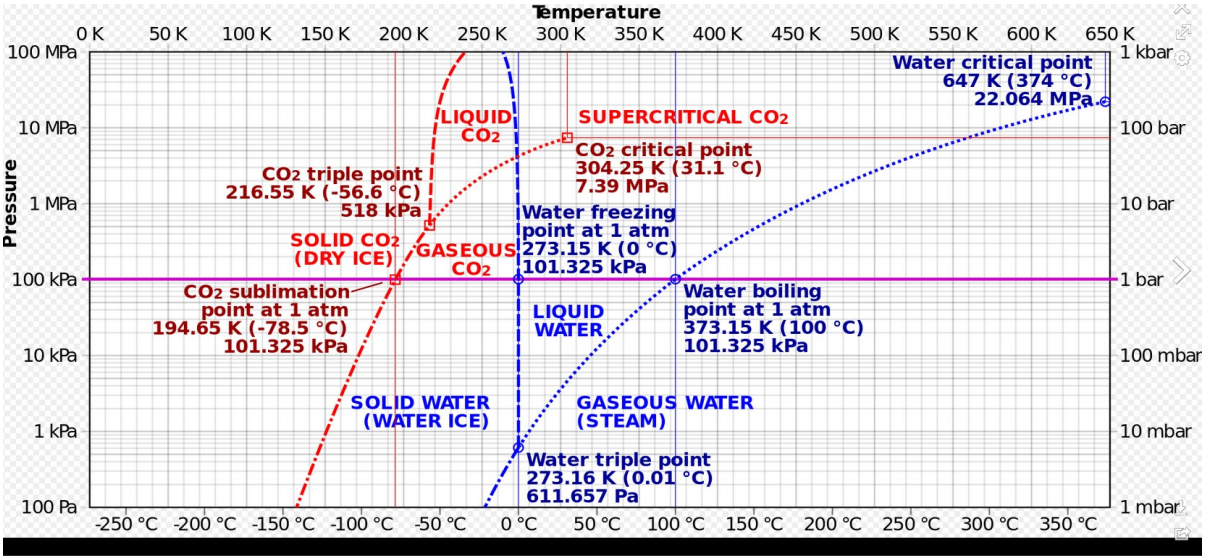
Here some examples of possible ship onboard processes:
Water distillation, hydro-thermal decomposition (HTR) of all plastic and fat/leftovers waste or industrial surplus/remains used/caused on a cruiser to gas/HFO fuel, heating, heating-up crude oil or HFO, CO_2 to CH_4 or cryo-segregation, etc.

Here some examples of stationary processes:
Cement clinker, HTR of all wood, plastic, and fat/leftovers waste or industrial surplus/remains to fuel, fine chemical processes, heating up crude oil, hot water deep ground injection for enhancing heavy oil recovery, wooden pulp processing, water distillation, etc. In combination with Archimédēs (pictures), it is alleviating up to max. 32% (highest yield) of the fossil fuel consumption during the day, provided sufficient space is applied.

Recuperation:
Post-Oxidizer hyper heat-exchange and filter (a kind of 700°C heat pump) is recuperating 30% of fuel still contained in the exhausts. It can enhance the overall fuel consumption efficiency (compensated calculus) by near 60% if the heat is completely used. All this is possible because all parts are insulated with Vortexed Supercement stable up to -1pH and 800°C (pls read our document Vortexed Spercement). Therefore, within the volumetric space of a previous fumes-scrubber, the following is recovered and stored:

a- 30% of the Wood/HFO/Diesel non burned fuel in exhausts is recovered as a secondary fuel and could be fired (ongoing tests);
b- 85% of plastic-food-wood wastes collected are converted to Gas or HFO fuel (ongoing tests) via HTR;

c- due to additional thermal heat @700°C (Archimede) it is possible in case energy remains are sufficient, to run a CO_2 to CH_4 or a cryo-segregation. We aim NO FUMES are exiting the chimney.
d- sulfuric acid is also recovered and sold.



Comparison of phase diagrams of carbon dioxide (red) and water (blue) as a log-lin chart with phase transitions points at 1 atmosphere

Post Oxidizer is sized / MW of power in fumes:
- Heat exchange temperature output as is settable by parameter at will;
- Max. temperature output is 700°C;
- The Hyper Heat Exchange is made out of trivial steel coated with Supercement (NO CUI and COV) and insulated with Supercement Foam;
- Efficiency >90%;
- Parametric hyper heat exchange dimensions versus power in fumes: 0.75m³/MW.

Pipes Insulation max 700°C:
All insulation systems up to 700°C adopt Vortexed Supercement Foam with Lambda 0.0348W/mK @25°C 0.12gr/cm³ and a Vortexed Supercement 105N/mm² hard shell layer.

There is a cost billed by us for the Case Study, Planning, Projecting and, Maintenance of our apparatuses.

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