1st INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

IV SEMANA PAULISTA DE P+L
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Alternative Fuels and Cogeneration for Reducing CO_2 Emissions

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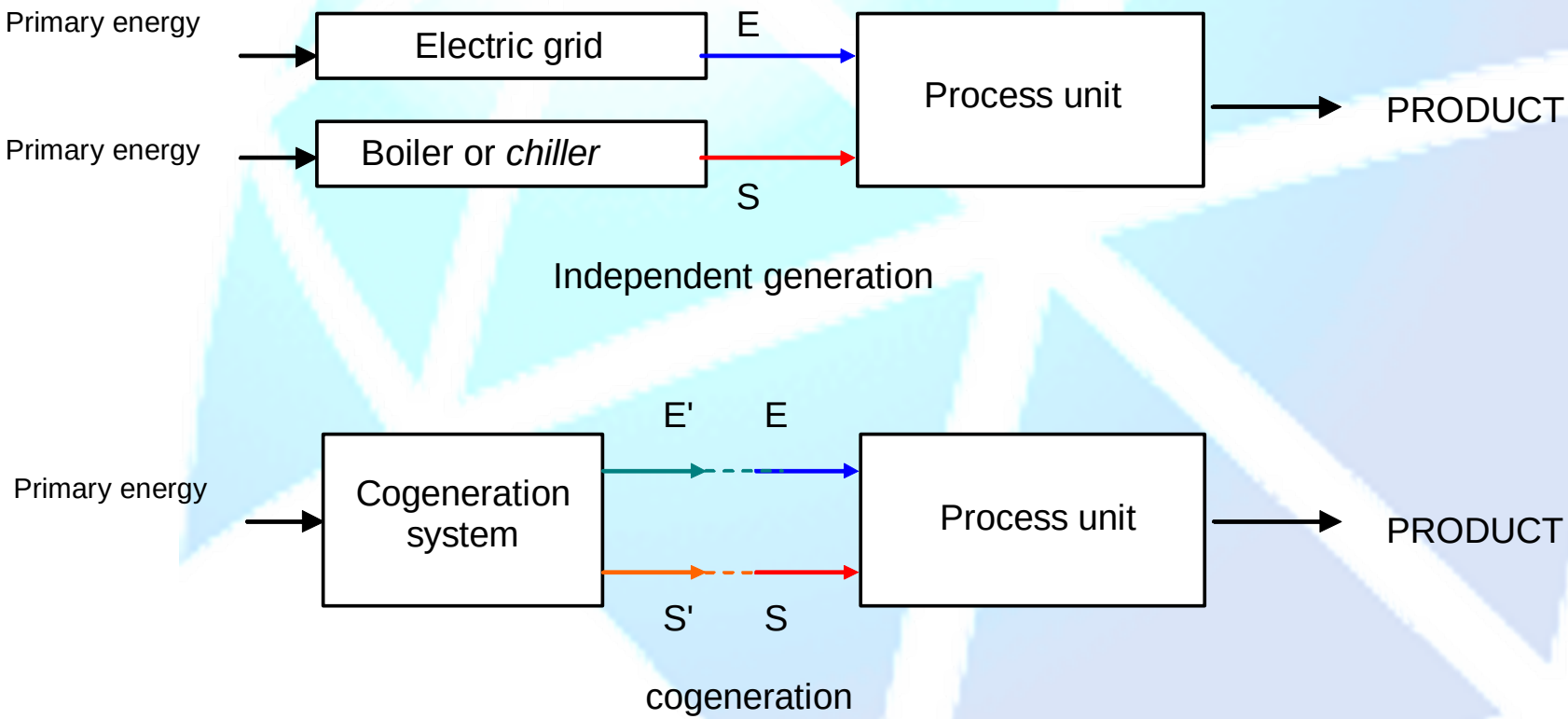
Introduction

- Cogeneration can be considered:
  - an energy conservation technique
  - an environmentally adequate practice
  - adequate when burning fossil fuels
- The availability of renewable fuels:
  - Solid wastes
  - Landfill gases
  - Industrial wastes and synthesis gas
- Cogeneration associated to renewable fuels

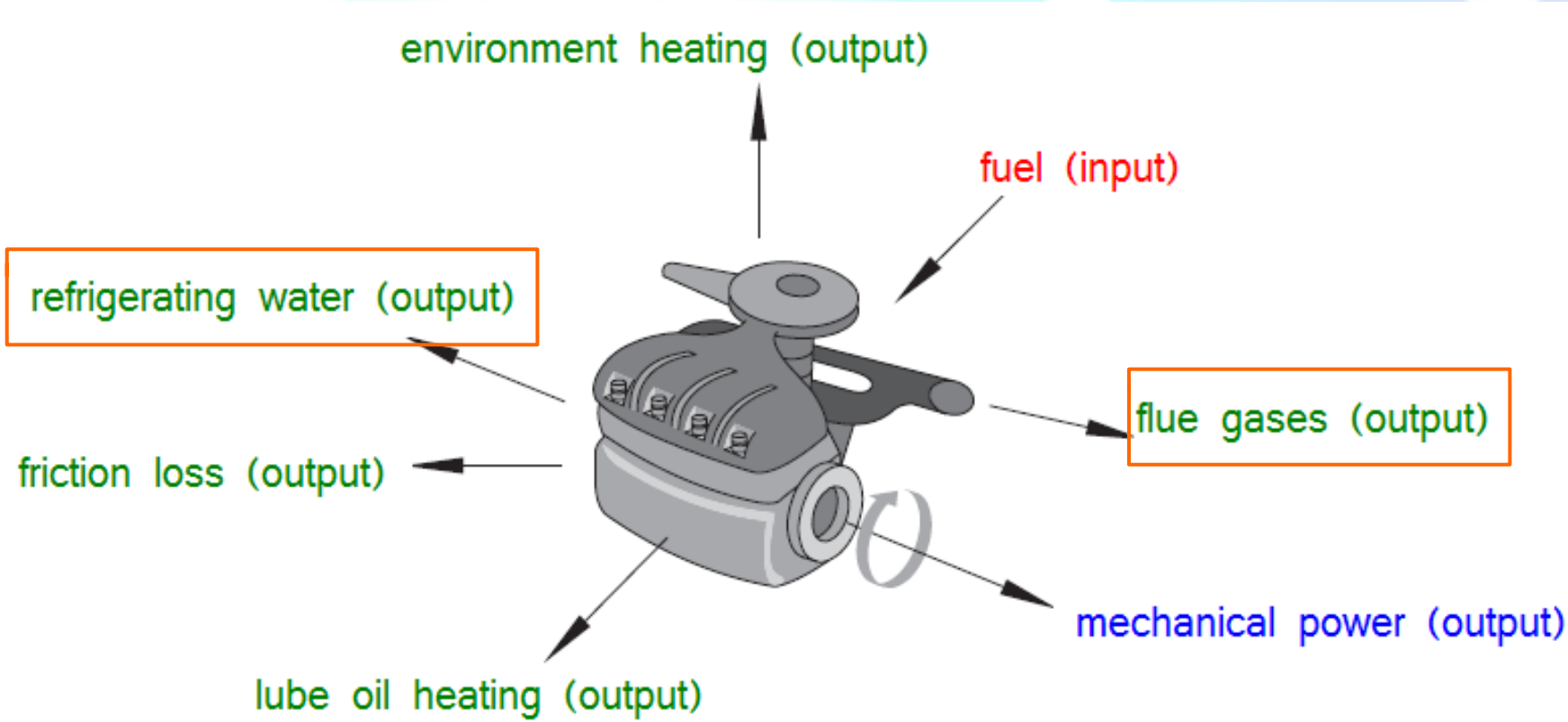
Cogeneration

- Cogeneration is defined as the combined heat and power generation for attending thermal heat and mechanical (or electrical) demands at the same time but with a single fuel.
- The alternative to cogeneration is to produce the thermal energy required to processes (boilers for producing steam and chillers for producing cold water, as example) and to purchase the electricity from the grid.

Independent generation x cogeneration



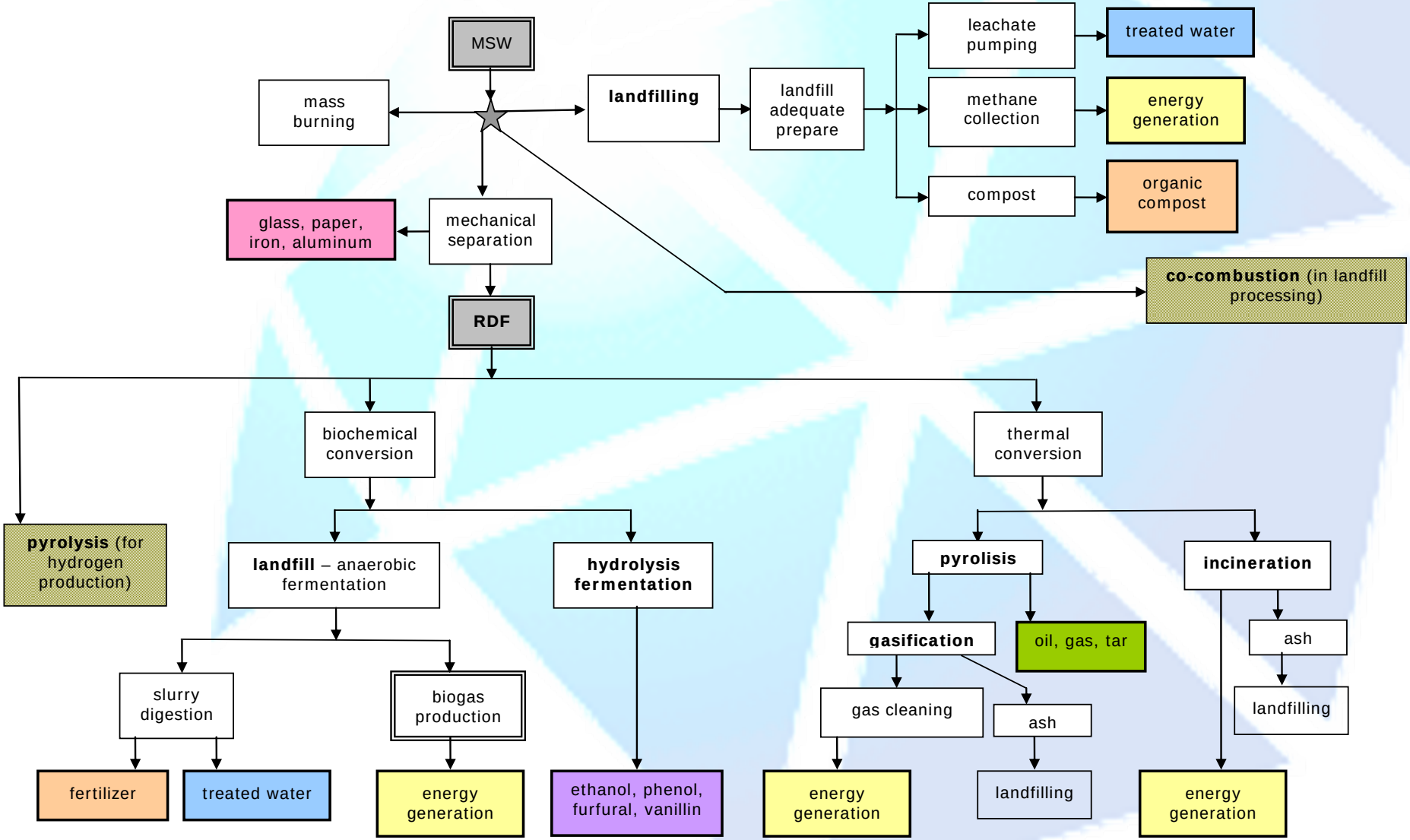
Example of cogeneration: internal combustion engine



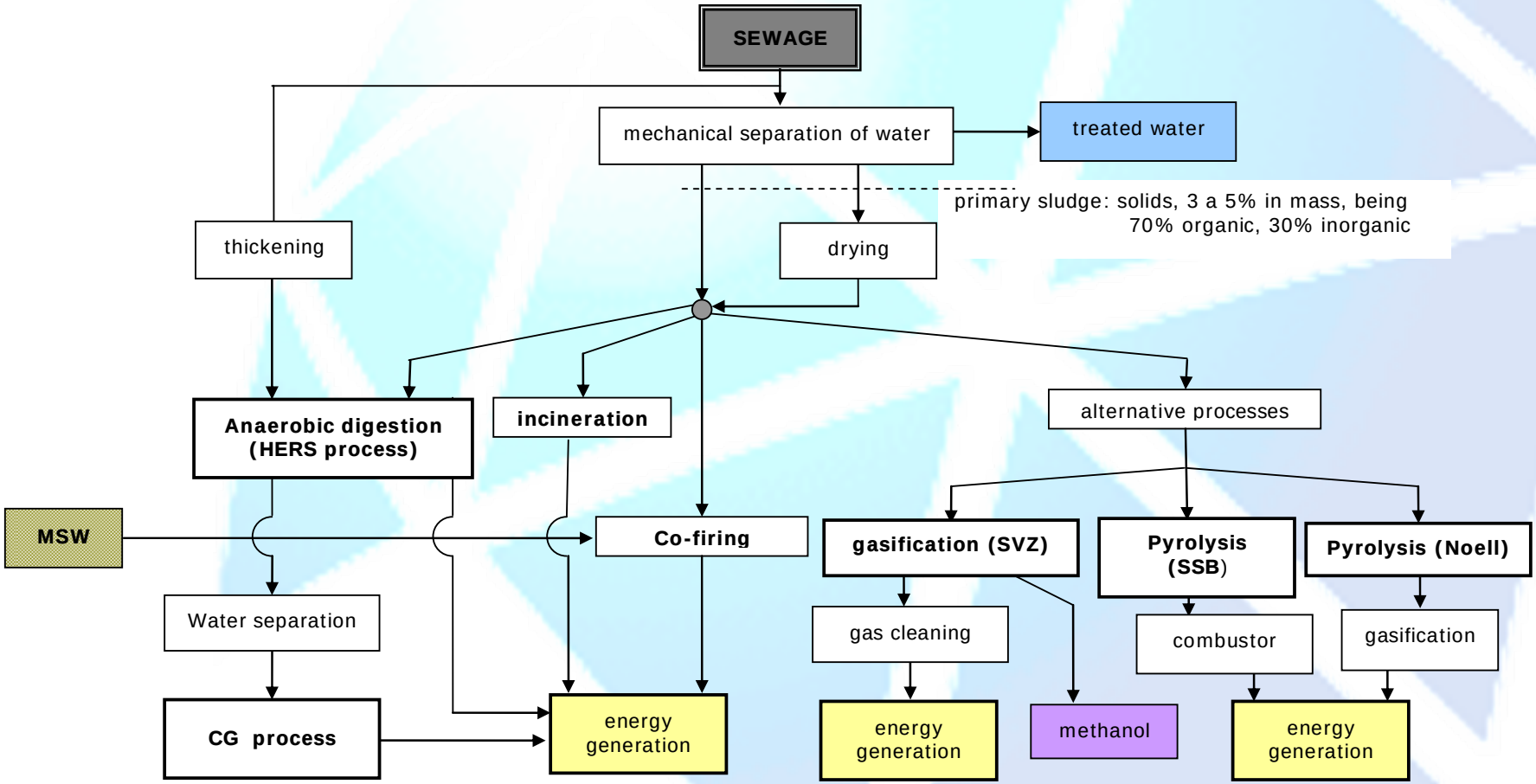
Renewable fuels: solid wastes

- The chemical structure $C_6H_{10}O_4$ is a reasonable representation of MSW structure;
- **Incineration** is defined as the destruction of solid, liquid and gaseous wastes by using heat in a controlled combustion process;
- residence time of 2 seconds at 850ºC are mandatory in the furnace.
- **Landfilling** is the process of disposing solid wastes and some other wastes according to technical and environmental good practices;
- A preliminary evaluation of 50% of all methane generated in a landfill is recovered and burned.

processing and products of MSW



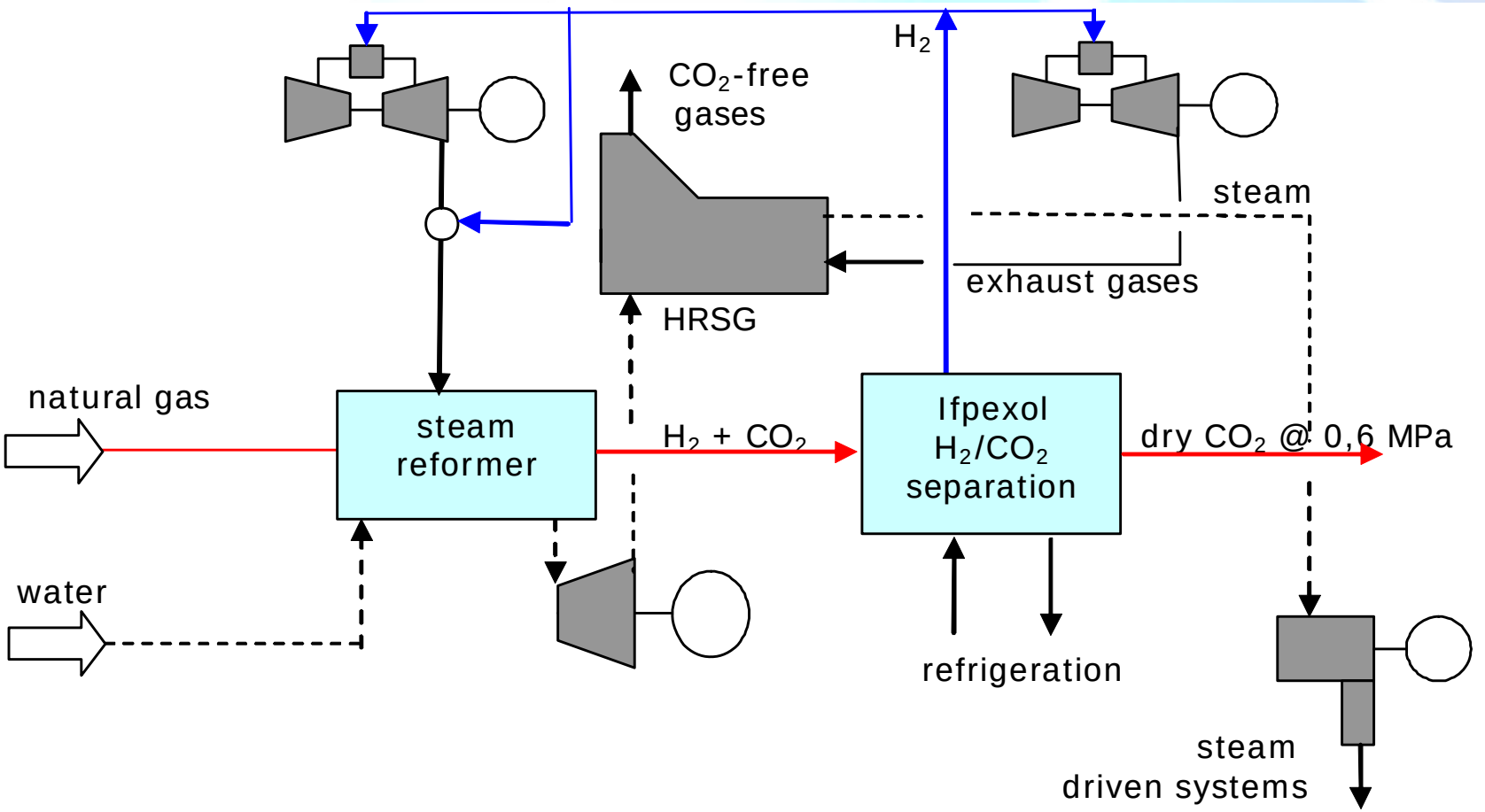
Renewable fuels: sewage



Renewable fuels: industrial opportunities

- Petroleum refinery process:
  - Production and use of hydrogen
- Steel mill:
  - Production and use of synthesis gases:
    - COG
    - BFG
    - LDG
- Pulp and paper process:
  - Production and use of black liquor

Refinery: HyGenSys process



Conclusions

- Natural gas market is perceived by the industrial sector as an efficient and environmentally justifiable fuel;
- The production of gaseous and solid fuels from the adequate conditioning of sewage and MSW together with the availability of industrial opportunities of generating certain alternative fuels may be viewed as environmentally adequate for its integration to the cogeneration concept, which may become more attractive by the use of waste energy.

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