Short product summary

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25.02.2022

Fuel Product Groups

LPG

- **Components:** saturated and unsaturated C_{3-4}
- **Products**
  - LPG as fuel – mixed C3 and C4, mainly saturated
    - In cylinders
    - Auto Gas
    - Residential
  - Petrochemical feed:
    - Olefins: Propylene, butylenes
    - Paraffins: iso and normal butane
- **Market characteristics**: winter dominance
- **Alternative utilisation**
  - Butane to gasoline
  - Propylene to Alkylation
  - Own consumption (all)
    - Steam reformer feed
    - Burning in furnaces

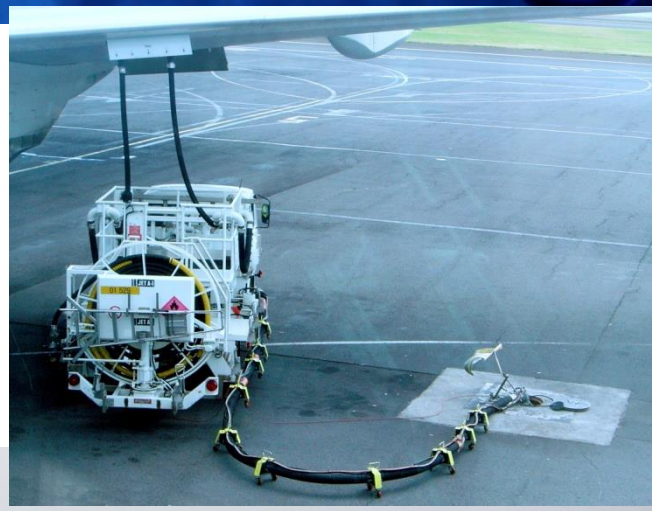
Gasoline

- **Components:** C_5 to 210°C
- **Products**
  - Blend of 6-10 different components
  - Normal 95 RON gasoline
  - Premium 99+ RON gasoline
  - Racing gasoline

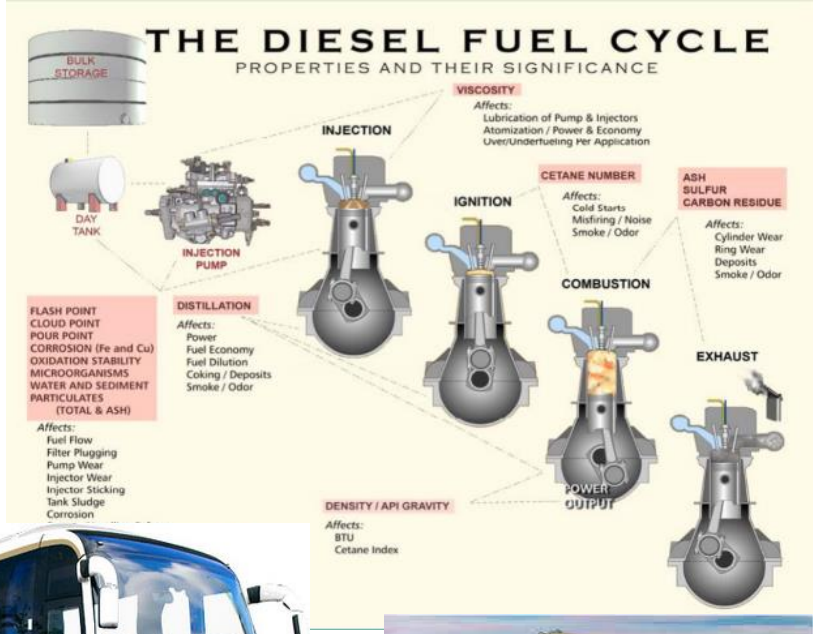
- **Market characteristics:** summer dominance
- **Alternative utilisation**
  - Butane to LPG
  - Lighter components to petrochemical naphtha
  - Heavy naphtha to kerosene
  - Reformate to aromatic extraction

Kerosine/JET-A1

- **Parameters (JET-A1)**
  - Boiling range: between ~180-250°C
  - Freeze point: max. -47°C
  - Flash point: min. 38°C
- **Products/grades**
  - JET-A1 (international)
  - JET-A (mainly USA)
  - JET-B (arctic climate), includes naphtha
  - JP-4/5/8 military grades
- **Market characteristics:** summer dominance
- **Alternative utilisation**
  - Domestic heating oil
  - Diesel fuel
  - Solvents



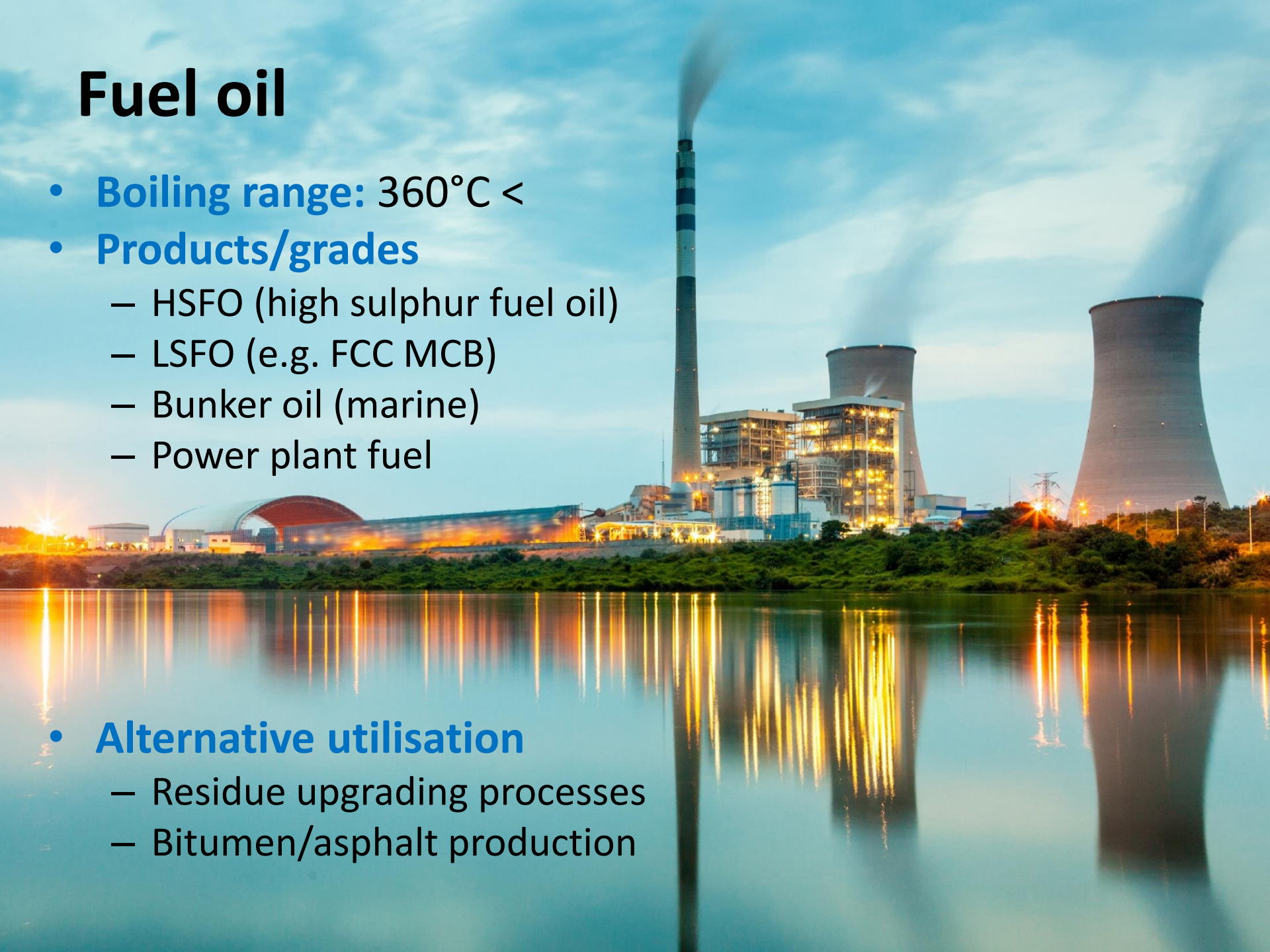
Diesel fuel/heating oil



- **Boiling range:** ~230-360°C
- **Products/grades**
  - Diesel fuel (ULSD)
  - Domestic heating oil
  - Military diesel
  - Marine diesel

- **Market characteristics:** diesel fuel summer dominance, domestic heating oil winter dominance
- **Alternative utilisation**
  - Kerosene/JET-A1
  - Petrochemical gasoil

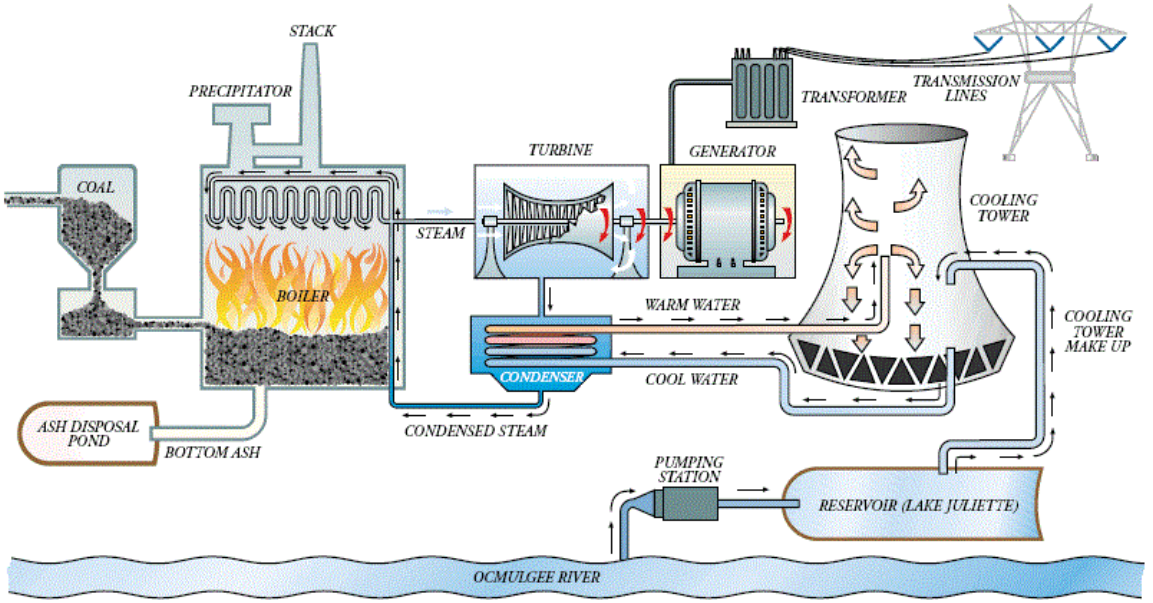
Fuel oil



- **Boiling range:** 360°C <
- **Products/grades**
  - HSFO (high sulphur fuel oil)
  - LSFO (e.g. FCC MCB)
  - Bunker oil (marine)
  - Power plant fuel
- **Alternative utilisation**
  - Residue upgrading processes
  - Bitumen/asphalt production

Coke

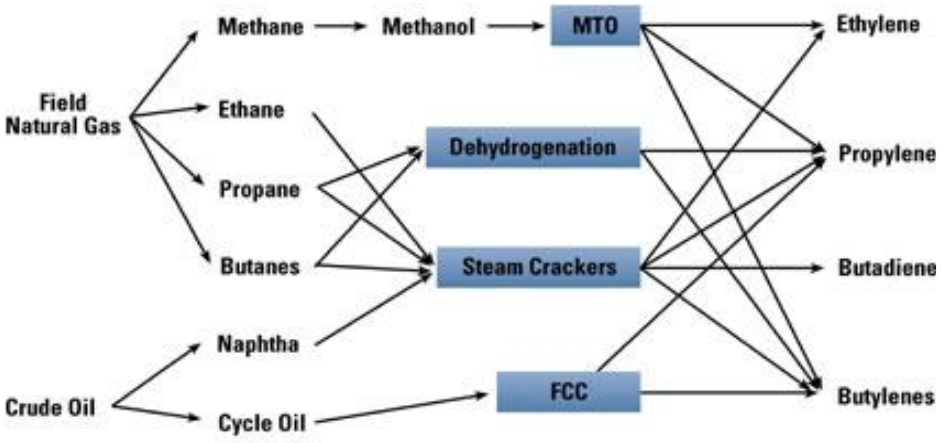
- **Parameters**
  - Solid
  - High carbon ratio
- **Alternative utilisation**
  - Cement factories
  - Coal fired power plants



Other Product Groups

Petrochemical feedstock

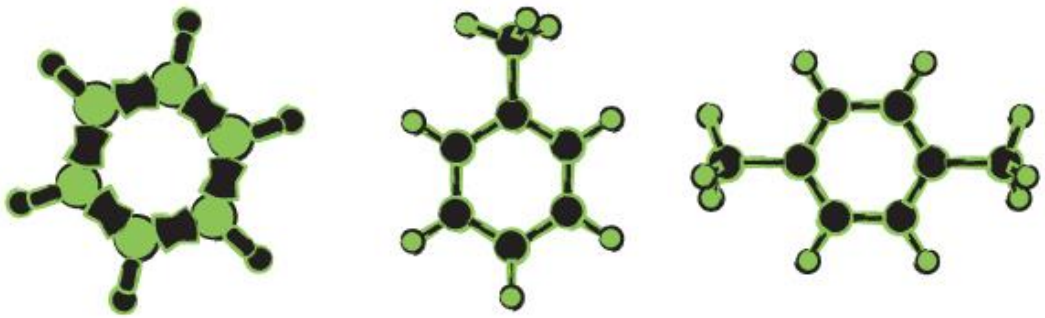
- **Components**
  - Light olefins
  - Virgin naphtha
  - Petrochemical gasoil



- **Alternative utilisation**
  - C3 fraction to LPG
  - C4 fraction to
    - LPG
    - ETBE/Alkylation
    - Gasoline
  - Naphtha – upgrade to gasoline
  - Gasoil – upgrade to kerosene/diesel

Individual aromatics

- **Components**
  - Benzene (e.g. to PS)
  - Toluene (e.g. to TDI to PU)
  - Xylenes (e.g. to PET)
- **Alternative utilisation**
  - May remain in the gasoline



Bitumen

- **Types**
  - Road bitumen
  - Insulation
  - Roofing
- **Market characteristics**
  - summer dominance
- **Alternative utilisation**
  - Residue upgrading
  - Heavy fuel oil

Base oil

- **Feedstock to lubricants**
  - Lubricating oils
  - Greases
  - Metal processing fluids
- **Alternative utilisation**
  - FCC feedstock

Group	Saturates		Sulphur Weight %	Viscosity Index	Process
I	< 90%	and/ or	> 0.03	80 – 119	Solvent refined
II	> 90%	And	< 0.03	80 – 119	Hydro-processed
II+	"> 90%"	And	< 0.03	100 – 119	"Hydro-cracked"
III	> 90%	And	< 0.03	> 120	Severe "Hydro-cracked"
IV	Polyalphaolefins (PAO's)				Chemical reaction
Group V - all other synthetics					

Solvents

- **Types**
  - Sulphur free
  - Aromatic free
- **Usage**
  - Thinners
  - Lacquers
  - Paints
  - Grill lighter fluids
- **Alternative utilisation**
  - Light solvents to gasoline
  - Heavy solvents to kerosene

Paraffins

- **Types**
  - Micro paraffin
  - Macro paraffin
- **Usage**
  - Candle production
  - Food industry
  - Cosmetics industry
  - Paper industry
  - Etc.
- **Alternative utilisation**
  - FCC feed

Sulphur

- **Usage**
  - Sulphuric acid production (85%)
  - Fertilizer industry
  - Rubber/tyre industry
  - Winery
  - Pharmaceutical industry
- **Alternative utilisation**
  - Deposition

The End