JIWAJI UNIVERSITY, GWALIOR(M.P.)

SOS IN INDUSTRIAL CHEMISTRY

Topic- Petrochemical

Lecture by-

Dr. Pooja Sharma

Guest Faculty in Industrial Chemistry Department

CONTENT

- Introduction
- Classes of Petrochemical
- Process of Refining
- Manufacturing of Petrochemical by Propylene
- Product
- Application
-

INTRODUCTION

- Petrochemical are those chemical which are derived from petroleum including natural gas.
- First petrochemical was isopropyle alcohol in 1920.

Petro+Oleum = Petroleum

Rock Oil

CLASSES OF PETROCHEMICAL

- Primary petrochemical are divided into three groups:-
- Olefins including ethylene and propylene
- Aromatics
- Synthetic gas

(olefins and aromatics are the building blocks for a wide range of material such as solvents , detergents and adhesive)

OLEFINS

- Include ethylene, propylene and butadiene.
- Important sources of industrial, chemical and plastic product.
- Butadiene used to make synthetic rubber.
- Olefins are the basis for polymer and oligomers used in plastic, resins, fibers, elastomers, lubricants and gels.
- Produced mainly form hydrocarbon by chemical cracking such as steam cracking and by catalytic reforming .

AROMATICS

- Includes benzene, toluene and xylenes.
- Manly produced by catalytic reforming or similar process.

SYNTHETIC GAS

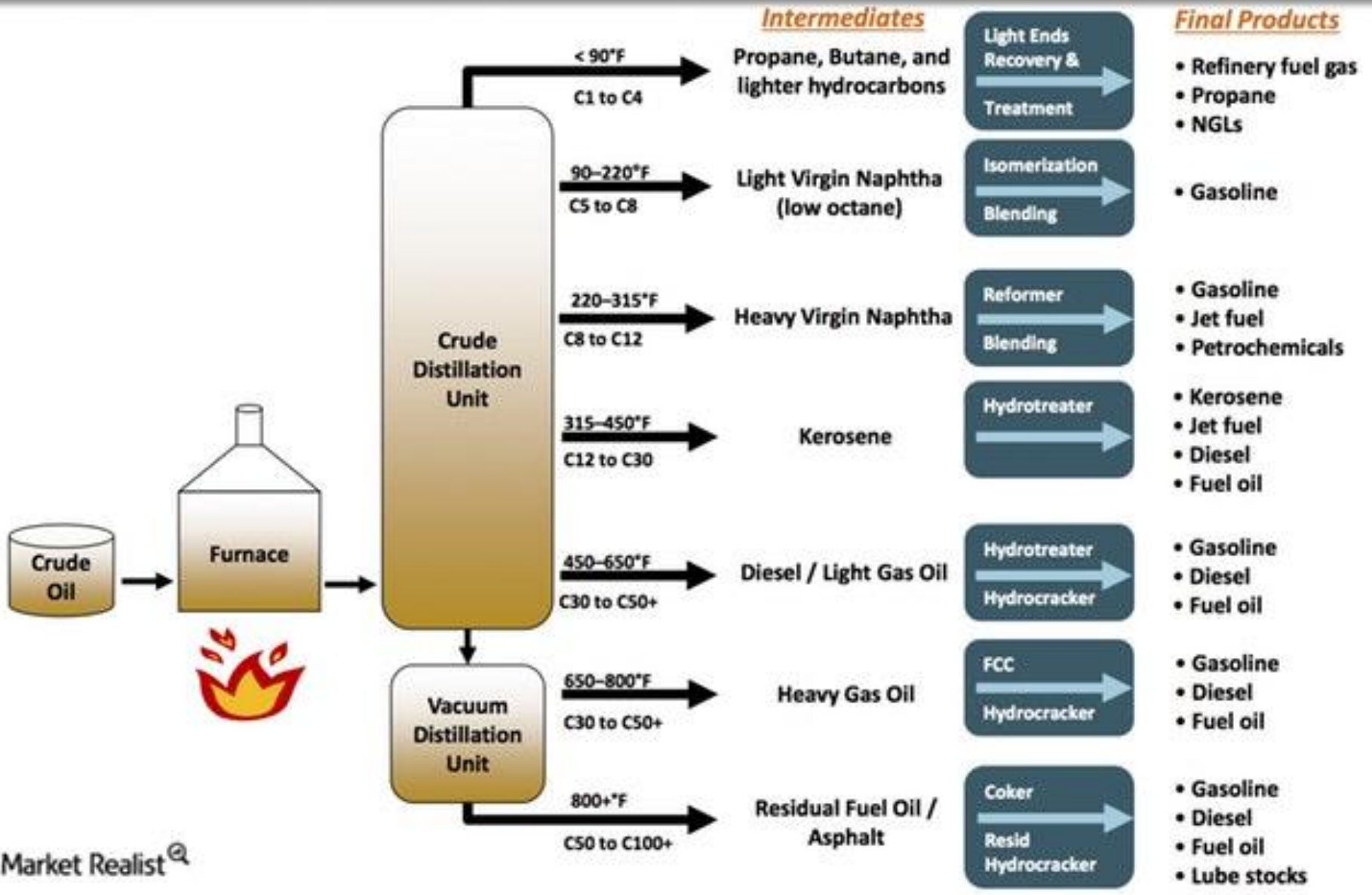
- A mixture of carbon mono oxide and hydrogen.
- Used to make ammonia and methanol.
- Ammonia is used to make fertilizers.
- Methanol is used as a solvents and chemical intermediate.

REFINING PROCESS

- Petrochemical refining begins with the distillation or fraction of crude oils into separate hydrocarbon groups.
- refining process involve three step –
  - Separation
  - Conversion
  - Treating

Source : Valero

Basic Refining Concepts

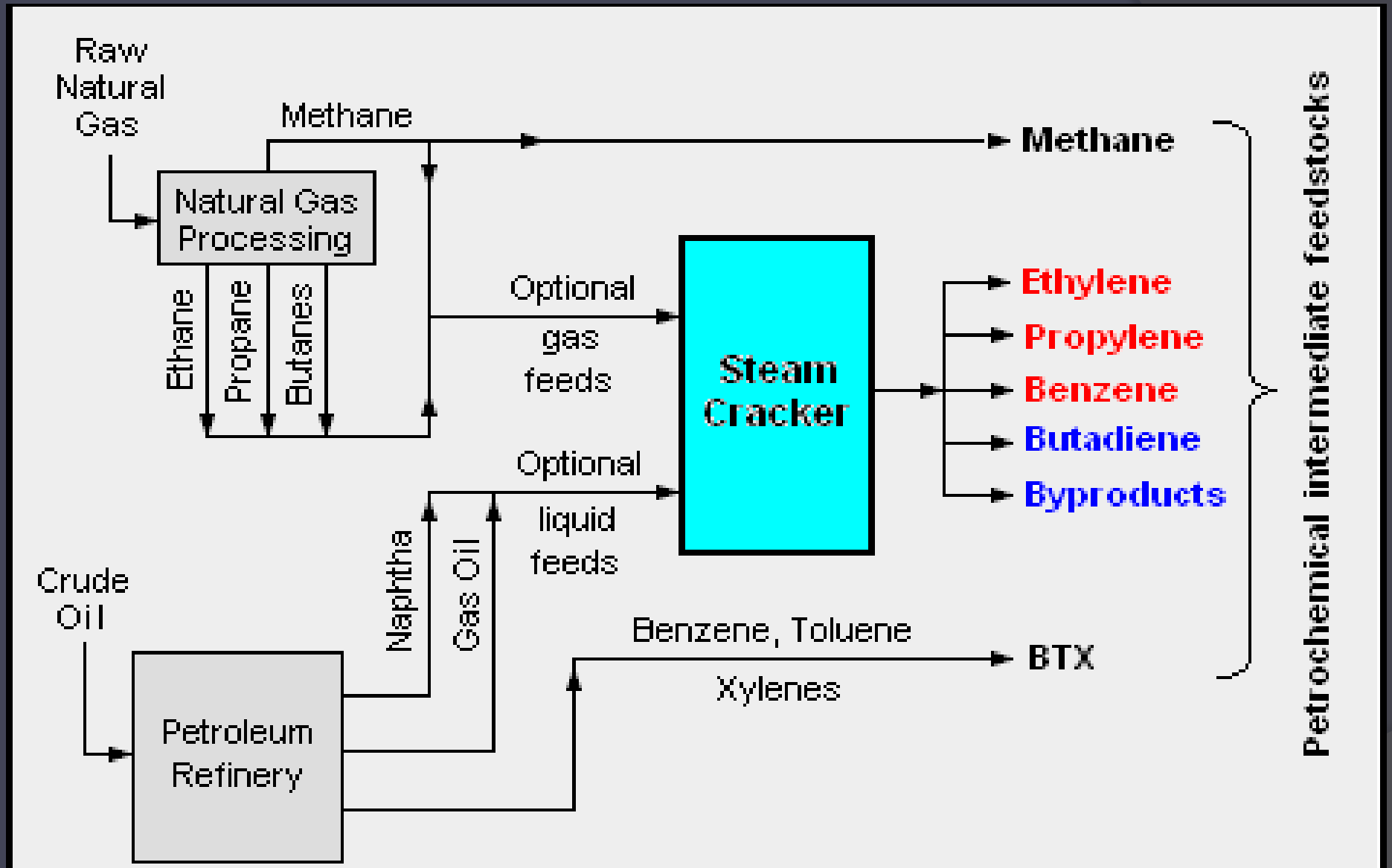


Market Realist

MANUFACTURE OF PETROCHEMICAL BY CHEMICAL CONVERSION

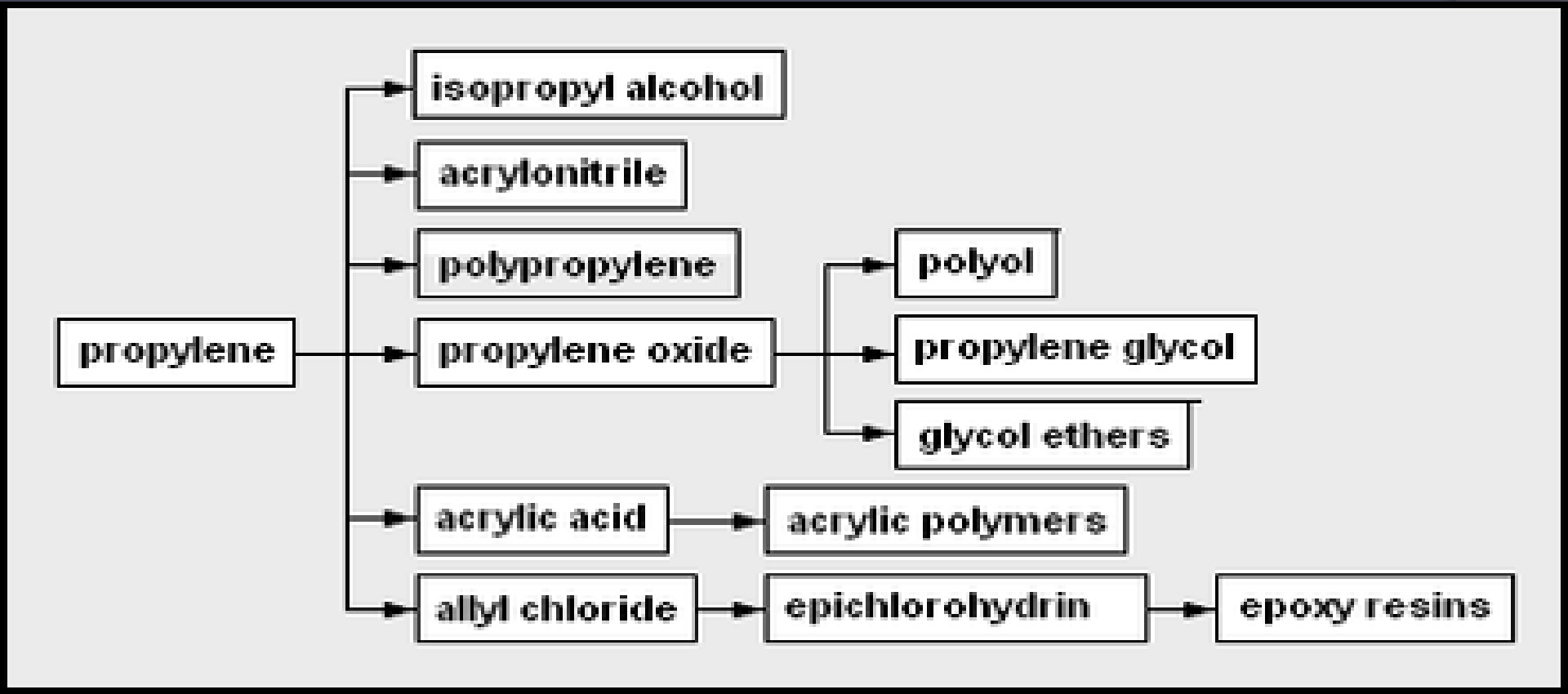
- PROPYLENE-

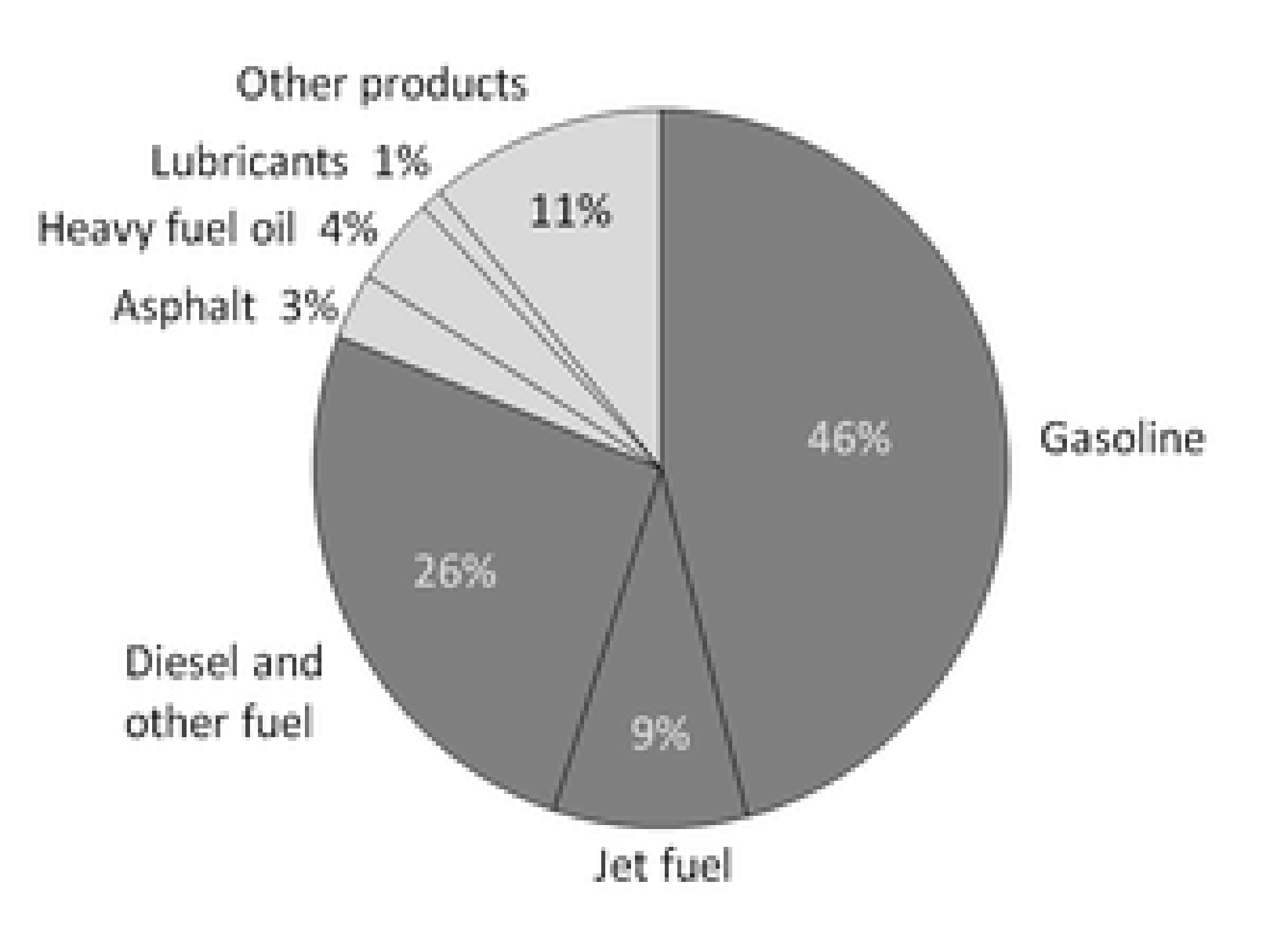
  Propylene is obtained as a by product during the catalytic cracking of the production of methylene and propylene. Propylene is also produced in large quantity during petroleum cracking. The refinery separated during catalytic cracking of gas oil to produced gasoline contains large amount of C-3 hydrocarbon they are separated to gets propane and propylene.


Raw Natural Gas
Methane
Natural Gas Processing
Ethane
Propane
Butanes
Optional gas feeds
Steam Cracker
Methane
Ethylene
Propylene
Benzene
Butadiene
Byproducts
Optional liquid feeds
Naphtha
Gas Oil
Crude Oil
Petroleum Refinery
Benzene, Toluene
Xylenes
BTX
Petrochemical intermediate feedstocks
Produced by cracking any of the optional feeds
Produced only by cracking any of the liquid feeds

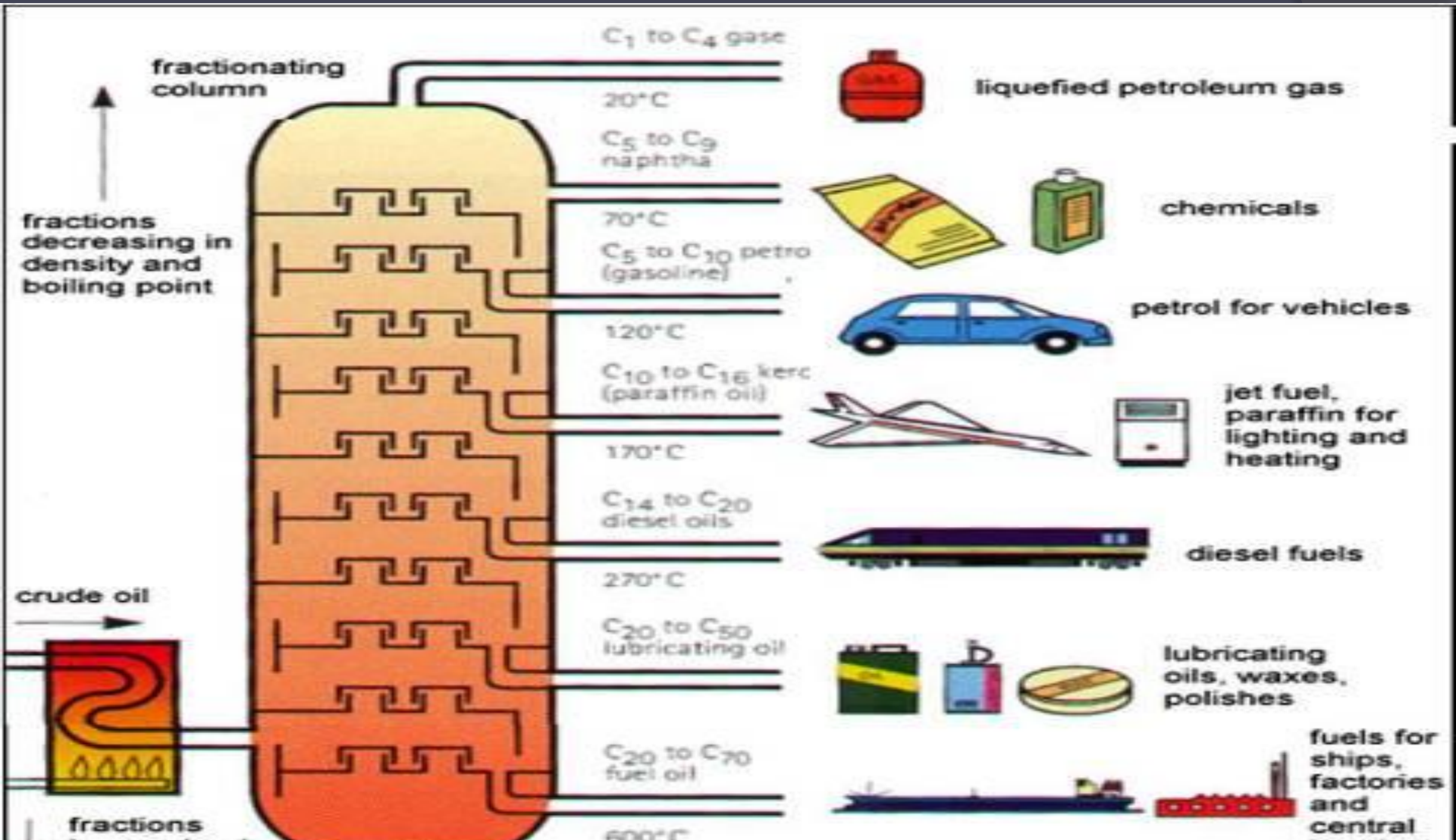
- USES-

It is used in the production of glycerol, allyl alcohol, allyl chloride, acetone, isopropyle, amine, quinine, propanoic acid, acrolein (PMA).




Other products
Lubricants 1%
Heavy fuel oil 4%
Asphalt 3%
11%
46%
Gasoline
26%
Diesel and other fuel
9%
Jet fuel

REFINED PETROLEUM PRODUCT AND USES



Uses

- Petroleum, as found in nature, cannot be directly used, it has to be refined &/or separated into various fractions before it can be marketed.

- **The main uses of Petroleum Products are:**

As a fuel (eg: Natural gas, gasoline, Diesel Fuels and Fuel Oil)

As a source of heat and power generation (eg: Kerosene and Fuel Oil)

As a lubricant (eg: Lubricating Oils & greases)

As a raw material for the Petrochemical Industry (eg: Natural gas and Naphtha)

THANK YOU