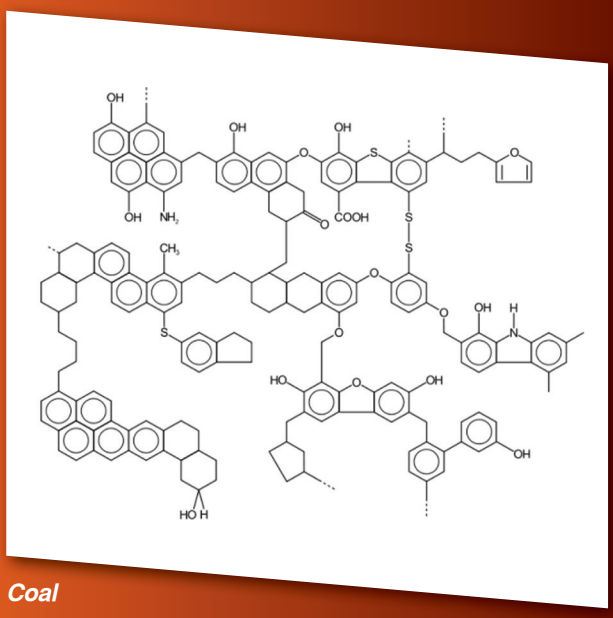
P7 PETROCHEMICALS

NATURAL GAS

CHEMICAL INDUSTRIES
RESOURCE PACK



Coal

Source: Wikipedia

South African Refinery Capacity, 2008

Refinery	Capacity (bbl/d)
Sapref	180,000
Enref	125,000
Natref	100,000
Sasol	92,000
PetroSA	450,000
Total	**692,000**

Source: South African Petroleum Association

Coal mining

Source: Mind over Matter, www.sasol.com

Introduction

Natural gas is a gaseous fossil fuel composed mainly of methane (CH_4). It is formed alongside oil fields and coal beds. Natural gas burns with relatively low emissions and can be safely stored, making it a convenient and efficient source of energy for heating and electricity generation.

Natural gas formation and extraction

The most common sources of natural gas are oil fields and natural gas fields. Gas fields are a result of anaerobic (oxygen-lacking) digestion of dead plant matter deep under the Earth's surface. Much like oil, natural gas is drilled for, then pumped to processing stations. Processing stations will remove "heavy hydrocarbons" such as butane and propane to ensure that the gas burned will emit low pollution.

Natural gas can also be released from coal through the process of coal gasification. In coal gasification, coal is exposed to high temperatures and pressures in order to break it apart into gaseous components. However, it is a very expensive process. There has also been research into capturing methane produced from landfills and biogas produced from cattle.

Generating power from natural gas

Electricity is produced from natural gas similar to the way coal generates energy. Natural gas is burned to release heat, which boils water and creates steam. The pressure from the steam is used to turn a turbine and a generator. The efficiency of this process can be further increased by using a combined cycle system. This system uses a natural gas fuel turbine, along with heat-recovery generator and steam turbine. As a result, 60% of heat from natural gas can be harnessed to generate electricity.

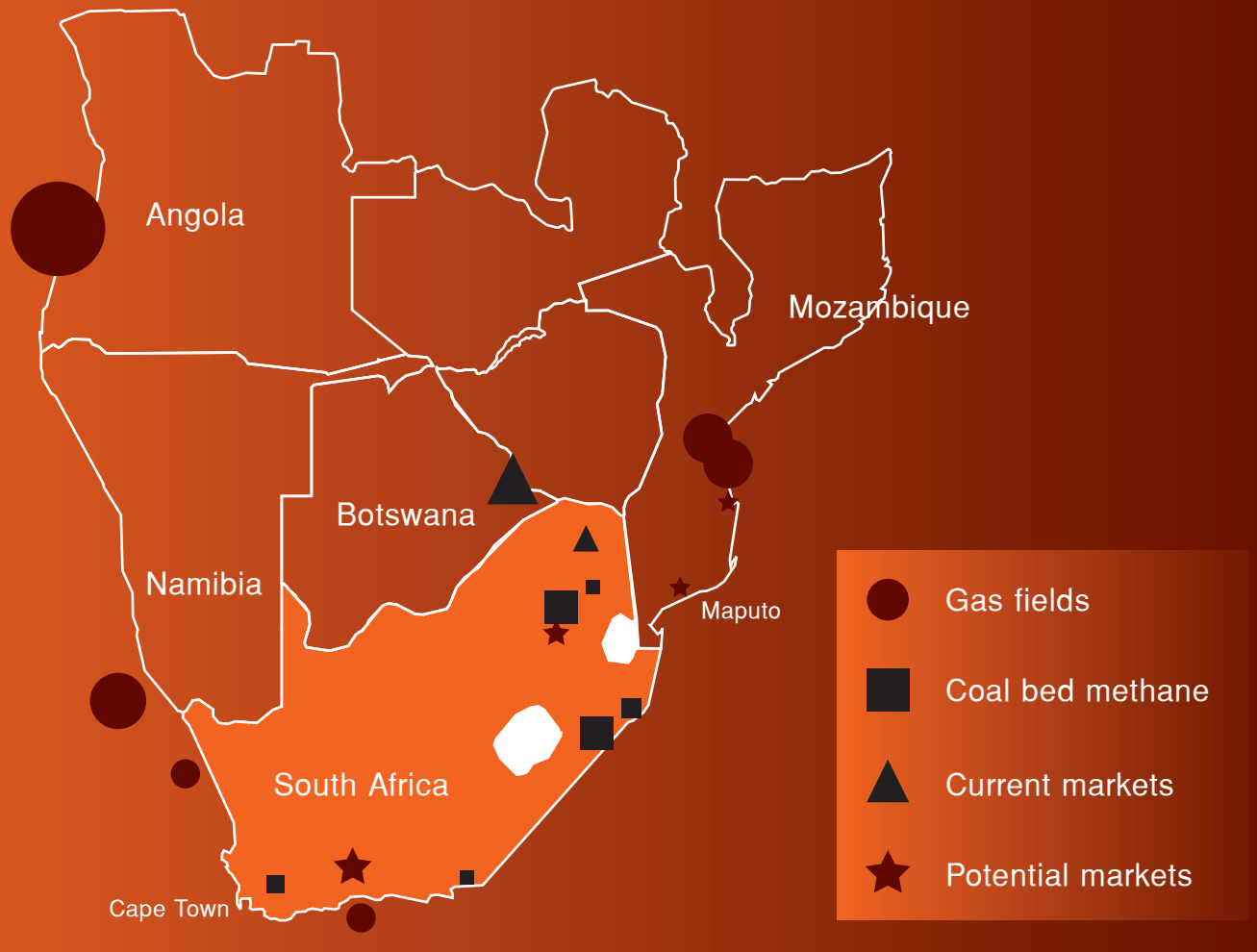
Natural gas energy: advantages and disadvantages

Advantages	Disadvantages
* Relatively low emissions compared to other fossil fuels (for the same amount of heat, produces 30% less carbon dioxide than burning oil and about 45% less than burning coal) * Safely stored and burned * Affordable * Many gas mines are still underutilised	* Limited supply as is a non-renewable resource * Tends to be more expensive compared to other fossil fuels * Less concentrated form of energy (170 cubic metres = 1 barrel of oil)

Summary

Natural gas is the cleanest burning of all the fossil fuels, though its higher cost prohibits more widespread use. Since we rely less on natural gas for power generation, it may outlast coal and oil. Yet, natural gas remains a non-renewable energy source, which makes its long-term viability limited.

Natural gas resources in Southern Africa



Source: EIA