

# Outlook for BAU Scenario

## II. Middle East

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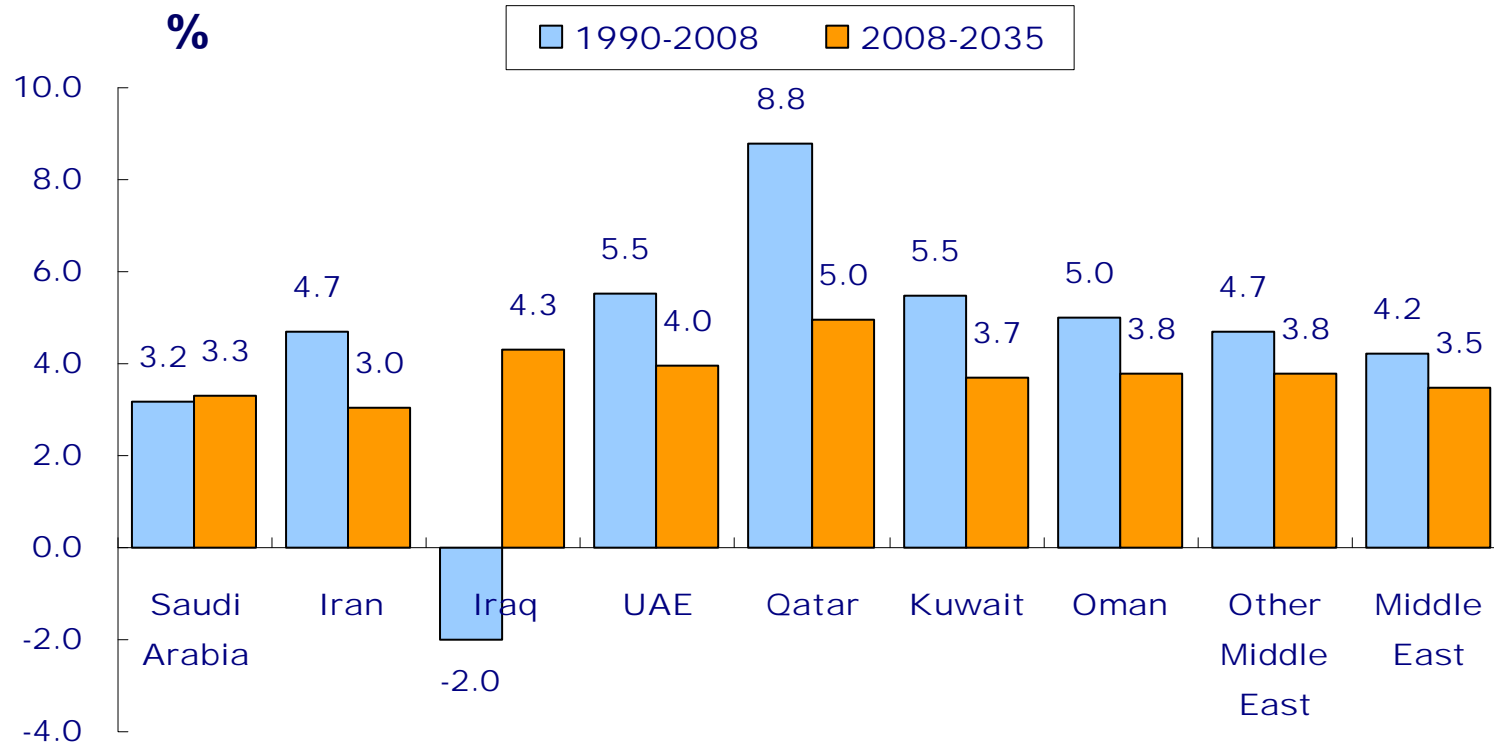
The Institute of Energy Economics, Japan (IEEJ)

\*Please note this outlook was finalised before the day of East Japan Great Earthquake, thus does not reflect any impacts of the event.



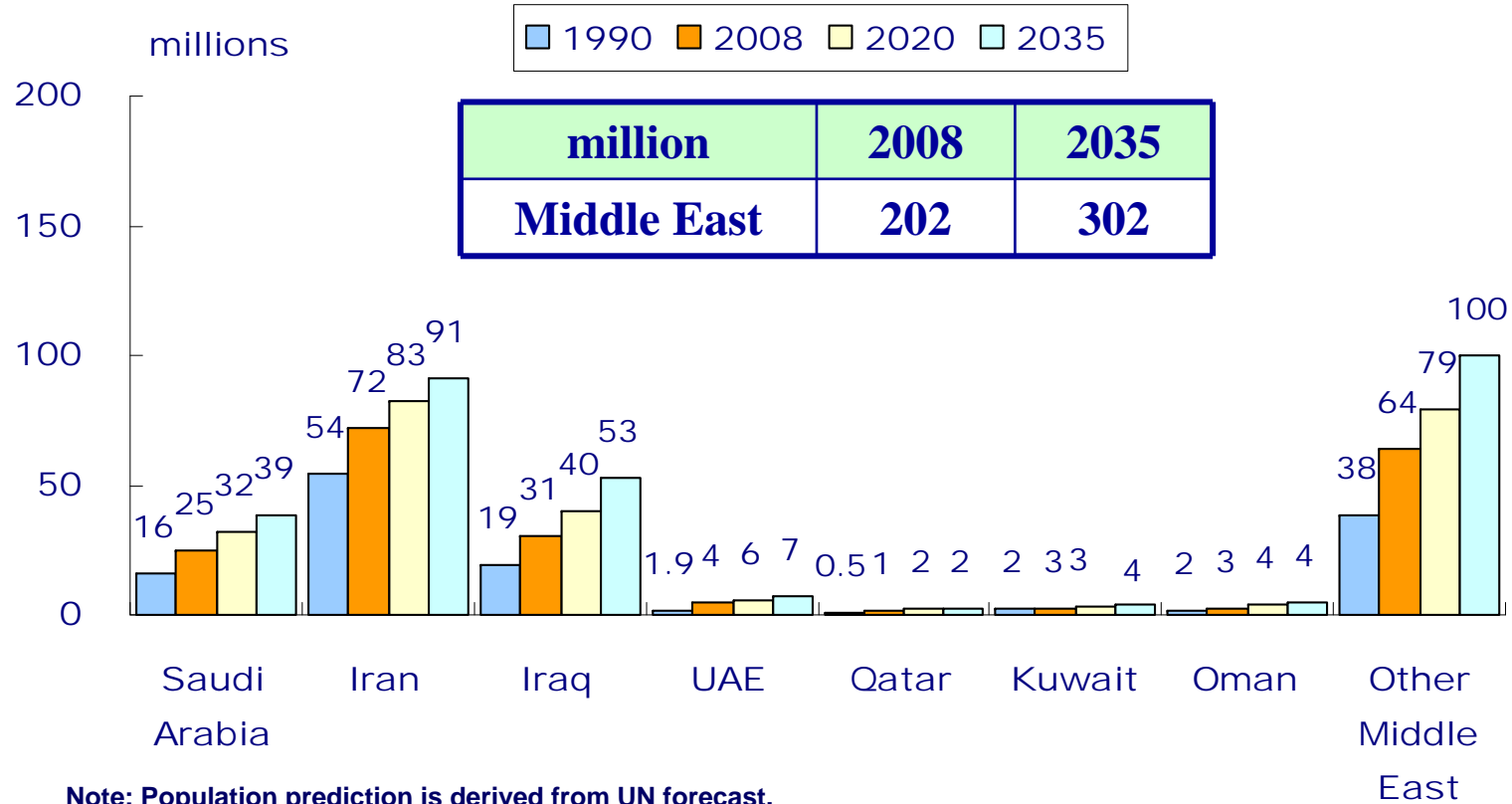
# I. Major assumptions

# GDP growth



- Middle East countries' GDP will continue grow moderately in the outlook period.
- Middle East as a whole will achieve Annual economic growth rate at 3.5% to 2035.
- GDP of the Middle East countries will be more than double by 2035.

# Population



- ME Population will achieve continuous increase. (Iran, Iraq and Saudi Arabia etc. , )
- Total population of Middle East will grow from around 200 million to 300 million by 2035.

## Nuclear & renewables

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### Nuclear

#### Iran

- Nuclear power plant has already been installed in Bushehr and it will start to operate from 2011  
(Nuclear power capacity is 1GW)

#### UAE

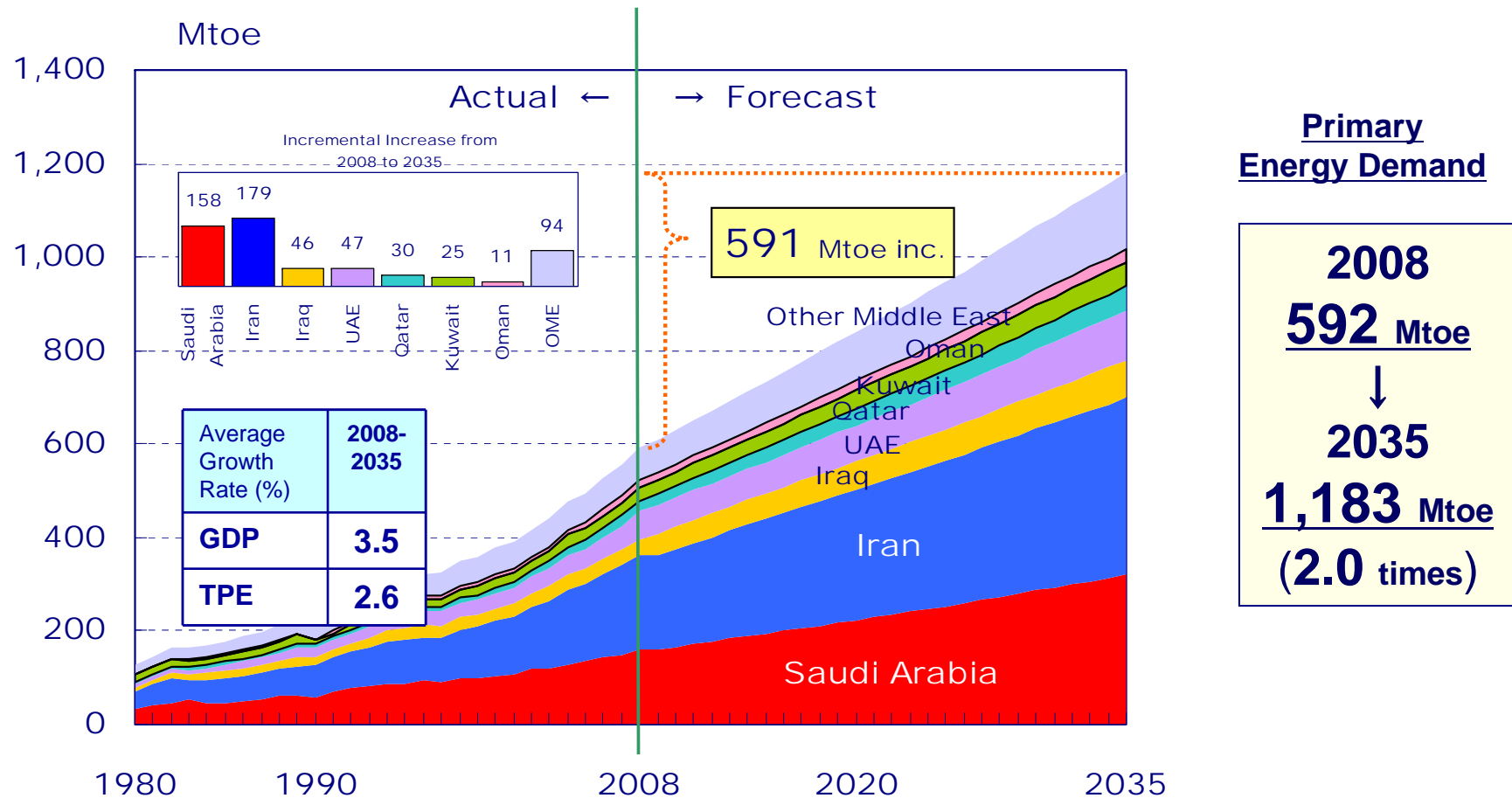
- Nuclear power plant will be installed from 2020
- Other three nuclear power plants will be built from 2025 and 2030  
(Total nuclear power capacities are 5.6GW in 2030)

### renewables

- Maintain the Status quo

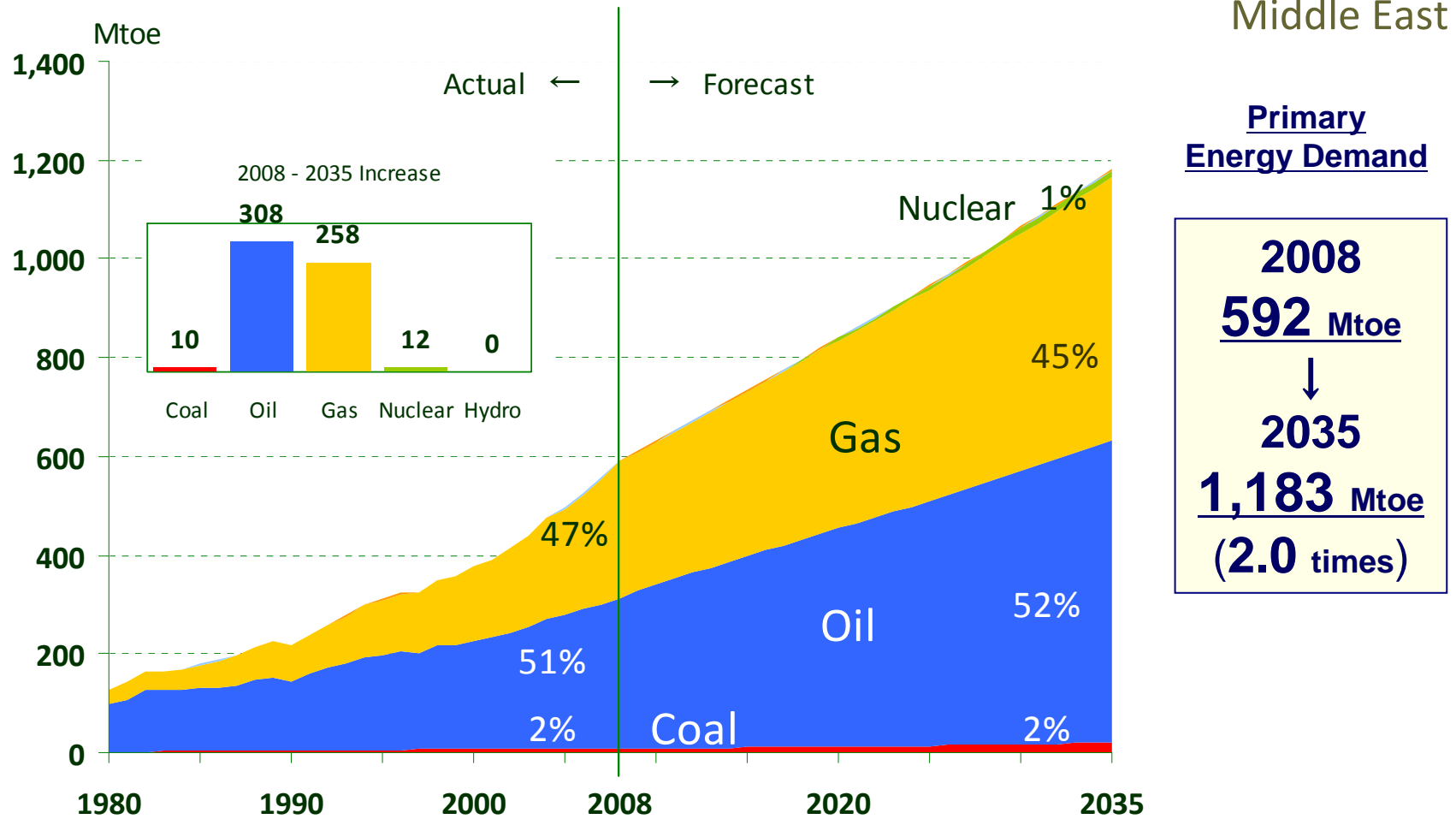
## II. Energy Outlook for Middle East (BAU Scenario)

# Primary Energy Demand by region



- Primary energy demand in Middle East will exhibit 2-fold increase to 2035.
- Saudi Arabia and Iran will account for more than half of the demand growth in Middle East.

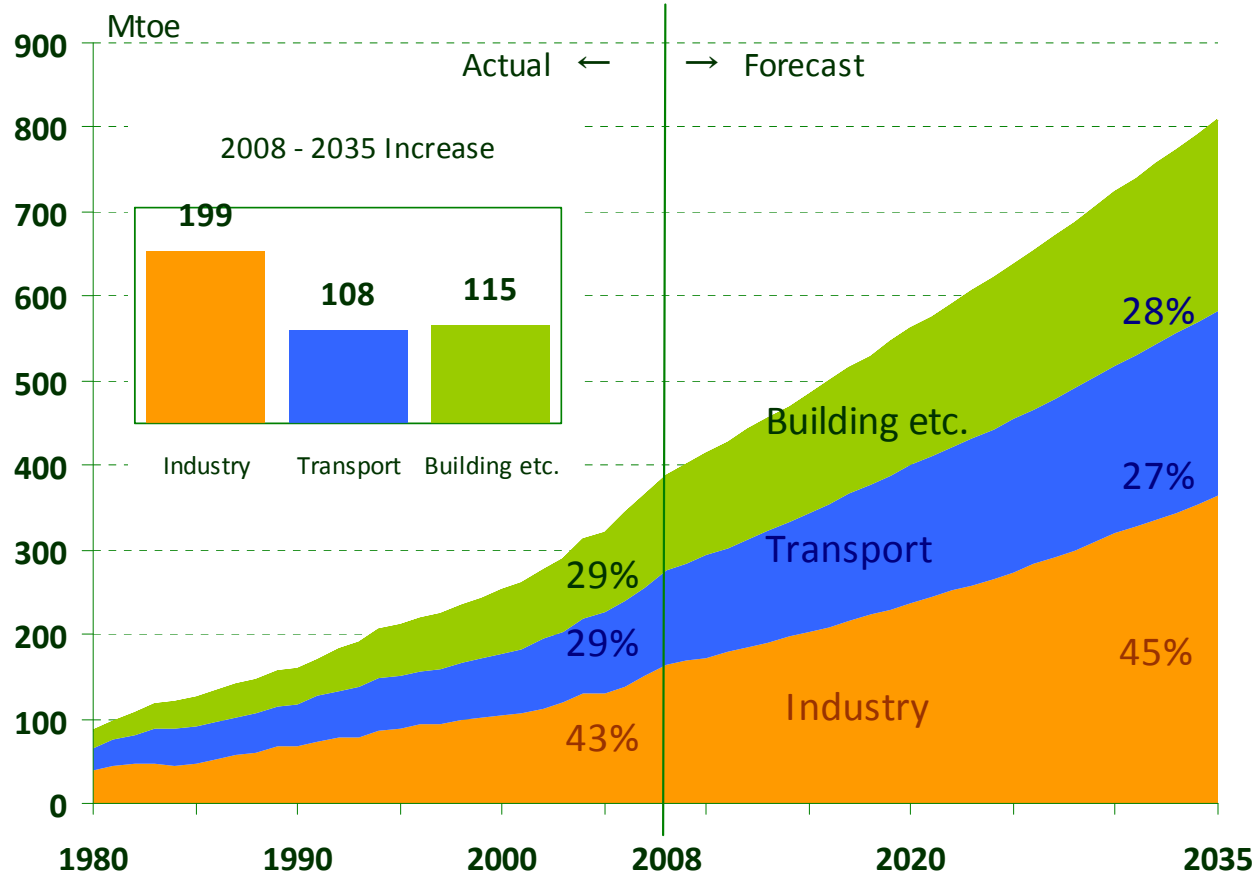
# Primary Energy Demand by energy source



- Oil will remain the most important fuel in primary energy demand in 2035.
- Gas demand will grow mainly in power and industry sector.
- Nuclear power accounts for 1% of the primary energy demand in Middle East in 2035<sub>g</sub>

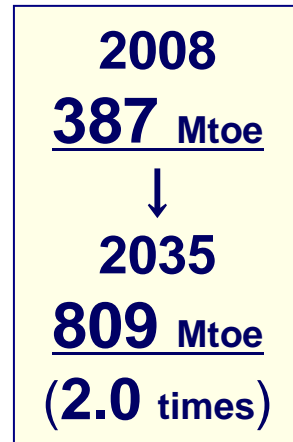


# Final Energy Demand by sector



Middle East

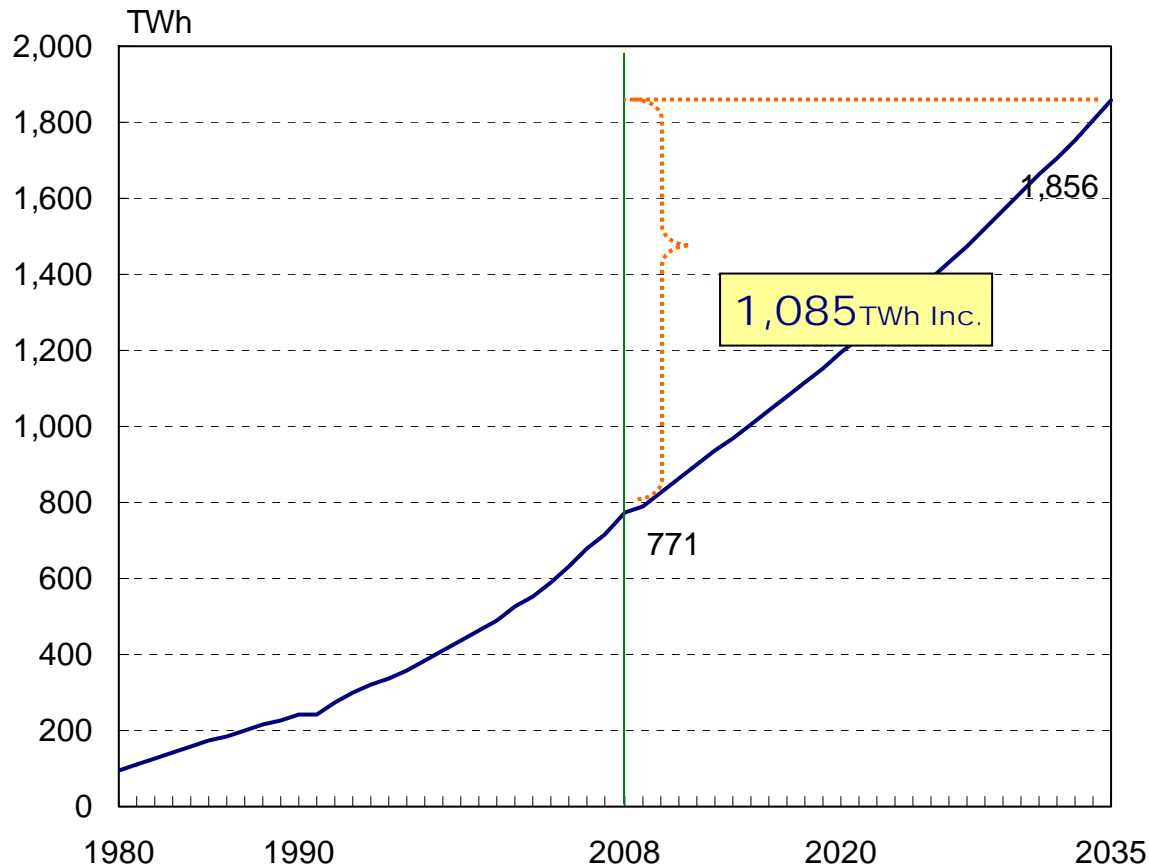
**Total Final Energy Demand**



Note: Industry includes non-energy sector.

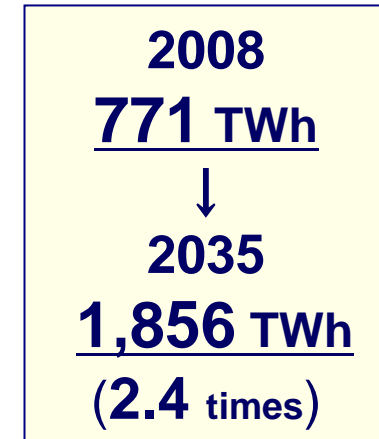
- Final energy demand will increase in industry, reflecting mainly the growth of petrochemical industry.
- Energy demand in Building and Transport sector will increase with growing income and population.

# Power Generation



Middle East

## Power Generation

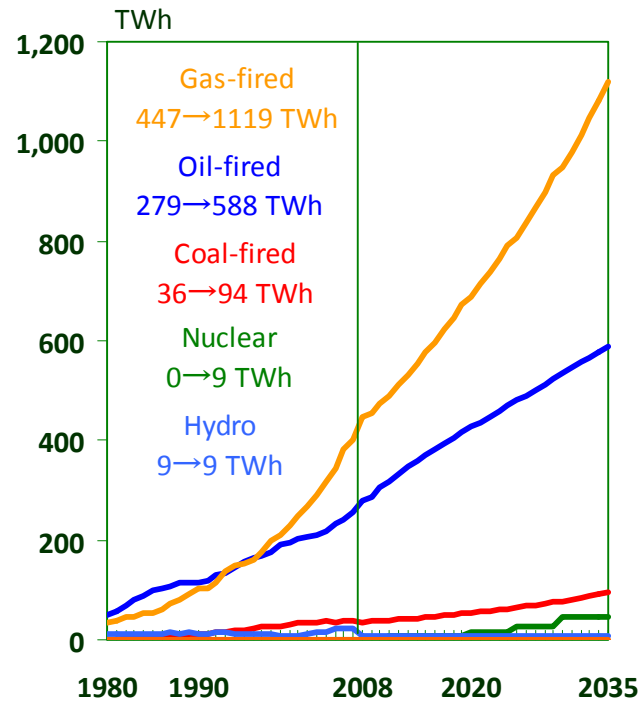


- Electricity demand in Middle East will exhibit 2.4-fold increase to 2035, backed by economic growth and population increase.
- Power generation mix is considered as an influential factor in energy outlook.

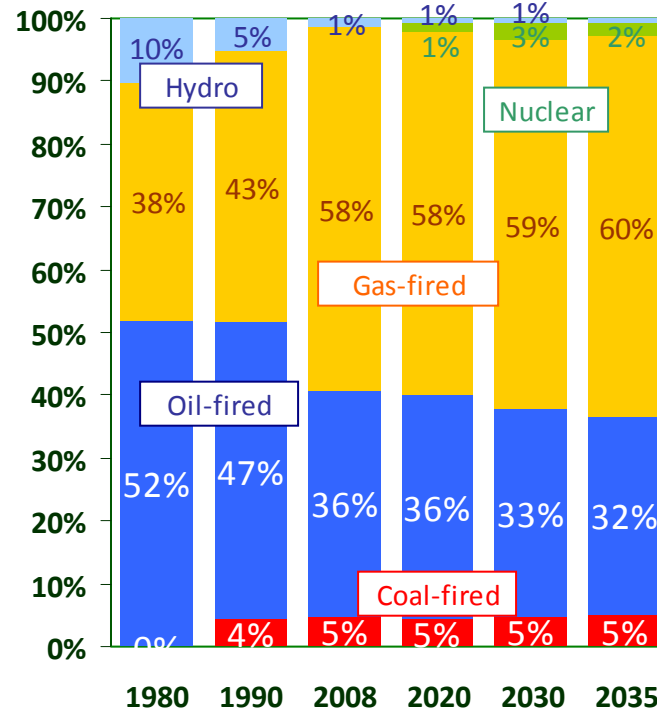
# Power Generation Mix

Middle East

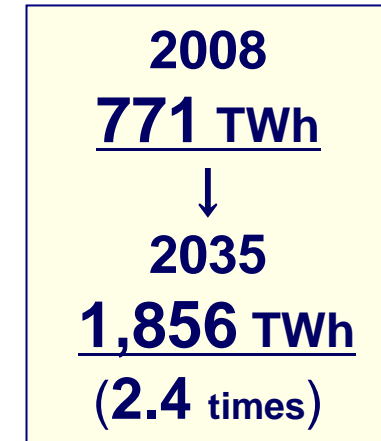
**Power Generation**



**Power Generation MIX**

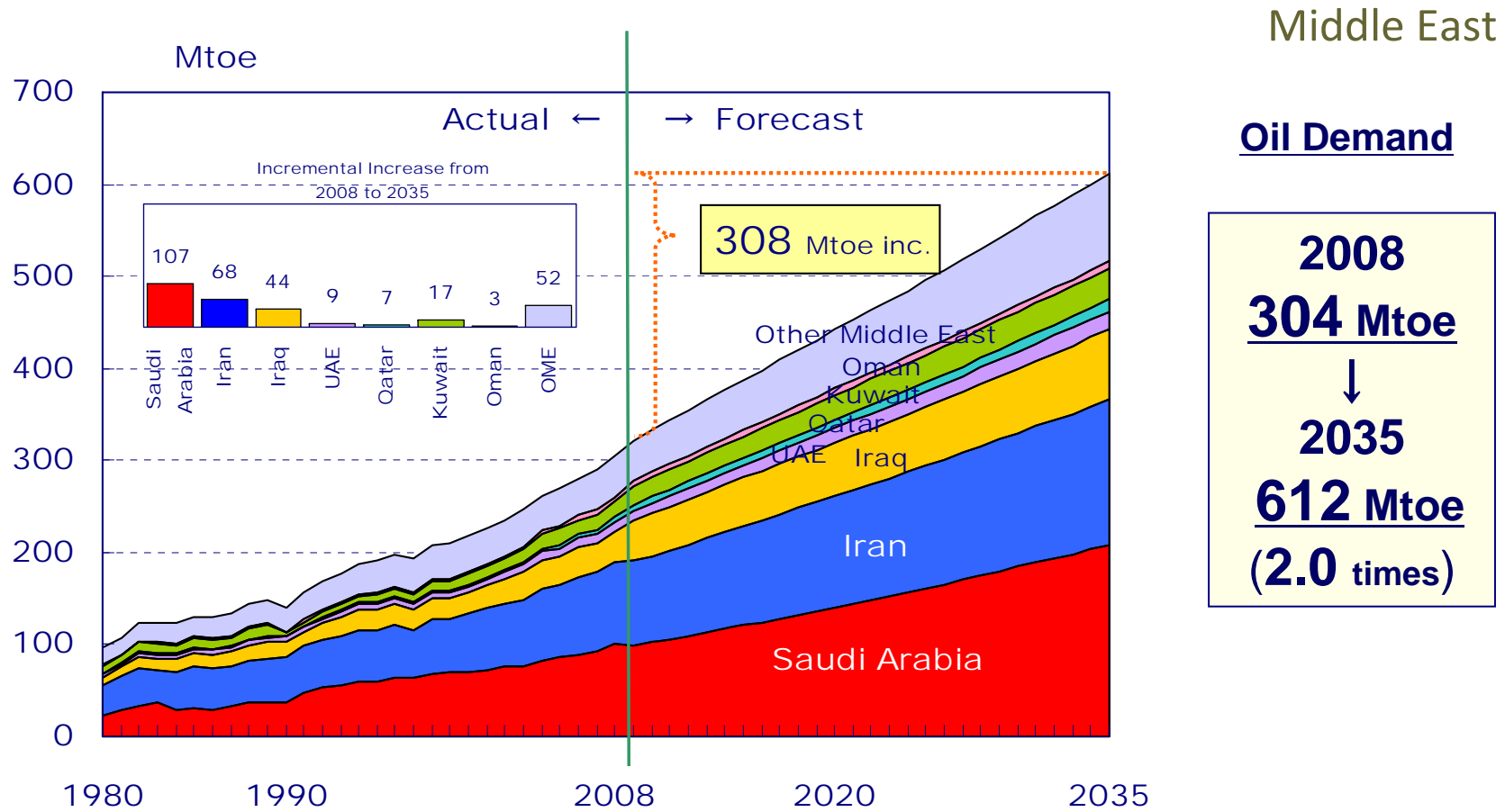


**Power Generation**



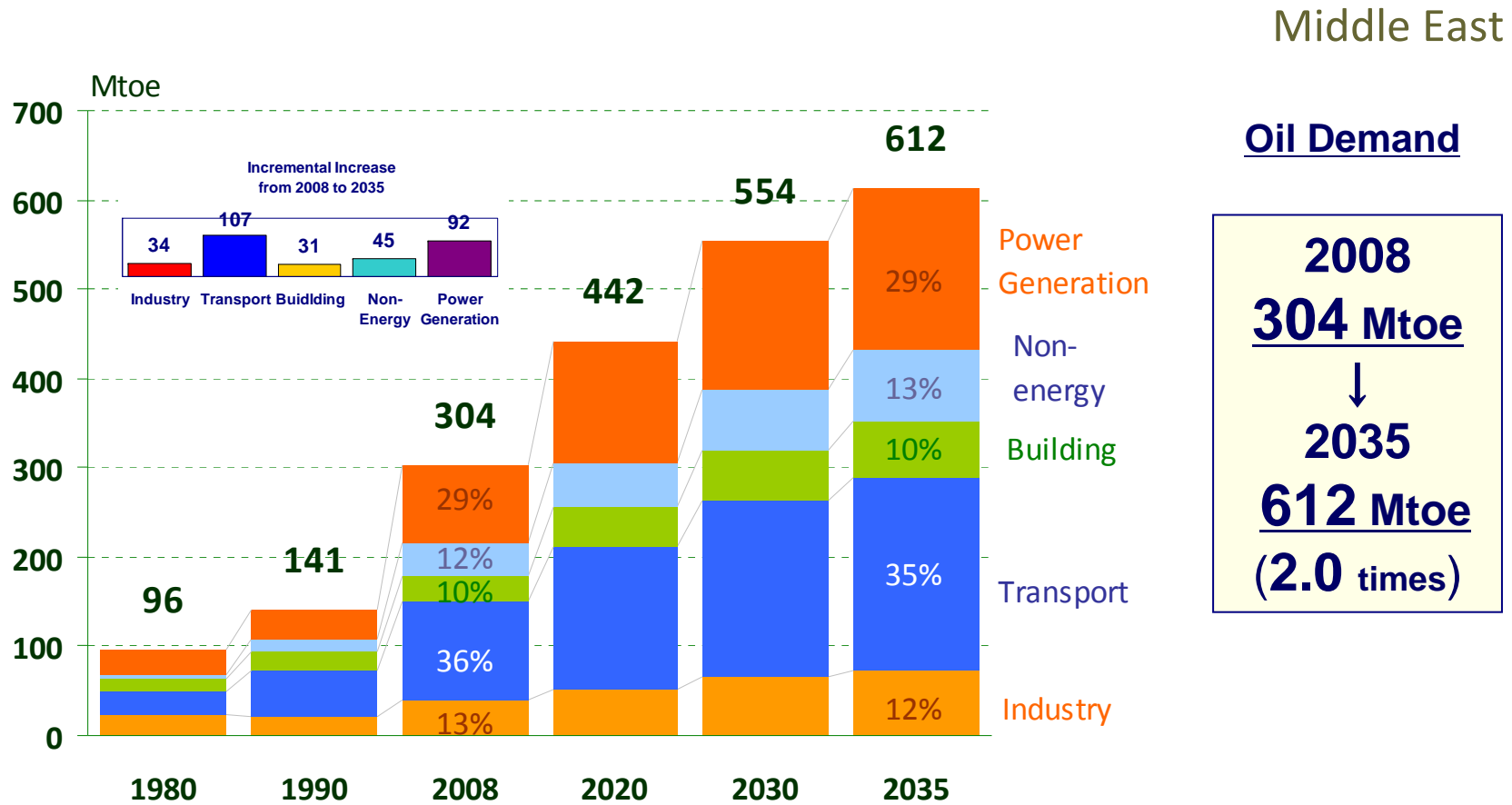
- Gas-fired power generation is expected to gradually replace oil-fired power generation towards 2035. However, a pace of replacement will not be fast because of the gas supply constraints in many countries in the region.
- The introduction of nuclear power plant capacity will be 6.6GW in total in 2035.
- Hydro power generation will remain at the current level.

# Oil demand by region



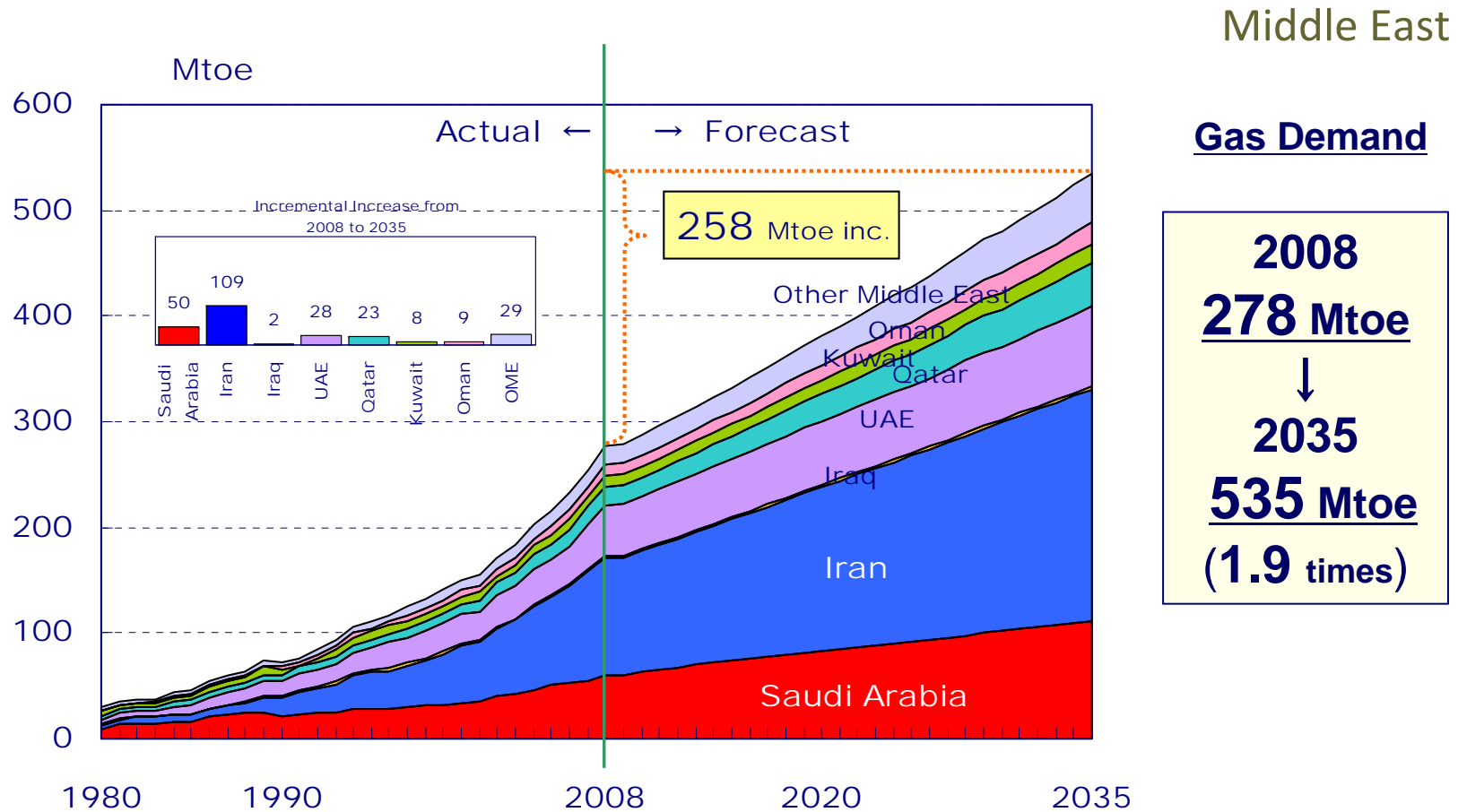
- Oil demand in Middle East will exhibit 2.0-fold increase to 2035.
- Saudi Arabia, Iran and Iraq will account for more than 70% of the oil demand growth in Middle East.

# Oil demand by sector



- Oil demand growth will depend mainly on the increase in the transport sector and power sector due to the increase of automobile ownership and electricity demand.

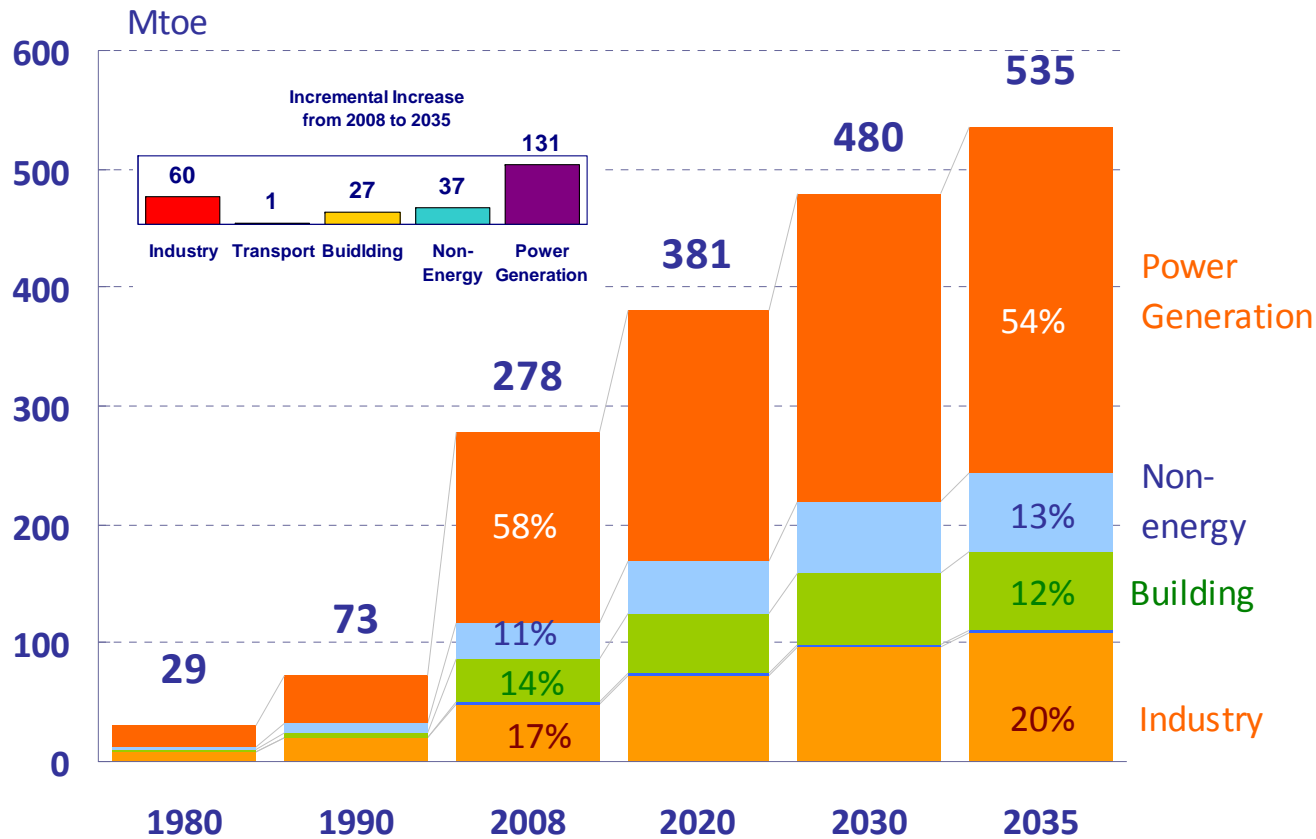
# Natural gas demand by region



- Gas demand in Middle East will exhibit 1.9-fold increase to 2035.
- Saudi Arabia, Iran, UAE and Qatar will account for more than 80% of the gas demand growth in Middle East. Especially, Iran will account for more than 40% of that.

# Natural gas demand by sector

Middle East

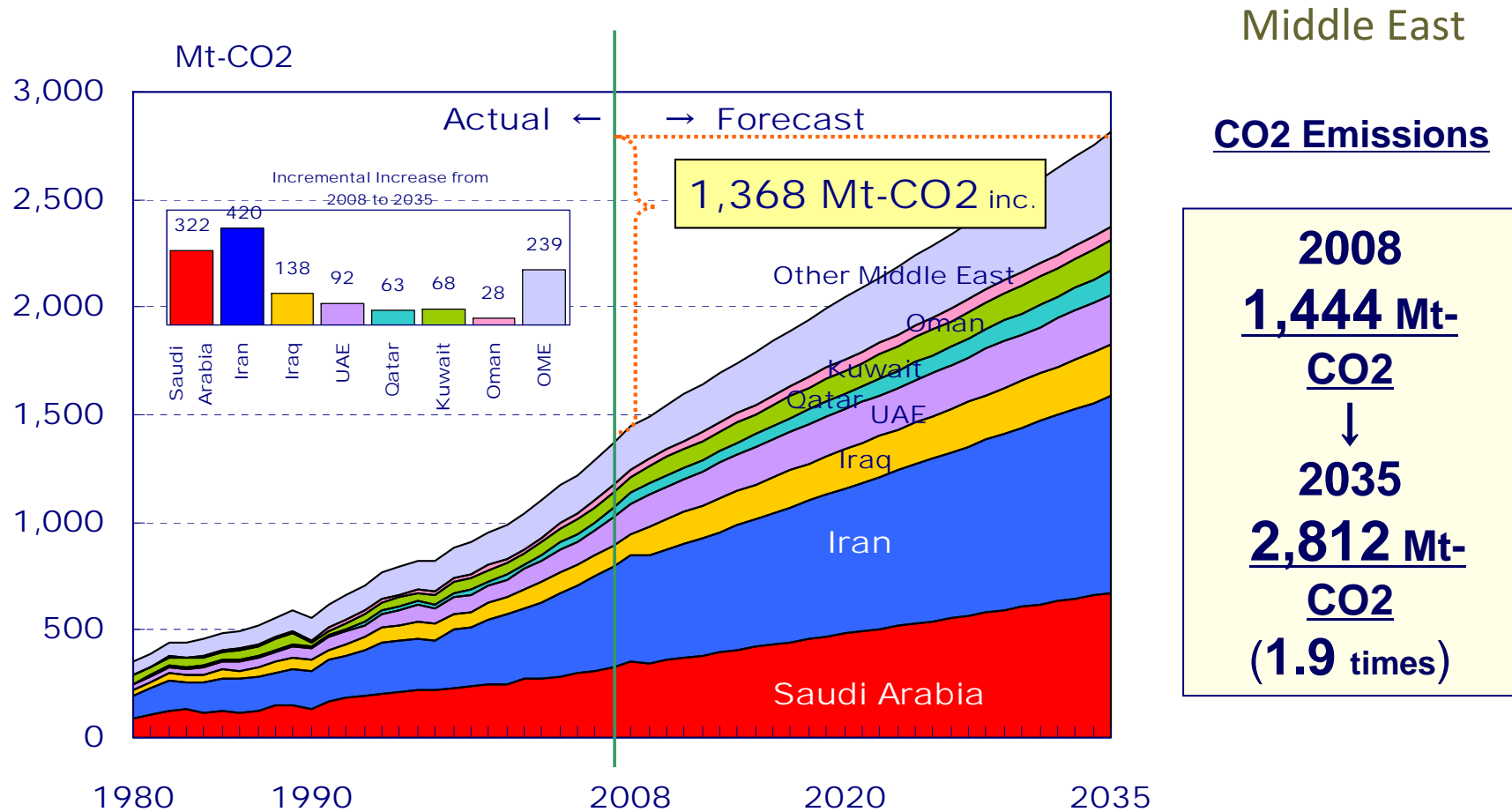


## Gas Demand

**2008**  
**278 Mtoe**  
 ↓  
**2035**  
**535 Mtoe**  
**(1.9 times)**

- Gas demand growth will depend mainly on the increase in the power sector and industry sector.
- Gas-fired power generation will exhibit 2.5-fold increase to 2035.

# CO2 emissions by region



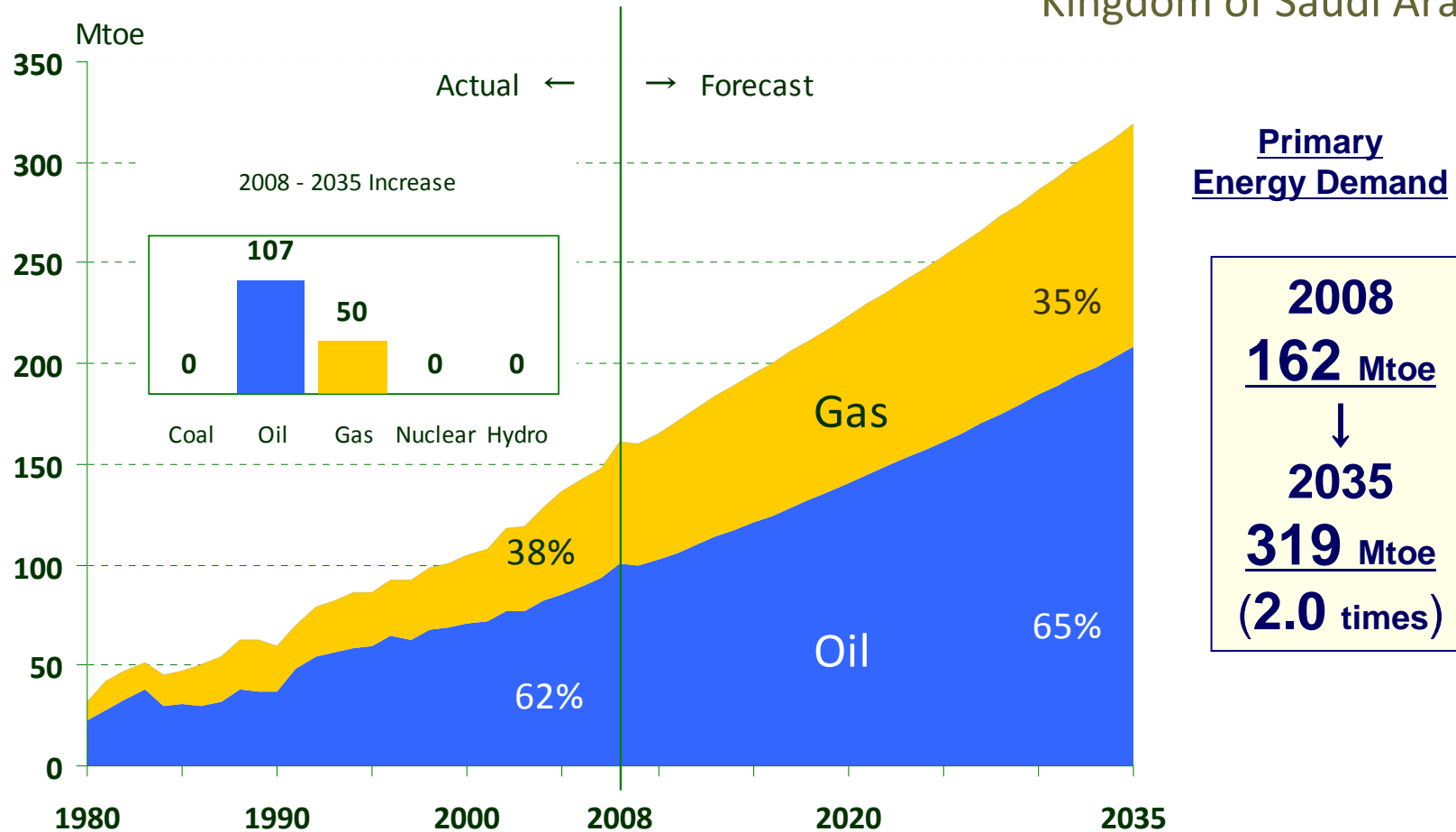
- CO2 Emissions in Middle East will exhibit 1.9-fold increase to 2035.
- CO2 Emissions growth will mainly depend on the increase in Saudi Arabia and Iran. They will account for more than 50 % of the CO2 emissions increase.



### III. Energy Outlook for the Kingdom of Saudi Arabia (BAU Scenario)

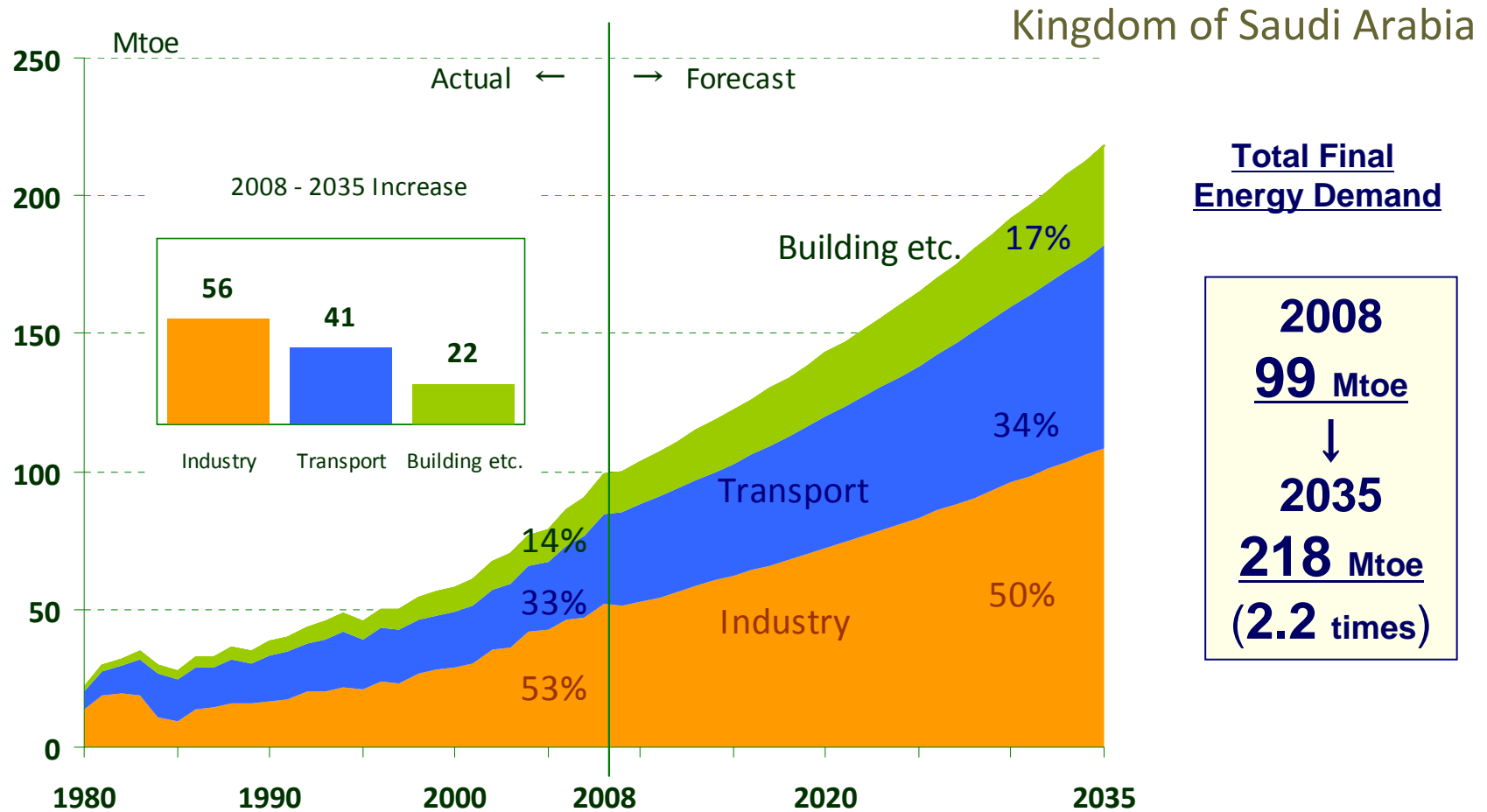
# Primary energy demand

Kingdom of Saudi Arabia



- Total primary energy demand will show 2.0-fold growth to 2035.
- Oil will remain the largest fuel in primary energy demand by 2035, and increase in oil demand depends on transport and non-energy sector.
- Gas demand will increase in power sector and non-energy sector.

# Final energy demand

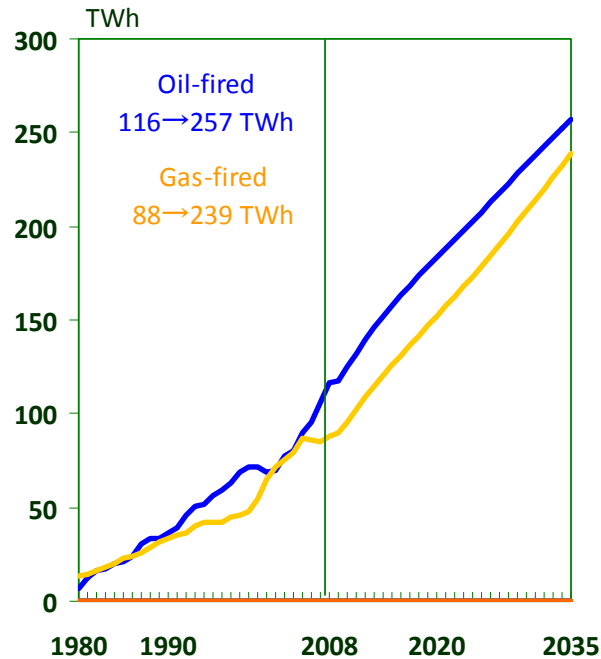


Note: Industry includes non-energy sector.

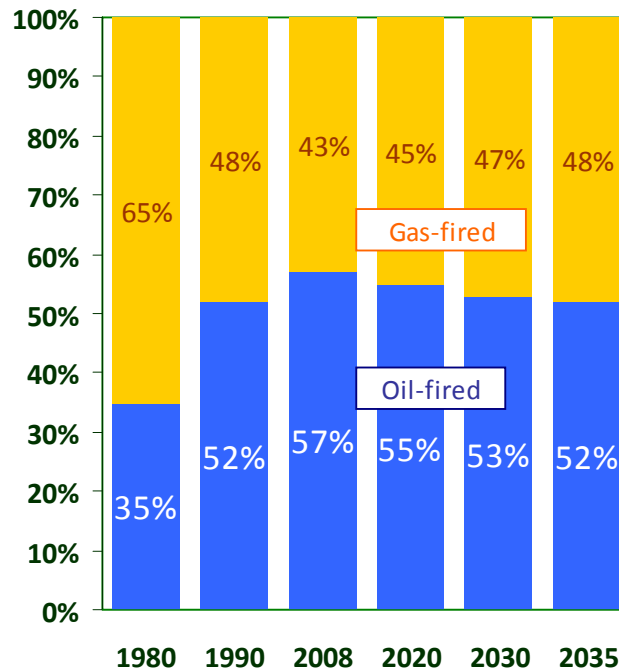
- Final energy demand will increase in industry, reflecting mainly on the growth of petrochemical industry.
- Final energy demand in Building and Transport sector will increase, backed by growing income and population.

# Electricity generation mix

**Power Generation**

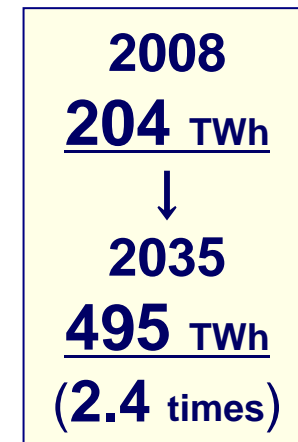


**Power Generation MIX**



Kingdom of Saudi Arabia

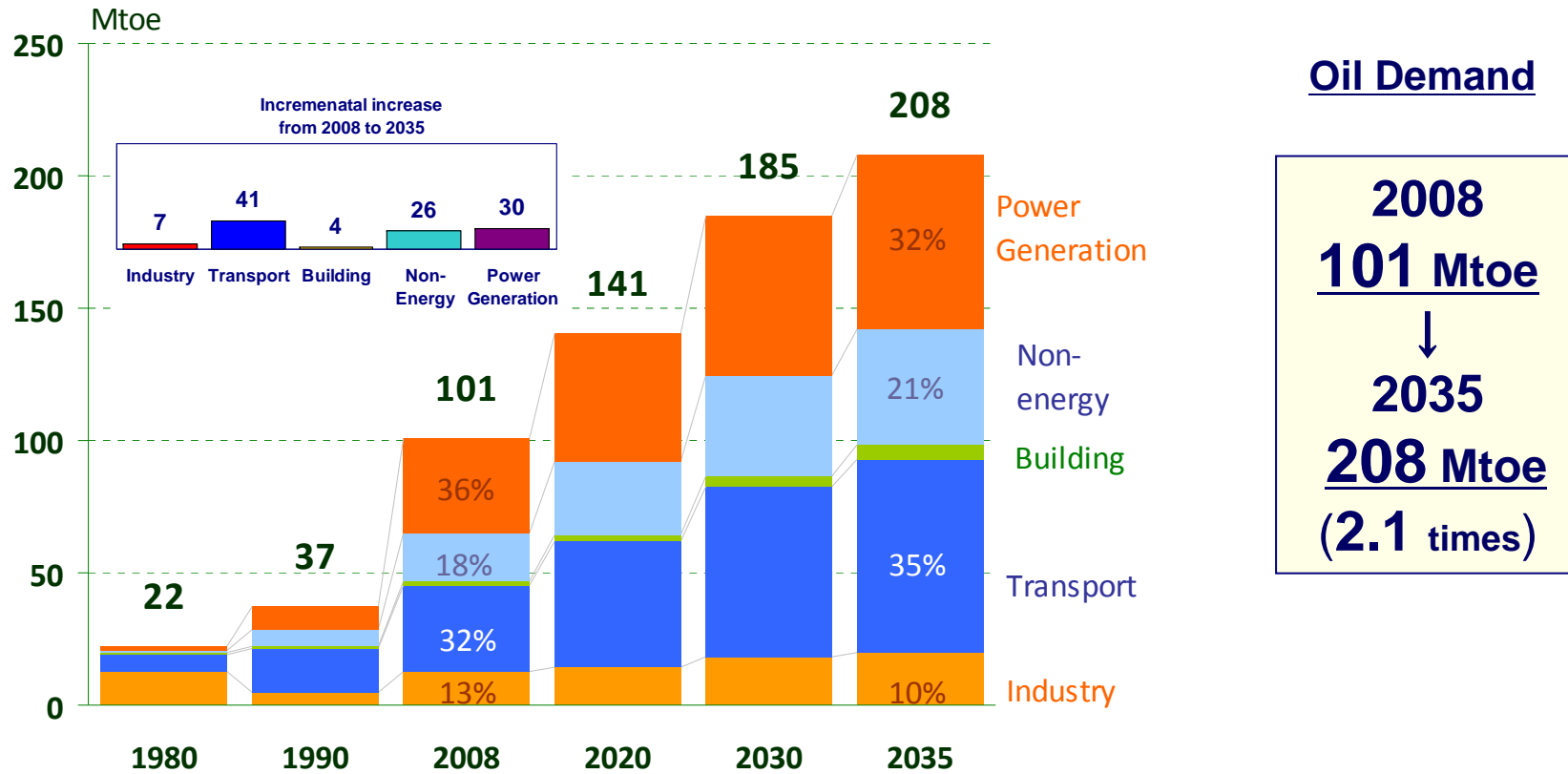
**Power Generation**



- Approximately 90% of electricity demand is attributable to residential and commercial sector.
- Electricity demand will show vigorous growth and achieve more than twice as much as the current level by 2035.
- Gas-fired power generation is expected to gradually replace oil-fired power generation towards 2035. However, a pace of replacement will not so fast because of the gas constraint. Oil-fired power generation will remain the largest share in the generation mix in 2035.

# Oil demand

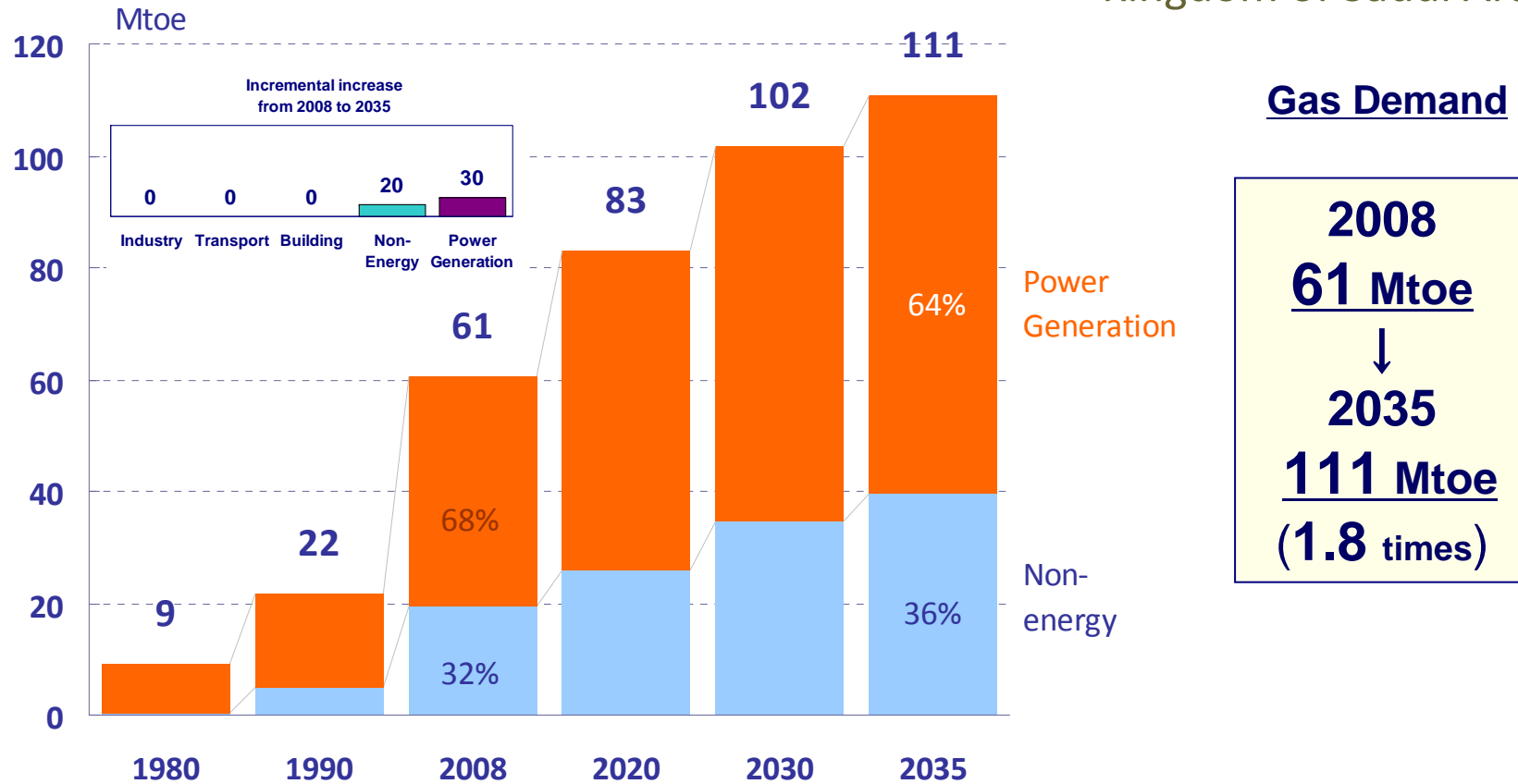
Kingdom of Saudi Arabia



- Oil demand in Saudi Arabia will show 2.1-fold growth to 2035.
- Growth in Transport sector will account for about 36% of oil demand growth in 2035.

# Gas demand

Kingdom of Saudi Arabia

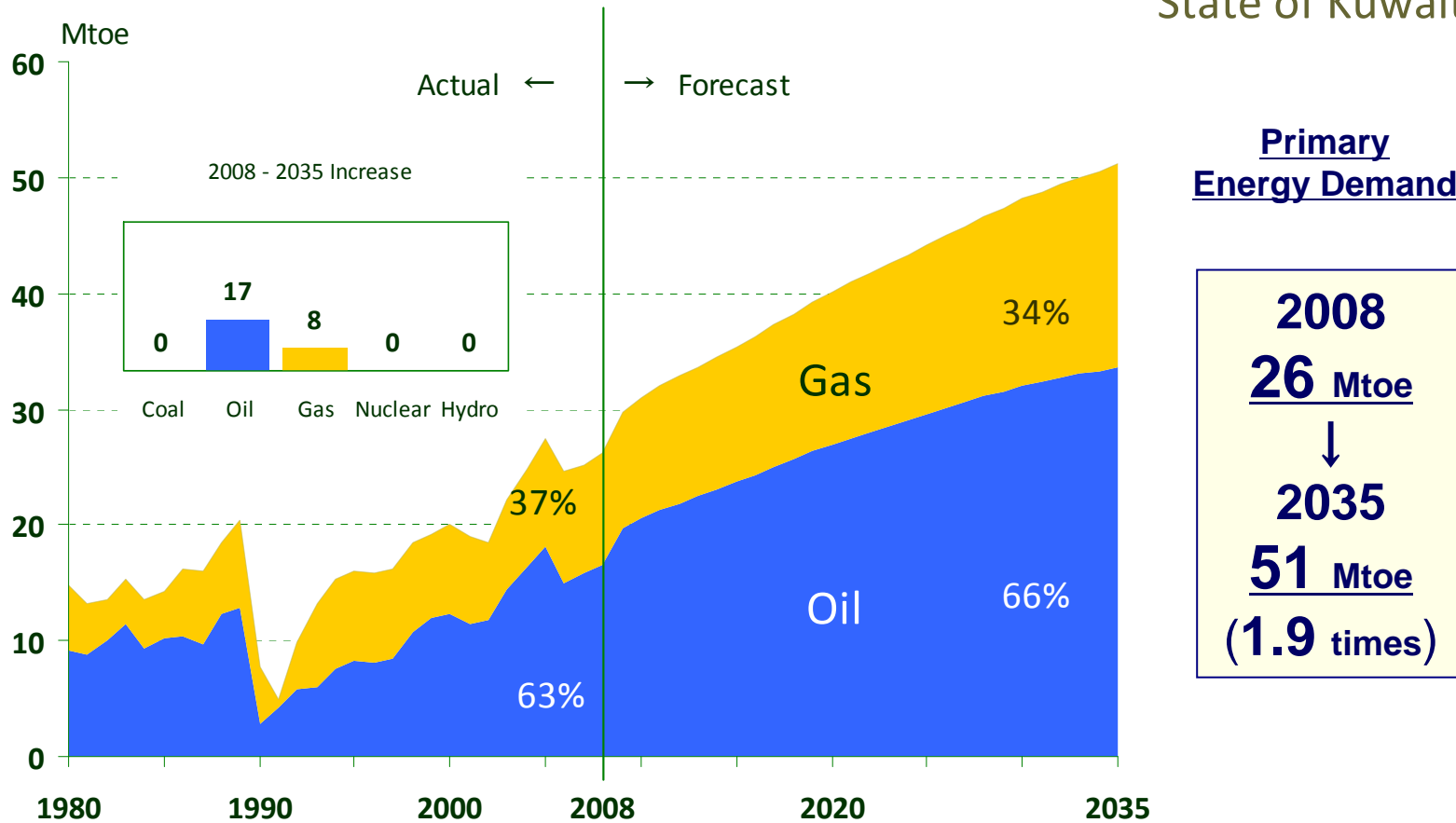


- Gas demand in Saudi Arabia will show 1.8-fold growth to 2035.
- Growth in Power sector will account for about 60% of gas demand growth in 2035.

## IV. Energy Outlook for the State of Kuwait (BAU Scenario)

# Primary energy demand

State of Kuwait

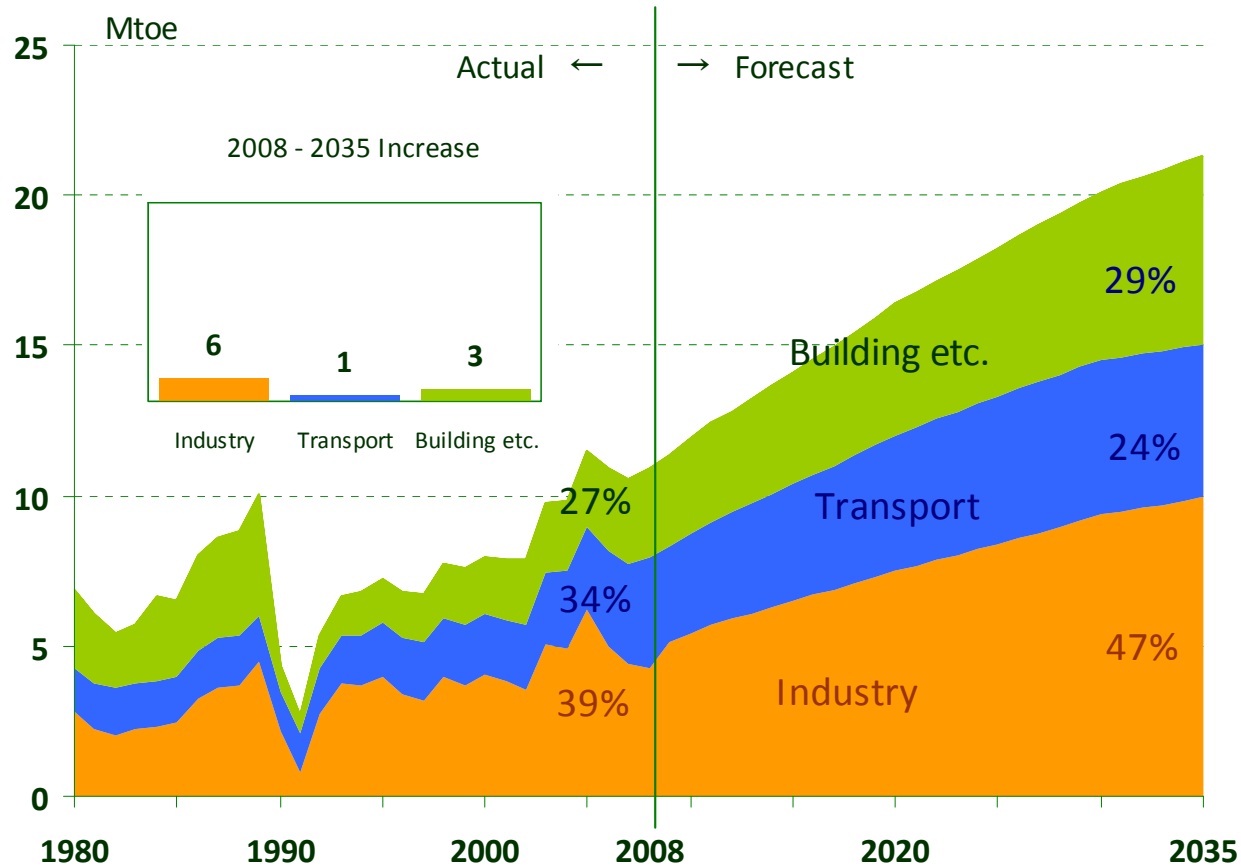


- Total primary energy demand will show 1.9-fold growth to 2035.
- Oil will remain as the most major fuel, while gas demand will increase mainly in industry and power sector.



# Final energy demand

State of Kuwait



## Total Final Energy Demand

**2008**  
11 Mtoe  
 ↓  
**2035**  
21 Mtoe  
 (1.9 times)

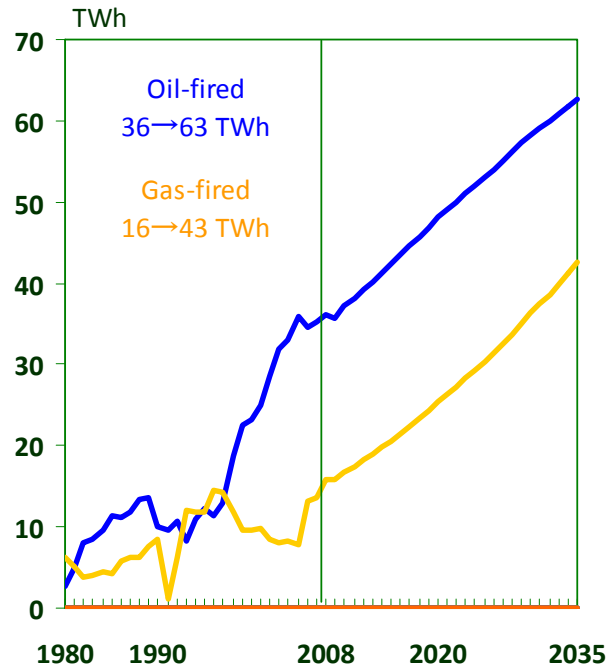
Note: Industry includes non-energy sector.

- Final energy demand will increase in industry and building sector.
- Demand in Building sector will exhibit 2.1-fold increase with backed by growing population and income to 2035.

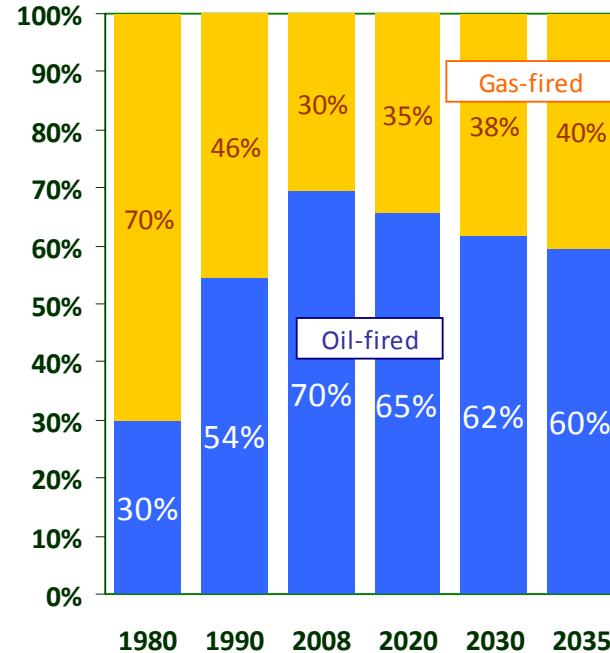
# Electricity generation mix

State of Kuwait

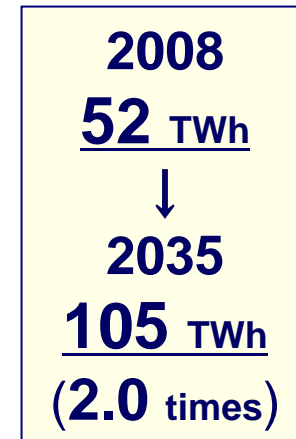
**Power Generation**



**Power Generation MIX**



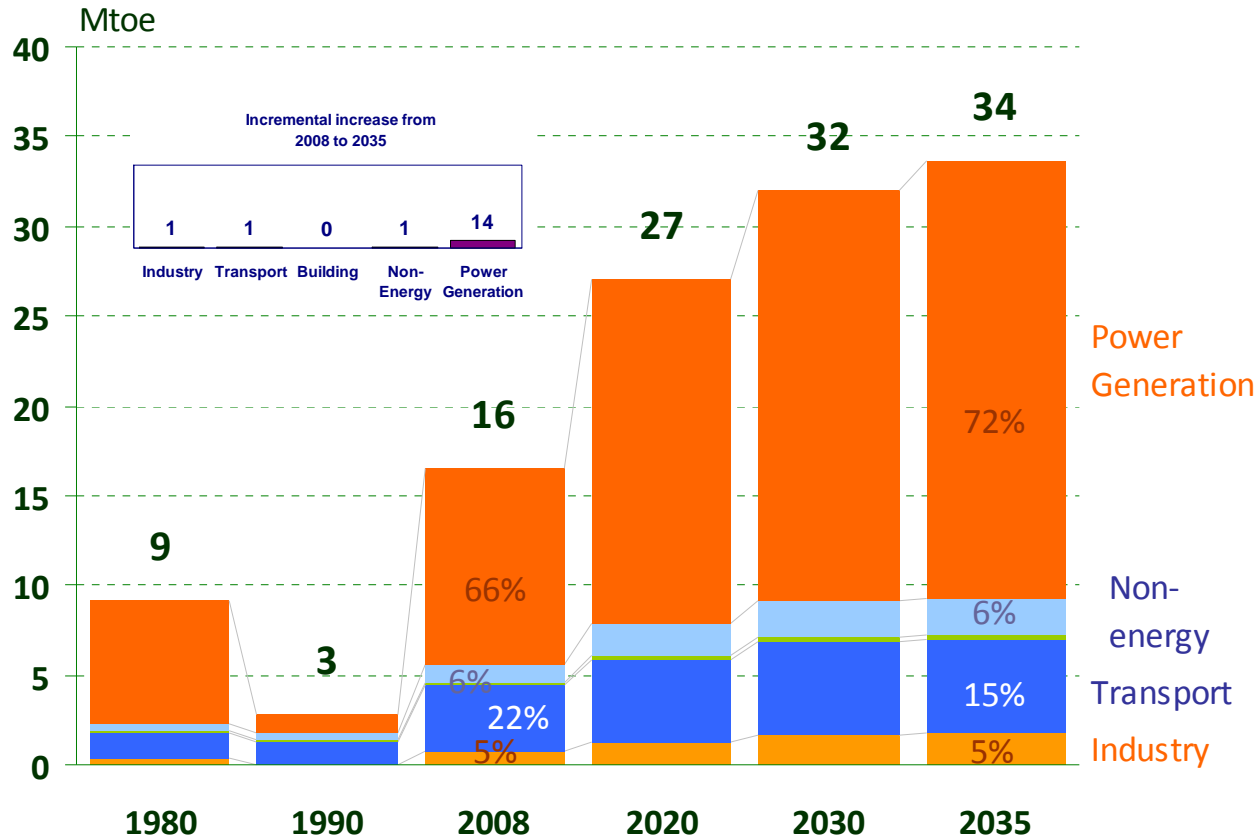
**Power Generation**



- Almost all of electricity demand in Kuwait is derived from residential and commercial sectors, and the demand shows vigorous growth at 5% annually in the past two decades.
- Gas-fired power generation is expected to gradually replace oil-fired power generation towards 2035. However, a pace of replacement will not so fast because of the gas supply constraints.

# Oil demand

State of Kuwait



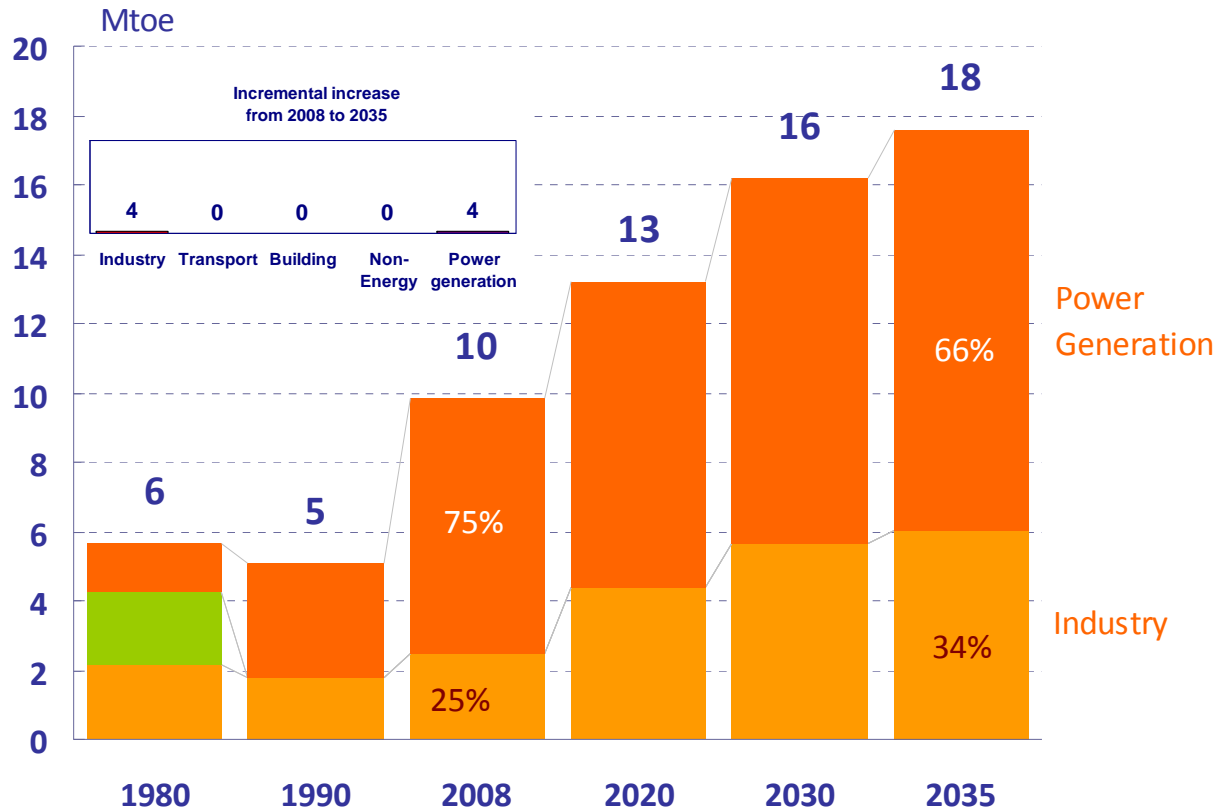
## Oil Demand

**2008**  
**16 Mtoe**  
 ↓  
**2035**  
**34 Mtoe**  
**(2.0 times)**

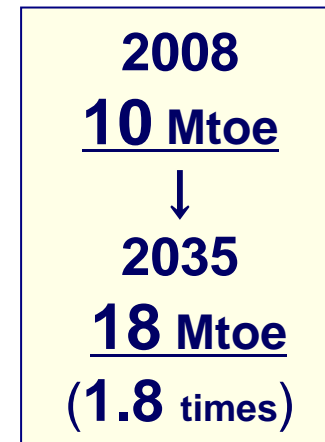
- Oil demand in Kuwait will show 2.0-fold growth to 2035.
- Growth in Power sector will explain about 79% of oil demand growth in 2035.

# Gas demand

State of Kuwait



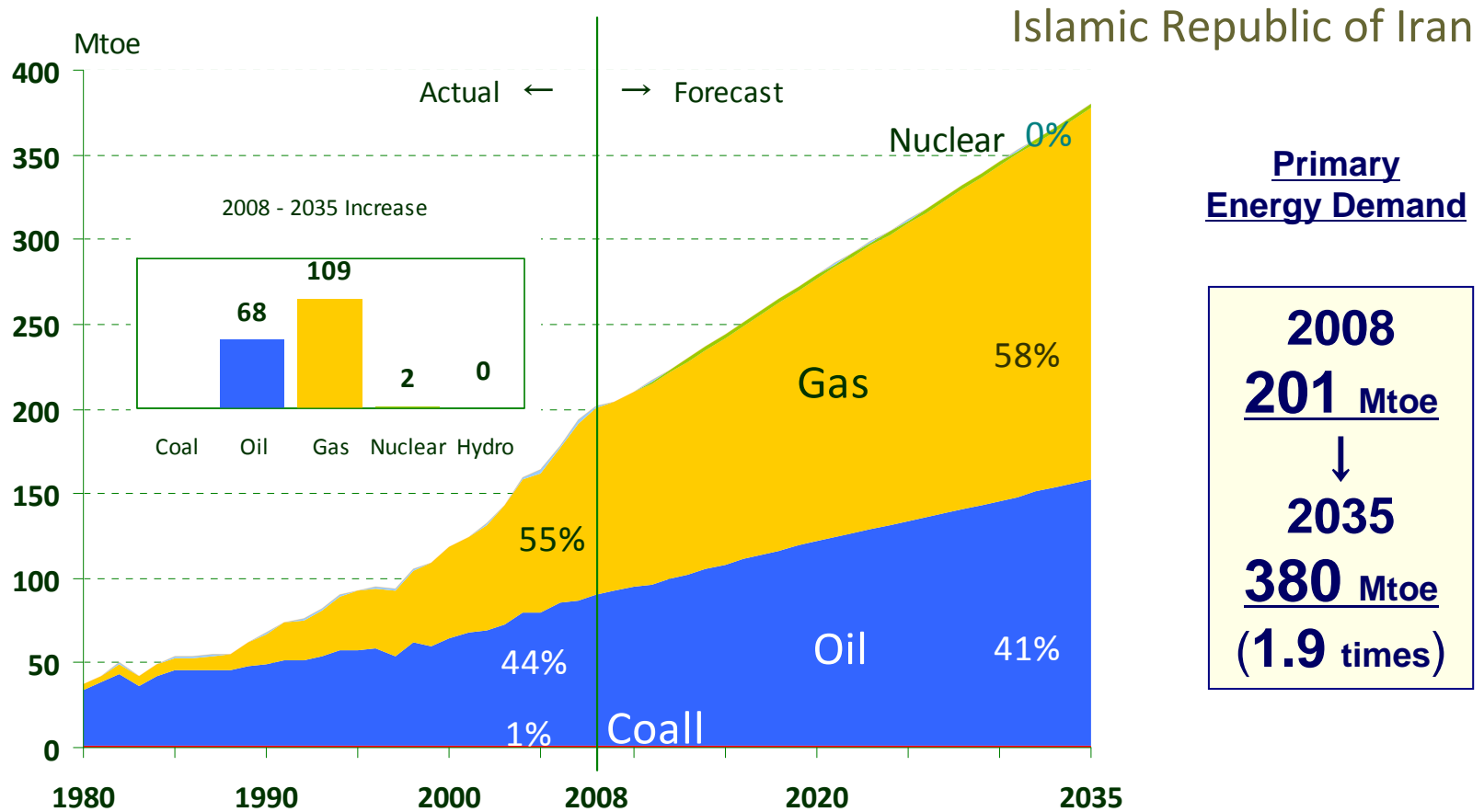
## Gas Demand



- Gas demand in Kuwait will show 1.8-fold growth to 2035.
- Growth in Power sector will account for about 54% of gas demand growth in 2035.

## V. Energy Outlook for the Islamic Republic of Iran (BAU Scenario)

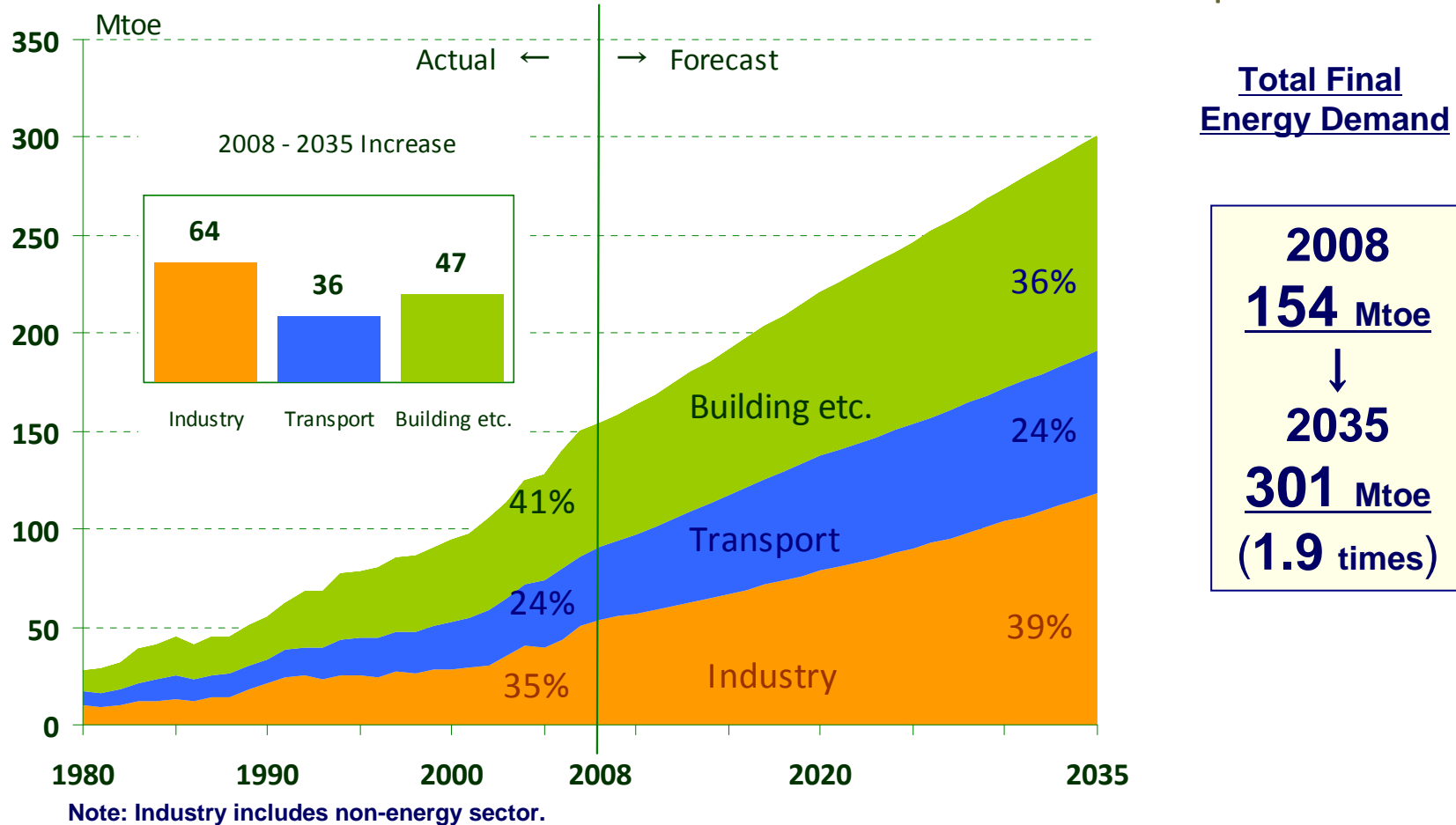
# Primary energy demand



- Total primary energy demand will show 1.9-fold growth to 2035.
- Oil demand will increase gradually in transport and building sectors, while gas demand will increase in building, industry and power sectors.
- Total primary demand structure will be slightly diversified by the introduction of the nuclear power.

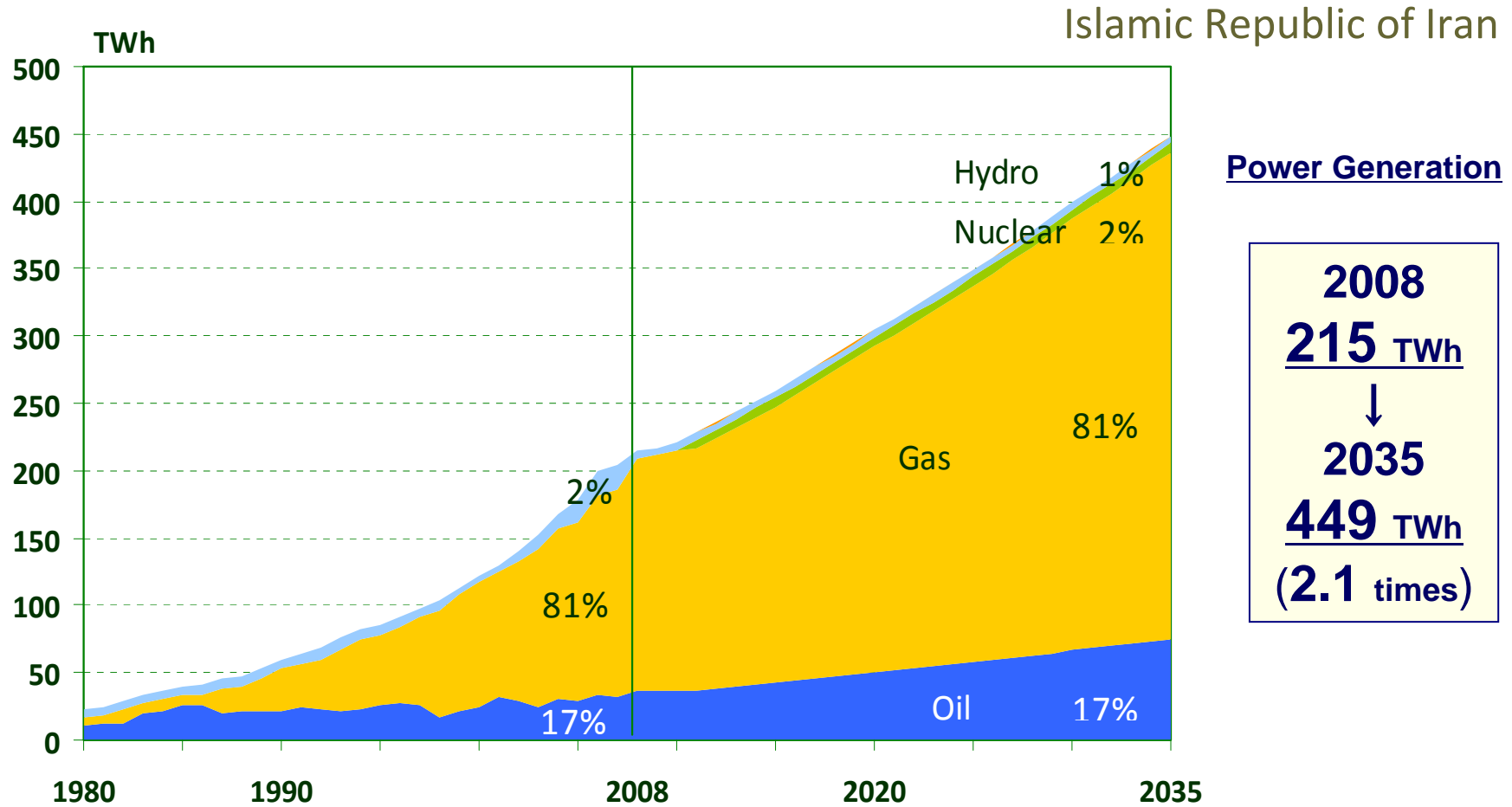
# Final energy demand

Islamic Republic of Iran



- Final energy demand will increase in building and transport backed by population growth and growing income.

# Electricity generation mix



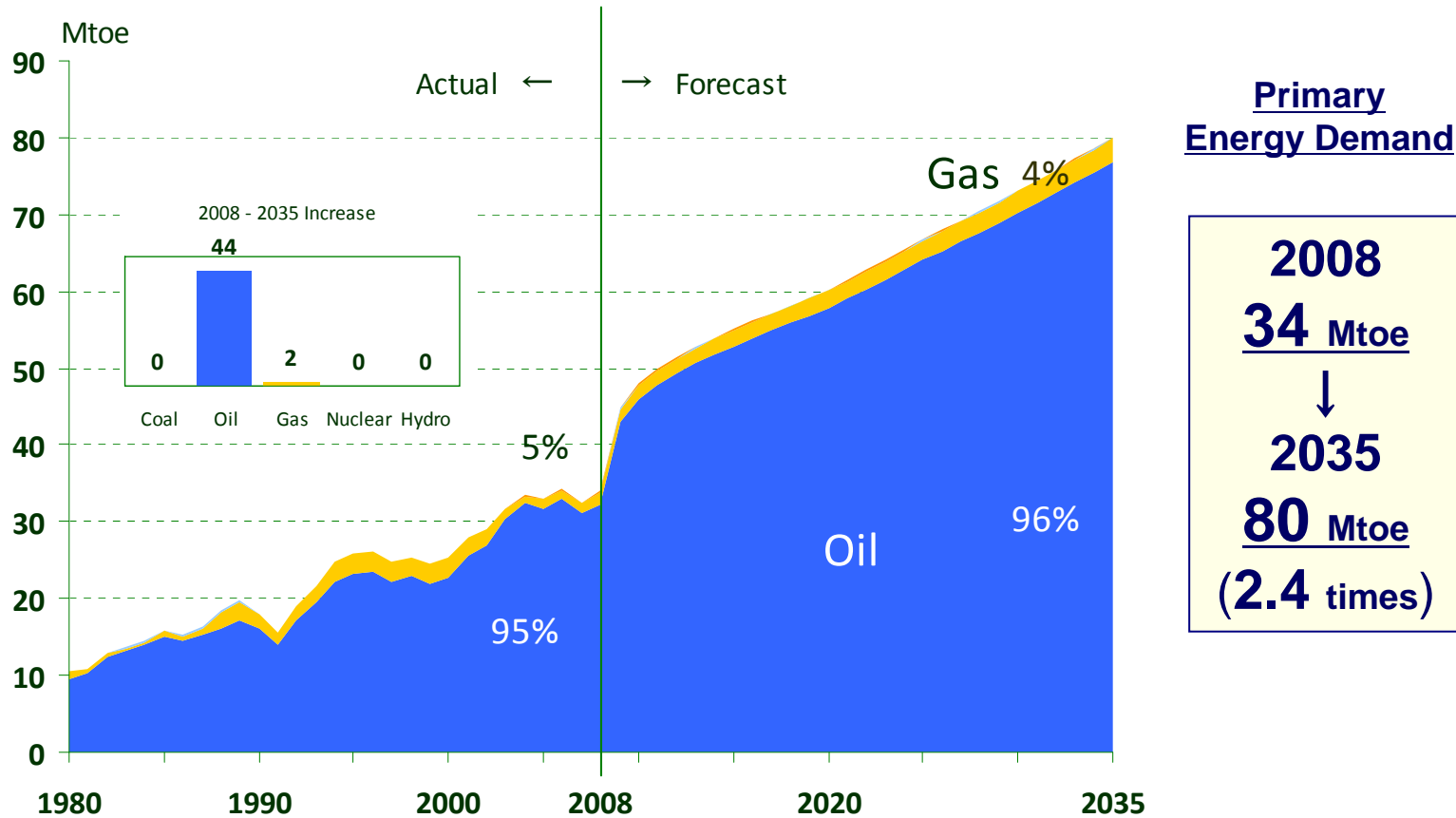
- No less than 70% of electricity demand is derived from residential and commercial sector.
- Nuclear power generation(Bushehr) will start from 2011, its capacity of that being 1GW.
- Gas-fired power generation will remain as dominant in total power generation.



## VI. Energy Outlook for the Republic of Iraq (BAU Scenario)

# Primary energy demand

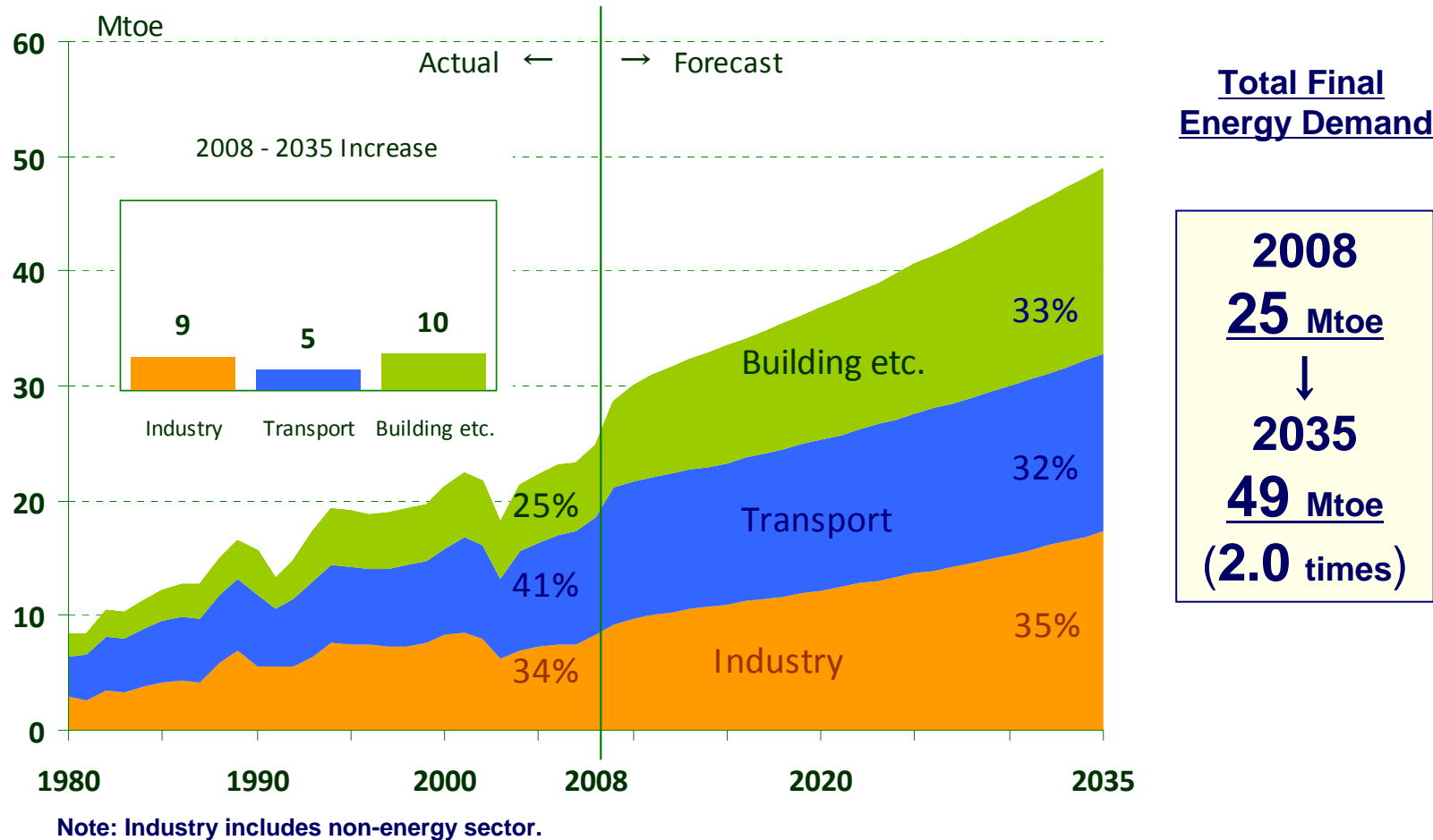
Republic of Iraq



- Total primary energy demand in Iraq will show 2.4-fold growth.
- Oil will remain as dominant in energy supply.

# Final energy consumption

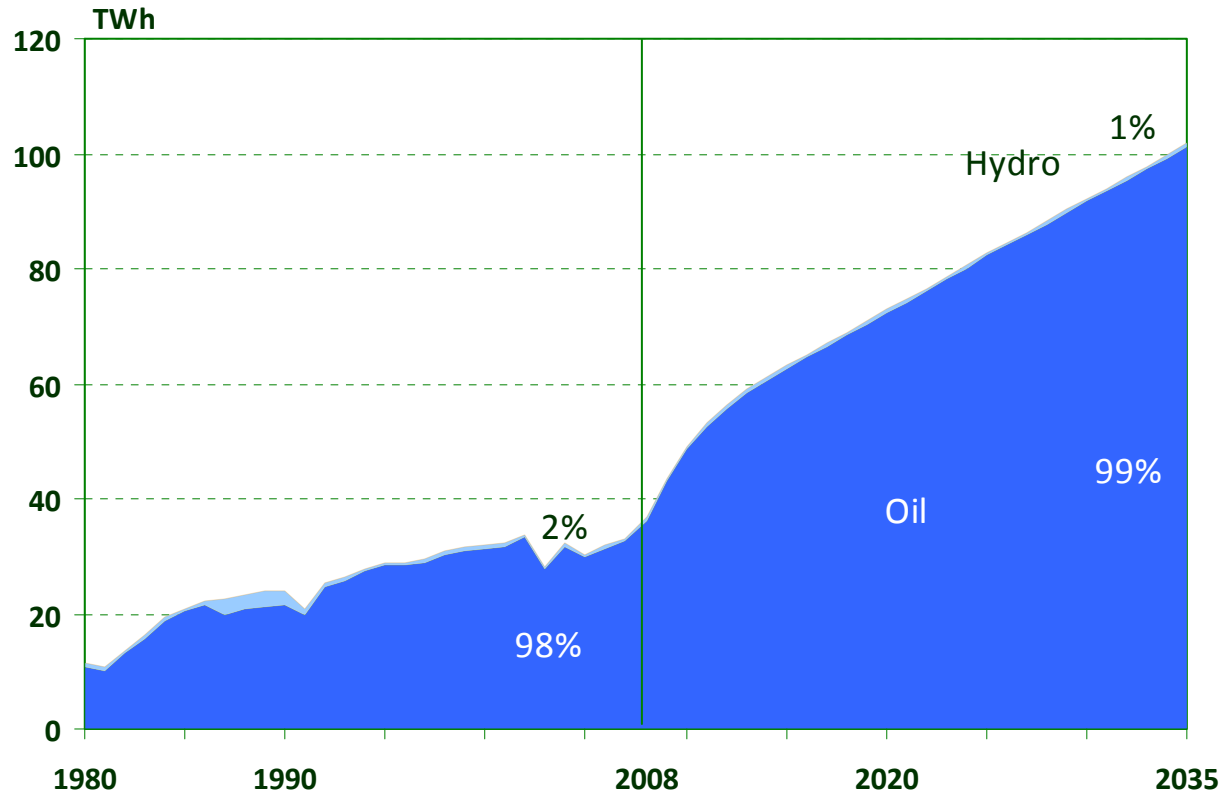
Republic of Iraq



- Final energy demand will increase in building sector backed by the large population increase.

# Electricity generation mix

Republic of Iraq



## Power Generation

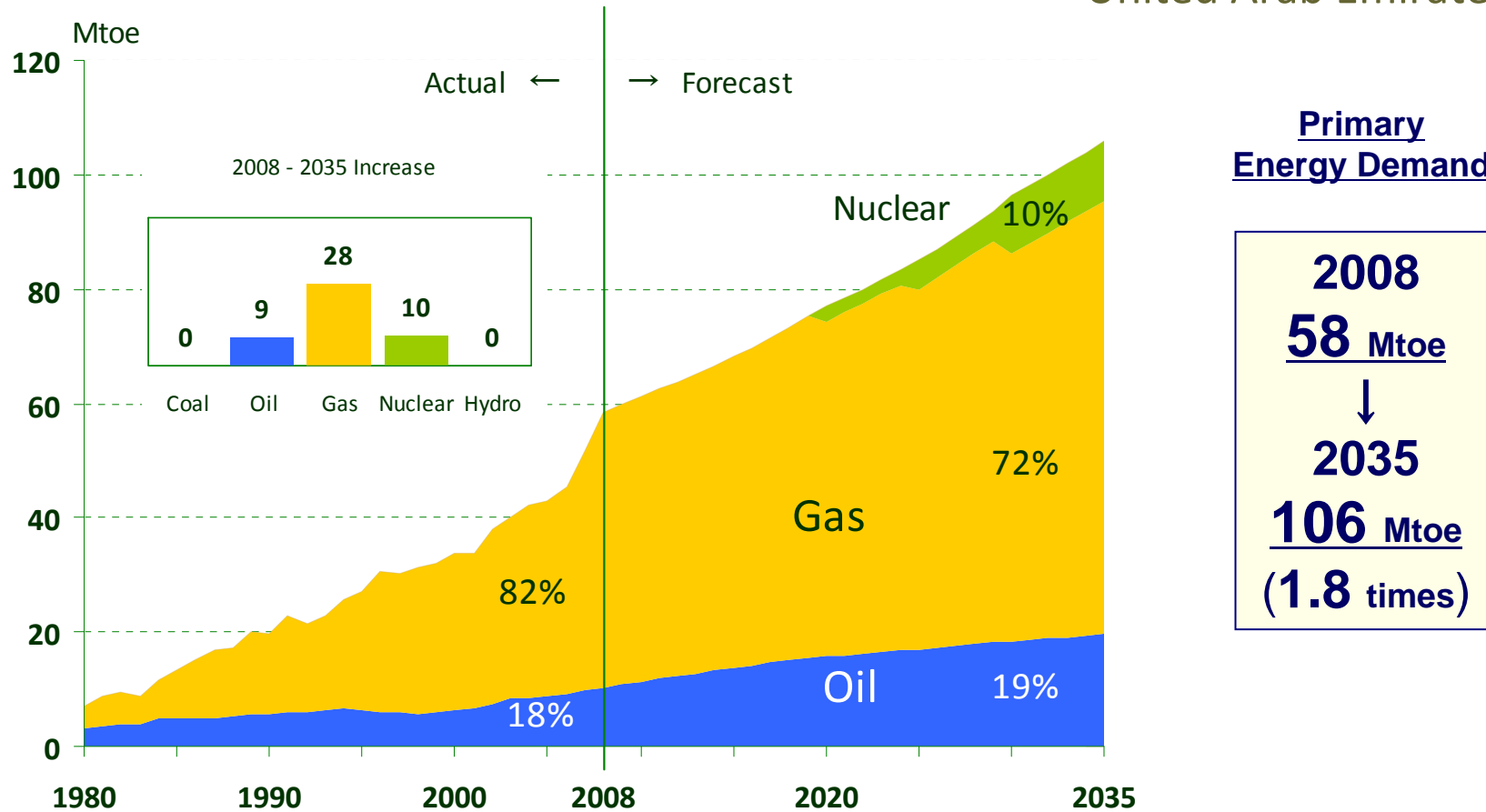
**2008**  
**37 TWh**  
↓  
**2035**  
**102 TWh**  
**(2.8 times)**

- Oil-fired power generation will account for almost all of growing electricity supply in forecast period.
- Hydro power generation will remain on the same level.

## Ⅶ. Energy Outlook for the United Arab Emirates (BAU Scenario)

# Primary energy demand

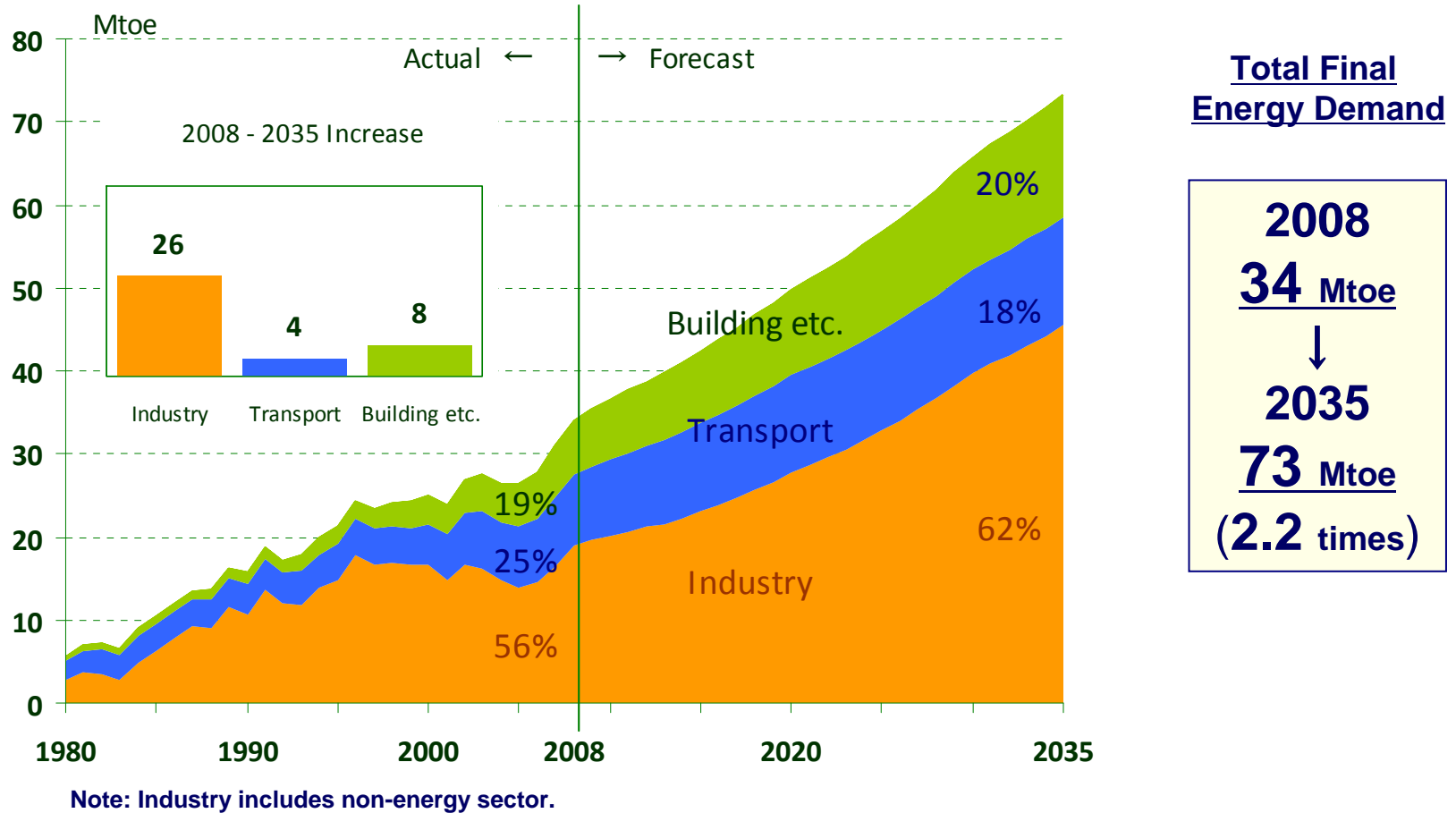
United Arab Emirates



- Total primary energy demand in UAE will show 1.8-fold growth to 2035.
- Gas will continue to play central role in its energy supply and the demand will increase in industry and power generation.
- Total primary demand will be to some extent diversified by the introduction of the nuclear power.

# Final energy consumption

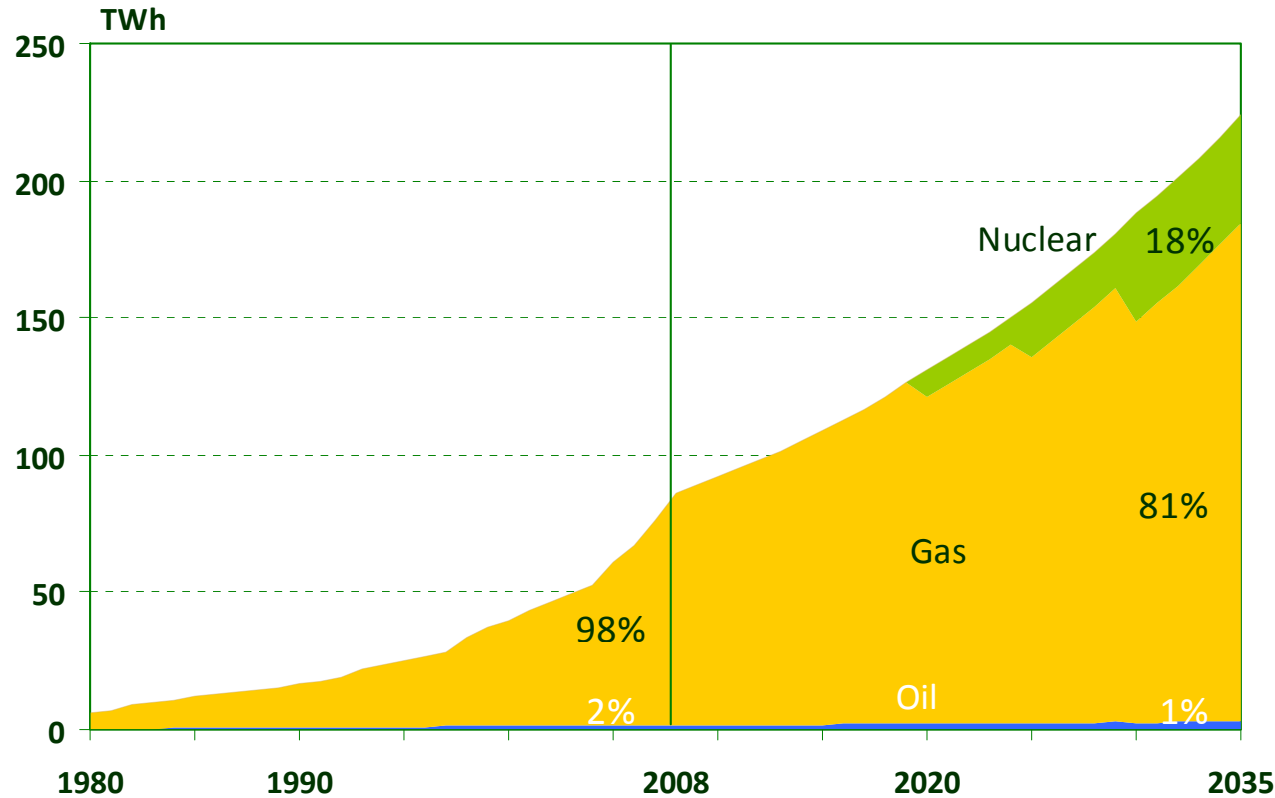
United Arab Emirates



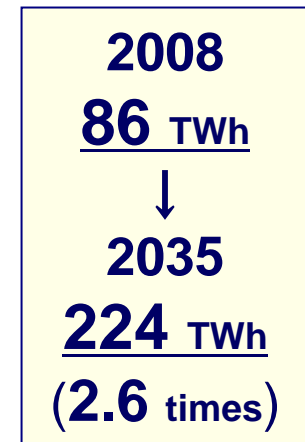
- Final energy demand will increase in building sector, backed by growing income and in industry sector, reflecting the growth of petrochemical industry.

# Electricity generation mix

United Arab Emirates



## Power Generation



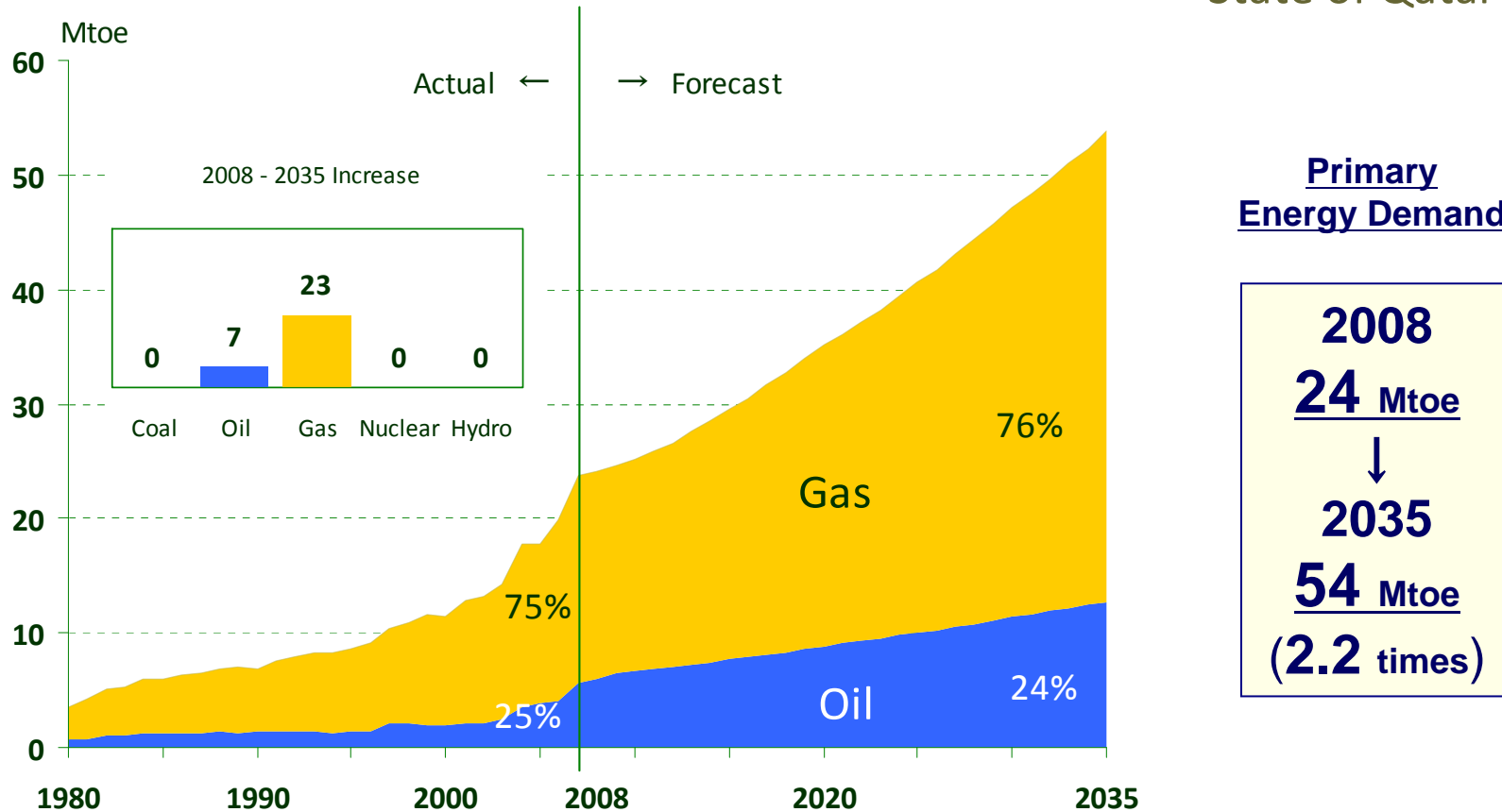
- Electric power generation will increase more than 2.6 times in 2035, compared to 2008.
- Nuclear power generation will start from 2020, whose capacities will be 5.6GW in total in 2030.
- Gas-fired power generation will remain as dominant in total power generation.



## VIII. Energy Outlook for the State of Qatar (BAU Scenario)

# Primary energy demand

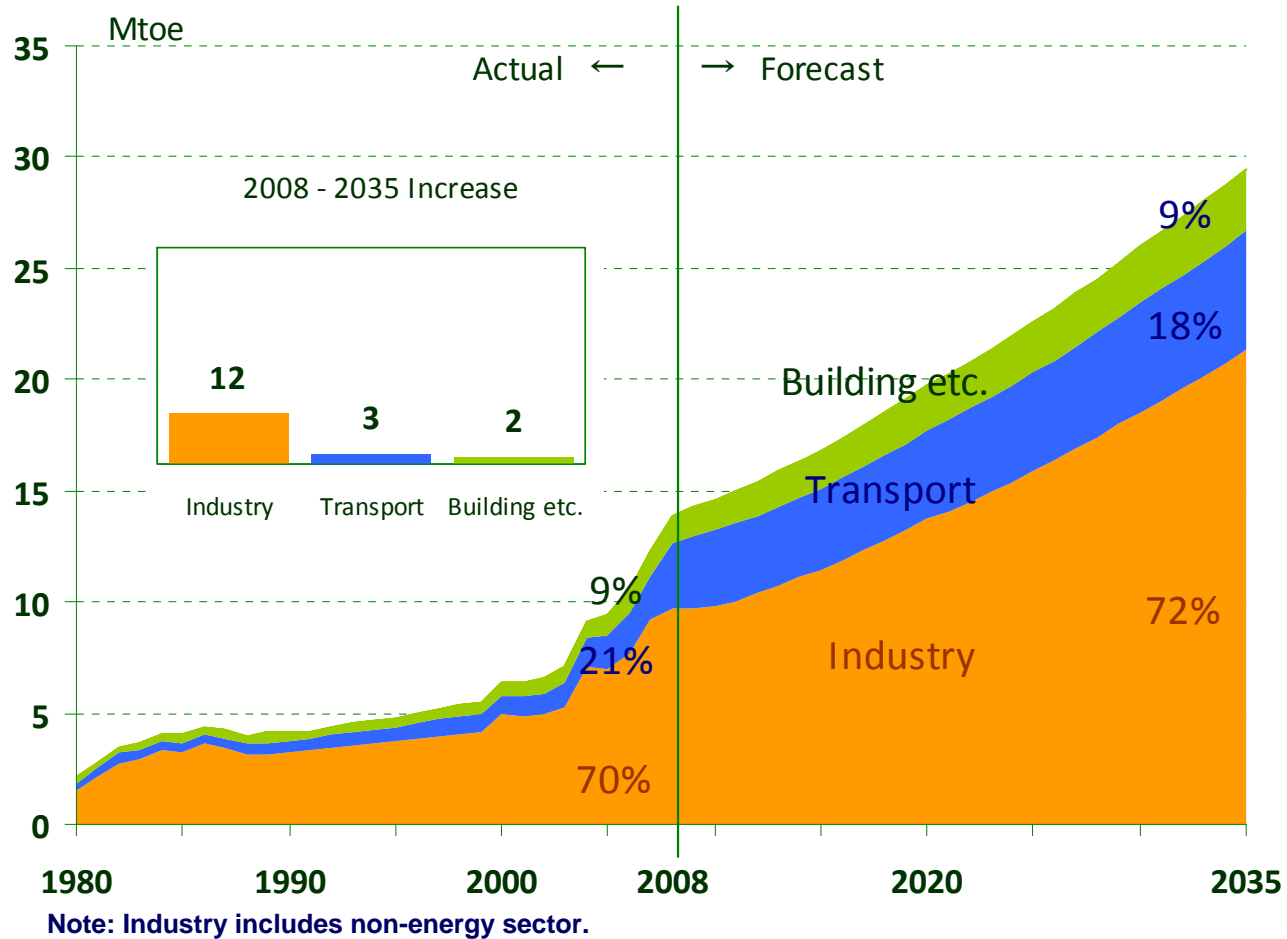
State of Qatar



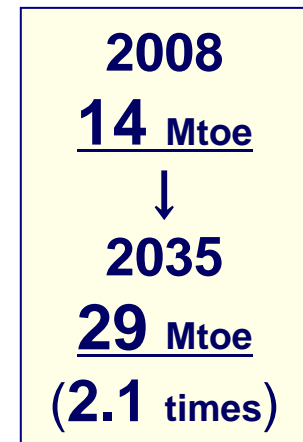
- Total primary energy demand in Qatar will show 2.2-fold growth to 2035.
- Gas will continue to play central role in its energy supply, back by the abundant gas supply potential.
- Gas demand will increase in industry and power sector.

# Final energy consumption

State of Qatar

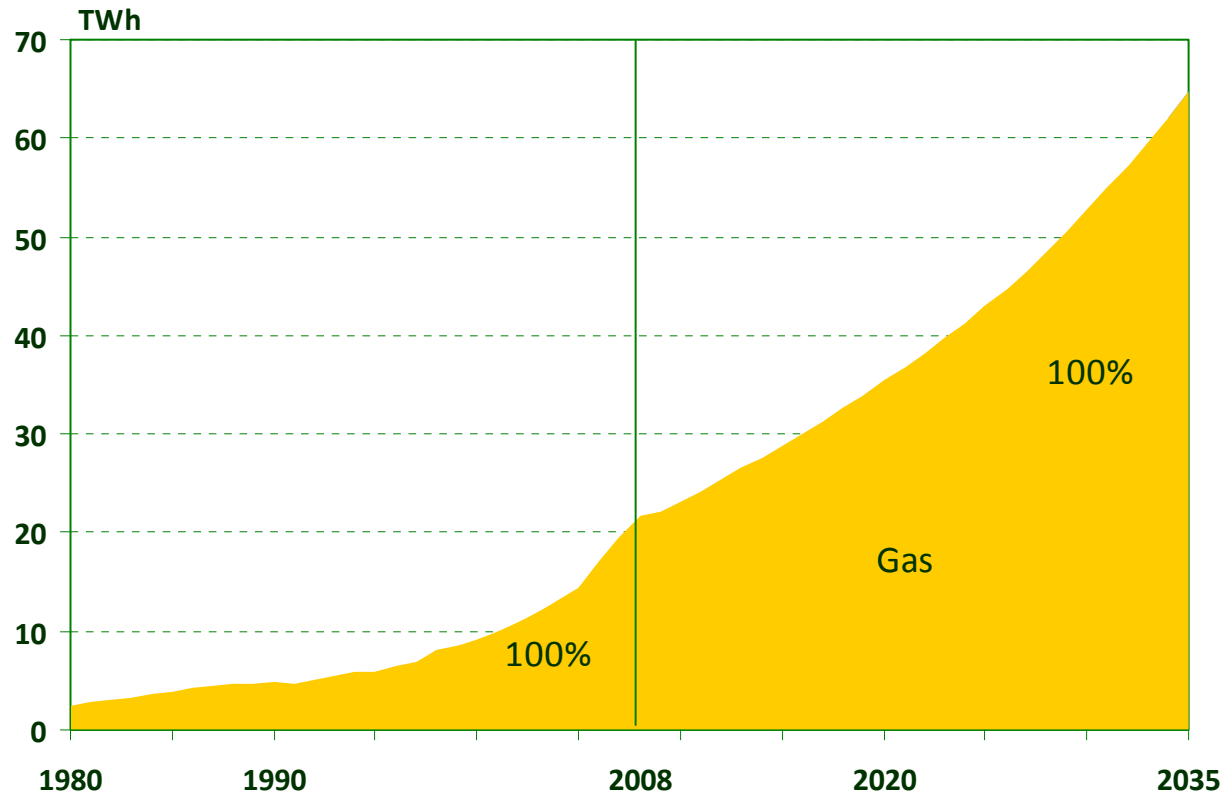


## Total Final Energy Demand



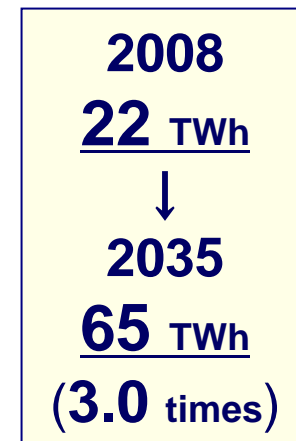
- Final energy demand will increase mainly in industry sector.
- Petrochemical sector account for major part of energy demand in industry sector.

# Electricity generation mix



State of Qatar

## Power Generation

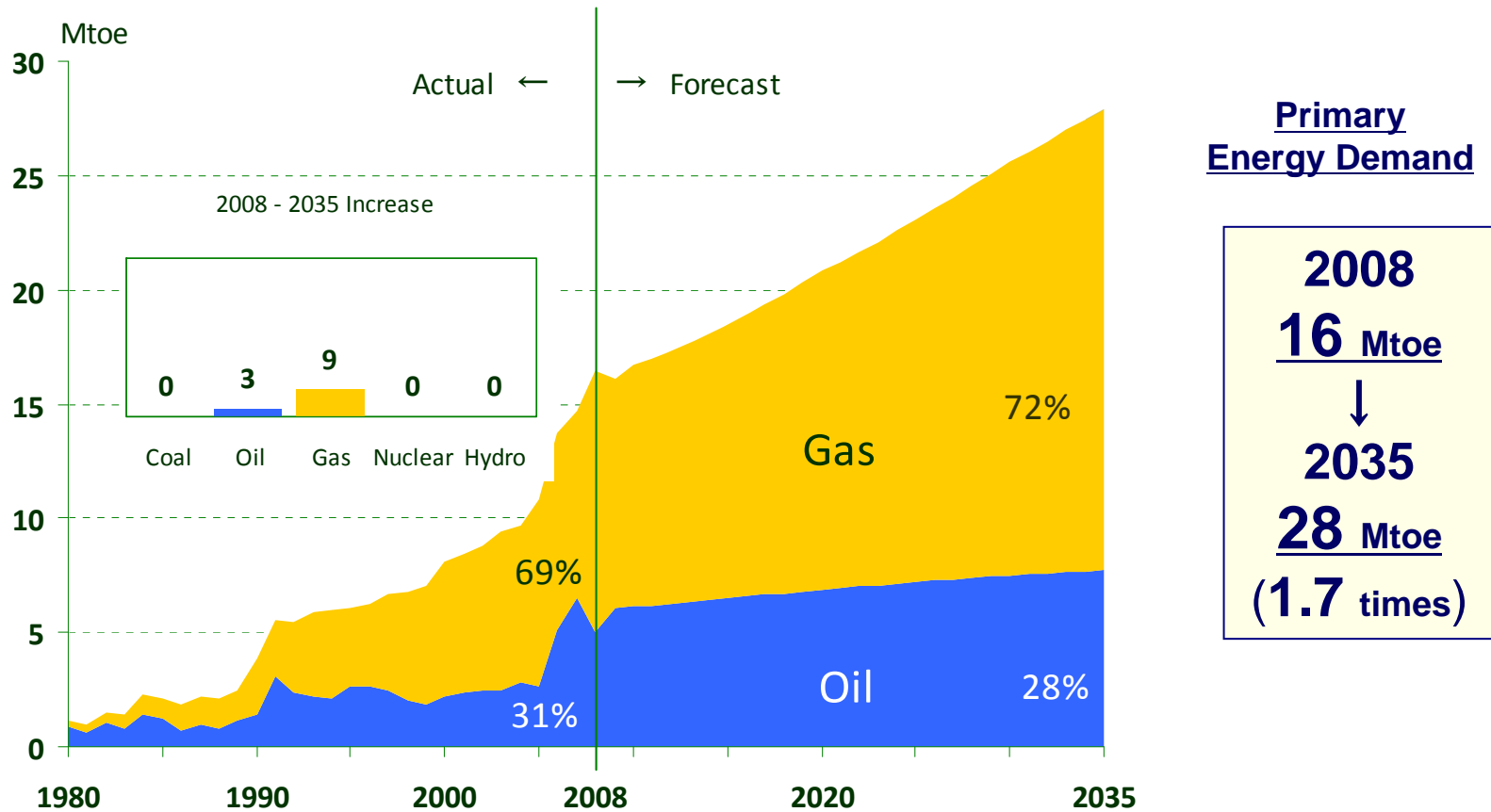


- Electricity demand in Qatar will show 3.0-fold growth to 2035.
- Two-thirds of electricity demand comes from residential and commercial sector.
- Gas-fired power generation will be the single supply option in the forecast period.

## Ⅸ. Energy Outlook for the Sultanate of Oman (BAU Scenario)

# Primary energy demand

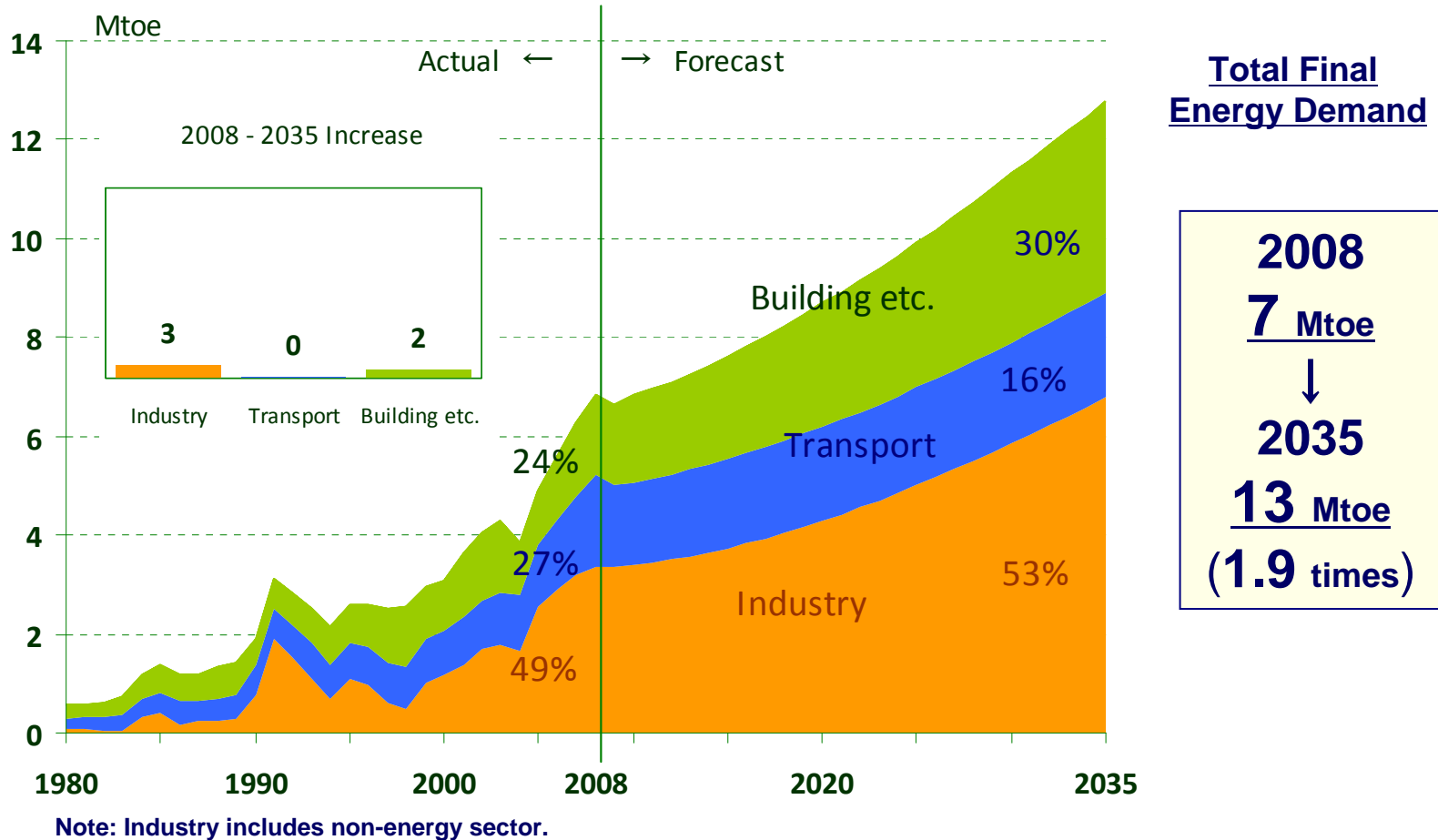
Sultanate of Oman



- Total primary energy demand in Oman will show 1.7-fold growth.
- Gas will remain the most important fuel to 2035, underpinned by the growth in power sector.

# Final energy consumption

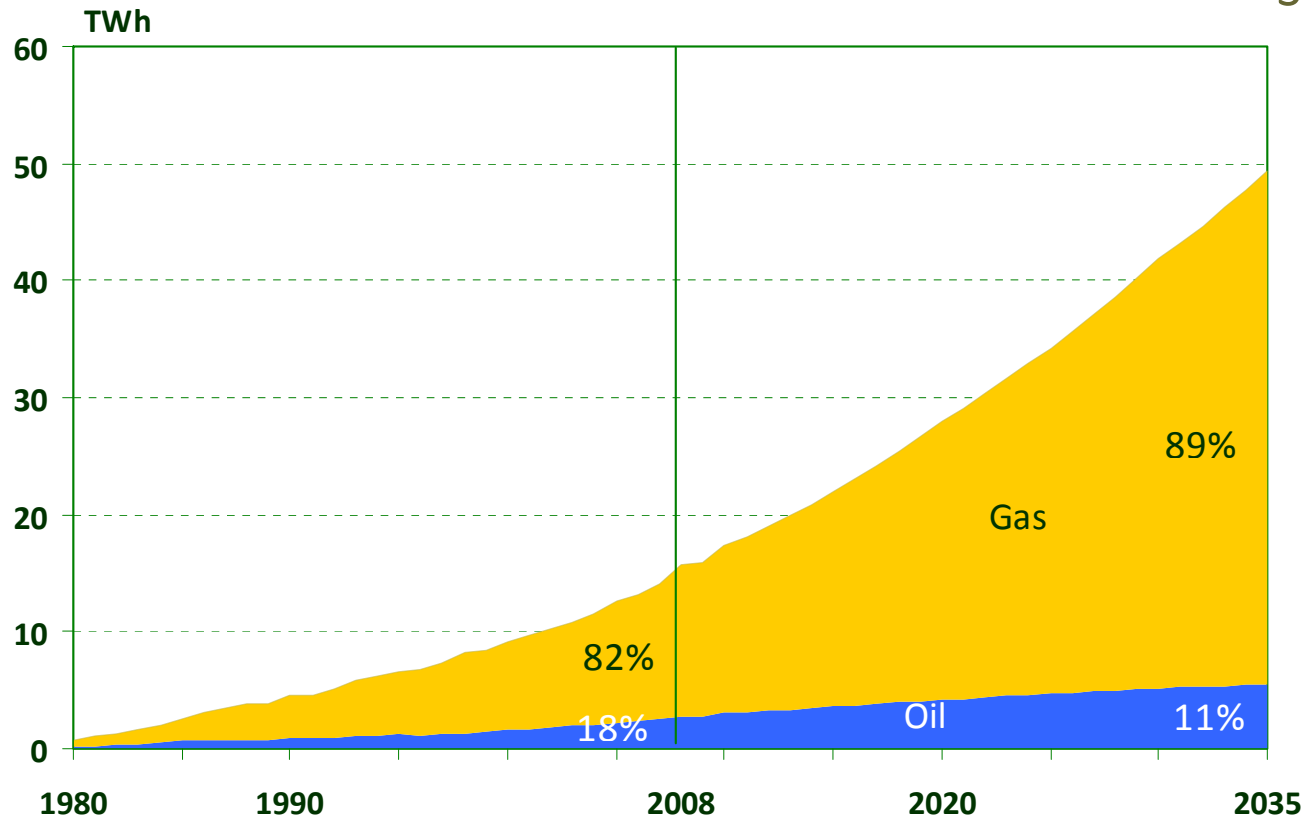
Sultanate of Oman



- Final energy demand will increase in industry and building sector.

# Electricity generation mix

Sultanate of Oman



**Total Electric Power Generation**

**2008**  
**16 TWh**  
 ↓  
**2035**  
**49 TWh**  
**(3.1 times)**

- Roughly 90% of electricity demand will be consumed in residential and commercial sector.
- Gas-fired power generation will account for almost all additional growth of electricity demand to 2035.