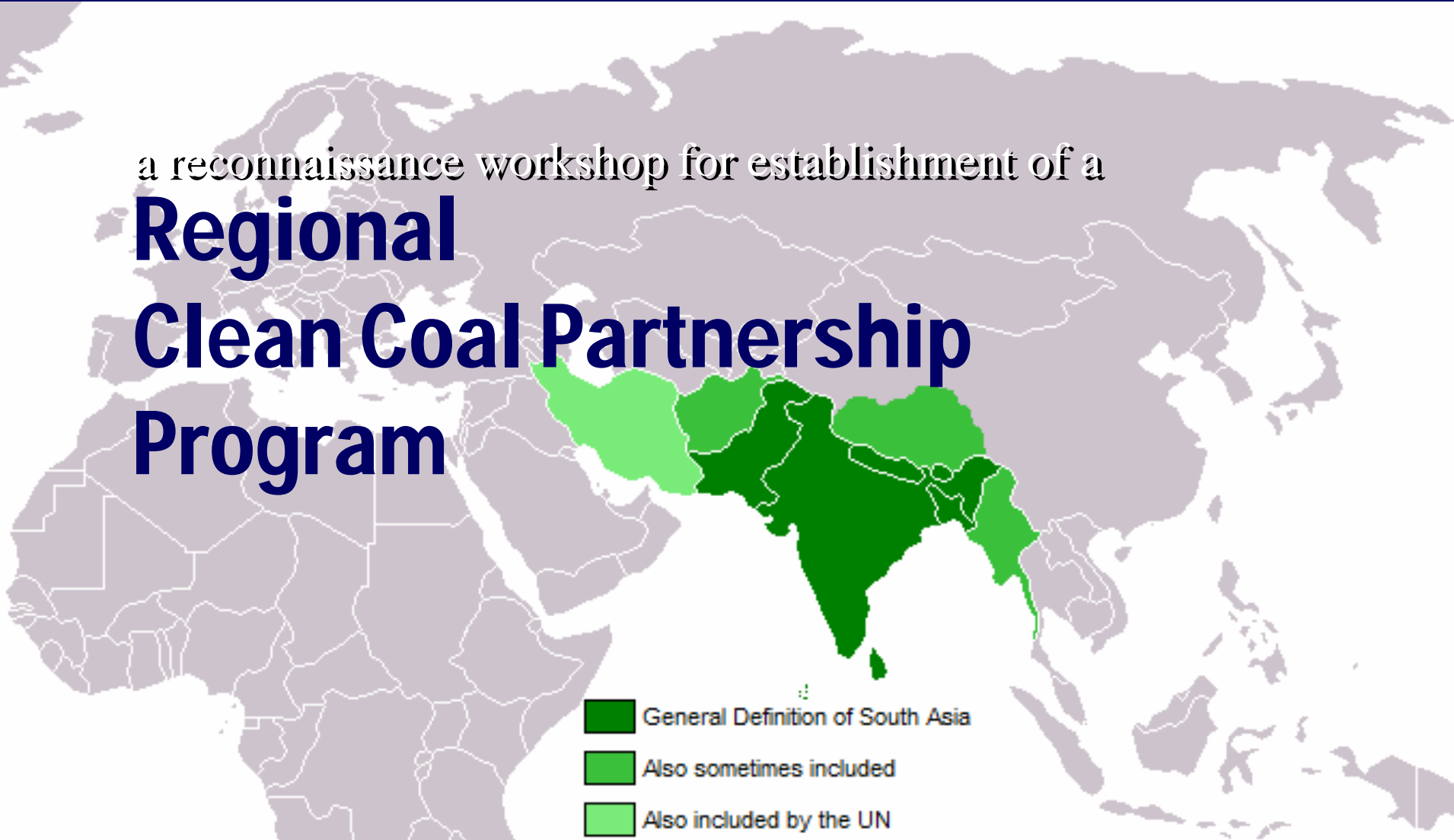


a reconnaissance workshop for establishment of a

# Regional Clean Coal Partnership Program

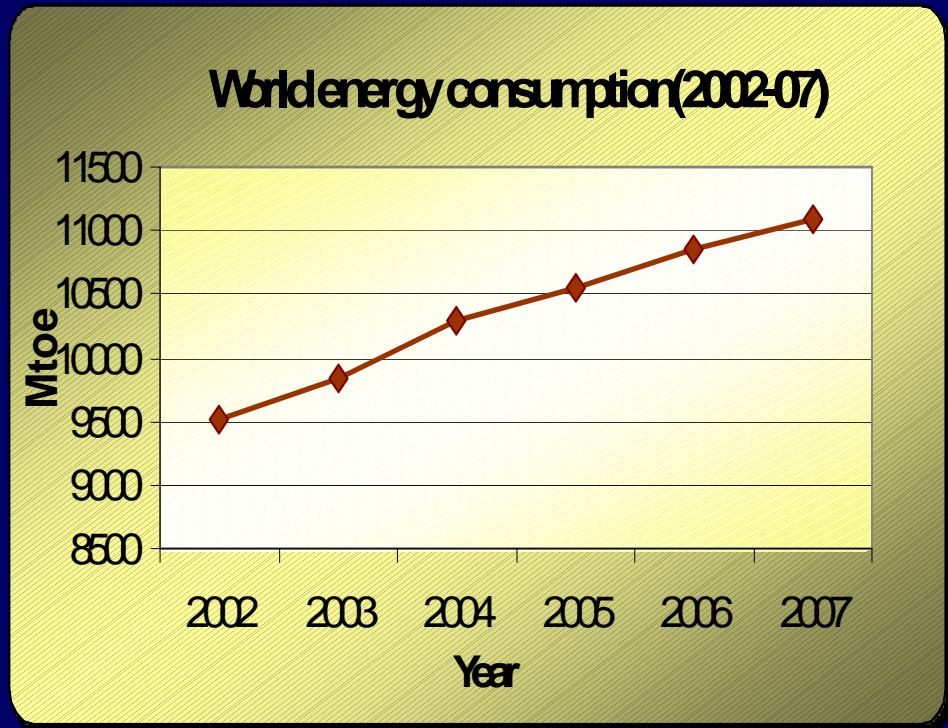
- 
- The map shows South Asia and surrounding regions. The legend indicates three categories of inclusion:
- General Definition of South Asia
  - Also sometimes included
  - Also included by the UN

16-19 September 2008, Kolkata

# Asian Coal Market Dynamics

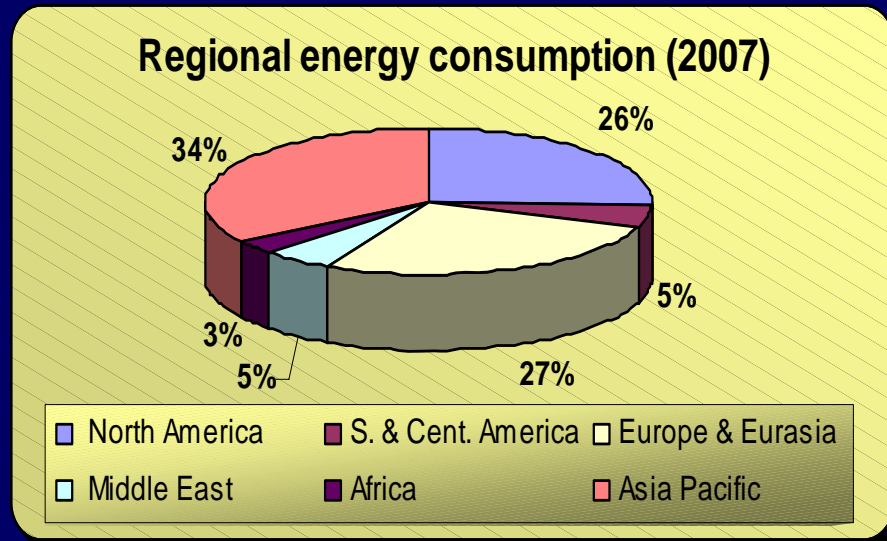
# World Energy and Coal

- World energy consumption on a YoY basis has increased by 2.4% in 2007 with a CAGR of 3.1% during the last five years (2002/07)



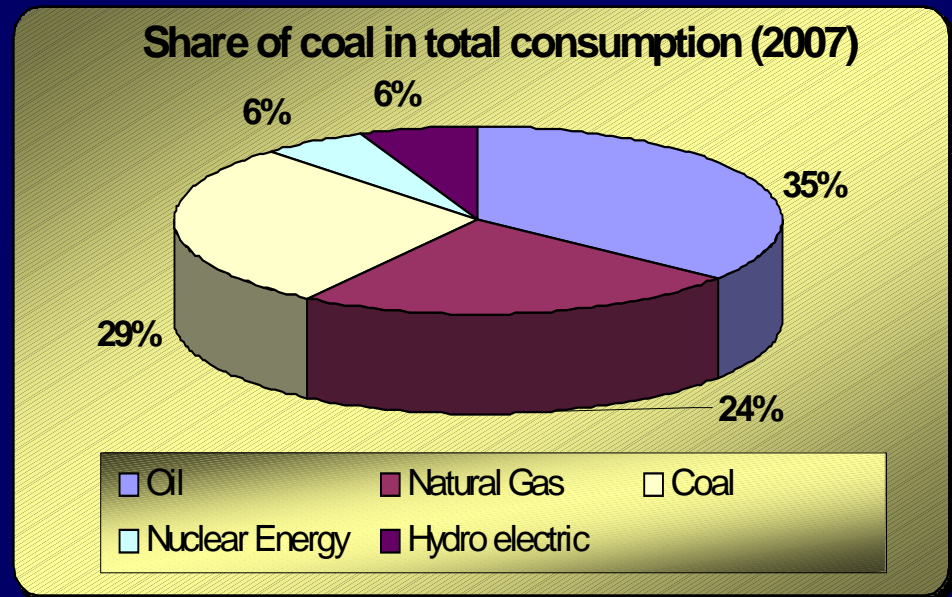
# Asia Pacific Region

- Asia Pacific region accounts for one third of world energy consumption and two thirds of its growth



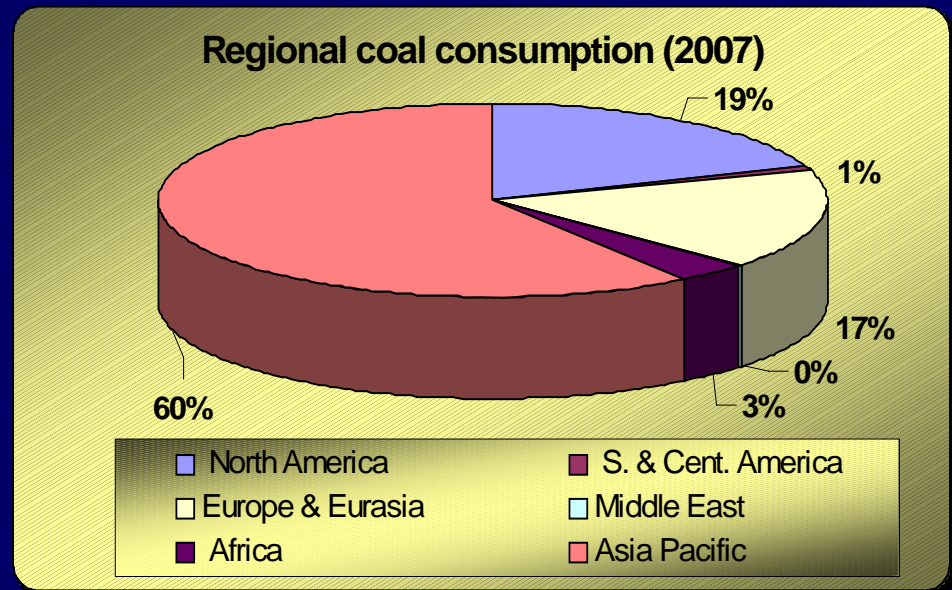
# World Energy and Coal

- The world energy consumption was 3177 Mtoe in 2007
- Coal accounts for about 30% of world energy consumption



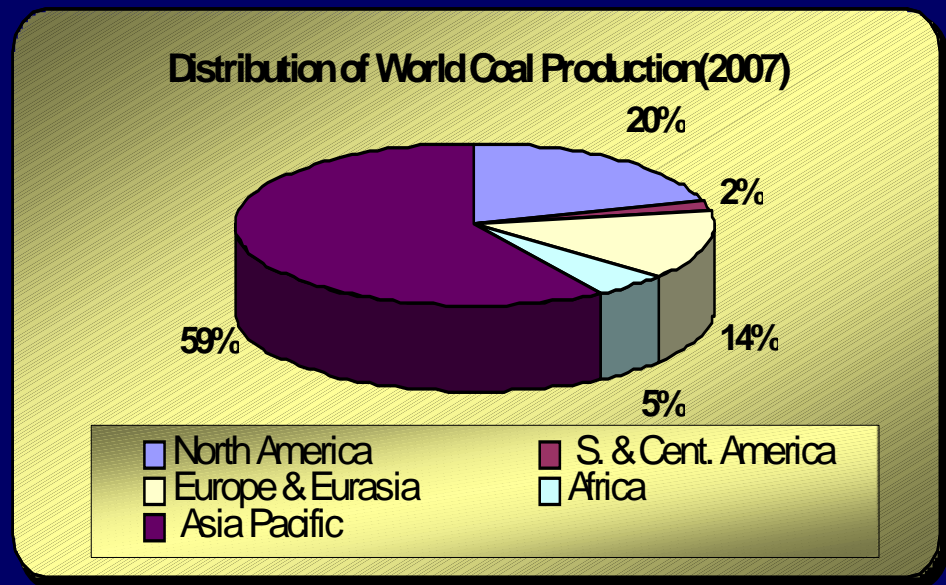
# Asia Pacific Region

- Asia-pacific region alone accounts for 60% of world's coal consumption



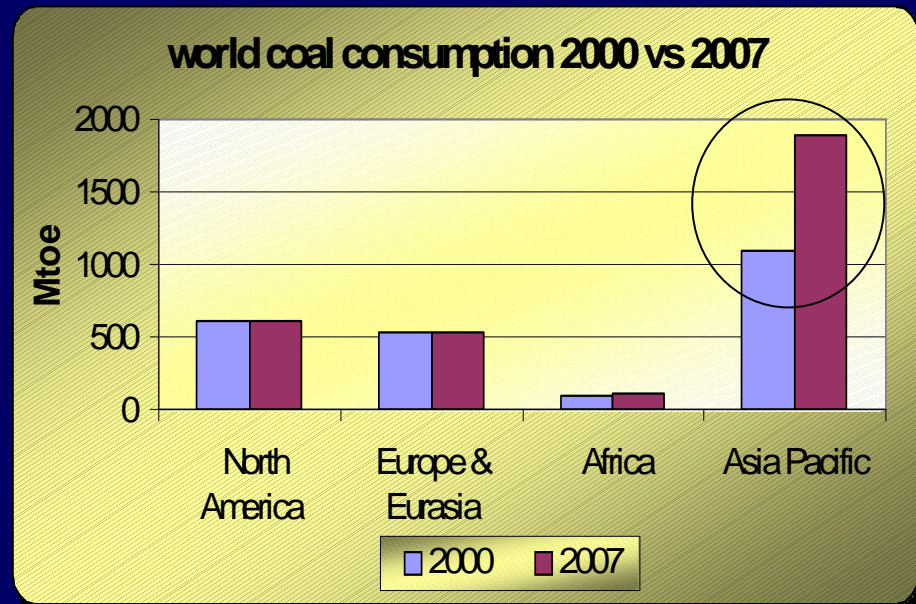
# World Energy and Coal

- Global coal production was 3136 Mtoe in 2007
- Asia Pacific region's contribution to production was almost 60%



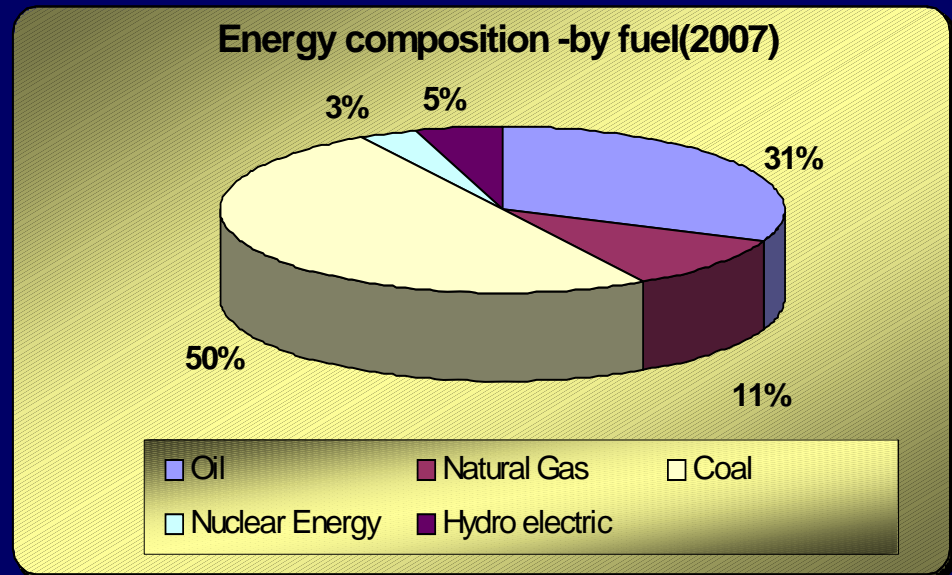
# Asia Pacific Region

- The region is the largest contributor to the growth of world coal consumption with a CAGR of 10% during 2002/07
- 30% of global coal reserves lies in Asia-pacific region



# Asia Pacific Region

- Coal has a share of 50% in total primary energy supplies in the region

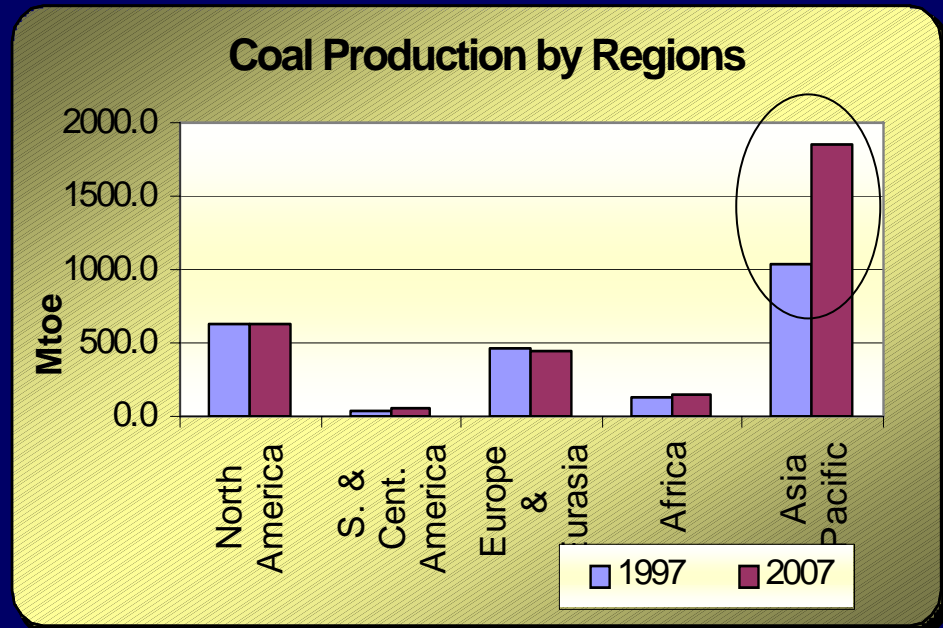


# Asia Pacific Region

- Coal production in Asia-pacific region in 2007 was 1850 Mtoe, up by 5.5% over 2006
- Compared to this, the world coal production increased by 3.3 % in the same period.

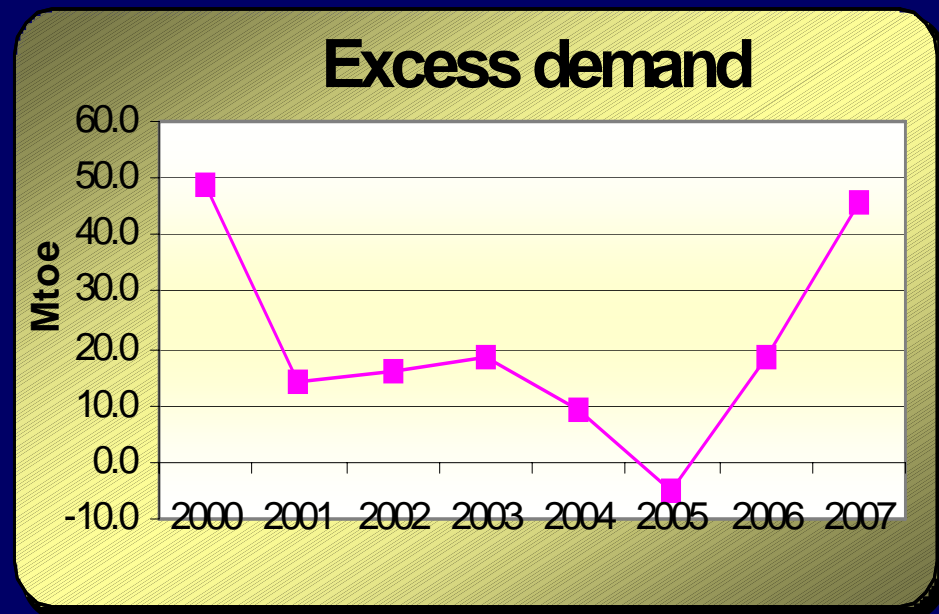
# Asia Pacific Region

- Asia-pacific region was the largest contributor to global coal production during the last 10 years with highest growth rate during 2002/07 at a CAGR of 9.8%



# Asia Pacific Region

- The demand-supply gap in Asia-pacific region has gone up sharply in the recent years
- So is the price

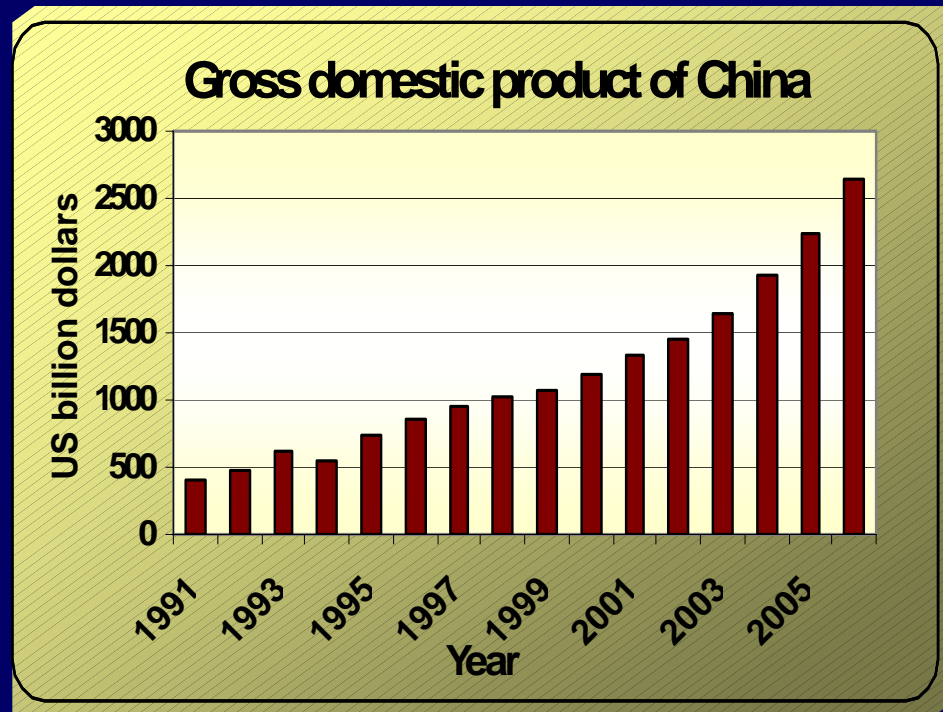


# The Drivers of Coal Demand

- **China**, growing at break-neck speed during the last decade, has emerged as the largest consumer of coal in the region, now a net importer
- **Japan**, one of the world's biggest importer, is burning more coal since an earthquake damaged a nuclear facility last year, doubling at least one utility's coal intake
- **India** would be importing more coal due to lower domestic availability to meet the demand of major expansion in coal-fired power capacities and increased steel and cement production

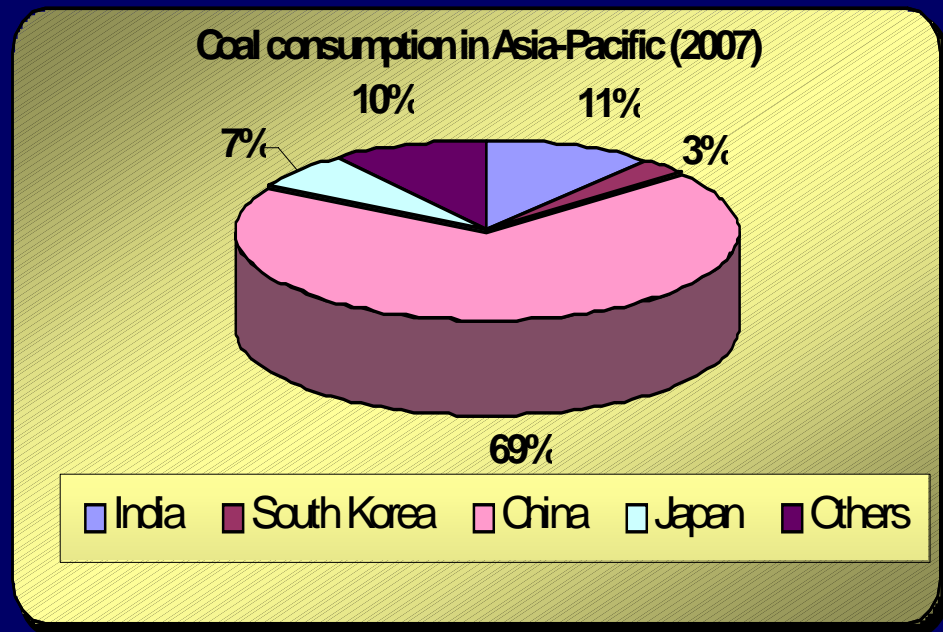
# China

- Chinese economy grew at a CAGR of 15% between 2001/06 due to rapid urbanization & industrialization; industrial sector contributing over 44% of GDP



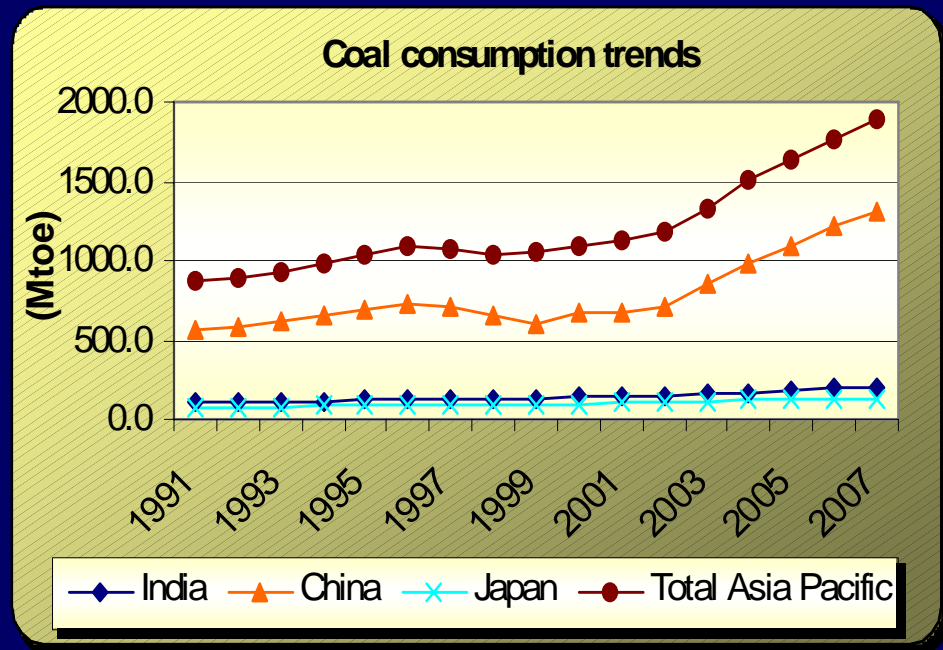
# China

- China accounts for coal consumption of almost 70% in Asia Pacific Region consuming over 1311 Mtoe in 2007, grew with a CAGR of 13% between 2002/07; around 83% of the increase in the region



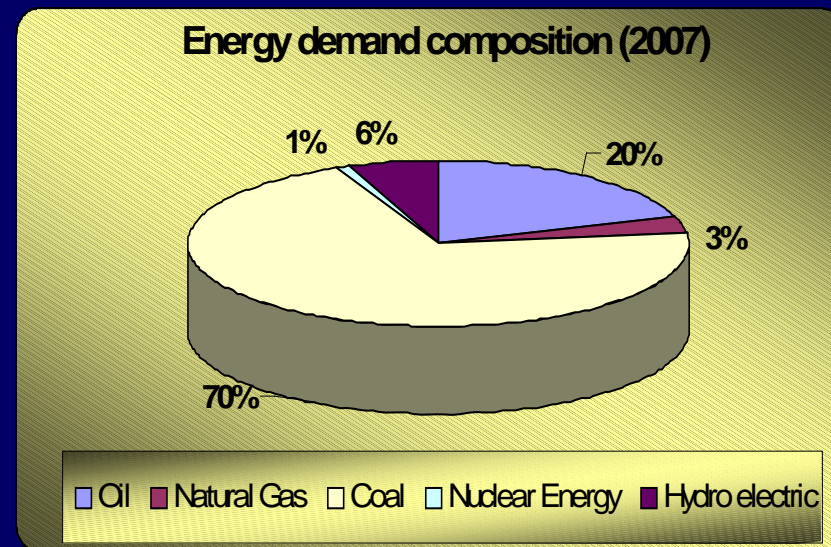
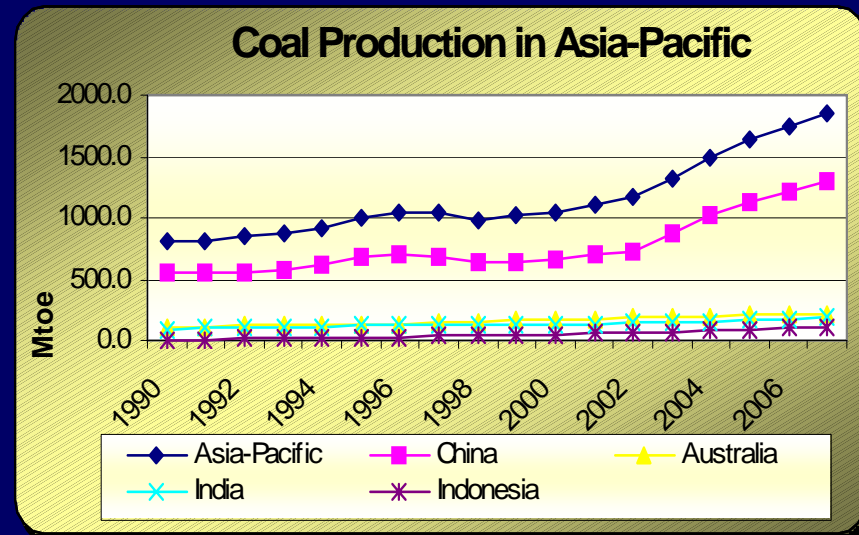
# China

- China has been the sole driver of demand in the region accounting for over 41% of global demand
- It has now emerged as a net importer for the first time in 2007



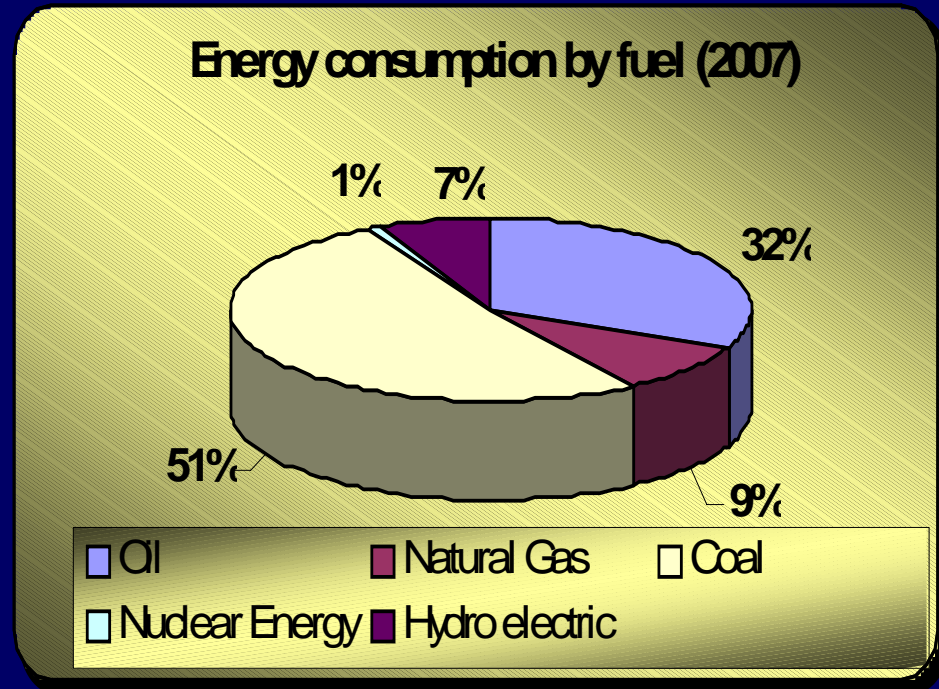
# China

- China accounts for 69% of coal production in the Asia Pacific region contributing 1290 Mtoe in 2007, nearly 41% of global coal production
- Coal constitutes 70% of primary energy consumption in China



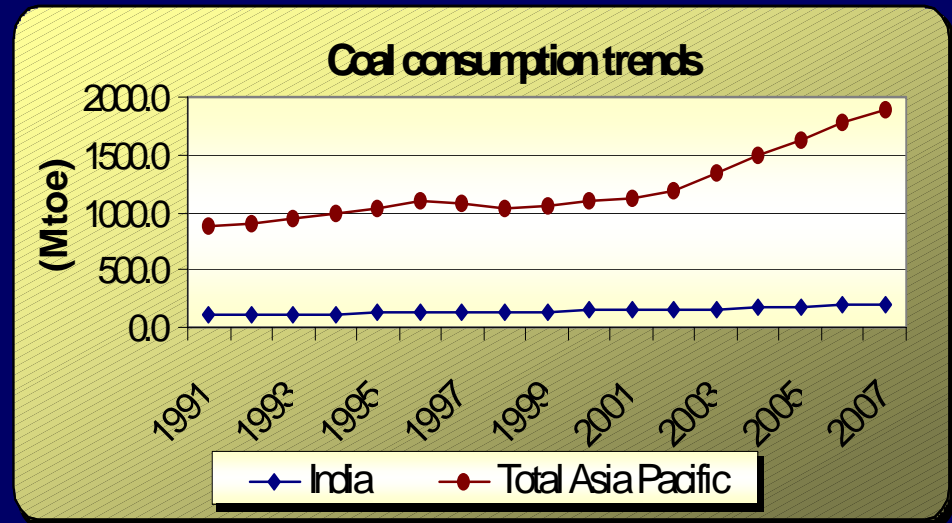
# India

- Coal accounts for 51% in the total primary energy consumption; 208 Mtoe in 2007, grew at 6.6% in 2007, on YoY basis
- India accounts for only 10% of the region's coal consumption



# India

- Its share in the region's growth in consumption is just 10% against 70% for China in 2007



# Coal and Climate Change

- Despite
  - Growing environmental concerns
  - Growing concerns for CO<sub>2</sub> emissions
- Increased interest in coal resulting in increased demand
- Is it Oil Shock??

# Uncertainties in Coal Supplies

- Inadequate transport infrastructure including shipping
- Rising coal production cost due to difficult geo-mining conditions; deeper mining
- Uncertain weather conditions: CC?
- Delay in building new capacities
- Growing “mineral nationalism”

# Uncertainties in Coal Supplies

**China:** has become net importer, closed large number of small mines, imposed increased export tax

**Australia:** Lack of rail and port infrastructure, long queues at port, repeated disruptions in production due to flooding, impact of uncertain weather

# Uncertainties in Coal Supplies

**Indonesia:** increased domestic coal consumption, reduced production, growing mineral nationalism

**South Africa:** Operating mines approaching end of economic life, costly and uncertain quality of coal of the new reserves, restricted port capacities

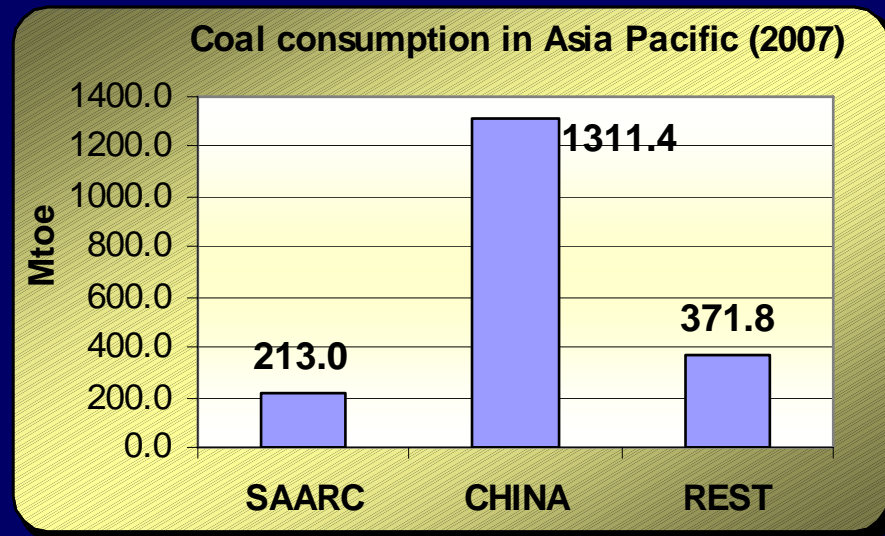
*Mozambique, Vietnam: It would take some time for new capacities to emerge*

# Price movement

- Only Sri Lanka would need a few million tonnes of coal import for power generation; is not likely to impact supply or prices in the international market
- Coal import by other SAAR countries would put them in a vulnerable situation in future wrt energy security

# SAARC

- SAARC countries have only around 11% share in region's coal consumption
- Excluding India, coal consumption in SAARC is minuscule



# Road ahead for South Asia

- India: Should aggressively address use of renewables, immediately stop using sub-critical technology, phase out small older inefficient units, restrict new capacities based on coal

# Road ahead for South Asia

- Pakistan: Should exploit Thar deposits, CBM, insitu gasification, pithead power generation, India could provide expertise (subject to geo-politics)

## Road ahead for South Asia

- Nepal Bhutan : Should exploit more hydro potential and micro hydel for distributed generation
- Maldives: Should exploit more renewables, solar, wind, bio-fuels

# Road ahead for South Asia

- Sri Lanka: Exploit more renewables, solar, wind, biomass
- Bangladesh: Should exploit coal deposits, CBM, in-situ gasification,
- Afghanistan: ??

# Finally

- Geopolitics would continue to play an important role in the region
- Emergence of regional energy market must be facilitated
- It would be advisable for smaller players to use more of domestic resources / renewable

Thank you