

Seaborne Energy Coal – Continuing Growth

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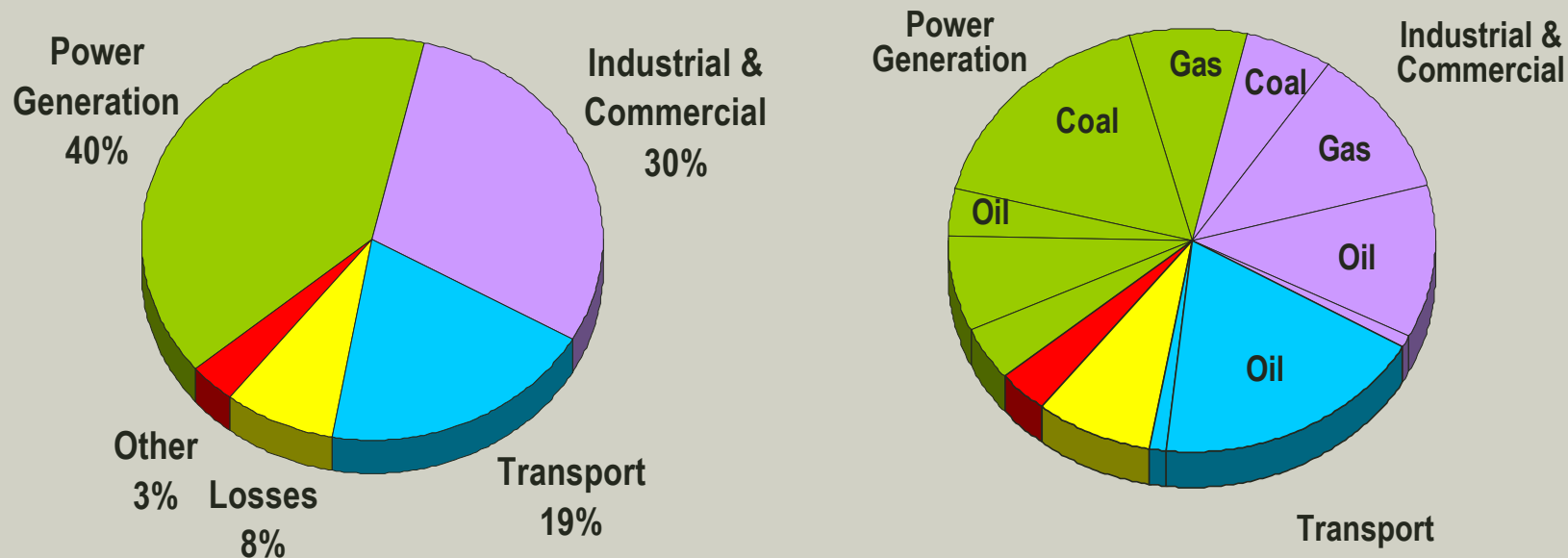
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Fossil fuels a major part of the global energy market

Global Energy market 384EJ pa*

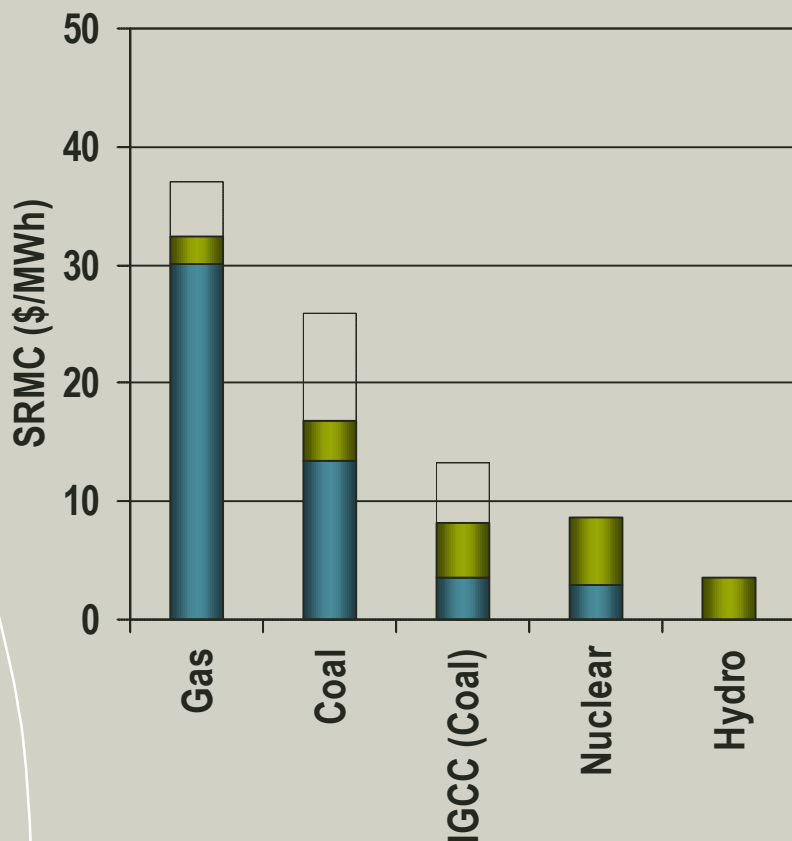
By Industry Sector



EJ = 1,000 PJ
~ 1 tcf gas
~ 24 Mtoe
~ 40 Mt coal

Coal competitive for existing and new build power

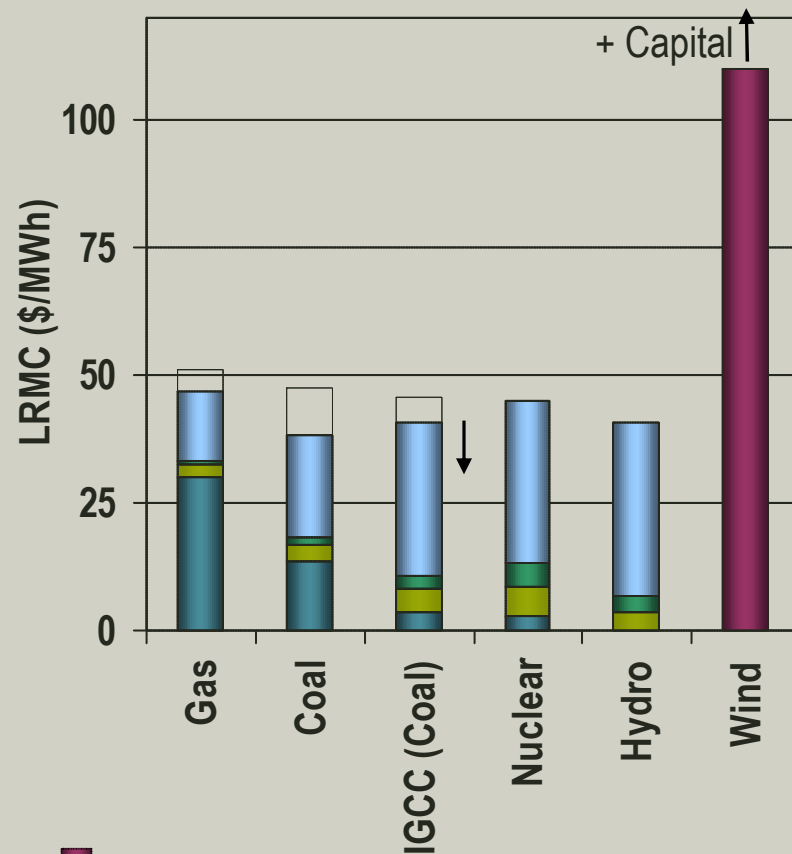
Existing coal plant competitive in dispatch



Legend



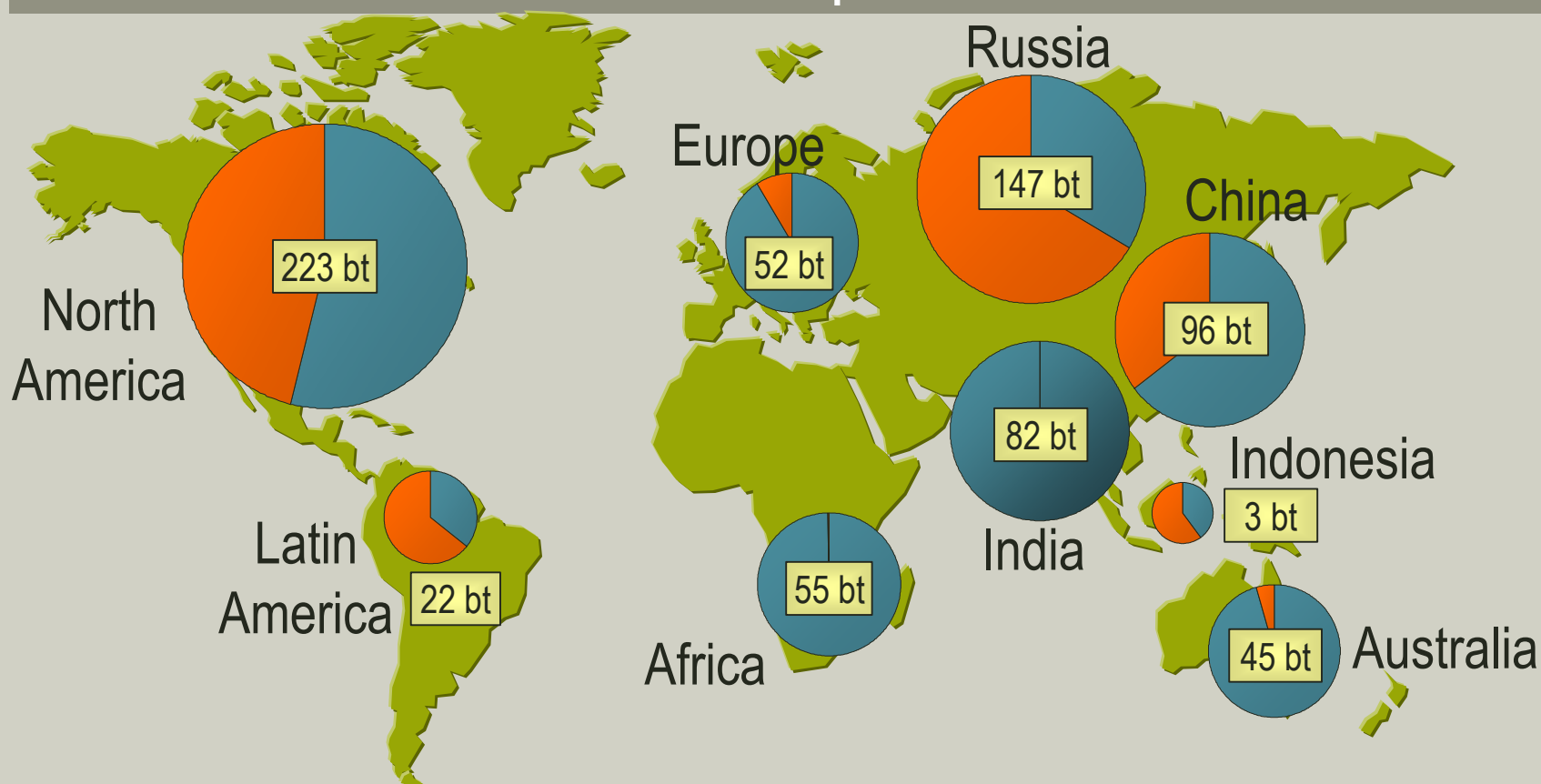
New build coal competitive, conventional power gen significantly cheaper than renewables



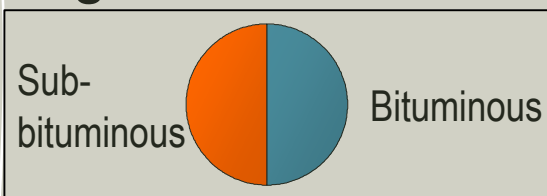
Notes: Coal @ \$1.50/mmbtu, Gas @ \$4.50/mmbtu, IGCC @ \$0.50/mmbtu, Nuclear \$0.32/mmbtu

Sources: Black & Veatch, Gas Turbine World Handbook, Uranium Information Centre, IEA – Renewables for Power Generation

Coal is abundant and wide spread



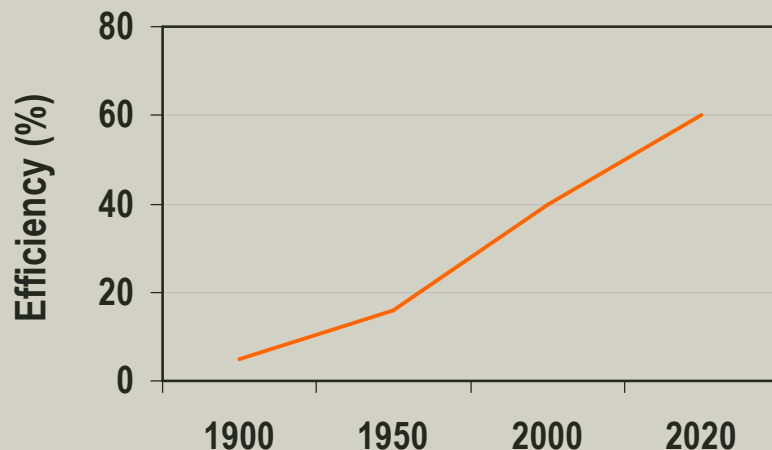
Legend



Total World 897 bt

Coal technology continuing to evolve

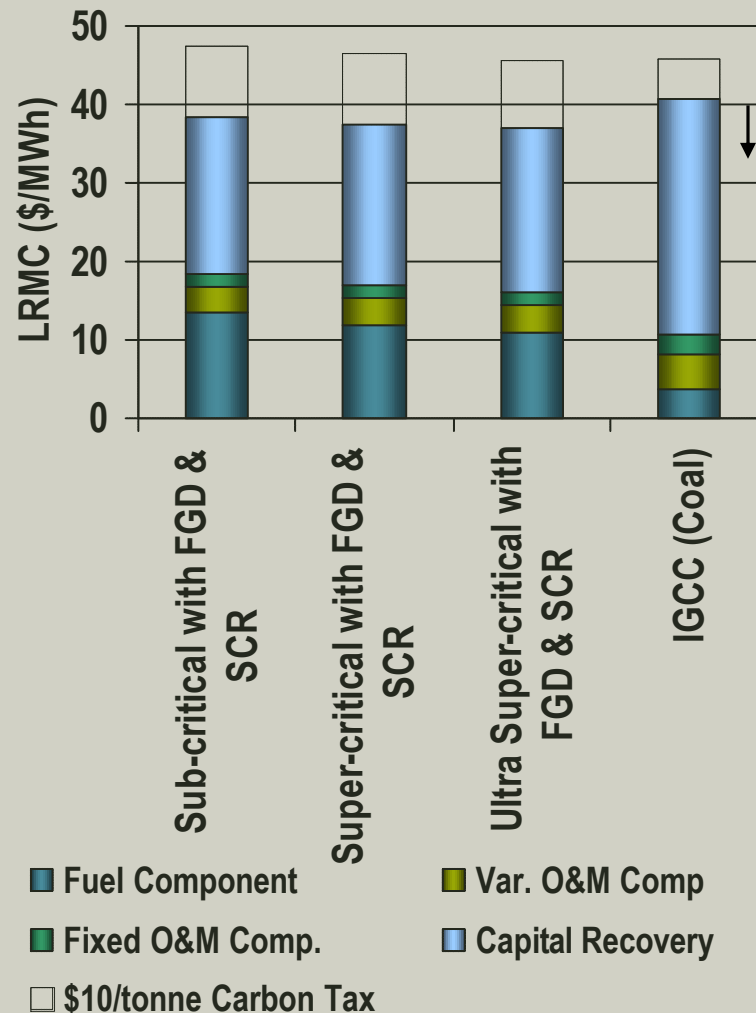
Efficiency of Coal-Based Power



Coal Technology Roadmap

1990:	Conventional pf
2002:	Supercritical
2005-15:	Ultra supercritical
2015:	Gasification (IGCC)
2015-25:	IGCC plus CO2 capture and sequestration.
2025-50	Hydrogen economy?

Technology continues to lower costs



Coal has a future

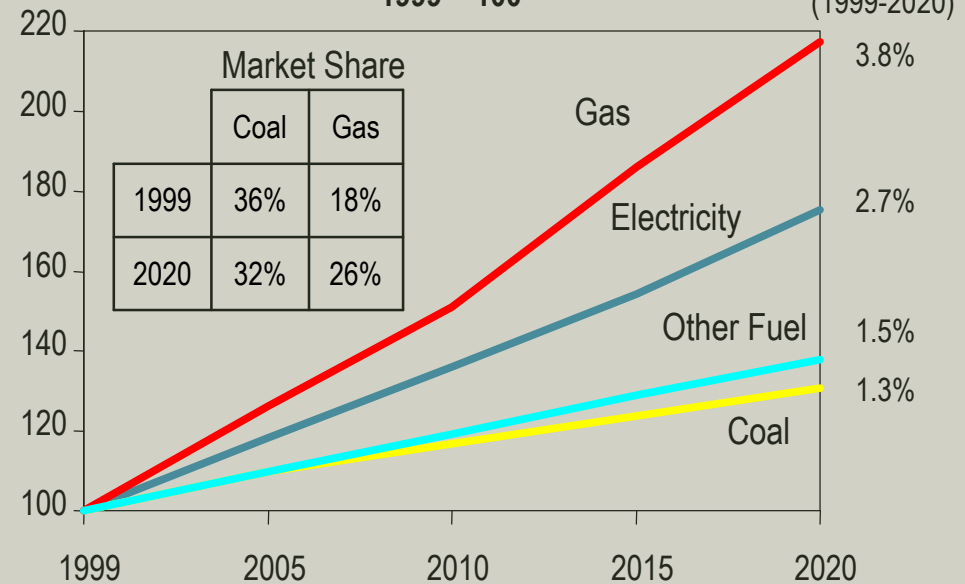
Cons

- Climate change issues
- Gas perceived as being a 'clean' fuel

Pros

- Competitive
- Abundant, stable supply
- Easy to store and transport
- Largest share of global generation

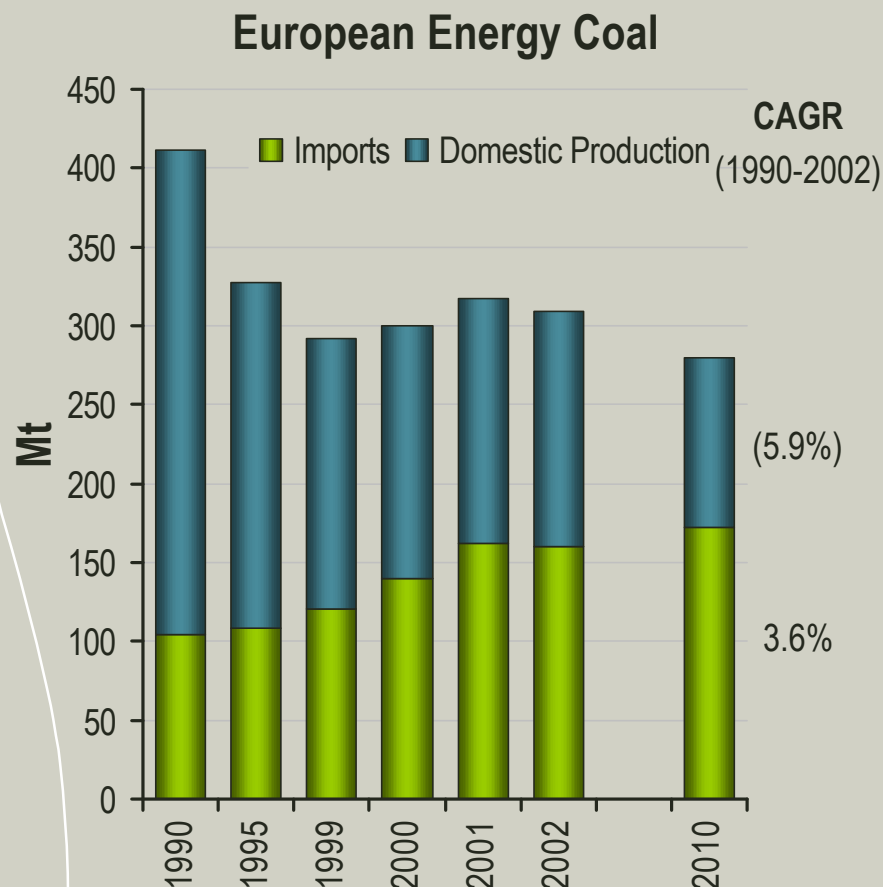
Electricity and generation fuel demand
1999 = 100



Conclusion

- Coal is relevant
- Substitution is not the answer
- Clean coal solutions being developed

Europe – imports flat or slight growth

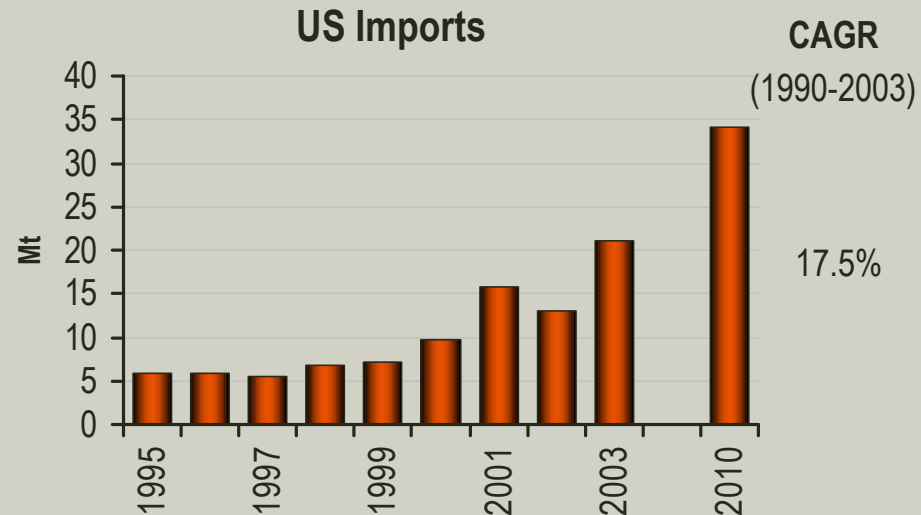
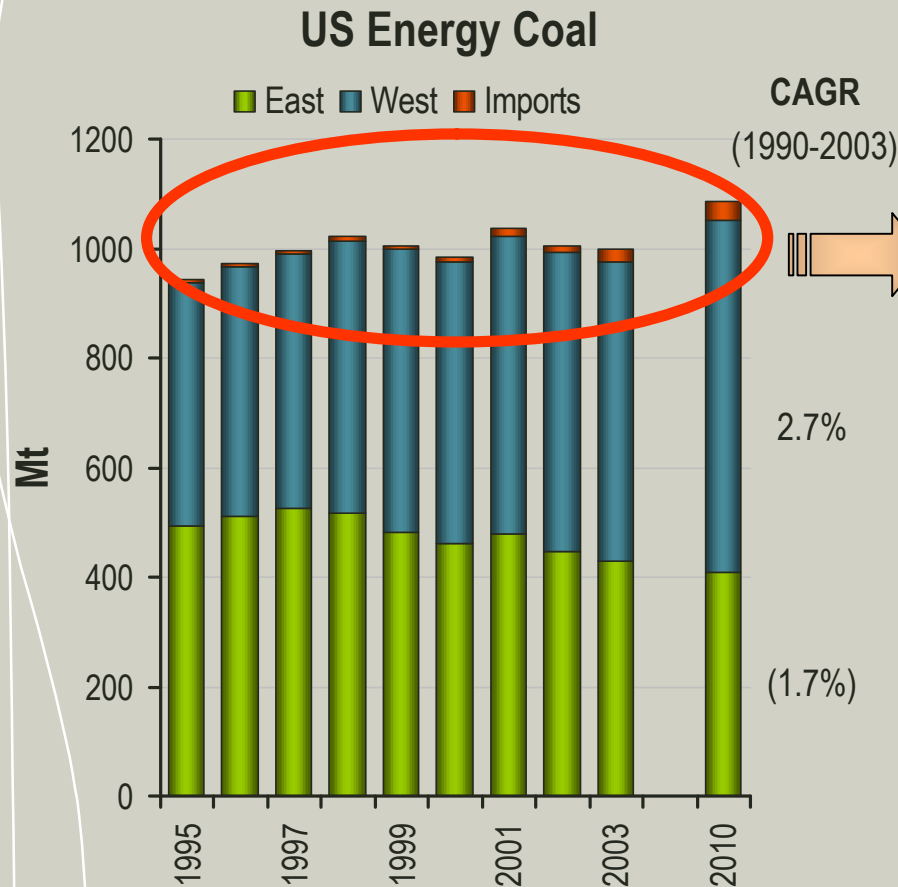


- Overall demand declining, but imports growing slowly
- ETS & LCD* already influencing market
- EU subsidy reduction program driving reduced domestic coal
- Energy market convergence
 - Power generation growth from gas
 - Strong coal/gas competition
- Deregulation and liberalisation

* ETS – Emissions Trading Scheme (CO₂), LCD – Large Combustion Directive (NO_x, SO_x & particulates)

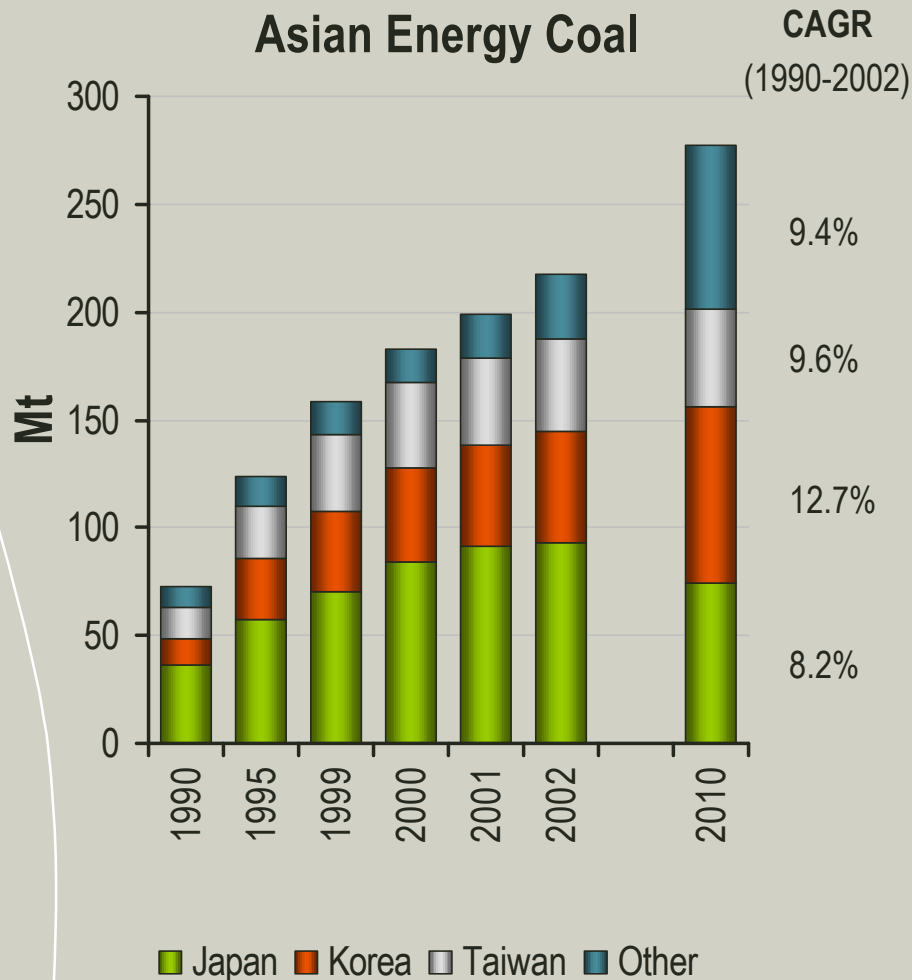
Sources: IEA Coal Information 2003, IEA Coal Information 2001

US import growth to continue



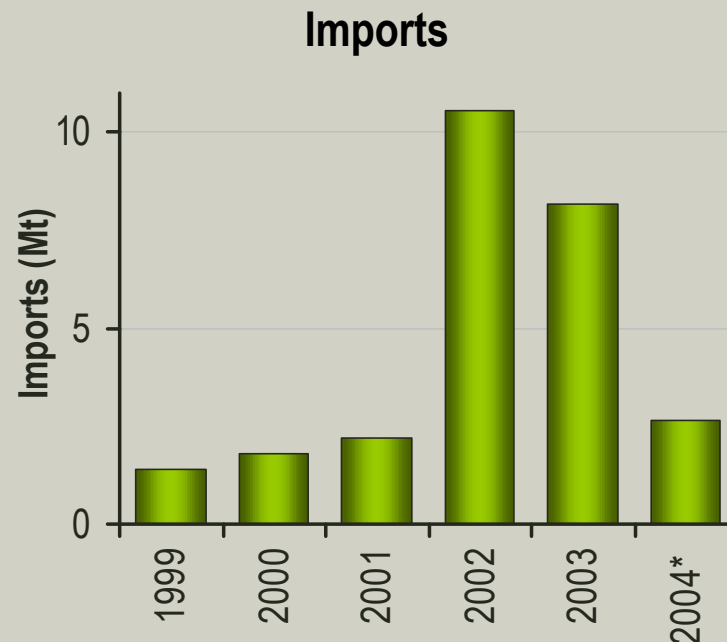
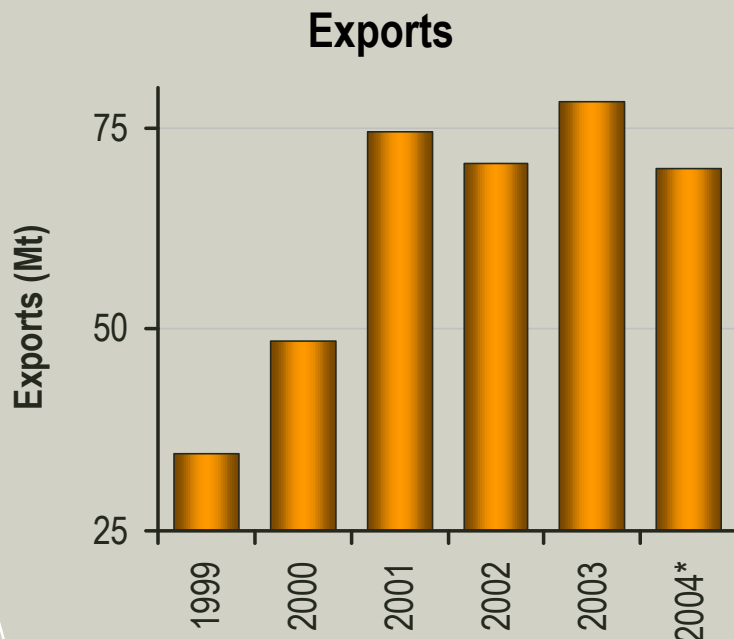
- Continued decline in US East production
- US West continues to grow
- Imports competitive with US West coal into coastal markets
- Imports continue to grow

Asia - Strong demand growth



- Increasing flexibility in coal purchasing
 - China penetration
 - Spot purchases
- Lack of pipeline gas alternatives
- No domestic energy supplies in key importing countries
- Nuclear concerns
- Slowly embracing deregulation
- Environmental consideration on the rise
- Japan only Kyoto Annex B country
- Japan decline assumes large expansion in nuclear capacity?

What role will China play?

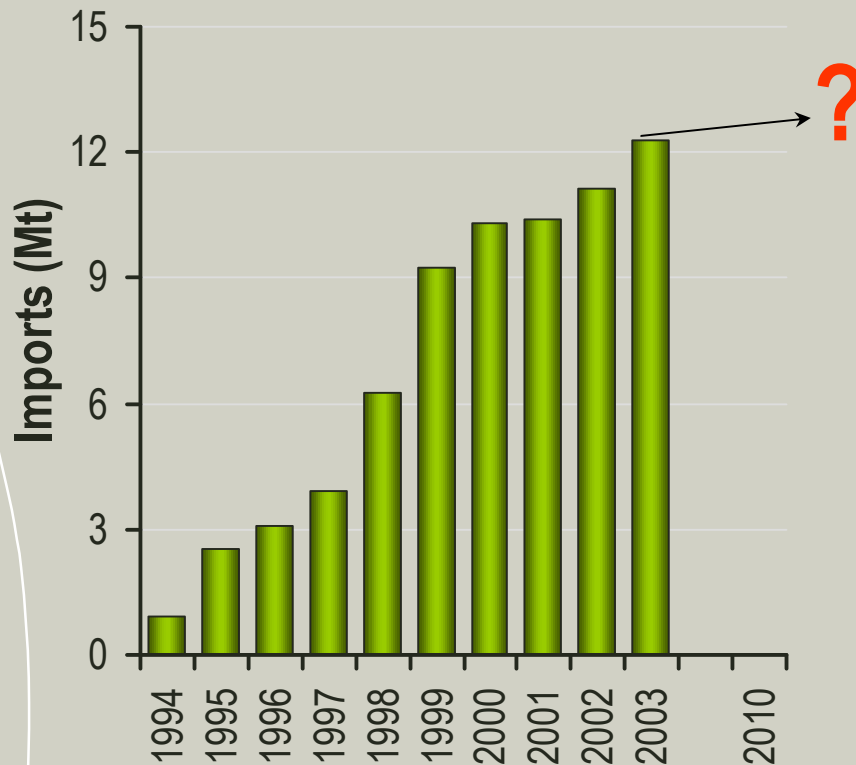


- Strong power demand & GDP growth
- Industry efficiency improvements
- Poor safety record, government closure of TVEs
- Large domestic coastal trade
- New domestic coal supply long distance from key coastal domestic markets

Notes: * Jan – April 2004 Annualised
Source: Barlow Jonker, McCloskey's Coal Stats

India imports growing

Imports growing from a low base

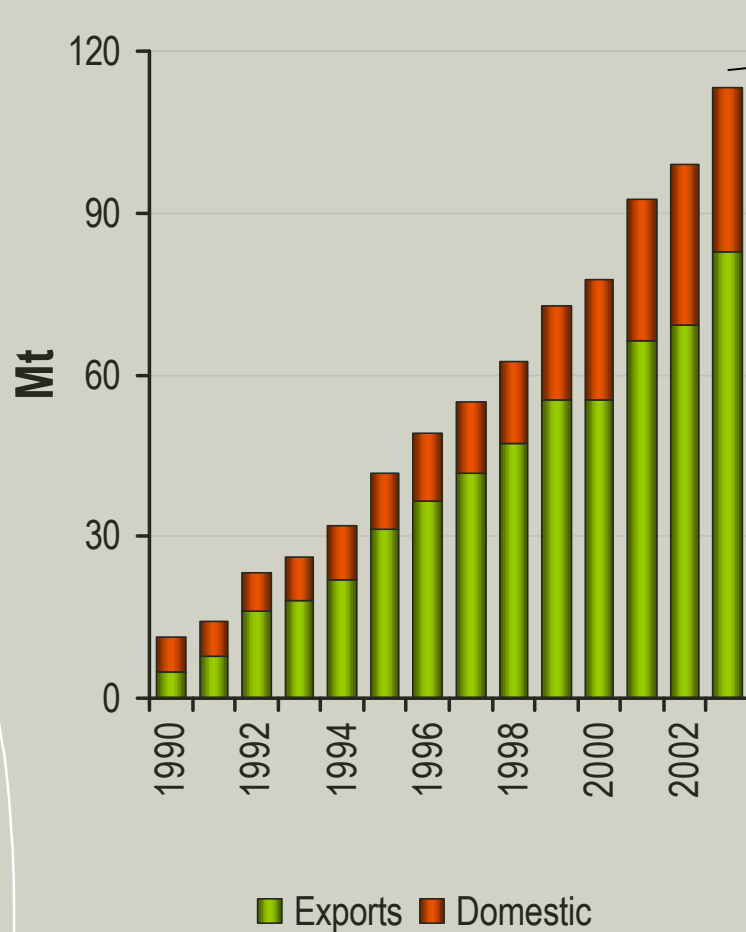


Low power consumption per capita

2001	TWhr/capita
India	0.49
China	1.02
Korea	5.25

- Domestic production 290Mtpa steam coal
- 71% of production has CV < 5000 kcal/kg & ash > 22%
- Washability issues
- 29% of all coal mined transported further than 1000km

Rapid Indonesian growth; is it sustainable?



- Lack of exploration
- Declining high quality reserves
- New supply is further inland
- Lack of infrastructure
- Domestic demand growth

Seaborne Energy Coal – Continuing Growth

- Seaborne energy coal will remain an important part of global fuel mix
 - Competitive economics
 - Supply security
 - Technological advancements
- Growing Pacific market
- Sustainable and valuable Atlantic market
- Some potential upside?
 - Impact of strong Chinese domestic demand?
 - Potential for Indian economic growth?
 - Sustainability of Russian exports?
 - Long-term direction of Indonesian bituminous coal exports?

