



# Energy Security: Indian Perspective

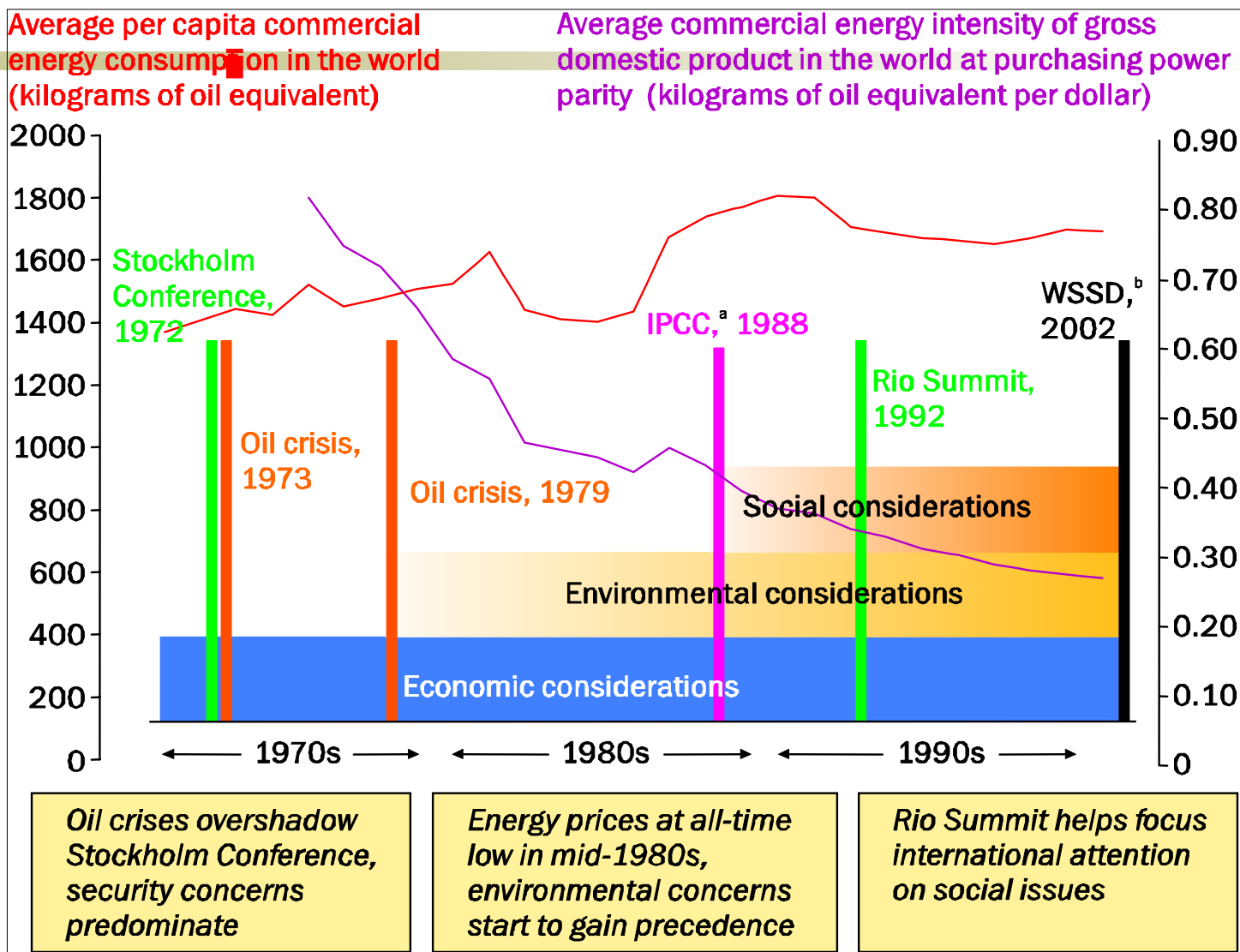
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# Evolution of sustainable Energy Development



Source: Sustainable Energy Perspective for Asia , TERI 2002



# Defining Energy Security

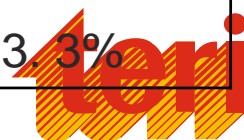
- Developing Efficient Energy portfolios
  - Oil security a very crucial aspect of Energy Security But There is more to Energy Security than Oil Security
- Universal access and consumption options
  - Security of supply critical
- Stable Prices
- Well developed Risk Management Tools
- Meeting global competition
- Meeting environmental goals : Both global

# Energy Demand and Supply Projections: India

	2002/ 03		2006/ 07		2024/ 25	
	D	S	D	S	D	S
<b>Coal MMt</b>	340.1	341. 3	460.5	405.0	669.0	450.0
<b>Gas bcm</b>	28.2	31.4	84.31	54.3	131.9	29.5
<b>Oil MMt</b>	97.7	33.0	134.5	34	256.7	80.0

# Energy consumption in Asia – Global Shares

Country	Share in world Coal Consumption	Share in World Oil Consumption	Share in World Hydro Consumption	Share in World Gas Consumption
China	31.0%	7.6%	10.8%	1.30%
India	7.2%	3.1%	2.6%	1.20%
Indonesia	0.7%	1.5%	0.4%	1.40%
Japan	4.4%	6.8%	3.8%	3%
Malaysia	0.1%	0.7%	0.3%	1.10%
Philippines	0.1%	0.4%	0.3%	0.10%
Singapore	0.2%	0.9%	-	0.20%
Total Asia Pacific	50.7%	28.8%	23.1%	13.3%



# Ever increasing Oil Demand

## World Oil Demand (million barrels per day)

	2000	2010	2020	2030	Average annual growth 2000-2030 %
<b>OECD total</b>	<b>44.8</b>	<b>49.6</b>	<b>54.0</b>	<b>57.6</b>	<b>0.8</b>
China	4.9	7.0	9.4	12.0	3.0
India	2.1	3.0	4.2	5.6	3.3
Other South Asia	0.5	0.8	1.2	1.8	4.0
Middle East	4.1	5.2	6.3	7.7	2.2
<b>Non-OECD</b>	<b>27.1</b>	<b>35.9</b>	<b>46.4</b>	<b>58.3</b>	<b>2.6</b>
Bunkers and stock changes	3.1	3.3	3.6	4.1	1.0
<b>Total demand</b>	<b>75.0</b>	<b>88.8</b>	<b>104.0</b>	<b>120.0</b>	<b>1.6</b>

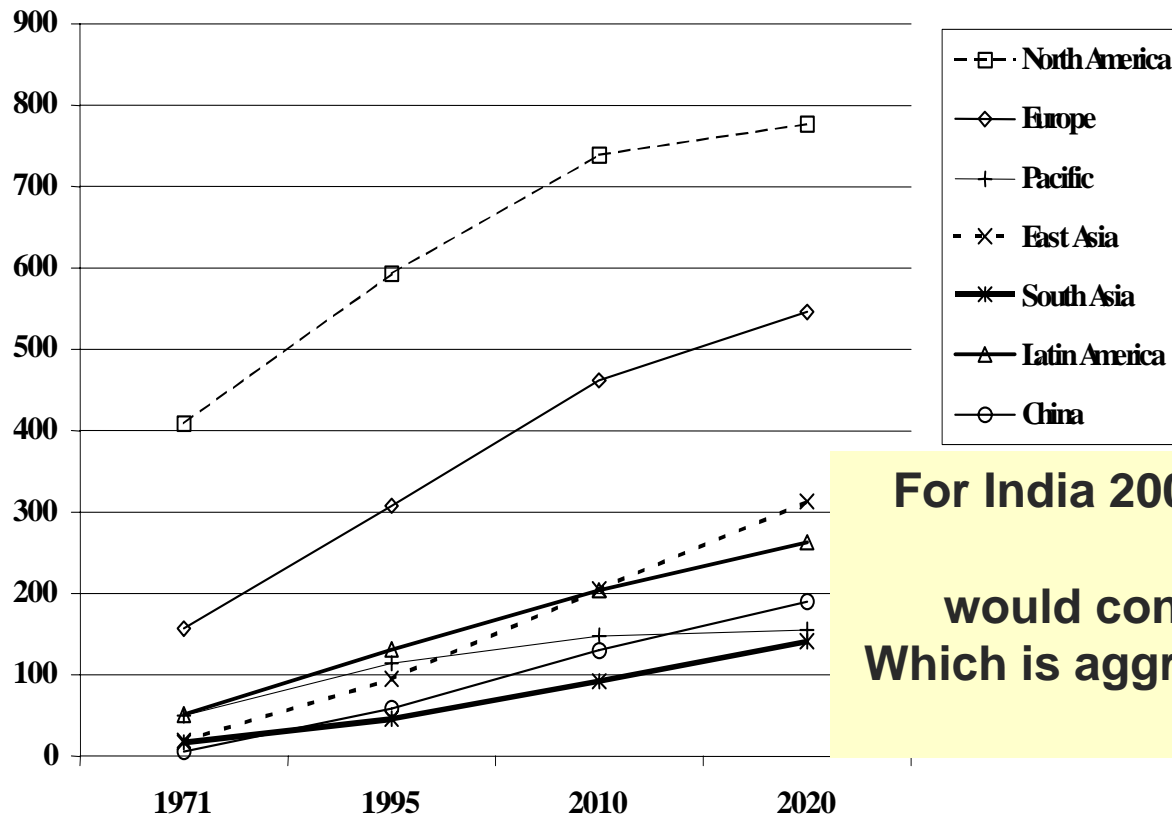
Source: World Energy Outlook IEA

- China to overtake Japan as the 2<sup>nd</sup> largest oil consumer in the world, Japan 3<sup>rd</sup> largest oil consumer
- India to emerge as the 5<sup>th</sup> largest oil consumer in the world



# Increasing Transportation Energy Demand

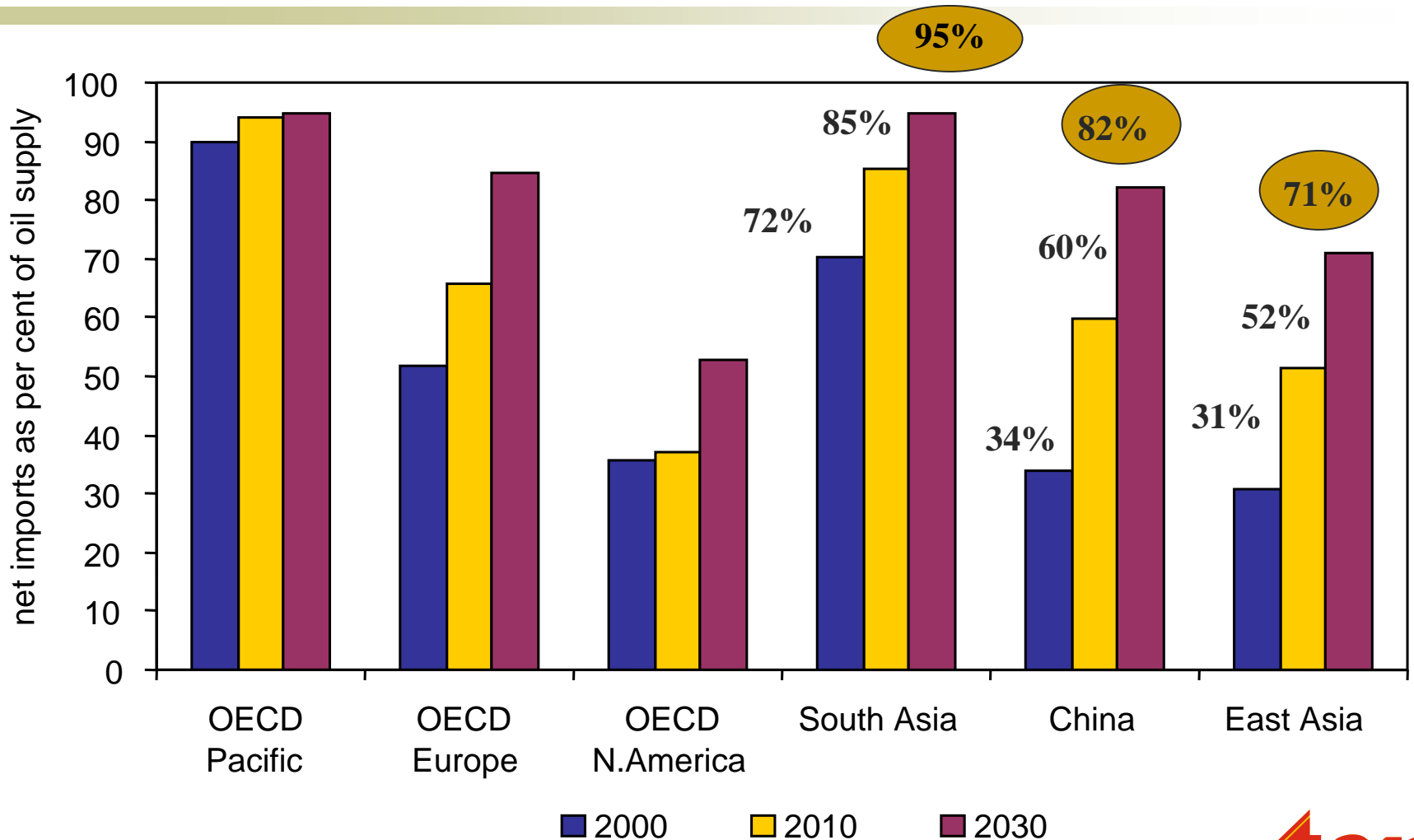
million tonnes of oil equivalent



**For India 200 million cars projected for 2030  
would consume 160 MTOE per year  
Which is aggregate of all forms of energy  
in 2000!!**



# Asia's Increasing Oil Import Dependency (%)





# How to Enhance Energy Security??

- Securing long-term contracts with the key suppliers.
- Acquisition of producing assets or exploration acreage.
- Developing risk management tools.
  - Strategic Petroleum and Gas Reserves
- Initiatives to boost domestic supply
- Diversification of energy portfolios
  - Role of Gas
  - Developing Alternate Source of Energy
- Improving Energy Efficiency
- Increased Need for Regional Cooperation

# Crude Imports : Diversifying sources

	<b>1999</b>	<b>2003(est)</b>
<b>ME</b>	52.4%	69.9%
<b>Asia Pacific</b>	5.3%	4.4%
<b>A Basin</b>	35.5%	15.7%
<b>Others</b>	6.8%	5.6%
<b>S &amp; C America</b>		4.5%
	<b>998kb/d</b>	<b>1.7 mmb/d</b>

# Strategic Reserves

- Emergency Response Mechanism against short term oil supply disruptions
- Size: 5 MMT of crude Oil Storage sufficient to meet 15 days consumption of crude oil
- Locations : 1 MMT (Vizag), 1.5 MMT( Mangalore), 2.5 MMT (Mangalore or nearby locations)
- International Energy Agency (IEA) requires oil importing member countries to hold stocks equivalent to 90 days of net imports.
- After setting the proposed strategic storage, India will have gross storage capacity in line with the IEA guidelines.
- the government of India also considering building of underground natural gas storage facilities

# Equity Assets

- Acquisition of equity oil abroad another major strategies adopted to enhance the oil security of the country
- Active pursuit of equity oil by the State-run exploration firm ONGC's overseas investment arm, OVL (ONGC Videsh Ltd)
- OVL holds equity in oil and gas projects in Sudan, Russia and Vietnam and has interests in exploration blocks in Iran, Myanmar, Iraq, Libya, Syria and Sudan
- GOI aims to produce 20 MT/ annum of equity oil and gas abroad by 2010, with a long-term target of acquiring 60 MT/annum of equity oil and gas overseas by 2025
- GoI also considering equity in coalmines abroad.

# Role of Gas

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- Gas playing increasingly Important role in World Energy scene
- Development of LNG terminals
- Several options for international gas pipelines under consideration
- Measures to Develop gas infrastructure in the region

# Development of Alternative Sources of Energy

- Renewable Sources of Energy
- Bio fuels e.g. ethanol blended petrol, bio diesel
- Hydrogen energy
- Coal Bed Methane

# Regional Cooperation – India's Efforts

- Significant bilateral energy cooperation between India – Nepal and India – Bhutan
- Most of this in form of large hydro-power projects
- India keen to import ONGC's recent gas discovery in Myanmar through Pipelines

# To sum up...

- Increasing importance of gas in world energy markets
- Revisit the significance of “clean coal” and “nuclear” ??
- Significant investment in energy infrastructure crucial
- Need to improve energy efficiency
- Efforts to boost development of alternative , cleaner technologies
- Regional cooperation to play a crucial role in enhancing Asia’s energy security



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Thank you

