



Some Aspects of Vision 2030

**Conference On Security And Cooperation In South Asia:
*A Global Perspective***

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Vision 2030

***“ Developed, industrialized, just and prosperous Pakistan
through rapid and sustainable development
in a resource constrained economy
by deploying knowledge inputs ”***



The Historical Context for Vision 2030

Playing Catch-up:

Earlier Exercises and Studies

Germany with the UK: ~140 years ago: (*Gerschenkron, 1962*)

History's Most Ambitious Benchmarking Exercise: Dec 1871
Meiji Japan's blueprint for a modern state. (*Morishima, 1982*)

Western Europe and the US:

Concepts of "technological congruence" & "social capability" to characterize the situation for **latecomers** (*Abramovitz, 1994*)

The Pacific Rim Countries and now China



Six Themes for Vision 2030

- The Global Imperatives and Societal Transformations
- The Just and Sustainable Society
- The Innovative Society: Knowledge, Technology, and Competition
- The Prosperous Society
- Macroeconomic Framework
- The State; its institutions and Instruments

Perils of forecasting ! (the 640 K syndrome)





Global Imperatives

- **The Techno-Economic- Knowledge Revolution**
 - Dispersion of information and technology
 - The changing nature of work and the workplace
- **Massive Realignment of Economic Activity:**
 - Economic liberalization
 - Capital market developments
 - Technological advances
 - Demographic shifts
- **Centers of economic activity** are shifting profoundly, not just globally, but also regionally.
- **Relocation** of manufacturing, services and design activities



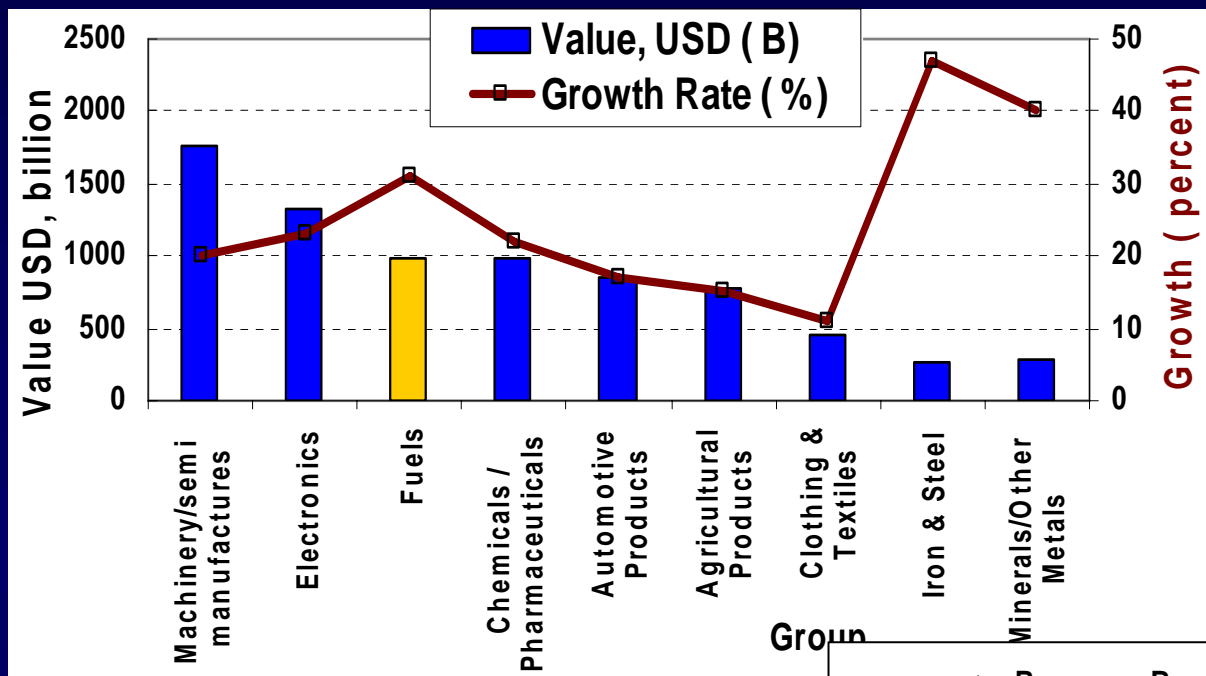
Major Challenges for Pakistan

- **Depleting Natural Resources** : water, land, energy
- ***The Demographic Transition***
- ***The 24 / 7 Society***
 - The city of the future as a self-sustaining unit
 - Urban and rural economics ?
- ***The Looming Global Mono-culture***
- ***Global Race for Talent***

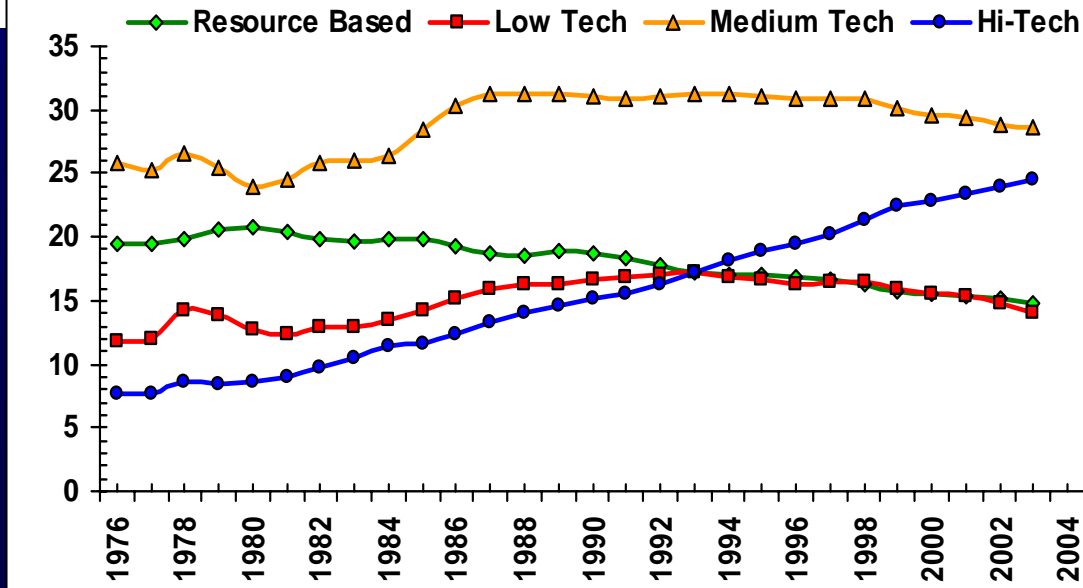


The Nature and Scale of the Challenge

1. Composition /Tech. Content of World Trade

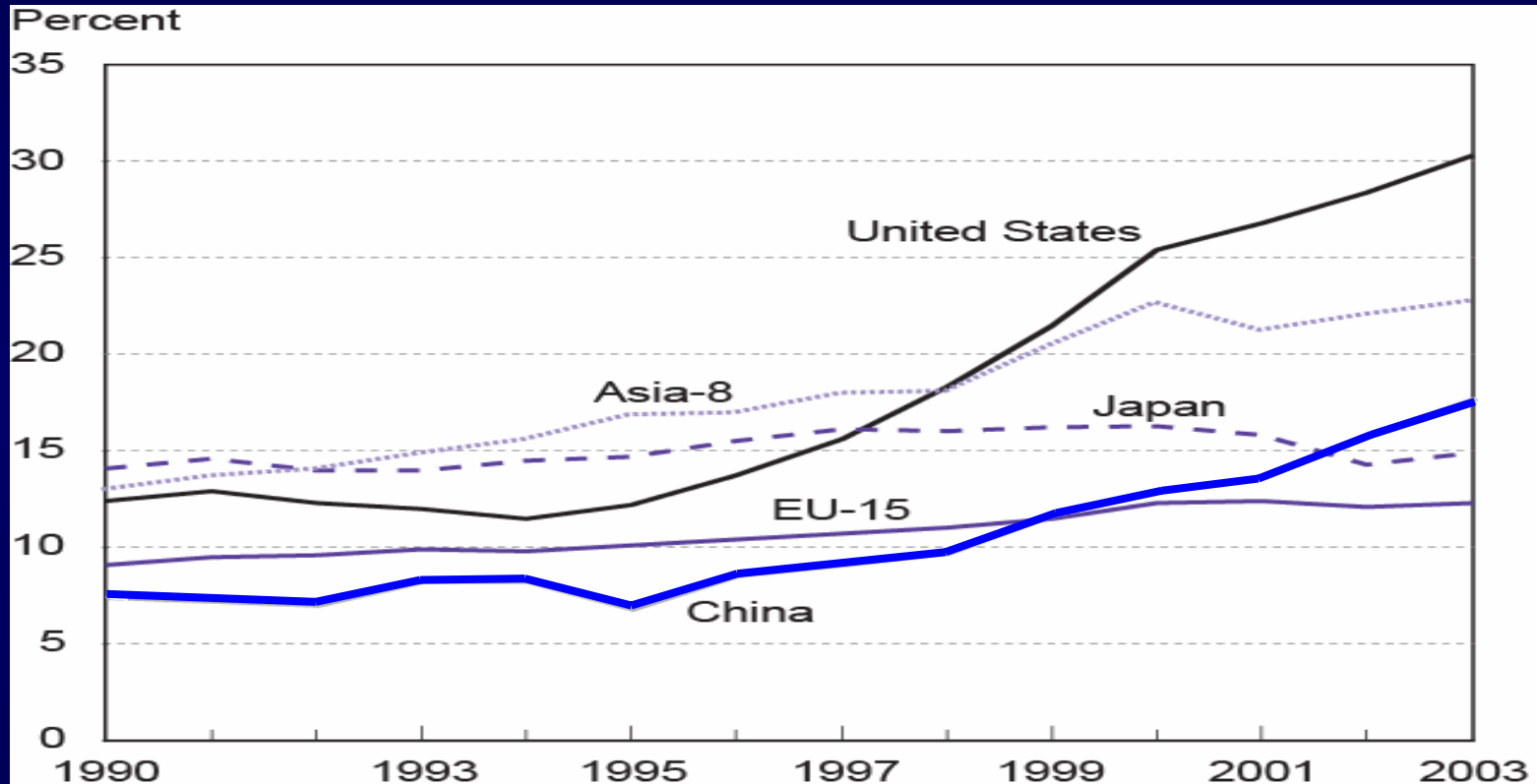


ref: WTO 2006



2. Changing Share of High-technology in Manufacturing, by Country / Region: 1990–2003

The United States, China, and other Asian countries have Shifted into high-tech manufacturing more rapidly than the EU and Japan

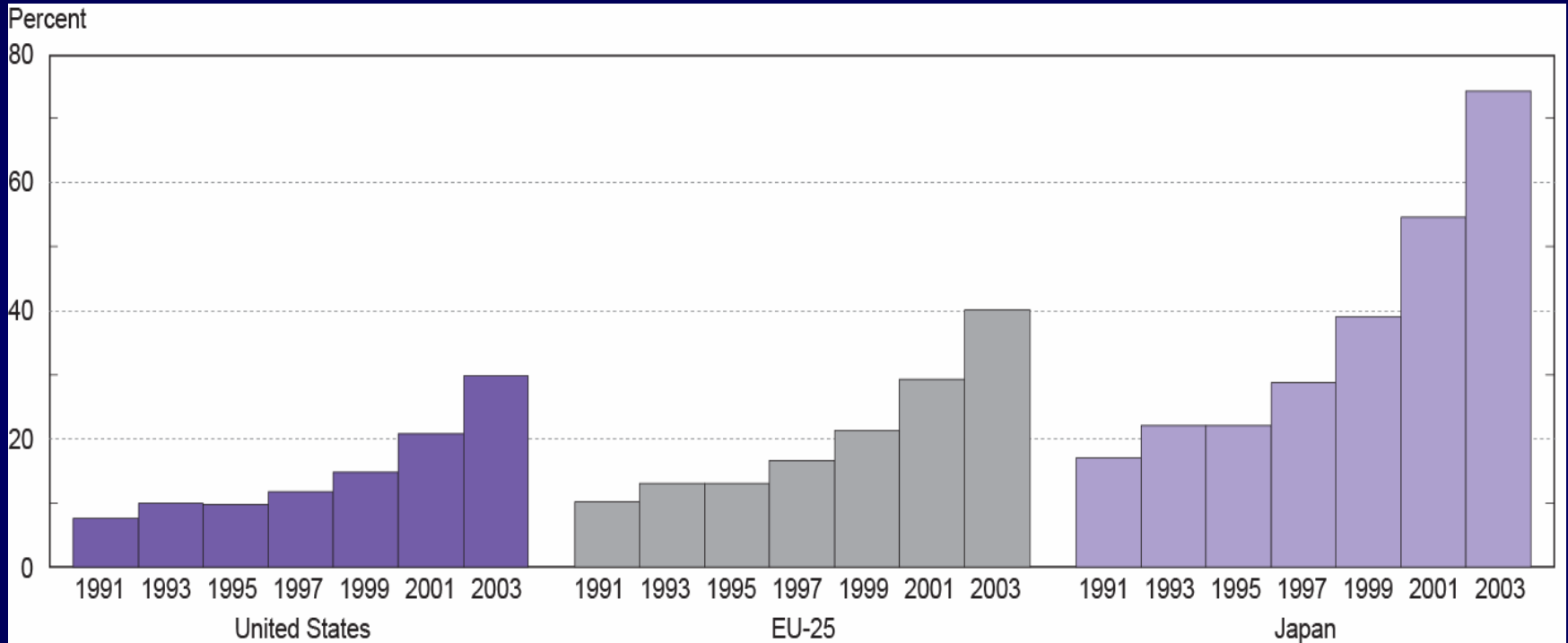


Asia-8 includes S. Korea, Taiwan, Thailand, Philippines, Malaysia, Singapore, Indonesia, and India



3. China's R&D expenditures relative to those of USA, Japan, and EU-25 [1991–2003]

Chinese R&D investment, 1991 to 2003:
Average annual increase >> USA, EU 25 , Japan



EU = European Union

NOTE: All data calculated by Organisation for Economic Co-operation and Development (OECD) with purchasing power parities.



3. Shift in Global Labour Skill Levels

Example: Irish Workforce, Educational Attainments (%)

	1972	1982	1992	2002
Primary	50	36	22	8
Secondary	21	24	28	28
H. Secondary	20	24	29	28
Tertiary	9	16	21	35

The table illustrates the shift in educational attainments in the Irish workforce from 1972 to 2002. The percentages for each level are: Primary (50% in 1972, 36% in 1982, 22% in 1992, 8% in 2002), Secondary (21% in 1972, 24% in 1982, 28% in 1992, 28% in 2002), H. Secondary (20% in 1972, 24% in 1982, 29% in 1992, 28% in 2002), and Tertiary (9% in 1972, 16% in 1982, 21% in 1992, 35% in 2002). The values for 1972 and 2002 are circled in red and green respectively, and arrows indicate the flow of data between these years.

Ease of Doing Business: Pakistan ranks at 76 out of 180 countries.
Rankings of the famous BRIC economies?

Brazil at 122, Russia at 106, India at 120, China at 83.

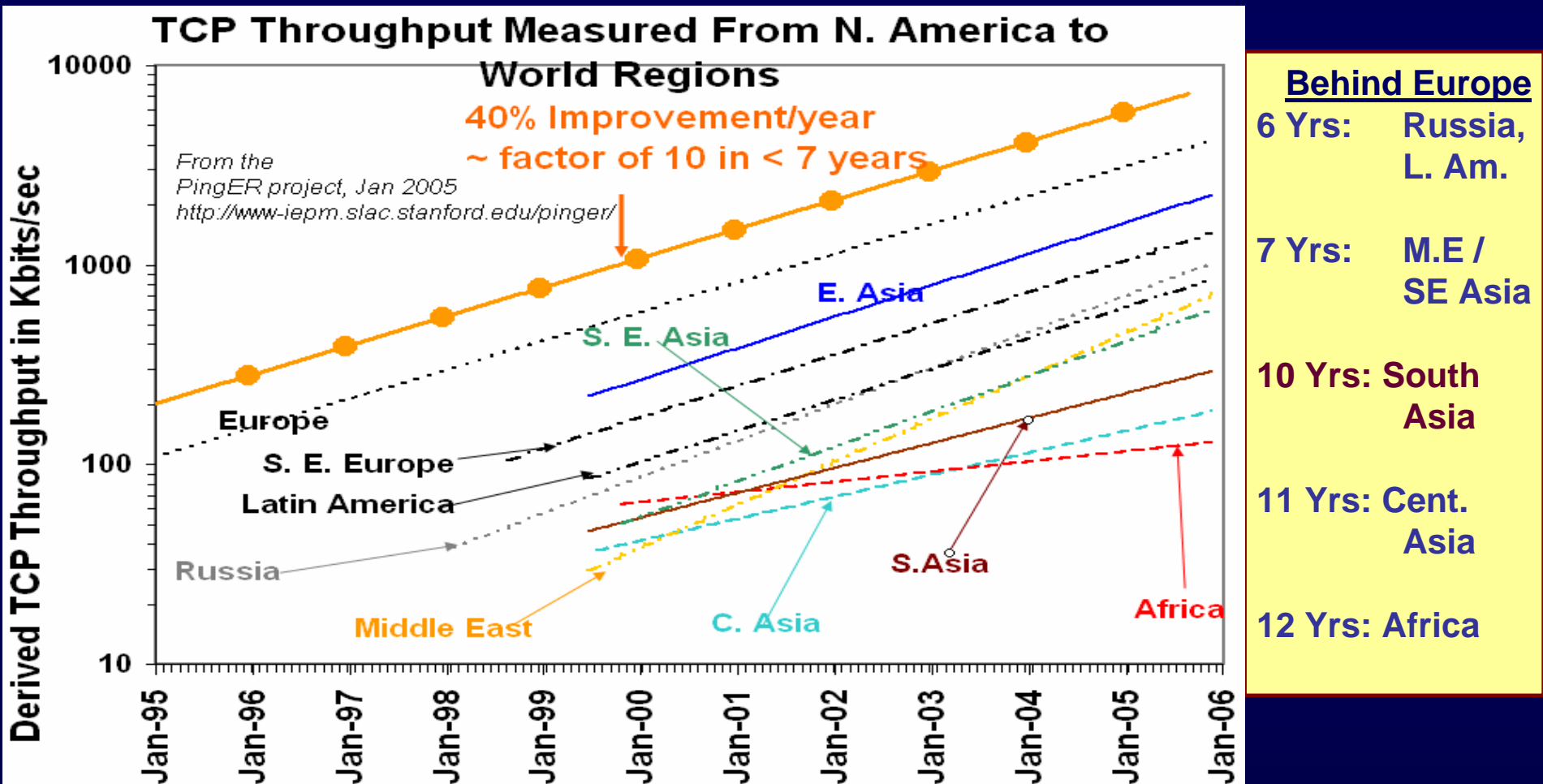
Vietnam is at 91

[Ref: World Bank, Doing Business 2008]



Bandwidth Connectivity as seen from the USA

Teledensity at present in Pakistan is ~ 45 % of the 160 m population (over 71 million connections, growing 2.8 – 3.0 m / month)



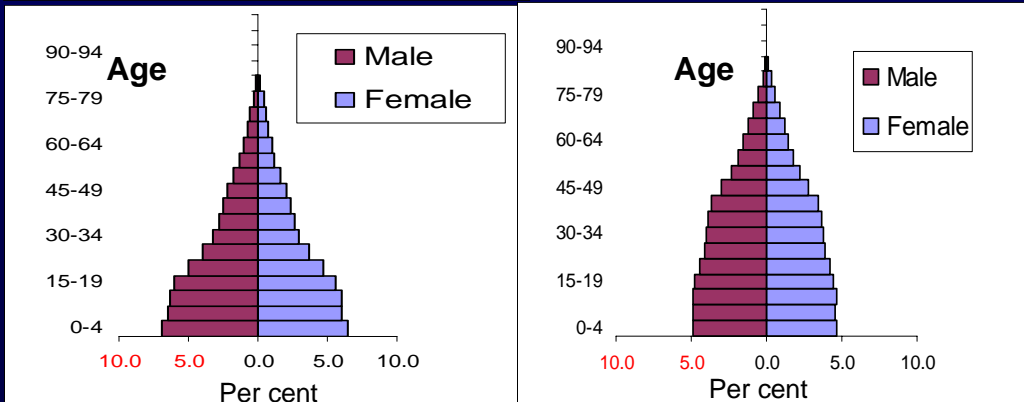
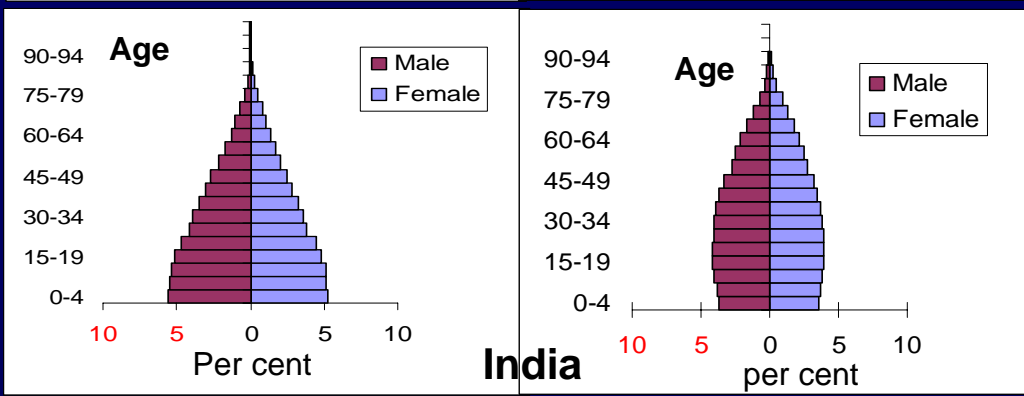
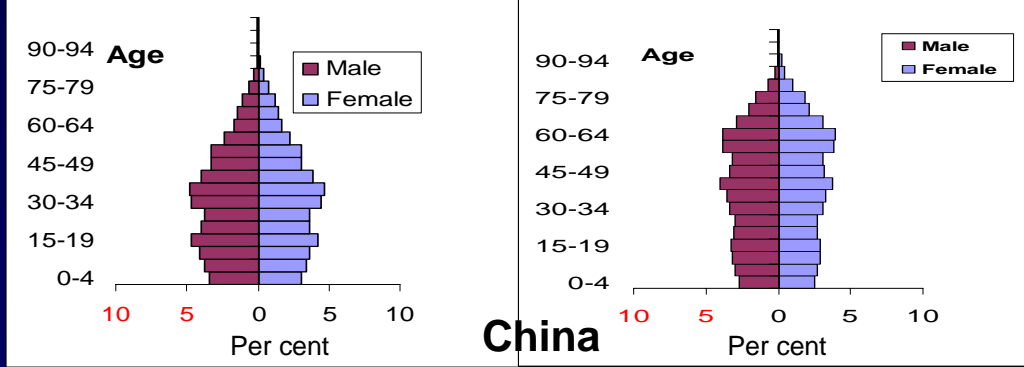
Many More Challenges for Pakistan: A Sample

- **The Demographic Transition**
- **The Habitat and Loss of Diversity : Water, Land, Climate Change, Food and the Environment**
- **Food Security**
- **Urbanisation**
- **Education and Skills: Shortages, gaps**
- **Energy and Security: Competition, or cooperation**



Current Population: 160 m 224 - 260 million in 2030 (over 60 % urban)

2005 2030



Different times of peaking

The demographic transition is a unique event in Pakistan. It has never happened before, and once completed will never happen again. We are living it now.

Rich countries grew rich before they became old.





Pakistan: Most Urbanised Country in S. Asia

- **Globally, urban dwellers** exceeded those in rural areas for the first time in human history in 2006 ... Shenzhen in China
- **Pakistan's urban population** : from **55 m** to **135 m** (2030)
- More and more settlements will grow into their equilibrium size – optimal and functional hierarchies

More and more of the economic power is concentrated in mega-cities with more than 10 million inhabitants

Klaus Klienfeld, CEO Siemens, 2006



The Looming Water Shortage in Pakistan

Current storage capacity : 9 % of avg annual flows
World average : 40 % of avg annual flows

Year	Population (m)	Water / Capita (m ³)
1951	34	5650
2003	146	1200
2010	168	1000
2030	230 - 260	770 - 680



Efficient Water Use : Ownership, Technology, Processes , Mindset ?

Climate Change & the Monsoon Model



The Water Challenge

World's largest contiguous irrigation system; BUT

- The **cropping intensity** for major crops in Pakistan: (twice the 75% assumed in the Indus Basin Treaty)
- **Total arable land** : 22 million hectares
 - **11 %** declared '**disaster area**' because of severe water-logging and salinity (water table only 0 – 5 feet)
 - **20 %** under **stress** (water table 5–10 ft below the surface).
 - **Overpumping** of the aquifers: Islamabad / Rawalpindi :~ water table fell by 1-2 meters/year (1982 to 2000)
 - Severe **pollution** in cotton growing areas

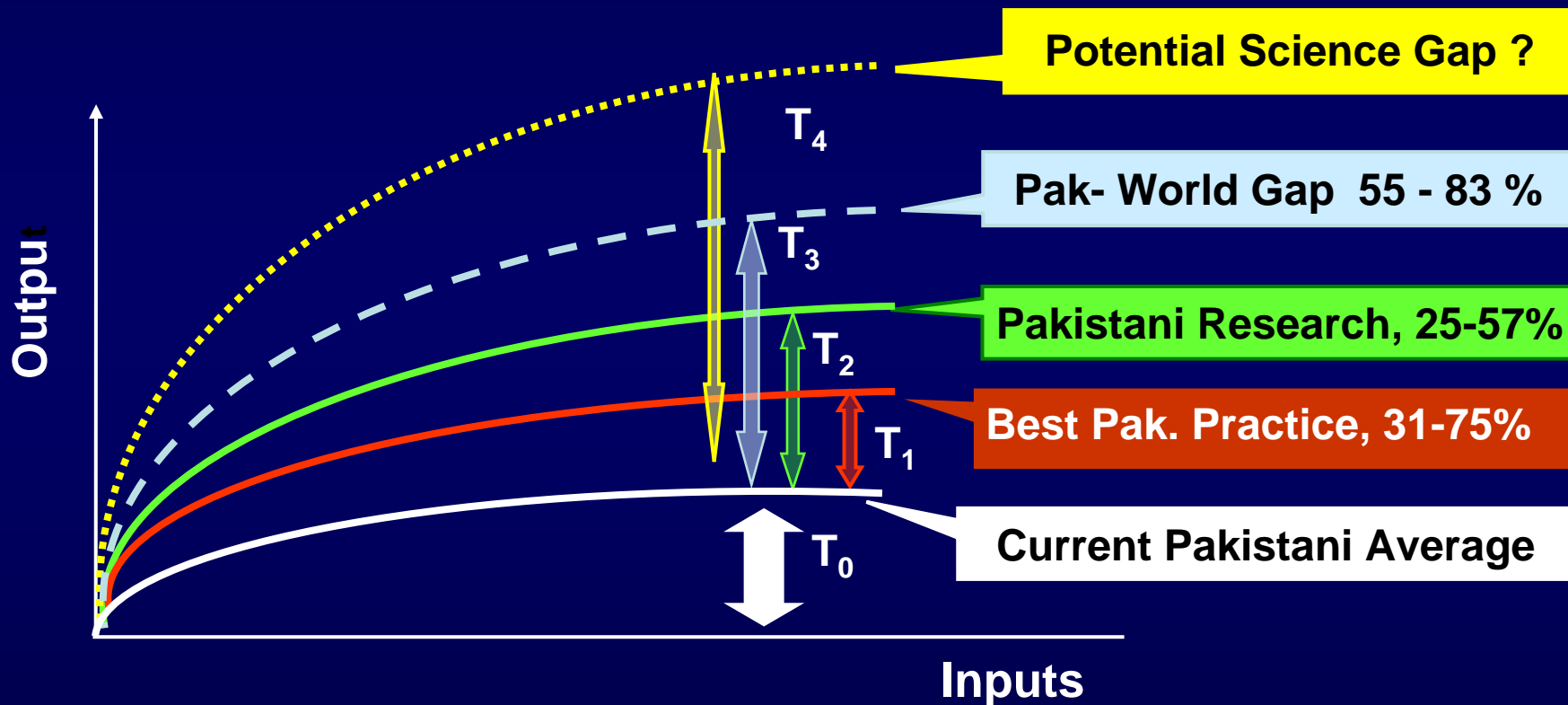
Green Revolution
essentially over



Food Security / Crop Improvements expected

Changing Dietary Habits !!

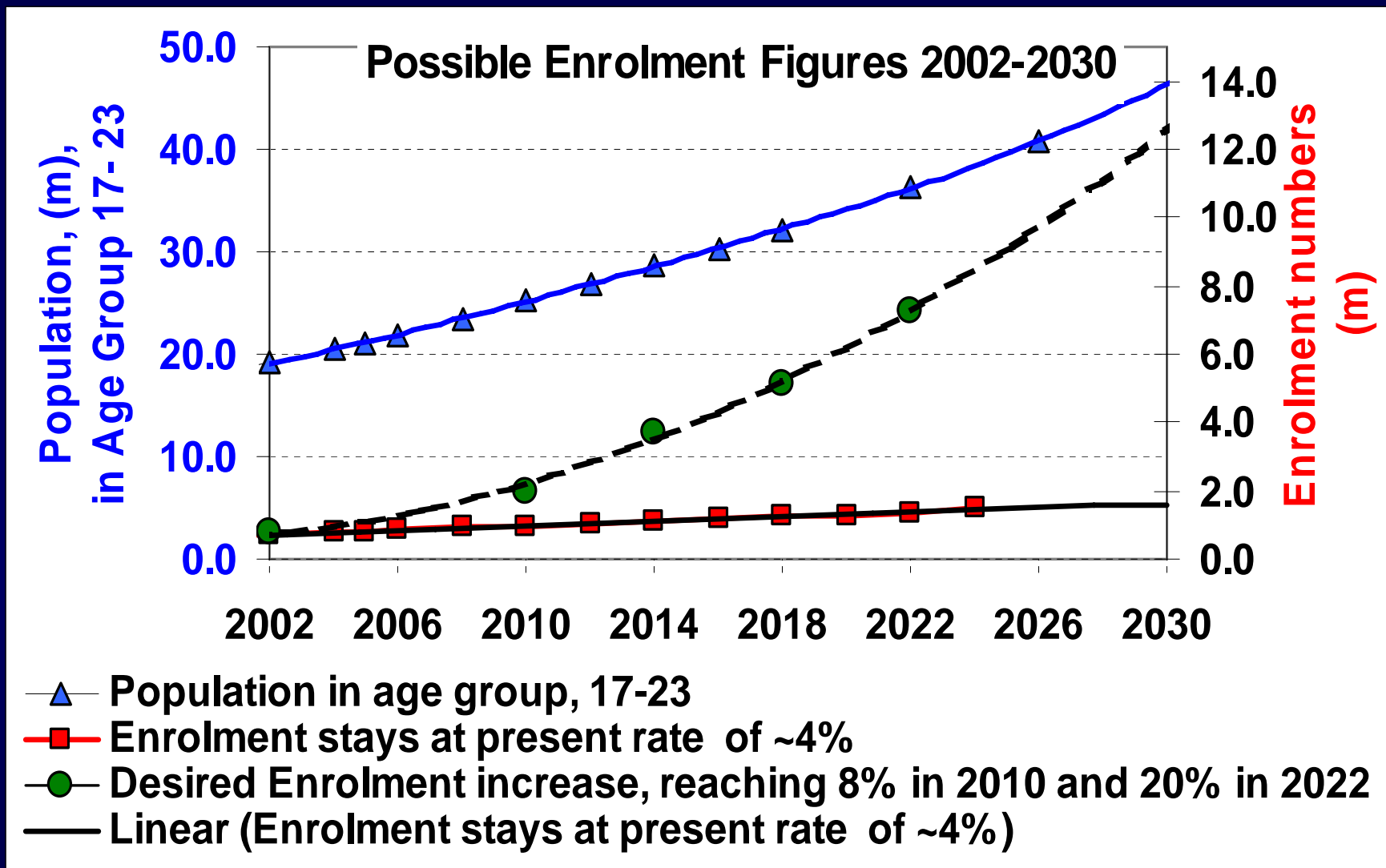
- Fed ourselves & exported 1-2 m tons nearly every year
- Case of **Cotton** from NIAB !



The gene revolution



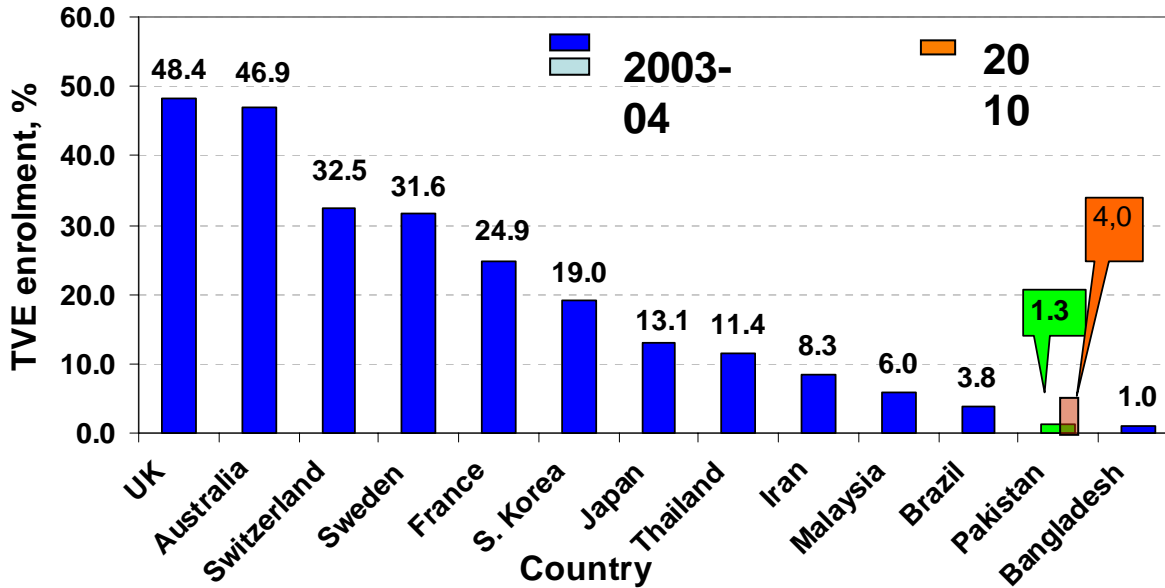
Need to make the accumulation of knowledge and collective competence the driver of economic growth.





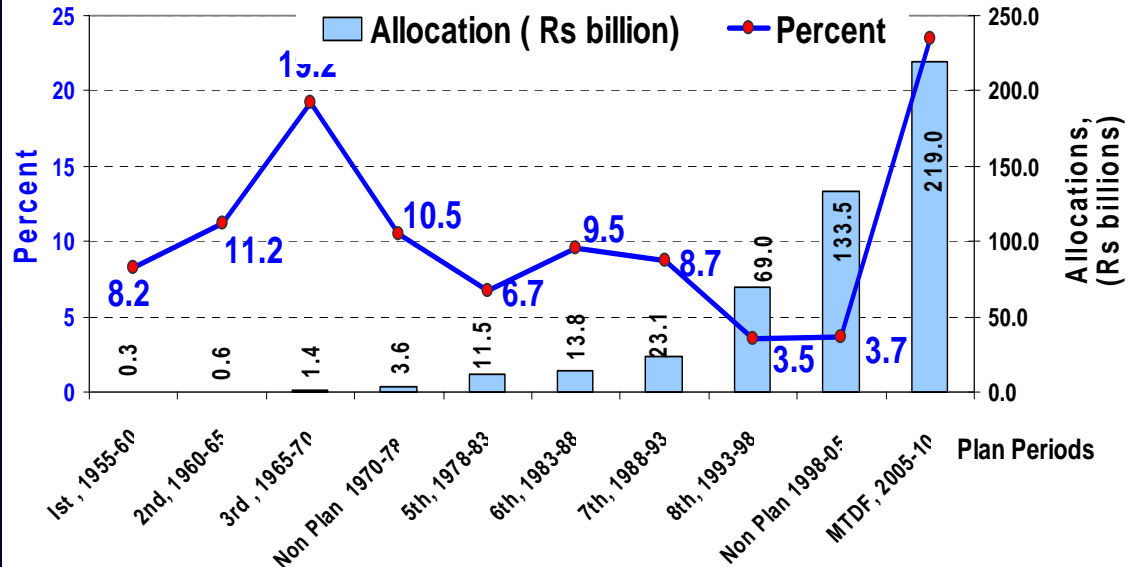
Maintaining the societal infrastructure? Produce more goods, services, food etc etc ?

OR



[Ref: EFA Global Monitoring Report, 2003-04, except Pakistan (Min. of Edu. 2006)]

Share of Technical Education as Percent of Total Allocation for Education





Many More Benchmarks for Pakistan

Some Current Nodes of Excellence in ICT

Sao Paolo	.....	eBanking
Moscow	.....	Pattern recognition,
Beijing	.....	Speech recognition,
Helsinki/Stockholm	.....	Mobile communications,
Seoul	.....	LCDs,
Tokyo	.....	High density DVDs,
Taiwan	.....	Organic LCDs,
Boston	.....	Gene diagnostics/distr. storage systems,
Austin	.....	Optical networks....

**What innovations and centres of excellence
will Pakistan be noted for in 2030?**

Unplanned pathways: S&T as change agent

Energy for Growth: Key National Agenda

Availability, Affordability, Sustainability

- **Low** confidence in market mechanisms
- **Key Considerations:**
 - Energy Efficiency / Conservation : (T&D), Devices
 - Environmentally friendly
 - **State** Intervention:
 - Diversify the energy mix
 - Reduce imports
 - Explore & acquire resources
 - Help build structures for cooperation

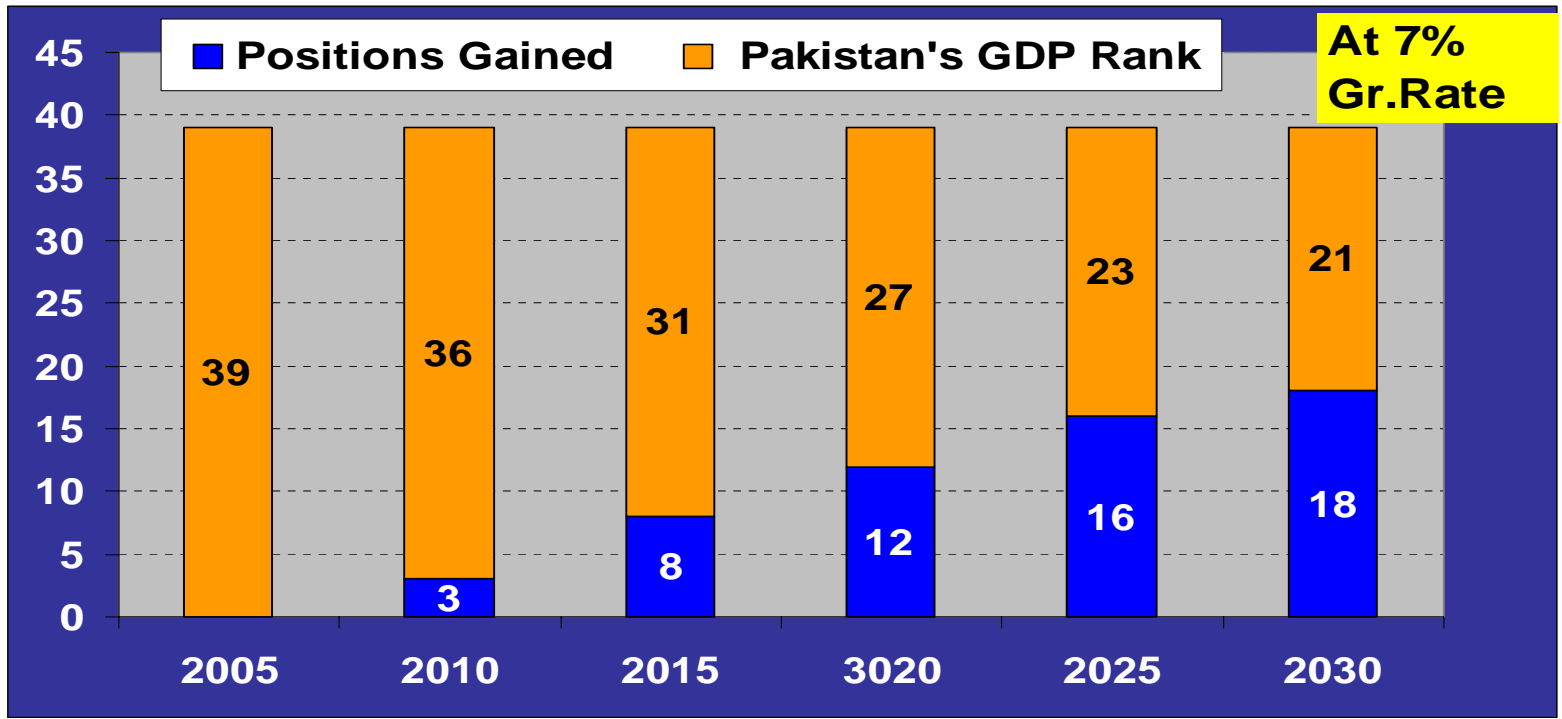
Fossil fuels : Prime source for the foreseeable future



- **Total Primary Energy** = 56 MTOE in 2006
360 MTOE by 2030
- **Power Generation** : from 19,540 MW to 162,590 MW
- **Ratio (primary commercial energy growth rate) : (GDP growth rate)**
1980 - 2005 :: 0.97
2001 - 2006 :: 1.02
- **Projected energy growth** : **7.2 % p.a. up to 2010**
8.8 % thereafter
(infrastructure, HRD)
- **Major Shift Planned**: coal, nuclear, and renewables



Pakistan's Projected GDP Rankings, 2005 – 30



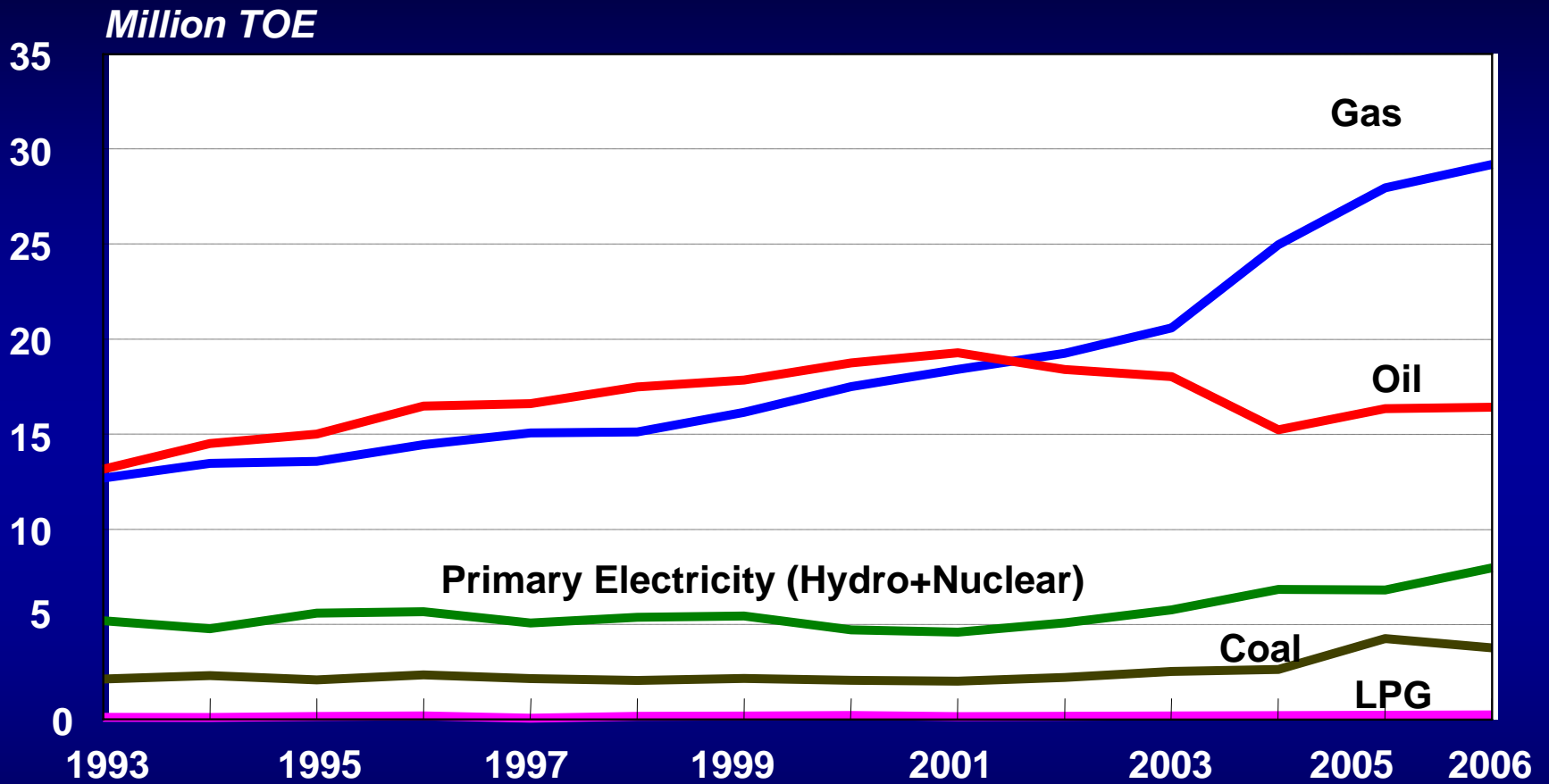
Ease of Doing Business	
Brazil	122
Russia	106
India	120
China	83
Pakista	76

Avg. GDP Gr. Rate %	Economy Size	
	Rank	PPP adjusted
7.0	21	11
5.0	26	14

[Ref: World Bank, Doing Business 2008]



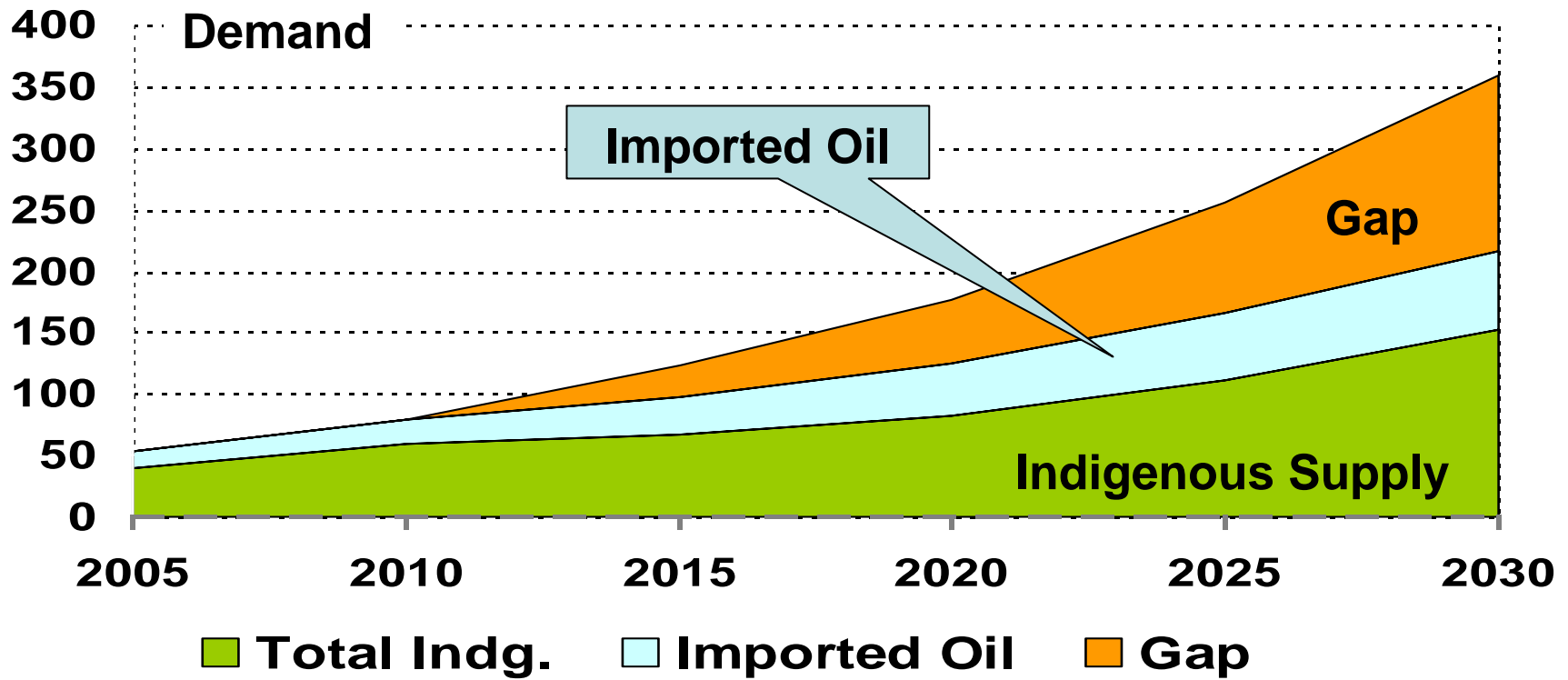
ENERGY SUPPLY MIX, 1993-2006 (MTOE)



Fiscal years ending 30th June



ENERGY GAP, MTOE



	MTOE					
	2005	2010	2015	2020	2025	2030
INDIGENOUS SUPPLIES	39.38	59.94	66.70	81.85	110.43	153.79
IMPORTED OIL	14.66	18.80	30.33	43.27	55.73	63.55
IMPORTED COAL	1.00	2.00	2.00	2.00	2.00	2.00
GRAND TOTAL	54.04	80.74	99.03	127.12	168.16	219.34
DEMAND	53.78	79.55	122.96	176.63	255.37	361.47
GAP	0.00	0.81	25.93	51.51	89.21	144.13



Indigenous Resource Projections

	On-Shore	Off-Shore	Total
Total Prospective area (sq. km.)	605,978	221,290	827,268
No of wells drilled (57 years)	1,383	13	1,396
Drilling density * (No. of wells / 1000 Sq.Kms)	2.28	.059	1.69

***World Avg. Drilling Density (wells/1000 Sq.Kms): ~10**

Canada ?

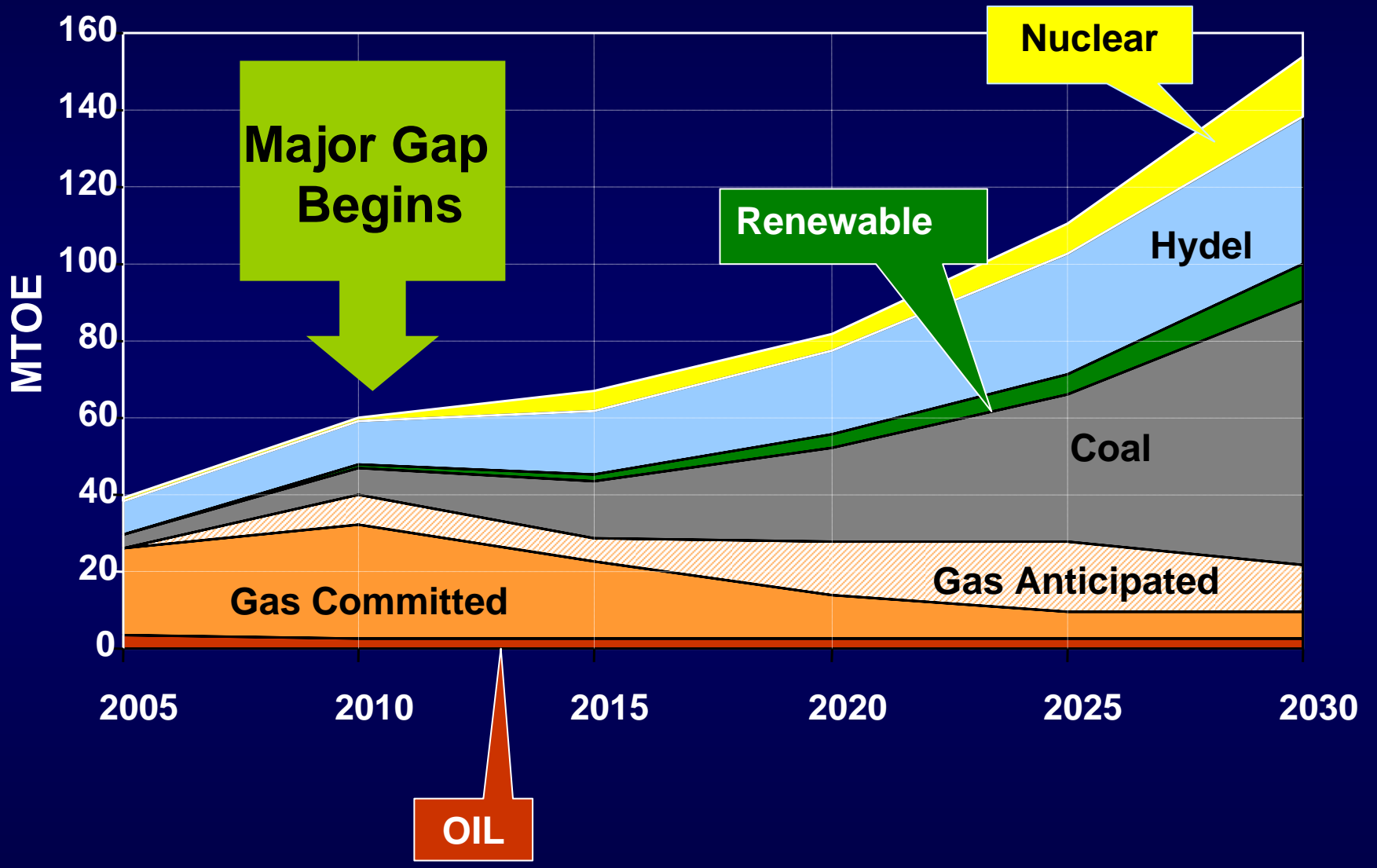


Energy Resource Potential of Pakistan

	Oil , MTOE) (b. barrels)	Natural Gas MTOE (Tr. CFT)	Coal, MTOE (b. tonne)
Resource potential	3,622 (27)	6,849 (282)	82,695 (1850)
Proven recoverable reserves	113 (0.84)	1,023 (51.532)	886 (1.98)
Cumulative production,	72 (0.54)	410 (18.714)	~89 (~0.20)
Remaining recoverable reserves	41 (0.31)	612 (32.819)	797 (1.78)
Annual production	3.2 (66,079 barrel/day)	27.9 (1.345)	2.1 (4.587 m tonne)
Reserves : production ratio	13 years	22 years	~ 400 years



Indigenous Supply Projections





World's Largest Coal Reserves, Billions of Tons

Coal Reserves, Billions of Tons

United States	247	India	93
Pakistan	185	Australia	79
Russia	157	Germany	73
China	115		

Oil Reserves, Billion Barrels

1	Saudi Arabia	264
2	Canada	179
3	Iran	138
4	Iraq	115
5	Kuwait	101

Saudi Arabia + Iran

= 402 B. Barrels of Oil

= Thar Coal Reserves

= 850 TCF of Gas



The Coal Environment

USA: 100 New Coal Plants, 500 MW avg, capacity announced during 2000-04

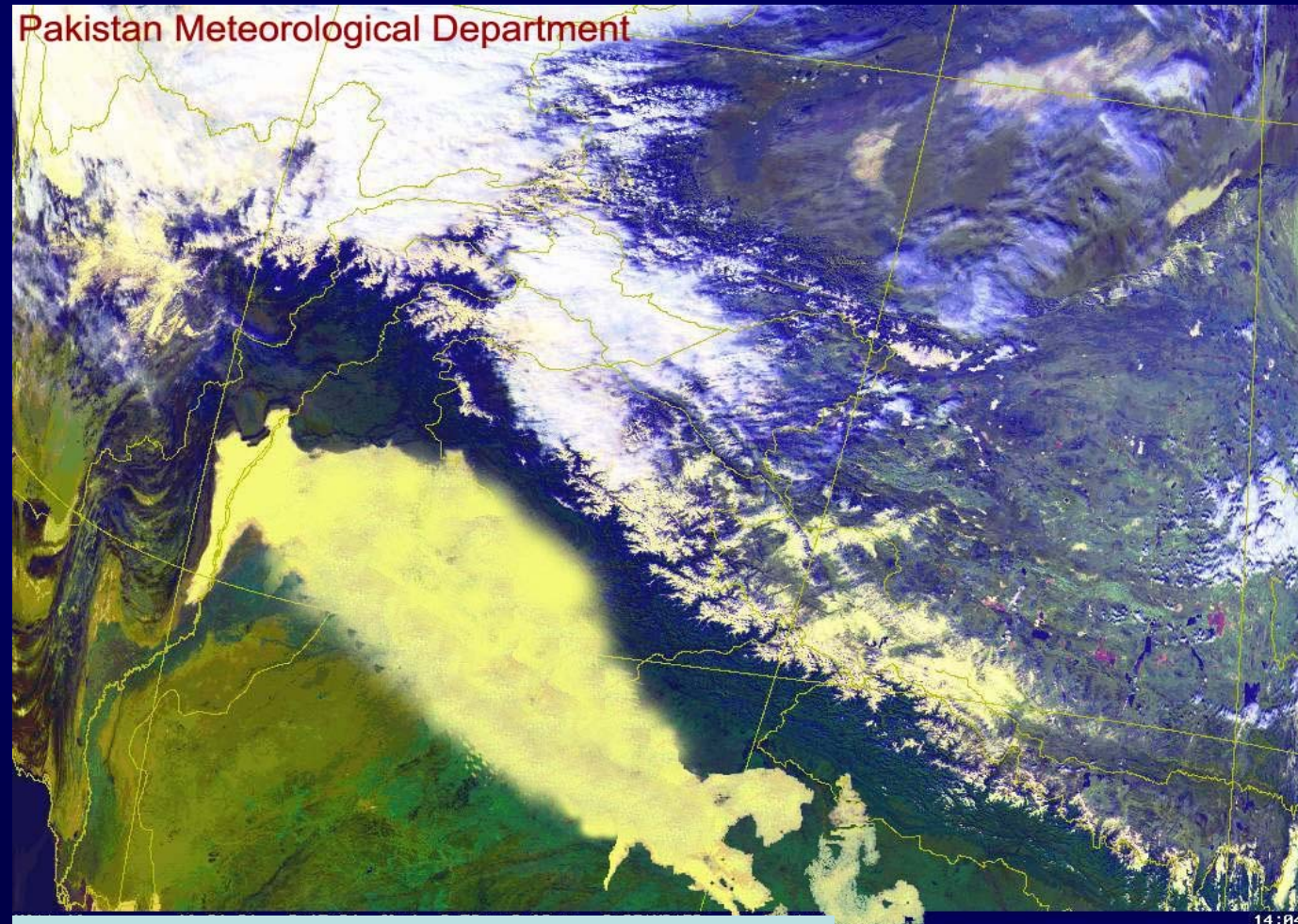
India:

Coal Share:

67% in 2002,

47% in 2032

(~ 4 x absolute)





Renewable Energy Numbers only?

Wind: 43,000 MW possible (Gharo, Mirpur Sakero, Talhar Sindh) Planned (MW): **880** (2010), **3150** (2020), **9700** (2030)

Solar: S. Pakistan; 2,140 KWh /sq m / year
<54,000 remote homes electrified> solar microwind<

Biofuels: Cars to run on at least 2 fuels (gasoline, CNG, ethanol); Biogas plants .

Profitability and Environmental Impact in State of Flux:

- **Fuel** prices, **Feedstock** cost /availability, **Government** regulation, and **Conversion** technologies.
- **SUBSIDIES**
- **NOx** emissions from bio-diesel?



Nuclear Matters

Nuclear	CAPACITY	CUMULATIVE
EXISTING	400	400
ADDITION 2020	2500	2800
ADDITION 2030	6000	8800

* KANUPP retires in 2019

- **Global** : 53 % energy expansion expected by 2030 (IEA 2006)
 - 435 NPPs, 370 GW, 16% of world capacity
- **Expansions** : OECD, USA, Japan, Asia
- **Availability** of uranium: Once through50 Years?
- **Waste, Safety**



Nuclear Concerns

1. Assured Supply vs Proliferation

- More states with NPPs
- Equitable & Accessible to all potential users

3. NPT and the NSG:

- US-Indian Nuclear Agreement? Energy & Weapons
- National & International Laws: Disregard

3. Role of IAEA

- International Cooperation / legal Framework
 - Nuclear Islands
 - Int. Nuclear Fuel Centres / Common Reserves



Energy Mix Plan Projections

Category	Current		Short Term		Med Term		Long Term	
	2004		2010		2020		2030	
	MTOE	%	MTOE	%	MTOE	%	MTOE	%
	50.8	100	79.4	100	177.4	100	361.3	100
Oil	15.2	30	20.7	26	45.5	25.7	66.8	18.5
Natural gas	25.5	50	39.0	49	77.9	44	162.6	45.0
Coal	3.3	6.5	7.2	9	24.8	14.0	68.7	19.0
Hydro	6.4	12.7	11.0	13.9	21.4	12.1	38.9	10.8
Renewable	0.00	0.0	0.8	1.1	3.00	1.7	9.2	2.5
Nuclear	0.4	0.8	0.7	0.9	4.81	2.7	15.1	4.2





Regional Energy Demand Projections

- Growth rate of primary commercial energy:
- **China:** For 2000-2005, the average was 9.96 per cent (slightly higher than the GDP growth rate of 9.5 per cent p.a)
- **India :** ~ 4.5 % p.a projected up to 2032 (Kakodkar, 2004)

Issues:

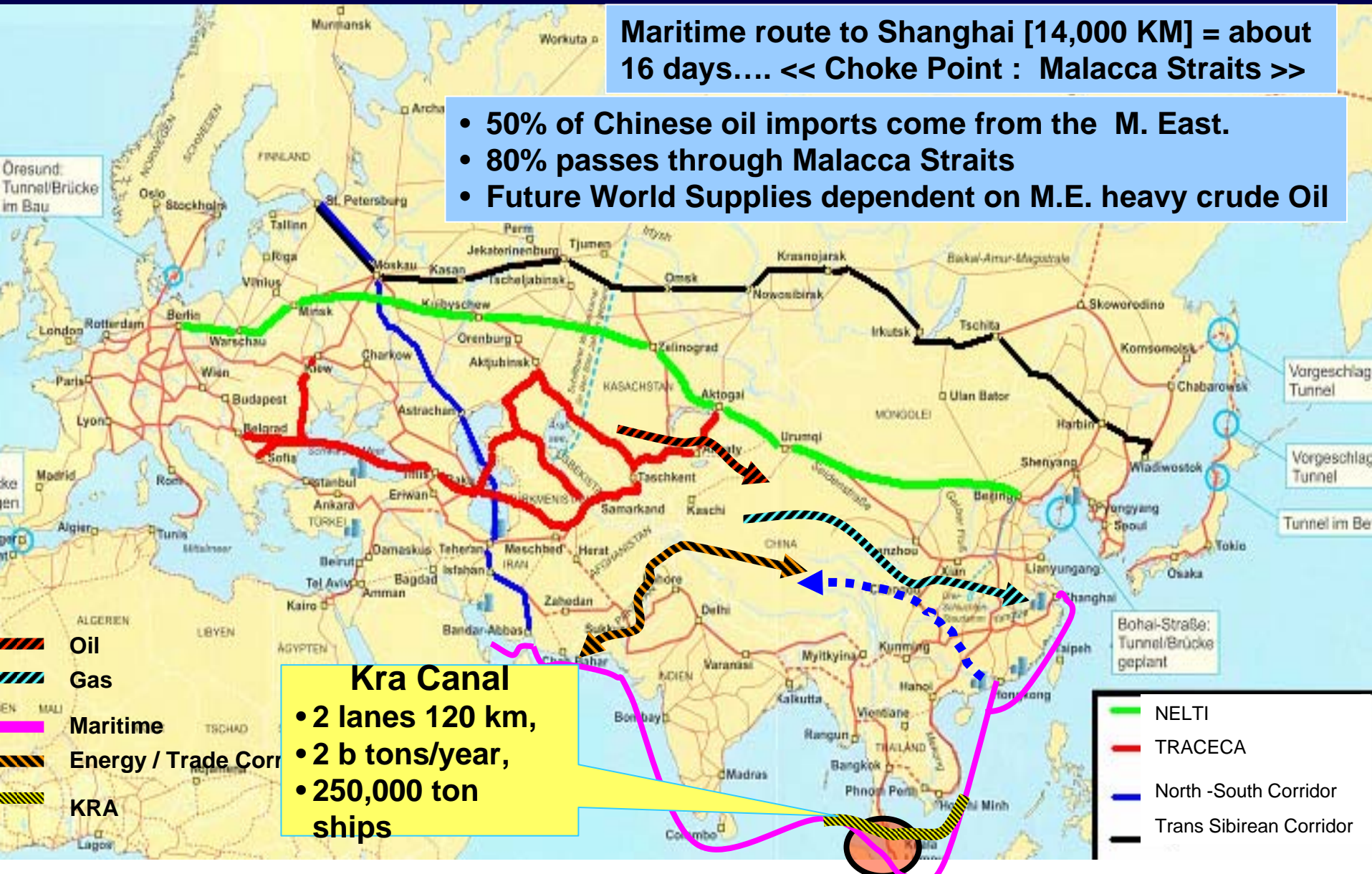
- Greater dependence on fewer suppliers
- Risk of disruptions in transit
- Major investments in both producing and consuming countries



Mitigating Vulnerable Supply Routes

Maritime route to Shanghai [14,000 KM] = about 16 days.... << Choke Point : Malacca Straits >>

- 50% of Chinese oil imports come from the M. East.
- 80% passes through Malacca Straits
- Future World Supplies dependent on M.E. heavy crude Oil



Kra Canal

- 2 lanes 120 km,
- 2 b tons/year,
- 250,000 ton ships

- NEITI
- TRACECA
- North -South Corridor
- Trans Sibirean Corridor

- Oil
- Gas
- Maritime
- Energy / Trade Corridor
- KRA

Vorgeschlag Tunnel

Vorgeschlag Tunnel

Tunnel im Be

Bohai-Strasse: Tunnel/Brücke geplant

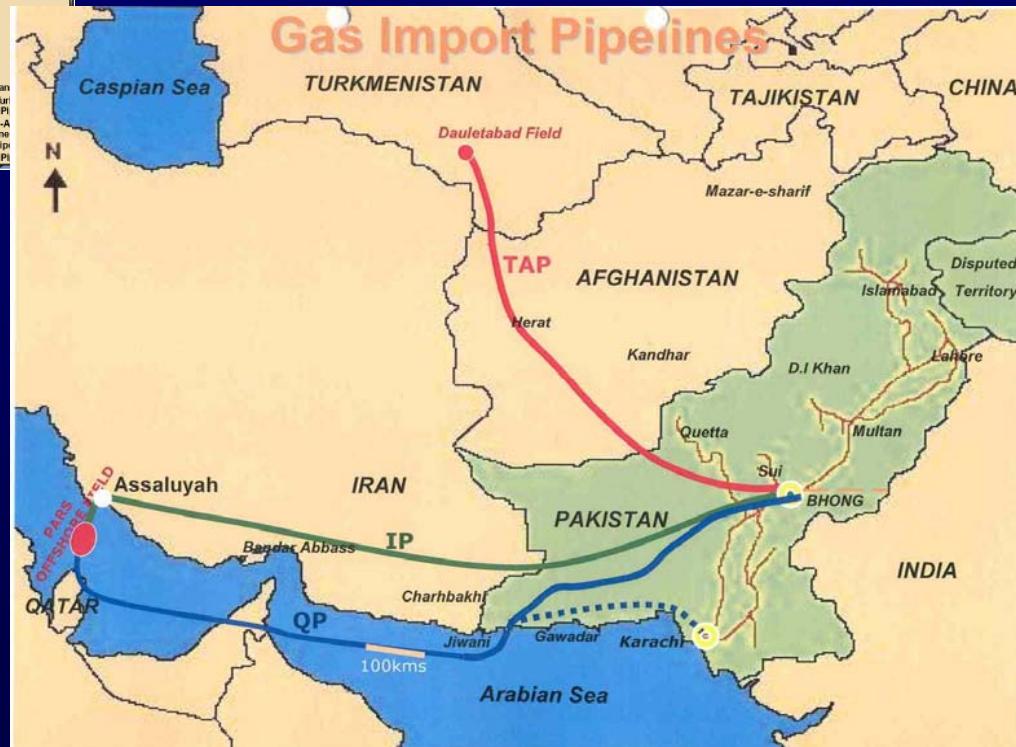


Gas Projects, Pakistan as Energy Hub

PAKISTAN: ASIA'S EMERGING ENERGY HUB



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Thank You