

WEC Cleaner Fossil Fuels Systems Roundtable
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Policies for Promoting Private Investment
in Fossil Fuels Development :
Lessons from the Case of Pakistan

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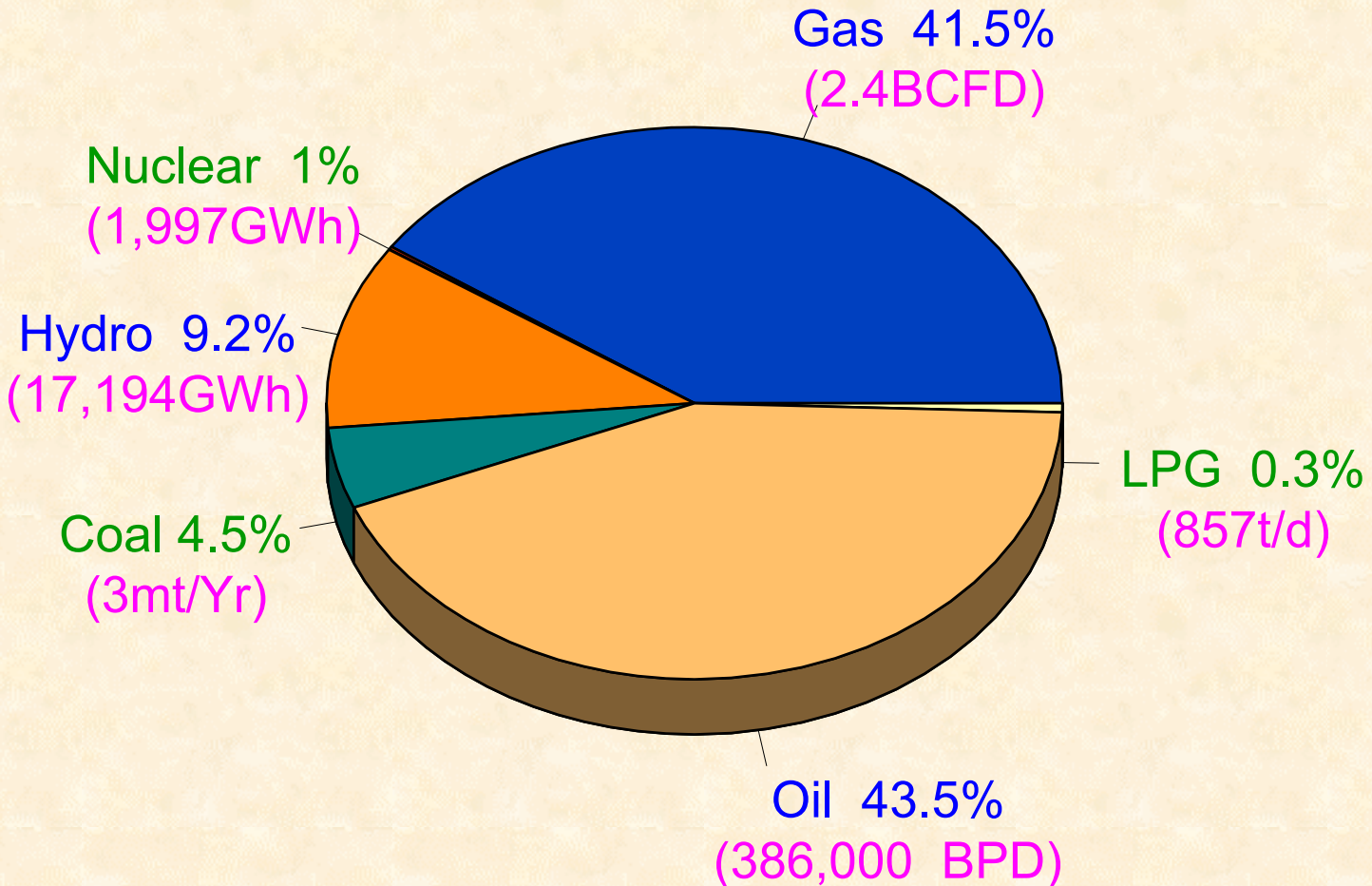
Focus of Discussion

- 1. Energy Situation**
- 2. Upstream Policies**
- 3. Deregulation, Governance and Investments**
- 4. Gas Import Pipelines**
- 5. Coal Utilization**
- 6. Energy Road Map**

Energy Situation

Pakistan Primary Energy Supplies 2000-01

44.5 Million TOE



Towards Cleaner Energy Mix

(% Share By Source)

	1998	1999	2000	2001	ACGR
Oil	43.5	42.7	43.4	43.5	3.4%
Gas	38.0	39.1	41.0	41.7	6.8%
Coal	5.1	5.1	4.7	4.5	-0.6
Hydro	13.1	12.8	10.7	9.2	-8.0
Nuclear	0.2	0.2	0.2	1.1	74.6
Total	100%	100%	100%	100%	

Hydrocarbons Demand & Production

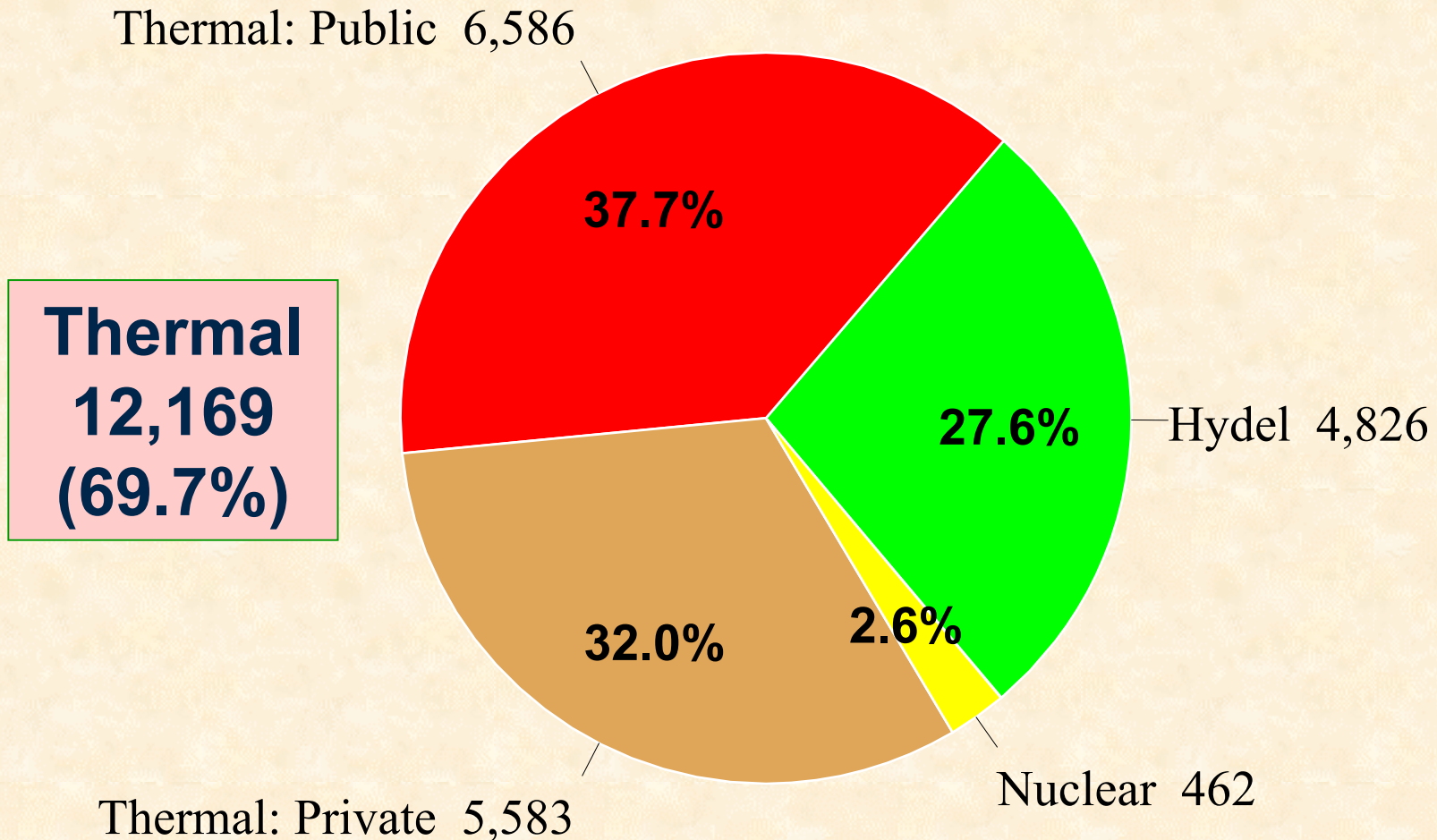
	<u>Demand</u>	<u>Production</u>	<u>Deficit</u>
Oil (b/d)	386,000	58,000	328,000(85%) Imports
Gas (bcf/d)	2.9	2.4	0.5(17%) Unsatisfied demand
LPG (t/d)	1,200	857	343(29%) Unsatisfied demand

Oil Deficit and Import Bill

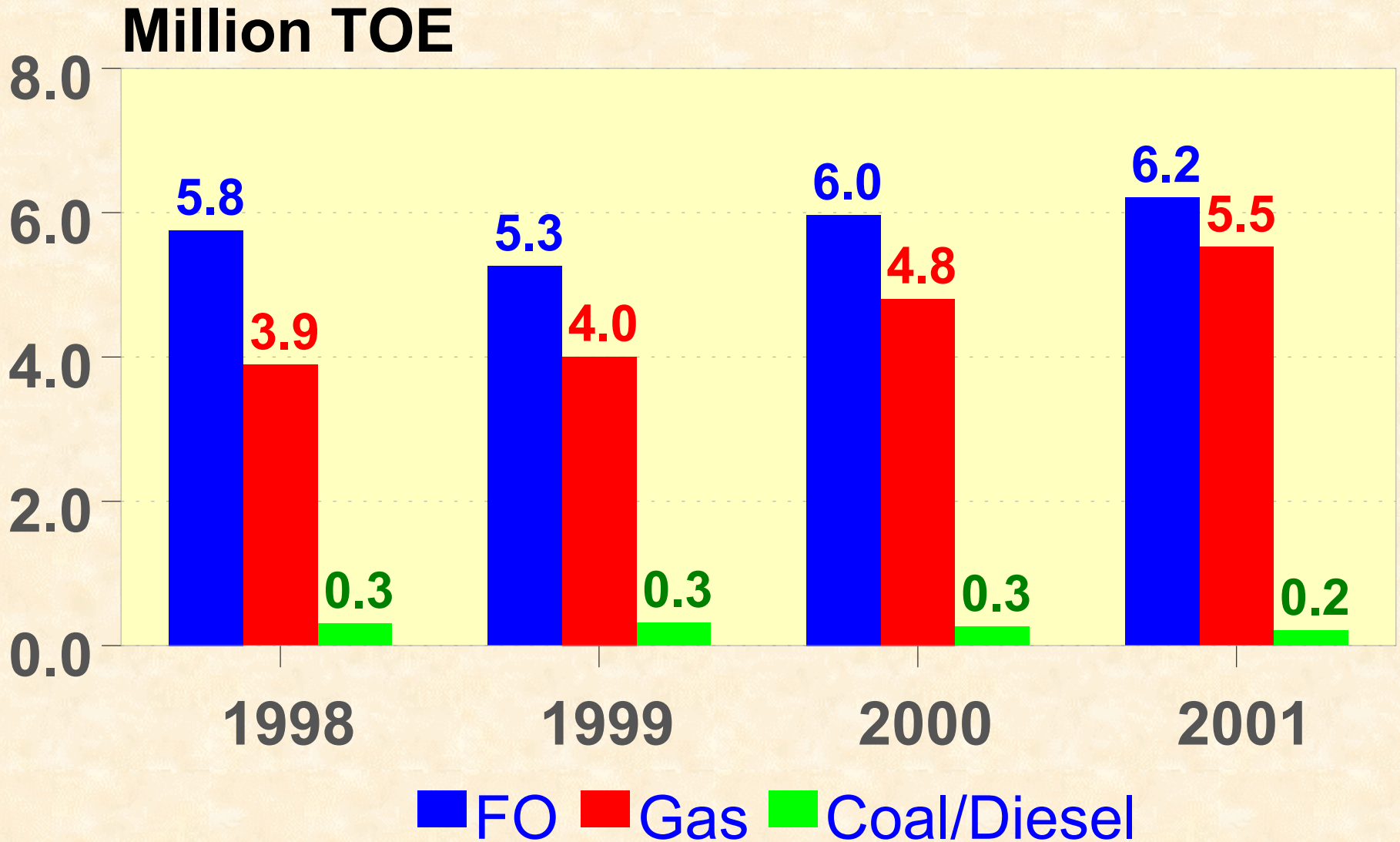
	<u>Quantity</u>	<u>Value</u>
	(mt/y)	(m \$)
Demand	19.0	
Supply		
Locally Refined Products	8.7	
Imported Crude Oil	7.0	1,362
Imported Products	10.0	1,964
Annual Import Bill		3,326

Pakistan Electricity Generation Capacities 2000-01

Total: 17,458 MW



Fossil Fuels Consumed in Power Generation



Fossil Fuels Consumed in Power Generation

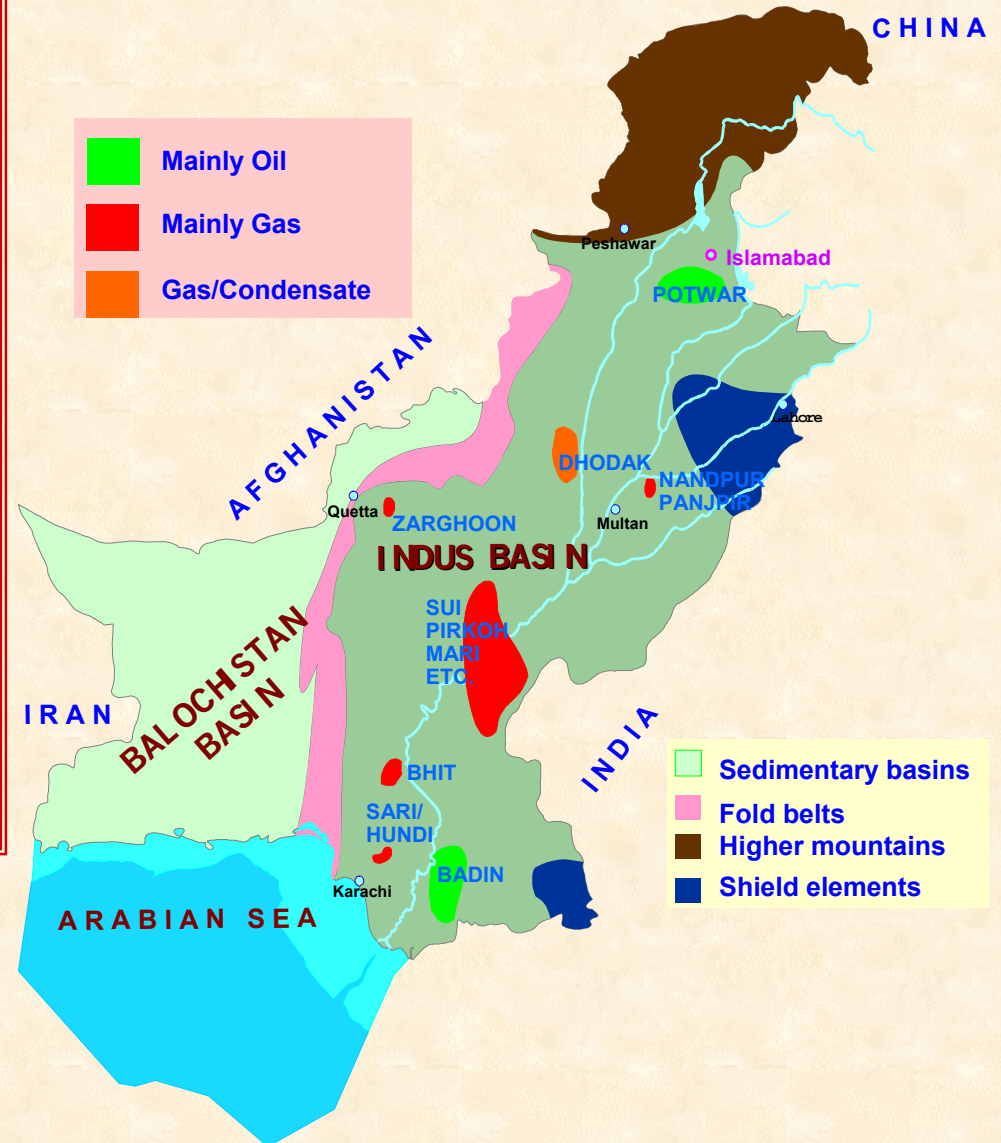
(% shares)

	1998	1999	2000	2001	<i>ACGR</i>
Coal	1.6	1.9	1.4	0.8	-15.9
Diesel Oil	1.5	1.4	1.0	1.0	-7.8
FO	57.8	54.9	54.1	52.0	2.6
N. Gas	39.1	41.8	43.6	46.2	12.4
Total	100%	100%	100%	100%	

Upstream Policies

Exploration of Oil & Gas

First exploration well	1866
First oil discovery	1915
Total exploratory wells drilled	526
Total discoveries	142
Success rate	1 : 3.7
Sedimentary basin area	827,268 sq km



Oil & Gas Reserves of Pakistan

	<u>Oil</u> (<u>Million</u> <u>barrels</u>)	<u>Natural Gas*</u> (<u>Trillion</u> <u>cubic feet</u>)
Discovered	737	38
Produced	441	14
Remaining	296	24

* Including Associated Gas

Oil & Gas Exploration: 1991 - 2000

Country	Discoveries/ Wells	CSR [%]	Govt.Take [%]	Avg. Costs [\$/boe]
Pakistan	42/156	27	45	2.77
Thailand	24/92	26	51	5.85
Bangladesh	3/13	23	61	2.31
Malaysia	83/184	18	81	2.73
Indonesia	98/628	16	68	4.02
Myanmar	4/35	11	54	3.47
Off. China	11/108	10	43	4.78
Vietnam	9/109	8	69	3.15

E&P Policies in Pakistan

- **Continued thrust on improvement of policy terms.**
- **Production sharing contracts in offshore with incentives based on water depths.**
- **Income tax rate reduction for onshore exploration to 40% from 50 - 55%.**
- **Exploration zones redefined particularly in difficult areas.**
- **Pipeline tariff admissible to gas producers.**

Deregulation, Governance and Investments

Liberalized Oil & Gas Sector

- **Shift from cost-plus to competitive regime.**
- **Deregulation of petroleum imports and oil & gas prices, discontinuation of the freight pool, increase in margins of marketing companies and retailers.**

Governance

- **Government functions of Policy, Regulation and Investment separated.**
- **Public sector companies given full autonomy in preparation for privatization.**
- **Interference of the Government minimized.**

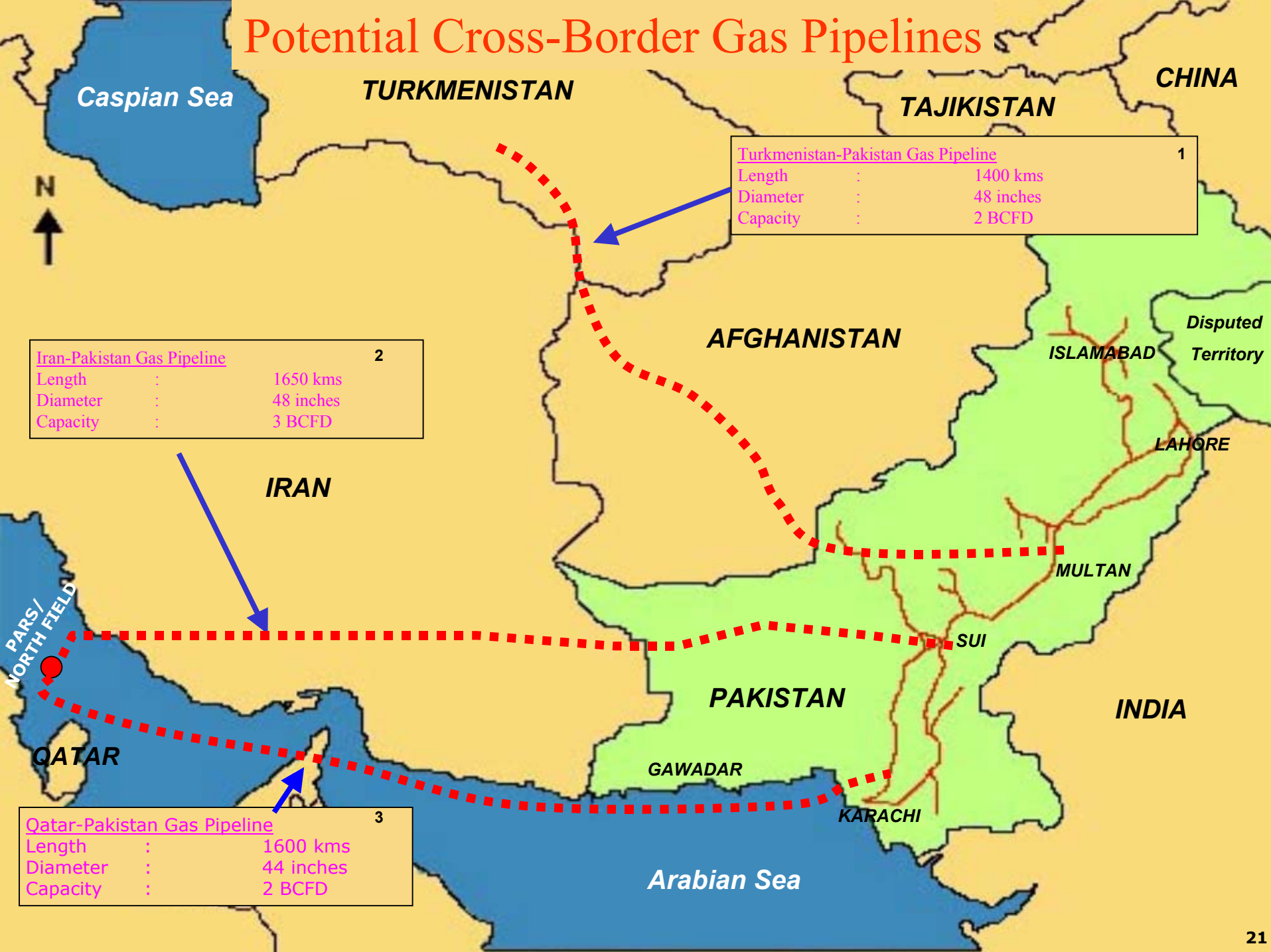
Investments Committed

As a result of these policy initiatives, an investment of more than US\$ 1.1 billion has been committed during 2000 & 2001 which includes:

	<u>US\$ Million</u>
• Exploration	73
• Gas Fields Development	505
• Oil Pipelines	278
• CNG	150
• Oil Marketing	55
•	
Total:	1,128

Gas Import Pipelines

Potential Cross-Border Gas Pipelines



Turkmenistan-Pakistan Gas Pipeline 1

Length	:	1400 kms
Diameter	:	48 inches
Capacity	:	2 BCFD

Iran-Pakistan Gas Pipeline 2

Length	:	1650 kms
Diameter	:	48 inches
Capacity	:	3 BCFD

Qatar-Pakistan Gas Pipeline 3

Length	:	1600 kms
Diameter	:	44 inches
Capacity	:	2 BCFD

Benefits of Gas Import

- **Substitution of more expensive imported liquid fuels with consequent improvement in balance of payment.**
- **Relief to the hard-pressed infrastructure of ports, roads and railways used in movement of imported liquid petroleum.**
- **Shift towards gas-driven environment friendly energy economies.**
- **Reduction in the cost of electricity generation.**

Coal Utilization

Utilization of Coal

- **Vast coal resources:**

Resource of 185 billion tonnes out of which 4,350 million tonnes are proven reserves.

- **Vision:**

Share of coal in energy mix at to be enhanced from present 4.5% to 20%.

- **Long Term Measures:**

- **Secure private investment for exploitation of Thar. Promote other coal fields for early development.**

- **Feasibility studies to establish coal based thermal power plants.**

(Contd..)

Utilization of Coal

- **Immediate Measures:**
 - **Conversion of cement/processing industry on coal through policy incentives**
 - **Study utilization of coal for town gas**
 - **Promote use of coal brickettes**
 - **Study in-situ gasification of Thar coal fields**
 - **Preparation of mining feasibility study on Thar coal**
 - **Provincial Government to develop infrastructure in coal fields**

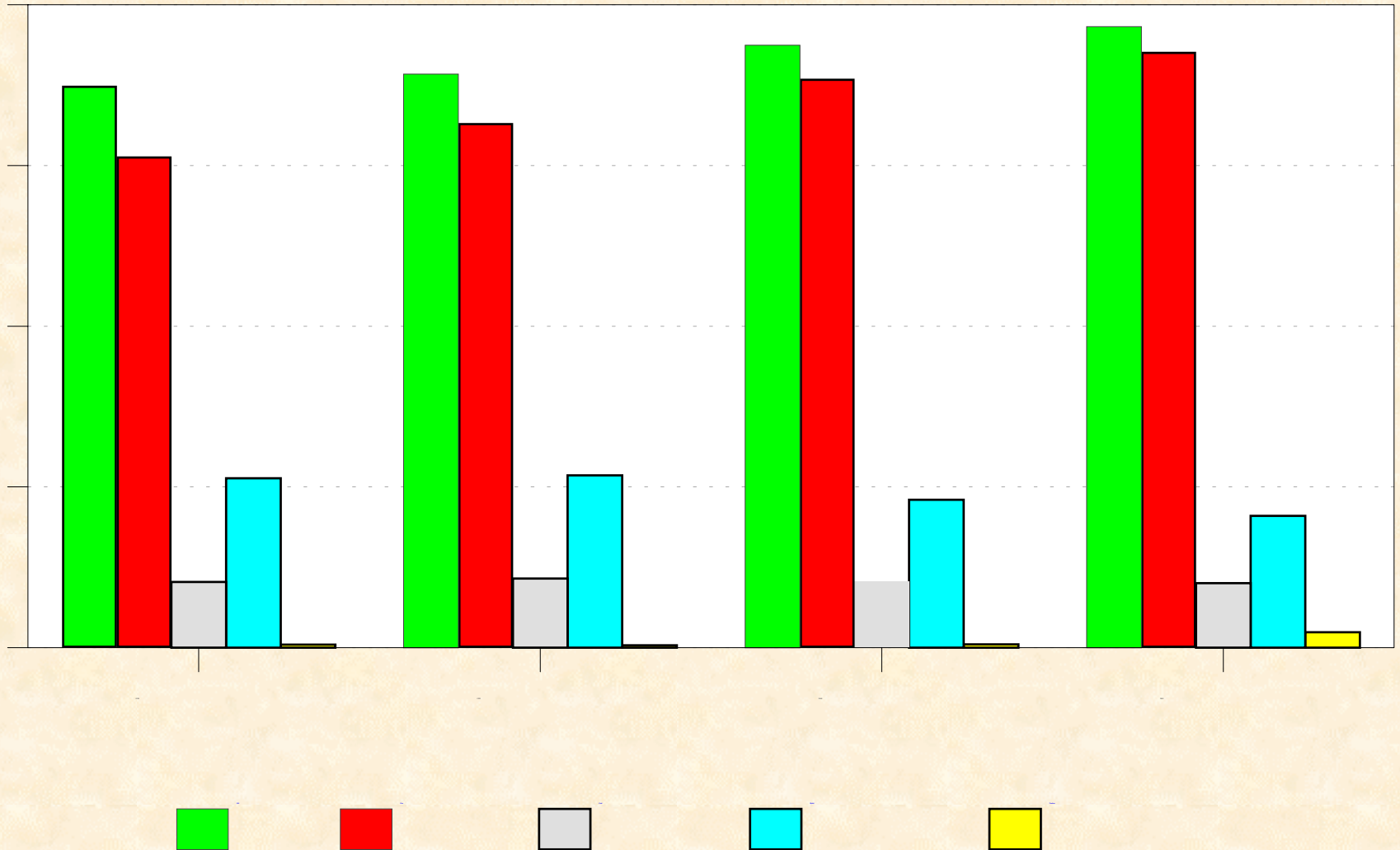
Energy Road Map

Pakistan Energy Road Map

- **Accelerate domestic exploration**
- **Promote market driven energy economy**
- **Ensure security of supplies at minimum cost**
- **Substitute liquid fuels with natural gas**
- **Increase share of domestic coal in energy mix by developing and adopting clean coal technologies**

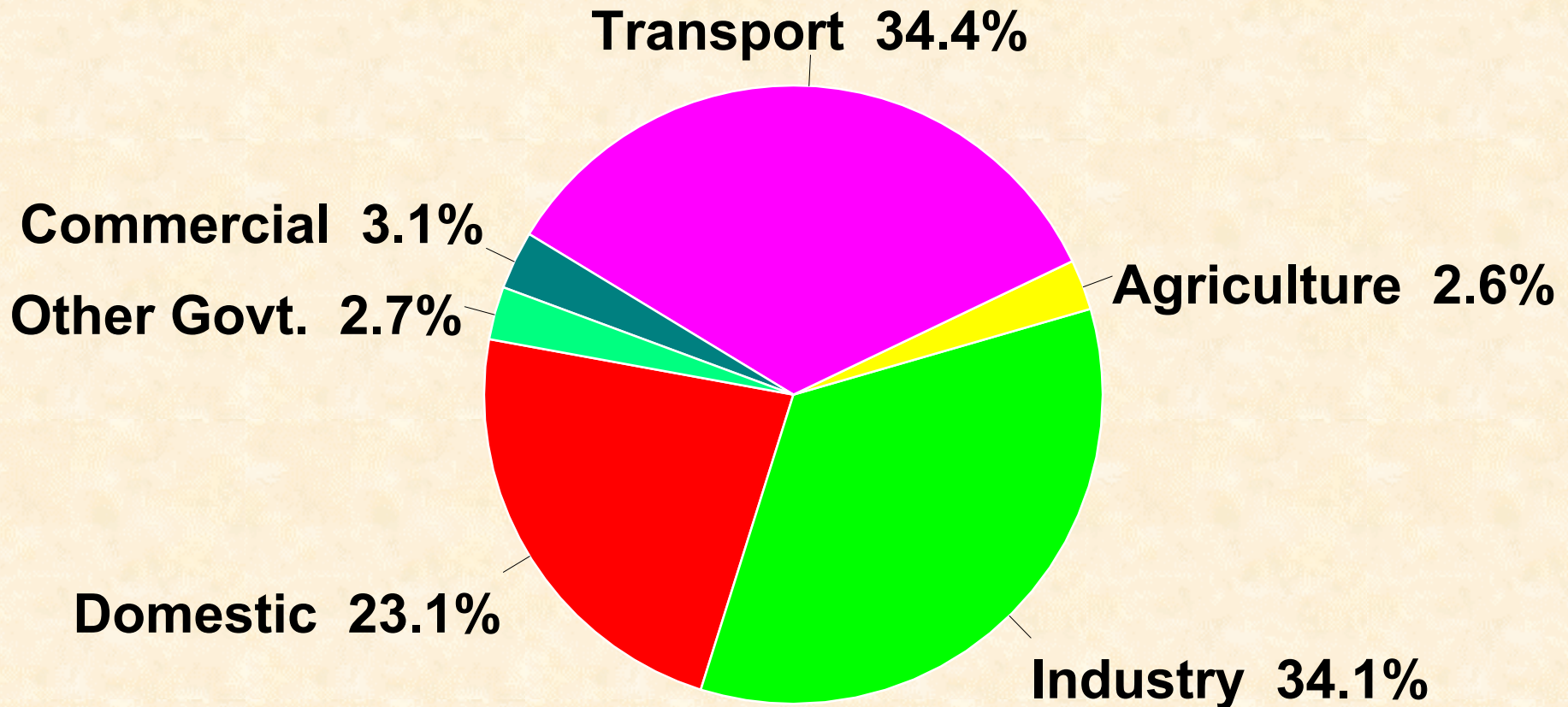
Support Slides

Pakistan Energy Mix By Source

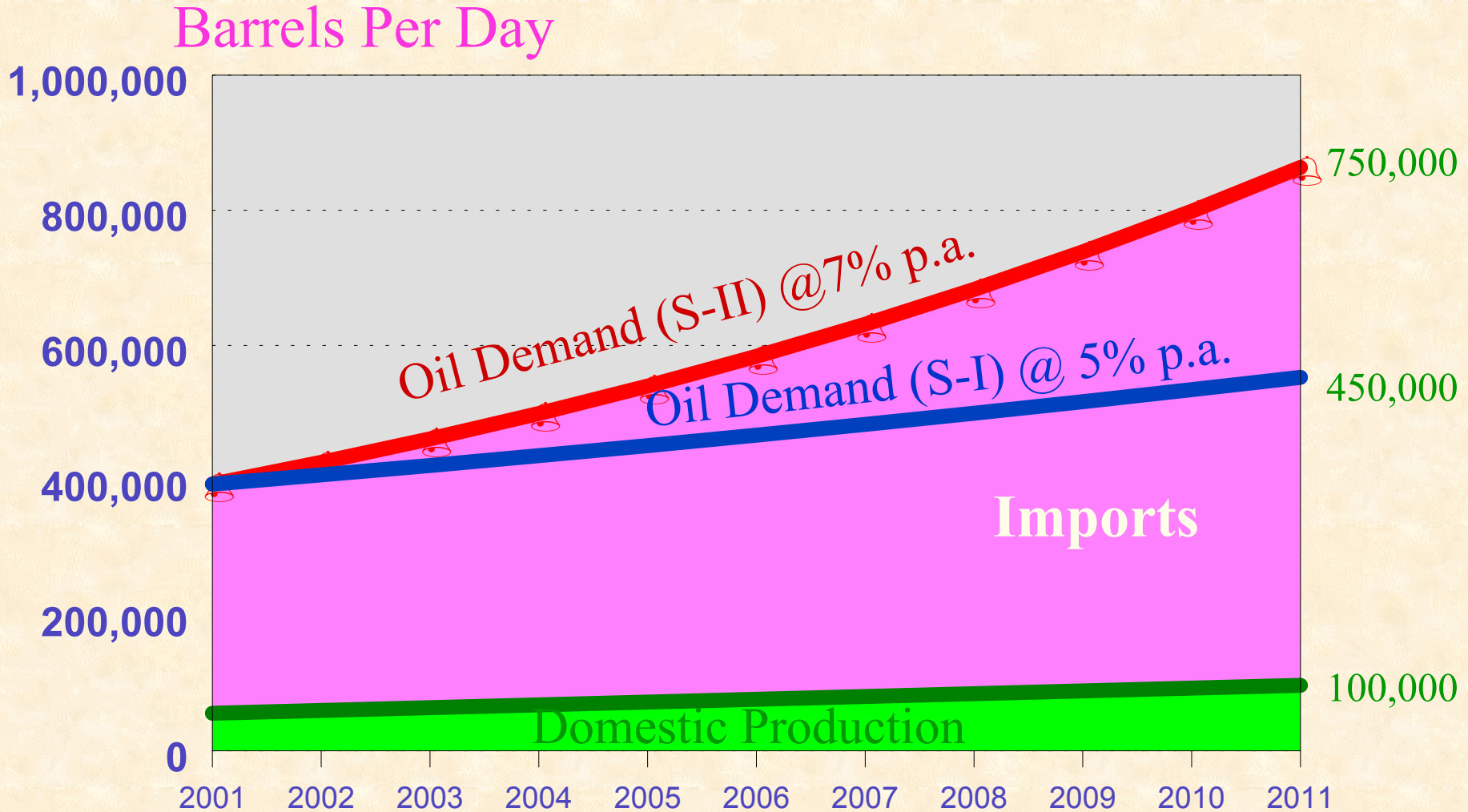


Pakistan Sectoral Energy Consumption 2000-01

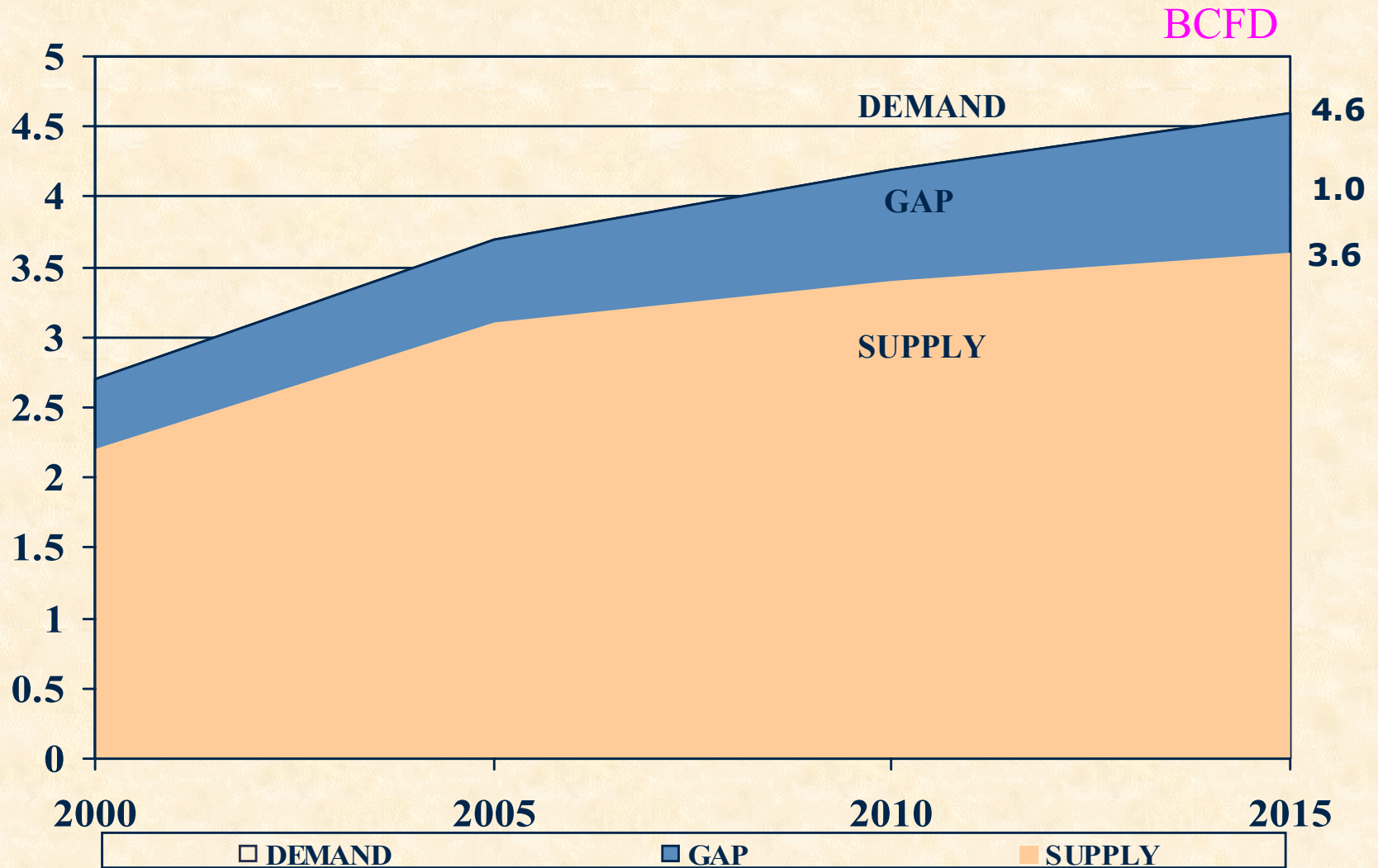
Total: 25.3 Million TOE



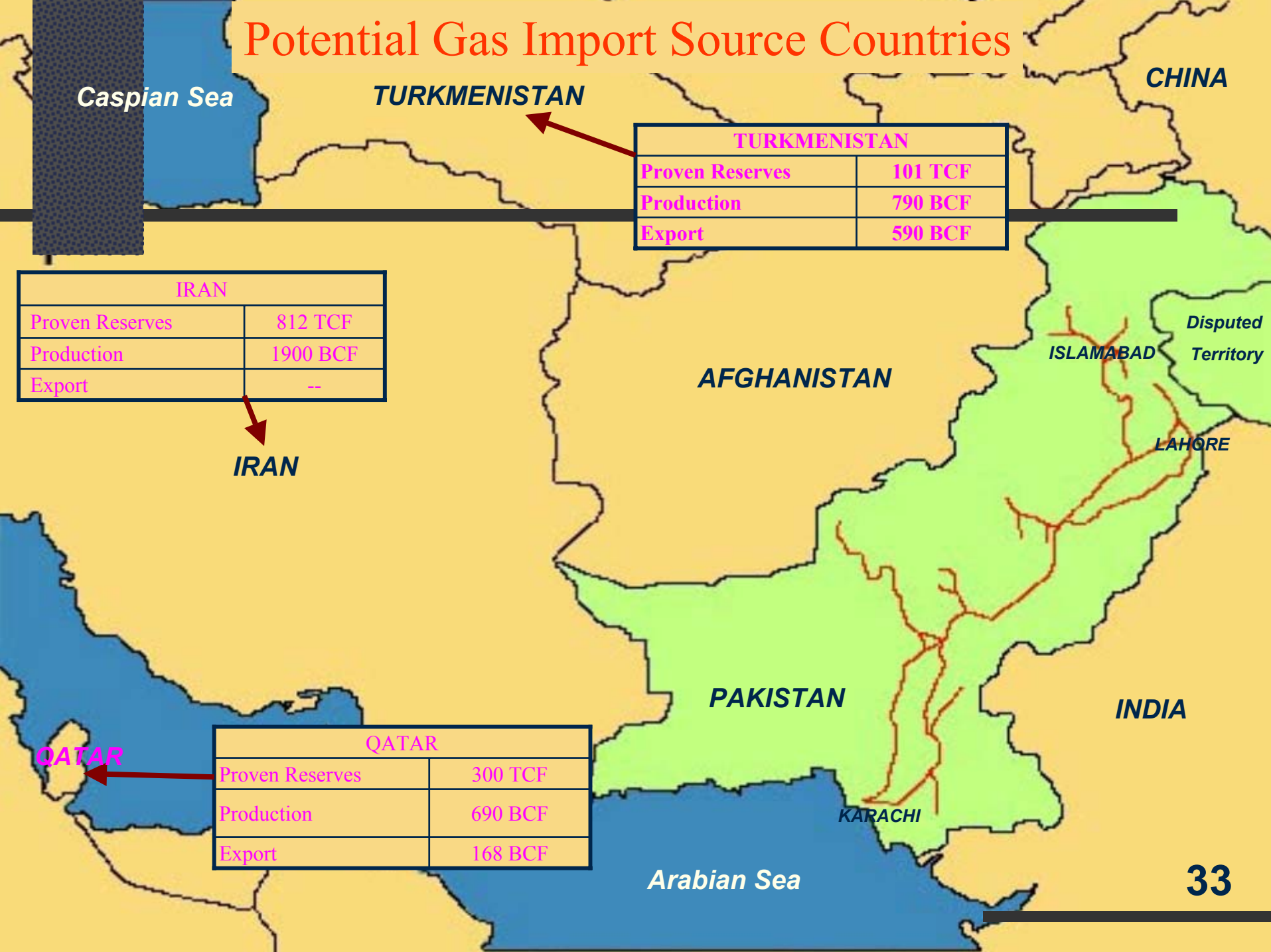
Oil Demand Projections and Domestic Production



Gas Supply and Demand Projections



Potential Gas Import Source Countries



TURKMENISTAN	
Proven Reserves	101 TCF
Production	790 BCF
Export	590 BCF

IRAN	
Proven Reserves	812 TCF
Production	1900 BCF
Export	--

QATAR	
Proven Reserves	300 TCF
Production	690 BCF
Export	168 BCF

Oil Refining Capacities

	<u>Existing</u>	<i>(Million Tonnes per Year)</i>	
		<u>Under Installation</u>	
ARL	1.66	Bosicor	1.2
PRL	2.20		
NRL	2.80		
Dhodak	0.12		
PARCO	4.50		
		<u>Proposed</u>	
		Iran Pak	6.0
Total:	<hr/> <u>11.28</u> <hr/>		

Pakistan Natural Gas Network

	(Km)		
	Northern <u>System</u>	Southern <u>System</u>	<u>Total</u>
Transmission Lines	5,000	3,000	8,000
Distribution & Service Lines	32,000	21,000	53,000
No. of Consumers (million)	2.0	1.6	3.6
Final Gas Consumed 2000-01 (MMCFD)	984	1020	2,004

Oil Imports and Prices

FO : Import and prices deregulated
effective 1.7.2000

LPG : Prices and allocation deregulated
effective 15.9.2000

HSD : Imports deregulated:
75% effective 1.1.2001
25% effective 1.4.2001

Natural Gas Producer Price

Actual Oil Price
Bands (\$/bbl)

Effective Oil Price Per Barrel for
Calculating Gas Price According
to Policy Formula

< 10.00

\$ 10.00 Floor Price

10.00 – 15.00

\$ 10.00 – 15.00

15.01 – 20.00

\$ 15.00 +
50% of fraction exceeding \$ 15.00

20.01 – 25.00

\$ 17.50 +
30% of fraction exceeding \$ 20.00

> 25.00

\$ 19.00 +
20% of fraction exceeding \$ 25.00

Natural Gas Consumer Prices

- Consumer Price will be equal to:
 - = Well head price + T&D cost
 - + Taxation + Profit
- Basis of Price will be the cost of service.
- No cross-subsidies will be provided and subsidies will be withdrawn in phases
 - Domestic sector subsidy to be withdrawn in 3-years
 - Fertilizer feedstock subsidy withdrawal under consideration

Privatization

- Disinvest GOP / public sector shareholding in discovered fields and companies.
- Privatize
 - PPL
 - OGDCL
 - PSO
 - NRL

Investment Required: Oil Pipelines

Pakistan encourages investment in oil pipeline projects.

- Construction of 843 km White Oil Pipeline (Karachi-Multan).
- Network of upcountry pipelines

Investment Required: Petroleum Storage

Present petroleum storage and handling capacity 2 million tonnes

National requirement 3 million tonnes

Pakistan seeks investments in oil terminals and handling facilities for additional 1 million tonnes

Gas Imports

- Gas Imports: Replacement of imported oil with imported gas will increase energy security both in terms of security of supply as well as security of price.
- The recent proposal from Qatar to bring gas exclusively to Pakistan, as well as the Iranian proposal which considers India as an essential component, could be considered.

Fossil Fuels Consumed in Power Generation

