Competition in India's Energy Sector

Final Report
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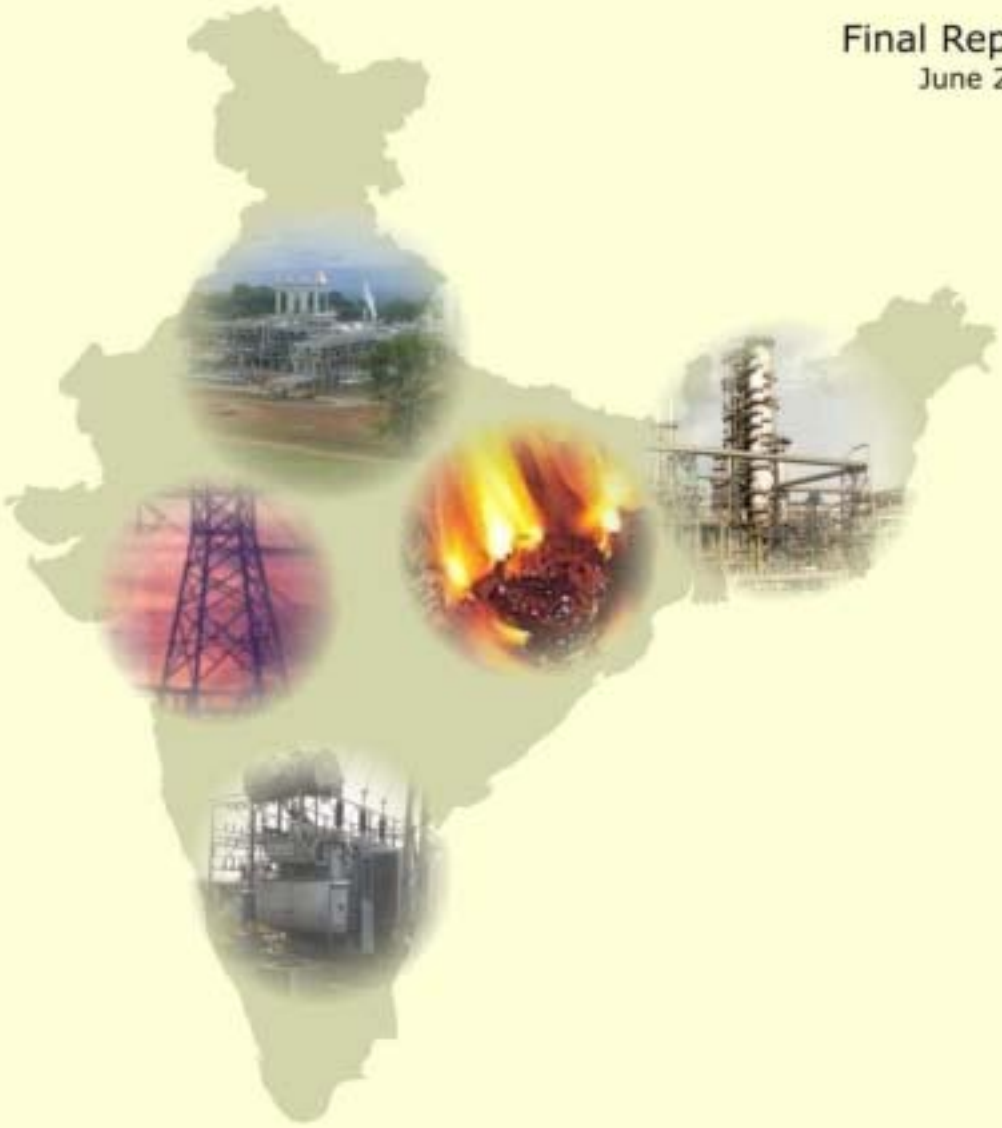

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Abbreviations

AC	Alternating Current
AEC	Ahmedabad Electricity Company
APERC	Andhra Pradesh Electricity Regulatory Commission
APM	Administered Pricing Mechanism
APTRANSCO	Andhra Pradesh Transmission Company
AREP	Accelerated Rural Electrification Programme
ARR	Annual Revenue Requirement
AT&C	Aggregate Technical and Commercial
ATF	Aviation Turbine Fuel
BCCL	Bharat Coking Coal ltd.
BCM	Billion Cubic Meters
BEC	Bid Evaluation Criteria
BETTA	The British Electricity Transmission Trading Arrangements
BPCL	Bharat Petroleum Corporation Limited
BPL	Below Poverty Line
BSES	Bombay Sub-urban Electric Supply
BU	Billion Units
CAGR	Compound Annual Growth Rate
CBAADA	Coal Bearing Areas (Acquisition and Development) Act 1957
CCI	Competition Commission of India
CCL	Central Coalfields Limited
CEA	Central Electricity Authority
CEB	Ceylon Electricity Board
CEGB	Central Electricity Generating Board
CEIL	Cairn Energy India Limited
CERC	Central Electricity Regulatory Commission
CESC	Calcutta Electric Supply Company
CGD	City Gas Distribution
CGS	Central Sector Generating Stations
CIL	Coal India Ltd.
CMPDIL	Central Mine Planning and Design Institute

COS	Cost of Supply
CTU	Central Transmission Utility
DC	Direct Current
DGH	Directorate General of Hydrocarbons
DGMS	Director General Mines Safety
DISCOMS	Distribution Companies
EA 2003	Electricity Act 2003
ECL	Eastern Coalfields Limited
EHT	Extra High Voltage
EP	Energy Policy
E&P	Exploration and Production
EIA	Environmental Impact Assessment
ERCs	Electricity Regulatory Commissions
EU	European Union
FPC	Fuel Policy Committee
FDI	Foreign Direct Investment
FIPB	Foreign Investment Promotion Board
FERC	Federal Electricity Regulatory Commission
FSA	Fuel Supply Agreement
GAIL	Gas Authority of India Limited
GIG	Gas Industry Group
GoI	Government of India
GRIDCO	Grid Corporation of Orissa
GSPC	Gujarat State Petroleum Corporation
HDI	Human Development Index
HEP	Hydro Electric Policy
HHI	Hirschman Herfindahl Index
HINDALCO	Hindustan Aluminium Company
HPCL	Hindustan Petroleum Corporation Limited
HSD	High Speed Diesel
HT	High Tension
HVDS	High Voltage Distribution System
IEA	International Energy Agency
IOCL	Indian Oil Corporation Limited
IM	Investment Multiple

IPPs	Independent Power Producers
ISO	Independent System Operators
JSEB	Jharkhand State Electricity Board
JSERC	Jharkhand State Electricity Regulatory Commission
JV	Joint Venture
KG	Krishna Godavari
kWh	Kilo Watt Hour
LDCs	Local Distribution Companies
LPG	Liquefied Petroleum Gas
LT	Low Tension
MCL	Mahanadi Coalfields Limited
MCR	Mineral Concession Rules
MEP	Ministry of Energy and Petroleum
ML	Mining Lease
MMRDA	Mines and Minerals (Regulation and Development) Act 1957
MMSCMD	Million Metric Standard Cubic Meter per Day
MMT	Million Metric Tonnes
MMTPA	Million Tonnes Per Annum
MNES	Ministry of Non Conventional Energy Sources
MNP	Minimum Needs Programme
MoA	Memoranda of Agreement
MoC	Ministry of Coal
MoD	Ministry of Defence
MOP	Ministry of Power
MoEF	Ministry of Environment and Forests
MoPNG	Ministry of Petroleum and Natural Gas
MOU	Memoranda of Understanding
MPERC	Madhya Pradesh Electricity Regulatory Commission
MRPL	Mangalore Refineries and Petrochemicals Limited
MS	Motor Spirit
MSO	Market Service Obligation
MW	Mega Watt
MWP	Minimum Work Programme
MYT	Multi-Year Tariff
NCL	Northern Coalfields Limited

NELP	New Exploration Licensing Policy
NEP	National Electricity Policy
NETA	New Electricity Trading Arrangements
NGC	National Grid Company
NGO	Non-Governmental Organization
NGT	National Grid Transco
NHPC	National Hydro Power Corporation
NIO	Notice Inviting Offers
NLC	Neyveli Lignite Corporation ltd.
NOCs	National Oil Companies
NTPC	National Thermal Power Corporation
NRL	Numaligarh Refineries Limited
ODR	Online Data Room
OERC	Orissa Electricity Regulatory Commission
OFFER	Office of Electricity Regulation
OFGEM	Office of Gas and Electricity Markets
OGL	Open General License
OIL	Oil India Limited
OMCs	Oil Marketing Companies
ONGC	Oil and Natural Gas Corporation
PDS	Public Distribution System
PELs	Petroleum Exploration Licences
PFC	Power Finance Corporation
PGCIL	Power Grid Corporation of India Limited
PJM	Pennsylvania-New Jersey-Maryland
PL	Prospecting License
PLF	Plant Load Factor
PNGRB	Petroleum & Natural Gas Regulatory Board
PPA	Power Purchase Agreement
PSC	Production Sharing Contract
PSEs	Public Sector Entities
PTC	Power Trading Corporation
PTG	Petroleum Tax Guide
PURPA	Public Utility Regulatory Policies Act
RAV	Regulatory Asset Value

REC	Regional Electricity Companies
RGGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana
RIL	Reliance Industries Limited
RLDC	Regional Load Dispatch Centre
RO	Retail Outlet
ROR	Rate of Return
RPI-X	Retail Price Index- X Efficiency Factor
RPL	Reliance Petroleum Limited
RSO	Retail Service Obligation
RTO	Regional Transmission Organization
RVE	Remote Village Electrification
SCCL	Singareni Collieries Company Ltd.
SEB(s)	State Electricity Board(s)
SERC(s)	State Electricity Regulatory Commission(s)
SEZ	Special Economic Zone
SMD	Standard Market Design
SMP	System Marginal Price
SOE	State Owned Enterprises
STU	State Transmission Utility
T&D	Transmission and Distribution
TCF	Trillion Cubic Feet
TFC	Twelfth Finance Commission
TSO	Transmission System Operator
UMPPs	Ultra Mega Power Projects
UK	United Kingdom
USA	United States of America
WBERC	West Bengal Electricity Regulatory Commission
WBSEB	West Bengal State Electricity Board
WBSEDC	West Bengal State Electricity Distribution Company Limited
WBSETC	West Bengal State Electricity Transmission Company Limited

Executive Summary

Even though private participation and competition in India's Energy Sector have been encouraged since the early 1990s, limited progress has been observed. Issues relating to industry structure, regulation and pricing that potentially impact competition in energy sub-sectors, i.e. electricity, oil & gas and coal, still confront India. A need was felt to identify various issues that affect competition, examine policies that are required to create a level playing field in the energy sub-sectors, and to take remedial steps accordingly. With these objectives, the FIAS (a joint service of the World Bank and International Finance Corporation), the DFID and the Competition Commission of India, have assigned the task of reviewing the competition issues in energy sector to TERI.

ES.1 Need for Competition and Private Sector Participation (PSP)

In India, there exists a huge demand-supply gap/shortage in provision of key energy inputs. This gap raises serious concerns about India's energy security, thereby impacting overall economic growth. For instance, in 2004-05, while the electricity demand was estimated at 591.4 billion KWh, the supply was only 548.1 billion KWh, thereby leaving a gap of 43.3 billion KWh. In the same year, domestic crude oil supply was 33.0 Million Metric Tonnes (MMT) against a demand of 124 MMT, resulting in a gap of 91.0 MMT. Similarly, natural gas shortage was estimated at 55.0 Million standard cubic meter per day (Mmscmd) based on a demand of 118.0 Mmscmd and availability of only 63.0 Mmscmd. For coal, the availability was 381.8 Million Tonnes (MT) against a demand of 405.5 MT, resulting in a gap of 23.7 MT. It is worth noting that the shortage across energy sub-sectors is either met through imports/trading or remains completely unmet. On the whole, it has been estimated that for India to meet its energy demand and deliver a sustained growth of 8% over the next 25 years, its primary energy supply/availability must increase by 3-4 times, and electricity supply by 5-7 times of 2003-04 levels.

Given the rising shortage, there currently exists a huge investment requirement to finance energy and related infrastructure. There are different estimates of the quantum of investments required to meet India's rising energy needs. For example, the World Bank has estimated India's minimal annual investment need for energy and related infrastructure at about 5% of 2003-04 GDP. However, the envisaged investment for electricity, gas and water sectors together, as stipulated in the Five Year Plans, is much lower (approx. 2.7% of the GDP) vis-à-vis the World Bank levels. In addition, there exists a divergence between planned outlay and actual utilization. For the energy sector as a whole, about 76.9% of public outlay of the Ninth

Plan and 83.2% of outlay of first three years of the Tenth Plan is actually utilized.

To meet the availability and investment gaps highlighted above, several countries have sought to introduce sector reforms aimed at enhancing competition, streamlining policy/regulatory impediments and securing a greater role for the private sector to finance and manage energy networks. However, the challenge confronting policymakers is to develop a competitive energy marketplace that improves national welfare, particularly that of the poor. Such a regulatory and legislative framework must also have strong incentives for innovation in delivering the energy services.

There exists a vast literature that confirms the energy-development linkage and the potential benefits that private participation in energy services can have on the poor. For instance, increased private investment could bring services to new consumers, lower end-user tariffs and improve sector productivity and efficiency. Further, in the electricity sector, competition and PSP can foster development of new distribution technologies that increase community participation. The reform experience of India's telecom and civil aviation sectors also demonstrates that competition can help achieve efficiency gains, stimulate investment, and improve the quality of service.

In view of the above discussion (i.e. demand-supply gap, shortfall in public investment targets, investment requirements to meet targets, evidence of poverty-development linkages and benefits that other infrastructure sectors have reaped from introduction of competition), it becomes imperative for the Government to create an enabling environment that fosters competition and PSP. While the Government has undertaken a few measures in this direction, there remain several impediments that constrain achievement of a reasonable level of competition. These are discussed in the following sections.

ES.2 Measures to encourage Competition and PSP

Recent years have witnessed some progress towards creation of an enabling environment for private participation. Reforms that began with liberalization of electricity generation in the early 1990s have been progressively extended to other segments. In 2003, the Government enacted the Electricity Act (EA 2003), which contains several competition enhancing provisions such as delicensed generation, freedom to undertake captive generation, recognition of trading as an independent activity, open access in transmission at the outset and in distribution in phases, unbundling of SEBs, multiple distribution licensees in a supply area, mandatory setting-up of State Electricity Regulatory Commissions (SERCs) and

allowing the regulator to issue directives in case of abuse of dominant position etc. Further, the Government notified the National Electricity Policy (NEP) in February 2005, National Tariff Policy in January 2006 and Rural Electrification Policy in August 2006. All these policies have also stipulated pro-competitive measures.

Till date, the Government has positioned an independent regulator at the central level and twenty-four states have either constituted or notified the constitution of the State Electricity Regulatory Commissions (SERCs). Under EA 2003, the state regulators have been mandated to set retail tariffs; establish performance standards in supply and efficient use of electricity; promote competition and create environment for PSP. The central regulator is mandated to determine tariff for Central Generating Stations (CGS) and regulate sale of electricity to states and interstate transmission of electricity etc. A review of implementation of various competition-enabling provisions of the EA 2003 and its enabling policies reveals that about 20 SERCs have issued their first tariff orders, 22 have notified open access regulations, 11 have issued regulations for intra-state trading and 8 have enacted the Multi-Year Tariff (MYT) regulations. Similarly, the central regulator has issued regulations including terms and conditions of tariff for 2004-09, open access in transmission, licensing of trading, and electricity grid code.

In the Oil & Gas sector, private participation in the upstream segment was initiated in 1979 when the Government issued licenses in a few potential oil-bearing areas. However, licensing rounds till 1995 could not generate much investment. In 1997, the Government revised its policy and announced the New Exploration Licensing Policy (NELP) under which the ONGC and OIL were also required to compete with the private players to obtain oil blocks instead of being given the same on a nomination basis. Successive NELP rounds have incorporated more competition-enabling provisions, and this has led to an increase in private participation. Till March 2005, private investments in Exploration and Production (E&P) segment under NELP have been around three times that of the investments made by the Public Sector Undertakings (PSUs). Further, in 2002, with the objective to introduce an economic pricing regime for petroleum products, the Government dismantled the Administered Pricing Mechanism (APM), under which the government decontrolled prices of all petroleum products except LPG for domestic supplies and kerosene for public distribution system.

Further, the Oil & Gas sector, which until recently was devoid of an independent regulatory oversight mechanism, has made some progress in this direction with the positioning of a downstream regulator i.e. Petroleum and Natural Gas Regulatory Board

(PNGRB). The Board, established under PNGRB Act 2006, is envisaged to protect interests of the consumers and entities engaged in activities relating to petroleum, petroleum products and natural gas, and promote competitive markets. In the upstream segment, the Directorate General of Hydrocarbons (DGH), though not statutorily mandated to function as an independent regulator, advises the government on all policy matters.

In the Coal Sector, private participation in captive mining was initiated in 1976 with the amendment of the Coal Mines (Nationalization) Act 1973. Since then, the Government has successively liberalized captive mining for consumption by companies engaged in generation of power, production of iron & steel, and manufacturing of cement. However, coal companies are not allowed to market coal produced in excess of their needs. Allocation of coal blocks is currently carried-out through a Screening Committee comprising of representatives from various ministries. The Government has recently mooted a proposal to replace this procedure with a transparent competitive bidding mechanism. On the pricing front, while the Government initiated partial deregulation of coal prices in 1996, it has now fully deregulated prices for all grades of coal through the Colliery Control Order 2000. In 2004-05, Coal India Limited (CIL) introduced the 'e-auction' system with the objective to allow traders and consumers to bid for their requirements from preferred sources and introduce transparency in allocation. However, CIL withdrew this system in January 2006, and in early 2007, re-introduced a new online booking system based on first-come-first serve basis.

It is worth noting that while energy sector legislations have some provisions that encourage competition, the Competition Act 2002 also equally applies to the energy sub-sectors. However, there are no provisions in both Sector laws and Competition Act to address the interface issues between the CCI and sector regulators.

ES.3 Reasons for limited competition and private participation

The above discussion suggests that significant measures have been initiated in recent years to promote competition and to resolve the underlying policy, institutional and regulatory impediments. However, private participation and investment in electricity, oil & gas and coal continue to be below expectations. For instance, in the electricity sector, while the Ninth Plan (1997-02) had targeted 43% of capacity addition from the private sector, the actual realization was only 27%. Similarly, the projected share of the private sector in total capacity addition in Tenth Plan (2002-07) was 10% vis-à-vis the envisaged level of 17%. According to the Tenth Plan document, the major impediments to greater private investment in capacity addition are poor financial health of the SEBs, delay in land

acquisition/ clearances, issues related to fuel linkages and contractual problems etc.

For the energy sector as a whole, the reasons for limited competition can broadly be attributed to structural issues, policy and regulatory issues, barriers to entry, lack of level playing field, abuse of dominant position, and institutional issues. These impediments are elaborated below:

ES 3.1 Structural Issues

In the electricity sector, although the generation segment has been completely delicensed and major clearances (except environmental and safety) streamlined, the input market with regard to price and availability of fuels inputs (such as coal and natural gas) continues to be closely administered by the Government. This creates distortions in the market.

Further, all segments of the electricity sector are currently dominated by the public sector (87% in generation, 100% in transmission, 86% in distribution and retail supply and 93% in trading activity). Within the generation segment, the market share of National Thermal Power Corporation (NTPC) is about 80% and the company is expected to further consolidate its dominance through takeovers, joint ventures, greenfield projects and ramping-up of existing power stations.

As with the electricity sector, the Oil & Gas and coal sectors are also dominated by public utilities. For instance, at present, the National Oil Companies (NOCs) together hold about 86% of India's Crude Oil Exploration & Production (E&P), 77% of the natural gas production, 74% of oil refining capacity and 86% of the marketing infrastructure.

In the coal sector, Coal India Limited (CIL) and Singareni Collieries Company Limited (SCCL) account for over 93% of India's E&P. Further, as CIL has undertaken coal mining over a long period and established its operations in a protected environment, it enjoys several incumbency benefits. This includes possession of all geological data, domain knowledge, business goodwill, close proximity with the Ministry of Coal, and established market/clientele.

It is worth noting that while dominance itself is not anti-competitive, it could lead to market distortions if abused by the dominant entity.

ES.3.2 Policy and Regulatory Issues

The EA 2003 provides the overall competition-enabling framework and, in pursuance of this Act, several state regulators have issued regulations pertaining to tariff rationalization, inter-state and

intra-state trading, Open Access, MYT etc. However, these regulations have not been able to generate much interest among private utilities in the sector. For instance, the Central Electricity Regulatory Commission (CERC) has awarded inter-state trading licenses to 19 companies and eleven State Electricity Regulatory Commissions (SERCs) have issued their intra-state trading regulations. Till date, only 7 licensees have commenced inter-state trading and this activity continues to be restricted to a few utilities. Similarly, despite many states issuing open access regulations, very few applications have been received and acted upon. There are currently several 'other charges' over and above the cross-subsidy charge, as specified in the state open access regulations. This has probably disincentivised potential entrants. Interest in open access in transmission across states has also been constrained because information regarding transmission capacity is not widely available. Further, at present, eight states have issued their final MYT regulations. However, there exist issues such as data uncertainty, use of simple target setting procedure with limited consideration on quality dimensions, and stipulation of annual performance review over the control period. This has an adverse impact on the effective implementation of MYT.

In addition, at present, end-user tariffs are heavily cross-subsidised in favour of agriculture and domestic categories. This has increasingly led the industrial consumers to bypass the grid system and adopt captive generation, thereby adversely impacting the revenues of distribution licensees. It is worth noting that tariffs that do not reflect the underlying costs, inherently distort price-profit signals, thereby acting as barrier to entry and competition.

Another policy bottleneck pertains to non-existence of definitive guidelines for design and development of power markets. At present, the philosophies and principles for regulating the sector differ from one state to the other. Even though EA 2003 provides a broad framework, there is a need to evolve a common market design so as to ensure smooth flow of power.

On natural gas pricing, the PNGRB Act 2006 focuses only on a single aspect of the natural gas value chain e.g. transportation tariff, leaving prices of other elements in the value chain to be determined by the market. However, at present, there exists multiplicity of natural gas prices and the pricing principle followed in the gas sector lacks clarity. Such uncertainty inherently acts as a barrier to entry.

Further, the pace of institutionalising the PNGRB has been slow. In addition, the PNGRB Act, as it stands, also contains certain ambiguities that are summarized below:

a. Regarding the 'Affiliate Code of Conduct' as applicable to entities involved in laying, building, operating and expanding

of pipelines and marketing of natural gas, the Act specifies that companies engaging in these businesses should have separate entities, and may have different ownership. These entities will be required to comply with the 'Affiliate Code of Conduct', if they are set-up under same ownership/control. However, in this definition, the word 'producer' has not been mentioned in the Act. Thus the existing Act allows a producer to undertake the marketing business of natural gas, enabling the entity to exercise greater market power.

b. The PNGRB Act also empowers the regulator to determine the period of exclusivity to lay, operate or expand a city or local natural gas distribution network. However, a key drawback of market exclusivity on competition in natural gas markets is that it can give the incumbent an added advantage or incumbency benefit over new entrants.

In the coal sector, despite deregulation, the pricing decision of the Public Sector Enterprises (PSEs) is still guided by the Ministry of Coal. Further, 'Vision Coal 2025', released by the Ministry of Coal in March 2005, is CIL centric and has limited reference to private participation.

A competitive environment also requires efficient fuel choices and appropriate inter-fuel substitution. Theoretically, in such an environment, the marginal use value of different fuels, which can be perfect/imperfect substitutes, is equal at a given place and time, and the prices of different fuels at different places do not differ by more than the cost of transporting these fuels. It is therefore imperative that prices of different fuels are not set in isolation as is being done in India. It is also imperative to facilitate inter-fuel substitution, especially between gas and coal for electricity generation. At present, India's policy planning supports limited inter-fuel substitution/linkages and this aspect not only constrains entry into the generation segment but also increases the energy supply risk.

ES 3.3 Barriers to Entry

Non-availability and inappropriate pricing of transmission capacity could act as major entry barriers in the electricity sector. In an integrated transmission set up such as that of India, issues related to congestion have historically been under-emphasised and network has not been developed with a long-term perspective. Further, pricing of transmission services, i.e. costs for network access and usage, is not currently determined in a manner that promotes open access and trading.

Over the past few years, the financial viability of State Electricity Boards (SEBs), which control majority of the distribution business, has eroded due to huge commercial losses, large amount of unmetered consumption, unsustainable tariffs charged to various

consumer categories, and inadequate investments. These have inhibited new entry in the generation segment.

Further, the lack of market-determined pricing for petroleum products has a direct impact on the level of competition. Even after dismantling of APM, the Government still controls prices of domestic LPG, PDS Kerosene, Gasoline and HSD for the national Oil Marketing Companies (OMCs), in order to minimize the impact of increasing oil prices in the international markets on domestic consumers. As a result, with increasing international oil prices (since 2004) and non- commensurate increase in domestic prices, under recoveries to OMCs have been rising. In fact, during 2005-06, gross under recoveries for these companies were estimated at about Rs. 397.0 billion ($ 9.3 billion). The private oil companies have also been negatively affected by this policy. Till January 2005, out of 7549 retail licenses given to RIL and Essar, only 450 outlets have been commissioned.

In the coal sector, private participation in coal exploratory activity and commercial mining without the existing restriction of captive mining have been proposed in the Coal Mines (Nationalization) Amendment Bill 2000. However, lack of stakeholder consensus and frequent change of Government at the centre has delayed the ratification of this important Bill. This uncertainty creates entry barriers, as time-bound formulation of policies is important, not only for fostering competition but also for reducing the cost of doing business.

Further, the duration and procedure of obtaining approvals for land acquisition, construction, water and electricity connections, environmental clearances and other start-up procedures have a direct impact on entry. Once these approvals are obtained and project operationalized, there exist central and state inspections, which can negatively impact 'competition in the market', in case they are non-transparent, costly and time-consuming. To reduce these administrative impediments, the Ministry of Power invited competitive bids for Ultra Mega Power Projects (UMPP) after initial project preparation. In the Oil & Gas sector, even though NELP has helped attract greater private participation and investment in the upstream segment, successive rounds have not shown any major procedural improvement as far as the total period taken under each round is concerned. More specifically, environmental and forest clearances cause considerable time and cost overruns, thereby deterring entry of players in this segment. Likewise, competition in coal sector is reduced owing to the preference accorded to public enterprises for grant of prospecting license (PL) and mining lease (ML)

ES 3.4 Lack of level playing field

Non-level playing field in the electricity sector arises due to a number of factors:

a) The payment mechanism for private generating stations is not assured due to the financial unsoundness of State Electricity Boards (SEBs). NTPC, on the other hand, has a tripartite agreement under which devolution of funds can be captured if the SEBs does not pay the bill to NTPC.
b) While the National Tariff Policy (NTP) 2006 mandates the competitive bidding route for private generators at the outset, it exempts public utilities from the same for another five years. This provision can put the private sector at a disadvantageous position as it might so happen that a public generator (who is exempt from taking the bidding route) wins the contract based on negotiations with the distributor.
c) Financial institutions are more willing to fund public projects that are backed by state guarantees.

In the Oil & Gas sector, while the Government is bailing out the NOCs for their under-recoveries through issue of oil bonds, assistance from upstream NOCs, and discounts from refineries etc., the existing private companies cannot avail of this facility. It has been estimated that private companies are left with an under-recovery of Rs. 3.39/liter on Motor Spirit (MS) and Rs. 5.77/liter on High Speed Diesel (HSD). Such under-recoveries have resulted in many private companies to either shelve or delay their retail operations.

The instances of non-level playing field, which is reinforced by government policy, in the coal sector are summarized below:

a. Exploration for coal is carried out by PSEs without the involvement of private sector. The geological information regarding coalmines is available with the Government. While a prospective private player has to purchase this information from the Government, CIL can have the same without cost.
b. Under the Coal Bearing Areas (Acquisition and Development) Act 1957 (CBAADA), the PSEs do not have to obtain coal-mining leases for land acquired.
c. The Land Acquisition Act 1894 allows full acquisition of tenancy land for 'public purposes'. However, the Act puts a restriction on the private companies, and allows it to acquire land only for dwelling houses or for provision of amenities directly connected with a company. This puts private players at a disadvantageous position vis-à-vis CIL.
d. The Contract Labour (Regulation and Abolition) Act 1970 prohibits the outsourcing of perennial jobs. Since all jobs in the mining sector are perennial in nature, no outsourcing is legally allowed in this sector. While public coal companies maintain in-house capacities, it becomes inherently disadvantageous and inefficient for potential private companies to maintain such in-house capabilities.

ES.3.5 Abuse of Dominance

In the Coal sector, there have been some instances that indicate that CIL is probably abusing its dominant position. For instance, CIL, taking advantage of its dominant position in a supply-constrained environment, currently offers coal at 'first come first serve' basis through the e-booking system at a premium of 30% on the declared price. Further, core consumers in the power, cement and steel sectors have often complained against the CIL for unilateral increase in prices, limited transparency/ justification in price determination process, lack of complaint redressal and inadequate coordination.

ES.3.6 Institutional Issues

There are some institutional issues, which although not evident currently, could impact competition in electricity sector in the long run. For instance, Power Grid Corporation of India Limited (PGCIL), which is designated as the Central Transmission Utility, owns and operates the RLDCs. As the RLDCs are primarily mandated to coordinate the integrated operation of the system in a particular region, such ownership structure could be detrimental to the interests of other players in the market. Similarly, PGCIL has a majority equity stake in PTC along with other public undertakings. A structural arrangement where a transmission company has a majority stake in power trading could give it considerable monopoly power and create access problems for independent private generators in a competitive market.

In India's energy sector, there currently exists a separate line ministry for each energy sub-sector i.e. power, oil & gas and coal. Further, the Government has established/proposed specialized regulators for the electricity and downstream oil & gas sector. Currently, there is no independent regulatory oversight for the coal sector but its establishment is often advocated. There is also some merit in institutionalising a 'Single Energy Regulator', which not only considers the pricing and supply linkages among energy sub-sectors and but also mitigates the risk of 'regulatory capture'. However, an energy regulator might face difficulty in getting acceptance from line ministries and to have people with knowledge of all energy sub-sectors. The entire issue needs to be examined in-depth.

Currently, there exists no formal understanding/ relationship between the CCI and energy regulator(s) on respective jurisdiction on competition issues. To resolve this interface issue, it is suggested to introduce a collaborative approach as has been adopted in South Africa, Brazil and the United Kingdom. Accordingly, the existing legislative framework would have to be suitably amended.
For enabling effective competition in the energy sector, it is imperative to not only streamline the regulatory design and

coordination mechanism but also ensure that competitive activities are appropriately monitored and timely interventions considered. To facilitate this process, all stakeholders (including policy makers, regulators, competition authority, multilateral institutions, utilities, consumer groups, academicians and media) should be adequately sensitised on competition issues. In this direction, the CCI could facilitate developing stakeholder-specific course modules on various aspects related to competition in energy.

ES.4 Perception Survey Findings

In order to gauge stakeholder opinion on this subject, TERI conducted a perception survey. According to the survey, about 51% of the respondents (consumers and non-consumers) opine that India has made moderate progress towards deregulation and greater PSP. Only about 6% of the respondents rated the reforms as 'above average'. The remaining respondents (31%) believe that the progress has been 'below average'. However, a break-up of respondents into consumers and non-consumers reveals that consumers are more dissatisfied with the reform progress. This does not necessarily mean that non-consumers are benefiting more from the pace of deregulation compared to the consumers.

For the electricity sector, the survey highlights that delicensed generation, recognition of trading as an independent activity, and freedom for captive generation are considered the most important provisions of the EA 2003, with potentially major impact on competition in the sector. The survey respondents, however, have accorded relatively less importance to provisions on open access and rationalization of tariffs and their impact on competition. Availability and pricing of fuels are considered the most important impediments to introduction of competition in the sector. Constraints in transmission capacity are also identified as a significant barrier. On regulatory oversight in the sector, there seems to be an overall satisfaction in terms of functioning and institutional capacity of the ERCs.

About 54% of the survey respondents in the Oil & Gas sector view the 'absence of freedom to fix prices for petrol and diesel' as a major competition-inhibiting factor. Further, more than 40% of the respondents believe that there currently exists a non-level playing field for private players' vis-à-vis incumbent utilities. However, the survey respondents expressed overall confidence on the ability of NELP to attract private participation and improve competition in the E&P segment. Further, about 42% of the respondents opine that PNGRB will have a substantial positive impact on competition in oil & gas sector.

According to the perception survey, the monopolistic structure of Indian coal industry is the biggest deterrent to competition and

greater private sector participation. Additionally, about half the respondents consider the absence of independent regulator and the presence of stiff legislations concerning land acquisition, rehabilitation and environmental management, as competition impediments. Further, 71% of the survey respondents believe that lack of transparency in the block allocation procedure is the most important contributor for limited private involvement.

Lastly, the TERI survey attempted to gauge stakeholder opinion on measures that could enable a competitive environment in the energy sector. The survey revealed that majority of the respondents (87%) accord high importance to strengthening the regulatory framework, which not only comprises of sound regulations but also their proper implementation. Further, 80% of the respondents considered simplification of statutory and non-statutory procedures necessary. These findings are largely in consonance with our research findings through literature review and other stakeholder interactions.

ES.5 Future Research Areas

During the analysis, it was found that there are some areas that may need further study as they have bearing on the competition in the energy sector. These may be taken-up in the future for improving the understanding on competition issues of various stakeholders. An illustrative list is indicated below:

- Impact of Competition on rural poverty
- Exploring alternative models for Competition in Electricity
- Quantification of benefits of effective competition in the energy sector

ES.6 Concluding Remarks and Role of CCI

All issues highlighted in ES.3 could be considered as part of CCI's advocacy activities in a phased (short/medium/long-term) manner. Even in these phases, the activities have been prioritised. For example, in the oil & gas sector, as a first priority, the CCI should focus on pricing issues and sensitisation of regulator on competition issues. The key issues and potential role of CCI is summarized in Table ES.1.

In order to make CCI's advocacy on these issues effective, it needs to have a well-researched and structured case. This could be presented in the form of an advocacy paper to the Government/Regulator, followed by a PDF (Policy Discussion Forum) for evolving consensus on these issues. For undertaking the above activity, the CCI may consider engaging TERI or such other institutes to prepare the advocacy papers and coordinate the PDF activity.

Table ES.1 Issues impacting competition and private participation

S.No.	Issue Description	Recommendation for CCI Advocacy
ELECTRICITY SECTOR		
Structural Issue		
1	Dominance of public utilities - 87% in generation, 100% in transmission, 86% in distribution & retail supply and 93% in trading activity	Dominance of utilities per se is not anticompetitive. That the utilities could abuse dominance should be highlighted to the Ministry.
Policy and Regulatory Issues		
1	Trading, MYT and Open Access Regulations laid down by SERCs have not generated much interest among private utilities in the sector.	Advocate with the SERCs for identifying the lacunae in existing regulations, and for taking remedial actions
2	End-user tariffs are highly cross subsidized in favour of the agriculture and domestic categories and tariffs do not reflect the actual cost of electricity	Advocate with the SERCs on the benefits tariff rationalization could bring in promoting competition in the electricity distribution segment.
3	Non-existence of definitive guidelines for design and development of power markets.	Evolve consensus between SERCs/CERC to develop a common market design so as to ensure free flow of power among states.
Barrier to Entry		
1	a. Non-availability of adequate transmission capacity; b. Pricing of transmission services does not promote open access and trading.	Impress upon Regulatory Commissions to ensure non-discriminatory access to transmission network with competitive pricing mechanism
2	Financial unviability of distribution licensees	This issue inhibits entry of new player in the generation segment. CCI could take-up this policy issue with the respective state governments and regulators
3	Limited inter-fuel substitution between gas and coal for electricity generation.	Easy substitution of inputs for electricity generation should be encouraged. Need to identify and resolve the policy and legal impediments to substitution.
Lack of level playing field		
1	Lack of payment security for private generating stations due to financial unsoundness of State Electricity Boards (SEBs). Public utilities given state guarantees.	Recommend to the Government for re-examination of the issue of state guarantee and review whether it can be extended to private utilities for capacity addition.
2	The National Tariff Policy (NTP) 2006 exempts public utilities from taking the competitive bidding route for 5 years. Private generators have to adopt the same from the outset.	Recommend to the Government to suitably amend the NTP 2006 so that level playing field is ensured among players irrespective of their ownership.
Institutional Issues		
1	Ownership of RLDCs by PGCIL	Reduce ownership of PGCIL in RLDCs. Emphasize on creating separate transmission company in each region and introduce 'yardstick competition' between service providers.
2	PGCIL's majority equity stake in PTC	Impress upon the Ministry of Power to reduce stake of PGCIL in PTC
OIL & GAS SECTOR		
	Issue Description	Recommendation for CCI Advocacy
Structural Issue		
1	Dominance of public companies - 86% of Crude Oil E&P; 77% of natural gas production; 74% of oil refining capacity and 86% of marketing infrastructure	Dominance of utilities per se is not anti competitive. That the utilities could abuse dominance should be highlighted to the Ministry.
Policy and Regulatory Issues		

1	The PNGRB Act 2006 focuses on only one aspect of natural gas pricing i.e. transportation tariffs. There exist multiplicity of natural gas prices.	There should be transparent rational pricing mechanism in natural gas sector. PNGRB's role in pricing in other segments of the sector should be examined. Issue to be taken-up with the Government/Regulator
2	Slow pace in institutionalizing the independent downstream regulator (PNGRB) and ambiguities in the PNGRB Act 2006 (Definition of 'Affiliate Code of Conduct' excludes the word 'producer' and open-ended on 'Marketing Exclusivity period')	Impress upon the Government to hasten the constitution of the downstream regulator and sensitise the regulator on competition issues. Include "producer' in definition of "Affiliate Code of Conduct". Market exclusivity should not deter competition.
Barrier to Entry		
1	Total administrative period under various NELP rounds has not shown much improvement. Environmental and forest clearances considered onerous and time-consuming.	Discuss with Central/ State Ministries for institutionalising a 'Single Window Mechanism' for speedy disposal of clearances
2	Lack of market determined pricing for petroleum products	Discuss the competition implications of the current pricing policy with the MoPNG and Ministry of Finance.
Lack of level playing field		
1	Government is supporting the NoCs for their under-recoveries through issue of oil bonds, assistance from upstream NOCs and discounts from refineries etc. No such facility is available to private companies.	Discuss the competition implications of the current pricing policy with the MoPNG and Ministry of Finance.
COAL SECTOR		
	Issue Description	Recommendation for CCI Advocacy
Structural Issue		
1	Dominance of Public Sector Enterprises (PSEs) - 93% of Coal Exploration, Production and Marketing	Dominance of utilities per se is not anti competitive. That the utilities could abuse dominance should be highlighted to the Ministry
Policy and Regulatory Issues		
1	Despite deregulation, pricing decision of PSEs is still guided by the Ministry of Coal.	Advocate with the Government on streamlining the coal pricing mechanism and examine the case for bringing the sector under regulatory oversight.
2	Vision 2025 document, released by Ministry of Coal in March 2005, is CIL centric and gives limited emphasis on private participation	Ministry may like to revisit the Vision document for promoting private sector participation in coal sector.
Barrier to Entry		
1	Delay in passage of the Coal Mines (Nationalization) Amendment Bill 2000 that allows private participation in commercial coal mining without the existing restriction of captive mining.	Advocate with the Government/other stakeholders on early passage of the Bill by highlighting the positive implications it could have on competition in the sector.
Lack of level playing field		
1	Prospective private player has to purchase geological information from the Government. The same is freely available to CIL.	Ensure level playing field among various players irrespective of their ownership
2	Under CBAADA Act 1957, the PSEs do not have to obtain coal-mining leases for land acquired.	Examine the possibility of extending the provisions of the Act to private players as well. Take-up the issue with the Ministry of Coal
3	CIL can take re-course to the Land Acquisition Act 1894 for full acquisition of tenancy land for 'public purposes'.	Examine the possibility of extending the provisions of the Act to private players as well.
4	Contract Labour (Regulation and Abolition) Act 1970 prohibits the outsourcing of perennial jobs. This makes private mining inefficient and less cost-effective.	Examine the provisions of the Act to allow outsourcing in select cases
Abuse of dominance		

1	Instances that indicate that CIL is abusing its dominant position (e-booking, consumer grievances on quality, pricing and allocation)	Advocate with Ministry of Coal for resolution of this issue. Highlight the benefits such measure could have on competition in coal-consuming sectors and the economy.
ENERGY SECTOR (ELECTRICITY, OIL & GAS AND COAL)		
	Issue Description	Recommendation for CCI Advocacy
1	Lack of coherence in energy sector planning considering the inter-linkages among the sub-sectors	Advocate with the Government the merits of constituting and operationalizing a 'Single Energy Regulator'
2	Non-existence of interface mechanism between energy regulatory authorities and CCI	Impress upon the Government to introduce amendments to sector legislation and Competition Act 2002 to bring about better coordination between the agencies
3	Limited capacity and understanding among stakeholders on competition issues	Initiate/continue discussion among stakeholder groups on competition issues through forums, media and specialized courses.

CHAPTER 1 Introduction

India's economic growth target at about 8% over the next few years calls for massive increase of infrastructure services in various sectors including the energy sectors. The estimated investment requirements as indicated in various expert reports are huge, and would enjoin upon exploring alternative avenues in addition to the traditional government sources.

Traditionally, monopolies were considered to be best suited to deliver energy services as they enjoyed economies of scale and economies of scope. However, the absence of competition gave monopoly suppliers an opportunity to set prices without providing commensurate value for money, and in certain circumstances, to conduct their business with little regard to protection of consumer interests. In many cases, absence of competition led to poor quality of services, and inefficient allocation of resources, resulting in operational inefficiencies. There was also a belief in India, that only the public sector could provide energy services efficiently, and that the entry of private sector should be restricted, if not altogether prevented. As a result, Government was both the service provider and policy maker in various energy sub sectors such as electricity, oil & gas, coal, etc.

The inability of the state and its agencies to deliver services in an efficient and cost effective manner led to a re-look of the policies relating to the provision of energy services in India, and it was felt that commercialization of these sectors could improve efficiencies and reduce costs. There were also certain pragmatic and non-ideology related factors facilitating this shift (Ministry of Finance 1996) such as the need to attract additional investment in infrastructure from the private sector, and the need to build quality infrastructure to remain globally competitive. Technological advances also made it possible to un-bundle energy services, both horizontally and vertically, and to separate the services that could be performed by several operators on a competitive basis from those that are best performed by a monopolistic service provider. It was realized that if commercialization, private sector participation and competition were to be encouraged, there was a need for a new mechanism to balance the interests of various stakeholders, to ensure financial viability of the industry, and to reduce transaction costs associated with privatization[1]. Even with commercialization of infrastructure services, and prospects of competition, the market structure in infrastructure services tends to retain a monopolistic element in India. For example, in India, more than 88% of power generation, and almost the entire transmission and distribution

1 S Sundar and S K Sarkar. Framework for Infrastructure Regulation, TERI. 2000. New Delhi. India

segments are in the public sector. It was also realized that unless these incumbent monopolies were restrained, new players could not enter the market. There was, thus, a need to create a level playing field between monopolistic incumbents and new entrants. All this called for expertise, which governments did not possess. Besides, as governments and their agencies continued to be providers of infrastructure services, and as they themselves had to be regulated, there was a need for a mechanism outside government, with adequate expertise and flexibility, to regulate all players, ensure efficiencies, and protect consumer interests. Hence, independent regulation came into existence in India's energy sector since 1996.

With a view to promoting competition in the energy sector, and also in the economy as a whole, government opened up this sector in 1991 in phases, and put in place several legislative frameworks. For instance, the latest Electricity Act 2003 contains enabling provisions for development of competitive and efficient power sectors, but there have been delays in finalizing and implementing various regulations and policies. Similar is the case in oil & gas sector with the enactment of the Petroleum and Natural Gas Regulatory Board Act 2006, whereby a regulator, to be positioned soon, is required to promote competition. The Competition Act 2002, enables a framework for competition in the economy as a whole, including the energy sectors. This Act is yet to be fully operationalized, even though positioning of a truncated CCI (Competition Commission of India) has taken place few years back.

Even though many years have passed since the introduction of private participation and promise of competition in energy sectors, no substantial progress has been observed. Issues relating to industry structure, regulation, pricing, etc, that potentially affect competition in energy sub sectors (such as electricity, oil & gas and coal) still confront us. There is a need to identify various issues that affect competition, examine policies that are supposed to create a level playing field in the energy sectors, and take remedial steps accordingly.

With this objective, the DFID and FIAS (Foreign Investment Advisory Service, a joint service of the IFC and The World Bank) assigned the task of reviewing various competition issues in energy sectors, to TERI (The Energy and Resources Institute), New Delhi.

1.1 Objective

The objectives of the above research study are to assess the competition issues in three energy sub sectors such as electricity, oil & gas, and coal. In particular, the study intends to assess the market size and structure of these sub sectors; examine various legislative and regulatory framework governing them, and assess the extent to which the competition goals have been achieved; assess the key polices in various energy sub sectors and examine their impact on competition; examine the institutional gap between the sectoral regulatory bodies and competition authority so as bring out their interface issues; and identify and recommend measures that enhance competition in the energy sectors.

The study, conducted in two Phases: Phase I completed by March 2006, and Phase II being concluded by June 2007, addresses, specifically, the following areas:

- To analyze the linkage between competitive environment and investment and the need to bridge the demand-supply gap, and further, assess the impact that greater energy sector investments could have on narrowing rural-urban divide and poverty;

- To study issues related to institutional framework like single energy regulator; interface issues between sector regulator and competition authority; and procedure for obtaining clearances/entry regulations for energy sector projects, for instance, for setting up of a power plant or an oil refinery;

- To identify capacity building requirements of independent regulators/government ministries on competition issues in the electricity, oil & gas and coal sectors;

- To assess how competition in other infrastructure sectors like civil aviation and telecom has led to improved efficiencies, lower tariffs and higher access (reach to people who otherwise would not have had access to such services) and draw relevant lessons for the energy sector.

- In relation to electricity sector
  - To assess the market structure and identify the market conditions conducive for introduction and promotion of competition and the existing barriers to the same;

  - To study the Electricity Act 2003, the National Electricity Policy (NEP) 2005, and National tariff Policy 2006, with a view to examine the adequacy of various provisions in furthering competition in the sector. Additionally, analyze key regulations emanating from the CERC and the SERCs (four

representative states) so as to highlight the difference in approaches and challenges in implementation of various competition-enabling provisions.

- In relation to oil & gas sector
  - To assess the market structure, and also assess the extent to which key policies in the Indian oil & gas sector have addressed competition-impacting issues and the existing entry barriers. Additionally, examine the extent to which deregulation has progressed in the downstream petroleum segment and its potential impact on competition;
  - To analyze key provisions of the PNGRB Act 2006 with a view to gauge their adequacy in promoting competition in the sector and in attracting new private investments.
- In relation to coal sector
  - To assess the market structure, and review the impediments to the passage of the Coal Mines (Nationalization) Amendment Bill and the effectiveness of attempts being made to resolve the pending issues;
  - To study the 'Vision 2025' document to assess implications/potential impact on competition and private sector participation in the sector

In undertaking the above activities, relevant international experience has been drawn up to suggest possible strategies and actions for consideration by the Competition Commission of India with regard to its 'competition advocacy' functions in promoting competition in the various segments of the energy sector. Wherever appropriate, it also includes recommendations for modification in existing or proposed laws and regulations emanating from the analysis, especially in the light of experience in other relevant jurisdictions and international best practices.

1.2 Methodology

In order to meet the aforementioned objectives, the project methodology included literature surveys, interaction with stakeholders and interest groups, peer reviews and analysis of the findings. Further, a 'Perception Survey' was conducted to assess the stakeholders' view on various competition related issues.

The findings of the Phase I of the study were discussed in a Consultation Workshop organized by the CCI with support from DFID and FIAS, in March 2006, and findings of the Phase II interim report/draft final report were deliberated upon in the second/third consultation workshops held in October 2006/February 2007. The suggestions that came out of these workshops as well as the comments and suggestions received from the members of the Advisory Committee of the CCI during a presentation made in February 2007 have also been addressed in this report.

Based on the above, a final report has been prepared. The report is organised as follows. Following this introductory Chapter, generic issues in the energy sector are discussed in Chapter 2. The next three chapters discuss the competition issues in energy sub-sectors i.e. electricity, oil & gas, and coal respectively. Chapter 6 deals with the institutional issues for bringing enhanced competition in the energy sector. The final chapter summarises the key competition issues with respect to the CCI's advocacy role in view of the Section 49(3) of the Competition Act 2002.

CHAPTER 2 Enabling competition in India's energy sector

2.1 Introduction

Energy is universally recognized as one of the most significant inputs to economic growth and human development. The growth of any nation, encompassing various sectors of the economy, is largely dependent upon its ability to provide adequate and affordable access to alternative energy sources. With India targeting a sustained annual economic growth rate in the range of 7-8%, there exists a need to augment its energy and related infrastructure. To deliver this growth, the energy demand is estimated to rise by at least 5.2% annually[2]. India is also expected to witness one of the highest growths in terms of incremental energy demand in the next decade, largely based on buoyant economy and rising population. In 2003, the country ranked fifth in the world in terms of energy demand. Although, the consumption of commercial energy has grown rapidly over last few years, a large part of India's population continues to have limited or no access to various energy sources. Table 2.1 indicates the per-capita energy consumption of major energy consumer countries of the world.

Table 2. 1 Per-capita energy consumption of major energy consumers

Country	Total consumption (MTOE)*	Per-capita consumption (KgOE)#
United States	2297.8	7896
China	1178.3	915
Russian Federation	670.8	4691
Japan	504.8	3944
India	345.3	325
Germany	332.2	4002
Canada	291.4	9106
France	260.6	4343
United Kingdom	223.2	3783
South Korea	212.0	4417

(* - Million Tonnes of Oil Equivalent, # - Kilogram of Oil Equivalent)

SOURCE World Energy Consumption Statistics, Economic Intelligence Service, Centre for Monitoring of Indian Economy (2005)

In addition to having low per-capita energy consumption, India has a large number of people dependent on traditional non-commercial energy sources (fuel wood, crop residue and animal waste) for meeting their household needs. Studies[3] suggest that almost 80% of energy consumed in Indian villages comes from non-commercial

2 Minutes of the Energy Coordination Committee (July 2005)
3 Pachauri. S., An energy analysis of household consumption in India, The Swiss Federal Institute of Technology, Zurich (2002)

sources, which comprise more than 30% of total energy consumed in the country. The implications of such an energy consumption pattern are manifold. A World Bank and UNDP study[4] of rural India indicates that about 37 hours per month are required for fuel wood collection, with women suffering the maximum amount of drudgery due to this activity. This represents opportunity cost of time that could have been utilized for income generating activities. Further, as non-commercial sources result in indoor air pollution, such sources also result in a detrimental impact on child and maternal health. A recent study[5] of 15293 rural households across 3 states in North India and one state in South India indicates that use of biomass fuel results in an economic burden of a huge Rs. 299 billion. In light of this evidence, it is being increasingly acknowledged that to foster sustainable growth, India needs to not only improve access to energy sources but also enhance usage of more-efficient commercial sources.

2.2 Need for competition and private sector participation

Since the mid-1990s, India has progressively involved the private sector in provisioning and financing of energy services. This trend can largely be attributed to the following factors:

- Rising demand-supply gap in availability of various energy sources
- Need to attract greater private players to finance energy projects and add operational efficiency
- Need to reduce energy poverty[6]
- Increasing evidence of successful introduction of competition in other infrastructure sectors
- Technological innovations that made it possible to unbundle services
- Realization that an efficient energy infrastructure was a pre-requisite to global competence.

These parameters are discussed in greater detail below.

2.2.1 Demand supply position

India's primary commercial energy demand that was estimated to be 314.7 MTOE (Million Tonnes of Oil Equivalent) in 2001-02 is projected to touch 563.2 MTOE in 2006-07 and 723.9 MTOE in

4 Energy Sector Management Assistance Program (ESMAP) of UNDP and The World Bank: Household energy use in developing countries – A Multi-country study (2002)
5 Parikh J.K, Lack of Energy, Water and Sanitation and its impact on Rural India, India Development Report 2004-05, Oxford University Press
6 According to UNDP (2000), energy poverty is defined as the absence of sufficient choice in accessing adequate, affordable, reliable, safe and environmentally benign energy services to support socio-economic development

2011-12[7]. Clearly, the rising demand needs to be either met by imports or by augmentation in energy supply infrastructure. The latter primarily involves an increase in exploration activity, development of new mines and setting up of additional generation, transmission & distribution infrastructure. Rising energy demand would also simultaneously require expansion of handling capacities at ports for oil and by the railways for handling higher quantities of coal. These supply side interventions need to be supplemented with demand-side management (DSM), which involves increased energy efficiency, better public transport and imaginative urban planning.

Currently, there exists a huge gap/shortage in provision of key energy inputs, as is evident in Table 2.2. This demand-supply gap raises serious concerns about India's energy security and its impact on the overall economic growth.

Table 2. 2 Demand-Supply situation and gap in energy sub-sectors (2004-05)

Energy source	Demand	Supply	Shortage	Status
Electricity (In Billion KWh)@	591.4	548.1	(43.3)	Largely unmet Demand
Crude Oil (In MMT)	124	33*	(91.0)	Imports
Gas (In Mmscmd)	118**	63	(55.0)	Unmet Demand
Coal (In MT)	405.5	381.8	(23.6)	Partially met through Imports

* Domestic Production, ** - Reflects allocation
@. The demand-supply position for all energy sub-sectors is available only till 2004-05
SOURCE(s): Central Electricity Authority (CEA) Website: www.cea.nic.in Economic Survey 2005-06 & Planning Commission, MoPNG, Gail Infraline, Annual Report 2004-05, Ministry of Coal
(KWh – Kilowatt hours, MMT – Million Metric Tonnes, MCM – Million Cubic Meter, MT – Million Tonnes; Mmscmd- Million standard cubic meter per day)

As observed from the above table, the shortage for India's energy sub-sectors is partly met through imports/trading and partly remains unmet. In the electricity sector, the demand-supply gap has led to increased incidence of unscheduled outages, load shedding, fluctuating voltage and erratic frequency. One of the major contributors to such shortages has been the inadequate investment in transmission and distribution segments. The aggregate technical and commercial (AT&C) losses that include theft, billing & collection inefficiency and network losses, exceed 40% for the country as a whole. Such high losses, coupled with tariff distortions, have made the State Electricity Boards (SEBs) financially unviable, thereby constraining their ability to either fund their own investment needs or attract private capital to do so.

In the petroleum sector, constrained supply has led to growing dependence on imports, which are estimated to be 77% of current consumption needs. The rising demand for petrol products has been a direct outcome of growth in motorized transport and rise in

[7] Planning Commission (2002)

share of road haulage. Therefore, the biggest challenge for this sector is to ensure crude oil and gas supplies in a constrained world market witnessing rising prices. To substantially augment exploration efforts and improve self-sufficiency, India needs to ramp-up capital investments, not only through the National Oil Companies (NOCs), but also through private sources.

In the coal sector, supply shortages are being partly met through imports, both coking as well as non-coking variety. As nearly 78% of India's electricity generated is coal based, a substantial expansion in domestic coal production is needed to meet the generation capacity additions in the future. On the whole, it has been estimated that for India to deliver a sustained growth of 8% in the next 25 years, it needs to grow its primary energy supply by 3-4 times and electricity supply by 5-7 times of 2003-04 levels[8].

2.2.2 Investment requirements

The World Bank (2006) has estimated that developing countries need about US $ 165.0 billion through 2010, increasing at 3% per annum till 2030-31 to ensure complete energy access. However, financing is available to meet only half the requirement, thereby creating a huge investment gap in the energy sector.

The World Bank have also estimated India's minimal annual investment need for energy and related infrastructure at about 5% of 2003-04 GDP. This translates to an annual investment of about Rs. 1271.5 billion (considering GDP at factor cost of Rs. 25.43 thousand billion in 2003-04)[9]. On the other hand, the Ninth (1997-02) and Tenth Five-Year Plans (2002-07) have envisaged an investment requirement of Rs. 3367.0 billion (Rs. 673.4 billion annually) and Rs. 4125.0 billion (Rs. 825.2 billion annually) respectively for the electricity, gas and water sectors together[10]. It is worth noting here that India's Five-Year Plans currently envisage a much lower level of investment (about 53-60%) vis-à-vis the desired levels as per the World Bank estimates. Further, the Ninth & Tenth Plans have considered the investment needs for Energy & Water sectors together. Therefore, if the water sector is excluded from the analysis, the gap between the desired and envisaged investment for the energy sector will widen further to the extent of the investment planned for the water sector. The above analysis is summarized in Box 2.1.

[8] Report of the Expert Committee on Integrated Energy Policy, 2006 Planning Commission, Government of India
9 Economic Survey 2005-06, Ministry of Finance, Government of India
10 Ninth & Tenth Five-Year Plan Document, Planning Commission, Government of India

Box 2.1 Current level of energy sector investment

- Annual investment need for energy and related infrastructure: 5% of 2003-04 GDP
- With GDP at Factor Cost (GDP_{FC}) of Rs. 25.43 thousand billion, annual investment need is Rs. 1271.5 billion
- Envisaged Investment for Ninth Plan (Energy & Water): Rs. 3367.0 billion (Average annual investment of Rs. 673.4 billion)
- Envisaged Investment for Tenth Plan (Energy & Water): Rs. 4125.0 billion (Average annual investment of Rs. 825.0 billion)

SOURCE TERI assessment (2006)

An analysis of public investment in the energy sector (power, coal & lignite, petroleum & natural gas and non-renewable energy sources) for the Ninth and Tenth plans[11] reflect a consistent and compounding gap between planned outlay and actual expenditure. Business as usual is, therefore, not likely to work and the overall economic growth objectives shall remain unfulfilled if the required investments in the energy sector are not realized.

It is well established that there exists a strong linkage between economic growth and energy demand, i.e. a high GDP growth will necessarily be accompanied by increasing per-capita income and changes in lifestyle as well as production activities. These two factors in-turn directly affect the energy demand. On the other hand, constraints in supply of various energy sources could negatively impact the overall economic growth prospects. As investment shortage typically affects the energy supply infrastructure, there is a ripple effect on economic growth, per capita-income and hence poverty. It is worth noting that while increased access to energy services does not necessarily result in socio-economic development, the lack of adequate energy inputs could act as a severe constraint to development. In this context, it becomes imperative to not only fill-up the gap between planned outlay and actual expenditure of the public sector but also attract private capital for developing energy and related infrastructure.

In addition to the gap between annual need and envisaged investment levels, there also exists a divergence between planned outlay and actual utilization. The latter comparison broadly reflects the extent to which public funding has been channelled into new energy sector projects and into implementation of existing central and state schemes. Between 1997-98 and 2004-05, the energy sector outlay as proportion of the annual planned outlay has been in the range of 21-23%. Amongst the various energy sub-sectors, electricity has constituted about 12-13%, oil & gas nearly 6-8% and coal a meagre 0.15% of yearly planned outlays. While the outlay seems adequate, the actual investment in each sub-sector has fallen short of planned levels.

11 Tenth Plan Period (2002-03, 2003-04, 2004-05), Planning Commission, Government of India

Electricity sector in India, until recently, has been mainly funded through budgetary support and external borrowings. Though recent regulatory reforms have attracted some private investments, the public sector investments (both, central and state) continue to finance a major portion of the new and ongoing projects. The trend of planned and actual public investment in the power sector is presented in Figure 2.1.

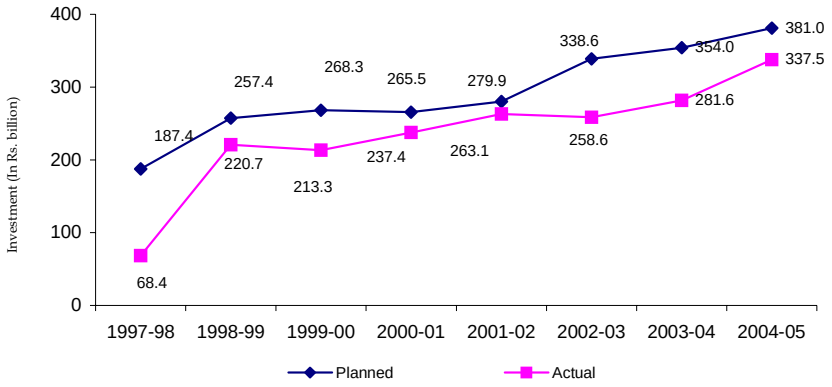


Figure 2. 1 Trend of planned and actual public investment in the power sector

SOURCE Compilation from Annual Plans, Planning Commission, Government of India (2000-01 to 2005-06)

It can be readily observed from above that there has been a consistent gap between planned and actual public investments in the power sector, both in the Ninth Plan and the first two years of the Tenth Plan. While the investment shortfall was Rs. 255.7 billion in the Ninth Plan, it was Rs. 195.8 billion in the initial three years of the ongoing plan (2002-05). The investment in power projects through bilateral and multilateral funding has also shown a downtrend in recent years. This is evident from the fact that total funds for externally aided projects in the power sector declined from Rs. 36.7 billion in 1999-00 to Rs. 24.1 billion in 2004-05.

Additionally, government efforts to induct private capital have borne limited success, as is evident from the fact that only 5061 MW of generation capacity was added by the private sector as against the envisaged level of 17588 MW in the Ninth Plan period (29% of target). The achievement ratio for central and state sectors was comparatively higher at 37.8% and 87.9% respectively. The Tenth Plan has targeted only 17.3% of the total capacity addition from private sector as compared to 43.7% in the Ninth Plan. The capacity addition targets and achievement in the Ninth and Tenth Plans are given in Table 2.3.

Table 2. 3 Capacity addition targets and achievement (Rs. billion)

Financial year/plan	Ninth Plan target	Ninth Plan achievement	Achievement	Tenth Plan target	Tenth Plan achievement (anticipated)	Achievement
	MW	MW	%	MW	MW	%
		(1997-2002)			(2002-07)	
Central	11909	4504	37.82	22832	16404	71.85
State	10748	9450	87.92	11157	10782	96.64
Private	17588	5061	28.78	7121	3455	48.51
Total	40245	19015	47.25	41110	30640	74.53

SOURCE Ninth and Tenth Five Year Plans, Planning Commission, Government of India
Report of the Working group on power for the Eleventh Plan (2007-12), GoI, MoP, February 2007

Figure 2.2 and 2.3 depict the proportion of central, state and private sector in overall capacity addition during the Ninth and Tenth Plan period.

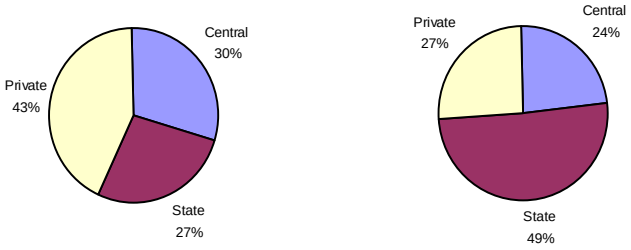


Figure 2. 2 Ninth Plan target versus achievement
SOURCE Compilation from Annual Plans, Planning Commission, GoI (2000-01 to 2005-06)

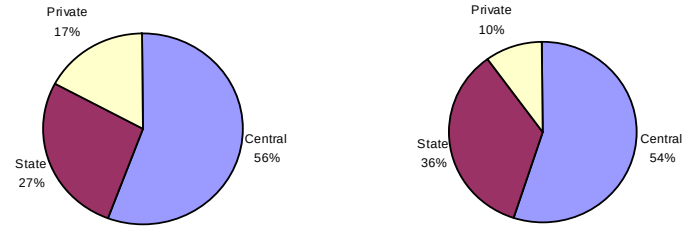


Figure 2. 3 Tenth Plan capacity addition target versus anticipated
SOURCE Compilation from Annual Plans, Planning Commission, Government of India (2000-01 to 2005-06)

The above analysis clearly indicates that despite regulatory reforms in the power sector, private investment has not been forthcoming in the sector. In this context, Annual Plan 2002-03 states that *private investment in electricity sector requires an enabling regulatory, legislative and market environment. Further, it also requires faster pace of reforms not only in power sector but also*

in related industries such as transport and coal. The Tenth Plan has specifically highlighted the following impediments to private investment in capacity addition:

- Poor financial health of State Electricity Boards (SEBs)
- Delay in land acquisition and environmental clearances
- Unresolved issues related to fuel linkages
- Contractual problems
- Law and order problems

The Working Group on power for the Eleventh Plan states that important reasons for non achievement of target capacity addition in the Tenth Plan in public and private sectors are non availability of escrow cover by State Government to IPP projects and fund constraints.

Even though the likely achievement from private sector as a proportion of target in the Tenth Plan will be higher than that in Ninth Plan, in absolute terms it is much lower. Infact, the target for the private sector was much lower in Tenth Plan than the Ninth Plan.

In the context of the oil & gas sector, the trend of planned and actual investment is presented in Figure 2.4

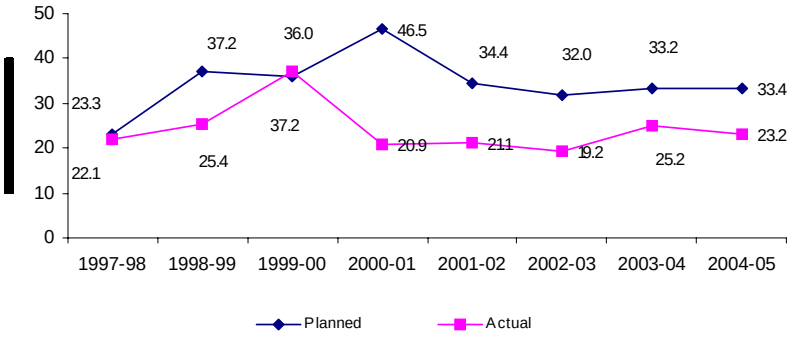


Figure 2. 4 Oil & Gas sector: Planned and Actual Investment

SOURCE Compilation from Annual Plans, Planning Commission, Government of India (2000-01 to 2005-06)

As in the power sector, the actual investments in oil & gas sector have consistently fallen short of the planned outlays, to the magnitude of Rs. 180.9 billion in Ninth Plan and Rs. 74.1 billion in the first three years of the Tenth Plan. The actual realization/achievement of planned outlay for this sector in the Ninth Plan is estimated at 66.8%.

In the coal sector, the cumulative investment in the Ninth Plan period was about 71.5% of the approved outlay. On the other hand, the anticipated expenditure in initial three years of the Tenth Plan

is only 18.1% of the target[12]. The trend of planned and actual investment in the coal sector is presented in Figure 2.5.

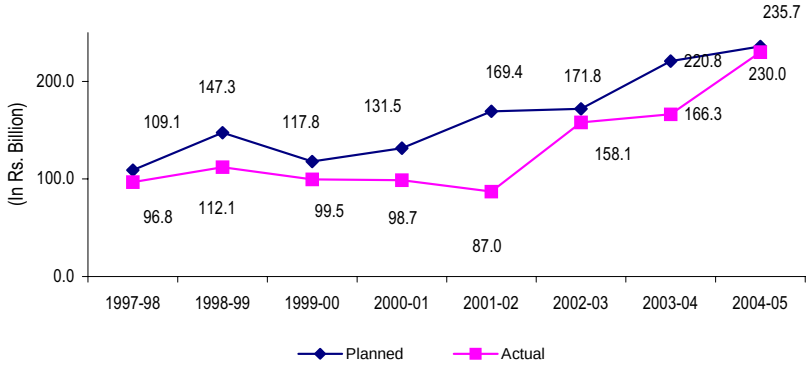


Figure 2. 5 Coal Sector: Planned and Actual Investments
SOURCE Compilation from Annual Plans, Planning Commission, Government of India (2000-01 to 2005-06)

For the coal sector, the aggregate gap between planned and actual investments stands at Rs. 50.6 billion during the Ninth Plan and Rs. 31.0 billion in three years of the Tenth Plan.

It is clear from the foregoing analysis that there has been a steady under-utilization of plan funds across all energy sub-sectors. For the energy sector as a whole, the shortfall between envisaged public investments and actual expenditure is estimated at Rs. 487.3 billion in the Ninth Plan and Rs. 300.9 billion in three years of the Tenth Plan. If the current levels of shortfall continue, the aggregate deficit between planned and actual expenditure in Tenth Plan could be much higher than those witnessed in the Ninth Plan. Assuming that the shortfall in the next two years of the Tenth Plan is the same as the shortfall that has taken place in the first two years (Rs. 120.7 billion per annum on an average), the cumulative shortfall for the Tenth Plan period could be as high as Rs. 603.6 billion.

While there have been slippages between planned and actual investment, the government has set ambitious physical and financial targets for various energy sub-sectors. These are highlighted in Table 2.4.

12 Mid-Term Appraisal of the Tenth Plan, Planning Commission, Government of India

Table 2. 4 Investment requirements of the Indian energy sector

Sector	Investment Requirements
Power	Rs. 9000.0 billion (US$ 200 billion) during 2002-12[13]
Oil & Gas	Rs. 3465.0 billion (US$ 77 billion) during 2001-30[14]
Coal	Rs. 2846.9 billion (US$ 63.26 billion) till 2025[15]

To summarize, it can be said that against a massive investment requirements, there is currently a gap not only between required and envisaged investment, but also between planned and actual energy outlays.

2.2.3 Reduction of energy poverty

Improved access and affordability of energy sources to the poor can make a significant difference to their social and economic welfare and be a catalyst for human development. The energy-development linkage is multi-dimensional: energy indirectly impinges on every aspect of economic activity, enables use of equipments needed for improved productivity, enhances quality of life and well-being by fulfilment of nutrition, warmth and lighting needs and improves opportunities for greater access to information. By fulfilling these needs, access to energy services helps alleviate poverty, and in a broader sense, deprivation. Chambers (1989) traced deprivation to five inter-related cluster of disadvantages i.e. physical weakness (lack of strength, under-nutrition, ill-health and disability); isolation (physical remoteness, ignorance and lack of access to knowledge); income poverty (lack of income and wealth); vulnerability (increased exposure to contingencies and deprivation) and powerlessness (inability to cope and adapt to change). The role of energy services in breaking the deprivation trap is schematically depicted in Figure 2.6.

13 Add 100,000MW of capacity by 2012 to ensure 'power for all' and bridge the demand supply gap. (Source: India's Electricity Sector – Widening Scope For Private Participation, Ministry of Power, GoI)
14 Oil Sector Investment Requirement: US$ 32 billion, Gas Sector: US$ 45 billion (Source: International Energy Agency)'
15 Assure coal security through optimisation of indigenous coking and non-coking coal production and investment in coal properties abroad to accrete overseas coal reserves (Source: Vision Coal 2025, Ministry of Coal, Government of India)

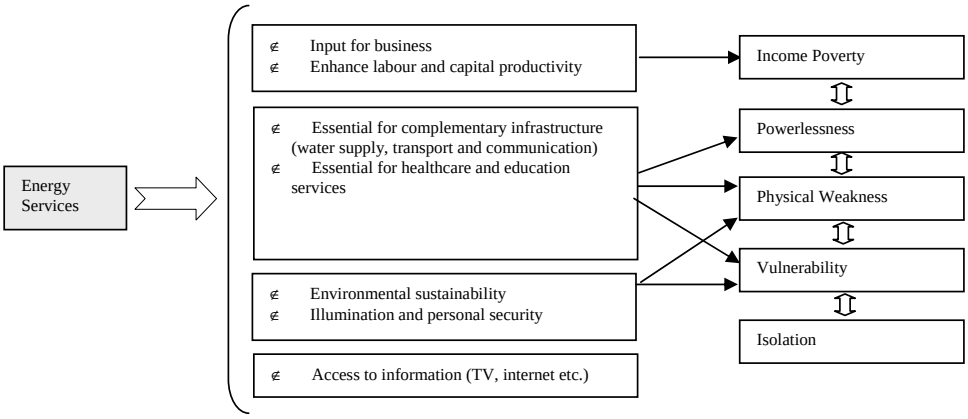


Figure 2. 6 Role of energy services to break the deprivation trap

SOURCE Poverty Reduction through Energy Projects, TERI (2000)

Harris (2003) has highlighted that private participation in infrastructure (including electricity) has potential benefits such as increased investment to bring service to new consumers, lower prices and improved productivity and efficiency. Nevertheless, private provisioning and competition are often criticised on the grounds that they adversely impact the poor, and lead to greater opportunities of corruption. Traditional energy sector policies have addressed the access concern by stipulating universal obligations for the incumbents and imposing cross-subsidies aimed at improving affordability to the poor. In a number of countries, traditional policies are being supplemented or replaced by sector reforms aimed at enhancing competition, reforming regulation, and securing a greater role for the private sector to finance and manage energy networks. However, the challenge confronting policymakers is to create a competitive energy marketplace that not only fosters investment and efficiency but also improves national welfare, particularly that of the poor. Such a regulatory and legislative framework must also have strong incentives for innovation in delivering energy services to the poor. For instance, a competitive energy market place might foster development of new electricity generation and distribution technologies that involve greater community participation. This could be especially helpful for improving access to the poor and fostering adoption of efficient energy channels among Indian households.

The British experience of liberalized retail energy sector[16] and its impact on fuel poverty[17] indicates a fairly positive outcome,

16 The UK Government initiated liberalization of gas and electricity markets in 1996. The programme, which culminated in 1999, meant that domestic consumers in Britain had choice of their supplier.
17 According to the UK Fuel Poverty Strategy, issued in 2001, a household is in fuel poverty if, in order to maintain a satisfactory heating regime, is would be required to spend more than 10% of its income on household fuel use.

especially on the impact competitive energy market has had on low-income consumers. To ensure that the competitive market is not less attractive to poor consumers, the UK Government adopted the following measures:

- Introduction of duties/obligations in the new Utilities Act 2000 relevant to tackling fuel poverty. The Act places an obligation over energy suppliers to provide a range of services to pensioners, disabled and chronically sick people; to offer energy efficiency advice and to ensure safety of supply to low-income consumers.
- In 2000, the Office of Gas and Electricity Markets (OFGEM) brought-out a Social Action Plan, which primarily aimed at ensuring that consumers have a range of tariff options and payment methods to suit their income and consumption level. The plan also had provisions to introduce changes to the license conditions of energy suppliers so as to improve protection for disadvantaged consumers and to lay-down establishment of pilot projects for identifying the specific needs of such consumers.
- The industry was also encouraged to bring forward initiatives for tackling fuel poverty as part of their long-term commercial strategy.

In addition to above, the government programme has emphasized on improving access to financial services in areas having major concentration of poor people having fuel shortage.

Liberalization of energy markets has enabled consumers to choose from a number of alternative suppliers to British Gas, the incumbent in gas sector, and to Public Electricity Suppliers (PES), which were the regional monopolies for electric supply. The simultaneous focus on reducing fuel poverty has also enabled a reduction in such households from 5.1 million in 1995-96 to 1.2 million in 2003-04[18]. The Department for Environment, Food and Rural Affairs (DEFRA) has attributed over one-half of the reduction to income improvements, one-fifth to fall in energy prices in initial years of liberalization and another one-fifth to energy efficiency improvements. However, the average domestic energy prices, which had declined sharply in 2000-01, have risen sharply in 2005-06. The Government has attributed the rising prices to higher international coal prices, recovery of wholesale electricity prices from a relatively low base, increasing wholesale gas prices and introduction of EU Emission Trading Scheme in 2005. However, DEFRA has refrained from imposing energy price

[18] Fourth Annual Progress Report, The UK Fuel Poverty Strategy, Department for Environment, Food and Rural Affairs (DEFRA), Government of UK (2006)

controls or caps on the ground that it will tend to reduce supply, competition and innovation.

The UK experience on fuel poverty has the following lessons for India. First, competition in electricity retail supply and oil & gas distribution can result in improvements in consumer-choice both in terms of tariffs and services and technological innovations. Second, in a competitive scenario, energy pricing would need to be regulated closely and progressive tariff structures developed so as to strike a balance between revenue generation of utilities and the purchasing ability of poor households. Lastly, it is imperative not only to incentivize private participants through direct tax cuts and long-term financial benefits but also to lay-down and monitor obligations to effectively service the poor.

To achieve the objective of 100% household electrification over the next five years, the Government of India, in April 2005, launched the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGVVY). The scheme provides subsidy to the extent of 90% of the incurred capital expenditure and functions through deployment of franchisees for distribution of electricity in rural areas. Further, the Government offers direct subsidy on kerosene and LPG through an extensive distribution network, although there exist problems of parallel marketing and non-transparency. As usage of kerosene for rural lighting has an adverse impact on rural health, the Government needs to make available more efficient and clean energy sources to the poor. Private participation and competition could be a possible solution to the multiple challenge of access, affordability and innovative solutions to alleviate energy poverty. However, to incentivize private participation, it is imperative to create an enabling environment that minimizes entry restrictions and provides level playing field to all market participants.

2.2.4 Experience of other infrastructure sectors – Telecom & Civil Aviation

2.2.4.1 Telecommunications

Till the initiation of reforms in the early 1990s, India's telecommunications network was almost entirely controlled by the government, which performed various roles ranging from licensing, policy-making, regulations, service provision and equipment manufacturing. The first move towards facilitating network creation by private entrepreneurs was initiated in 1992 when the government allowed private sector to provide 'value added services', which included cellular mobile services. Subsequently, in 1994, the National Telecom Policy (NTP) was announced, thereby marking a shift in government policy from self-reliance to seeking supplemental external resources for the growth of telecom services. However, NTP-94 laid limited emphasis on competition and its potential impact on reducing prices or improving quality. Further, in the absence of an independent regulator, existence of legal

disputes and allegedly non-transparent bidding process for basic and cellular services, the progress of the deregulation was slower than anticipated. In 1997, government established the Telecom Regulatory Authority of India (TRAI) as an independent regulator for the sector.

Between 1994 and 1999, the private operators faced severe financial losses caused by their commitment to a high license fee and, subsequently, high tariff rates to recover these costs. Faced with this crisis, the government announced a New Telecom Policy in 1999 for ushering-in greater competition in almost all telecom sub-sectors. Under the new policy, the fixed licence regime was replaced by revenue sharing arrangement as means to pay license fees. The policy further clarified the roles and powers of the TRAI. In 2000, with the enactment of TRAI (Amendment) Act, the telecom regulator was split-up into two agencies i.e. a "new" TRAI, divested of all its adjudicatory and dispute-settling powers, and Telecommunications Dispute Settlement and Appellate Tribunal (TDSAT). Till date, the regulator has taken several decisions that have impacted market structure and competition. In particular, TRAI has played an active role in tariff rebalancing, establishing interconnection rules, mandating account separation and administering the provision of Access Deficit Charge (ADC) to the incumbent operator (i.e. BSNL).

Regulatory and policy initiatives like Calling Party Pays (CPP) and Unified Licensing Regime (ULR) introduced in the sector have led to a phenomenal growth in the subscriber base and investment and a decline in end-user tariffs. The industry structure has also witnessed a change with several private operators competing with incumbent service providers. While incumbent operators control a majority of fixed line service, the private cellular operators service over 78.2% of the mobile segment. In addition, 44% of internet segment and entire V-SAT market is serviced by private operators. In 2004-05, the level of competition, as measured by the HHI Index, was estimated at 0.16 for mobile segment and 0.67 for basic segment. Correspondingly, the HHI Index[19] for China stood at 0.58 and 0.40. This shows that the Indian mobile market is much more competitive compared to the Chinese mobile market. The growth of subscribers, teledensity and Foreign Direct Investment (FDI) details are highlighted in Table 2.5.

[19] HHI Index: 1 – Monopoly, 0 – Pure Competition and less than 0.50 – moving towards competition

Table 2. 5 Telecom growth indicators (1997-98 to 2005-06)

	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Number of subscribers									
(In million)	18.7	22.8	28.6	36.3	44.9	54.5	76.5	98.1	139.8
Overall teledensity	1.9	2.3	2.8	3.5	4.3	5.1	7.0	8.9	12.7
Urban	5.8	6.8	8.2	10.4	12.2	14.3	20.8	26.9	28.3
Rural	0.4	0.5	0.7	0.9	1.2	1.5	1.6	1.7	1.9
FDI Inflows (In Rs. million)	17756.4	2126.7	2885.8	39709	10815	3014	874.2	5880	7630

SOURCE Websites of TRAI and Department of Telecommunications (Accessed on 18th January, 2007)

It is observed that the total number of telecom subscribers has increased at a CAGR of 28.6% from 18.7 million in 1997-98 to 139.8 million in 2005-06. The teledensity has also increased from 1.91 in 1997-98 to 12.7 in 2005-06. As regards investments, a significant amount of private investments have been made in the telecom sector recording one of the largest foreign direct investments (FDI) made in the country. It is to be noted that this has been possible due to appropriate reform aiming to introduce competition and technological advancements in the telecom sector.

While telecom service is available in 89% of villages in India, statistics reveal that the urban-rural gap in teledensity has widened since 1997-98. For instance, in March 2006, teledensity in urban areas was 28.3 and in rural areas was 1.9. This indicates that the rural teledensity is a mere 6.5% of urban teledensity. The regulator has attributed the rising urban-rural divide to the limited competition in rural mobile telephone segment, which continues to be funded mostly by the incumbent operator. Further, increased competition in telecom services has led to a consistent decline in end-user tariffs and average revenue per user (ARPU).

Even though India's telecom sector has experienced rapid growth, there exist certain issues that impinge on competition. Major issues include the duration for obtaining network interconnection with incumbent operator, lack of infrastructure sharing and high level of regulatory levies and duties on the service providers. In addition, the existing statute does not mandate the telecom regulator to have a working level relationship with the Competition Commission of India (CCI).

2.2.4.2 Civil Aviation

Until 1994, when the Air Corporations Act 1953 was repealed, the government had a monopoly over all aspects of India's Aviation sector. This included the scheduled air transport services, which were exclusively provided by the incumbent operators i.e. Indian Airlines and Air India. The Directorate General of Civil Aviation (DGCA) was responsible for granting flying licenses, certifying aircrafts for flight and issuing rules and procedures governing Indian airports and airspace. The Airports Authority of India (AAI)

was entrusted with the responsibility of administering all national and international airports and managing air transport operations through the Air Traffic Control. Since the early 1990s, the government has initiated policy measures to liberalize air transport services in India. Some of the major initiatives include: (a) announcement of a cargo 'Open Skies' policy for international flights; (b) permission of non-state owned airlines to enter the Indian market and (c) gradual liberalization of bilateral air service agreements with third countries. Due to these initiatives, by April 1998, there were 7 scheduled private operators that operated alongside Indian Airlines and 27 non-scheduled operators. However, many of these airlines had to subsequently wind-up operations due to lack of financial resources and knowledge on the sector, frequent shifting of routes and operational inefficiencies.

Further, the government has made amendments to AAI Act to provide greater operational and managerial independence to private airport operators. In 2003, a high-powered committee on Civil Aviation was constituted with the mandate to examine inconsistencies in the aviation sector policy. The major recommendations of this Committee include:

1. Unbundling of AAI and corporatisation of airport management
2. While the larger airports could be managed by an independent corporate entity, the smaller ones could be grouped together on a regional basis and corporatised.
3. Form an independent regulator to administer pricing, as airport services have monopoly characteristics.

Based on these recommendations, the government proposes to position an economic regulator for Civil Aviation, thereby restricting the role of DGCA to air traffic control, security and safety.

Recent policy initiatives in the sector include introduction of limited Open Sky Policy, strengthening of international airline tie-ups to overcome capacity constraints and modernization of airports in metro cities such as Delhi and Mumbai and greenfield airports in Hyderabad and Bangalore. In 2006, the government allowed greater flexibility to private airport developers in deciding the oil company to source their requirement of aviation turbine fuel (ATF) for airlines.

With rapid changes in the policy scenario, competition in scheduled air transport services has increased and the market structure has evolved from monopoly to oligopoly. Currently, there are 9 private operators in the domestic segment and 2 private operators have been allowed to ply on international routes. Further, as many as 7 operators are scheduled to commence domestic carrier services in 2007. The entry of new players in the

domestic marketplace has led to drastic decline in the market share of incumbent operators (by passenger traffic) from 100% in 1994-95 to 35.3% in 2004-05[20].

Competitive pressures, especially due to the rapid expansion of the low cost carrier (LCC) segment, have led the incumbent operators to offer discounts on some routes. Such discounts along with rising ATF price and staff costs have instead negatively impacted the financial health of operators. On the demand side, lower fares and access have fuelled increased demand for air travel. There has, therefore, been an increase in both the width and depth of consumption of air services. The passenger, freight and aircraft movement since 1995-96 are highlighted in Table 2.6.

Table 2. 6 Civil aviation growth indicators (1995-96 to 2004-05)

	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Total passengers (million)	370.1	364.9	366.3	389.8	390.3	420.2	399.8	437.2	487.7	592.8
Freight loaded (million tonnes)	0.65	0.68	0.71	0.70	0.80	0.85	0.85	0.98	1.07	1.28
Aircraft movement (million)	0.41	0.42	0.42	0.42	0.47	0.49	0.51	0.56	0.64	0.72

SOURCE Websites of Ministry of Civil Aviation and Directorate General of Civil Aviation (DGCA), Government of India (1997-98 to 2005-06)

It is observed from the above table that between 1995-96 and 2004-05, the total passengers, freight loaded and aircraft movement have increased at a CAGR of 5.4%, 7.8% and 6.5% respectively. While the aviation marketplace has expanded, there remain entry barriers relating to the government stipulation of maintaining a minimum fleet size and subscribed equity capital for domestic air transport operators, pricing strategy of carriers and commercial tie-up between Indian (incumbent) and AAI for airport handling.

2.2.4.3 Lessons for competition in the energy sector

While there are many competition issues in telecom and civil aviation sectors, there is no denying the fact that the government has progressively introduced measures for inviting greater private sector participation. Even though both these sectors have different characteristics vis-à-vis the energy sector, there is some commonality in the initial conditions that facilitated their deregulation. For instance, the telecom sector was characterized by low levels of access, poor quality of service and unavailability of value added services before its deregulation. With the introduction of reforms and competition-enhancing initiatives, teledensity and access have increased and mobile tariffs are among the cheapest in the world. On the contrary, the urban-rural divide has widened and

[20] Directorate General of Civil Aviation, Government of India

ARPU of operators has shown a downward trend. In the civil aviation sector, competition has increased both availability and affordability of air services. However, as with the telecom sector, competitive pressures in Indian aviation services are exerting pressure on the bottom line of both the incumbent and private operators.

Competition in energy markets is likely to not only ensure maximum efficiency gains but also send appropriate pricing signals that align consumption with production. Besides, there exist potential end user benefits on account of better quality of service and improved access. It has been highlighted in the earlier analysis that there exist huge investment requirements in India's energy sector. To realize this scale of investments, it is pertinent to liberalize energy markets and promote competition therein. Competitive markets are in fact self-regulated with level playing field being provided to all players irrespective of their ownership tend to facilitate investment flows that are required to bridge the demand-supply gap. It is well known that Indian consumers pay one of the highest charges for energy on purchasing power parity basis. It is assumed that with introduction of competition and resultant efficiency improvements, the price levels could be brought down and be made more cost reflective. This has been the case in the UK electricity market, where competition introduced in generation segment has led to fall in tariffs to the tune of 40% between 1998-2002 while transmission and distribution charges have come down by 32% since 1995 (Thomas S., 2005).

In summary, while the context and objectives of reforms in India's telecom and civil aviation sectors might be different from the energy sector, the basic element of competition as a tool to achieve efficiency gains and stimulate investments remains valid. The success of competition in lowering prices, bettering quality of service and promoting energy access to all could be realized only through a careful engineering of the competition process keeping in view the local institutional constraints and the prevailing political and social milieu.

2.2.5 Potential benefits of competition – Perception survey findings

Theoretically, competition in any sector not only results in structural changes and productivity growth but also impacts the overall consumer welfare by improving access and quality of service and by reducing end-user tariffs.

To validate this contention, TERI undertook a Perception Survey in October-December 2006. It also attempted to examine stakeholder opinion on the likely impact of competition and PSP in the energy sector as well as assess the existing regulatory and structural hurdles to competition and to investigate future strategies for

enabling a competitive environment in the sector. The research methodology, approach and respondent profile are presented in Annexure 2.1.The survey findings for consumers and non-consumers are presented in Table 2.7.

Table 2. 7 Potential benefits of competition – Perception survey findings

Benefit from competition	Consumers	Non-Consumers
Service expansion/Access	Substantially Positive (50%)	Substantially Positive (72%)
Quality of Service – Reliability and Continuity	Substantially Positive (77.8%)	Substantially Positive (80%)
Efficiency of State Owned Utilities	Substantially Negative (55.6%)	Moderately Positive (56%)
Bridging the demand-supply gap in provision of key energy inputs/outputs	Moderately Positive (55.6%)	Substantially Positive (52%)
Market-oriented end-user tariffs	Moderately Positive (55.6%)	Moderately Positive (68%)
Overall Investments in the Sector	Substantially Positive (55.6%)	Substantially Positive (68%)
Income Inequality and Poverty	Moderately Negative (44.4%)	Moderately Positive (52%)

SOURCE TERI Survey (2006)

The survey clearly highlights that a majority of respondents (both, consumers and non-consumers) view that competition will result in greater service expansion, improved reliability and continuity of service and greater overall investments. However, there seems to be a divergence of stakeholder opinion on efficiency of state owned enterprises and income inequality.

In view of the discussion in this section (i.e. widening demand-supply gap, persistent shortfall in public investment targets, high investment requirements to meet targets, high level of energy poverty and benefits other infrastructure sectors have reaped through introduction of competition), it becomes imperative for the Government to create an enabling environment that fosters competition and helps attract greater private participation in the sector. The next section discusses the key elements of a competitive environment for the energy sector.

2.3 Creating an enabling environment for competition

In broad terms, a competitive environment refers to the macro-economic set-up (comprising of regulatory, policy and institutional framework, sound governance standards, existence of well-functioning financial institutions, public-private partnerships etc.) that fosters competitiveness and growth of players in the marketplace.

International experience suggests that credible and stable regulation plays a central role in the transition of the energy sector from a monopolistic to a competitive environment. Among other things, a sound regulatory framework helps to ensure level playing field for all players, non-discriminatory treatment to all consumers and fair access to bottleneck facilities controlled by the incumbent service providers. However, the biggest challenge for policymakers in various countries has been to develop independent regulatory oversight mechanisms that help enforce regulations and create a more competitive environment for energy sector. In this regard, Holder and Stern[21] (1999) and Noll[22] (2001) have suggested six characteristics of regulatory governance for infrastructure (including energy): coherence, independence, accountability, transparency, predictability and capacity.

In India, the full potential of the private sector to meet energy sector needs is still largely untapped due to the extent of risks, other than normal business risks, that are sufficiently significant to deter entry as well as discourage private entrepreneurs to participate more freely. These non-business risks could largely be attributed to inconsistent policies, lack of effective regulatory governance and flawed institutional set-up. While these impediments have been identified for each of the energy sub-sectors in subsequent chapters of this report, the TERI Perception Survey attempted to have the opinion of private players and consumers on issues that need to be resolved for enabling a competitive environment in the sector. The results are given in Table 2.8.

Table 2. 8 Measures to enable a competitive environment

Measures	Non-consumers	Consumer	Compiled
Strengthen regulatory framework to ensure non-discriminatory treatment to all players	Major	Moderate	Major
Streamlining approval and clearance mechanism	Major	Low	Major
Remove pervasive pricing distortions in the electricity, oil & gas and coal sectors	Major	Major	Major
Reducing monopoly power of incumbent organizations	Major	Moderate	Major

SOURCE TERI Survey (2006)

The survey findings clearly show that the non-consumers accord high importance to strengthening the regulatory framework, which not only comprises of sound regulations but also their proper

[21] Stern J. and Holder S., Regulatory Governance: Criteria for assessing the performance of Regulatory Systems, London Business School and NERA (1999)

[22] Kessides Ed. I., Regulatory and Structural Assessment in the Network Utilities, Telecommunications Reform in Romania (2000)

implementation. Streamlining approval/clearance mechanism, removing pricing distortions and reducing monopoly power of incumbent organizations are also considered by non-consumers as major competition-enabling measures. However, removal of pricing distortions is the only major reform measure suggested by consumers for introducing competition in the sector. Some of the cross cutting issues are discussed below.

2.3.1 Strengthening the regulatory framework – Avoiding uncertainty and regulatory capture

In recent years, Government of India has taken several initiatives to increase competition through institutional, legislative and regulatory reforms. While electricity sector reforms have progressed both at the central and state level, the pace of reforms in oil & gas and coal sectors has been rather slow. For instance, although the Administered Price Mechanism (APM) for petroleum products was dismantled in April 2002, there currently exists no price competition at either the refinery gate or retail outlets. Further, the Petroleum & Natural Gas Regulatory Board (PNGRB) Act 2006 took almost four years to be ratified and the Coal Mines Nationalization (Amendment) Bill 2000 is still awaiting Parliamentary assent. Such legislative delays inherently add to uncertainty, which can act as a barrier to entry, as they raise doubts on the willingness of the policy makers to introduce greater private participation and competition in the sector.

Many legislative delays in India also occur due to changes in the Government or political mindset. In the words of a consumer group that responded to our survey '*Investors must be satisfied that their investment will at least make neutral returns before they look at opportunities. To this end, they must be assured of the continuity of existing policy regime, or the gradual move to a more favourable policy regime in the future. Given the lacunae in our political and constitutional system, it may be necessary to form a 'Standing Committee on Investments and Policy' comprised of senior bureaucrats from the Law Ministry and the Ministry of Commerce and senior policy makers representing diverse political parties. Such committee could oversee the approval of long-term projects and be empowered to compensate investors of policy commitments that are not kept or enforced.*

It is, therefore, imperative that policies/regulations are formulated in a time-bound manner and in consonance with well-established principles, are flexible and are effectively communicated and disseminated to all stakeholders. A noteworthy aspect of the Electricity Act 2003 and the Tariff Policy 2006 that could contribute significantly to enhancing regulatory certainty is the rate making process under Multi-Year Tariff (MYT) framework. The significance of the MYT framework and its implementation status across Indian states is discussed in detail in Chapter 3.

A related aspect is that of 'Regulatory Capture', which essentially means that the regulated entities, in the organised form, have a tendency and ability to influence the regulator to protect their own interests. Amongst various factors, regulatory capture arises in situations where the government is perceived to directly/indirectly intervene in the affairs of the regulator or the government functions both as a regulator and an operator or the regulator gets closely linked to a particular operator. As all these cases critically impact the overall operating environment, they have a direct bearing on private investment and competition in the sector.

2.3.2 Streamlining approval and clearance mechanism

Any new project is subject to a specific set of approvals, which could either be generic or sector-specific. The duration and procedure of obtaining approvals for land acquisition, construction, water and electricity connections, environmental clearances and other start-up procedures have a direct impact on viability of operations and, hence, competition in the sector. Once these approvals are obtained and project operationalized, there exist central and state inspections that aim at ensuring continuing compliance to requirements of various statutory bodies, acts and regulations, and providing the Government with statistics essential for future planning. In case these inspections are non-transparent, costly and time-consuming, they could negatively impact 'competition in the market'. It is well established that greater the number of inspections and approvals, the more are the possibilities of rent seeking. Streamlined approval and clearance mechanisms are therefore essential to ensure greater private participation and competition in any sector, including energy.

Realizing that approvals/clearances could impede new private investment in the electricity sector, the Ministry of Power invited competitive bids for Ultra Mega Power Projects[23] (UMPP) after undertaking the initial project preparation. This process involves site selection, assured linkages of coal supply and environmental sanctions. The revenue flow risk has been mitigated through payment security arrangements with state electricity authorities and through letters of credit and escrow accounts. While this procedural simplification holds for mega projects with minimum capacity of 4000 MW, the TERI Perception Survey suggests that the approval and clearance mechanism has been substantially streamlined even for non-mega projects. According to survey respondents, environmental and water-related clearances for power projects are the most cumbersome. Clearances for land acquisition (from state governments) and fuel linkage (from Department of Coal and Ministry of Petroleum & Natural Gas) also

[23] A detailed discussion on UMPP is given in Chapter 3 on 'Competition in India's Electricity Sector'

need to be streamlined. In the words of a survey respondent, '*clearances for new generation projects are not so much an issue any more. But in case of operating utilities, especially DISCOMs, the Government needs to institutionalize the Electrical Inspector Clearance by accredited third-party agencies instead of leaving it to few individual inspectors appointed by State Governments so as to avoid corruption and to develop proper compliance to all safety norms. Probably, this last bastion of inspector-raj is yet to be disbanded*'.

For the Indian oil & gas sector, the perception survey revealed that approvals required from the Ministry of Environment and Forests (MoEF) and State Pollution Control Boards as well as those needed for import of natural gas are considered major candidates for reform. In fact, the Standing Committee on Petroleum and Chemicals[24] also found that most projects related to the petroleum sector were delayed due to impediments in obtaining environmental clearances. The Committee also suggested that Ministry of Petroleum and Natural Gas (MoPNG) and MoEF should develop a joint mechanism in consultation with the state governments in order to facilitate early environmental clearances for pending projects.

To better understand the existing license/clearance/approval mechanism in various segments of the Indian oil & gas sector, TERI met representatives of some utilities. While a detailed segment-wise analysis of the clearances required is presented in Annexure 2.2, our interactions revealed that environmental and forest clearances are considered the most cumbersome. In September 2005, the MoEF initiated measures to re-engineer the clearance process and make it more effective and time-bound. Even though a final notification on the same was issued in September 2006, the operators do not foresee a substantial improvement over the existing mechanism.

In the Indian coal sector, the survey respondents considered the preference accorded to public enterprises for grant of prospecting license (PL) and mining lease (ML) as a major competition impediment.

2.3.3 Minimizing pricing distortions

Pricing is one of the most critical elements of energy regulation. This is because cost-reflective tariffs enable the utilities/operators to maintain, modernize and expand their facilities and services. Therefore, to create a competitive environment and reduce impediments to financial viability of energy provision, the regulatory framework should allow utilities to charge tariffs that

[24] Twentieth Report of the Standing Committee on Petroleum and Chemicals, Ministry of Petroleum and Natural Gas, Government of India (2001)

cover underlying costs. In the Indian context, while there has been some reduction in cross subsidy levels/tariff rationalization in the electricity sector, there exist imperfections and administrative control in pricing of oil & gas and coal. It is worth noting that controls on pricing of fuel inputs have a direct bearing on competition in the electricity sector. In recent years, there has been an increased recognition on the need for introducing cost reflective pricing across the energy sector. This is exemplified by the recommendations of the Rangarajan Committee Report[25] for petroleum products and the notification of National Tariff Policy 2006 for electricity sector.

2.3.4 Reducing market concentration

The creation of a competitive environment is hampered by the existence of monopolies or a few dominant players. Currently, India's energy sector has vertically integrated monopoly utilities, mostly owned and operated by the public sector. While the details of ownership pattern across the three sub-sectors are incorporated in the subsequent chapters, Table 2.9 provides an overview of the structural characteristics of India's energy sector.

Table 2. 9 Structural characteristics of India's energy sector

Energy sector	Ownership pattern
Electricity sector	
Generation	Public (87%), Private (13%)
Transmission	Public (100%)
Distribution & end-user supply	Public (87%), Private (13%)
Trading	Public (93%), Private (7%)
Oil & gas sector	
Crude oil exploration & production	Public (86%), Private (14%)
Natural Gas production	Public (77%), Private (23%)
Oil refining	Public (66%), Private (34%)
Marketing	Public (98%), Private (2%)
Coal sector	
Exploration, Production and Marketing	Public (93%), Private/Captive (7%)

SOURCE CEA General Review 2006 (published by Ministry of Power, Government of India, March 2006), CEA General Review 2006 (published by Ministry of Power, GOI, March 2006), TEDDY 2004/05, TERI, Petroleum Planning and Analysis Cell (PPAC) 2006 (www.ppac.org) Provisional Coal Statistics, Coal Controller's Organization, Government of India, Ministry of Coal

The existence of dominant utilities typically raises concerns on abuse of dominant position by virtue of lop-sided Government policies, economies of scale and ineffective separation of roles of incumbent provider and regulator. To address this concern, the Electricity Act 2003 initiated unbundling of vertically integrated electricity utilities with the underlying objective of delineating ownership of segments. At present, 14 states have unbundled/

[25] Report of the Committee on Pricing and Taxation of Petroleum Products (February 2006)

corporatized their State Electricity Boards (SEBs). However, many states are yet to unbundle their SEBs and there also exists cross-ownership issue in the electricity transmission and trading business i.e. Power Grid Corporation of India Limited (PGCIL)[26] owns a majority stake in Power Trading Corporation (PTC)[27]. In the oil & gas sector, while there has been a proposal to unbundle Gas Authority of India Limited into separate transmission and marketing entities, there exists cross-ownership among upstream and downstream segment public companies. On the other hand, the coal sector is almost completely dominated by Coal India Limited (CIL).

2.3.5 Encouraging non-discriminatory access to incumbent facilities

Another pre-requisite for enabling a competitive environment in energy sector is to establish and enforce regulations that ensure non-discriminatory access to incumbent facilities. For instance, in the electricity sector, market power can be mitigated and competition enhanced by promoting non-discriminatory access to monopoly transmission and distribution facilities through 'Open Access'. However, open access requires prior unbundling/ separation of generation, transmission and distribution activities. In the oil and gas sector, the regulator can introduce a 'common carrier principle', which stipulates non-discriminatory third-party access to an incumbent's pipeline infrastructure without differentiation in tariffs to various players.

2.3.6 Improving Inter-fuel substitution

A competitive environment requires efficient fuel choices and appropriate inter-fuel substitution. Theoretically, in such an environment, the marginal use value of different fuels, which can be perfect/imperfect substitutes, is equal at a given place and time, and the prices of different fuels at different places do not differ by more than the cost of transporting these fuels. It is therefore imperative that prices of different fuels are not set in isolation as is being done in India. Similarly, it is necessary to remove other policy, regulatory and legal impediments to inter-fuel substitution, especially between gas and coal for electricity generation. Inter-fuel substitution, if promoted, would not only expand India's energy mix but also reduce its supply risk.

2.3.7 Strengthening economy-wide governance standards

Effective governance, in public and private sectors, is essential for creating a competitive environment and encouraging private sector investment in any sector (including energy services). Ineffective public sector governance brought about by corruption, abuse of discretion and bureaucratic interference adds not only to cost but

[26] PGCIL is the Central Transmission Utility (CTU) and owns a bulk of India's transmission network.
[27] PTC India Limited is the dominant public sector organization involved in power trading

also to uncertainty and vulnerability of conducting business. Further, the competitive environment is impacted by corporate governance standards. More specifically, sound corporate governance provides confidence to lenders and investors and facilitates access to lower cost capital. The commercial laws and regulations that help foster corporate governance include accounting and auditing standards, disclosure rules, bankruptcy and foreclosure regimes and minority shareholder rights etc.

2.3.8 Well-functioning financial institutions and markets

Another important component of a competitive environment is the existence of robust financial institutions and diversified capital markets. Such a financial set-up reduces the risk of instability associated with sudden outflows of short-term capital. Financial intermediaries like banks, insurance companies, leasing companies, securities firms, and pension fund management companies have an important role to play in funding and supporting energy projects. Generally, energy projects are financed through a combination of soft loans, grants, country funds, private investment and participation of multilateral and bilateral organizations. Therefore, private participation in energy projects crucially depends on the soundness of financial infrastructure and supporting regulations.

Apart from the above, competitive environment in the energy sector can be fostered by establishing a transparent bidding process, reducing transaction costs of lengthy government processes and strengthening state utilities dealing with private sector either as output off-taker or input supplier. There also exist institutional issues (i.e. design of the energy regulatory agency, coordination between CCI and sector regulators and capacity building of various stakeholders on competition issues) that need to be addressed for enabling a competitive energy sector. These are discussed in Chapter 6 of this report. Before we summarize the take-away of this chapter, the next section highlights some of the important findings of TERI Perception Survey.

2.4 Important findings of the perception survey

- About 51% of the survey respondents (consumers and non-consumers) opine that India has made moderate progress towards deregulation and greater PSP. Only 5.7% of the respondents rated the reforms as 'above average'. The remaining respondents (31%) believe that the progress has been 'below average'. However, a break-up of respondents into consumers and non-consumers reveals that consumers are more dissatisfied with the reform progress. This is evident from the finding that 50% of the consumers believe that 'below average' progress has been made, while only 24% of the non-consumers share the same opinion. This does not necessarily

mean that non-consumers are benefiting more from the pace of deregulation compared to the consumers.

Á Existing literature suggests that some energy segments are structurally constrained by natural monopoly characteristics, while others are amenable to competition. Accordingly, the survey not only attempted to validate this structural distinction but also tried to gauge stakeholder opinion on existing and likely level of competition in these segments. The survey shows that there is overall pessimism on competition in the energy sector as no segment is rated 'potentially competitive' and four segments are viewed to have 'limited' competition. Even in segments of the oil & gas sector, where private interest has substantially increased in recent years, the respondents opine moderate competition. The key survey findings are summarized in Table 2.10

Table 2. 10 Existing level/likelihood of competition

	Consumers	Non-consumers	Combined
Electricity sector			
Generation	Limited (50%), No response (30%)	Moderate (56.0%)	Moderate (42.9%)
Transmission	Limited (60%)	Limited (80%)	Limited (74.3%)
Distribution and End-user Supply	Moderate (44.4%)	Limited (80%)	Limited (67.6%)
Oil & gas sector			
Exploration and Production (E&P)	Limited (55.6%), No response (33.3%)	Moderate (43.5%)	Moderate (34.4%)
Oil Refining and Marketing	Limited (55.6%)	Moderate (56.5%)	Moderate (43.8%)
Crude and Product Pipelines	Limited (50%)	Limited (43.5%)	Moderate (51.5%)
Gas Transportation and Marketing	Limited (71.4%)	Limited (43.5%)	Moderate (71%)
Coal sector			
Exploration and Production	Limited (87.5%)	Moderate (73.9%)	Limited (82.8%)
Transportation	Moderate - Limited (50%)	Moderate (60.9%)	Limited (60.7%)

SOURCE TERI Survey (2006)

The survey findings are somewhat contrary to our literature review for two segments i.e. electricity end-user supply and coal E&P, both of which are segments where competition could ideally be introduced. These aspects shall be probed further in the sector-specific survey. To create an enabling environment for competition in the energy sector, the survey respondents have suggested the following points:

Non-consumers

a. The private sector requires greater regulatory handholding and cooperation with incumbent utilities, especially in the early phases of deregulation.
b. The government should endeavour to progressively reduce bureaucratic hassles and allow freedom to private utilities so as to enable operational decisions that are based on sound commercial logic.

c. There is a need to harness and develop fuel usage based on the available fuel mix of a region. It is therefore suggested that North India could rely on its hydro-potential; East, West and Central could develop coal-based usage and South could more fully exploit its nuclear and non-conventional energy sources. Such strategy could not only reduce fuel transportation costs but also mitigate India's rising import dependency for these resources.

Consumers

a. *Competition in oil & gas sector is severely constrained* by the absence of independent regulator and lack of level playing field
b. The Government has yet to promote Public-Private Partnerships (PPP) in energy sector in a big way

∉ Apart from structural issues that make competition inherently difficult, there exist certain public policy issues that erect entry barriers and restrict competition. The survey findings on these issues is presented in Table 2.11:

Table 2. 11 Barriers to competition in India's energy sector

	Consumers	Non-consumers	Combined
Structural issues			
Natural Monopoly characteristics of key segments	Major (50%)	Moderate (52.2%)	Major (48.5%)
High sunk costs in planning and implementation of energy schemes	Major (66.7%)	Moderate (52.2%)	Major (46.9%)
Ineffective separation of potentially competitive segments from monopoly segments	Major (55.6%)	Major (56.5%)	Major (56.3%)
Public policy issues			
Inadequate regulatory/policy/legal framework	Moderate (60%)	Moderate (47.8%)	Moderate (51.5%)
Incumbency benefits for existing public sector monoliths	Moderate (66.7%)	Major (47.8%)	Major (43.8%)
Existence of distribution controls – Linkages	Moderate - Major (37.5%)	Major (52.2%)	Major (51.5%)
Existence of price controls and distortions	Moderate - Major (37.5%)	Major (82.6%)	Major (71%)
Absence of political will to reform	Major (66.7%)	Major (86.4%)	Major (80.6%)
Inadequate/Improper implementation of competition-enhancing provisions of various energy sector legislations [Electricity Act 2003 and Coal Mines (Nationalization) Amendment Bill]	Major (55.6%)	Major (54.2%)	Major (54.5%)
Clearances/Approvals required for establishing a new project	Moderate (66.7%)	Moderate (43.5%)	Moderate (50%)

SOURCE TERI Survey (2006)

It can be observed from Table 2.11 that while the respondents view inadequacy of regulatory, policy and legal framework to be a moderate impediment to competition; the lack of proper implementation of these policies is consensually (54.5%) viewed as a major barrier. In other words, to foster the development of

competitive energy market, the survey indicates the criticality of a cohesive approach to implementation of existing policy. Further, the lack of political will to reform (80.6%) and existence of price controls and distortions (71.0%) are viewed as the most important entry barriers.

Apart from the structural and public policy issues, competition could also be impeded by presence of regulatory barriers, public sector mindset and private restrictive practices. These issues are discussed in chapter 3 for the electricity sector, chapter 4 for the oil & gas sector and chapter 5 for the coal sector.

2.5 Summary

In sum, this chapter primarily highlights the need for competition in India's energy sector and the pre-requisites to enable the same. Summarized below are the key points that emerge from the above discussion.

- Á Currently, there exists a massive demand-supply gap in India's energy sector. This not only has implications for the country's energy security but also constrains its overall economic growth prospects.
- Á The envisaged public investment in the energy sector (as per five-year plans) is much lower than the desired level (Rakesh Mohan Committee & World Bank). Further, actual investment in each energy sub-sector has fallen short of the envisaged/planned levels. Other sources of investment viz. private capital and bilateral/multilateral funding have also not been forthcoming in successive plan periods. In light of the consistent investment shortages, the ambitious growth targets laid down in various energy sub-sectors may not be realized.
- Á Private participation and competition help introduce affordability and innovative solutions (services and tariff) to alleviate energy poverty. However, in a competitive marketplace, pricing will have to be closely regulated as is evident from the UK experience. Further, incentives to attract private participation needs to be complemented with clear obligations to service the poor.
- Á In other infrastructure sectors such as telecom and civil aviation, competition has led to lower prices and better quality of service. However, improved access to all can only be achieved through careful engineering of the competition process keeping in view the institutional constraints and the prevailing socio-economic conditions.
- Á Certain measures such as avoiding regulatory uncertainty & capture, streamlining approval/clearance mechanism, minimizing pricing distortions, reducing market concentration, encouraging non-discriminatory access to

incumbent facilities, strengthening economy-wide governance standards and well functioning financial institutions and markets can help enable a competitive environment in India's energy sector.

- The TERI Perception Survey indicates that even though the stakeholders consider inadequacy of legal/regulatory and policy framework as a 'moderate' competition concern, the lack of proper implementation of policies is consensually viewed as a 'major' impediment in energy sector.

The subsequent chapters discuss the specific competition issues in the electricity, oil & gas and coal sectors and the possible role of CCI to address the same.

CHAPTER 3 Competition issues in India's electricity sector

3.1 Overview

The developing countries, with over 75% of the world's population, are increasingly contributing to global energy demand growth. Substantial growth in new electricity consumption is expected to come from the developing world. However, in several countries, the rising demand has not been commensurately fulfilled and there remain concerns of access to reliable electricity provision, as well as poor quality of supply. Such electricity shortages have a direct bearing on the economic development and prosperity of any nation. For instance, these deficiencies could prompt the manufacturing sector to make massive investments in stand-by or stand-alone captive facilities. It is therefore imperative to augment investment in electricity infrastructure not only from public sources, but also through private capital. In this context, an enabling regulatory framework, which facilitates private participation and hence competition plays an important role.

The electricity sector, the world over, is typically characterized by natural monopoly conditions, externalities and public good characteristics. For any commodity market, the sector's core structure is determined by the interaction between demand and supply attributes. However, this interaction is mostly imperfect, because the supply side cannot store its output and the demand side falters owing to low elasticity and high consumption variability. Therefore, the market for electricity is fundamentally different from other commodity markets, and this significantly complicates its underlying industry structure.

Broadly, the electricity sector can be divided into four segments: generation, transmission, distribution and retail supply. Of these, generation and retail supply are potentially competitive while transmission and distribution functions are monopolistic in nature, and thus, difficult to liberalize.

Given the functional separation of the electricity sector, the most simplistic model involves vertical integration of various segments within an individual utility. With electricity sector restructuring, the vertically integrated utility gives way to a number of specialized market players across different functional lines. The general design of a vertically integrated monopoly utility is presented in Figure 3.1.

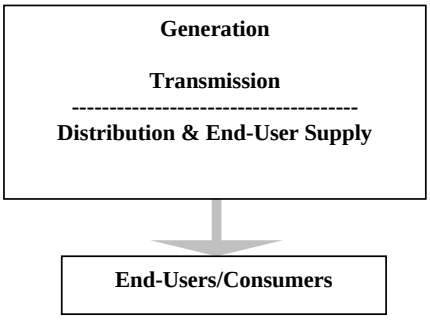


Figure 3. 1 Design of a vertically integrated utility

A vertically integrated utility, which operates and manages both the monopoly (transmission and distribution) and the competitive functions (generation and retail supply), has an incentive to hamper competition and distort efficient market functioning. For instance, the grid monopolist may impose discriminatory access conditions and charges, or may undertake strategic investment in network augmentation that puts competitors at a disadvantage. The monopolist can also enter into long-term contracts that block transmission capacity or favour a biased development of the transmission network. Unbundling or separation of functional components is widely considered as a policy option to counter the ability of vertically integrated utilities to distort competition. Preliminary literature survey on competition in electricity markets reveals that unbundling of a vertically integrated utility could typically result in three major models i.e. Wholesale, Retail and Portfolio Manager Model. These are discussed in Annexure 3.1.

In most countries, electricity sector reforms have been fairly recent, focusing on privatisation of State-Owned Enterprises (SOEs), separation of potentially competitive segments from natural monopoly ones and creation of competitive wholesale and retail markets apart from positioning independent regulatory framework. The drivers for such reforms have been rapid technological innovations; need to reduce cross-subsidies and overcoming organizational inertia in public utilities. While technological advancements have reduced the economically efficient plant size, unbundling is being considered necessary to improve efficiency and introduce competition. Further, to attract new investment and improve efficiency of monopoly utilities, various countries have initiated progressive liberalization of the electricity sector.

As mentioned earlier, electricity sectors in almost every country have evolved with vertically integrated geographic monopolies that have been either publicly owned or subject to public regulation of prices, service obligations, major investments, financing, and

expansion into unregulated lines of business. This meant that the primary components of electricity provision - generation, transmission, distribution, and retail supply - were integrated within individual electric utilities.

The basic structure for transition to competitive electricity markets has already been developed in theory and applied in practice in other countries (e.g. England and Wales, Norway, Argentina)[28] . This is explained in greater detail in Annexure 3.2. The transformation of a regulated monopoly electricity industry into one that relies on competition to supply power at the wholesale and retail levels is highly challenging. The physical and economic attributes of electricity significantly complicate the task of replacing the existing monopoly structure with competitive market mechanisms. In this context, this chapter reviews the structural and regulatory requirements as well as nature and source of anti-competitive factors in India's electricity sector.

Electricity industry worldwide has undergone significant changes paving the way for creation of a power market and introduction of competition in wholesale and retail trading of power. There exists significant international experience with regard to retail market supply and competition. Annexure 3.3 gives a detailed historical market structure of the electricity sector in United Kingdom (UK) and United States of America (USA) and the dominant phases towards introducing a competitive structure.

This chapter has been divided into the following sub-sections:

- *Indian electricity sector- size, structure and ownership pattern*: This sub-section discusses the market structure of the electricity sector in India viz. generation, transmission, distribution and trading, and summarizes the salient features of each segment.

- *Legal and regulatory framework of the electricity sector - the competition context*: The key provisions of the dominant legislations and policies viz. the Electricity Act 2003 (herein referred to as the Act or EA 2003), the National Electricity Policy 2005 and the National Tariff Policy 2006 are discussed in this sub-section with particular emphasis on competition enabling provisions.

- *Role of regulators in facilitating competition and status of competition enabling regulatory initiatives*: The

[28] Joskow L. Paul, "The difficult transition to competitive electricity markets in the U.S.", Joint Center, AEI-Brookings Joint Center for Regulatory Studies Publication, Texas A&M University, July 2003, Prepared for the conference "Electricity Deregulation: Where From Here?" at the Bush Presidential Conference Center. Texas A&M University, 4th April 2003.

legislation enabling the setting up of autonomous regulatory bodies at the central and the state levels and important provisions of the EA 2003 to promote competition in the electricity industry with regard to (a) unbundling of state electricity boards by a stipulated date, (b) issuance of tariff orders by regulatory commissions, (c) open access in transmission and distribution in phases, (d) recognition of trading as an independent activity and (e) implementation of a multi-year tariff framework by regulatory commissions, are discussed in this sub-section along with the status of these reform measures in different states.

- *Competition and rural electricity coverage*: This sub-section discusses the key initiatives that have been undertaken by the Central Government to improve rural electricity coverage and also highlights the important provisions of the recently notified rural electrification policy with regard to competition.

- *Nature and source of anti-competitive factors*: The issues and impediments that are envisaged to slow down the progress of competition in the electricity sector are discussed in this sub-section. The primary factors that have been identified as being responsible for such barriers are, (a) structure/market construct of the electricity sector, (b) policy, regulatory and legal impediments and (c) public and private sector institutional bottlenecks.

- *Perception Survey Findings:* This sub-section discusses the stakeholder opinion (consumers and non-consumers) through a perception survey that was conducted, on the potential impact of key policies and appraises the progress on competition-enhancing parameters in India's electricity sector.

3.2 Indian electricity sector – Size and structure

3.2.1 Generation Segment

India's electricity sector has grown substantially since independence, from an installed capacity of 1362 MW in 1947 to 143772 MW as on 31st March 2006[29], representing a CAGR (compounded annual growth rate) of 8.4%. Despite this growth in the installed capacity, the per capita consumption of electricity in India is 606 kWh, as compared to the world average of 2429 kWh[30]. As regards fuel mix, the total capacity consists of 82065 MW of

[29] Ministry of Power, Government of India (GOI) Website: www.powermin.nic.in accessed in December 2006
[30] IEA Energy Statistics (2003)

thermal, 32135 MW of hydro, 3310 MW of nuclear and 6158 MW of renewable sources with coal remaining the mainstay resource for electricity generation. However, emphasis is being increasingly laid on non-conventional energy sources, especially biomass, solar, and wind for grid and off-grid applications. The Ministry of Power (MOP) has envisaged an additional generation capacity of 100000 MW to achieve its vision of 'Power for All' and increase per-capita consumption to 1000 units, both to be achieved by year 2012. It has also been estimated that achievement of this target requires an investment of Rs. 9 trillion (US$200 billion).

3.2.1.1 Installed capacity

The growth of installed capacity (source-wise) till date is given in Figure 3.2.

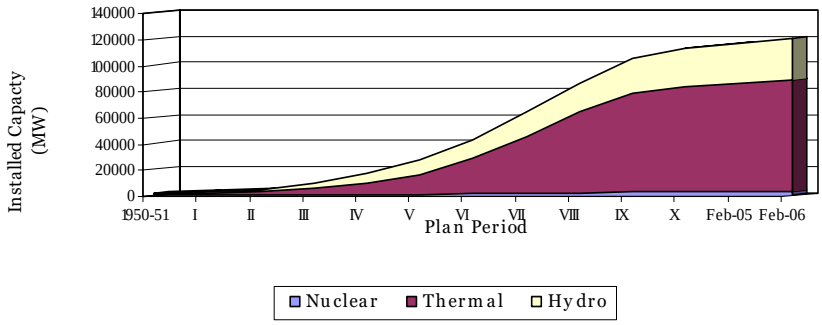


Figure 3. 2 Growth of installed generation capacity in India
SOURCE: Annual Report (2005-06) and Performance Report, 2006 (January 2007), Ministry of Power, Government of India (GOI)

The central sector and state sector together constituted 87% of the total installed generation capacity at the end of 2005-06. Figure 3.3 gives the sector-wise break-up of the percentage contribution by different sectors to the total installed generation capacity.

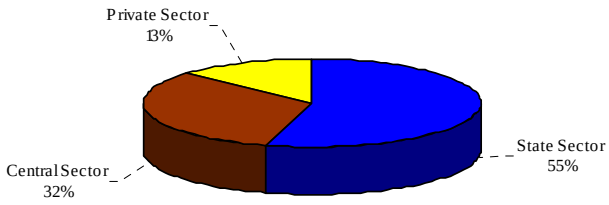
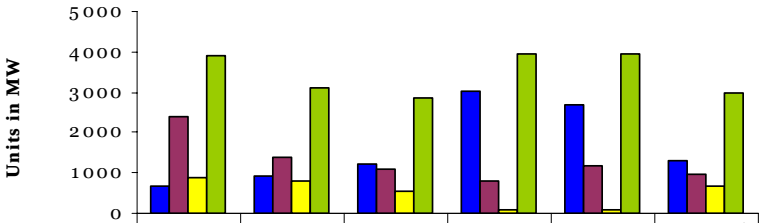


Figure 3. 3 Sector-wise installed capacity in India's electricity sector in 2005-06

SOURCE CEA General Review 2006 (published by Ministry of Power, Government of India, March 2006)

The trend of capacity addition over the past five years sector-wise is illustrated in Figure 3.4.



	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Centre	659	905	1210	3035	2710	1320
State	2376	1394	1100	817	1169	985
Private	864	816	548	100	70	661
Total	3899	3115	2858	3952	3949	2966

Figure 3. 4 Sector-wise capacity additions from 2000-01 to 2005-06

SOURCE CEA General Review 2006 (published by Ministry of Power, Government of India, March 2006)

A capacity addition of 41110 MW was targeted for the power sector for the Tenth Five-Year Plan period from year 2002-2007 with 22832 MW, 11157 MW and 7121 MW from the central sector, state sector and private sector, respectively. However, at the time of the mid-term appraisal by the Planning Commission, Government of India (GOI), a capacity addition of 36956 MW was found possible as against a target of 41110 MW during the Tenth Five Year plan period. The break-up of the original capacity addition plan for the Tenth Five Year plan period vis-à-vis the revised plan, source-wise and sector-wise is summarized in Table 3.1.

Table 3. 1 Tenth Five Year period capacity addition plan (sector-wise and source-wise)

Tenth Five Year Plan Period	Central		State		Private		Total	
	Original plan	Revised	Original plan	Revised	Original plan	Revised	Original plan	Revised
Hydro	8742	6177	4481	4248	1170	700	14393	11125
Thermal	12790	11070	6676	7992	5951	4199	25417	23261
Nuclear	1300	2570					1300	2570
Total	22832	19817	11157	12240	7121	4899	41110	36956

SOURCE Annual Report (2005-06) of Ministry of Power, GOI

It can inferred from Table 3.1 that in contrast to a 17% share of the private sector in the total capacity addition, the revised estimates during the mid-term appraisal of the Tenth Five Year Plan revealed the private sector's share in the total capacity addition at 13%.

Table 3.2 indicates the sector-wise plan capacity addition during 2005-06 and the actual achievement upto 31st January 2006.

Table 3. 2 Planned vis-à-vis achieved capacity addition in MW during 2005-06 (sector-wise and source-wise)

2005-06	Central		State		Private		Total	
	Plan	Achievement	Plan	Achievement	Plan	Achievement	Plan	Achievement
Hydro	1670	280	1216.00	860	1382.60	0	3458.52	1140.00
Thermal	1210	500	865.92	125	0	660.80	2886.00	1285.80
Nuclear	590	540	0	0	0	0	590.00	540.00
Total	3470	1320	2081.92	985	1382.60	660.80	6934.52	2965.80

SOURCE Annual Report (2005-06) of Ministry of Power, GOI

It can be seen from Table 3.2 that although the achievement in the total capacity addition during 2005-06 was 57% below the planned target, the share of the private sector in which capacity addition was 22% which was much higher than that proposed originally for 2005-06.

Although, presently the power sector in India is dominated by the public sector having approximately 87% share in the total installed capacity, the GOI through various measures has been trying to encourage private sector participation. Accordingly, recognizing the fact that economies of scale leading to cheaper power could be secured through large size power projects and for introducing the efficient super critical technology in a big way, a unique initiative was launched by GOI for development of Ultra Mega Power Projects (UMPPs) under tariff based international competitive bidding route. The development of 4000 MW power projects through a tariff based bidding process is a first of its kind in the world. So far, nine sites for development of 4000 MW project each have been identified.[31] The details with regard to the tariffs that were quoted in the financial bids of the winning entities have been summarized in Box 3.1.

More than 20% share from private enterprises is expected during the Eleventh Plan. Table 3.3 gives a comparative overview of the capacity additions planned (sector-wise and source-wise) as per the Tenth and the Eleventh Plan periods.

[31] The bidding process has been initiated in respect of three projects i.e. Sasan (Madhya Pradesh), Mundra (Gujarat) and Krishnapatnam (Andhra Pradesh). In respect of first two sites of Sasan and Mundra, the Apex Evaluation Committee appointed by the GOI evaluated the financial bids on 18th December 2006. Letter of Intent was handed to the consortium of Globeleq Singapore PTE. Ltd. and Lanco Infratech Pvt. Ltd. with regard to the Sasan project and to Tata Power Company Ltd. with regard to the Mundra project on 28th December 2006.

Table 3. 3 Comparative overview of capacity additions in MW planned as per Tenth and Eleventh Five Year Plan (sector-wise and source-wise)

Source	Central		State		Private		Total	
	Tenth Five Year Plan (FYP)	Eleventh FYP	Tenth FYP	Eleventh FYP	Tenth FYP	Eleventh FYP	Tenth FYP	Eleventh FYP
Hydro	6177	11080	4248	3957	700	3744	11125	18781
Thermal	11070	19880	7992	15538	4199	11145	23261	46563
Nuclear	2570	3160	0	0	0	0	2570	3160
Total	19817	34120	12240	19495	4899	14889	36956	68504

SOURCE Annual Report (2005-06) of Ministry of Power, GOI

3.2.1.2 Electricity generation status in India

The gross electricity generation in India, which was only 4.1 Billion Units (BU) in 1947-48, increased to 264 BU during 1990-91 and 623.22 BU in 2005-06. In 2005-06, the contribution of thermal, hydel and nuclear generation to the total generation was 499.84 BU, 99.88 BU and 17.31 BU respectively. Even though about 80% of the total electricity generated in India is from thermal sources, hydel power generation has witnessed a high growth of 18% in 2005-06 over 2004-05.

The total generation in public utilities in India over the years is given in Figure 3.5.

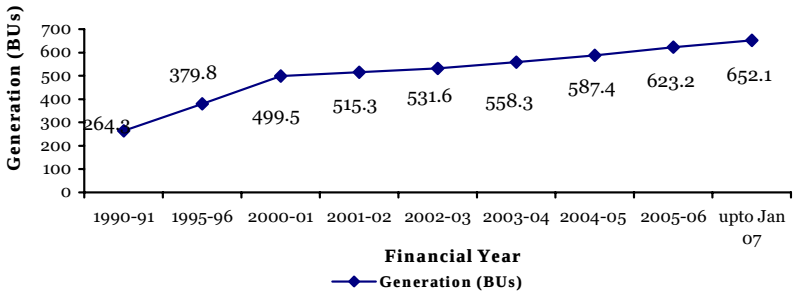


Figure 3. 5 Overall electricity generation trend in India (BUs)

SOURCE Annual Report (2005-06) and Performance Report 2006 (January 2007), Ministry of Power, GOI

In terms of sector-wise contribution in total generation during 2005-06, the contribution of central sector, state sector and private sector was 259.56 BU, 304.84 BU and 109.58 BU respectively. The ownership pattern of India's generation segment is given in Figure 3.6.

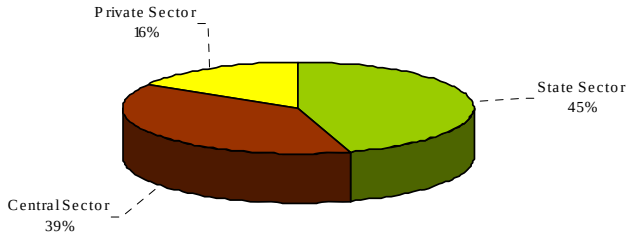


Figure 3. 6 Sector wise percentage contribution in total electricity generation during 2005-06 in India

SOURCE CEA General Review 2006 (published by Ministry of Power, GOI, March 2006)

The Plant Load Factor (PLF) is an important metric of the operational efficiency of the thermal generation plants. The PLF of the overall system has improved from 63% in 1995-96 to 74.8% in 2004-05, implying a satisfactory improvement in the efficiency of generation. The overall PLF during 2005-06 (upto February 2006) has increased to 73%. The comparative trend in PLF ownership-wise over the years is presented in Table 3.4.

Table 3. 4 Ownership-wise plant load factor (As percent of total capacity)

Financial Year	Central	State	Private	Overall
1990-91	58.1	51.3	58.4	53.8
1995-96	70.9	58.0	72.3	63.0
2000-01	74.3	65.6	73.0	69.0
2001-02	74.3	67.0	74.7	69.9
2002-03	77.1	68.7	78.9	72.2
2003-04	78.7	68.4	80.4	72.7
2004-05	81.7	69.6	85.1	74.8
2005-06	81.9	66.8	85.6	73.4
2006-07	83.5	69.6	83.5	75.8

SOURCE Annual Report (2005-06) and Performance Report 2006 (published in January 2007), Ministry of Power, GOI

It can be readily observed that the PLF of private sector power plants is higher than average of all State Electricity Boards (SEBs) together and central sector owned power plants.

3.2.1.3 Captive Generation

The Central Electricity Authority (CEA) has estimated that as on 31st March 2005, there were 2098 industrial units (plant capacity of 1 MW and above) with a total captive installed generating

capacity of 19102.6 MW. The maximum number of plants has an installed capacity between 1 MW to 10 MW and plants with a capacity of more than 100MW are the least. The generation fuel that is used by the captive plants is mainly steam, diesel, hydro, gas or co-generation plants with steam based plants accounting for around 46% of the total installed capacity. The industries that have set these captive plants include a diverse set with players from textiles, engineering, cement, chemical, paper, minerals, sugar, electronics, jute, service and other sectors.

Estimated capacity addition from captive power plants in the next five years is around 12000 MW. The surplus capacity from these captive plants can therefore contribute substantially in meeting the 'Power for All' target by 2012. Captive power, if harnessed optimally can play a significant role in tiding over the prevalent power crisis situation in the country with the average all India peak deficit mounting to 12.3% during 2005-06.

Figure 3.7 shows the growth of electrical energy generated by captive electric generation units.

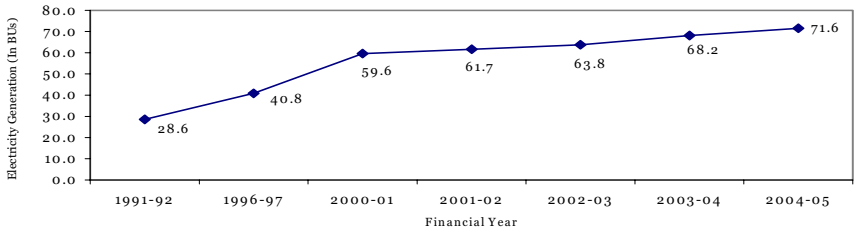


Figure 3. 7 Captive power generation (BUs)

SOURCE CEA General Review 2006 (published by Ministry of Power, GOI, March 2006)

Box 3.1 summarizes the salient features of the generation segment in India.

Box 3.1 Salient features of the generation segment in the Indian electricity sector

Salient features of generation segment of electricity sector in India:

- The percentage contribution of the public sector (central and state sector owned power plants) in the total installed capacity was 87% and total generation was 84% in 2005-06.
- In the central sector, National Thermal Power Corporation (NTPC) is the largest thermal generating company in India and in the hydropower sector; National Hydroelectric Power Corporation (NHPC) is the dominant player.
- Although a capacity addition of 41,110 MW was targeted for the power sector for the tenth five-year plan with 7121 MW contribution from the private sector, at the time of the mid-term appraisal, a total capacity addition of 36,956 MW was found feasible with a revised estimate of 4899 MW contribution from the private sector. Hence, the revised estimates during the mid-term appraisal of the tenth five-year plan revealed private sector share of 13% in total capacity addition, in contrast to 17% share of the private sector, originally planned for the tenth five-year plan.
- The power generation sector in India is dominated by the public sector which accounts for approximately 87% share in total installed capacity.
- In the last few years, the Government of India (GOI) has been trying to encourage private sector participation. The GOI has planned to develop several Ultra Mega Power Projects (UMPPs) of 4000 MW capacity each and have offered these for construction in the private sector.
- The bidding process has been initiated in respect of three projects i.e. Sasan (Madhya Pradesh), Mundra (Gujarat) and Krishnapatnam (Andhra Pradesh). In respect of first two sites of Sasan and Mundra, there has been excellent response as 10 developers have submitted their bids for Sasan and six have submitted their final bids for Mundra UMPPs. In respect of Sasan (Madhya Pradesh) financial Bids were opened on 18th December 2006 and the lowest tariff of Rs.1.196 per kWh (levelised tariff for 25 years and the first year tariff as 93 Paisa per unit) was quoted by the consortium of Globeleq Singapore Ltd. and Lanco Infratech Pvt. Ltd. In respect of Mundra (Gujarat) financial Bids were opened on 18th December 2006 and the lowest tariff of Rs. 2.264 per kWh. (levelised tariff for 25 years and the first year tariff as Rs.1.91 per unit) was quoted by Tata Power Company Ltd.
- During the Eleventh Plan period, approx. 22% of total capacity addition is planned to be added by the private sector.
- Regarding efficiency of the privately owned power projects vis-à-vis the public sector, the average PLF of private sector plants has been estimated at 80% in comparison to average PLF of 78% and 68% of central sector and state sector owned power plants, respectively during the past five years (2000-01 to 2005-06).

SOURCE TERI Compilation

3.2.2 Transmission Segment

At the time of independence, power system in India was essentially isolated and dispersed in and around urban and industrial areas. The highest transmission voltage during this period was 132 kV. The enactment of Electricity (Supply) Act 1948 led to the establishment of the SEBs and made them directly responsible for coordinated development of transmission and distribution network across urban, semi-urban and rural areas. In 1964, the country was demarcated into five regions for transmission systems viz. the Northern region, the Southern region, the Western region, the Eastern region and the North-eastern region. Provisions were also simultaneously made for encouraging exchange of power among states by establishing 'Regional Electricity Boards'. As a result, by the end of 1980's, strong regional networks came into existence. Subsequently, in 1989, Power Grid Corporation of India Limited (PGCIL) was established primarily to manage the transmission system associated with central generating stations and the intra-regional transmission programme based on planning by the CEA. Since the beginning of the current century, the focus of transmission planning has shifted from regional self-sufficiency to optimization of resources on an all-India basis. This optimization

is envisaged through a National Grid system, which would enable efficient generation and transmission planning. PGCIL is working towards achieving its mission of "Establishment and Operation of Regional and National Power Grids to facilitate transfer of power within and across the regions with reliability, security and economy, on sound commercial principles"[32].

Envisaging the need for accelerated implementation of National Power Grid programme on priority to enable scheduled/unscheduled exchange of power as well as for providing open access to encourage competition in power market, the formation of such a national Power Grid has been envisaged in a phased manner as outlined in Box 3.2.

Box 3.2 Phases in the formation of the National Power Grid

Phase-I: Considering wide variation of electrical parameters in various regional grids, mostly High Voltage Direct Current (HVDC) interconnections were established between the regions. This phase was completed in the year 2002, with the commissioning of Sasaram HVDC back-to-back, thereby achieving inter-regional transfer capacity of 5000 MW.

Phase-II: During this phase, inter-regional connectivity is planned to be strengthened with hybrid system consisting of high capacity AC (765 kV & 400 kV) and HVDC lines. Such a National Grid is envisaged to disperse power not only from Mega generation projects but also to enable transfer of bulk power from one part of the country to another in different operational scenarios. The foundation of this phase has already been laid by PGCIL by commissioning of 2000 MW Talcher-II HVDC Bipole and 1000 MW, Raipur – Rourkela 400kV D/c AC transmission line. The inter-regional transfer capacity has been enhanced to 8000 MW. This phase is likely to be completed by the end of 2007, and the cumulative inter regional capacity would be enhanced to about 23000 MW, depending upon commissioning of planned generation projects.

Phase-III: Further, strengthening of National Grid is envisaged through 765 kV AC lines/ HVDC lines to Southern region and linking North Eastern Region with rest of the National Grid through high capacity transmission system. This phase is planned to be implemented by 2012 i.e. end of eleventh plan, which would enhance cumulative inter-regional power transfer capacity to about 30000 MW.

SOURCE Website of MOP, GOI, www.powermin.nic.in (accessed in December 2006)

Over the years, the transmission system has witnessed growth, both in terms of physical network as well as in the introduction of higher voltages and new technologies for bulk power transmission. The bulk transfer of electricity at voltages over 132 kV has increased from 3708 circuit kilometer (ckm) in 1950 to more than 265000 ckm in 2006[33]. In terms of ownership, a major portion of India's high voltage transmission lines are owned and operated by the Central Government. The transmission share of central, state and private sector in total electricity generated is given in Figure 3.8:

[32] http://www.powermin.nic.in/JSP_SERVLETS/internal.jsp accessed during January 2007
[33] Ministry of Power Website: www.powermin.nic.in (accessed during December 2006)

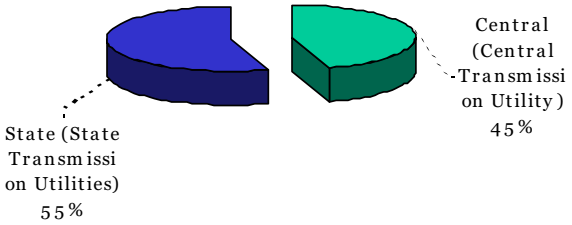


Figure 3. 8 Ownership pattern of the transmission segment in India

SOURCE CEA General Review 2006 (published by Ministry of Power, GOI, March 2006)

The key player in India's transmission segment is PGCIL, the largest transmission utility in the world. It is responsible for the establishment and operation of regional and national electrical power grids. Apart from PGCIL, there exist some state utilities that were formed by restructuring the SEB. In other states, the SEBs continues to operate and manage the transmission network. Although the transmission sector in India as in most countries continues to be dominated by public sector monopolistic structure, the government has undertaken certain initiatives to promote private sector participation in this segment as well as detailed in Box 3.3. MOP has envisaged establishment of an integrated National Power Grid in the country by 2012 with an inter-regional power transfer capacity of about 37150 MW. A perspective transmission plan has been evolved for strengthening the regional grids and establishment of a strong National Power Grid to support the generation capacity addition program of about 100000 MW during Tenth and Eleventh Plan period.

Box 3.3 summarizes the status of private sector participation in the transmission segment of the electricity sector in India.

Box 3.3 Private sector participation in transmission

- PGCIL has established the first public-private joint venture in the Indian power sector with Tata Power (PGCIL stake of 49% and Tata Power stake of 51% in the JV Company i.e. 'Powerlinks Transmission Limited') for implementation of major transmission lines of transmission system associated with Tala HEP in Bhutan, East-North inter connector and Northern Region Transmission System. The JV Company has received its transmission license from CERC, the first such license in the Indian power sector.
- Action has been initiated by the Government to introduce more private investment in transmission projects. For example, transmission system associated with Koldam and Parbati-II have been floated under the JV route. In addition, some transmission lines under the Western Region Strengthening scheme are envisaged to be implemented through 100% private sector participation route. The Ministry of Power (MOP) is also in the process of finalizing policy guidelines for private investment in transmission.
- For creation of the National Power Grid, an investment of Rs. 710 Billion has been envisaged by the MOP. Out of this, Rs. 500 Billion is planned to be mobilised by PGCIL and remaining Rs. 210 Billion is envisaged through private sector participation. The National Power Grid is being implemented in a phased manner with phase I of the program having been completed in 2002, phase II is envisaged to be completed by the end of year 2007 and the last phase of this program is to be implemented by the end of the eleventh plan period, i.e. by 2012.

SOURCE Annual Report (2005-06) of Ministry of Power, GOI and www.powermin.nic.in (accessed in December 2006)

3.2.3 Distribution Segment

India has a vast network of sub-transmission and distribution network, primarily for supply of power to the end-consumers. As on 31st March 2005, the total number of consumers was 137.82 million, with corresponding load of 267571 MW[34]. The consumer mix in 2004-05 is presented below:

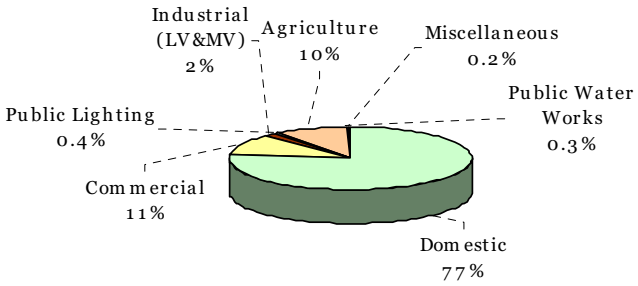


Figure 3. 9 Consumer mix in India (2004-05)

SOURCE CEA General Review 2006 (published by Ministry of Power, GOI, March 2006)

In 2004-05, the major portion of electricity viz.338387 GWh representing 87.63% of the total energy consumption was distributed by the Public Sector and remaining 12.37% was distributed by the private sector (Figure 3.10).

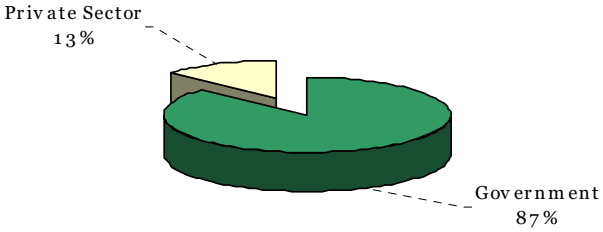


Figure 3. 10 Ownership pattern of the distribution segment

SOURCE CEA General Review 2006 (published by Ministry of Power, GOI, March 2006)

Presently, the sub-transmission and distribution system in India are characterized by high T&D losses and low reliability, primarily on account of inadequate investments in network upgradation.

[34] CEA General Review 2006 (published by Ministry of Power, Government of India, March 2006)

The all India T&D loss level as a percentage of availability has varied between 34.0% in 2001-02, 38.3% in 2002-03 to 32.5% in 2003-04 and 31.25% in 2004-05[35]. It has been estimated that a reduction in T&D losses by 1% would result in a saving in capacity by about 800 MW[36]. The aggregate technical & commercial (AT&C) losses are in the range of 50% of the power generated[37]. In financial terms, the commercial losses (excluding subsidy) have increased from Rs. 4.1 billion (US$ 91 million) in 1990-91 to Rs. 23.6 billion (US$ 524 million) in 2004-05[38]. These losses have been attributed to low metering efficiency, un-metered supply, theft and pilferages. To improve the financial viability of utilities, reduce T&D losses and improve the quality of supply, GOI launched the Accelerated Power Development and Reform Program (APDRP) in 2001. Under the APDRP, MoUs (Memorandum of Understanding) and MoAs (Memorandum of Association) were signed with state governments for linking government support to upgradation of distribution network and progressively reducing the AT&C losses. Box 3.4 gives the status of private sector participation in the distribution segment.

Box 3.4 Status of private privatization in the distribution segment

Orissa was the first state to privatise its distribution business (1999-2000) followed by Delhi in July 2002 (BSES Yamuna Power Ltd, BSES Rajdhani Power Ltd and North Delhi Power Ltd.). Other private distribution companies in the country are NPCL (Noida Power Company Ltd), AEC (Ahmedabad Electricity Company), SEC (Surat Electricity Company Limited) and CESC (Calcutta Electricity Supply Company Limited) and TISCO (Jamshedpur), BSES (Mumbai). In 2004-05, the major portion of electricity, representing 87.63% of the total energy consumption was distributed by the Public Sector and the remaining 12.37% was distributed by the private sector.

In the public sector, the 13 State Electricity Boards supplied 49.51% and the Municipalities and Electricity Departments of the States and Union Territories supplied 38.12%.
Out of the total energy distributed by the Private Sector, the four major private licensees viz. TATA Electric Companies, CESC, Torrent Power AEC Ltd and BSES Ltd distributed 0.59%, 1.52%, 0.88% and 3.74% of total energy to its consumers respectively.
Status of electricity distributed by various agencies during 2004-05:

Agency	Quantum (GWh)	% to total consumption	% increase over 2003-04
State Electricity Boards	191189.64	49.51	5.80
Electricity departments	142625.06	36.94	9.61
Municipalities	4572.17	1.18	4.91
Private licensees	47746.79	12.37	4.37

SOURCE Annual Report (2005-06) of Ministry of Power, GOI and www.powermin.nic.in (accessed in December 2006)

3.2.4 Power Trading

[35] CEA General Review 2006 (published by Ministry of Power, Government of India, March 2006)
[36] Investment Promotion & Infrastructure Development Cell, DIPP, Government of India
[37] Ministry of Power Website, www.powermin.nic.in , Government of India (accessed during December 2006)
[38] Economic Survey 2005-06, Government of India

One of the most important benefits of trading is that it helps optimize the utilization of existing generation and transmission resources by correcting the imbalances in energy demand. In this way, trading allows for a more realistic assessment of investment opportunities in electricity deficit regions. Trading opportunities in India exist across time i.e. seasonal, time-of-day (peak demand time varies in cities/states) and unanticipated demand variations.

Trading is generally considered an important step towards introducing competition in the electricity sector. Till March 2004, the trading volume of electricity was estimated at 11 BU, which was about 2% of the total electricity generated. The market share of different players in power trading during 2004-05 is given in Figure 3.11.

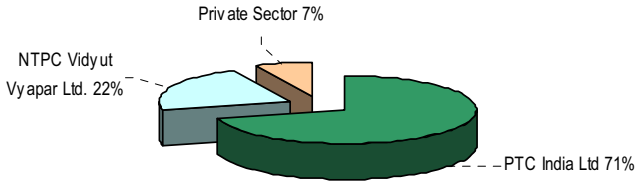


Figure 3. 11 Ownership pattern of the trading segment in India
SOURCE CEA General Review 2006 (published by Ministry of Power, GOI, March 2006)

The current pattern of trading is short-term in nature taking into consideration only the imbalances in peak demand and supply. Power Trading Corporation (PTC) India Private Limited is the dominant public sector organization involved in power trading. It was established in April 1999 with the objective to catalyze development of mega/other power projects, to facilitate power trading and to efficiently exchange power with neighbouring countries. Box 3.5 gives the status of power trading in the country.

Box 3.5 Status of Power Trading in the country

- As on 31st March 2005, 13 trading companies have been issued trading license
- In 2004-05, the total volume of electrical energy traded was 11846.53 GWh which constituted 1.99% of the total generation
- Out of the total volume of trade, PTC traded 8358.26 GWh constituting 70.55% of the total volume of trade, followed by NTPC Vidyut Vyapar Nigam Ltd., which traded 2616.26 GWh, constituting a percentage share of 22.08% in the total volume of trade.
- Maharashtra imported 2878.23 GWh through trading companies, which in 2004-05 was the maximum import by any state constituting 24.30% of the total volume traded.
- Orissa exported 4520.40 GWh through trading companies, which was the maximum export by any state constituting 38.16% of the total volume.

SOURCE Annual Report (2005-06) of Ministry of Power, GOI and www.powermin.nic.in (accessed in December 2006)

3.3 Legal and regulatory framework of the electricity sector: the competition context

The electricity sector in India is under the concurrent list of the Constitution of India, and is administered both by the central and the state governments. The Constitution has, however, given supremacy to central legislation. Thus, if there is a conflict between a Central Act and the provisions of a state legislation, then the law made by the Parliament would prevail and the inconsistent provisions of the state legislation would be void.

The legislative framework of the electricity sector in India has been developed in three major phases. The first phase covers early years from the time electricity was first introduced, up till 1948, when production and distribution of electricity were largely in the private sector and concentrated in major towns and cities. During this phase, provisions of the Indian Electricity Act, 1910 governed the sector. The second phase from 1948 to 1991 was marked by growth in the public sector either through SEBs or Central Government owned generating and transmission companies. The Electricity (Supply) Act, 1948 provided the framework for governance of the power sector and established the SEBs as monolithic state owned entities responsible for generation, transmission and distribution of electricity. While private sector participation was permitted in generation to begin with, followed by distribution and transmission, the structure that emerged in the country featured private entities in generation providing their services to the SEBs known as 'single buyer model' and the private entities in distribution dependant on the SEBs for upstream operations.

The third phase of the legislative framework can be marked from 1991 onwards. In 1998, the Central Government passed the Electricity Regulatory Commission (ERC) Act enabling the setting up of autonomous regulatory bodies at the central and state levels. The Central Electricity Regulatory Commission (CERC) was established in August 1998. The ERC Act mandated CERC to regulate the tariff of the central generating companies and other generating companies in case of a composite scheme for generation and sale of electricity to two or more states and to regulate the interstate transmission of electricity undertaken by the PGCIL and other organizations, including the tariff payable to them. The ERC Act also provided for the establishment of state commissions as an option to the state governments, for the purpose of regulating the working of the licensees and others involved in the electricity sector in the state and for the purpose of determining the tariff/ charges payable for the intrastate transmission and supply of electricity.

In continuation to its reform agenda, GOI notified the Electricity Act 2003 (EA 2003) on 10th June 2003, which repealed the three

existing legislations viz. Indian Electricity Act 1910, Electricity (Supply) Act 1948 and the ERC Act 1998.

3.3.1 Electricity Act 2003 (EA 2003)

Preamble

Quote

An Act to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalization of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies, constitution of Central Electricity Authority, Regulatory Commissions and establishment of Appellate Tribunal and for matters connected therewith or incidental thereto.

Unquote

As is evident in its preamble, the EA 2003 aims to promote competition, protect interest of consumers while supplying electricity to all areas, rationalize electricity tariff, ensure transparent policies regarding subsidies and provide an enabling regulatory environment. Besides allowing for private investments in all the segments of the electricity supply chain, the Act has provided for various measures to introduce competition in the electricity industry. These include the following.

- Delicensed generation
- Freedom for captive generation
- Recognition of trading as an independent activity
- Open access in transmission at the outset and in distribution in phases
- Multiple distribution licensee in a supply area
- Unbundling of SEBs by a stipulated date

Generation has been delicensed under the EA 2003 imparting enough flexibility to augment the existing generating capacity. However, for hydroelectric generation, generating companies have to prepare and submit to the CEA, a scheme estimated to involve capital expenditure exceeding such sum as may be fixed by the Central Government, from time to time by notification. Captive generation has been made free from any kind of license. This is aimed at enabling consumers to set up their own plants to meet their power requirements. The EA 2003 also enables small-scale industrial units to group together and set up group captive plants to meet their power requirements. The provision regarding captive generation not only gives choice to the consumers to generate electricity for their own use, but also seeks to create competitive pressures on the existing utilities to improve their performance.

Trading, which implies 'purchase of power for resale thereof', has been recognized as an independent and licensed activity. The responsibility of development of market including trading has been vested with the regulatory commissions; whereby State Electricity Regulatory Commissions (SERCs) have been mandated to fix trading margin for intra state trading and the CERC for inter state trading. The Act has debarred the transmission company from entering into trading activity in order to avoid any conflict of interest that may arise in case of an entity operating both activities simultaneously.

Non-discriminatory open access has been introduced in the transmission segment. However, the EA 2003 provides that open access in distribution has to be introduced in a time bound manner by the SERCs after taking into consideration the state specific conditions. Even before elimination of cross subsidies, open access can be allowed on payment of a surcharge to take care of the current level of cross subsidies.

In order to encourage competition in the distribution segment, the EA 2003 allows more than one licensee in the same area of supply with permission to each such licensee to build his own distribution system. Besides, the regulatory commission may fix only the maximum ceiling of tariff for retail sale of electricity in case of multiple distribution licensees.

The EA 2003 mandates unbundling of SEBs, thereby separating the transmission activity from generation and distribution, and providing for independent system operation by various load dispatch centres operating at the national, regional and state levels.

Some of the other provisions of the EA 2003 that have a direct impact on competition are -

- Á Setting up of an Electricity Regulatory Commission in a state has been made mandatory
- Á Tariff determined by bidding process would prevail over the one determined by the regulator
- Á Development of power market including trading as specified and guided by National Electricity Policy
- Á A categorical provision on market dominance mandating the regulator to issue directives to a licensee/generating company if such entity abuses its dominant position, which is likely to have an adverse effect on competition
- Á Subsidy by the state government has to be paid in advance and in such manner, as may be specified by the regulatory commission

The market construct of the EA 2003 in terms of competition enabling provisions is summarized in Table 3.5.

Table 3. 5 Market construct of The Electricity Act 2003

Market design concepts	Minimum prerequisites		Relevant provisions of the Act defining prerequisites
Wholesale competition	∉	Open access to transmission network	10 (1), 10 (2), 38, 39, 40, 42 (2, 3), 42 (4)
	∉	Power procurement through trading in conjunction with bilateral contracting	
	∉	Surrogate regulations, technical codes, commercial contracts, metering, billing and settlement arrangements	
Retail competition	∉	Open access to transmission as well as distribution networks	9 (1), 9 (2), 10 (1), 10 (2), 38, 39, 40, 42 (2,3), 42 (4), 62 (4)
	∉	Flow-through of wholesale costs in retail tariffs	
Operationalizing non-discrimination in network access	∉	Transparent information disclosure rules	Definitions (47), 38 (2), 39 (2), 40 (c), 42 (3)
	∉	Fair allocation and tradability of transmission rights	
	∉	Prevent gaming and safeguard abuse of dominant position	
Competitive neutrality (abuse of dominant position)	∉	Independent system operation (requires segregation of transmission and system operation functions) and neutrality of RLDC/ SLDC from market participants	38 (2), 39 (2), 40 (c), 42 (3), 60, 134
	∉	Defined rules of corporate governance	
	∉	Separate policy on abuse of dominant market position	
Efficiency	∉	Operationalizing economic despatch and integrated operations of the grid	Preamble 29, 33, 61, 63, 79 (2), 86 (2), 134 (5)
	∉	Capacity procurement progressively through tariff bidding, covering both long-term and short-term purchases	
	∉	Tradability of PPA and short-term power purchase contracts	
	∉	Competition in trading and generation	
	∉	Tradability of transmission rights	
	∉	Optimal location of generation and transmission facilities	
	∉	Time differentiated and cost-responsive wholesale and retail tariffs	
Power markets	∉	Development of power markets by regulators taking into consideration the prevailing policy framework	66, 79, 86

SOURCE "Electricity Act, 2003 and the emerging regulatory challenges", J L Bajaj and Anish De, International Journal of Regulation and Governance, Volume 4 (1), June 2004

3.3.2 National Electricity Policy (NEP)

In pursuance of the provisions of the Act, GOI notified the NEP in February 2005. The NEP stresses the need for promotion of competition and highlights that a part of new generating capacities (say 15%) may be sold outside long-term PPAs. It further mentions that as the power markets develop, it would be feasible to finance projects with competitive generation costs outside the long-term power purchase agreement framework. The policy indicates that in the coming years, a significant portion of the installed capacity of new generating stations could participate in competitive power markets, which would increase the depth of the power markets and provide alternatives for generators and licensees/ consumers, leading to a reduction in tariff in the long run. The policy underscores the fact that competition will bring significant benefits to consumers, in which case, it is competition, which will determine the price rather than any cost plus exercise on the basis

of operating norms and parameters. Hence, all efforts need to be made to bring the power industry to this situation as early as possible, in the overall interest of consumers.

In addition to the above, GOI also notified the Tariff Policy in January 2006. The primary objectives of the policy are to ensure availability of electricity to consumers at reasonable and competitive rates and promote competition, efficiency in operations and improvement in quality of supply. Some of the specific provisions with regard to the general tariff approach and that pertaining to generation, transmission and distribution are highlighted in Table 3.6.

Table 3. 6 Provision in the Tariff Policy relating to tariff setting

Functions	Specific Provisions in the context of tariff setting
General approach to tariff	∉ All future requirement of power should be procured competitively by distribution licensees except in cases of expansion of existing projects or where there is a State controlled/ owned company as an identified developer
	∉ Even for Public Sector projects, tariff for all new generation and transmission projects should be decided on the basis of competitive bidding after a period of five years or when the Regulatory Commission is satisfied that the situation is ripe to introduce such competition
	∉ Multiple players will enhance the quality of service through competition and all efforts will need to be made to bring power industry to this situation as early as possible in the overall interests of consumers
Taxes/ Duties	∉ The right of State Governments to impose duties, taxes, cess on sale or consumption of electricity can potentially distort competition if levied selectively and on a non-uniform basis.
	∉ For realizing the goal of making available electricity to consumers at reasonable and competitive prices, it is necessary that such duties are kept at reasonable level
Generation	∉ Power procurement for future requirements should be through a transparent competitive bidding mechanism using the guidelines issued by the Central Government
	∉ Non-conventional power procurement by Distribution Licensees for future requirements shall be done, as far as possible, through competitive bidding process under Section 63 of the Act within suppliers offering energy from same type of non-conventional sources. In the long-term, these technologies would need to compete with other sources in terms of full costs.
Transmission	∉ Investment by transmission developer other than CTU/STU would be invited through competitive bids. The Central Government will issue guidelines in three months for bidding process for developing transmission capacities. The tariff of the projects to be developed by CTU/STU after the period of five years or when the Regulatory Commission is satisfied that the situation is right to introduce such competition would also be determined on the basis of competitive bidding.
Distribution	∉ Tariff Design - Suggests cross-subsidy to be replaced by direct subsidy - Electricity Duty may be a good source of direct subsidy - BPL consumers to be charged at least 50% of the average cost of supply
	∉ Incentivise AT&C loss reduction by linking returns in a MYT framework to an achievable trajectory
	∉ Implementation of the MYT framework - Sharing mechanisms for excess profits and losses with the consumers. - In the first control period, the utility may be incentivized at a higher level than being penalized – accelerating performance improvement of the utility
Trading Margin	∉ Though there is a need to promote trading in electricity for making the markets competitive, the Appropriate Commission should monitor the trading transactions continuously and ensure that the electricity traders do not indulge in profiteering in situation of power shortages.

SOURCE TERI Compilation

3.4 Role of regulators in facilitating competition

As stated earlier, the CERC was constituted in July 1998 under the aegis of the ERC Act. Under the provisions of this Act, tariff fixation powers were conferred to CERC. Subsequent to the enactment of the ERC Act, the EA 2003 was passed in June 2003, which provides a framework to introduce competition in the sector along with existence of a regulatory body that regulates prices and enforces service standards on various electricity utilities. The key functions of CERC as outlined in Section 79 of the EA 2003 are summarized below:

- To regulate the tariff of generating companies owned or controlled by the central government
- To regulate the tariff of generating companies other than those owned or controlled by the central government specified in the Act, if such generating companies enter into or otherwise have a composite scheme for generation and sale of electricity in more than one state
- To regulate the interstate transmission of energy including tariff of the transmission utilities
- To promote competition, efficiency, and economy in the activities of the electricity industry

The Act also provides for the establishment of SERC as an option to the state governments. As per Section 82 of the EA 2003,

Quote

Every State Government shall, within six months from the appointed date, by notification, constitute for the purposes of this Act, a Commission for the State to be known as the Electricity Regulatory Commission.

Unquote

The functions and power of SERCs[39] as outlined in Section 86 of the EA 2003 and as mandated by their own reform Act are briefly outlined below:

- Setting retail tariffs
- Setting related performance standards in the supply of electricity

[39] Orissa was the first state to set up an independent regulatory commission in electricity sector. The Orissa Electricity Regulatory Commission (OERC) came into existence with the enactment of Orissa Reforms Act, 1995. Presently, twenty-four states, namely, Andhra Pradesh, Assam, Bihar, Chattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttaranchal, Uttar Pradesh and West Bengal have either constituted or notified the constitution of SERCs. A joint electricity regulatory commission has been notified for Mizoram and Manipur. The constitution of a joint regulatory commission for union territories is also under process.

- Setting performance standards in the promotion of efficient use of electricity by consumers to be achieved by licensees
- Promotion of competition
- Creation of environment for private sector participation and
- Co-ordination with environmental regulatory agencies and to evolve policies and procedures for appropriate environmental regulation of the electricity sector and utilities in the state

The EA 2003 further provides a framework for the introduction competition in the sector along with empowering the existing regulatory entities to regulate prices and enforce service standards on various electricity utilities based on factors that would encourage competition, efficiency, economical use of resources, good performance and optimum investments.

As outlined earlier, the EA 2003 also includes some other measures to promote competition in the electricity industry, which include delicensed generation, freedom for captive generation, recognition of trading as an independent activity, open access in transmission at the outset and in distribution in phases, multiple distribution licensee in a supply area and unbundling of SEBs by a stipulated date. Status of these reform measures that have been undertaken in different states is discussed below.

3.4.1 Unbundling/corporatization/reorganization of SEBs

Fourteen states have unbundled/restructured their SEBs. These are Andhra Pradesh, Assam, Delhi, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tripura, Uttaranchal, Uttar Pradesh and West Bengal. SEBs in Maharashtra, Gujarat and Tripura were unbundled in January 2005. West Bengal is the most recent state where the electricity board has been restructured in January 2007[40]. In Delhi and Orissa, the distribution business has been privatized.

Eight state governments – Bihar, Chhattisgarh, Himachal Pradesh, Jharkhand, Kerala, Meghalaya, Punjab and Tamil Nadu have been granted extension by the central government for continuation of their SEBs as State Transmission Utility or licensee for different

[40] On 24th January 2007, the bifurcation of the West Bengal State Electricity Board (WBSEB) was approved by the Cabinet. According to the approved scheme, two new government companies would be formed with effect from 1st April 2007, but the final transfer scheme would be formulated within one year after closure of accounts of the WBSEB for 2006-07. The West Bengal State Electricity Transmission Company Limited (WBSETC) would look after transmission and state load despatch functions, while the distribution and hydro-business are to be vested with the West Bengal State Electricity Distribution Company Limited (WBSEDC).

periods. While Kerala, Punjab and Tamil Nadu have been granted extension till June 2007, Bihar has been granted extension till March 2007. All the other remaining states (viz. Chattisgarh, Himachal Pradesh, Jharkhand and Meghalaya) were granted extension only till December 2006.

3.4.2 Issuance of tariff orders

Twenty SERCs[41] have already issued their first tariff orders.

3.4.3 Open access regulations and calculation of surcharge

The Act provides for non-discriminatory open access[42] in the transmission segment at the outset and mandates SERCs to introduce open access in distribution in a time bound manner after taking into consideration state specific conditions.

The regulation for Open Access in inter-state transmission was notified by CERC in January 2004. These regulations are applicable for access to the inter-state transmission system and the transmission customers have been divided into long-term and short-term customers. Presently, twenty states[43] have issued open access regulations.

In order to allow more time to the incumbent utilities to adjust to the new environment, the Act has built in transitional provisions in terms of surcharge. The Act mandates the consumer buying power through open access to make a payment to the incumbent DISCOM to compensate for the loss of cross-subsidy. This payment has been termed as 'Surcharge', which an open access consumer has to pay in addition to the wheeling charge. The level of surcharge has to be determined by the SERC. This surcharge shall be utilised to meet the requirements of current level of cross subsidy within the area of supply of the distribution licensee[44].

Apart from surcharge, the Act mandates payment of an additional surcharge on the charges of wheeling, which would be specified by the SERC. This additional surcharge is levied on the consumer to meet the fixed cost of the existing distribution licensee arising out

[41] Andhra Pradesh, Assam, Chattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tripura, Tamil Nadu, Uttaranchal, Uttar Pradesh, and West Bengal
[42] Open Access has been defined in section 2 (47) of the EA 2003 as "the non-discriminatory provision for the use of transmission lines or distribution system or associated facilities with such lines or system by any licensee or consumer or a person engaged in generation in accordance with the regulations specified by the Appropriate Commission."
[43] Assam, Andhra Pradesh, Chattisgarh, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttaranchal, West Bengal, Gujarat, Kerala, Delhi and Tripura (draft).
[44] Section 42 (2) of EA 2003

of his obligation to supply[45]. Sixteen states have finalized methods to be adopted for computation of open access surcharge. These are Tamil Nadu, Madhya Pradesh, Karnataka, Rajasthan, Gujarat, Haryana, Chattisgarh, Jharkhand, Andhra Pradesh, Uttaranchal, Maharashtra, Kerala, Punjab, Assam, West Bengal and Orissa.

The National Tariff Policy 2006 mandates that when open access is allowed, the surcharge would be computed as the difference between the tariff applicable to the relevant category of consumers and the cost of the distribution licensee to supply electricity to the consumers of the applicable class. Further, the cost of supply to the consumer would be computed as the aggregate of (a) the weighted average of power purchase costs (inclusive of fixed and variable charges) of top 5% power at the margin, in the merit order approved by the SERC adjusted for average loss compensation of the relevant voltage level, and (b) the distribution charges determined on the principles as laid down for intra-state transmission charges. In addition, the cross-subsidy surcharge has to be brought down progressively at a linear rate to a maximum of 20% of its opening level by 2010-11.

Table 3.7 gives the details of regulations issued by some SERCs for intra-state transmission and distribution open access

Table 3. 7 Summary of open access regulations and experience across states

State	Date of Issuance of Open Access regulation	Phase	Capacity sought to be allocated by the Open access consumer	Date by which open access shall be allowed	Charges for open access	Application seeking open access	Open Access taking Place	Remarks
Uttaranchal	8-Jun-2004	1	5 MW and above	31-Dec-2005	No	No	No	
		2	3 MW and above	31-Dec-2007				
		3	Above 1 MW	31-Dec-2008				
Madhya Pradesh	24-Jun-2005	1	10 MW or above at 132 kV	16-Jun-2005	Yes As per Draft National Tariff Policy			
		2	5 MW or above at 33 kV. or above and situated in industrial growth centers	16-Jun-2005				
		3	2 MW or above at 33 KV. or above and situated in industrial growth centers	1-Oct-2005				
		4	5 MW and above and situated anywhere in state	1-Apr-2006				
		5	1 MW and above and situated in industrial growth center	1-Oct-2006				
		6	2 MW and above and situated anywhere in state	1-Apr-2007				
		7	1 MW and above and situated anywhere in state	1-Oct-2007				
Delhi	3-Jan-2006	1	5 MW and above	1-Jul-2007	Yes	No	No	
		2	3 MW and above	1-Jan-2008				
		3	1 MW and above	1-Jul-2008				
Kerala	2-Nov-2005	1	10 MW and above	1-Dec-2005		Yes	No	Mandatory open

[45] Section 42 (2) of EA 2003

State	Date of Issuance of Open Access regulation	Phase	Capacity sought to be allocated by the Open access consumer	Date by which open access shall be allowed	Charges for open access	Application seeking open access	Open Access taking Place	Remarks
		2	5 MW and above	1-Dec-2006				access to the Licensee's transmission system and /or distribution system shall be provided to any person generation electricity through renewable sources
		3	3 MW and above	1-Dec-2007				
		4	1 MW and above	1-Dec-2008				
Jharkhand	28-Aug-2005	1	25 MW and more	1-Nov-2005	Yes	Yes	No	
		2	10 MW or more	1-Apr-2006				
		3	1 MW or more	1-Apr-2008				
Andhra Pradesh	1-Jul-2005	1	Consumers availing of power from NCE developers irrespective of the quantum of contracted capacity	1-Sep-2005				
		2	Contracted capacity being greater than 5 MW	1-Sep-2005				
		3	Contracted capacity being greater than 2 MW	1-Sep-2006				
		4	Contracted capacity being greater than 1 MW	1-Apr-2008				
West Bengal	9-Jun-2004	1	Power from Co-generation and Non-conventional source of energy	1-Aug-2006	No	Yes	No	Mandatory open access to the Licensee's transmission system and /or distribution system shall be provided to any person generation electricity through renewable sources
		2	10MW and above in single premises	1-Jul-2007				
		3	5MW and above 5MW in single premises	1-Aug-2008				
		4	1MW and above in single premises	1-Jan-2009				
Assam	1-Aug-2005	1	10 MW and above	1-Apr-2006	Yes			
		2	7.5 MW and above	1-Apr-2007				
		3	3 MW and above	1-Apr-2008				
Maharashtra	10-Jun-2004	1	Not less than 5 MVA	1-Apr-2005				
		2	Not less than 2 MVA but less than 5 MVA	1-Apr-2006				
		3	Not less than 1 MVA	1-Apr-2007				

SOURCE TERI Compilation

It is evident from the table that all the regulations provide for the phasing criteria according to which open access shall be allowed in the state, and categorise the customers as short term and long term customers. The various charges that may be levied for providing open access and have to be determined by the various Commissions are given below.

1. Transmission charge
2. Wheeling charge
3. Cross Subsidy Surcharge
4. Additional Surcharge
5. Grid Support/Parallel Operation Charges (captive generators only)
6. Reactive energy charges
7. Operating charge
8. Imbalance charge
9. Interconnection expense
10. Handling and Service Charge
11. Scheduling and System Operation charge

The regulations of most states detail out only the cross-subsidy and additional surcharge. The open access regulations in Andhra Pradesh, Assam, Madhya Pradesh and West Bengal provide details of most of the above mentioned charges, while that of Kerala and Jharkhand mention some of these including reactive energy charge and scheduling and system operation charge. Some SERCs have also stated that they will determine the charges related to open access once they receive an application for allowing open access. It is also seen that although most states have issued the open access regulations, very few applications have been received for obtaining open access.

Although Kerala was the first state to have allowed open access, this has not taken place as the applicant shifted its operations to another state. WBERC has also granted open access to 3 applicants (Electro Steel, HINDALCO and Bhusan Industries Ltd). However, open access has not yet commenced. JSERC has also allowed open access to one applicant (TISCO), but this has been challenged by the Jharkhand State Electricity Board (JSEB) and therefore, no open access is taking place in the state too. No open access has also taken place in Uttaranchal and Delhi. In sum, there has been limited progress on this front at the state level.

This highlights the fact that although in India, several SERCs have notified the open access regulations besides fixing surcharge, transmission and wheeling charges, it has hardly helped consumers to come forward to avail of the open access facility. There may be compelling reasons such as cross subsidy surcharge, transmission charges etc., that disincentivize the consumers to go in for open access. For instance, a high cross subsidy surcharge may disincentivize open access purchase. The consumer opting for open access has to pay a surcharge to compensate the incumbent distribution licensee for the loss of cross subsidization. Besides, the consumer would also have to pay the wheeling charge. Therefore, unless the difference between the tariff of incumbent licensee and the tariff of new supplier is more than the summation of all the

charges, there would be no tariff advantage that could incentivize open access.

An example of the high level of cross-subsidy surcharge can be observed from those computed in the open access cross subsidy surcharge orders issued by the SERCs of Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Rajasthan and Tamil Nadu. Table 3.8 and 3.9 give the wheeling charges, voltage wise system losses and quantum of cross-subsidy surcharge as computed in the states of Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Rajasthan and Tamil Nadu.

Table 3. 8 Cross subsidy surcharge in Andhra Pradesh

State utilities	Voltage level	Wheeling charges		Cross-subsidy
		% losses	(Rs. kVA / month)	(Rs./unit)
APCPDCL	33 kV	4.21	32.70	1.30
	11 kV	11.34	91.02	1.62
	LT	22.37	126.44	1.94
APEPDCL	33 kV	6.10	11.28	1.26
	11 kV	10.85	56.41	2.06
	LT	19.11	224.00	2.06
APNPDCL	33 kV	5.45	23.49	0.21
	11 kV	11.40	85.94	1.78
	LT	21.24	185.52	1.20
APSPDCL	33 kV	4.85	25.03	0.33
	11 kV	10.34	109.43	1.48
	LT	18.92	152.06	1.66

SOURCE APERC order on determination of surcharge and additional surcharge for 2006-07 dated 29th August 2006

Table 3. 9 Cross subsidy surcharge in Rajasthan, Karnataka, Gujarat, Tamil Nadu and Maharashtra

States	Voltage	Wheeling charge-HT		Cross subsidy surcharge (per unit) in Rs.
		% losses	Rate of wheeling (Rs.)	
Rajasthan (Jaipur)	EHT	4.60	0.01/unit	1.55
	HT – 33kV	8.40	0.25/unit	
	HT – 11kV	13.40	0.28/unit	
	LT	21.15	0.77/unit	
Rajasthan (Jodhpur)	EHT	4.60	0.01/unit	1.75
	HT – 33kV	8.40	0.15/unit	
	HT – 11kV	13.40	0.17/unit	
	LT	21.15	0.58/unit	
Rajasthan (Ajmer)	EHT	4.60	0.01/unit	1.56
	HT – 33kV	8.40	0.22/unit	
	HT – 11kV	13.40	0.23/unit	
	LT	21.15	0.54/unit	
Gujarat	HT – 66 kV-33kV	10.01		1.35

States	Voltage	Wheeling charge-HT		Cross subsidy surcharge (per unit) in Rs.
		% losses	Rate of wheeling (Rs.)	
Rajasthan (Jaipur)	EHT	4.60	0.01/unit	1.55
	HT – 33kV	8.40	0.25/unit	
	HT – 11kV	13.40	0.28/unit	
	LT	21.15	0.77/unit	
Karnataka	BESCOM	6.12	0.01	1.15
	MESCOM	5.80	0.16	
	HESCOM	9.21	0.13	
	GESCOM	6.39	0.13	
Tamil Nadu	HT – 66 kV-33kV	6.00	0.20/unit	1.60
Maharashtra, Tata Power Corporation Distribution			kVA /month = 150	0
Reliance Energy Limited Distribution			kVA /month = 35	0
Maharashtra State Electricity Distribution Company Limited	132 kV	Nil	Nil	0
	33 kV	11	kVA /month = 3	0
	22kV & 11kV	17	kVA /month = 37	0
	LT		kVA /month = 113	0

SOURCES (1) Rajasthan Electricity Regulatory Commission order for determination of wheeling charges and cross-subsidy surcharge for 2006-07 dated 19th September 2006; (2) Gujarat Electricity Regulatory Commission order for determination of transmission charge, wheeling charge and cross subsidy surcharge dated 28th February 2006; (3) Karnataka Electricity Regulatory Commission order for determination of transmission charge, wheeling charge and cross subsidy surcharge dated 9th June 2005;(4) Tamil Nadu Electricity Regulatory Commission order for determination of transmission charge, wheeling charge, cross subsidy surcharge and additional surcharge dated 15th May 2006; (5) Maharashtra Electricity Regulatory Commission order titled Methodology for computation of Cross-Subsidy Surcharge for Open Access transactions dated 5th September 2006

It can be inferred from Table 3.8 and 3.9 that in the six states where the cross-subsidy surcharge has been computed, the average surcharge is as high as Rs.1.62/kWh in Rajasthan and as low as zero in Maharashtra. It also emerges that the system loss for the applicable voltage level that is used in computing the surcharge is highest in the case of Maharashtra at the 33 and 11 kV level. As per the Maharashtra cross subsidy surcharge order, the cross subsidy surcharge has been computed according to the mandate of the Tariff Policy 2006 and this works out to be zero. This is due to the fact that the weighted average cost of power purchase of the top 5% at the margin is computed as Rs.4.81/kWh, after adding the effective intra-state transmission tariff. When grossed up for the applicable voltage-wise losses, the power purchase cost further increases. As the average realization of High Tension (HT) category of consumers is less than the weighted average power purchase

cost of top 5% at the margin, the cross subsidy surcharge has been computed as zero.

The high levels of system losses highlight the uncertainty in supply of power and inadequate back-up support provided by the state that acts as a major barrier to promote open access. Moreover, the high level of overall average charges for providing open access discourages competition and protects the incumbent utilities from cheaper sources of power. However, now that GOI is encouraging setting up of merchant power plants, it is hoped that cross subsidy surcharge will be rationalized.

3.4.4 Trading

The EA 2003 mandates inter-state trading licensing by CERC and intra-state trading licensing by SERCs. The CERC has issued its regulations for inter-state trading and these are called the Central Electricity Regulatory Commission (Procedure, Terms and Conditions for grant of Trading License and other related matters) Regulations, 2004.

Eleven states, namely Andhra Pradesh, Assam, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Maharashtra, Madhya Pradesh, Rajasthan, Karnataka (draft) and Punjab (draft), have issued intra-state trading regulations. As on 31st March 2006, CERC has awarded inter-state trading licenses to 19 companies. These licenses have been awarded for various categories i.e. from A to F that is summarized in Table 3.10.

Table 3.10 Details of inter-state trading licenses awarded by CERC

Category of the licence	Volume (MU/ year)	Net worth (Rs. crore)	License fee (Rs lakh/year)	Number of licenses awarded till 31.3.2006
Category A	<100	1.5	1	10
Category B	100 – 200	3.0	2	1
Category C	200 – 500	7.5	5	2
Category D	500 – 700	10.0	7	0
Category E	700 – 1000	15.0	10	0
Category F	>1000	20.0	15	6
Total				19

SOURCE Website of CERC India, www.cercind.org (accessed during January 2007)

At present, only 7 licensees[46] have been undertaking inter-state trading in electricity. The seven licensees have traded a total of 14188 MU during 2005-06. Of the total volume, 58.90% was traded by PTC India Ltd followed by Adani Exports Ltd (21.00%),

[46] These are PTC India Ltd, NTPC Vidyut Vyapar Nigam Ltd, Adani Exports Ltd, Tate Power Trading Company Ltd, Reliance Energy Trading Ltd, Lanco Electric Utility Ltd and Subhash Kabini Power Corporation Ltd. Except for the last company (which operates as category A licensee) all other licensees operate as category F trading companies.

NTPC Vidyut Vyapar Nigam Ltd (11.58%), Tata Power Trading Company (4.75%), Reliance Energy Trading Ltd (3.40%), Subash Kabini Power Corporation Ltd (0.29%) and Lanco Electric Utility Ltd (0.08%)[47]. The volume of electricity traded by the licensees has increased from 11028 MU in 2003-04 to 14188 MU in 2005-06 registering a growth of 29%. The growth was 7% from 2003-04 to 2004-05 and 20% from 2004-05 to 2005-06. However, the volume of electricity traded as a percentage of the total electricity generation has increased from 1.98% in 2003-04 to 2.52% in 2005-06.

The sale price has increased during 2005-06 as compared to 2004-05. At price range of Rs.2–2.50, 70% of the volume was traded during 2004-05 whereas during 2005-06, about 60% of the volume has been traded at the price range of Rs.3 – 4. Maximum sale price was Rs.3.30 during 2004-05 whereas it was Rs.4.75 during 2005-06. Substantial increase in the prices of traded power indicates shortages that are prevailing in the country and that demand is less elastic to prices.

It is imperative to note that the trading licensees have purchased 51.29% of the total volume from only four selling entities: West Bengal State Electricity Board, GRIDCO in Orissa, APTRANSCO in Andhra Pradesh and Jindal Thermal Power Company Ltd. (JTPCL) and sold 52.64% of the total volume to only three buying entities: Maharashtra State Electricity Board, Madhya Pradesh State Electricity Board and Punjab State Electricity Board during 2005-06. This implies that trading activity is still restricted to few utilities and is not yet broad-based.

The trading margin charged by the licensees has been varying for various transactions undertaken during 2005-06. However the margin has been fixed at 4 paise/kWh since the issue of CERC (Fixation of Trading Margin) Regulations dated 26th January 2006. Critics often argue that fixing trading margin for electricity is not a market friendly initiative and should be reconsidered. There is, however, no unanimity on the subject.

The range of trading margin computed for the entire volume traded by all the licensees before the trading margin was fixed by CERC is given in Table 3.11.

[47] Website of Infraline Energy India (accessed during January 2006)

Table 3. 11 Trading margin and volume of electricity traded during 2005-06

Trading Margin (Paise/kWh)	Volume of electricity traded during 2005-06 (MU)	% of the volume
Ô 5	5587.03	39.38
6-10	6765.56	47.68
Õ 11	1835.72	12.94
Total	14188.31	100.00

SOURCE Website of Infraline Energy India, http://www.infraline.com/power/default.asp?URL1=/power/PowerTrading/Trading.asp&idCategory=2734 (accessed during January 2007)

Note: The range of trading margin has been computed before the inter-state trading margin was capped by CERC at the rate of 4paise/kWh

Maximum trading margin was 43 paise and 128 paise respectively during 2004-05 and 2005-06. The average trading margin was 9 paise/kWh for the entire volume traded by all the licensees during 2005-06. The highest weighted average trading margin was in the case of Adani Exports Ltd (20 paise/kWh) and the lowest margin was in the case of Lanco Electric Utility Ltd (4 paise/kWh).

At 4 paise/kWh trading margin, the volume of electricity traded by the licensees was 14.56% during 2004-05. At the same trading margin, 0.89% of the volume was traded during first half of 2005-06 (April-September).

3.4.5 Multi-year tariff (MYT) regulations

3.4.5.1 Concept and objectives of MYT

The aim of the regulatory reform process is to provide utilities with incentives to improve their investment and operating efficiency and to ensure that consumers benefit from the efficiency gains. International experience of regulatory reforms in the electricity sector has indicated an evolution of incentive based regulation as an alternative to the traditional rate-of-return (ROR) or cost-of-service (COS) regulation of utilities and regulators have adopted a variety of approaches to incentive regulation. Incentive regulation schemes commonly use benchmarking as a tool, which is broadly defined as the *comparison of some measure of actual performance against a reference or benchmark performance*.

While examining the process of setting retail tariff in India, the present system being followed by the SERCs is an annual tariff determination exercise that is based on the ROR regulatory principles. According to the present system of tariff determination, the utility is required to submit an annual filing of expected revenues from charges and the Commission has to either approve the tariff proposed by the licensee or provide an alternative tariff. One of the issues that have often been discussed by the Government as well as the electricity regulatory commissions is the

possibility of replacing the annual tariff determination exercise by a new system where the tariff determination is done for a number of years, in one exercise, called the 'Multi Year Tariff (MYT)' regulation mechanism.

The broad objectives of MYT regulation are:

- **Cost reduction:** This is the most important objective of a MYT regulation. In theory, increasing incentives to cut costs is one of the easier tasks to build into the MYT framework. However, meeting this goal often conflicts with other objectives, such as sharing the benefits (cost savings) with consumers.

- **Innovation:** innovation in the context of a MYT framework can mean, (a) encouraging the utility to find effective ways to cut costs or (b) designing incentives to develop new and creative service offerings.

- **Improving customer service and satisfaction:** this generally requires the MYT principles to be accompanied with a reward/ penalty provision to encourage compliance.

- **Risk allocation:** MYT principles determine whether the utility or the consumer can bear particular risks most efficiently and evaluate how investment decisions get influenced by various risk allocations.

- **Other objectives:** From the point of view of the various stakeholders who are involved in the MYT framework, some of the other goals that MYT regulation seeks to address are given below.

    - Simplification of the regulatory process – the regulator lays down tariff methodologies for a defined future time period that are simple, unambiguous and understood by all stakeholders who are then able to plan accordingly.
    - Efficiency improvement and risk mitigation – design of incentives, as a part of the MYT exercise will help promote efficiency. MYT principles can help licensees mitigate risks in electricity supply on account of substantial risks that have to borne due to varying consumer mixes, which is mostly beyond their control.
    - Greater cost effective electricity supply for consumers.

UK was one of the first countries to implement 'Performance based Regulation' through a 'Price Cap Regulation'. Annexure 3.3 and Box 3.6 give a snapshot of the performance based regulatory framework in the electricity sector of UK.

Box 3.6 Experience of United Kingdom – role of the regulator, OFGEM

The Price Cap method of tariff calculation separates the profits of the regulated utility from its costs by setting a price ceiling. The method is commonly referred to as the 'RPI-X' model and has been used in UK for more than a decade. In this method, for each rate period, which normally varies between 3-5 years, the price for each year is set based on the Retail Price Index (RPI) and an efficiency factor X. Prices remain fixed for the rate period and the utility keeps or shares the achieved cost savings. In price cap regulation that is followed in UK, the regulator determines the ceiling on prices that can be charged by the distribution companies for various classes of consumers (usually there are only a few classes). Within the cap the utility is free to charge lower to maximize revenues and profitability or to respond to competition.

There are 14 electric distribution companies (discoms) in the UK. The total revenue of these discoms along with the associated prices for using their networks is regulated by the Office of Gas and Electricity Markets (OFGEM). The total revenues that a regulated discom is allowed to recover from its prices through the price cap mechanism is that it sets an initial starting values for revenues (Po), specifies an exogenous input price index for adjusting revenues for input price inflation and the associated price levels over time (RPI), and a productivity factor 'x' which further adjusts revenues and profits over time.
The Po and x values are determined based on a review of the relative efficiency of each firm's operating costs, the firm's current capital rate base, referred to as the firm's regulatory asset value (RAV), forecasts of future capital additions, estimates of the cost of the firm's debt and equity capital, assumptions about the firm's debt-equity ratio, tax allowances and other variables. The allowed revenues for the firm over the 5-year period are the sum of the allowed operating costs and allowed capital costs determined in each year. Po and x are chosen so that the present discounted values of the revenues over the five-year period is equal to the present discounted value of the total operating and capital-related charges that have been allowed for each discom during the price review.
Since the overall price cap covers both capital and operating costs, the ultimate value of x depends on the target efficiency improvements in operating costs and the forecast carrying charges on the existing RAV plus the carrying charges on allowed levels for future investments over the 5-year price control period.

SOURCE TERI Compilation

3.4.5.2 Issues and experience of MYT setting process in India

The Multi-year Tariff framework in the Indian electricity sector has been mandated as per section 61 (f) of EA 2003. Further, the National Tariff Policy outlines a detailed MYT framework for generation, transmission and distribution activities. Subsequent to the Act and the Policy, presently eight states have issued final MYT regulations, which include, Andhra Pradesh, Assam, Kerala, Maharashtra and Madhya Pradesh. Delhi, Jharkhand, Karnataka and West Bengal have brought out draft MYT regulations. Other states such as Gujarat, Orissa and Tamil Nadu have amended their existing tariff regulations to outline a general MYT framework.

In India, it is seen that operating costs do not constitute a major proportion of total costs of utilities. Most of the operating costs like maintenance expenditure and employees wages are sticky and major variations are not expected in the short run. In fact the low level of maintenance expenditure often gets translated into low efficiency levels resulting in avoidable voltage fluctuations and breakdowns. While employee costs are to an extent governed by historical behaviour of the firm, maintenance expenditure is determined largely by technical factors. The most important factor in operating costs that can be controlled is the investment program. Investment program varies with the economy's growth rate, load growth of different consumption categories, age of existing equipment, service quality requirements, etc. In India, all these factors have little necessary relationship with historical cost. Hence, projecting the costs and benefits of investment becomes the key task in arriving at price caps for multi-year tariffs. In MYT regulations that have been issued by the regulatory commissions in

India, the procedure for determining capital requirement is not mentioned. In fact, it is in capital expenditure that the possibility of a lower capital allowance and high-powered incentive or a higher capital allowance and low incentive exists. These choices have been tried by OFGEM in UK and have received recognition from academics and regulators.

Annexure 3.4 gives a detailed description of the final MYT regulations issued by Andhra Pradesh, Assam, Kerala, Madhya Pradesh and Maharashtra and the draft MYT regulations issued by Delhi, Jharkhand and West Bengal. Some of the issues that get reflected through the existing regulations passed by different SERCs specifying an MYT framework are discussed below.

- *Data uncertainty*- Data uncertainty is a key concern that has been expressed by most SERCs in India while discussing the implementation of MYT framework. Although attempts have been made to provide certainty on application of principles in determination of revenue requirements and tariffs across a multiple year period, most SERCs have tended to keep the duration of the control period relatively short in view of data uncertainties. Lack of robust baseline data leads to difficulties in specifying the trajectory for performance parameters such as AT&C loss levels.

- In many countries, yardstick regulation is based on hedonic regression and frontier cost estimation and also takes into account cost and quality dimensions. In India, the MYT regulations use the simple target setting procedure and quality dimensions are not adequately addressed while formulating such performance based regulation.
- For establishing performance targets under a MYT framework, it is essential to clearly separate the utility's generation, transmission and distribution activities before such targets are set for specific parameters[48].

    - To incentivize better performance and penalize under-performance, it is necessary to structure incentives and penalties appropriately. For designing such incentives/ penalties, it is important to set targets based on costs filed by generating company/licensee for the base year after checking for prudency of the same. In India, very few states specify targets in their respective MYT regulations. Except in the case of Madhya Pradesh and

[48] In India, those states in which the Annual Revenue Requirement (ARR) components under an MYT framework have been separately mentioned for generation, transmission, distribution and retail supply in the case of Assam, Andhra Pradesh, Delhi, Jharkhand, Kerala and Madhya Pradesh.

Assam[49], all other states that have issued MYT regulations, do not specify the expected performance parameters in the MYT regulations but only mention that the Commission shall determine these targets from time to time.

- Mechanism of sharing gains/losses[50] within the MYT framework should be designed with regard to those factors that are within the control of the applicant, and on that basis, such gains/ losses be shared with consumers.

- For establishing normative benchmarks for certain variables such as Working Capital, it is essential for every regulatory commission to undertake benchmarking studies to evaluate the Utility's performance.

- *Annual Performance Review:* Almost all SERCs have issued MYT regulations that specify annual performance review during each year of the control period. However, it is imperative to highlight that the annual performance review should not be used by regulatory commissions as a proxy for revising targets annually. Such procedure may defeat the entire objective of a multi-year tariff setting exercise and incentive regulation but will instead, complicate the annual tariff filing exercise with a multi period tariff filing. SERCs should examine the option of moving towards an end-of-control period review process, whereby any deviations arising on account of annual variations/fluctuations are accounted for during the next control period.

Table 3.12 gives a snapshot of the competition enabling regulatory activities that has been undertaken by different SERCs.

[49] The salient features of the MYT regulation with regard to fixing targets in the case of Madhya Pradesh and Assam are, (a) MYT regulations issued by MPERC specifically mention the targets for performance parameters over the control period in generation (such as availability, auxiliary consumption, PLF, etc), transmission (e.g. transmission system availability, O&M costs) and distribution (loss targets); (b) In Assam, the MYT regulations specify that the loss reduction trajectory is required to be submitted by the licensee for each year of the control period and if the divergence is more than 10% of the initial assumption of losses, then the Commission will make suitable adjustments based on a third party review study.

[50] In the Assam MYT regulations, the sharing mechanism for gains is such that 50% of additional profit is to be retained by the licensee/generating company, 25% is to be credited to the contingency reserve and 25% is to be passed on to consumers. In case of losses, licensee would be allowed to retain 50% of the gains arising out of higher loss reduction than the target and 50% is to be passed on to consumers. In the case of Maharashtra, the sharing mechanism is such that one-third of the gains are to be passed as rebate in tariffs, one-third is to be retained in a special reserve and one-third may be utilized at the discretion of the utility. In case of losses, one-third of the losses are to be passed on as an additional charge in tariff and the balance is to be absorbed by the utility.

Table 3. 12 Competition enabling regulations issued by different SERCs

S.No.	States	SERCs	Unbundling of SEBs	Open access	Cross-subsidy surcharge	Trading	Multi-year tariff
1	Andhra Pradesh	APERC	å	å	å	å	å
2	Assam	AERC	å	å	å	å	å
3	Chhattisgarh	CSERC		å	å		
4	Delhi	DERC	å	å			å (draft)
5	Gujarat	GERC	å	å	å	å	å*
6	Haryana	HERC	å	å	å	å	
7	Himachal Pradesh	HPERC		å		å	
8	Jharkhand	JSERC		å	å	å	å*(draft)*
9	Karnataka	KERC	å	å	å	å	å*(draft)*
10	Kerala	KSERC		å	å		å
11	Maharashtra	MERC	å	å	å	å	å
12	Madhya Pradesh	MPERC	å	å	å	å	å
13	Orissa	OERC	å	å	å		å*
14	Punjab	PSERC		å	å	å*(draft)*	
15	Rajasthan	RERC	å	å	å	å*(draft)*	
16	Tamil Nadu	TNERC		å	å		å*
17	Uttaranchal	UERC	å	å	å		
18	Uttar Pradesh	UPERC	å	å			
19	West Bengal	WBERC	å	å			å*(draft)*

SOURCE TERI Compilation

- Amendment made to existing tariff regulations

3.5 Competition and rural electricity coverage

3.5.1 Status of Rural Electrification and Overview of Government initiatives

The SEBs/state governments have pursued rural electrification actively since inception. As on 12th December 2005, of the 593732 inhabited villages in the country, close to 474132 villages are reported electrified representing about 80% of the total inhabited villages. The states of Andhra Pradesh, Delhi, Haryana, Goa, Gujarat, Maharashtra, Nagaland, Punjab, Kerala, Sikkim, Tamil Nadu, and the union territories of Andaman and Nicobar Islands, Chandigarh, Daman and Diu, Dadra and Nagar Haveli, Pondicherry and Lakshadweep Islands, have reportedly achieved 100% electrification of villages in their territories. Further, six states are reported to have electrified more than 75% of the villages. The state-wise details of the electrification of rural households are given in Annexure 3.5.

Due to the deteriorating financial condition of the SEBs, the pace of rural electrification has slackened in recent years. However, GOI has initiated a number of measures for aiding access to electricity in rural areas. Some of these are outlined in Annexure 3.5.

The recently announced Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) was launched by GOI in April 2005 with the objective of providing 100% household coverage in next five years. This scheme replaced the existing 'Accelerated electrification of one

lakh villages and one crore households' programme, the Minimum Needs Programme (MNP) and the rural electrification component of Pradhan Mantri Gramodaya Yojana (PMGY). The RGGVY has been launched to fulfil the commitment of the National Common Minimum Programme of completing the household electrification in the next five years and modernizing rural electricity infrastructure. The RGGVY scheme provides free-of-cost connection to all rural households living below the poverty line.

A subsidy towards capital expenditure to the tune of 90% is being provided. A key feature of the scheme relates to deployment of franchisees for distribution of electricity and revenue collection in the rural areas. For projects to be eligible for capital subsidy under the scheme, the states are required to provide a prior commitment of establishment of franchisee system for management of rural distribution system within two years of sanction of project. In case of non-compliance, the capital subsidy could be converted into interest bearing loans. Rural Electrification Corporation (REC) Ltd. has been designated as the nodal agency for implementation of this program. All funds for the program are to be channelized through REC. Further, REC has issued guidelines for franchisee deployment and the states are required to follow these guidelines.

The scheme also lays special emphasis on sustainability of rural supply through collection of cost of electricity from the beneficiaries. To achieve this objective, it is proposed that franchisees such as Non-Government Organizations (NGOs), consumer associations, etc will be deployed with appropriate involvement of Panchayati Raj Institutions. The Central Government has already approved Rs.50000 million (US$ 1 billion) for providing capital subsidy for this scheme in the remaining period of the Tenth Five Year Plan. The total estimated cost of the scheme is Rs.160000 million (US$ 3.6 billion), which will also continue during the Eleventh Plan period.

3.5.2 Facilitating measures for rural electrification – competition context

The EA 2003 envisages the supply of electricity through a two-pronged approach involving extension of grid connected power supply and distribution thereof, and through stand-alone systems. Further, with an objective of facilitating supply to rural areas, section 14 of the EA 2003 provides the flexibility for offering the distribution function by a distribution licensee to another person without a separate license. The EA 2003 further permits generation and distribution of electricity in rural areas (to be notified by state government) without a license. The Act's emphasis on a national policy for stand alone systems (including those based on renewal energy) for rural areas and national policy on electrification and local distribution in the rural areas are measures to promote rural electrification in a significant way. Also, it is commonly debated

that in course of time, competition would be encouraged by subsidizing access, not tariffs, and asking for the lowest bid in these areas. Thus, the EA 2003 paves the way for development of supply to rural households in an unencumbered manner.

In compliance with sections 4 and 5 of the EA 2003, the GoI notified the Rural Electrification Policy on 23rd August 2006. Some of the salient features and key provisions of this Policy are summarized in Table 3.13.

Table 3. 13 Rural Electrification Policy- competition enabling policies

Functions	Specific Provisions in the context of competition
Goals	Á Provision of access to electricity to all households by year 2009. Á Quality and reliable power supply at reasonable rates. Á Minimum lifeline consumption of 1 unit per household per day as a merit good by year 2012.
Definition of Electrified Village	A village would be classified as electrified based on a Certificate issued by the Gram Panchayat, certifying that – a) Basic infrastructure such as Distribution Transformer and Distribution Lines are provided in the inhabited locality as well as a minimum of one Dalit Basti / hamlet where it exists; and b) Electricity is provided to public places like Schools, Panchayat Office, Health Centers, Dispensaries, Community Centers etc.; and c) The number of households electrified are at least 10% of the total number of households in the village.
Permitting Stand Alone Systems for Rural Areas	Á The retail tariffs for electricity supply by persons exempt under eighth proviso to Section 14 would be set, based on mutual agreement between such person and the consumers. Since these would be micro enterprises with low capital expenditure, short gestation periods and no entry barriers, competitive market forces would ensure reasonable prices reflecting actual costs. Á But the benefit of financial assistance / subsidies by the government (central or state) or other agencies, if any, must be fully passed on to the consumers. The Appropriate Commission would lay down guidelines for this purpose for various types of projects (for different fuels, technology and size) receiving subsidy as opposed to tariff determination on case to case basis. The Appropriate Commission shall have right to intervene by scrutinizing tariff if these guidelines are not implemented in any particular case.
Bulk Power Purchase and Management of Local Distribution in Rural Areas	Management of Local Distribution Á Franchisees would be selected following a transparent process on the basis of clearly laid down criteria. Wherever feasible, the franchisees should be selected on the basis of competitive bidding for the most favourable bulk supply tariff for the distribution licensee. The State Government may adopt alternative basis such as revenue sharing, if considered appropriate. Bulk purchase of power and retail tariffs Á Persons exempt under Section 13 may procure power from the existing licensee of the area or from any other source. Á Where such persons purchase power from the licensee of the area, they would be treated as a separate category by the Appropriate Commission for the determination of the Bulk Purchase Price ("BPP") to be paid by them to the licensees. In such cases the tariff for retail sale to the consumers in the area of such persons would be as determined for the licensee by the Appropriate Commission. Á If not determined competitively, the BPP should be set on a normative basis based on representative consumer mix and should not vary on a case-to-case basis. The BPP set along with margins prescribed for the local distribution enterprise should be such that consumers tariff is maintained at the same level. This BPP would be fully factored into the submissions of the State Utilities to the State Electricity Regulatory Commissions for their revenue requirements.

SOURCE TERI Compilation

It is generally an accepted fact that the availability of adequate power at affordable prices at the village level will lead to revitalization of the village economy and can make significant contribution to the national efforts towards massive employment

creation and poverty alleviation[51]. With the enactment of the EA 2003 and the recently announced Rural Electrification Policy 2006 mandating that rural electrification has to be achieved in a time bound manner and also containing competition enabling provisions even though at a preliminary level, such efforts by the Government will definitely make rural electrification, the cornerstone of all development efforts in the rural areas. An interesting example of the efforts towards rural electrification at the state-level can be seen in the case of Gujarat, which is summarized in Box 3.7.

Box 3.7 Government of Gujarat initiative to promote rural electrification: Jyoti Gram Yojana

Recognizing the fact that 'Reliable and adequate energy supplies, if not guarantying economic growth and employment generation, their absence typically limits growth', the Government of Gujarat initiated implementation of Jyoti Gram Yojana in the month of September 2003. The program aims to provide continuous three-phase electricity supply in all the villages of Gujarat for 24 hours and 365 days. The villages covered under this scheme (out of a total 18230 inhabited villages in the state) are 2516 during 2003-2004 and 2645 during 2004-2005. The program has covered a total of 11786 villages (approximately 65% of total villages) up to 30th September 2005. The key impacts of this program are summarized below:

- Employment has gone up and resulted in higher worker productivity
- Migration has come down due to, (a) more employment opportunity in villages and (b) improved living condition
- Energy efficient lights (CFL) are being used more extensively
- Damage of electrical and electronic equipments have reduced
- Socio-cultural impacts: (a) better awareness about family planning, health issues, AIDS, etc., (b) increased use of electronic media, (c) better education - increased attention and willingness to study: 66%; increased use of computer; improvement in girl child's education; duration of study increased by 92 %; school absenteeism reduced by 13 % and school drop-out reduced by 80 %
- Average gain in 3 to 6 hours of work/week because of uninterrupted electricity supply
- Cost saving from reduced use of diesel generator
- Reduced loss and less breakdown due to voltage fluctuation

SOURCE Jyoti Gram Yojana, 'POWERING' RURAL GUJARAT - A Rapid Impact Assessment Study, By Hemchandracharya North Gujarat University with Centre for Environmental Planning & Technology, Supported by Education Department, Government of Gujarat, 2005-06

3.6 Nature and source of anti-competitive factors in the electricity sector

While the current policy and regulatory framework has been geared towards competition through the enactment of the EA 2003, a number of issues have come up that has slowed down progress in this regard. The primary factors responsible for such barriers are, (a) market construct of the electricity sector, (b) policy, regulatory and legal impediments and (c) public and private sector institutional bottlenecks.

Challenges faced due to the structure/ market design of the sector

As discussed at the beginning of this chapter, the electricity sector can be divided into four segments viz. generation, transmission,

[51] The Indian Regulatory Review, September 2006, pp. 13-24

distribution and retail supply. Of these, generation and retail supply are potentially competitive while transmission and distribution functions have monopoly characteristics. These characteristics of different activities within the electricity sector pose a significant challenge to the successful design of competitive markets, and effective implementation of a regulatory framework.

Policy, regulatory and legal impediments to competition: issues in implementation

The enabling provisions of the EA 2003 like open access are expected to bring about a change in the market structure by encouraging competition in the bulk power market and in retail supply in phases. However, when one examines the ground reality and the actual implementation in states, there seems to be very few cases of open access actually operating. Similarly, in the case of trading, although close to 3% of the gross energy that is generated in the country is being traded, the trading activity is far from being competitive with higher margins being charged by some traders. In order to create a competition inducing market environment, it is imperative to address the regulatory policy and legal impediments to competition.

Public and private sector institutional bottlenecks

As described earlier, presently the Government owns about 89% of the total installed generation capacity, with the private sector accounting for the remaining. Prior to policy reforms, power procurement by SEBs was characterized by: (a) procurement from state owned power plants, (b) procurement from allocated quota of the central government owned generating plants (e.g. NTPC, NHPC, etc.) and (c) inter-state exchange in electricity. Though private investment in power generation was liberalized in early nineties, their share in total generating capacity presently, is not significant. The institutional bottlenecks that are faced by both private and public sector utilities, act as a barrier to implementing a competitive market framework. These are discussed below.

3.6.1 Generation

The public sector involvement in the central power generation programme began with the creation of two generating corporations viz. National Thermal Power Corporation and National Hydro Power Corporation in 1975, which gave a substantial boost to the growth of the power sector in the country. The setting up of the Nuclear Power Corporation Ltd. and the Power Grid Corporation of India Ltd. gave a further impetus to the power development programme. Historically, the ownership structure of the power sector in India has been characterized by the dominance of the public sector. The generation segment of the power sector in India faces several competition-inhibiting barriers primarily on account of the institutional bottlenecks and impediments due to the policy,

regulatory and legal framework of the sector. These are discussed below.

3.6.1.1 Policy, regulatory and legal impediments to competition: issues in implementation

Availability and pricing of fuel: Inadequate availability of fuel obstructs entry into the generation market thereby limiting competition. Although the generation segment of the electricity sector has been completely delicensed, and although there has also been streamlining of clearances required to set up a power plant (the major clearances that are required, being environmental and safety standards clearance), the major bottleneck is in terms of the highly controlled input market with regard to price and availability, particularly in the case of coal and gas.

According to the Economic Survey 2005-06, domestic coal production has not been keeping pace with the growing demand in the electricity sector, and has resulted in a generation loss of 1512 MUs during 2004-05. Similarly, demand for gas has been outstripping supply and the power stations have not been getting the required allocation of gas. The actual supply has fallen substantially short of allocation, resulting in a huge loss of power generation. The gas-based stations (with dual fuel facility) sometimes have to use liquid fuel like naphtha, resulting in very high cost of generation. Appropriate pricing of fuel is another related issue that needs to be resolved. The pricing of natural gas is still evolving in India. On the other hand, the system of pricing in India's coal sector has been far from transparent. Resultantly, the two inputs (e.g. coal and natural gas) used for production of electricity, are not substitutable.

3.6.1.2 Public and private sector institutional bottlenecks

As stated earlier, the total installed capacity of electricity utilities was 143772 MW as on 31st March 2006. The central sector and the state sector together constituted 87% of the total installed generation capacity at the end of 2005-06. Thermal power is the predominant source of power in the country. Of the total thermal installed capacity of 30391 MW in the central sector, NTPC's share is 80%. As NTPC plans to further augment capacity through takeovers, joint ventures, greenfield projects and ramping-up existing power stations, its dominance in the market is likely to consolidate. For instance, at the bulk supply level, electricity that is traded is either generated by NTPC, or is bought as surplus from SEBs. Surplus electricity from SEBs constitutes a very small fraction of the tradable electricity at the bulk supply level. As a result, NTPC wields substantial amount of market power at this level.

One possible way of realizing the total potential of competition in generation is by separating generation completely from distribution and measuring the market concentration of players in the generation sector through the Hirschman Herfindahl Index (HHI). The HHI, in fact, gives an appropriate measure of concentration in those industries/sectors where the public and the private sector players contest for 'competition in the market'. However, in the Indian power generation sector, since the generating stations "do not compete in the market", the HHI computed on the presumption that the share of each plant in the total installed capacity of the state would be very small and would give a misleading picture of competition. For instance, an exercise of computing HHI for a few states in India based on the market share i.e. installed capacity of generating stations in the particular state revealed that out of the 9 sample states that were considered, the HHI varied in the range of 0.1 to 0.3, with majority states having an index of 0.2. This brought out the interesting fact that since the market share of individual plants (irrespective of their type of ownership) is very small in comparison to the total demand of the state, the HHI gives a misleading picture of the degree of concentration in the generation sector[52].

One of the other major institutional bottlenecks that discourage competition in the generation sector is the lack of level playing field in the market as discussed below.

(a) **Payment security mechanism for the Central Generating Stations**: A significant impediment to private sector investment in the generation segment of the electricity sector in India is that returns are not secured. IPPs presently do not have a payment security. According to private sector players, if they continue to sell power to financially unsound SEBs, no financial institutions will be willing to lend money. NTPC on the other hand, enjoys this advantage wherein they have a tripartite agreement where the devolution of funds to the state can be used for payment of dues, if the state does not pay the bill to NTPC.

[52] HHI gives level of market concentration in a particular sector and the values of this index range between 0 and 1. Values closer than 1 indicate more concentrated market structures. In the electricity sector, those states with lower HHI indicate a diversified market structure, with more number of players and greater scope for competition. The HHI is given by the following formula –

$$HHI = \sum_{i=1}^{N} \times (xi/X)2 - \sum 1/N$$

$$(1 - \sum 1/N)$$

where,
xi – installed capacity of a generating station in MW
X – total installed capacity in MW
xi/X – market share of a particular generating station
N – number of generating stations in the state

There exists no such payment security mechanism for the private sector.

(b) **Competitive Bidding:** Section 5.1 of the National Tariff Policy 2006 says,

Quote

All future requirement of power should be procured competitively by distribution licensees ***except in cases*** *of expansion of existing projects or* ***where there is a State controlled/owned company as an identified developer and where regulators will need to resort to tariff determination based on norms***

Even for the Public Sector projects, tariff for all new generation and transmission projects should be decided on the basis of competitive bidding after a period of five years or when the Regulatory Commission is satisfied that the situation is ripe to introduce such competition.

Unquote

This makes it clear that whereas the National Tariff Policy mandates competitive bidding route for private generators, it exempts the public sector undertakings from the same for another five years. This is likely to put the private sector at a disadvantageous position. Having submitted the bid, it might so happen that the public sector generator (who is allowed not to come through competitive bidding) wins the contract purely on negotiations with the distributor. Also, whereas PSUs would continue to earn a pre-determined rate of return, the same is uncertain in case of competitive bidding.

(c) **Financing of new generating stations**: financial institutions are more willing to fund projects that are backed by state guarantees.

3.6.2 Transmission

As explained earlier, transmission and distribution functions comprise the wires business that are relatively less amenable to competition and historically characterized by natural monopoly attributes. Some of the competition issues in this regard are discussed below.

3.6.2.1 Policy, regulatory and legal impediments to competition: issues in implementation

Availability and pricing of transmission capacity

Though transmission costs constitute a small component of the total cost of supplying electricity, a fair and non-discriminatory access to transmission system remains a cornerstone for promoting competition in electricity markets. It is important, therefore, to have adequate transmission capacity in the first place to provide

third party access. Trading deals, in some cases, did not go through because of lack of transmission corridors for supplying power from surplus to deficit regions.

Depending upon season-wise and peak/off-peak availability and demand scenarios in various regions (eastern, western, northern, southern and north eastern), there is surplus of electricity in some regions while deficits in others simultaneously. For instance, as per the Draft National Electricity Plan that is prepared by CEA for the five-year period 2007-12, under the winter scenario, while northern, western and southern regions would be running peak deficits, eastern and north-eastern regions would be running surpluses in the peak hours. This phenomenon underscores the need to augment the existing inter-regional transmission capacity while moving towards a national grid system. In an integrated set up, issues related to congestion tend to be under-emphasised since the centralized scheduling process takes care of short-term congestion issues. However, with power markets likely to open up, the adequacy of transmission facilities will be critical for market efficiency. In the past, inadequate investments have been made in the intra state transmission capacity that may trigger difficulties in handling incremental transmission requirements resulting from open access and trading.

The need for adequate transmission capacity for sustaining competition in the electricity markets has been recognized internationally as well. *For instance, while referring to the development of competitive markets in the US, Joskow has commented, "Transmission networks provide the essential supporting platform upon which competitive wholesale markets depend. Transmission congestion effectively reduces the geographic expanse of competition, increases the incidence of locational market power and can limit entry of competing generators. A well functioning transmission network is a critical component of a programme to create robust competitive wholesale and retail markets for electricity. Yet the legacy transmission network that we inherit from the era of large number of vertically integrated regulated firms was not designed to promote competition among generators over large geographic areas, focused on interconnecting generators and loads within individual utility control areas and did not take local market power and other market performance problems into account when investments were made. It should come as no surprise that the legacy network is not well suited for supporting competitive wholesale markets and that significant investments will be required to adapt the legacy network to its new role."*

It is, therefore, pertinent to develop a transmission network in India with a long-term perspective as against the erstwhile objective of installing evacuation capacity for generating stations.

Some reserve capacity in the system should be maintained so that open access and trading transactions could be easily accommodated. The related issue herewith is pricing of transmission services, whether transmission services should be priced on a national, regional or state basis or should a pooled price approach be followed or should there be zonal or locational prices. Costs for network access and usage ought to be determined in a manner that promotes open access and trading. A high component of transmission charges might not stimulate open access transactions, as the consumer might find the incumbent's supply cheaper. In short, the network has to be carefully augmented, integrated, priced and regulated to sustain competition in electricity markets.

Open access and cross-subsidy surcharge: Transmission networks provide the essential supporting platform upon which competitive wholesale markets depend. To encourage open access it is essential that lines of congestion in the transmission network are identified by respective SERCs and utilities. The two main reasons why not many entities have applied for open access license in different states is firstly, as stated above, information regarding transmission capacity is not widely available and secondly, because the cross subsidy surcharge is presently very high. It is necessary for every state to identify congestion points in the transmission network as soon as possible and convert transmission capacity into transmission capability.

3.6.2.2 Public and private sector institutional bottlenecks

As per Section 38 (2) of the EA 2003, the CTU is required to undertake the following functions:

(a) undertake transmission of electricity through inter-State transmission system;
(b) discharge all functions of planning and coordination relating to inter-State transmission system;
(c) ensure development of an efficient, co-ordinated and economical system of inter-State transmission lines for smooth flow of electricity from generating stations to the load centres;
(d) provide non-discriminatory open access to its transmission system for use by any licensee or generating company on payment of the transmission charges.

The regional load dispatch centres (RLDCs), which are mandated to coordinate the integrated operation of the power system in a particular region, are required by law to be operated by the CTU, till the time the Government Company or authority is notified by the Central Government to operate as RLDC.

Since the cash flows of the PGCIL are linked to the efficient operation of the grid, ownership of RLDCs by the PGCIL may be

detrimental to the interests of the other players in the market. Monopoly problems inherent in the ownership of RLDCs by the PGCIL can be mitigated to a certain extent by developing performance incentives based on certain transparent target parameters. If the PGCIL manages to achieve the target by delivering lower costs for each of these services, it keeps a proportion of the difference between the target and actual costs. If the PGCIL does not manage to meet the target, it pays a proportion of the difference between the target and the actual costs. For determination of such benchmarks, the Central Government could consider creating a separate transmission company in each of the regions and introduce 'yardstick competition' between various transmission service providers.
Further, Power Trading Company (PTC) has been established with majority equity participation by PGCIL along with NTPC, Power Finance Corporation (PFC), and other financial institutions. PTC would purchase power from identified private projects and sell it to identified SEBs. A structural arrangement where a power transmission company has a majority stake in power trading could give it considerable monopoly power. In a competitive market, such a firm could create access problems for an independent generator (that may wish not to trade through PTC).

Transmission is best operated as a regulated monopoly with price cap regulation. A significant but minority shareholding of the government in transmission would be desirable. Transmission business ought to be confined to system integrity, investments, and operations on behalf of buyers and sellers of power for the benefit of consumers. Instead of buying or selling of power on its own, the transmission company should facilitate such transactions[53].

3.6.3 Distribution and Retail Supply

Competition in supply and consumer choice is the most important feature of a competitive market. The power industry worldwide has undergone significant changes paving the way for creation of a power market and introduction of competition in wholesale and retail trading of power. The Indian power sector is undergoing important transitional changes after the introduction of reforms and restructuring in trade, industry and commerce.

However, although restructuring of the power sector has taken place in many states, and a few of them have been privatized, the monopolistic nature of supply still persists. The parallel distribution companies with independent distribution network as envisaged in the Act are yet to come up in spite of an enabling legal

[53] India Infrastructure Report 2001, Chapter 6: The Electricity Sector; 6.1 Missing Interconnections in the Power Systems; Puneet Chitkara, Rajiv Shekhar and Prem K Kalra; 6.2 Power Sector Reforms and Regulation: The Road Ahead; Sebastian Morris

framework as provided in the Act. Presently, consumers continue to buy power from single monopoly utilities without any choice of supplier. As long as there is a single supplier, the consumer is unlikely to get quality power at reasonable rates due to lack of competition. Some of the impediments that are being faced to promote competition in the distribution and retail supply segment of the power sector are discussed below.

3.6.3.1 Policy, regulatory and legal impediments to competition: issues in implementation

Financial viability of distribution: It is widely recognised that distribution segment has to be commercially viable in order to sustain the provision of electricity in the long run. However, over the past few years, the financial viability of SEBs, which control majority of the distribution business, has eroded substantially. The rate of return of SEBs has been recorded at (-) 26 per cent during 2005-06[54]. The finances of SEBs have deteriorated due to widespread aggregate technical and commercial (AT&C) losses, large amount of unmetered consumption, unsustainable tariffs charged to various consumer categories, and inadequate investments. The main reasons for high AT&C losses are summarized below:

Technical Losses:

- Overloading of existing lines and substation equipments
- Absence of upgradation of old lines and equipments
- Low HT: LT ratio
- Poor repair and Maintenance of equipments
- Non-installation of sufficient capacitors

Commercial Losses

- Low metering/billing /collection efficiency
- Theft & pilferage and tampering of meters
- Absence of Energy Accounting & Auditing

Annexure 3.6 elucidates the details in this regard.

It is well known that most of the investments that were envisaged when the generation segment was thrown open to private enterprise in the early nineties did not fructify due to the insolvent state of downstream distributors. The issue of solvency and credit-worthiness of the buyers therefore must be addressed, not only because it is an issue important by itself, but also to stimulate private investments in the generation segment.

Irrational end user tariffs: Currently, end-user tariffs are heavily cross-subsidised. While State Governments have been reluctant to allow increase in tariffs of subsidised categories such as

[54] Economic Survey 2005-06, Ministry of Finance, Government of India

agriculture and domestic, they have at the same time not been releasing adequate subsidies to cover up the deficits of the SEBs. Industrial consumers, on the other hand, are increasingly adopting captive generation, which also directly impacts the revenues of a distribution licensee. In a state of cross subsidised tariff structure, and the situation where consumers have been used to paying lower tariffs (below cost) or have not been paying at all, private entry in distribution segment is difficult to come through unless appropriate transition support is given by the state governments.

3.6.3.2 Public and private sector institutional bottlenecks

International experience of competition in the retail power supply market across different countries indicates that firstly, the retail supply business is separated from distribution and secondly, instead of parallel networks, multiple suppliers are allowed to supply through a common network. Some of the country specific experience with regard to retail supply competition is summarized in Box 3.8.

Box 3.8 Country specific experience with regard to retail supply competition

UK: The retail supply of electricity has been separated from distribution function, by issue of separate retail supply licence through the existing distribution network. All gas and electricity customers are allowed to change their suppliers. There are 17 Distribution licensees & over 75 retail supply licensees who are supplying to various consumers including domestic customers. With the issue of multiple licences, consumers have been provided with a choice of suppliers.
USA: In Colorado, the retails supply of power has been deregulated. In order to provide customer choice, all types of suppliers of electricity are allowed to compete for retail customers. Suppliers are allowed non-discriminatory open access to the distribution network. Except for requirement of universal service, exclusive monopoly in the supply including metering and billing service is no longer recognised.
In California retail supply of electricity has three investor owned and two municipal owned vertically integrated companies. Their service areas are discreet zones, and as such they have not competed with each other except for new industrial customers.
Australia (New South Wales): Retail competition in electricity supply was introduced in seven phases based on annual electricity usage in 1996. Initially small number of large industrial customers was allowed to select retail suppliers. By January 2002, all New South Wales customers including household customers were having choice of retail suppliers. There are four state owned suppliers and 17 other retail suppliers.
New Zealand: Separate Retail suppliers & distribution licensees exist. There are 10 retailers & 30 distribution companies.
Japan: In Japan, only extra-high voltage customers are allowed to choose their suppliers.

SOURCE Discussion Paper on "Introduction of Competition in Retail Supply of Electricity", Karnataka Electricity Regulatory Commission, 22nd August 2005

In India, though several SERCs have notified the open access regulations besides fixing surcharge, transmission and wheeling charges, it has hardly helped consumers to come forward to avail of open access. As discussed earlier, some of the compelling reasons that prevent consumers from going for open access are high cross subsidy surcharge, unreasonable transmission charges etc.

The EA 2003 provides for parallel distribution networks to introduce competition. But, worldwide experience to introduce competition in retail supply, shows that instead of parallel networks, multiple suppliers are allowed to supply through a common network, as it is not economically viable to duplicate the existing distribution network due to the sunk-cost associated with it and the scale of economies derived from network operation. In this context, it becomes imperative to separate supply from wire business to make retail supply competitive. In such a case appropriate amendment to the EA 2003 may have to be necessitated.

3.6.4 Generic issues in promoting competition

Apart from the specific issues/impediments faced in promoting competition in the generation, transmission, distribution and retail supply segments, there exist certain cross-sectoral issues in fostering competition in the electricity sector. These are briefly discussed below.

Electricity environment in the country – Natural monopoly and scarcity: As discussed earlier in the Chapter, electricity sector, world over, is typically characterized by natural monopoly conditions, externalities and public good characteristics. Of the four segments of the electricity sector, generation and retail supply are potentially competitive while transmission and distribution functions are relatively difficult to liberalize.

The first step to enable competition in a natural monopoly set-up would be to separate the monopoly (transmission and distribution) and competitive (generation and retail supply) functions of the vertically integrated utility. In the generation segment, 'competition for the market' is being introduced by the Government through measures such as competitive bidding process for setting up new generation stations. In the retail supply segment, the functions of metering, billing and marketing can be outsourced by the utility. In India, distribution utilities are increasingly outsourcing services such as billing and metering to private developers. For instance, franchising of utility services such as billing and metering in urban areas has been undertaken in Bhiwandi, Maharashtra.

Additionally, at present, there exists a considerable demand-supply gap in India's electricity sector. The primary reasons for this gap are summarized below:

- There has been inadequate generation capacity addition as per plan schedules. In recent years, demand of power has outstripped availability, thereby resulting in a rising gap. While the energy availability grew by only 5.6% during 2005-06, the increase in energy requirement was of the order of 6.8%.

Similarly, the rate of growth in peak demand in 2005-06 was 6.1% vis-à-vis 5.3% growth in peak met.

- The average Plant Load Factor (PLF), which is an indicator of generation efficiency, declined from 74.8% in 2004-05 to 73.6% in 2005-06.
- Shortage of key fuel inputs, such as coal and gas, in thermal power generation is one of the most critical factors for the demand-supply gap.
- Transmission and Distribution (T&D) system bottlenecks hamper the effective supply of power to end-consumers, thereby contributing to the gap.
- High levels of AT&C losses affect the rightful use of available power. Such losses can be attributed to poor collection efficiency, high rates of distribution transformer failure of and low level of investment in upgradation of transmission.

Annexure 3.7 elaborates the above reasons for the demand-supply gap.

In a country like India, which faces severe power shortages, the existing environment is less conducive for market forces to bring about competition. In such a scenario, competition can at best be introduced through regulatory and policy intervention. One such measure would be dividing the market into different segments, where the primary responsibility of the regulator would be to encourage investments in the sector and increasingly draw the market players' interest towards investing in the sector.

Ideological resistance to unbundling: As discussed in the transition model to competitive electricity markets, the first step towards unbundling of SEBs is the vertical separation of competitive segments (e.g. generation, marketing and retail supply) from regulated segments (distribution, transmission, system operations) either structurally (through divestiture) or functionally. International experience of electricity market structures clearly indicates that the decision and process involved in unbundling SEBs are highly political in nature. This is primarily because electricity being an essential commodity/ service, its jurisdiction and administration rest with both the central and state governments in most countries. This is particularly true in the case of developing countries. In India, unbundling has been strongly resisted by political parties and SEBs' workers. There have been instances of strikes as well. Though the EA 2003 mandated unbundling of SEBs by 10th June 2004[55], only a few SEBs have been unbundled till date. Further, the State Load Dispatch Centre has to be unbundled from the state transmission utility for providing non-discriminatory access to the transmission system.

[55] Except when the date is extended, as mutually decided between the Central and State Government

While examining the international experience of unbundling of vertically integrated utilities, it is seen that in the case of Sri Lanka, the Electricity Reform Act (No. 28 of 2002) that was notified by the Government of Sri Lanka in 2002 clearly mandates reorganization of the electricity industry by ensuring that the functions of the vertically integrated state owned utility, Ceylon Electricity Board (CEB), (relating to generation, transmission, distribution and supply of electricity) are separated and discharged by separate companies. However, as recent as May 2006, Sri Lanka's ruling party had decided to postpone the implementation of the restructuring programme of CEB due to pressure from the employees' unions affiliated with the People's Liberation Front (JVP). The JVP-affiliated Ceylon Electricity Employees' Union, apparently threatened a total blackout, should the government proceed with plans to implement the Electricity Reform Bill[56].

Similarly, in the case of USA, the electric power industry has historically been regulated by the states. The states have divergent views about the desirability of transitioning to competitive wholesale and retail electricity markets and restructuring utilities in their states to do so. There is no clear national law that adopts competitive wholesale and retail market model as national policy. This has, instead, had the effect that USA has relied heavily on individual state initiatives and efforts by Federal Electricity Regulatory Commission (FERC) to use its existing authority to encourage competition. This finds evidence in the fact that FERC's proposed Standard Market Design (SMD) rules that envisaged creating and coordinating Independent System Operators (ISOs) to schedule and dispatch generation and demand on transmission networks with multiple owners, has been postponed by the Congress.

In sum, unbundling is pertinent to separate regulated activities in the electricity supply chain from those that are competitive, and in this context, delays in unbundling naturally delays introduction of competition.

Importance of strong regulatory oversight: A strong regulatory oversight is typically required to ensure level playing field among the market players. For instance, information regarding network availability etc should be available to all the players. Such issue cannot be over-emphasized given the strong presence of incumbents across the supply chain. It might so happen that the regulated entities do not follow the regulations issued. In this regard, the key challenge becomes the enforceability of regulations ensuring their compliance by all concerned. It is, therefore, essential to lay down a sound monitoring process. In this

[56] This is against the backdrop that CEB is presently losing Rs. 40 million a day, and is burdened with a debt of about Rs. 30 billion in the short term and about Rs. 50 billion in project finance.

regard, each regulatory agency may follow a three step approach: it shall first undertake a periodic review of compliance against the regulations issued, followed by sending feedback to the regulated entities on the findings from the performance review in the first step, and finally, reviewing the regulations in line with results emerging from the foregoing process.

Institutional capacity to handle competition issues: The degree of complexity in managing a competitive electricity marketplace will increase as open access and trading become available to a large number of consumers. Technical constraints to generation as well as the transmission systems have to be carefully considered while drawing up the dispatch schedule. Issues related to competitive market design including setting up of a power exchange are complex, requiring strong capacity building of the regulator as well as the regulated utilities.

Common framework on market design needs to be evolved: Though the Act spells out the broad framework, there are no definitive guidelines along which the power markets need to be designed. In fact, the Act vests the power of developing the electricity markets including trading with the regulatory commissions. As the philosophies and principles for regulating the sector differ from one state to the other, given the underlying heterogeneity that exists in the existing regulatory system, there is a need to evolve a common market design so as to ensure smooth flows of power from one state to the other.

Competition and rural electricity coverage: With regard to the inter-state differences in rural electricity coverage, there emerges a very clear trend with regard to those states with greater poverty and HDI (Human Development Index) deficiencies such as low levels of literacy and high infant mortality rates. These states have drastically low electricity coverage. For instance from Annexure 3.5 it is clear that states such as Uttar Pradesh, Jharkhand and Bihar that have a percentage of unelectrified rural households of 80%, 90% and 95% respectively, are also the states that have greatest HDI deficiencies. This probably brings out a potential linkage between availability of social and physical infrastructure (including electricity) in rural areas and social parameters.

Till recently, the SEBs/State Governments pursued rural electrification efforts. However, now states are increasingly inviting private players to execute such projects. With central funding for rural electrification projects and overall supervision of such projects by the state government, private players are awarded projects through a bidding process. Such public-private-partnership model is conducive to move towards creating a competitive environment in provision of rural electrification.

3.7 Perception Survey Findings

As highlighted earlier, the EA 2003, the NEP 2005 and the National Tariff Policy 2006 stipulate several competition-enabling provisions. This section primarily attempts to gauge stakeholder opinion (consumers and non-consumers) on the potential impact of key policies, and appraise the progress on competition-enhancing parameters.

The survey highlights that delicensed generation, recognition of trading as an independent activity and freedom for captive generation are considered the most important provisions of the EA 2003, having potentially major impact on competition in the sector. The survey respondents have surprisingly accorded relatively less importance to provisions on open access and rationalization of tariffs and their impact on competition. One of the most noteworthy aspects of the survey is the diametrically opposite opinion of stakeholders on multiple distribution licensees in a supply area. While the consumers consider this provision of the EA 2003 as a major step towards enhancing competition, the non-consumers think otherwise. Further, the survey highlights that the success of various competition-enhancing provisions will critically hinge on their proper implementation and the existence of political constituency for reforms. The opinion of consumers and non-consumers as regarding the impact of the competition-enabling provisions is summarized in Table 3.14.

Table 3. 14 Impact of competition-enabling provisions of Electricity Act 2003

	Consumers	Non-consumers	Combined
Delicensed Generation	Major (55.6%)	Major (68%)	Major (64.7%)
Freedom for Captive Generation	Major (66.7%)	Major (48%)	Major (52.9%)
Open Access in Transmission and phased implementation of Distribution Open Access	Moderate (55.6%)	Moderate (48%)	Moderate (50%)
Recognition of electricity trading as an independent activity	Major (44.4%)	Major (56.0%)	Major (54.5%)
Multiple Distribution Licensees in a supply area	Major (66.7%)	Minor (40%)	Major-Moderate (32.4%)
Unbundling of SEBs	Major (44.4%)	Moderate (48%)	Moderate (41.2%)
Rationalization of retail tariffs towards cost of service (COS)	Moderate (77.8%)	Moderate (56%)	Moderate (61.8%)

SOURCE TERI Survey (2006)

The first phase of this project had identified certain barriers in implementation of the competition-enhancing provisions. The survey attempted to gauge the stakeholder perception on progress India has made, in addressing these concerns. For most of these parameters, the respondents have indicated their disapproval at the pace of reforms, the most important being availability and pricing of fuels such as coal and gas (53.1%). This clearly highlights the importance of integrated planning

for the energy sector, towards which India has made progress by formulating the 'Integrated Energy Policy' 2006. Further, 48.4% of the respondents opine that India has made only limited progress on availability and pricing of transmission capacity. It is worth noting that augmentation of transmission network is extremely critical to facilitate inter-regional power transfer. Such transfer will not only help reduce peak demand shortages and overall energy deficit but also ultimately foster competition in the sector. The Government has released new guidelines for private investment in transmission capacity and planning. Despite this, private involvement in transmission facilities, normally considered natural monopoly, has not gained momentum.

Further, about 45% of the non-consumers view the progress on rationalization of end-user tariffs as 'minor'. It is worth reiterating that irrational electricity tariffs negatively impacts the viability of distribution segment and the emergence of credible markets in the generation segment. On the regulatory oversight mechanism, there seems to be overall satisfaction in terms of functioning and institutional capacity of ERCs. This is evident from the survey findings that about half the consumer respondents and a third of the non-consumer respondents consider that substantial progress has been made. However, there exists considerable scope for further strengthening the regulatory institutions so as to instil confidence in merchant investors and help enable a level-playing field for all participants. On this aspect, a respondent has stated that '*the role of regulators has to transit from merely tariff making to overall sectoral planning, operational and safety management, aspects which are currently not much regulated*'. Box 3.9 presents some major barriers to competition, as identified by the survey respondents, in India's electricity sector.

Box 3.9 Major barriers to competition in India's electricity sector

Non-consumers

- Absence of macro-management approach of the regulators
- There currently exists administered pricing for all fuel inputs to the electricity sector. Therefore, attempts to make the electricity tariffs market driven may not actually bear results.
- Non-level playing field for private vis-à-vis incumbent service providers.
- Lack of adequate infrastructure (especially poor transmission and distribution facilities)
- Absence of political will to reform and political interference.

Consumers

- Lack of political will to reform
- Heavy regulation of fuel markets
- Lack of support from Government institutions and of public awareness on need for reforms

SOURCE TERI Survey (2006)

3.8 Conclusion

In sum, the following important points emerge from the foregoing discussion on the competition issues in India's electricity sector:

- Most of the electricity supply industry in India is under public ownership. This is evident from the fact that a major portion of generation, distribution and power trading, and almost entire transmission segment is either owned by the central or the state governments.
- The EA 2003, which is currently the overarching legislation governing India's electricity sector, has introduced several measures for making the sector more competitive. These include delicensed generation, trading, open access in transmission (at the outset), distribution open access (in phases), multiple distribution licensee and unbundling of SEBs. However, there still exist several issues with regard to implementation of these provisions. Some important issues include availability and pricing of transmission capacity, financial viability of SEBs, fuel supply, end-user tariffs and cross subsidy surcharge. The question of level playing field also needs to be addressed as well.
- In a country such as India, which faces severe power shortages of the order of 12.3% peak shortage and 8.4% energy shortage during 2005-06, the existing environment is less conducive for market forces to bring about competition. In such a scenario, competition can at best be introduced through proper regulatory and policy intervention. One such way is by introducing 'competition for the market'. An example of such an initiative by the GOI is the development of UMPPs under the tariff based competitive bidding route.
- The perception survey that was conducted to gauge stakeholder perception on the progress that India has made in addressing barriers to competition in the electricity sector brings out some interesting results. Some of the key barriers to competition that have been identified by the respondents include, non-level playing field for private vis-à-vis incumbent service providers, lack of adequate infrastructure, lack of political will to reform and heavy regulation of fuel markets.

In conclusion, it can be stated that while the EA 2003 contains competition-enabling provisions, there exist certain policy, regulatory and legal impediments that constrain private investment and hence competition. Therefore, for competition in the electricity sector to be enabled, the perceived risks of domestic and foreign companies need to be better understood and addressed by respective authorities. Table 3.15 summarizes the sectoral impediments to competition and the likely advocacy role of the Competition Commission of India (CCI).

Table 3. 15 Sectoral impediments to competition and role of CCI

Segments of electricity sector	Impediments to competition	Role of CCI
Generation	Lack of level playing field	Recommend to the Government to address various issues in generation segment
Transmission	Lack of access to transmission network	Impress upon Regulatory Commissions to ensure non-discriminatory access to transmission network
	Pricing of transmission capacity	Costs of network access and usage ought to be determined in a manner that promotes open access and trading. The CCI may advise the Regulatory Commissions to take action against any kind of discriminatory pricing by a particular entity
Distribution and Retail Supply	Lack of distribution open access	Impress upon respective regulatory commissions against any kind of practice that results in denial of market access to consumers

SOURCE TERI Compilation

CHAPTER 4 Competition issues in India's Oil and Gas sector

4.1 Overview

Oil and Gas sector is one of the six core industries in India and has important forward linkages with rest of the economy[57]. Crude oil exploration and production and the petroleum refining industries together have the second largest share of 6.17% in the infrastructure index of India[58]. The sector also accounts for about 37% of India's total primary commercial energy consumption, making it a major contributor of the consumption basket second only to coal[59]. Further, in 2004-05, the sector was the largest contributor to the Indian exchequer with a contribution of US$ 27 billion[60], around 40 % of the total excise and customs revenues of the Government of India.

India's Oil and Gas sector is increasingly making its presence felt in the international arena. At present, India is the sixth largest crude oil consumer and the ninth largest crude oil importer in the world. The sector is also increasing its share in the global refining capacity. The position of the Indian refining segment in the world is expected to strengthen further with plans of Reliance Petroleum Limited (RPL) to commission another refinery with a capacity of 29 Million Metric Tonnes Per Annum (MMTPA), in addition to its existing 33 MMTPA refinery at Jamanagar, Gujarat, which was the first fully private refinery to be commissioned in India. As a result, Reliance refinery would have world's largest refining capacity in a single location[61]. Essar Oil also commissioned its 10.5 MMTPA refinery at Vadinar, Gujarat, in 2006-07 (December 2006) making it the second fully private refinery in India.

However, a key concern for the hydrocarbon sector is the mismatch between demand and supply of both, domestic crude oil and natural gas in India. While the domestic production of crude oil has stagnated around 31-33 Million Metric Tonnes (MMT) per year for the last few years, the demand for crude oil has been steadily increasing. Consequently, India's dependence on imported crude oil has been rising and in 2005 –06, it was over 70% of the domestic requirements. During the year, India imported 99.41 MMT of crude oil, at a cost of US$ 38.78 billion. This growing

[57] Electricity, coal, finished steel, cement, crude oil and petroleum products together have a weight of 26.68 % in the Index of Industrial Production (IIP) http://indiabudget.nic.in/es2004-05/chapt2005/chap13.htm
[58] Reserve Bank of India – Handbook of Statistics on Indian Economy, RBI, New Delhi, 2005-06
[59] Planning commission Integrated energy policy, Planning Commission, New Delhi, 2004-05
[60] India Brand Equity Foundation, India at Davos,IBEF Essay:2006
[61] Test by fire for Reliance, Times of India, 26th Oct, 2006, http://timesofindia.indiatimes.com/articleshow/154081.cms accessed on 15th January 2006

import dependence not only raises supply risks, but also makes the economy susceptible to market risks. The supply risks arise primarily from uncertainty of crude oil availability due to potential instability in certain oil producing countries. The market risks originate from oil prices pushing-up inflation and adversely impacting economic growth.

Similarly, there exists a mismatch between demand and domestic production of natural gas. Against a total demand of 162.03 Million Metric Standard Cubic Meter per Day (MMSCMD) the availability of natural gas is only 81.17 MMSCMD resulting in a substantial gap of about 50%, consequently demand is limited by supply [62].

In view of the rising demand-supply gap in both crude oil & gas, there is an urgent need for India to increase public and private investments, especially in the exploration and production segment. However, currently there exist certain constraints affecting competition and therefore, private investment in the sector. The major impediments include lack of independent regulation in the upstream and downstream segments; lack of transparency in pricing of petroleum products & natural gas and entry barriers for new players in the marketing of transport fuels and distribution of natural gas.

This chapter aims to review the *important legislations and entry barriers in the Indian Oil & Gas sector that constrain private participation and competition.* It begins by detailing the existing structure of the oil and gas sector bringing out dominance of Public Sector Entities (PSEs) in all segments of the sector. In the subsequent section, two important regulations – the New Exploration Licensing Policy (NELP) and the recently enacted Petroleum and Natural Gas Board Act, 2006 are analysed with respect to competition enabling provisions in each. Based on this analysis, the chapter puts forth key areas of advocacy for the Competition Commission of India (CCI). The chapter ends with the key findings of the perception survey conducted by TERI to aid in understanding the views of various stakeholders on competition issues in the oil and gas sector.

4.2 Indian Oil & Gas sector – size and structure

The Ministry of Petroleum and Natural Gas (MoPNG) is at the helm of affairs and administers the entire gamut of activities of the Indian hydrocarbon sector. The Ministry has, under its aegis, set-up a number of organizations to facilitate delivery of its various functions.

[62] Ministry of Petroleum and Natural Gas, Basic Statistics, MoPNG, GoI, Delhi, 2005-06

The Indian hydrocarbon Sector can be broadly divided into following sub-sectors:

1. Exploration and Production (E&P)
2. Oil Refining and Marketing
3. Gas Transportation and Marketing
4. Crude Oil and Petroleum Product pipelines

The crude oil production in 2005-06 registered a decline of around 5% as compared to 2004-05 [63]. Of the total crude oil production of 32.19 MMT in 2005–06, 11.43 MMT was onshore and 20.76 MMT was offshore. For natural gas, the production was 32.20 Billion Cubic Meters (BCM), of which 9.4 BCM was from onshore fields and 22.74 BCM offshore fields[64].

Till the first round of NELP in 1999, Oil & Gas exploration sector in India was almost entirely under public sector companies. Progressive liberalization of the exploration licensing policy attracted some private domestic and foreign firms. While the E&P segment continues to be dominated by the public sector, oil and gas discoveries during 2005–06 were dominated by private/Joint Ventures (JVs) especially Cairn Energy India Limited and Reliance Industries Limited (RIL) etc. as shown in Figure 4.1.

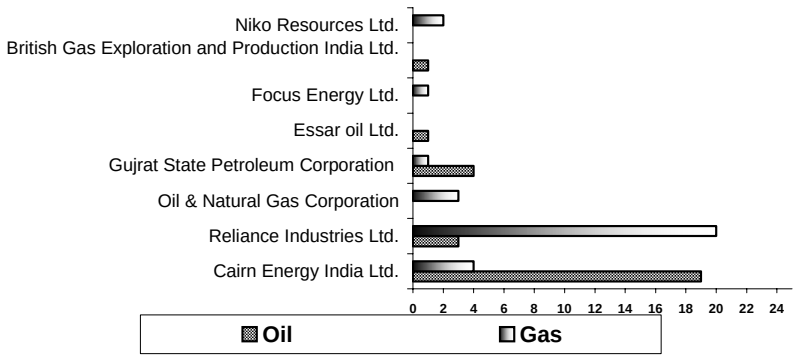


Figure 4. 1 Oil and Gas discoveries by the sub sector players in India (2005-06)
SOURCE DGH India, MoPNG, GOI

However, domestic oil and gas production is still dominated by Public Sector Companies accounting for 85.87% of the total crude oil production and 77.14% of the total natural gas production. Private/JVs have around 14% and 23% of total crude oil and natural gas production respectively (Figure 4.2). Nevertheless, in the last five years, from 2001-02 to 2005-06, private sector oil production grew at a Compounded Annual Growth Rate (CAGR) of

[63] Substantial decline during this year occurred due to fire accident in Mumbai High
[64] Ministry of Petroleum and Natural Gas, Basic Statistics, MoPNG, GoI, Delhi, 2005-06

around 1.97%, and gas production recorded growth of around 16.3% respectively.

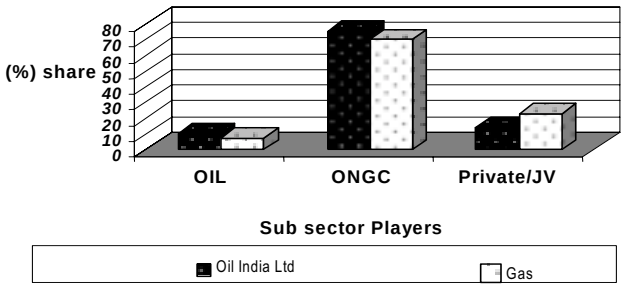


Figure 4. 2 Production share (%) of sub sector players in India (2005-06)

SOURCE Petroleum Planning and Analysis Cell, MoPNG, GOI

In the refining segment, India's total installed capacity has increased from 62.24 MMTPA in April 1998 to 132.47 MMTPA in April 2006. By the end of the Tenth Five Year Plan (2006-07), with the commissioning of the 10.5 MMTPA Essar refinery at Vadinar and doubling of the capacity of the IOCL Panipat refinery to 12 MMTPA, the total refining capacity will increase to 149 MMTPA.

Similar to the E&P segment, the refining segment is also dominated by National Oil Companies (NOCs) i.e. Indian Oil Corporation Limited (IOCL), Bharat Petroleum Corporation Limited (BPCL) and Hindustan Petroleum Corporation Limited (HPCL) and their subsidiaries. The share of various players in India's overall refining capacity as of 1st April 2006 is given in Figure 4.3.

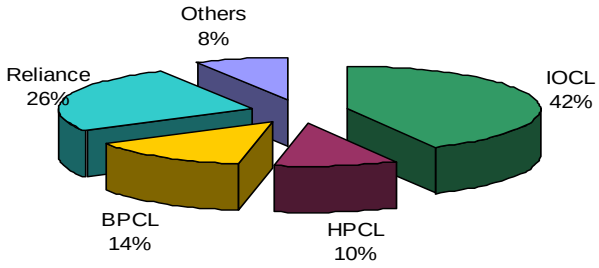


Figure 4. 3 Refining sub-sector players in IndiaSOURCE Petroleum Planning and Analysis Cell (PPAC) 2006 (www.ppac.org)

However, the dominance of NOCs is expected to decrease progressively with the commissioning of the above mentioned Essar refinery and the 29 MMTPA RIL export oriented refinery at the Jamnagar Special Economic Zone (SEZ).

The retailing segment is also dominated by NOCs as is shown in Figure 4.4. The key NOCs operating in the downstream sector are IOCL, HPCL and BPCL. Retail outlets share of private/JVs is around 2% of the total market during 2004-05.

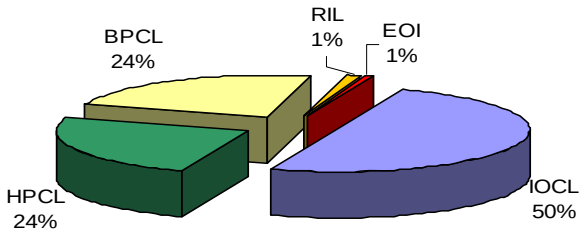


Figure 4. 4 Marketing sub-sector players in India
SOURCE TEDDY 2004/05, TERI

As on 1st April 2006, there were crude oil pipelines in the country spanning over 3971 km with a capacity of 28.50 MMT, transporting crude from various supply points to refineries[65]. IOCL and OIL own the cross country crude oil pipelines[66]. The total product pipelines [including Liquefied Petroleum Gas (LPG) pipeline] length as on 1st April 2006 was 9546 km with a capacity of 55.58 MMT[67]. GAIL, IOCL, HPCL and Petronet own the product pipelines.

In natural gas transportation, GAIL is the dominant player in the country. In the retail segment, the company has key JVs such as the Mahanagar Gas limited (JV with British Gas and the Government of Maharashtra) in Mumbai and Indraprastha Gas limited (JV with BPCL and the Government of National Capital Territory of Delhi) in Delhi.

4.3 Legal and Regulatory Framework

The Indian Oil & Gas sector is currently devoid of an independent regulatory oversight in the upstream segment. Despite dismantling of the Administered Pricing Mechanism (APM) in 2002, which implied petroleum pricing moving towards market determined prices, the Government continues to control the pricing of automotive fuels, LPG for domestic sector, and kerosene through Public Distribution System (PDS).

[65] Indian Oil Corporation Limited.IOCL investors presentation, IOCL, India 2006, www.iocl.com, accessed at 13th October 2006
[66] IOCL has two pipelines (i) Salaya-Mathura-Panipat and ii) Haldia-Barauni and OIL has one Duliajan-Bongaigaon-Barauni crude pipeline
[67] Petroleum Planning and Analysis Cell (PPAC), Oil Industry Statistics, PPAC, New Delhi, 2006.

The Directorate General of Hydrocarbons (DGH) advises the Government on matters pertaining to the upstream segment; however, the organization still does not have the mandate as the regulator of the sector. In this regard, the Integrated Energy Policy (Planning Commission, August 2006) states that '*the current upstream regulation provided by DGH is neither independent nor comprehensive in a technical sense with respect to optimal development of the hydro-carbon resources*'. For the downstream segment, the Government is in the advance stage of setting-up a Petroleum & Natural Gas Regulatory Board (PNGRB), which would oversee and regulate the refining, processing, storage, transportation, distribution, marketing, and sale of petroleum products and natural gas, under the PNGRB Act 2006.

For the upstream segment, the Government of India announced a new licensing policy in 1997– the NELP. The main objective of NELP has been to attract latest technology and investment to the exploration and production segment from national and international E&P companies[68].

In the next section, various competition impacting provisions of the NELP and PNGRB Act are discussed.

4.3.1 New Exploration Licensing Policy

In pursuance of the Industrial Policy Resolution, 1956, ONGC and OIL, the National Oil Companies (NOCs) have monopolised the upstream segment in India. In 1979, the Government made the first systematic attempt of introducing private participation in the segment by providing licenses. As exploration activities had been initiated only in a few (15%) potential oil bearing areas and as there was delay on the part of the Government to award contracts for oil exploration, the outcome was not satisfactory. Initially private players were interested. However, there were entry barriers such as reservation of most prospective acreage for NOCs such as:

a) NOCs could participate in the private operated fields where they had the option to share profits once it commenced production without taking part in incurring exploration costs;
b) Unattractive fiscal terms;
c) Lack of significant finds and the slow rate of progress/delay in signing contracts;

As a result, licensing rounds held between 1979 and 1995 resulted in investment of only US$ 2 billion.

[68] Director General of Hydrocarbons, DGH Exploration blocks under PSC, DGH, India: 2006

In 1997, the Government announced the NELP. Under the policy, the Government intended to provide a level playing field to all the players for award of exploration acreages. Under the NELP, ONGC and OIL were also required to compete to obtain oil blocks instead of being given on the nomination basis as in the past by the Government. Interested parties could bid directly without mandatory participation of NOCs and carried interest[69] of the Government/NOCs. In addition, players are given seven years of income tax holiday from the commencement of commercial production, and customs duty on import for exploration operation is abolished for the players. Total freedom is also given to companies to market gas in the domestic market. Salient features of NELP are listed in Box 4.1.

Box 4.1 Salient Features of NELP

- The possibility of the seismic option in the first phase of the exploration period.
- Foreign participation upto 100%.
- No minimum expenditure commitment during the exploration period.
- No signature, discovery or production bonus.
- No mandatory state participation.
- No carried interest by National Oil Companies (NOCs).
- Income Tax Holiday for seven years from start of commercial production.
- No customs duty on imports required for petroleum operations.
- Biddable cost recovery limit upto 100%.
- Option to amortise exploration and drilling expenditures over a period of 10 years from first commercial production.
- Royalty for onland areas payable at the rate of 12.5% for crude oil and 10% for natural gas. For offshore areas, royalty payable at the rate of 10% for oil and natural gas. Royalty for discoveries in deep-water areas beyond 400 m iso-bath chargeable at half the applicable rate for offshore areas for the first seven years of commercial production.
- Fiscal stability provision in the contract.
- Freedom to the contractor for marketing of oil and gas in the domestic market.
- Provision for assignment.
- Arbitration and Conciliation Act, 1996, based on UNCITRAL model, applicable.
- To facilitate investors, a Petroleum Tax Guide (PTG) in place.
- Companies are free to bid for any number of blocks, singly or in consortium
- The company is required to give preference to the use of Indian goods and services subject to quality, schedule, availability and competitive pricing. It also has to give preference to employment to qualified Indian national

SOURCE http://dghindia.org/nelp_background.html accessed on 21st February 2006.

Under the six rounds of NELP completed so far, a total of 162 onshore and offshore blocks have been awarded as compared to 21 blocks awarded under the previous licensing rounds held from 1992 to 1997. There has been significant improvement in private sector participation under these rounds. Out of the total 162 blocks, 56 blocks have been awarded to either private companies or to a consortium of private companies. The number of bids per block by

[69] Carried interest: Carried interest was exercised by NOCs only after commercial discovery. In pre-NELP rounds NOCs had the right to take upto 40% share in all offered blocks (mandatory 10% in the beginning and 30% after commercial discovery).

the players has also been increasing in the respective rounds. In the sixth round of NELP, of the total 52 blocks, ONGC had been awarded 25 blocks, while Reliance Industries had received 7. Of the 25 assets awarded to ONGC, the Indian firm will be the operator in 24, while Cairn Energy will run the remaining one[70]. A summary of the blocks offered under various NELP rounds is given in Table 4.1.

Table 4. 1 Summary of NELP rounds

NELP Rounds	NELP -I	NELP -II	NELP -III	NELP -IV	NELP -V	NELP -VI
Blocks						
Blocks offered	48.00	25.00	27.00	24.00	20.00	55.00
Total bids	45.00	45.00	53.00	44.00	69.00	165.00
Blocks awarded	24.00	23.00	23.00	20.00	20.00	52.00
No. of bids/ block	0.90	1.76	1.93	1.82	3.40	3.00

SOURCE DGH, MoPNG, GOI (http://www.dghindia.org/site/index.aspx) accessed on 24th November 2006

Table 4.2 puts forth more details about the awarded blocks under NELP. Though maximum blocks have been won by the NOCs or only NOC led consortium, the role of private players has been steadily increasing. Around 35% of the total blocks have been awarded to only private (domestic and foreign) players or consortia. While foreign players have also won blocks under these rounds, many blocks have been awarded to consortium in which they have a minority stake. Seven blocks have been awarded to only foreign companies in these six rounds. Hence, there is definitely a scope for improvement in terms of participation of foreign players under future NELP rounds.

Table 4. 2 Awardees for the last five rounds in NELP

	NOC/ NOCs JV		Private/Private JVs				Operational blocks	Blocks Relinquished
Rounds	NOCs/ NOCs JV	NOC-Pvt JV	Domestic Private	JVs (Dom. pvt +foreign)	Foreign companies	Total pvt/ pvt.- JV		
NELP I	7	1	9	2	2	13	20	4
NELP II	14	0	2	2	0	4	18	5
NELP III	13	1	0	9	0	9	23	0
NELP IV	13	5	0	2	0	2	20	0
NELP V	3	9	3	3	2	8	20	0
NELP VI	18	17	7	7	3	17	52	0
Blocks Relinquished	6	0	1	1	1	3		
Total	74	33	22	26	8	56	153	9

SOURCE DGH India, GoI, 2006

[70] Govt awards 52 oil and gas blocks, Business Standard,9th February 2007 http://www.businessstandard.com/economy/storypage.php?tab=r&autono=274161&subLeft=1&leftnm=3 accessed on 10th February 2007

Although the number of blocks awarded to PSUs and PSU led consortium is higher than offered to private players, large chunk of the investments have come from the private players (Indian and foreign). Players such as RIL and Cairn Energy India Limited (CEIL) each have invested more than ONGC (Table 4.3). Further, the number of discoveries by these players has been far more as compared to those by the PSUs.

Table 4.3 Exploration investment by sub sector players upto March 2005

Companies	Total blocks	No. of discoveries	Investment made (US $MM) (upto March 2005)
ONGC	47	Nil	415.58
RIL	32	18	566.79
CEIL	5	21	645.60
OIL	6	Nil	2.95
HOEC	3	1	2.46
GSPCL	5	4	21.04
JOGPL	3	Nil	Nil
GAZPROM	1	Nil	6.59
CANORO	1	Nil	1.91
HARDY	1	Nil	10.14
ESSAR	2	1	6.31
PHOENIX	2	Nil	6.79

SOURCE DGH India, MoPNG, GOI

Table 4.3 provides the evidence of increasing private sector participation and competition in the upstream sector. As on March 2005, total private investment in the E&P sector under NELP was around 3 times the investment made by the PSUs. Furthermore, even the success rate (number of discoveries as compared to the total blocks awarded) of private sector oil companies was much better than the NOCs. Consequently, NELP rounds have not only seen an increase in private participation in the sector but also an enhancement of domestic reserves (Figure 4.5). Under the five rounds of NELP, discoveries by private participants have been much more significant than that of NOC's. For instance, the Reliance gas find in 2002 in the Krishna Godavari (KG) Basin was around 14 Trillion Cubic Feet (TCF). In 2005–06, based on an independent assessment, RIL revised the reserve potential for the Dhirubhai-1 and Dhirubhai-3 wells to 11.3 TCF from the earlier estimate of 5.32 TCF. Consortium led by Gujarat State Petroleum Corporation (GSPC) made a discovery of around 20 TCF of gas at the KG–8 well located in the KG Basin.

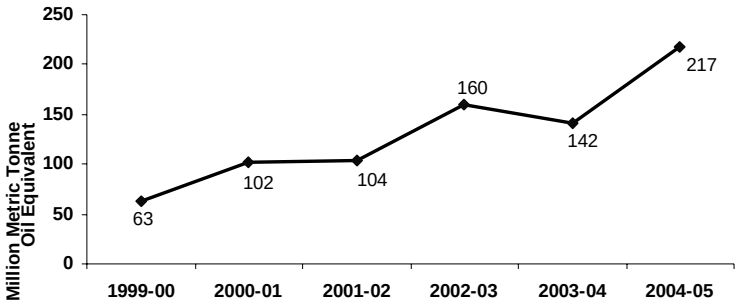


Figure 4. 5 Reserve accretion under different NELP rounds
SOURCE DGH India, MoPNG

Given the success that has been registered under the NELP rounds, not only in terms of increasing investments in the sector but also number of discoveries, it becomes imperative to analyse the key competition enabling provisions of the policy.

4.3.1.1 NELP Rounds and Competition enabling provisions

As mentioned earlier, by early February 2007, six rounds of NELP have been completed. The following section traces the evolution of the NELP through each of its round to facilitate greater competition and transparency in the E&P segment of Indian Oil & Gas sector.

4.3.1.1.1 NELP -I (1999)

The first round of NELP was path breaking as it introduced a new type of block for bidding -*deepwater block*, which was non-existent in the pre-NELP phase. For the first time, provision was made to allow companies to bid for one or more block/s, individually or in association with another party. The successful companies/consortia were also free to form an unincorporated or incorporated venture.

4.3.1.1.2 NELP -II (2000)

Under the second round, deepwater blocks were given further coverage and new deep-water blocks located in West Coast and Gujarat were included. For the first time, basin information dockets and data packages were digitized and made available on CD ROM and Exabyte tapes[71]. The need for increased transparency in the bidding process was realised and the weights assigned to the broad parameters for bid evaluation were made public. The commitment for the work programme for the exploration phase-I was assigned the maximum weight of 60%. Government of India appointed IHS Energy Group of USA as the marketing consultant for this round to conduct international road shows at important

[71] Press Information Burae, Third road show for NELP-II blocks held in USA, PIB, GoI, India: 2003

centers of the world. These were attended by a number of international players such as Shell, British Petroleum, British Gas, Premier Oil, Cairn Energy etc.

4.3.1.1.3 NELP -III (2002)

In order to promote exploration acreages and attract investments, Government undertook more promotional road shows and launched a website on NELP-III, which, inter-alia, provided geological, fiscal and contractual details.
Technical and financial capability requirements for both deep-water exploration and production were considered necessary. Consequently, separate Bid Evaluation Criteria (BEC) for deep water and onland blocks with different sub criteria and scores were prepared for this round.

The third round of NELP was very impressive in terms of attracting multiple bids in 78% of blocks as compared to around 50% blocks attracting multiple bids under NELP -I and NELP -II[72].

The underlying reasons could be manifold:

- The promptness of the Government in the decision making process in NELP -II. The entire process of award of blocks and signing of contracts in NELP-II was completed in about three and half months time (see Table 4.4 for further details). The expectation of similar trend in the following rounds could have resulted in greater participation.
- The year for implementation of third round of NELP and dismantling of Administered Pricing Mechanism (APM) for the petroleum products coincided. The pricing decontrol could be another factor that might have given boost to the private companies to invest in India.
- Slashing of income tax rate applicable to foreign companies from 48% to 40%. This was another positive measure taken to encourage competition[73].

4.3.1.1.4 NELP -IV (2003)

The continuous improvement in preparation of data repository and success achieved through promotional road shows during first three rounds started to show impressive results in the fourth round. The number of companies visiting data rooms for review of data under NELP-IV as well as the number of data packages purchased was the highest as compared to the first three NELP rounds. A total of 75 data packages were sold and the total amount received from sale of data packages was about US$ 3.5 million

[72] Petroleum Federation of India, Review on E&P Licensing Policy, Petrofed, New Delhi: 2006

[73] Petroleum Federation of India, Review on E&P Licensing Policy, Petrofed, New Delhi: 2006

(about Rs. 17 crores)[74]. Participation of international players increased under NELP -IV with nine international companies bidding for the first time. Increased private sector involvement in NELP -IV was largely due to the following factors:

1. Provision of fast-track arbitration
2. Higher weightage to technical and financial capability for deepwater blocks
3. Abolition of surcharge on income tax for foreign companies
4. Return of bank guarantee to investors after completion of minimum work

4.3.1.1.5 NELP -V (2005)

NELP -V was even more successful than NELP -IV in terms of private sector participation. Out of a total 26 foreign companies that submitted their bids, 17 companies were first timers. The Government of India undertook an extensive promotional exercise for NELP -V along with some more positive initiatives to encourage competition. These are:

1. Complete information to all interested parties through the Internet.
2. Companies having a net worth of US$500 million or more were not required to give a bank guarantee towards Minimum Work Programme (MWP) commitment for onland and shallow water blocks.
3. BEC was made more transparent by disclosing sub criteria including weights for the first time.

4.3.1.1.6 NELP -VI (2006)

The approach to the sixth round of NELP was different from the previous rounds. The first five rounds laid more emphasis on work programme, i.e. the commitment by the bidder to do seismic survey and drill well, which led to highly exaggerated bidding in respect of this parameter. For instance, ONGC and RIL failed to make the promised investments in 10 E&P blocks in KG basin within stipulated timelines[75]. Driven by these facts, NELP -VI discouraged speculative bidding on the basis of aggressive work programme. Instead, it emphasised on fiscal parameters and gave weightage to technical capability of the designated operator[76].

In this round, the blocks, namely onland, shallow water and deep water, were categorised on the basis of prospectivity into type A and type B. Bid Evaluation Criteria was made dependent on the

[74] Press Information Bureau, Best response to NELP rounds so far, PIB, GoI: September 2003
[75] Reliance, ONGC face $134 mn fine, Rediff News, September 2006, http://www.rediff.com/money/2006/sep/06rel.htm accessed on 23rd October 2006
[76] DGH India, Proposed changes for BEC in NELP VI, DGH, India: 2006

type of blocks. Unlike the first five rounds, the bidders were asked to submit MWP consisting of 2D-seismic coverage in the Notice Inviting Offers (NIO) against each block.

4.3.1.2 Issues under NELP

4.3.1.2.1 Time factor in NELP rounds and competition

The NELP rounds have not shown any major improvement as far as the total administrative period taken under each round is concerned. NELP -I offered 48 blocks, out of which only 25 blocks were awarded and this took a long 15 months to complete the round. While NELP- II offered more blocks than NELP IV and V, it took less time[77] in converting the winning bidders to sign the contracts for the blocks. NELP- III (27 blocks), on the contrary, could not maintain the speedy action achieved in NELP -II and completed the round almost in a year. NELP- VI was significant in terms of offering maximum blocks in any one round till date. Decision on final awardees of NELP-VI came February 2007, which in turn completed the process in five months from the date of closing bids[78]. However, NELP -VI took a year from the date of announcement to complete the entire process. The total time taken by all the rounds has been compiled in Table 4.4.

Table 4. 4 Time taken in NELP rounds

Round	Blocks offered	Date of announcement of the round	Deadline for receiving the bids	Date of award of blocks	Total time taken	Time taken b/w awarding and bids receipt
NELP I	48	January 8, 1999	August 18, 1999	April12, 2000 (signing of contract)	15 months	8 months
NELP II	25	December 15, 2000	March 31, 2001	July 17, 2001	7 months	3.5 months
NELP III	27	March 27, 2002	August 28, 2002	February4, 2003 (signing of contract)	11 months	6 months
NELP IV	24	May 8, 2003	September 30, 2003	February 7, 2004 (signing of contract)	9 months	4 months
NELP V	20	January 4, 2005	May 31, 2005	September 29, 2005	9 months	4 months
NELP VI	55	February 24, 2006	September 15, 2006	9th February 2007	12 months	5 months

SOURCE TERI compilation

4.3.1.2.2 Effect of improvement in data repository

As explained earlier, data packaging has become more detailed and advanced. In addition to physical data rooms, Online Data Room (ODR) facility was also made available to interested E&P companies to view the data and assess the prospectivity of the blocks offered as the rounds progressed. It is clearly evident from the table below that the number of foreign companies that viewed

[77] NELP II took a total time of 7 months and the time taken for awarding the bids after receiving them was only 3.5months. NELP IV and NELP V were completed in 9 months each.
[78] "Secretaries panel likely to meet on Monday for NELP VI", The Hindu Business Line, 12th January 2007, http://www.thehindubusinessline.com/2007/01/12/stories/2007011204931000.htm accessed on 23rd January 2007

and purchased data under various rounds have doubled from NELP-I to NELP-V.

Table 4. 5 Data viewed vis-a-vis data purchased by companies in NELP rounds

Round	Foreign companies		Indian companies/ consortium	
	Viewed	Purchased	Viewed	Purchased
NELP-I	42	10	14	6
NELP-II	35	7	11	6
NELP-III	37	4	14	5
NELP-IV	30	6	13	9
NELP-V	87*	21	24*	11

SOURCE Compiled from various Infraline reports

*This figure includes ODR visitors and physical data room viewers. Some companies have availed both the facilities.

4.3.1.2.3 Open Acreage Policy: New dimension for upstream

Given the nature of finds that India has had, a large number of companies have expressed keen interest to be a part of the exploration process in India. The open acreage policy allows foreign companies to bid for blocks they would like to explore rather than the Government to identify the blocks for exploration from time to time.

Under the open acreage policy, blocks will be available throughout the year and companies can visit data room anytime and if they find any block attractive, they can bid for it. Once a bid is received for a block, it is made known and other bids from interested parties are invited within the stipulated period to make it more transparent and competitive process. The norms are expected to give maximum weight to the technical capability of the bidders. Nonetheless, to kick off the open acreage system, national data repository has to be in place, where data from the already awarded (explored and producing) blocks and to be awarded blocks, would be stored for viewing. This policy has not been yet finalised. However, it has been proposed to introduce the same along with the seventh round of NELP. Open Acreage policy would be an improvement over the present policy as it is likely to generate more competition in the sector.

4.3.1.3 NELP criteria and competition issues

4.3.1.3.1 Minimum Work Programme (MWP)

The terms and conditions under MWP identify the operators who are not able to complete the work within the stipulated exploration period with no hydrocarbon discovery. Government monitors the work programme under two phases.

(A) First phase provides for a total period of twelve months extension as per Production Sharing Contract (PSC) between the Government and the awardees of the exploratory block. The extension of first six month is given as per PSC without any terms and conditions. In case the operator requests for an additional six-month extension, it is granted based on the following terms and conditions:

- Contractor will have to provide a 100% bank guarantee and 10% cash penalty for the unfinished works as determined by the DGH[79].
- In case the contractor does not wish to continue the exploration, contractor could relinquish the area in terms of the provisions of the PSC in the beginning of this extension period.

(B) Second phase comprises of a period beyond twelve months extension. The PSC has the provision not to allow phase II extension. In case the extension for 12 to 18 months is permitted, considering the merits of the case, the criteria remain the same as for 6-12 months extension except that the cash penalty is raised to 30% of the unfinished work as compared to 10%.

This penalty provision signals a stern approach adopted by the DGH towards awardees not performing as per commitment. However, it is noteworthy that the factor leading to this non-completion of MWP was due to assigning a high weightage to the work programme criteria. Consequent to this, bidders overstated their work programme and indicated investment commitment to win the bid (see box 4.2), but subsequently the winners failed to comply with the same and thus requested for extensions. All these, in effect, defeat the purpose that the policy has envisaged.

Box 4.2 Instances of non-completion of MWP by the players

The MWP of ONGC for five NELP-II deepwater blocks (GS-DWN-2000/1, GS-DWN-2000/2, MB-DWN-2000/1, MB-DWN-2000/2 and KK-DWN-2000/4) covers drilling of exploratory wells. ONGC failed to complete MWP with in stipulated time frame. As a result, ONGC was fined for not meeting the minimum work programme commitment. The DGH recommended recovery of US$ 6.351 million for failure to drill two exploratory wells on block MB-OSN-2000/1, US$ 19.615 million for three undrilled wells on block MB-DWN-2000/1 and US$ 22.807 million for not drilling two wells on MB-DWN-2000/2. ONGC has deposited an amount of US$ 13.5 million against a due amount of US$ 17 million as liquidated damages for availing extension in exploration phases. In addition, the DGH levied a penalty of US$ 7.275 million on RIL for failing to do a 3D seismic survey and drill two exploratory well on block KG-OSN-97/3 and US$ 2.645 million for unfinished 2D and 3D seismic survey and one undrilled exploratory well on block KG-OSN-97/4.

SOURCE :http://www.tribuneindia.com/2006/20061208/biz.htm#5 accessed on 16th Dec 06; http://www.newkerala.com/news4.php?action=fullnews&id=63236 accessed on 16th December, 2006; DGH India

[79] Director General of Hydrocarbons, Action to be taken on pending extension case, DGH report, GoI:2006

The example at Box 4.2 would also show the need for timely payment of stipulated penalty by DGH for non-completion of MWP necessary to maintain the sanctity of PSC. Twelve months extension to ONGC for these five deep-water blocks got over in August 2006. DGH rightly recommended a penalty for future extension of time by 6 months instead of permitting an alternate work programme by ONGC for those five deepwater blocks. In conclusion, DGH has taken right steps towards making NELP an unbiased and competitive policy. This attitude could raise the confidence of potential investors to bid in the future rounds.

4.3.1.3.2 Profit gas/ petroleum

Profit gas/petroleum is the profit earned by the operator from the block once the nominated block commences its production. Under the PSC regime, the contractor is required to share profit gas/petroleum with the Government, in the event of a hydrocarbon discovery. The profit gas/petroleum to be shared may be based on the Investment Multiple (IM) or the post tax rate of return in some cases. IM is the ratio of net revenue to investment of the operator. Investment, in turn, may be defined as all costs incurred in exploration and development of the block. Profit gas/petroleum share is linked with IM. Once any block matures, steady flow of revenue starts generating implying higher IM value. As IM is increased, Government's share from the profit gas petroleum is correspondingly increased. Table 4.6 shows typical linkage between profit gas/petroleum share of the Government from the operator and IM. However, Government's share for any block is determined based on the bid submitted by the company.

Table 4. 6 Relation between IM and profit gas/petroleum share

Investment multiple at the end of any year	Government share of profit gas/petroleum (%)	Contractor share of profit gas/petroleum (%)
Less than 1.5	10	90
1.5 to less than 2.0	20	80
2.0 to less than 2.5	30	70
2.5 to less than 3.0	40	60
3.0 to less than 3.5	50	50
3.5 and above	60	40

SOURCE "Natural Gas Pricing: Producer vs. Consumer"Infraline report, 2006

4.3.1.3.3 Profit gas in kind

The Government has proposed to make gas available in different regions by insisting on taking the Government's share of PSCs in the various gas fields in kind enabling it to supply the gas to different regions. The Government modified PSCs in the fifth round of NELP stating that it would exercise the option of taking

gas in kind[80]. If Government exercises this option to take profit gas in kind, it would have adverse impact on competition.

There exist many operational concerns among the awardees of the blocks, especially the Gas Industry Group (GIG), formed by BG India, Exxon Mobil Gas (India) Private Ltd., Gujarat Gas Company Ltd., Gujarat Paguthan Energy Corporation Pvt. Ltd., Gujarat State Petroleum Corporation Ltd., RIL and Shell. As considerable amount of gas discovered shall be given to the Government in kind, it could, to a great extent, negate the provision of free marketing of gas in the PSC. In addition, if the Government decides to market its share at subsidised price, it would discourage a level playing field and deter investment in the natural gas sector. Further, the companies would not be able to commit the quantities on long time basis, as exercising the option by the Government to take gas in kind shall affect steady availability to the companies on long term.

International experience, however, reveals that around 50 countries out of total 61 countries studied, required their profit gas share to be supplied in kind in addition to cash payment of royalty. The exceptions are those countries (11 countries) not having the option due to various reasons[81]. A preliminary study of the global practices including those in Vietnam, Myanmar, Iran, Bangladesh and Pakistan suggest that 100% of the gas is sold to the Government at a price less than $ 2/MMBtu[82]. According to an estimate of GAIL, NELP players have the freedom to sell roughly 80% of the gas. In comparison, contractors in India can sell the gas at the market-driven price, which is higher than the selling price prevailing in these countries[83]. There is no evidence that marketing restrictions in other countries have led to adverse impact on foreign investments. As a whole, the impact of these provisions on foreign investment needs more analysis to draw conclusion on its effect on competition.

4.3.1.3.4 Inter ministerial Clearance

Environmental clearance is a major issue that can impact entry of foreign players in this segment. Wildlife sanctuary, national parks, coral reefs and areas of biosphere sensitivity are excluded for the activities of exploration and production by MoEF (Ministry of Environment and Forests) even though these areas may be highly

[80]The Hindu Business Line, Private firms against Govt taking gas profit in kind, 24th February 2005, http://www.thehindubusinessline.com/2005/02/24/stories/2005022402970300.htmaccessed on 31st October 2006

[81] Sarkaritel.com News and Features-Corporate News, UK study supports Gail's stand on profit gas in kind, 20th September 2005, http://www.sarkaritel.com/news_and_features/sep2005/20gailuk.htm accessed on 3rd February 2007

[82] Compiled from various Infraline Natural gas related studies

[83] Infraline, Government's Share In Profit Gas: In Cash Or In Kind, Infraline research reports, India: May 2005

prospective [84]. There are instances when MoEF did not grant environment clearance for a part of the block falling in such areas and consequently, operators had to relinquish the area (for example, ONGC in the MS-OSN-97/3 block). The areas of bio-diversity sensitivities such as national park, sanctuaries etc. therefore should be indicated in the bid document for NELP so that delays due to MoEF clearances could be avoided in the drilling stage. Operators have suggested that guidelines may be framed to grant clearances, if the area is prospective and Environmental Impact Assessment (EIA) studies show insignificant impact on environment[85]. However, scope of clearance has not been widened despite the recommendation of EIA studies in this regard. As a result, in most of the cases, there is a delay in obtaining clearances. Therefore, streamlining of environmental clearance process is needed to avoid delays as they lead to time and cost overruns. There have been delays in getting no objection certificates and clearances from State Pollution Control Boards and Forests Departments. However, the new EIA notification of September 2006 of the MoEF further rationalised the clearance process and hopefully, will address the issue.

In 2006, Ministry of Defence (MoD) constituted a study group to study the availability of seismic data in India and suggested certain restrictions to make available the data in the public domain without compromising the national security interest. Thus, any type of proposal for outsourcing the acquisition of this data through any Indian/Foreign firm should be routed through Geodetic & Research Branch, Survey of India for MOD Clearance. Restricting the acquisition and use of gravity data by E&P companies under the proposed Draft Restriction Policy by MoD (2006), will not only hamper the progress of the important E&P activity being carried out by various companies in the country, but may also be highly counter productive.

Another major drawback is obtaining naval clearance from the Indian Navy /MoD for deployment of vessels/offshore rigs. An operator is required to make an application through the Home Ministry to MoD for obtaining naval security clearance for vessels. The period required by Navy/MoD for such clearance is 120 days[86]. Operators have been requesting to cut down time for clearance to five working days and in case of any emergency to 24 hours. These, as a whole, greatly affect competition.

[84]Oil and gas practice group of J.Sagar Associates, Oil and gas update, August 2005, http://www.jsalaw.com/files/OG%20Update%20August%202005.pdf accessed on 28th December 2006
[85] NEERI publication, completion of ten years of EIA notification: a review & recommendations: 2004 http://paryavaranmitra.org.in/misc/EIA%20Article.doc accessed on 1st February 2007
[86] Infraline, E&P Operators: Issues of Concern, Infraline, India: December 2004

4.3.1.3.5 Improper announcement of discovery: competition aspects

Any company, participating in the domestic exploratory activities, could take undue advantage of absence of a regulator by announcing any arbitrary discovery without any notification to the Government on proper assessment of reserves, field size and production potential of the said discovery. The information of arbitrary discovery could attract the share market to buy the shares of that company. This could impact the stock market as a bubble consequent upon rise in stock prices. Regulator should govern the loophole of insider information as NIKO Resources Limited have allegedly already taken recourse to this insider information for their benefit.

However, the tendency has since been curbed by the MoPNG by setting some guidelines for announcing new discoveries for all E&P companies under PSC regime. These guidelines were announced in May 2006[87], as illustrated below:

- If and when a new discovery is made within any contract area, it is mandatory that the Government and management committee be informed of the discovery.
- Information on any new discovery made in the concerned block in any contract area is to be declared at large only after detailed technical analysis and approval from Government and management committee at various stages of the exploration phase.

These guidelines made by the Government are evidently timely and are expected to prevent the players from indulging into anticompetitive practices.

4.3.1.4 Fiscal issues in NELP

There exist four types of payments the government receives from the PSC: royalty, cess, profit sharing, and corporate tax. In addition, there are certain state levies. The various forms of fiscal transfers with their benefits and drawbacks in the background of NELP are discussed below.

4.3.1.4.1 Cess and Royalty

NELP rounds have exempted all players from payment of cess. As regards royalty payment to the State Government, NELP has the maximum royalty rate at 12.5% of international price listed as against 20% of the price in non-NELP areas[88]. Further, for deep-

[87] MoPNG, Guidelines for announcement of new discoveries under production sharing regime"-MoPNG notification, India: May 2006

[88] TERI Publication, New Exploration Licensing Policy: Will it strike oil?" TERI, New Delhi: July 1999

water exploration, the rate of is half of the applicable rates for offshore blocks, which is 10%, in the initial seven years from commencement of commercial production.[89] This royalty concession initiative is no doubt a positive step to encourage competition. Table 4.7 shows payments received by the respective state Governments during last four years. The royalty receipt by the State Governments nearly doubled during the last four years.

Table 4. 7 Royalty paid to State Government on crude oil and natural gas production (Rs. crore)

State	2002-03	2003-04	2004-05	2005-06
Gujarat	887.97	867.45	1130.97	1707.60
Assam	589.13	703.19	894.08	1207.47
Tamil Nadu	71.06	70.64	102.31	142.83
Andhra Pradesh	78.35	77.29	77.25	110.45
Arunachal Pradesh	4.51	20.84	10.98	27.70
Tripura	5.75	5.94	6.96	7.39
Rajasthan	1.20	1.43	2.38	2.57
Total	1637.97	1746.79	2224.93	3206.01

SOURCE Lok Sabha starred question no.306, June 2006,GoI

4.3.1.4.2 Central-State relationship

From the point of view of revenue earned by the Government of India, NELP has given fiscal incentives to the players through the following measures:

- Reducing royalty rate as discussed earlier implying revenue foregone by the State Government.
- Exempting cess collection from NELP blocks resulting in loss of revenue to Central Government.

Before the recommendations of the Twelfth Finance Commission (TFC) came out, there were concerns raised by the State Governments suggesting that they should also have a share in the revenues accruing through PSCs. Due to non-compensation of the revenue loss from reduction in the royalty rate in NELP, State Governments claimed for profit petroleum share with the Central Government. The delays in issuing Petroleum Exploration Licences (PELs) to the companies by the State Governments was said to be one of the impacts that the companies had to bear because of Central Government not sharing the Profit Petroleum with State Governments[90]. The resulting delays in approvals and clearances discouraged private players to enter into the bidding process.

The TFC recommended that the Union Government should share the profit petroleum from NELP areas with the states, where the

[89] TERI Publication, Issues in the deregulations of the oil and gas sector, TERI, New Delhi: 1999

[90] Infraline, NELP-V: A look back, a look around and a look ahead, Infraline Research, India: February 2005

mineral oil and natural gas are produced, in the ratio of 50:50[91]. The recommendations of the TFC were accepted with the condition that this should be within the overall ceiling of transfers recommended by the Commission (38% of gross revenues). Once the total transfers exceed 38% of gross revenues of the Centre, sharing of the non-tax revenue of Profit Petroleum will not accrue in that particular year[92].

4.3.1.4.3 Profit oil and cost oil

Pursuant to the PSC under the NELP, the successful bidders are granted a license to conduct E&P operations in a defined area. The successful E&P companies are required to explore, develop and exploit the blocks at their own cost.

However, if any commercial deposits of hydrocarbon are discovered and realized by the E&P companies, the costs of their operations is recoverable under the PSC from such commercial discovery (called 'cost oil'). The remaining produce, if any, constitute the profit element (called 'profit oil') which is shared between the parties as per (biddable) percentages stipulated in the PSC.

In case of no commercial discovery, the entire cost, including the added burden of service tax on the services obtained, falls upon the E&P companies. Incidence of service tax increases contract cost by another 12.24 %[93], which is a significant amount, and therefore enhances the risk. This acts as a disincentive against investment in E&P activities.

4.3.1.5 Tax holiday

Presently, the global upstream sector is characterised by increasing competition among countries, in addition to the inherent competition among companies. Presently there are many countries that are keen to invite companies to accelerate exploration activities. As a result, companies compete for the best acreage in the countries. The impacts of this are twofold.

Firstly, due to larger participation of the oil companies the countries can drive a harder bargain over access to acreage. On the other hand, competition could drive the companies away to other countries if companies find any bargain being too hard.

[91] Twelfth Finance Commission, Profit Petroleum, The Twelfth Finance Commission report, India: 2002
[92] Main recommendation of the Twelfth Finance Commission,Ministry Of Finance report,India:November 2002 http://finmin.nic.in/the_ministry/dept_expenditure/plan_finance/FCD/main-recomm.htm accessed on 28th December 2006
[93] Infraline, Proposal by Private E&P Companies for Exemption from levy of service tax on oil field services under the Production Sharing Contracts in India, Infraline, India: 2005

As a matter of fact, for the last few years, the number of countries which have opened their upstream sectors to the international industry (such as Libya, Russia, China, Argentina, Venezuela, Algeria, Myanmar, Nigeria, Angola etc.) have increased. Further, countries have improved their terms to make them more attractive to invite increasing number of oil companies to undertake exploration and production activities and at the same time improving their own revenues[94].

India has not been far behind in this regard. India has opened the upstream sector to international players keeping in mind the competition enabling policies adopted by the other countries. With the growing participation of foreign companies in consecutive NELP rounds, the observations and concerns of the companies need serious consideration. One of the fiscal incentives extended to E&P companies bidding for exploratory blocks under NELP is the provision of a tax holiday for a period of seven years from the commencement of commercial production. However, E&P companies feel that they have large expenditures to offset revenues and hence, they do not actually benefit from tax holiday. The companies, therefore, requested that they should have the freedom to choose their seven years tax holiday period out of the 15 years since the commencement of commercial production[95]. As exploration activities generally have long-gestation projects, a longer duration of tax holiday could provide the operators the necessary relief.

4.3.1.6 Infrastructure status

Given the challenges faced by the Oil and Gas industry, namely on one hand growing oil import dependence of the country and on the other the recent Gas finds by NOCs (ONGC in KG-Basin) and private players (RIL in KG basin and Cairn Energy in Rajasthan) on the other, Government may consider granting infrastructure status to exploration and production business. Infrastructure status will exempt E&P business from paying income tax for 10 years, which could give further impetus for exploring the unexplored basins. If the sector gets the infrastructure status then the concerns regarding duration of income tax holiday would also get addressed.

4.3.1.7 Key Inferences

NELP is undoubtedly a competition enabling and enhancing policy. However, there still remain certain drawbacks. Operators have to bear substantial service tax if there are no commercial discoveries.

[94] Petroleum Federation of India, Review on E&P Licensing Policy, Petrofed, New Delhi: 2006
[95] The Financial Express, Oil ministry seeks sops for E&P firms to face global challenge, 29 November 2005 http://www.financialexpress.com/fe_full_story.php?content_id=109953 accessed on 23rd December 2006

Till NELP V, the BEC gave extra weight to MWP that resulted in the bidders overstating the work programme to win a block, which later on failed. This leads to delays in the exploration process. NELP VI, however, has reduced the over weight on work programme. Failure to complete the MWP commitment by the players and extension of exploration phase with penalty provision might be made stricter even though DGH has taken some quick measures against defaulters.

Another important drawback is the time taken in the inter-ministerial clearances and approvals. This is something, which acts as an impediment to entry in NELP rounds. There is a need to specify time limits for processing requisite clearances so that exploration is carried out in line with the terms of the PSC. Also, the time taken in the total process of bids is very high. It should be reduced and open acreage system should be taken into consideration as early as possible.

In addition, after huge oil and gas discoveries from NELP blocks that would contribute to the economic growth of India in the future, time has come to think of giving upstream sector an infrastructure status. Infrastructure status would give ten years tax holiday, which could mitigate the concern of various players in this regard. After meeting these concerns NELP could achieve greater competitive efficiency in terms of less entry barriers and more accretion of oil and gas reserves.

4.3.2 Petroleum and Natural Gas Regulatory Board Act, 2006

The PNGRB Act, 2006 is a step towards establishment of an independent regulator in the Indian downstream petroleum sector. It seeks to establish a regulatory body to regulate refining, processing, storage, transportation, distribution, marketing, and sale of petroleum products and natural gas, excluding production of crude oil and natural gas. *The objective of the Act is to protect the interests of the consumers and entities engaged in specified activities relating to petroleum, petroleum products and natural gas in all parts of the country and promote competitive markets.* Thus, facilitating a competition enabling environment is one of the objectives in the Act.

The need for an independent regulatory body to regulate the Indian Oil and gas sector is widely recognized. The Integrated Energy Policy report (August 2006) emphasises the role of a regulator in the downstream sector *to primarily ensure competition on equitable basis in refining, transportation, distribution and retailing of oil and gas.* The Policy further mentions that "*the regulator must review the current regime that limits competition from both foreign and domestic private players in the downstream sector.*"

The PNGRB Act has covered a long journey before it was finally enacted. The bill was first introduced in the Lok Sabha in May 2002 (as Petroleum Regulatory Board Bill) but finally enacted in April 2006. Figure 4.6 gives the entire timeline before the enactment of the Act. However, the full establishment of the regulatory body is in its final stages.

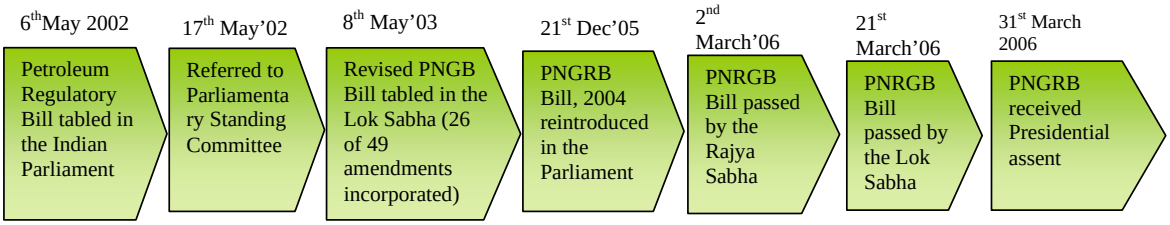


Figure 4. 6 Journey of the Petroleum and Natural Gas Regulatory Board Bill

The important clauses of the Act that would impact competition and relevant international experience are discussed in the subsequent sections.

4.3.2.1 Key provisions of the PNGRB Act 2006

There are a number of provisions in the Act and related aspects of the sector, which would impact the competition in the sector. Some of these are:

- Declaration of pipelines as common carrier or contract carrier [Section 11 (d)]
- Establishment of the Affiliate Code of Conduct [Section 21(i)]
- Determination of period of market exclusivity for city gas distribution [Section 20 (4)]
- Enforcement of retail service obligation and market service obligation [Section 11(f)(v)]

4.3.2.1.1 Declaring pipelines as contract or common carrier

A question that the regulator would need to address is declaring of pipelines as contract or common carrier. The Act provides the regulator with the powers to authorize/declare a pipeline as contract or common carrier.[96] Under the Act, ***Contract carrier*** is defined as pipelines for transportation of petroleum, petroleum products and natural gas by more than one pursuant to firm contracts for at least one year as may be declared or authorized by the Board. On the other hand ***Common carrier*** is defined as

[96] Under Section 11 of the PNGRB Act 2006, the regulator is mandated to authorise laying, building and operating of natural gas pipelines and city gas distribution network. For entities involved in marketing of notified petroleum products, establishing and operating Liquefied Natural Gas (LNG) terminals and establishing storage facilities, the Act only provides for a registration. While the former may be construed as permission, the latter may or may not be equivalent to permission and will largely depends on the regulations that will be laid by PNGRB for the same.

pipelines for transportation of petroleum, petroleum products and natural gas by more than one entity as the Board may declare from time to time on a non-discriminatory open access basis. These definitions exclude petroleum product pipelines to specific consumers and crude oil pipelines.

The provisions related to pipelines are more crucial for the natural gas sub sector as compared to petroleum products largely because the former can be transported only through pipelines, whereas the latter has more options such as rail and road. In addition to this, natural gas market (including transmission and city gas distribution) is still at a nascent stage in India and there are a number of issues, which would require clarity to enable the markets to develop speedily and competitively. At present, India has a sparse pipeline network and with increasing domestic hydrocarbon consumption, there is a need to encourage investments in pipeline. According to the Hydrocarbon Vision 2025, India would require an investment of US$ 10 billion till 2025.

In view of the fact that pipeline business is capital intensive and requires long term investment, the operator would insist on long term take or pay contracts to cover the capital investment. In case of contract carriers, the operators get into long term take or pay contracts with the entities thereby securing their revenues. For common carriers the financing would be provided against bankable guarantees. To provide investment, FIs would require operator to have a projected steady stream of revenue, which would be possible only if there are long- term contracts. In case of natural gas the need for long term contracts, and, thus contract carrier is even greater as this fuel, unlike petroleum products, cannot be stored and thus possibility of contingency reserves is not feasible. Furthermore, international experience (Box 4.3) shows that contract carriage is the more preferred means to promote competition in natural gas transportation. In India, the regulatory approach on this subject is not yet known.

Box 4.3 International experiences in gas transportation modes

- UK: The UK gas industry was operated by a vertically integrated organization, British Gas (BG), under Government ownership before 1986. In 1986, the Government privatised BG where the vertical structure of BG remained intact but market itself was separated into three horizontal segments: the wholesale market, the contract market, and the tariff market. After privatisation, the UK Government allowed independent gas shippers, traders, and suppliers to enter into the wholesale market in order to arrange gas supplies for large consumers, and permitted these large consumers to contract for natural gas directly with the producers in the contract market. The tariff market remained closed to competition and BG continued to be the sole supplier of natural gas to residential and small consumers (i.e., consumers who use less than 2500 therm annually). The Government regulated the retail tariffs to protect consumers from the market power of BG.
- US: Operators transport natural gas on contract basis. Under the contract carrier system, shippers execute transportation contracts with the pipeline and storage companies. FERC permitted pipelines without market power to request negotiated rates or market pricing. The customers, who desire an uninterrupted supply of gas choose a cost-of-service based tariff rate. Recourse rate is charged for users who could stand an interruptible supply of gas. Once the entire capacity of the pipeline has been contracted on a firm basis, another shipper cannot get a firm supply of gas unless (1) an existing firm shipper's contract expires, (2) an existing firm shipper releases or resells all or a portion of its capacity, or (3) the pipeline undertakes an expansion. In case of competing bids, access is provided on a non-discriminatory basis to the bidder offering the highest 'net present value' to the pipeline. However, there is a ceiling on the maximum pipeline tariff that is authorized by the FERC.
- Brazil: In Brazil, despite a court order from the Brazilian Supreme Court in support of common-carrier rules for pipeline access, unused capacity in the Brazil-Bolivia pipeline is yet to be released. Petrobras, Brazilian oil giant, might be unwilling to relinquish its monopoly at home resulting delay in implementation of proper common carrier access. In continuance of the fact, contract carriage has been proposed as the mode of pipeline transportation in Brazil. Under the gas law, any interested party can have free access to natural gas transportation pipelines and associated infrastructure, by means of remunerating the owner of the pipelines. This remuneration is freely established between the parties, without a state intervention. Such access however is currently pending as gas regulations are yet to be fully implemented.

SOURCES The Benefits and Deficiencies of Energy Sector Liberalisation: World Energy Council report, 2000; Gas to power to South America: International Gas Union publication, 2006; ICLG gas regulation 2006 report

4.3.2.1.2 Affiliate code of conduct

Another important aspect, which would have far reaching implications on competition in the sector, is related to the ***'affiliate code of conduct'***. This code of conduct is applicable to those entities, which are involved in laying, building, operating and expanding of pipelines and marketing of natural gas. The Act specifies that companies engaging in both businesses should have separate entities and may have separate ownership. These separate entities would be required to comply with the affiliate code of conduct, if under same ownership/control.

It is recognised that separating the transport element from the merchant function is the single most important aspect for instilling confidence and promoting competition in the gas industry. By unbundling pipeline operations, consumers can have the freedom to contract a supply and transportation portfolio that best fits their unique requirements in terms of accessing transportation services on an equitable and non-discriminatory basis. Unbundling of services also prevents a situation where a supplier is able to cross subsidize prices of the services involved.

International experience (Box 4.4) has shown that the best way to maintain such conditions is to establish a strong affiliate code of conduct statute and entrust the regulator with the job of enforcing

the rules in order to protect the industry participants from abuse of an incumbent's dominant market position[97]. It is essential that affiliates actually treat each other at arms length and do not give each other preferential treatment or an unfair competitive advantage. This is particularly important in markets where a dominant incumbent player is present.

Box 4.4 International experiences in implementing affiliate code of conduct

- UK: The Gas Act, 1995 introduced gas-to-gas competition under a new licensing framework, with separated licensing of gas suppliers, whose function was to sell piped gas to consumers; public gas transporters, whose function is to operate the pipeline system through which such gas will normally be delivered, and gas shippers, whose function is to arrange with public gas transporters for appropriate amounts of gas to be conveyed through the pipeline system. Transporters and dominant suppliers had a statutory duty not to give undue preference to any customer (other than in response to competition in case of suppliers) (OECD 2002).

- US: In the USA the FERC (Federal Energy Regulatory Commission) originally promulgated Order 497 as part of the legislation that initiated unbundling and open access. Subsequently, it was felt that Order 497 was no longer sufficient, given the evolution of integrated participation by companies in the energy business. Therefore, FERC implemented a more comprehensive Affiliate Code of Conduct legislation known as Order 2004. Under the order, there was unbundling of the pipeline transportation and merchant function, and it required pipelines to provide for the open access in transportation and storage in a non-discriminatory manner. Along with access, pipelines were also required to provide equal and timely access to information relevant to the open access services.

- Pakistan: From the first quarter of 2006, privatisation drive started to gallop either in terms of divesting ownership of 51% shares along with management control or strategic sale with transfer of management control for the public oil and gas companies.[1] The time, Pakistan expressed its intention to attract interest in new gas-fired power generation projects, but there are still concerns over the continuing availability of gas supplies. The pipeline construction projects invited foreign companies, so there are no barriers to private participation in new pipeline projects.

SOURCES Gas to power to South America: International Gas Union publication, 2006;
The Benefits and Deficiencies of Energy Sector Liberalisation: World Energy Council report, 2000;
Report on progress in creating the internal gas and electricity market: Commission of the European Communities, 2005, Regulatory reform in gas and electricity and the professions OECD Reviews of Regulatory Reform in the United Kingdom, 2002; Access in gas sector in India: learning from outside: TERI publication, 2005;
http://www.adb.org/Documents/News/2001/nr2001131.asp accessed on 25th November 2006

4.3.2.1.3 Marketing exclusivity for local gas distribution

An important provision of the Act provides powers to the Board to decide the ***period of exclusivity*** to lay, build, operate or expand a city or local natural gas distribution network (for a certain number of years). This time period would be determined based on the regulations formulated in this regard. Furthermore, the Act puts forth some key objectives for the Board when deciding the time period:

- Promoting competition among entities
- Avoiding infructuous investment
- Maintaining or increasing supplies
- Securing equitable distribution
- Ensuring adequate availability

[97] International Gas Union, Gas to power to South America, International Gas Union publication, Horesholm, Denmark: March 2006

This exclusivity in the City Gas distribution network is required not only because all pipeline businesses are capital intensive but also the offtake of the retail consumers is small, leading to limited returns to the service provider. Therefore, market exclusivity is required to provide adequate incentives for operators to develop the CGD network. However, a key drawback of market exclusivity from competition viewpoint is that it can give the incumbent an added advantage or an incumbency benefit over the subsequent players that want to enter into the market. It is here that the role of a strong regulator comes into play, which through its regulations, should ensure that no such incumbency benefits accrue to the incumbent.

International experience

The international evidence demonstrates that no country has pursued the highly competitive market model, in the early stages of market development. There exist two most prevalent international models regarding exclusivity driven phased competition for city gas distribution. In the first model, Local Distribution Companies (LDCs) can exclusively or almost exclusively supply all customers without volume restrictions. This model earlier prevailed in markets that are currently mature and highly competitive like Canada and USA and it is being pursued in emergent markets like China, Northern Ireland and Sao Paulo, Brazil. The second EU Directive in 2003 discussed phased competition for emergent markets with underdeveloped gas systems. It emphasised that postponing competition is legitimate for up to 20 years from the time of first gas supply through a network in a defined geographical area.

In the second model, competition starts from a high volume threshold below which customers cannot choose their suppliers. Thereafter, the threshold is reduced in stages. This model prevails in mature markets including France, Belgium, Spain, and the UK, which are progressively introducing/ enhancing competition. Some of the examples are cited below in the box 4.5.

Box 4.5 International experience on marketing exclusivity

- China: China issued new regulations to reform the bidding process for city gas distribution, replacing private treaty negotiations between city mayors and gas companies with public tenders. Before the reforms, China Gas had seemed to gallop for industry leadership, with or without professional management. Later, Chinese oil companies were discovering abundant gas deposits and building pipelines to transport the gas to the cities.[1] This implied for China Gas companies to compete for monopoly contracts to distribute gas to individual Chinese cities as the Government regulation in China required only one operator, allowed to be the owner of infrastructure for city gas project. LDCs have 30-year distribution and supply monopolies with access to all customers. In 2002, the Chinese Government allowed private foreign and domestic investment in utilities. Several exclusive licenses for 30 years have been issued to private parties over the past few years.
- Brazil: Gaspart runs seven Local Distribution Companies (LDC), in which the other shareholders are Petrobras Gas S.A. ("Gaspetro"), a 100% subsidiary of the Brazilian state-owned petroleum company Petróleo Brasileiro S.A. ("Petrobras"), and the respective State Governments in which each LDC is located. The LDC has exclusivity for the concession period for a pre-defined area. The LDC can provide distribution and retail services to all customer categories, including very large customers including thermoelectric customers for 12 years without volume restrictions. Exclusivity for supply to large and very large customers ends after 12 years of the concession. It continues for the duration of the concession period for residential and commercial customers. Each LDC runs its business under an exclusive concession for the period of approx. 30 to 50 years, granted by the respective State, and sells the gas, all of which is purchased from Petrobras, to mainly large clients for industrial use and as fuel for natural gas vehicles.
- United States: United States had almost complete monopoly for distribution and supply until 1978. Beginning with the National Gas Policy Act in 1978, various legislations and FERC orders opened the market to supply competition. Most states LDCs are virtual monopolies for distribution although commercial bypass was possible. Retail competition has occurred slowly. Even in the highly competitive state of New York only 7.5 percent residential customers had switched their supplier in 2002, demonstrating considerable customer inertia to exercise choice.
- Venezuela: Private sector investors must obtain a permit from Ministry of Energy and Petroleum (MEP) in the regulation and supervision of Venezuela's natural gas sector, in order to engage in transportation activities. All permits, without exception, must provide for special advantages in favour of the Republic. Holders of transportation permits will benefit from a five-year exclusivity period to provide the service authorised by MEP for the fixed capacity offered through the permit.
- Canada: Until 1985 LDCs enjoyed a monopoly for supply and distribution services. Considerable supply competition has occurred since 1985. All consumers can choose their suppliers. Exclusive franchises for distribution allow limited commercial bypass. In practice, distribution remains a monopoly. Canada has varying franchise periods for each province e.g. for Alberta its 20 years with extension for 10 or more years; for Ontario it is25 years.

SOURCE http://www.dailytimes.com.pk/default.asp?page=2005%5C11%5C22%5Cstory_22-11-2005_pg5_1 accessed on 25th November 2006;
http://www.privatisation.gov.pk/oilgas/ogdc.htm accessed on 25th November 2006;
The Benefits and Deficiencies of Energy Sector Liberalisation: World Energy Council report,2000;
http://www.iclg.co.uk/index.php?area=4&country_results=1&kh_publications_id=25&chapters_id=580 accessed on 25th November 2006;
http://www.dundee.ac.uk/cepmlp/car/html/car3_article6.htm#return12 accessed on 25th November 2006;
http://www.mitsui.co.jp/en/release/2005/1174086_1209.html accessed on 6th December, 2006

4.3.2.1.4 Retail and market service obligations

One of the key objectives of the regulator would be to regulate the various segments so as to ensure uninterrupted supply of petroleum, petroleum products and natural gas. Moreover, along with this, one of the key functions of the Board would be to ensure adequate availability of all petroleum products and natural gas, display of maximum retail prices at all outlets and secure equitable distribution for petroleum products.

The Board through its regulations has been authorized to impose ***Market Service Obligation (MSO)*** on all entities and ***Retail Service Obligation (RSO)*** on retail outlets**.** The Act defines ***MSO*** as obligation to set up marketing infrastructure and retail outlets in remote areas in respect of notified petroleum and petroleum products, to maintain minimum stock of notified petroleum and petroleum products and of local distribution entity to supply natural gas to consumers. ***RSO*** is defined as obligation of

dealers and distributors for maintaining supplies to consumers throughout the specified working hours and of specified quality, quantity and display of maximum retail price of petroleum products and natural gas including CNG.

This provision would require adequate attention of the regulator so as to ensure RSO and MSO among the players in the marketing sector without hampering competition in the sector. Here again, the regulator would be required to formulate regulations to ensure the same. The regulator would need to set up an institutional mechanism aimed at achieving a level playing field.

4.3.2.1.5 Pricing in oil and gas sector

A crucial factor that would have a direct impact on the level of competition prevailing in the sector is pricing. A sound pricing policy acts as a definite incentive for investments and facilitates a level playing field.

This is clearly visible from the fact that in the petroleum sector, non-commensurate revision of domestic retail prices of key petroleum products as compared to international prices is such that the prevailing prices do not cover the entire cost. This has stifled competition in the downstream sector.

While the controlled pricing regime hampers competition and private investment, in a developing country like India, it is often supported on the pretext that it helps promote equity and address social concerns. The current government policy can be explained by the fact that a complete pass-through of international crude/petroleum product prices to consumers, can result in excessive volatility, which may adversely impact poor households. This is especially true in case of the four sensitive petroleum products - petrol, diesel, LPG and kerosene. Price increase of these petroleum products directly influences household energy consumption and expenditure, choice of fuels and prices of other essential items etc. On a macro level, sectors such as agriculture, transport, industry (especially small and medium enterprises), physical infrastructure and social sectors and commerce may also be negatively impacted by fuel price increases.

However, there is a need to recognize that partial pass through of increased prices to domestic market can adversely impact the government fiscal deficit and is feasible only in the short-term. The drawback of existing pricing policy has been succinctly summarized by World Bank (2005), which points out: 'the economy still needs to contract in order to offset the effect on the balance of payments and indeed the failure to let domestic prices rise block-off the adjustment that would gradually come from the short to medium term impacts of the price elasticity of demand for oil. The

government deficit itself is likely to be unsustainable and will eventually require some offsetting fiscal action'.

In addition, the current pricing policy has resulted in massive under recoveries for the Oil Marketing Companies (OMCs). In fact, for 2005-06, the gross under recoveries for these companies were estimated at about Rs. 397.04 billion[98]. Witnessing that national oil marketing companies were selling petroleum products at lower than the costs, a number of private players have put on hold their plans to set up retail outlets. For instance, in 2002, RIL and Essar were given licenses to open 5849 and 1700 retail outlets respectively. However, till January 2005, both companies had commissioned only 318 and 132 outlets respectively[99]. Moreover, in case of the national oil companies the Government did provide some relief by way of oil bonds, supply of subsidized domestic petroleum products and sharing of subsidy burden by the national upstream companies viz. ONGC, OIL and GAIL, but the existing private players have received no sops from the Government. This has had an adverse impact on the existing private oil companies because they had to maintain their price levels at the price levels of the national oil marketing companies to maintain their market shares[100]. In the gas sector, due to multiplicity prices and lack of clarity on the pricing principles, natural gas consumers have not been able to tie up with domestic gas companies in the country.

In view of the above, it is imperative for the regulator to ensure that there is a level playing field among the existing players in the market with respect to pricing. The Act authorizes the Board to lay down regulation of transportation tariffs and the principles of determining the same for common or contract carrier and city gas distribution. In this regard, the Act lays down guidelines:

1. Factors that encourage competition, efficiency, economic use of resources, good performance and optimum investments
2. Safeguard consumer interest and at the same time recovery of cost of transportation in a reasonable manner
3. Principles rewarding efficiency in performance
4. Infrastructure connected to common or contract carriers
5. Benchmark against a reference tariff calculated based on cost of service, internal rate of return, net present value and alternate mode of transport
6. Policy of Central Government applicable to common carrier, contract carrier and city gas distribution network

In case of both petroleum products and natural gas, the Act mandates the Board to ***monitor prices and to take corrective***

[98] Ministry of Petroleum and Natural gas, Annual report 2005-06,MoPNG,New Delhi,2006
[99] India Brand Equity Foundation (IBEF) Oil and Gas http://www.pwc.com/in/eng/ins-sol/publ/oil_gas.pdf accessed on 30th October 2006
[100] Petroleum pricing issue has been dealt detail in subsequent section of the report.

measures to prevent restrictive trade practices. A similar mandate has been given to the Board for transportation tariffs. To aid in the monitoring process, the regulator would need to develop internal benchmarks.

In the case of natural gas pricing, the Act focuses only on a single aspect of the Natural Gas value chain – transportation tariff. However, a key problem in the gas sector is the multiplicity of prices existing in the country. On one hand, gas from the nominated blocks is marketed at APM prices determined by the Government. On the other hand, domestic gas procured from NELP blocks is sold at prices determined on the basis of the Production Sharing Contracts and the prevailing market conditions. In case of LNG, which is imported under an Open General License (OGL), prices are determined on contract-to-contract basis. Thus, at present, the existing natural gas prices in the country range from USD 1.8 per MMBtu (APM gas) to USD 4.75 per MMBtu (Panna-Mukta-Tapti gas). This range of prices has an impact on the economics of all the natural gas consuming sectors, even making its use unfavourable for some. Therefore, the regulator may be required to monitor prices effectively so as to ensure that there is a level playing field. It may also be required to lay down some principles for natural gas pricing and to set a ceiling selling price below which the players may decide the market prices.

4.3.2.2 Key Inferences

The PNGRB Act, 2006 is a long awaited piece of legislation for the Indian domestic hydrocarbon sector. However, there is delay in the operation of the board, which is an area of concern. During this transition period, all the regulatory issues are being handled by the Government, and with the sector being dominated by public companies, this hampers creating a competitive level-playing environment. Hence, the regulator should be established to make functional on a priority basis.

The Act does have a number of key provisions, which would have far reaching impact on the level of competition and market development of the Oil and Gas sector in the country. One particular area of work would be the pipeline segment of the sector. By 2008, the discoveries made by Reliance and other players under the NELP would be ready to supply natural gas on commercial basis. By that time the country would require a robust pipeline network to evacuate the available gas.

Notwithstanding the above, there are some ambiguities in the Act, which would need to be taken care of by the regulator. For instance, firstly, in the definition of Affiliate code of conduct the word "producer" is missing, which may be involved in other associated activities. Secondly, while determining the period of

marketing exclusivity, the regulator would need to ensure that there are no incumbency advantages accruing to the incumbent at the end of the exclusivity period. This would be essential for ensuring competition in the natural gas markets. Finally, the Act provides limited role to the regulator in terms of pricing of products in the sector, whilst it is the central issue, which may determine the level of competition in the sector.

At the time of authorization of pipelines, the regulator would be required to be aware of the demand as well as supply forecast so as to judiciously determine the size/width and other associated specifications of pipelines.

In conclusion, the regulator has a challenging task at hand to ensure competition and level playing field in downstream hydrocarbon sector.

4.4 Other important policies in the hydrocarbon sector

4.4.1 Refining and marketing

Refining sector was de-licensed in June 1998. Thus, refineries can be set up without specific Government permission subject to other statutory requirements. As per the existing guidelines for FDI in petroleum sector, FDI in refining was permitted upto 26% (public sector holding of 26% and balance 48% by general public). In case of private Indian companies, FDI in refining was originally permitted upto 49%[101]. Later on, Indian petroleum-refining sector has been opened to full foreign investment, as the Cabinet has decided to allow 100 % FDI and foreign investors, investing in the petroleum refining sector, will not be required to take any clearances from the Foreign Investment Promotion Board (FIPB). They only have to notify the country's central bank, the Reserve Bank of India. However, in case the project is taken up along with a PSU, FDI is restricted to 26%.

4.4.1.1 Observation

After the de-licensing of refining sector, RIL commissioned India's first fully private refinery in 1999, which is one of the major contributing factor behind the enhancement of refining capacity. As on 1st April 2006, private sector had about 25% share in the total refining capacity in the country.

Another important aspect that deserves attention is the recent change in crude mix for India on competition. India imported 57.6

[101]Indian refining sector to allow 100% foreign investment, Alexandar's Oil and Gas Connections, July 2000
http://www.gasandoil.com/GOC/news/nts02769.htm accessed on 11th October 2006 accessed on 29th December 2006

MT (million tonnes) of sour crude and 41.7 MT of sweet crude in 2005-06. As compared to previous year, in 2005-06, sour crude registered a 5.5% increase, while the sweet crude import grew only by 1.3%. Import of sour crude is increasing because of the price differential between sour and sweet crude[102]. (In August 2006, the price differential between Brent (sweet) crude and Dubai (sour) crude was $4.34 per barrel[103]. The difference between sweet and sour was wider in 2005 ranging to as much as $8.00 per barrel)[104]. This change in the crude mix is in line with the observations of the Sub Group Committee report on refining that heavy crude will replace light crude by 2012. Majority of old Indian refineries are designed to refine sweet crude while crude processed by the RIL refinery is designed for processing a crude mix in the ratio favouring high sulphur content at 95:5[105]. In addition, private refineries boast of lesser loss compared to the PSU refineries. Consequently, RIL has been able to achieve higher refining margin than PSU refineries.

4.4.2 Marketing

4.4.2.1 Competition issue

A key regulatory development in this sector to encourage private sector participation took place in 2002, wherein marketing of transportation fuels was opened to new entrants including private sector[106]. As per the notification of MoPNG, authorization to market transportation fuels, namely, motor spirit (MS), high speed diesel (HSD) and aviation turbine fuel (ATF) is available to a company investing or proposing to invest a minimum of Rs 20 billion over a period of ten years in oil exploration and production, refining, pipelines or terminals in India. A bank guarantee of Rs 5 billion had also been mandated from the interested company. Any company seeking to market transportation fuels is required to make an application giving details of the scheme of marketing for which authorization is sought[107].

[102] Sweet crude has lesser sulphur content than sour crude. Crude with lesser sulphur content (sweet crude) is easier to process than high sulphur (sour) crude.

[103] Indian Oil Corporation Limited, monthly crude oil prices, IOCL, India: 2006 http://www.iocl.com/crude_prices.aspx accessed on 29th December 2006

[104] Montepeque Jorge, , Sour Crude Pricing: A Pressing Global Issue, Middle East Economic Survey, VOL. XLVIII, No 14:4th April 2005

105 MoPNG, Presentation on" Is Indian Refining industry competitive", MoPNG, New Delhi: 2006

[106] MoPNG, Ministry of Petroleum and Natural Gas Resolution Number 230224 MoPNG,India: 21st November 1997 http://ppac.org.in/notifications/K19-02.pdf accessed on 25th November 2006

[107] The marketing scheme has to cover details of

- Á Source of supply of products to be marketed, tankage and other infrastructure developed or proposed to be developed along with their capacity
- Á Means of transportation of products to depots and to retail outlets
- Á Number and locations of RO's proposed
- Á Total quantum and type of products to be covered under the scheme

In spite of private sector being allowed, this segment continues to be dominated by NOCs, which have the strongest and the largest distribution network in the country. The companies had 31650 retail outlets in April 2006. IOCL has the highest number of outlets at 10228 outlets, followed by HPCL with 6626 outlets countrywide. During April to November 2005, the number of retail outlets increased from 26552 to 29380 retail outlets, of which only 1370 belonged to private players. IOC, HPCL, BPCL, and IBP have a market share of 83.5% during April to December 2005. Private players include Reliance, Essar, and Shell have 16.5 % marketing share[108].

Table 4. 8 Retail outlets of PSUs

Company	2003-04	2004-05	% Increase	Market share (%)
IOCL/AOD	9145	10228	11.84	38.52
IBP	2767	3272	18.25	12.32
HPCL	5507	6626	20.32	24.95
BPCL	5520	6426	16.41	24.20
Total	22939	26552	15.75	100.00

SOURCE Ministry of Petroleum and Natural Gas Economics & Statistics Division (Basic Statistics 2004-05), MoPNG 2004

As per the notification, *there is no limit on quantum and size of the scheme and the number and location of the retail outlets in the scheme provided that no encroachments of the existing retail outlets will be allowed for a period of time.* Further, retail outlets have to be set up by these companies as per their commercial considerations subject to the condition that they would set up at least 5.6% of the retail outlets in remote areas and at least 5.3% of these in low service areas[109]. After this notification, GOI permitted Reliance Petroleum, ONGC, Numaligarh Refineries Limited (NRL), Essar Oil, Shell India, and Mangalore Refineries and Petroechemicals Limited (MRPL) to set up their respective marketing and distribution/network.

However, in April 2006 while reviewing the performance of the oil marketing companies (OMCs), it was observed that OMCs had expanded their retail outlet (RO) network in a big way after the dismantling of the Administered Pricing Mechanism (APM), without paying adequate attention to improve institutional mechanisms, resulting in not only reduction in their average

[108] MoPNG, Report of the Committee on Pricing and Taxation of Petroleum Products, Rangarajan Committee, GoI, New Delhi: February 2006

[109] MoPNG, Note on Marketing of transportation fuels, Ministry of Petroleum and Natural gas, India: 2006 http://petroleum.nic.in/msbody.htm#mkttrans accessed on 3rd December 2006

throughput per RO[110], but also increase in complaints of malpractices. The outcome was that most of PSU retail outlets stand one after another eating each other's revenue[111].

Nevertheless, downstream market[112] till date is very much concentrated favouring dominance of PSUs reflecting Hirshman – Herfindahl Index (HHI)[113] way above 0.18 for the last two decades (Figure 4.7).

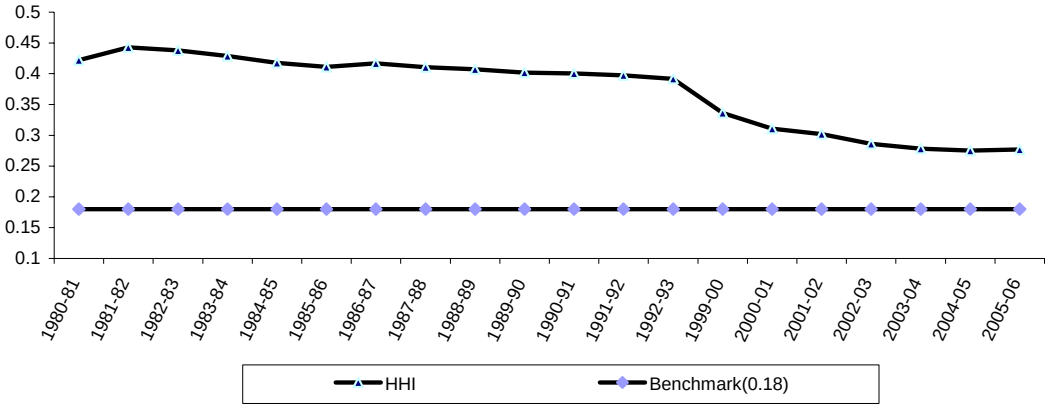


Figure 4. 7 Hirshman-Herfindahl index in downstream sector (only marketing)

SOURCE TERI estimation

However, the HHI index provides a partial picture as it focuses only on one segment of the hydrocarbon sector. To arrive at the HHI for the entire industry, it is essential to take into consideration the cross ownership that exists in the sector. In fact, HHI is an inadequate measure of concentration for most of the energy sub sector where firms are often collaborators in various joint ventures, partnerships and other deals[114]. Therefore, a further research is definitely required to arrive at the exact concentration measure for not only the hydrocarbon sector but also for the energy sector on the whole.

[110] Per RO throughput for PSUs came down to 140-145 kilo litres per month from 250 to 275 kilo litres per month in last five years whereas per Private RO throughput is around 400 kilolitres per month

[111] MoPNG, Ninth report of parliamentary standing committee of Petroleum and Natural gas, MoPNG, India:2005-06

[112] Downstream here includes on marketing of petroleum products

[113] Hirshman Herfindahl index is a measure of the size of firms in relationship to the industry and an indicator of the amount of competition among them. It is calculated by the square of the market share of each firms in the industry divided by square of total share of the market.

[114] Love James, Antitrust Considerations and the Petroleum Industry - Center for Study of Responsive Law; Prepared Statement for hearing on: Solutions to Competitive Problems in the Oil Industry; Committee on the Judiciary House of Representatives Congress of the United States: March 29, 2000 accessed on 5th December 2006

4.4.2.2 Pricing and subsidy

Although the GoI has made efforts to encourage private participation in the sector, a key deterrent in achieving this has been the prevailing pricing regime in the country. Global prices of crude oil reached new peaks in 2006 with the Indian basket of crude oil touching an all-time high of $ 73.96 per barrel in July2006[115]. This steep increase in prices had a major impact on the NOCs. Since the announcement of the dismantling of the APM, in the petroleum sector effective 1st April 2002, a beginning was made to decontrol prices of all petroleum products except LPG for domestic supplies and Kerosene through public distribution system (PDS). However, with the continuing increase with the international prices, Government took control again. For instance, there has been no increase in the prices of PDS kerosene since March 2002 and domestic LPG since November 2004. In case of petrol and diesel, prices were last raised inadequately in June 2006 but reduced again in November 2006 due to political reasons whereas international crude oil prices have literally doubled from $32.36 per barrel in March 2004 to $73.96 per barrel in July 2006 and reduced to around $56 per barrel in November 2006 and again increased to $61 per barrel in December 2006.

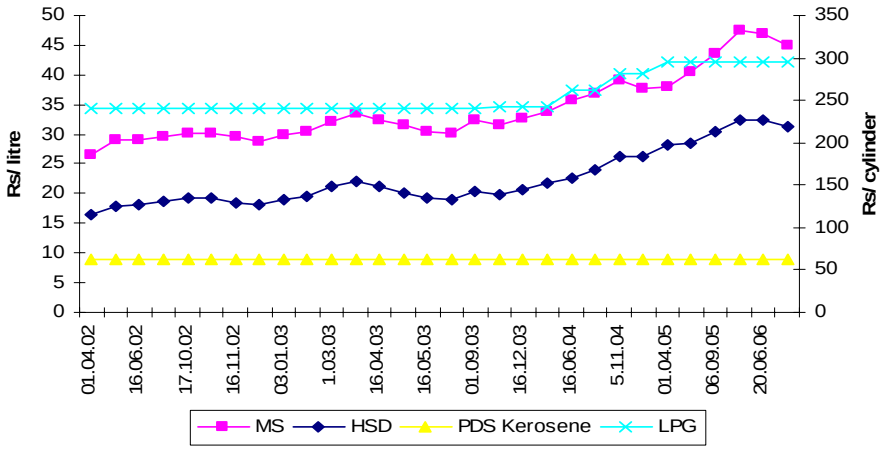


Figure 4. 8 Major Price revisions in Retail Selling Price of petroleum products at Delhi

SOURCE MoPNG and PPAC, GoI

It is clearly evident from Figure 4.8 that with the change in the price of international crude, the revision in the price of petrol and diesel is non commensurate with the rise in international prices. As a result, all national oil marketing companies have incurred huge under recoveries. The Government, realizing the threat to the financial viability of these companies, has extended financial support. The Government has compensated to an extent through

[115] Monthly average crude oil prices; Source: Indian Oil Corporation

issuance of oil bonds and also by requiring other oil companies in upstream and downstream to share a part of the burden.

4.4.2.2.1 Competitive aspects

It may be noted that the price increase effected on 6th June 2006 in respect of petrol and diesel shifted a burden of only 13% of gross under recoveries (Rs.735 billion) suffered by oil marketing companies to consumers. On the other hand, private sector players benefited from change in pricing methodology (shifting to trade parity pricing) and discount from refineries (15% of the compensation). However, due to setting of higher prices compared to OMCs prices, they lost competitive advantage. The details are given in table 4.9.

Table 4. 9 Present subsidy burden sharing policy

Gross under recoveries	Amount (Rs.billion)	Percentage (%)
Price increase in petrol and diesel	92	13
Issue of oil bonds	283	39
Share of upstream oil companies	240	33
Others (change in pricing methodology, discount from refineries etc.)	120	15
Total	735	100

SOURCE Compiled from newspaper reports, 2006

On the other hand, continuing cap on domestic fuel prices has had serious adverse impact on market shares of private retailers such as RIL, Shell and Essar, who do not enjoy Government support to compensate for fuel price subsidies. Therefore, while the private sector is allowed to price petrol and diesel on commercial considerations, OMCs have been restrained in revising prices through administrative instructions. However, private sector is being denied a level playing field as Government subsidies are available only to the public sector firms and their ambit is extended beyond the promised LPG and kerosene to include petrol and diesel. As a result, private companies are left with an under recovery of Rs 3.39/litre on petrol and Rs 5.77 / litre on diesel[116].

4.5 Issues that need to be addressed for furthering competition in the sector

From the foregoing analysis it can be concluded that the present policy regime and legislative framework have the required facets for promotion of competition in the oil and gas sector. However, a number of issues that needs to be addressed by the policy makers,

[116] Presentation by Muralidhran K. (2006), Private Participation in Infrastructure Services at the National Conference on 'Regulatory Performance in India: Achievements, Constraints and Future Action' organized by TERI on November 9-10, 2006 at New Delhi

regulators of the sector, the relevant competition authority and the other stakeholders, are discussed in the following sections.

4.5.1 Pricing and subsidies

The importance of a sound pricing policy in establishing an efficient and competitive market cannot be undermined. Price sends out signals to all the stakeholders with regards to the health and sustainability of the sector. A comprehensive and stable pricing policy acts as an incentive for suppliers to enter market and thereby encouraging competition and investments in the sector. A suitable pricing regime also encourages usage of the product.

For example, even though the Government of India (2002) issued authorisation to private and public companies for opening around 11000 outlets, the prevailing irrational pricing of the petroleum products has stifled the process of commissioning these outlets. As a result in last four years, companies have commissioned only around 1800 outlets.

At present, in the natural gas sector there is a lack of existence of a well defined pricing principle. Due to the ad hoc pricing mechanism, a range of prices exists in the sector leading to uncertainty for the both the suppliers and the consumers in the sector. The pricing system has also stifled investments in the laying of transmission pipelines in the country.

Given the relevance of pricing in enabling a competitive environment, the role of CCI in advocating the same could be immense. CCI may through discussions with MoPNG, Ministry of Finance and the Planning Commission advocate introduction of market-based prices in both petroleum and natural gas sector. Further, it can also advocate for converting universal subsidies that presently exist in the sector, with targeted subsidies.

4.5.2 Clearances

As discussed earlier, there are a number of clearances required by the entities involved to commission a project. TERI in its perception survey had asked all the participants about the number of clearances required in various activities namely – exploration, refining and marketing. The detailed list of clearances is given in Annexure 2.2.

These clearances are not only time consuming but also lead to delay in the establishment of assets. According to exploration companies, they require more than 70 clearances before they are allowed to drill an exploration well[117].

[117] Petroleum Federation of India, Review on E&P Licensing Policy, Petrofed, New Delhi: 2006

In the marketing segment, based on our discussions with the stakeholders around 21 clearances are required. The aggregate time spent by marketing companies for obtaining these clearances ranges from around 3.45 to 4.35 years. On the other hand, the estimated time required to set up one retail outlet is 6 to 8 months.

Discussions with various stakeholders revealed that institutions rarely adhere to the time expected in which a clearance should have been obtained. In case of exploration, this delay can cause substantial losses, as exploration in itself is a seasonal activity. Recognizing these, a single window clearance for all projects has been suggested. The promotion of single window clearance for various activities may be a possible area of advocacy for CCI.

4.5.3 Pipelines

Natural gas has been considered as the future fuel in this century. However, there is a lack of adequate pipeline infrastructure in the country. This can be a big hindrance in developing gas markets, as a robust pipeline and other associated infrastructure are important prerequisite for developing gas markets. A widely accepted fact is that pipeline business is a capital intensive business with a high initial cost involved. To meet the investment requirements, there is also a need to create a conducive environment for private sector participation. Furthermore, at the time of authorizing pipelines and other relevant infrastructure, the regulator needs to be aware of the present and future natural gas demand and supply position. This would be crucial in ensuring not only that the demand is met from the supply optimally, but also would ensure development of infrastructure in the sector. Recognising the above, the new regulator would require having adequate capacity to handle these intricate issues related to pipeline regulation.

In conclusion, it can be stated that while both NELP and the PNGRB Act, 2006 contain competition-enabling provisions, the NELP through its six rounds completed so far, has been able to encourage competition in the exploration business. There has been an increase in the number of private domestic as well as foreign players. This has resulted in an increase investments and reserve accretion in the sector. However, there are a few issues that need attention of the relevant parties to ensure a better and sustained private participation in the sector.

The PNGRB Act, 2006 also has a number of competition enabling provisions. However, the need of the hour is to establish a regulator for the sector at the earliest. Regulations and rules made by the regulator would determine the level of competition in the sector. A key area of concern for the regulator would be pipelines, as lack of a robust pipeline infrastructure is a key impediment in developing India's gas sector. In the petroleum sector, a key issue that would

require adequate attention from both the government and the regulator is petroleum pricing, because, lack of market based pricing in the petroleum sector has stifled competition in the downstream sector as elaborated earlier. Table 4.10 summarizes the sectoral impediments to competition and the likely advocacy role of the Competition Commission of India (CCI).

Table 4.10 Sectoral impediments to competition and role of CCI

Segments of Oil and Gas sector	Impediments to competition	Role of CCI
Oil and Gas sector	Clearances	Promotion of single window clearances
Downstream	Controlled Petroleum pricing and perversity of subsidies	Impress upon the government need of market based pricing and adoption of innovative delivery options for targeting subsidies
	Pipelines	Build capacities of the regulator and other relevant stakeholders for promoting competition in the pipelines segment

SOURCE TERI compilation

4.6 Perception Survey Findings

This section attempts to gauge stakeholder perception on various entry barriers and appraise the impact of key policies introduced thus far in the oil & gas sector. While the minutes of meeting with select officials is placed at Annexure 4.1, below are the key findings of the perception survey:

- An analysis of the survey responses reflects that 54.2% of the survey respondents view the 'absence of freedom to fix prices for petrol and diesel' as a major competition-inhibiting factor. As highlighted earlier, the impact of pricing policy typically depends on the segment in which the oil company functions. In the current pricing regime, while the upstream and refining companies stand to gain, the OMCs would loose due to the lack of freedom to pass price increase to the end consumers. This not only impacts the financial viability of operations for the OMCs but also reduces their ability to make-up for the capital expenditure for expansion and modernization.

  Further, the OMCs have to bear the burden of subsidies on LPG and Kerosene that are marketed by NOCs. About 35.7% of the non-consumers consider this factor as a major competition deterrent. Another key finding is that 41.7% of the respondents feel that there currently exists a non-level playing field for private players' vis-à-vis incumbent utilities. The perception on this factor is stronger among the non-consumers than the consumers. The opinion of consumers and non-consumers is summarized in Table 4.11.

Table 4. 11 Impact on competition in the oil & gas sector

	Consumers	Non-consumers	Combined
Absence of freedom to fix prices for petrol and diesel in line with international prices	Substantial (77.8%)	Substantial	Substantial (54.2%)
Lack of independent regulatory framework	Substantial (44.4%)	Low (26.7%)	Substantial (33.3%)
Non-level playing field for private players vis-à-vis PSUs	Substantial (33.3%)	Substantial (55.6%)	Substantial (41.7%)
Requirement of minimum investment guarantee to permit marketing of transportation fuels	Moderate (45.5%)	Moderate (40%)	Moderate (42.3%)
Monopoly of NOCs in Aviation Facilities	Substantial (30%)	Moderate (40%)	Moderate (32%)
Restrict marketing of subsidized LPG & Kerosene by NOCs	Low (30%), NR (30%)	Substantial (35.7%)	Substantial (29.2%)

SOURCE TERI survey (2006)

Although the APM for petroleum products was dismantled in April 2002, there exists no price competition at either the refinery gate or retail outlets. The pricing of petroleum products was until recently set on the principle of import parity. Subsequent to the recommendations of the Rangarajan Committee, in June 2006, the Government adopted an alternative pricing mechanism for arriving at the refinery gate prices and retail prices on the basis of trade parity. This pricing model is essentially an 80:20 weighted average of 'import parity' and export parity prices. The TERI survey indicates support (53.8%) for discontinuation of administered prices for petroleum products as this could substantially improve competition in the sector.

Another important Government policy in recent years has been the introduction of NELP, which not only endeavours to improve transparency in the allocation of oil & gas blocks but also the level of private participation and discoveries. Till date, the Government has completed six rounds of bidding for blocks under the NELP with many private, domestic and foreign players participating in the process. However, many global players were missing in this round of bidding. Nevertheless, the survey respondents have expressed overall confidence on the ability of NELP to attract private participation and improve competition in the E&P segment.

The survey also attempted to gauge stakeholder perception on proposed downstream regulator and the impact such regulatory set-up could have on competition in the retail and institutional segments. According to the survey, about 42% of the respondents opine that PNGRB will have a substantial positive impact on competition in oil & gas sector.

The box below presents some major barriers to competition, as identified by the survey respondents, in India's oil & gas sector.

By Non-consumers

- ∉ Continued Government control on product pricing for NOCs
- ∉ Inadequacy of pipeline infrastructure
- ∉ Existence of NOCs as dominant players across all segments impacts level playing field

By Consumers

- ∉ Lack of rationalized duty structure
- ∉ Absence of an independent regulator
- ∉ Distorted pricing of petroleum products

CHAPTER 5 Competition issues in India's coal sector

5.1 Overview

Coal is India's predominant source of commercial energy, accounting for over 50% of its overall energy consumption. It is also the most important input for electricity generation in India, as about 75% of domestic coal production is consumed in the power sector[118]. In addition, other industries such as steel, cement, fertilizers, chemicals, paper and many medium and small-scale industries are also dependent on coal for their process and energy requirements. In the transport sector, though direct consumption of coal by the railways is almost negligible on account of phasing out of steam locomotives, the energy requirement for electric traction is still dependent on coal converted into electric power. However, one of the biggest constraints on usage of Indian coal is that it is generally high in ash content and low in calorific value.

In 1947, India was producing a little over 30 million tonnes of coal. Successive Five-Year Plans of India gave importance to increasing the coal production and implemented several legal and institutional changes in the coal sector. By the end of 1960s, coal production from a large number of big and small coalmines (largely from the then privately-owned mines) had reached around 60 million tonnes. However, in late 1960s, prior to nationalisation, the coal industry faced a slowing of growth in demand due to low price of petroleum products. With a view to analyse the causes and to suggest a comprehensive energy policy for the country, the Fuel Policy Committee (FPC) was set up in 1970. The FPC made a comprehensive analysis of the energy sector and concluded that coal should be considered as the primary source of energy for the country and recommended the use of coal in preference to oil products on grounds of economics and energy security. Subsequently, the coal sector was nationalized in two phases, i.e. coking coalmines in 1971-72 and non-coking coal mines in 1973-74. One of the main objectives of nationalization was to augment capital investment in coal mines, primarily to meet the rising coal demand. Successive Five Year Plans have also reiterated the pre-eminence of coal in India's energy supply arrangements and have set out investments to match demand and supply and maximize production of indigenous coal.

However, the objectives of nationalization and consecutive Five Year Plans have not been completely realized, as India continues to face acute shortage of both, coking and non-coking (thermal) coal supplies, along with continuous deterioration in quality of thermal

[118] http://coal.nic.in accessed on 31st January 2007

coal supplies. The sector is also beset with challenges like existence of public sector monopolies, presence of archaic legislations concerning land acquisition, mining, rehabilitation and environment management. Further, the coal sector is grossly inefficient compared to international standards. In the absence of competition, lack of benchmarking of operations and independent oversight of its operations, Coal India Limited (CIL) is riddled with excessive manpower against international standards, poor project formulation, low utilisation of workforce, machinery and capital, low productivity etc. There also exist constraints on port capacity and infrastructure, which result in high costs of handling and transportation of imported coal.

This chapter discusses the industry structure and legal and regulatory framework along with issues related to competition in the sector, followed by issues in captive mining and coal block allocation process.

5.2 Indian coal sector - Size and structure

The Geological Survey of India has estimated the coal resources of India at 253.30 billion tonnes as on January 1, 2006 up to the depth of 1200 metres. The extractable reserve is pegged at only 52 billion tonne[119]. Currently, the lignite reserves in the country have been estimated at around 36009 million tonnes[120]. Coal production in India in 2005-06 was 406.99 million tonnes, as compared to 382.62 million tonnes in 2004-05, reflecting a growth of 6.3%[121].

As per the Indian Constitution, the responsibility to regulate coalmines and mineral development in India lays with both, the central and state governments. In India, Ministry of Coal is the primary body responsible for policy formulation with regard to development and exploitation of coal and lignite resources in the country. The Ministry of Coal has two Public Sector Enterprises (PSEs): Coal India Limited (CIL) and Neyveli Lignite Corporation Limited (NLC) under its administrative control. The third company in the public sector, Singareni Collieries Company Limited (SCCL) is a joint venture between the State Government of Andhra Pradesh (51%) and the Central Government (49%).

These public sector enterprises have maintained a dominant position in the coal sector during last ten years as illustrated in Table 5.1.

[119] Minstry of Coal, Government of India. Coal vision 2025.
[120] Annual Report 2005-06, Ministry of Coal, Government of India, New Delhi.
[121] Provisional Coal Statistics 2005-06, Coal Controller's Organization, Ministry of Coal, Government of India

Table 5.1 Trend of production of raw coal and lignite by CIL and SCCL during last ten years.

Year	CIL's share of coal production		SCCL's share of coal production	
	Quantity (million tonnes)	All India share (%)	Quantity (million tonnes)	All India share (%)
1996-97	250.62	86.6	28.73	9.9
1997-98	261.01	86.9	28.94	9.6
1998-99	256.49	86.5	27.33	9.2
1999-00	260.59	85.7	29.56	9.7
2000-01	268.14	85.5	30.27	9.7
2001-02	279.65	85.3	30.81	9.4
2002-03	290.69	85.2	33.24	9.7
2003-04	306.37	84.8	33.85	9.4
2004-05	323.57	84.6	35.30	9.2
2005-06(P)	343.37	84.4	36.14	8.9

SOURCE Provisional Coal Statistics, Coal Controller's Organization, Government of India, Ministry of Coal

Of the total production of coal in India, about 84% comes from the collieries of CIL and 9% from SCCL and over 73% of the total Lignite production comes from Neyveli Lignite Corporation. This indicates the monopoly status that the public sector enterprises (PSE) enjoy in terms of share in the total production in the coal/lignite sector. Details of the above mentioned PSUs in the Indian coal sector are mentioned in Annexure 5.1.

5.3 Legal and Regulatory framework

During 1971-73, the private coal mines were nationalised. In October 1971, the Coking Coal Mines (Emergency Provisions) Act, 1971 mandated the Government for taking over the management of coking coal mines and coke oven plants pending nationalization. This was followed by the Coking Coal Mines (Nationalization) Act, 1972, under which the coking coal mines and the coke oven plants other than those with the Tata Iron & Steel Company Limited and Indian Iron & Steel Company Limited, were nationalized on May 1, 1972, and brought under the Bharat Coking Coal Limited (BCCL), a new Central Government Undertaking. Another enactment, namely the Coal Mines (Taking Over of Management) Act, 1973, extended the right of the GoI to take over the management of the coking and non-coking coal mines in seven States including the coking coalmines taken over in 1971. This was followed by the nationalization of all these mines on May 1, 1973 with the enactment of the Coal Mines (Nationalization) Act, 1973.

This nationalisation process was a response to the urgent need to make large capital investment in the coal mines to meet the burgeoning demand, to prevent unscientific mining and to

ameliorate the working and mining conditions of labour especially in areas like slaughter mining, lack of health, housing and education facilities for workers, and violation of mine safety laws.

The Coal Mines (Nationalisation) Act 1973 was amended in 1976 to allow captive coal mining by private companies engaged in the production of iron and steel and sub-leasing of isolated small pockets not amenable to economic development and not requiring rail transport. In 1993, the Act was further amended to allow captive coal mining in the private sector for power generation, washing of coal obtained from a mine and such other end uses as may be notified by the Central Government from time to time. Cement production was notified as a specified end-use for the purposes of captive coal mining in 1996. By such amendments, coal mining for captive consumption by companies engaged in generation of power, production of iron and steel, production of cement and washing of coal were allowed. These companies are not allowed to market the coal produced by them and can take up coal mining only subject to the conditions given below:

- that the Memorandum and Articles of Association of such companies permit coal mining.
- that they act only as per the Acts and Rules relating to mineral production, coal production, contract labour and environmental protection provisions.

The allocation of captive coal blocks is carried out through a Screening Committee, which has members from Ministries of Coal, Railways Power and Steel, concerned State Government, CMPDIL (Central Mine Planning and Design Institute), concerned coal subsidiary of CIL and others. In recent times, there has been an attempt on the part of the Government to a transparent competitive bidding mechanism. A proposal for the same is under consideration in the Ministry. Further, the Government expressed its intention to broaden the captive segment by allowing standalone private mining companies, both domestic and international, having fuel supply agreement (FSA) with the 'approved end users' to undertake captive mining.

As far as pricing is concerned, the Colliery Control Order 1945 empowered the Central Government to fix grade-wise and colliery-wise prices of coal. Following the recommendations of the Bureau of Industrial Costs and Prices (BICP), Government decided to deregulate the prices of all grades of coking coal and A, B, & C grades of non-coking coal and this decision was implemented with effect from 22nd March 1996. Later, in line with the recommendations of the Committee on Integrated Coal Policy, the Government decided to de-regulate the prices of soft coke, hard coke and D grade of non-coking coal and this decision was implemented with effect from 12th March 1997. The Government

also decided to allow CIL and SCCL to fix prices of E, F and G grades of non-coking coal once in every six months by updating the cost indices as per the escalation formula contained in the 1987 report of the BICP and necessary instructions to this effect were issued to CIL and SCCL on 13th March 1997. Finally, through the Colliery Control Order, 2000, the pricing of coal was fully deregulated.

CIL also started with trial e-auctions between December 2004 and March 2005. During 2005-06, Government approved a total of 20 MT of coal to be sold through e-auction. E-auctions allowed traders and consumers to bid for their requirements from preferred sources, thus, bypassing the black market in coal and transferring the premium from those sales to the coal companies instead. However, bulk of coal was still sold to the power sector at regulated rates well below those prevailing in the auction market. While 95% of coal was being made available to the core sector at a price of about Rs 1155/MT, the price in the auctions was as high as Rs 1660-1900/MT. In a recent judgement in December 2006, the Supreme Court of India ruled that e-auctions – when held by a near monopoly such as CIL are discriminatory, against public interest and consequently unconstitutional. Lastly, while the primary target of e-auctions was the non-core sector, large core sector players would also bid, thus pushing up prices. In light of this judgement by the court, e-auctions have been discontinued. However, CIL has now started a new concept of e-booking which is again an online booking system on first come first serve basis at 30% premium over the existing price.

Issues pertaining to deregulation and captive mining are discussed subsequently in this chapter.

5.3.1 Coal Mines (Nationalisation) Amendment Bill, 2000

The entry of private sector in coal exploratory activity and commercial mining without the existing restriction of captive mining has been a widely debated option for realizing efficiency gains and for augmenting domestic coal supply. This was to be achieved by mobilising the necessary additional investment required in the sector to increase production and to introduce competition by increasing the number of players. A process in this regard was initiated during the Eight Five-Year Plan period. The proposal of the Ministry of Coal to amend the Act to allow non-captive coal mining was approved by the Cabinet in February 1997. However, the draft Bill for the amendment could not be introduced in the Parliament since the Ministry received a strike notice from the trade unions demanding withdrawal of the Bill.

The process was revived again in late 1990s; Coal Mines (Nationalisation) Amendment Bill was introduced in the Rajya

Sabha in April 2000. After extensive and wide-ranging discussions and consultations at various levels, it was recommended that the Bill be passed. However, due to trade union's opposition, the same was not passed. The unions claimed that if the full budgetary support to the national coal companies (which stands discontinued since 1995/96) were restored, it would result in increased production to meet the demand. The Government held several discussions with the trade unions over the years but without any effect. Lastly, in August 2002, a Memorandum of Settlement was signed between CIL and 5 central trade unions and frequent meetings were held between trade unions and Minister of coal and mines in early 2003. Frequent change of Government at the Centre requiring repeated Cabinet endorsement for the Bill further delayed its approval.

5.3.2 PPP in State-joint venture

Pending the passage of the Coal Mines (Nationalisation) Amendment Bill in the Parliament, Government undertook steps to allow private commercial mining within the existing laws by handing over coal blocks through Government company dispensation route. Under this mechanism, the Central Government hands over the blocks to State Government, which in turn hands them over, to state utilities and companies. The latter can then partner with private companies to form joint ventures for commercial coal mining. Though this measure was aimed at increasing the production of coal in the short run, it has an indirect bearing on competition in the sector, as it would lead to increased number of players who would compete in the market. Discussions with the Ministry of Coal officials indicated that the Ministry considers this provision as one of the most important ways of introducing and promoting competition in this sector.

The existing structural, policy and legal framework, provides a non-level playing field to prospective private players in a number of ways. The monopoly of CIL and corresponding incumbency benefits that it enjoys, archaic and inadequate policy framework in the sector, and public sector mindsets that actually impede competition, are discussed in the following sections.

5.4 Structural impediments to competition

Coal mining projects, by their very nature, involve high sunk costs in planning and implementation. The existing scenario, where PSEs have established their mining operations over a long period of time in a protected environment, places the potential private players at a disadvantage in terms of cost of production, price and profit. The public sector enterprises have been in existence for

more than three decades and, hence enjoy the incumbency benefits as listed in Box 5.1.

Box 5.1 Incumbency benefits to CIL

- All the available geological data are in possession with CIL
- Monopolizing infrastructure (CIL has constructed railway lines through budgetary support etc.)
- Domain knowledge in terms of vast experience
- Established market and clientele
- 'Business Goodwill'
- CIL enjoys close proximity with the Ministry of Coal that guides CIL's pricing and distribution decision.
- Biased attitudes of other legal and regulatory institutions

These benefits have been achieved over a period of time and any new player will have to compete with the existing players in these aspects in addition to the economic barriers of competing with a natural monopoly service provider.

5.5 Policy impediments to competition

Inadequacy of legal provisions in terms of creating a level playing field for all players and promoting competition in India's coal sector are discussed in the subsequent section.

At present, exploration for coal is carried out by a number of public sector enterprises without involvement of the private sector. The geological information regarding coal mines is available with the Government. A prospective private player has to purchase this information from the Government at a cost.

Further, the provisions for acquisition of a coal bearing land, under the Coal Bearing Areas (Acquisition and Development) Act 1957 (CBAADA) allows possession of a virgin coal bearing land by the Central Government for a centrally controlled public sector company only. This implies that the PSEs do not have to obtain coal-mining leases for land acquired under the Act. As there is no scope for private players to acquire land under this Act, there is clearly a lack of level playing field in the sector.

Further, full acquisition of privately owned/tenancy land for 'public purpose' is provided in the Land Acquisition Act 1894. However, the term 'public purpose' has not been defined. The Act also puts a restriction on the private companies and allows it to acquire land only for "dwelling houses for workmen employed by the company or for the provision of amenities directly connected therewith". In contrast, there is no such restriction on PSEs in this regard.

Lastly, the ineffective separation of potentially competitive segments from monopoly structure creates another source of inequality to the potential private players. For instance, there are certain segments in the mining industry like provisions of health,

education and housing for mine workers that can be outsourced. But the Contract Labour (Regulation and Abolition) Act, 1970 does not allow outsourcing of perennial jobs and since all jobs in the mining sector are perennial in nature, no outsourcing is legally allowed in this sector. Due to this restriction, the existing Government companies avail of the in-house capacity, which adds to costs and lowers efficiencies[122]. The potential private players in the sector, who are already starting at a relatively disadvantageous position, would aim at obtaining maximum efficiencies at lowest costs. Contracting out these non-core segments would effectively help them in achieving the same. Hence, an amendment, enabling outsourcing of certain segments is required in the above-mentioned Act. As of now, certain coal mining activity is being outsourced through an indirect route. For example, the company purchases equipments for mining activities and the equipments are such that can be used only by trained persons. Hence, workforce to operate these equipments and carry out mining exercises, is indirectly involved.

Various countries have different legal framework under which private domestic and foreign companies need to undertake coal mining. Apart from Australia, which is quite liberal towards private and foreign investors, other countries have different degrees of regulation as far as private and foreign companies are concerned. The legal framework of these countries is summarised in Table 5.2.

[122] Review of regulatory framework in coal industry of India, TERI & IMC Report, Volume 1, 2000

Table 5.2 Legal issues-International Experience

Country	Experience
Indonesia	Ownership over land and mineral resources belongs to the state. Mining operations are undertaken in two main forms: (i) Mining authorization: Issued to either state or private domestic companies. Foreign companies are not permitted to apply for the same and (ii) Coal Contract or Work (CcoW): The Government grants A contract to a contractor for exploration and production. While a domestic company can also apply for CcoW, foreign players can mine coal through a joint venture with domestic companies.
South Africa	As per common law prevalent in South Africa, mineral rights are tied with surface land rights held by the individual landowner. Any company, which wants to undertake prospecting has to negotiate with the mineral rights holder and later, has the option to purchase the mineral rights. In practice, once purchased these mineral rights are held by that company indefinitely till either liquidation or further sale of the rights. These legal provisions provide hindrances to new companies, especially foreign companies, who cannot access the mineral rights acquired by the firms established over time. The Minerals Act, 1991 recognizes the common law rights of landowners and holders of mineral rights. Any applicant for a prospecting or mining authorization, other than the holder of mineral rights, has to obtain the consent of the mineral rights holder for prospecting and mining and of landowner regarding surface usage. This is however subject to obtaining the necessary prospecting permit and mining authorization from the state. Moreover, the holder of prospecting permit holder needs to submit an environmental management programme in respect of surface land concerned in prospecting that takes considerable time. There are no specific incentives for foreign investors to enter the mining industry in South Africa. However, the Government does encourage their participation.
Australia	There is no discrimination between state and domestic private mining companies as far as exploration license, assessment lease and mining lease are concerned. Foreign companies need not seek approval under foreign investment policy to take up the exploration right and are exempt from examination under the Foreign Acquisition and Takeovers Act 1975. They are not even obligated to seek Australian partners in exploration activities.
China	The state owns all mineral resources. Registration and licensing are required for all exploration and mining ventures. State permits foreign companies, enterprises and other economic organizations, as well as individuals, to invest in the exploration for and exploitation of mineral resources in China. Exploration and extraction rights can be transferred to others including foreign parties in specific circumstances. The holder of an exploration license has the right to carry out exploration activities within the designated area and has the first and exclusive rights to obtain the right to mine the mineral in the exploration area. Foreign investment can take the form of a joint venture where foreign companies will have operational responsibility and will look after technical aspects, provide funds for exploration and development works. The Chinese partner provides mining resource property, the necessary permits, labour force, existing technical data and the relationships with the regulatory authorities.

SOURCE TERI compilation (2006)

5.5.1 Deregulation of price and distribution in monopolistic structure

Price deregulation is one of the prerequisites for introducing competition. However, in a monopoly supply environment, consumers may be exploited. With deregulation, the right of fixing the price of coal has been conferred on CIL and SCCL. However, the pricing decision is still guided by the Ministry of Coal. The benefits of price deregulation can be realised only when there are a number of players in the industry.

International experience shows that different countries are at different stages of de-controlling the coal price. Indonesia and China still maintain control over price, though a process of de-control has been announced by the Chinese Government in recent times. In South Africa prices are mainly deregulated except for ESKOM power, a state owned company. In Australia pricing is totally deregulated with companies free to decide the pricing mechanism. Table 5.3 shows in detail the pricing and distribution mechanism followed in some foreign countries.

Table 5. 3 International experience on pricing and distribution mechanism

Country	Experience
Indonesia	A linkage system exists between state power company and state coal company. The Ministry of Finance, being a shareholder in both these companies, must agree to the price.
South Africa	Coal pricing has been deregulated. Except for coal supply to Eskom power stations (represents more than 90% of the country's total generating capacity), where captive collieries have long-term contracts, export pricing and inland pricing for normal consumers are determined on competitive basis.
Australia	Coal prices are determined in three ways - contract negotiations, tenders and spot transactions. Many major coal consumers enter into long-term contracts with coal exporters. These contracts typically provide for prices, which are set in US dollars to be reviewed annually by negotiation. Purchasing coal through tenders is also common and the proportion of coal being purchased in this way is increasing. Tenders normally involve the supply of coal to a customer during a period of up to 6 to 12 months. Spot purchases of coal are usually transactions involving a single cargo for prompt delivery. Coal prices for spot or tender sales are typically lower than for long-term contract sales.
China	Pricing in China is still under Government control, though, a process of de-regulation is underway. In 1992, Beijing began to ease its price controls on thermal coal - coal supplied to power plants - by introducing a so-called two-tier price system. The Government set a quota for each state coal mine to sell its product to power plants at Government-fixed prices. Coal contract negotiations between mines and major buyers have traditionally occurred at the annual coal conference, bringing together Government authorities, major coal consumers and mining companies. After filling the quota, the mine could then sell its extra products at market prices. At the end of 2004 the Government scrapped this two-tier system. Under the new system, the Government sets a price for thermal coal, called the state-guided price, and allow mines to sell their product 8 % above or below the guided price. In January 2006, at the opening of the 10-day annual coal-ordering conference in Beijing, the Government said that from this year thermal coal prices will be decided through independent negotiations between buyers and sellers

SOURCE TERI compilation (2006)

Similarly, deregulation of distribution was expected to provide the consumers with options of sourcing coal according to their preferences and economic advantages. On the supply side, it was expected to bring careful management of coal inventory to reduce cost and focus on productivity and on minimum landed cost of energy from amongst all sources including imports. However, in practice, sale of coal in core-sector is still guided by the system of linkages and sponsorship.

Pending the enactment of the Coal Mines (Nationalisation) Amendment bill 2000, the Government formulated a captive mining policy, within the existing legislative framework. Certain issues in this regard are discussed.

5.5.2 Issues in captive mining

In spite of introduction of captive coal mining in the coal sector, private participation has not been forthcoming. Even after a decade of blocks being allotted to various parties, only in few blocks, production has actually commenced. The disinterest towards captive route is attributed to the coal block allocation procedure and to other impediments as discussed below.

5.5.2.1 Captive coal block allocation process

The process of allocation of captive blocks in India is decided by a Screening Committee headed by a Secretary in the Ministry of Coal on a case-to-case basis. The coal blocks being offered for private mining will not be contiguous with the present workings of national coal companies. Only virgin blocks devoid of any infrastructure facilities will be offered (Annexure 5.2). The above decision was based more on blocking the competition than to allow it.

Since this mechanism is fraught with non-transparency, the Government has attempted a switch over from inter-ministerial screening committee mechanism, to a market driven competitive bidding mechanism to introduce transparency in the process of allocation of captive blocks and allow for competition among applicant parties. Accordingly, the Ministry of Coal put up a draft bid document for proposed allotment of coal blocks for captive mining inviting comments and suggestions.

5.5.2.2 Other issues in captive mining

There are a number of impediments that have stalled private participation. These are listed below:

- CIL was the custodian of all coal blocks and it was the CIL that was recommending the allotment of coal blocks

- Coal blocks were allotted to parties who were not serious on taking up coal mining for end usage
- Disposal of coal produced during mine development and periodic small surpluses in excess of the captive needs through sale is not permitted
- Captive blocks were not divided scientifically and the development of captive mines could not be undertaken in a commercially viable manner
- It was not possible to dovetail the mine operation with the proposed industry, which was one of the main conditions for captive mining

Further, companies that want to take-up captive mining have to go through several time-consuming processes including the following:

- Preparation of a Mining Plan by a 'qualified person' recognised by Central Government based on geological data furnished by Central Mine Planning and Design Institute (CMPDI)
- Approval of mining plan by the empowered standing committee in MoC
- Environment and forest clearance from the Ministry of Environment and Forests, GoI
- Clearance from Director General Mine Safety (DGMS).
- Arrangement of transportation contract with Ministry of Railways
- Mining lease from the State Government
- Land acquisition and related resettlement issues

As per the information available to the Expert Committee on Road Map for Coal Sector Reforms, major delays occur, in most cases, in obtaining environmental clearance and the necessary approvals for land and mining leases from the concerned State Governments, as also the subsequent land acquisition process.

Although a number of companies have been allotted captive coal blocks, the number of players who have actually started production is much less. Table 5.4 gives the performance of six companies that have started production. Their share however in terms of domestic production is negligible. Though the share of coal production from these captive blocks have increased from 3% in 1996-97 to 6.3 % in 2005-06, it is still nowhere near the Government's expectation in terms of bridging the demand supply gap.

Table 5.4 Trend of production of raw coal by private captive mines during last ten years

Year/ % of All India share	BECML	ICML	JSPL	HIL	Meghalaya	TISCO	MIL	BLA	CML	Total Private
1996-97	-	-	-	-	1.1	1.8	-	-	-	2.9
1997-98	0.2	-	-	-	1.1	1.7	-	-	-	3.1
1998-99	0.6	-	0.0	-	1.4	1.8	-	-	-	3.8
1999-00	0.7	-	0.3	-	1.3	1.7	-	-	-	4.0
2000-01	0.8	-	0.5	-	1.3	1.7	-	-	-	4.2
2001-02	0.9	-	0.5	-	1.6	1.7	-	-	-	4.7
2002-03	0.9	0.1	0.6	-	1.3	1.7	-	-	-	4.6
2003-04	1.0	0.4	0.7	0.0	1.5	1.7	-	-	-	5.4
2004-05	1.0	0.6	0.8	0.1	1.4	1.7	0.0	0.0	0.0	5.7
2005-06(P)	1.0	0.6	1.3	0.2	1.4	1.6	0.1	0.1	0.0	6.3

SOURCE Provisional Coal Statistics 2005-06, Coal Controllers Organization, Ministry of Coal, Government of India

Table 5. 5 Year wise details of Captive Blocks allotted

1993-95	1996-98	1999	2000	2001	2002	2003	2004	2005
3	10	2	2	1	1	22	5	22 (21)*

SOURCE The Expert Committee on Roadmap for Coal Sector Reforms, Ministry of Coal, Government of India. *Letters confirming allocation to these 21 allottees to be issued (as on December 2005)

Table 5.5 gives the year wise details of captive block allocation. As per the distribution of coal resources among the different mining categories, CIL has been allotted 289 blocks out of total 499 with 73% of the currently proved coal reserves on exclusive basis, SCCL is allotted 9% of the proved reserves and the blocks identified for captive mines have about 10% of the currently proved coal reserves. Moreover, 56% of the reserves in captive mines are in the category of indicated reserve (Table 5.6) where the detailed exploration is to be done by the respective companies themselves[123].

Table 5.6 Distribution of Coal Resources among Coal Mining categories (In billion tonnes)

Blocks	Proved	Indicated	Inferred	Total	% share
CIL	67.71	19.42	4.56	91.96	37
Captive	9.55	15.86	2.70	28.11	11
Non-CIL	3.46	5.17	5.98	14.61	6
Others (TISCO etc.)	2.77	0.35	0	3.12	1
Un-blocked	0.78	7.01	21.61	92.49	37
Godavari Valley	8.26	6.08	2.58	16.92	7
NE Region	0.43	0.10	0.37	0.90	
Total	92.96	117.08	37.80	247.84	100

SOURCE The Expert Committee on Roadmap for Coal Sector Reforms, Ministry of Coal, Government of India

[123] Report (Part-I) of the Expert Committee on Road Map for Coal Sector Reforms. Ministry of Coal, Government of India, New Delhi.

5.5.3 Effects on other related sectors

Any distortion in the coal sector either in terms of price or distribution control gets reflected in the power, steel and cement industries. Inefficient and administrative pricing in the coal sector renders these industries un-competitive. They fail to get adequate return on their investment, thereby inhibiting additional capacity building. In addition to the pricing policy, distribution policy regarding coal also has widespread and serious anti-competition implications for other coal consuming industries. Bulk of the coal movement is through railways, which introduces distortion in the distribution of coal and this in turn leads to inefficiency in logistics. This inefficiency can occur from two sources. Firstly, the decision on distribution of coal on an administrative basis through linkage committee robs the consumers of choice on sourcing of coal on economic basis. Secondly, cross subsidization of passenger transport by freight transport also distorts the landed cost of coal to the consumers of coal. Though captive mining tried to address the issue of price distortion and distribution rigidity, the non transparent process of allocation of blocks, inexperience of the approved end-user companies in undertaking coal mining and only recent emphasis on this policy and many other factors, have contributed to the failure on this front. This has also been discussed earlier in detail in this chapter

5.6 Impediments due to public sector attitude/mindset

As detailed earlier, the near monopoly of CIL, has given a number of incumbency benefits to it. There are pre-disposed attitudes and mindset within the existing legal and regulatory institutions like Director General of Mine Safety, Ministry of Labour, Central Pollution Control Board etc, in favour of CIL, all being government owned.

The most important document, 'Vision Coal 2025', released by the Ministry of Coal in March 2005 sought to address various issues of ensuring sustainable coal development and recommend policy directions required to be put in place for meeting national objectives of domestic coal sector. This document is CIL centric to a large extent and has meagre mention of SCCL and no mention at all of others. The document is silent on the issue of competition in the India's Coal Sector. It makes only a passing statement for need of an independent coal regulatory authority for the sector to regulate various aspects including the pricing mechanism.

Further, delay on the passage of the Coal Mines (Nationalisation) Amendment Bill, 2000 reflects reluctance on the part of the present Government to push through the legislation.

5.7 Perception Survey Findings

As highlighted in the chapter, this sector has traditionally been characterized by existence of public monopoly (i.e. Coal India Limited), lack of independent regulation, absence of transparency in price/tariff determination and gross inefficiency vis-à-vis international standards on both labour and capital. There also exist constraints on port capacity and infrastructure, which directly increases the cost of imported coal. Given that coal is a key constituent in India's total energy basket and a principal source of electricity generation, it is imperative for the government to address long-standing structural, policy and regulatory issues. Against this backdrop, an assessment of stakeholder perception was made, on factors impeding competition, reasons for limited private participation in coal mining and statutory provisions impacting new coal projects.

While the highlights of our discussion with various stakeholders such as Ministry of Coal, Ministry of Steel and Ministry of Power; NTPC Limited and Sponge Iron Manufacturer's Association (SIMA) are summarized in Annexure 5.3, the perception survey results are briefly discussed below:

- According to the survey, the monopolistic structure of Indian coal industry is the biggest deterrent to competition and greater private sector participation. This result was expected as a substantial portion of India's coal production comes from the collieries of 2 public sector enterprises i.e. CIL (over 85%) and SCCL (about 10%). The existence of a public monopoly structure obviously raises concerns on non-level playing field for private operators as the government continues to have critical control over pricing, marketing and distribution etc.

  The effect of a monopolistic market structure is exacerbated by the absence of an independent regulatory oversight. According to the survey, 47.8% of the respondents (consumers – 50% and non-consumers – 46.7%) consider the absence of independent regulator in the coal sector a major competition impediment. While the necessity for establishing an independent regulator has been widely debated over the last few years, there has been limited progress on this matter. It is worth reiterating that independent regulatory oversight would not only boost investment and create a level playing field in the sector but also distance the government from activities such as allocation of blocks, approval of mines etc. Further, the presence of stiff legislations concerning land acquisition, rehabilitation and environmental management are considered as a major competition impediment by 43.5% of the survey respondents. The opinion of consumers and non-consumers on impact of the competition-enabling provisions is summarized in Table 5.7.

Table 5.7 Factors impeding competition in the coal sector

	Consumers	Non Consumers	Combined
Absence of independent sector regulator	Most important (50%)	Most important (46.7%)	Most important (47.8%)
Dominance of a Public Sector Monopoly leading to non-level playing field	Important (50%)	Most important (60.0%)	Most important (52.2%)
Presence of stiff legislations concerning land acquisition, rehabilitation and environment management	Most important (62.5%)	Most important (33.3%)	Most important (43.5%)
Acute shortage of coking & non-coking supplies and deterioration of quality of coal	Important (50%)	Less important (26.7%)	Important (32%)

SOURCE TERI survey (2006)

- Over the years, the private sector has been allowed to carry out coal mining for captive consumption in industries such as power generation, iron and steel, cement production and coal washing. Despite this measure, the participation of private sector in captive mining across different user industries has not been forthcoming. According to the survey, 70.8% of the respondents believe that the lack of transparency in the block allocation procedure is the most important contributor for limited private involvement in the sector. Further, about half the respondents opine that 'high cost and low quality of geological information' and 'release of blocks with low prospects' are major deterrents to private captive mining. Parameters such as 'restrictions on use of surpluses in excess of captive needs' and 'lack of developed supporting infrastructure such as seaports and railroads' were rated as moderate contributors to lack of private involvement in captive mining.

- Lastly, the survey examined the extent to which some statutory provisions of existing sector legislations erect competition impediments. The survey findings for non-consumers are summarized in Table 5.8:

Table 5. 8 Need for reforming statutory provisions

Mines and Minerals (Regulation and Development) Act 1957, Mineral Concession Rules	
Preference to PSEs for grant of PL and ML	Major
High cost of geological information	Moderate
Coal Mines Nationalization Act	
Restriction of commercial mining by other government/PSEs	Major
Restriction on competitive bidding for coal blocks	Major
Coal Bearing Areas (Acquisition and Development) Act 1957 and Land Acquisition Act 1894	
Preference to PSEs for land acquisition	Major
Notification under Contract Labour (Regulation and Abolition) Act 1970	
Restriction on the use of contract labour	Moderate
Colliery Control Order 2000	
Power of the government to control production	Major

SOURCE TERI survey (2006)

Clearly, deepening reforms would substantially improve the competitive environment in the coal sector. The box 5.2 presents some major barriers to competition, as identified by the survey respondents in India's Coal Sector.

Box 5.2 Major barriers to competition

By non-consumers

- Existence of public sector monopoly
- Absence of transparency in allocation of coal mines
- Lack of independent regulator, having tariff fixing authority, in the sector
- Restrictions on commercial mining
- Tedious procedures for obtaining land acquisition and environmental/forest clearances
- Lack of political will and excessive employee unionism

By Consumers

- Absence of independent coal regulator
- Ownership of the entire value chain is concentrated with the Government
- Non-transparent entry of players on competitive bid basis

SOURCE TERI survey (2006)

5.8 Role of CCI

In the existing state of affairs, where Indian coal sector is predominantly public owned with few private players, the role of the Competition Commission of India (CCI) in terms of competition regulation measures is very limited. Certain provisions in the Competition Act, 2002, like 'Anti-competitive agreement' and 'Regulation of Combinations' are not applicable to the Indian coal sector at the moment as there are insignificant private players in domestic commercial mining segment.

Recent practices show that in some cases, CIL was probably abusing its dominant position. As mentioned earlier, it introduced sale of coal through e-auction at price premium. The same was noticed by the Supreme Court, which imposed a ban on it in

January 2006. However, CIL has again started a new concept called e-booking in which coal is being offered on 'first-come-first-served' basis with a 30% mark-up on the declared price. This seems to be a case of 'abuse of dominant position' by CIL where it is imposing a discriminatory condition in sale of goods. CCI may play an important role here under Section 4 of the Competition Act 2002.

CCI can also play its advocacy role by advising the Central Government on competition issues, creating public awareness and imparting training on competition issues. It can persuade the Government in expediting the passage of the Coal Mines (Nationalization) Amendment Bill, 2000 and making amendments at legislative and policy fronts to remove various discriminatory provisions against private players.

5.9 Recommendations

Government needs to make a sincere effort at getting the Coal Mines (Nationalisation) Amendment Bill passed in the Parliament. The provisions of this Bill will allow for private sector participation in the commercial coal mining in India, which will increase the number of players, thereby, facilitating investment and competition in the sector.

It is also required to provide the private players with a level playing field, as and when they enter into the coal industry on a full scale, by amending various discriminatory provisions within the current legal and policy framework. Under MMRDA/MCR (Mines and Minerals (Regulation and Development) Act 1957/ Mineral Concession Rules), there is no enforceable provision for the acquisition of surface rights. It confers the right of carrying out various activities connected with mining, but for surface rights the applicant has to negotiate with individual landowners. It is recommended that MMRDA/MCR be amended to provide surface rights to the applicant subject to the provisions of other applicable Acts, like Forest (Conservation) Acts, etc.

As far as the Coal Bearing Areas (Acquisition and Development) Act, 1957 (CBAADA) is concerned, the Government has the following options

a) repeal the CBAADA altogether, or
b) retain the CBAADA while extending the provisions to the private sector by enacting specific legislation for land acquisition, where there are coal deposits, in consultation with the various state governments, or
c) retain an amended CBAADA for a limited period until significant private sector participation emerges.

An amendment to the Land Acquisition Act, 1894 be made to remove the difficulties for the private parties in getting the acquisition rights over surface land subject to other related laws like those related to privately owned (including tenancy land), state owned forest land and state owned non-forest land (revenue land). The Colliery Control Order 2000 should be withdrawn in its entirety both at central and state level and the office of the Coal Controller should be abolished. This calls for the responsibility for collection and distribution of taxes collected under the Coal Mines (Conservation and Development) Act 1974 to be assigned to a party other than Coal Controller. Moreover any kind of restriction-both statutory and contractual- on the use of contract labour in the non-core areas within the coal sector should be abolished. Further, there is a need to bring the coal sector under independent regulatory oversight till market forces can take control to regulate the various aspects of the sector including pricing without further delay.

5.10 Conclusion

In view of the above analysis, it is clear that the effects of various anti-competitive factors identified in the coal sector on the rest of the economy are widespread. Some initiatives have already been taken to reform the sector and there is a need to further carry forward the same. It is required to clearly define the reform objectives in coal sector and make sure that all policy changes are coherent in nature and can simultaneously help in achieving the stated objectives. The first step is to restructure the sector by introducing more number of players so that it can reduce the dominance of any one player and can facilitate competition. Other major steps include bringing the coal sector under the independent regulatory oversight. It is also required to streamline processes, procedures and remove various discriminatory provisions in the existing legal framework against the private players in order to incentivise and expedite captive coal production. To conclude, Table 5.9 summarises the impediments to competition in coal sector and possible role of CCI.

Table 5.9 Impediments to competition & role of CCI

Impediments to competition	Possible Role of CCI
Dominant position of Public sector enterprises	Ensure fair conduct of PSEs holding dominant position in the sector
Competition advocacy	4 Advising Central Government on competition issues 4 Creating public awareness and imparting training on competition issues 4 Expediting the passage of Coal Mines (Nationalization) Amendment Bill, 2000 4 Amendments at legislative and policy framework to remove various discriminatory provisions against private players

CHAPTER 6 Competition in India's energy sector: Institutional issues

Introduction

In recent years, several countries have initiated structural and institutional reforms in the energy sector to attract greater private investments and improve efficiency of incumbent utilities. The key aspects of such measures have been vertical de-integration and unbundling of various segments, privatization of state-owned enterprises and introduction of new pricing regimes and rules to enhance competition. However, the achievement of these objectives critically depends on the implementation and enforcement of reforms in an orderly manner. To address this concern and to mitigate investment risks[124], many countries have established 'independent' regulatory institutions across key infrastructure industries. According to Levy and Spiller (1994), for attracting long-term private capital, it is not only imperative to create new regulatory institutions, but also to introduce sound governance principles and institutional arrangements.

Typically, the institutional framework of any country comprises of its legislative and executive establishments, regulatory design, administrative capabilities and social/informally accepted norms under which utilities operate. For a regulated sector such as energy, the institutional set-up should clarify the coordination mechanisms between the regulator and the Government, regulated entities and Competition Authority. Such inter-institutional relationship clarity directly enhances the transparency and predictability of the decision-making process and increases the overall competitiveness of the sector. Smith (1997) suggested that effective institutional design of energy regulatory framework has a major impact on a utility's strategic decisions and investment willingness. In this context, it is important to analyse the institutional issues that contribute towards fostering a competitive energy marketplace. This chapter discusses three such issues i.e. single vs. multi-sector energy regulator, interface between sector regulator and competition authority and capacity building requirements of various stakeholders on competition issues.

[124] Investment risks in the sector primarily arise due to huge sunk investments in projects, economies of scale and scope and widespread consumption spread of energy services

6.1 Institutional design of the energy regulatory agency

Based on a study of institutional designs of the energy sector in twenty countries, Pinto Jr. (2002) established a typology of regulatory agencies and mapped the hierarchical relationships among the institutions. The alternative institutional models that emerged include:

a. Specialized regulator: Agency that regulates a single industry
b. Single Sector Regulator: Agency that gathers competencies of different energy industries such as electricity, oil & gas and coal
c. Multi-services regulator: Agency that is responsible for the regulation of several sectors, all of which display similar legal and economic characteristics. For instance, an infrastructure regulator could oversee diverse services such as telecommunications, electricity, transport etc.
d. Quasi-Judicial multi-services regulator: Agency that combines legislative, administrative and judicial competencies of different infrastructure industries.
e. Whole regulator: Agency that not only regulates diverse infrastructure industries, but also discharges the role of a competition authority.

Research studies[125] indicate that the existence of industry-specific agencies is not predominant, except in countries such as Argentina, Chile, India, Finland, and France etc. In addition, countries such as United Kingdom and Denmark that initially had such regulators (for electricity and gas) have merged them to introduce a single agency for energy. This decision has been attributed as an institutional response to rapid technological convergence that has changed the strategic behaviour of energy utilities towards diversification and multi-utility activities. Brazil has adopted a mixed institutional design for its energy regulator. While the country has a specialized federal regulator for the electricity industry, it has formed multi-services regulator at the state-level. The Public Utilities Commission of the United States is a typical example of quasi-judicial multi-service regulator. The last institutional design, i.e. whole regulator, is prevalent in countries such as Australia and New Zealand. In these countries, the competition authority has the responsibility for application of competition law on the energy sector. The different regulatory structures are summarized in Table 6.1.

[125] Pinto Jr. H.Q, Institutional designs and regulatory reforms in the Energy Industries: An international comparative analysis and lessons for Brazil, Centre for Brazilian Studies, University of Oxford (2001)

Table 6. 1 Alternative approaches to structuring regulatory agencies

Industry specific (electricity or gas)	Sectoral (energy, telecommunications, transport)	Multi-sector
Argentina	Brazil (Federal)	Australia (State)
Chile	Canada (Federal)	Bolivia
India	Guatemala	Brazil (State)
Nicaragua	Colombia	Canada (State)
Finland	Hungary	Costa Rica
France	Mexico	El Salvador
Portugal	United Kingdom	Italy
	United States (Federal)	Panama
	Spain	United States (State)
		Jamaica

SOURCE TERI compilation (2006)

In India, there currently exists a separate line ministry for each of the power, oil & gas and coal sectors. Nuclear power is under the Department of Atomic Energy and there is a separate ministry for promoting the use of non-conventional energy sources. Further, the Government has established/proposed specialized regulators for the energy sector i.e. Central Electricity Regulatory Commission (CERC)/State Electricity Regulatory Commissions (SERCs) for the electricity sector and Petroleum and Natural Gas Regulatory Board (PNGRB)[126] for the downstream petroleum segment. Currently, there is no independent regulator for the coal sector but its establishment is often advocated on the grounds that it could help promote competition.

In the context of India's existing energy regulatory framework, there is an ongoing debate on the desirability and necessity of a single energy regulator. According to the Integrated Energy Policy (IEP)[127], 'since domain knowledge is important, a common regulator is not recommended for all energy sub-sectors. However, to provide cohesion and consistency of regulation across all energy sub-sectors, the regulators should meet regularly and arrive at the common principles'. Simultaneously, the IEP favoured a 'hydrocarbons regulator' for oil and gas sector to ensure a defined pricing mechanism for sensitive fuel items. Reports in January 2007[128], indicate that the Plan Panel of the Planning Commission is considering institutionalizing a 'Super Regulator' for the energy and transport sectors with all encompassing powers. While no policy decision has yet been made in this regard, it is worth

[126] PNGRB Act 2006 received presidential assent in 2006 but the Board is yet to be constituted
[127] Integrated Energy Policy: Report of the Expert Committee, Planning Commission, GoI (2006)
[128] Plan panel favours single regulator for energy, The Economic Times: http://economictimes.indiatimes.com/articleshow/1112065.cms (Accessed on January 30, 2007)

examining the respective merits and demerits of a Single Energy Regulator.

6.1.1 Advantages

- Energy sub-sectors face similar issues such as those related to introduction of competition in a traditionally monopolistic environment, relationships with stakeholders, tariff, investments etc. A wider scope of the regulator's sectoral coverage would facilitate cross-sectoral learning and greater consistency in approaches to regulatory processes across related as well as different sectors. This would reduce the need for "reinventing the wheel" for each industry and would ensure better co-ordination.
- There could be economies of scale in use of regulatory resources.
- It would reduce the risk of "industry capture" as it provides a check against the development of close proximity between the regulator and any particular industry.
- There will be greater independence from line ministries and thus there will be less chances of potential regulatory capture.

6.1.2 Disadvantages

- Getting acceptance of relevant line ministries to the concept of having a single regulator may be difficult. As a result there could be potential delays and stumbling blocks in implementing the reform program.
- The level of evolution of regulatory bodies in different sectors is different. Some sectors (for e.g. coal) do not have an independent regulator. Further, as the energy sub-sectors are at different stages of development, different strategies/ approaches need to be adopted.
- The regulators may lack adequate knowledge or expertise in all sectors. There may also be an absence of sector specific focus. This is crucial especially when there is a need for relatively tight regulation.
- Where the organizational structure provides for sector-specific regulatory staff, as is often the case, savings in regulatory costs may not be significant.
- The costs of failure in case of single energy sector regulator are high. Since all resources would be vested into one agency, any regulatory failure would have a direct bearing on all sectors. Sector specific regulatory bodies would serve to diversify risks and limit the impacts of a failure of the regulatory agency.

While there are certain disadvantages of a 'Single Energy Regulator', it is worth noting that there also exist several inter-linkages between energy sub-sectors. These linkages have an important bearing not only on prices but also on effective delivery of services. For instance, in India's electricity sector, power producers increasingly have to deal with the issue of the fuel supply

terms in order to compete effectively in the market. This also involves making a choice between gas and coal based generation. In case of coal, most electric utilities face unreliable delivery and poor quality of domestic coal. Coal being a major input in electricity generation, the quality and price of coal have a direct impact on the tariffs that are to be charged from the end-consumers. Further, the price of gas tends to be market determined and will reflect international prices, which in-turn would depend on the international demand-supply position. This market-based environment implies a greater degree of fluctuation in prices. Such inter-linkages between coal, gas and electricity, and the need to ensure flexibility and quick decision making, point to the need of having a 'Single Energy Regulator' (covering electricity, coal and gas) at the central level. This issue has to be examined in depth.

6.2 Coordination between sector regulator and competition authority

For the effective introduction of competition in the energy sector, the regulatory institutions need to not only function in a neutral and transparent manner but also to develop a working level relationship with other Government agencies, especially the competition authority. This assumes importance because both these agencies are mandated to function and exercise powers on issues that directly impinge on competition in the marketplace. For instance, the CERC/SERCs are required by the Electricity Act 2003 to administer the rate setting procedure, oversee the implementation of open access in transmission and distribution segments and establish regulations to foster competition in the sector. The critical areas where provisions of Competition Act 2002 interact with those of Electricity Act 2003 are highlighted in Annexure 6.1. The PNGRB is also empowered by the PNGRB Act 2006 to protect the interest of consumers by encouraging fair trade and competition and to regulate access to common carrier or contract carrier facilities. On the other hand, the CCI is mandated by the Competition Act 2002 to prohibit anti-competitive agreements, abuse of dominant position and regulate combinations among/between enterprises.

It is evident from the above discussion that even though the CCI and sector regulators have a complementary and mutually-reinforcing role in ensuring competition, there are some issues on which these authorities could have overlapping powers. A typical example of such inconsistency could arise in case of a merger and acquisition (M&A) transaction in the electricity sector. The Electricity Act 2003 expressly empowers the regulator to accord approval for merging the utility of one licensee with the utility of another licensee. Likewise, the Competition Act 2002 makes it obligatory for the CCI to oversee such transactions in the economy-wide context. This issue could potentially lead to a conflict between the regulator and the CCI, especially in cases where a merger

approved by the former comes under investigation/scrutiny of the later.

The Petroleum and Natural Gas Regulatory Board (PNGRB) Act 2006 empowers the Board to protect consumer interests for fostering competition and to regulate access to common/contract carrier and city/local natural gas distribution. Further, Section 11 of the PNGRB Act mandates the Board to monitor prices and restrictive trade practices. While the definition of 'Restrictive Trade Practices' has been adopted verbatim from the Monopolies and Restrictive Trade Practices (MRTP) Act 1969, the PNGRB Act contains no reference to the Competition Act 2002 nor does it provide for any consultation between the Board and the Competition/ MRTP Commission.

In view of above, it becomes imperative to resolve the potential overlap by establishing a synergic and harmonious relationship between the CCI and energy sector regulator(s). International experience also suggests that such relationship, if established, results in overall regulatory clarity, while preventing opportunities of fora shopping. Before we examine the possible ways to resolve the interface issue, an overview of the coordination mechanism that has been institutionalized between electricity regulators and competition authority in South Africa, Brazil and the United Kingdom (UK), is discussed below:

6.2.1 Competition Commission and National Electricity Regulator, South Africa

In 1998, the democratically elected government of South Africa enacted its Competition Act, which provided the basis for establishment of a Competition Commission. Since then, this body has been responsible for investigating, controlling and evaluating anti-competitive practices and related issues. The Competition Act was amended in 2000, primarily to clarify the Commission's jurisdiction over regulated industries. Section 21 (h) of this Act, makes the Competition Commission responsible to:

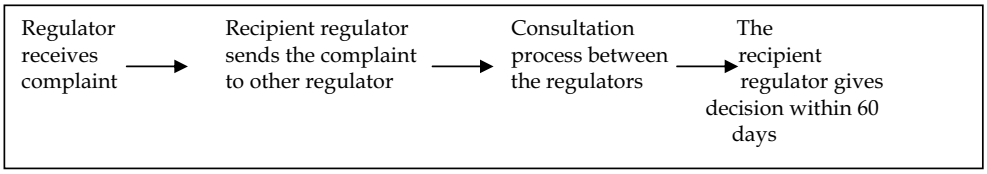
a. Negotiate agreements with any regulatory authority to coordinate and harmonize the exercise of jurisdiction over competition matters within the relevant industry or sector, and to ensure consistent application of principles of the Act
b. Participate in the proceedings of any regulatory authority
c. Advise and receive advice from any regulatory authority

The Act also broadly provides for concurrent oversight between Competition Commission and regulators by the way of understanding or Memorandum of Agreement (MoA). These agreements typically specify procedures aimed at promoting co-operation, as well as providing exchange and protection of confidential information.

Currently, the Competition Commission has agreements with regulators in the electricity, telecommunications and broadcasting sectors. The MoA between the Commission and National Electricity Regulator (NER), the federal electricity regulator, seeks to '*establish the manner in which the parties will interact with each other in respect of the investigation, evaluation and analysis of merger transactions and complaints involving electricity licensees, other licensees, consumers and persons which are subject to the regulation of NER*'. The following aspects are covered as part of this agreement:

- Merger Transactions – The public is required to submit separate and concurrent applications to the Commission and the NER. The two bodies shall thereafter make independent determinations based on the criteria and mandates of their respective legislations. In arriving at a decision, the Commission and the NER may consult each other. In case these bodies are unable to reach a common determination, the consultation process would focus on identifying reasons for such divergence and try to resolve them. If either the Commission or the NER does not approve the transaction, it shall be deemed inappropriate.

- Complaints – In case a complaint is lodged about an anti-competitive practice, in which the NER and Competition Commission have concurrent jurisdiction, the following process shall be followed:



The agreement also details the case where approval of either the Commission or Authority is required but not both. To manage and facilitate cooperation in respect of matters dealt with by each regulator, a Joint Working Committee has been constituted, having representation of both the Commission and the NER.

To summarize, the coordination mechanism between the Commission and NER has the following salient features:

- The Competition Act 1998 provides for concurrent oversight between the Commission and NER by the way of an understanding/MoA.
- The MoA establishes the specific process to be adopted for resolving a merger issue or a competition related complaint.
- To facilitate cooperation, a Joint Working Committee has been constituted.

6.2.2 Brazilian Competition Policy System (BCPS) and National Agency for Electric Energy (ANEEL), Brazil

The Competition Law in Brazil, in its current form, was enacted in 1994. The legislation established a Brazilian Competition Policy System (BCPS) consisting of three agencies i.e. Administrative Council for Economic Defence (CADE), the Economic Law Office (SDE) in the Ministry of Justice and the Secretariat for Economic Monitoring (SEAE) in the Ministry of Finance. While CADE was allocated an adjudicative role, SDE was assigned the principal investigative role and SEAE, the responsibility of conducting economic analysis. Therefore, competition cases begin in the SDE, which, with the assistance and advice from SEAE, conducts preliminary investigations and administrative proceedings before submitting its recommendations to CADE that renders the final judgement.

Brazil has instituted regulatory bodies across sectors such as telecom (National Agency for Telecommunications), electricity (National Agency for Electric Energy), petroleum (National Oil Agency) and banking (Brazilian Central Bank). The Competition Law applies fully to the regulated sectors. Under the current set-up, CADE is attributed with execution of antitrust rules. On the other hand, the regulatory agencies give technical options when requested and notifies the existence of imperfections, although they have no decision-making powers on the same. To establish a continuous exchange of information, publications and researches between the BCPS and the industry regulators, Brazil has institutionalized formal agreements between the agencies.

The coordination between ANEEL, Brazil's principal electricity regulatory agency, and BCPS is set-forth in Article 3 of the Competition Law. This article specifically requires ANEEL to enter into formal agreements with the competition authorities for harmonizing & clarifying its institutional action. In accordance with this provision, ANEEL has entered into a cooperation agreement with the BCPS. This agreement provides that any partner may refer complaints regarding attempts to manipulate the electric power sector. Investigation of violation begins with a preliminary enquiry, conducted by the SDE. If the charges are well founded and supported by evidence, SDE files administrative proceedings and simultaneously forwards the case to SEAE and ANEEL. At this stage, ANEEL is required to declare its formal position through a technical report. Subsequently, the CADE hears the proceedings & declares its stand on the competition issue. During all these phases, ANEEL can advise and provide regular information to the competition authorities.

The salient features of coordination mechanism between the BCPS and ANEEL are summarized below:

- The Brazilian Competition Law is fully applicable to regulated sectors, with competition authorities responsible for its enforcement.
- ANEEL has entered into a cooperation agreement with the BCPS. This agreement stipulates the exact procedure to deal with a competition complaint.

6.2.3 Office of Fair Trading and Office of Gas & Electricity Markets (OFGEM)

Established under the Fair Trading Act 1973, the Office of Fair Trading (OFT) is broadly entrusted with enforcing competition, administering consumer regulations and executing various market & policy initiatives. In the context of competition enforcement, OFT functions under the ambit of the Competition Act 1998 and Article 81 & 82 of the European Commission Treaty[129]. It is also empowered to refer competition-impeding merger transactions to the Competition Commission (CC)[130]. The Commission subsequently conducts inquiries into merger references and implements appropriate remedial measures.

In relation to the regulated sectors, OFT enforces the Competition Act and the Articles of EC Treaty concurrently with regulators such as OFCOM (Communications), OFGEM (Gas & Electricity), OFWAT (Water and Sewerage), ORR (Railways) and CAA (Civil Aviation). The concurrent functioning of the OFT and the regulators is stipulated in the Competition Act (Concurrency Regulations) 2004. The key provisions of this regulation that facilitate coordination between these agencies include:

- The OFT and OFGEM are required to exchange information for determining which authority has jurisdiction in a particular case. This is determined based on parameters like sector knowledge, scope of regulation and recent experience in dealing with similar issues. The agreement on competent authority for a particular case is generally reached within one month of the receipt of a complaint. In case such agreement is not reached within the stipulated time period, the matter is referred to the Secretary of State for final decision.
- The procedure for resolving disputes on which authority exercises the prescribed functions in a case have been elaborated in the Concurrency Regulations.

[129] Article 81 & 82 of the EC Treaty deal with anti-competitive conduct like unlawful agreements/associations and abuse of dominant position in member states of the European Union

[130] The Competition Commission, established under Competition Act 1998, conducts investigations into mergers, markets and the regulation of major regulated industries that are referred to it. The Commission has no power to conduct inquiries on its own initiative. Additionally, the Commission decides and implements decisions on appropriate remedies.

- The regulations state the procedure to transfer cases from one authority to another.
- Use of OFT staff by OFGEM and vice versa: The staff transfer is encouraged to support effective case handling through shared knowledge and expertise.

For matters that are not addressed specifically in the Concurrency Regulations, the arrangement is worked out by means of informal interaction between the OFT and the regulator.

The OFT and the OFGEM are represented on the 'Concurrency Working Party' (CWP) that was established in 1997. The primary objectives of the CWP were to facilitate a consistent approach in competition enforcement, to consider practical working arrangements and to provide a medium of discussion on matters of common interest between the OFT and the regulators. The CWP meets bi-monthly.

The key features of the coordination mechanism between OFT and OFGEM are summarized below:

- Sector regulators (including OFGEM) in the UK have concurrent jurisdiction for application of the Competition Act 1998 and Article 81 and 82 of the European Commission Treaty
- The Competition Act (Concurrency Regulations) 2004 lays down the jurisdictional boundary of the OFT and OFGEM, as well as the settlement procedure in the event of a dispute between these statutory bodies
- To facilitate a consistent approach in competition enforcement, the OFT and OFGEM are represented on the Concurrency Working Party (CWP) that meets regularly.

6.2.4 Interface between energy regulator(s) and CCI: Some suggestions

While there is a vast institutional diversity on the coordination mechanism between competition agency and sector regulators, the collaborative approach (as adopted in South Africa, Brazil and the UK) is considered highly desirable in the Indian context.

Currently, neither the sector legislations nor the Competition Act provide for any formal consultation mechanism to deal with a competition issue. Further, there exists limited clarity on which appellate body would deal with appeals against orders of these agencies. To overcome this ambiguity, India could set-up collaborative arrangements incorporating best practices of various countries and modify them to suit our needs. Measures to foster such collaboration are suggested below:

6.2.4.1 Amendments to energy legislations

Currently, the Competition Act 2002 and amendment thereof mandate the CCI to express and deliver judicial opinion on competition issues that may be referred to it by any statutory body. However, the Act neither makes it obligatory for the sector regulators to invite opinion from the CCI nor does it specify any mechanisms to avert conflicts between them on competition issues.

Further, there exists no coherence in energy sector legislations (Electricity Act 2003 and PNGRB Act 2006) on the mandate and role of the CCI vis-à-vis other regulators and appellate bodies. To address this concern, the sector legislations need to be amended so as to clearly delineate the role and operational responsibility of CCI and the regulators on competition issues in the regulated sectors. Some of the possible amendments are highlighted below:

- Make the guidelines and principles laid down in the Competition Act 2002 binding on the energy regulators
- Make it obligatory for energy regulators to seek the advice of the CCI on competition matters
- Allow representation of the CCI in the proceedings before the energy regulator
- Form a common appellate body to ensure coherence in law enforcement and development of common jurisprudence on competition issues across the sectors

6.2.4.2 Amendment to Competition Act 2002

Section 49 of the Competition Act, which deals with competition advocacy, does not expressly require the CCI to carry forward its advocacy role and participate in the proceedings before sector regulators to advise them on competition issues. The Competition Act should therefore be suitably amended so as to require the CCI to intervene in regulatory proceedings on competition issues and make known its views on the matters under consideration before the energy regulators. Additionally, the energy legislations and the Competition Act need to contain specific provisions that mandate establishment of protocols for mutual cooperation and assistance.

In addition to the above, it is desirable to constitute a forum on competition issues so as to provide for effective and ongoing consultations between the CCI and energy regulators. A similar institutional arrangement currently exists in the electricity sector. Under the Electricity Act 2003, a Forum of Regulators (FOR) has been constituted to provide for effective coordination between the regulatory commissions.

To summarize, it is pertinent to state that an early resolution of the interface issue, by means of an effective coordination mechanism

between the competition and energy regulators, holds the key to proper enforcement of the competition law in the sector. This would surely go a long way towards fostering a competitive energy marketplace and providing greater regulatory clarity in this sector.

6.3 Capacity building requirements of stakeholders

For effective competition in the energy sector, it is imperative to not only streamline the regulatory design and coordination mechanism but also ensure that competitive activities are appropriately monitored and timely interventions considered. In the latter context, there needs to be greater understanding on competition issues among various stakeholders such as policy makers, regulators, competition authority, multilateral institutions, utilities, consumer groups, academicians and media. Such awareness helps promote a competition culture and ensures greater participation of stakeholders in the reform process. This section[131] examines the capacity building requirements on competition issues and the ways through which stakeholder capacity can be enhanced.

6.3.1 Goals and capacity building requirements of stakeholders

For purpose of current discussion, 'capacity' is interpreted as skills and expertise that various stakeholders should possess in order to deal with issues arising from implementation of competition policies/regulations.

- The **Government** has multiple interests in the energy marketplace. First, as a protector of consumer rights, it seeks affordable access to energy services for the country's population, particularly the poor. Second, as a policy maker, it seeks greater private sector investment and competition so as to enhance economic growth and employment opportunities. Lastly, as a regulator of economic activity, it seeks to strike a balance between producer interests and consumer welfare. The specific capacity building requirements of the Government include:

  a. Understanding the merits of introducing competition in the energy sector.
  b. Designing policies to introduce competition (licensing of coal, market design of electricity and gas, cross-sectoral planning issues especially as electricity has coal/gas as fuel inputs etc.)
  c. Existing policies that hamper competition such as subsidy and cross-subsidization

[131] Based on inputs drawn from stakeholders as part of the Questionnaire Survey on 'Assessment of Competition in India's Energy Sector'

d. Delineation of jurisdiction of sector regulators and CCI on competition issues

- **Regulators** encourage market mechanism and level playing field and also ensure the affordability and reliability of energy services. The regulators need to gain expertise on the following competition-impacting aspects:

  a. Market design to effectively implement competition philosophy in energy sectors
  b. Transition to competition and its implementation strategy
  c. Framing rules and regulations such that minimum regulatory intervention is required
  d. Parameters to monitor competition and corrective measures required
  e. Standards for utilities on information disclosure and reporting on competition parameters

- **Competition Authority**, with economy-wide jurisdiction on ex-post review of abuse of dominant position and other anti-competitive behaviour of firms, primarily seeks to establish an equitable framework for growth of the sector. In discharge of its mandate, the Authority undertakes competition advocacy, adjudication of enquiries and regulation of combinations. In the context of the energy sector, the Competition Authority requires the following capacity building:

  a. Deriving synergies with sector regulators in introducing and maintaining competition
  b. Issues that would be better handled by the energy regulator(s) through referrals
  c. Devising energy-specific benchmarks on competition in consultation with sector regulators
  d. Developing an effective communication strategy

- **Multilateral institutions** seek to impress upon the Government and other stakeholders on the importance of level-playing field across energy forms and among domestic/international firms. These institutions also aim at ensuring efficiency and transparency in regulations that includes a reliable and enforceable rule of law to resolve disputes free of political interventions.

- **Energy utilities** essentially seek greater transparency in policy and regulations, easy access to resources, affordable input prices and equitable market mechanisms. The capacity building requirements of utilities includes:

a. Ensuring regulatory compliance
b. How to respond to regional, national and international competition
c. Understanding the potential benefits of competition to utilities and its staff

- **Consumers and Civil Society Organizations** are important stakeholders in the reform process. As energy serves as an input to industries, consumers can be broadly categorized as 'industry' and 'households'. As energy consumers, the industry seeks secure and affordable supplies of energy. On the other hand, the households seek enhanced supplier choice, reliability and continuity and inexpensive energy services. The capacity building requirements of consumers include:

  a. Understanding benefits of competition in terms of price and quality of service
  b. Role in supporting competition in the energy sector (demand response, participation at public hearings etc.)
  c. Role in monitoring competition and effective implementation of policy
  d. Mechanism of intervention in the event of anti-competitive practices by energy utilities

- **Academicians** seek ways to contribute/influence research and thinking on financial, regulatory and technical issues in the energy sector. Key capacity building requirements include

  a. Developing research capabilities on competition issues
  b. Building better synergies with other stakeholders to lend credibility and acceptance of competition research

6.3.2 Enhancing capacity: Some suggestions

Given below are some suggestions that could help develop better capacity on competition issues in the energy sector.

- 'A Centre of Excellence' for competition in energy sector could be institutionalised to undertake the following activities:
  a. Develop and disseminate competition advocacy literature and material on a regular basis to all stakeholders
  b. Undertake continued research and market studies for CCI on issues such as predatory pricing, abuse of dominant position, mergers and acquisitions and carry-out data collection and analysis on a regular basis;

- A 'Discussion Forum' could be initiated among stakeholder groups to develop support for competition, deliberate on ways

to resolve impediments and share best practices in the national/international context;

- Organize national and regional training programs, lectures and workshops as well as short/long-term courses on competition issues;

- The CCI may publish a regular newsletter on topical issues and happenings on competition issues and the work being undertaken by the Commission;

- The CCI and Government could activate print and electronic media on competition issues with the aim to highlight the following:

    a. How does a competitive market function and the benefits it could have for consumers, businesses and overall economic performance;
    b. Understand the logic behind decisions and views of the CCI;
    c. Promote a culture of compliance among businesses by explaining the key provisions of the Competition Act 2002 and how the CCI intends to apply it;
    d. Raise consumers' awareness of their rights and duties;
    e. Advise Government on how to achieve the most effective climate in which competition – and consumers – can benefit

- The CCI/Government may consider funding academic programs on regulation and competition at various universities and providing the opportunity to write thesis while interning at regulatory agencies.

The above measures could materially add to the knowledge base and stakeholder interest and involvement on competition issues while simultaneously providing a platform for divergent views.

6.4 Summary

The institutional set-up of any country comprises of its legislative and executive establishments, regulatory design, administrative capabilities and prevalent socio-economic norms. It also consists of unambiguous coordination mechanisms among the regulator, Government, regulated entities and Competition Authority. In this context, the chapter initially appraised the institutional design of the energy regulatory agencies and coordination between competition authority (CCI) and energy regulators. Lastly, it has examined the capacity building requirements of various stakeholders on competition issues. The key points are summarized below:

- There currently exists a vast institutional diversity on the way regulatory agencies have been structured. Broadly, the literature survey suggests five models i.e. specialized regulator, single sector regulator, multi-services regulator, quasi-judicial multi-services regulator and whole regulator. At present, India has separate line ministries for electricity, oil & gas and coal sectors. In addition, the government has institutionalised specialized regulators for the electricity and downstream oil & gas sectors. While the current institutional set-up has its own merits, India could consider establishing a 'Single Energy Regulator' to ensure regulatory consistency and inter-linkage among the sub-sectors.

- At present, the energy sector legislations (i.e. Electricity Act 2003 and PNGRB Act 2006) and Competition Act 2002 do not clarify the respective jurisdiction of these agencies on competition issues. To avoid opportunities of fora shopping and promote greater regulatory clarity, it is imperative to develop a working-level relationship between the agencies. In the Indian context, a collaborative approach is desirable as has been institutionalised in the UK, South Africa and Brazil.

- In the current scenario, capacity building of stakeholders is deemed extremely important for the implementation of reforms and other competition-enhancing initiatives. To expand the knowledge base on competition issues, the Government/CCI could consider establishing 'a Centre for Excellence' of competition in energy, forming a 'Discussion Forum', organizing national and regional workshops, training programmes and lectures, publishing a regular newsletter, activating print and electronic media, and funding academic programmes on competition.

CHAPTER 7 Concluding Remarks and Advocacy Role of The Competition Commission of India (CCI)

In the foregoing chapters, a detailed review has been done of the structural, policy/regulatory and institutional issues that impede competition, the policy changes needed to address these issues, and the potential advocacy role of CCI in the sector. It has been emphasized in Chapter 2 that resolution of the competition/PSP impediments in the energy sector could help bridge the demand-supply gap, meet growing investment needs, reduce energy poverty and improve quality of supply. It has also been emphasized that, due to the close linkages among energy sub-sectors, sub-optimum level of competition in one sector directly/ indirectly impacts operational efficiency and competition in other sectors.

To help resolve issues that impede competition, the CCI could consider taking-up the recommendations of this study with the government/regulatory authorities in a phased (short/medium/ long-term) manner. This phasing has been suggested on the basis of the expected duration required to resolve a particular competition issue. Table 7.1 summarizes the key recommendations for CCI's follow-up and advocacy.

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Table 7. 1 Recommendations for CCI's follow-up

Competition Issue	Recommendation	CCI's Advocacy Role	
		Short Term	Medium-Long Term
Issues Impacting Competition and Private Participation			
Electricity			
Structural Issue			
Dominance of Public Utilities	Highlight to the Ministry the possibility for abuse of dominance	.	
Policy and Regulatory Issues			
1. Trading, MYT and Open Access Regulations laid down by SERCs have not generated much interest among private utilities in the sector	Advocate with SERCs for identifying the lacunae in existing regulations, and taking remedial actions	.	
2. End-user tariffs are highly cross subsidized	Advocate with SERCs on the benefits tariff rationalization could bring to competition in the electricity distribution segment	.	
3. Non-existence of definitive guidelines for design and development of power markets	Evolve consensus among SERCs/CERC to develop a common market design so as to ensure free flow of power among states.		.
4. Limited inter-fuel substitution between gas and coal for electricity generation	Advocate resolution of policy and legal issues impeding substitution of inputs for electricity generation.	.	.

Barriers to Entry	
1. Lack of access to transmission network and pricing of transmission services does not promote Open Access and Trading	Impress upon Regulatory Commissions to ensure non-discriminatory access to the transmission network
2. Financial Unviability of Distribution Licensees	CCI could take-up this policy issue with the respective state governments and regulators
Lack of level playing field	
Non level playing field in generation	a. Suitably amend the NTP 2006 b. Re-examine the issue of state guarantee and review whether it can be extended to private utilities for capacity addition.
Institutional Issues	
1. Ownership of RLDCs by PGCIL	Reduce ownership of PGCIL in RLDCs. Emphasize on creating separate transmission company in each region and introducing 'yardstick competition' between the service providers.
2. PGCIL's majority equity stake in PTC	Impress upon the Ministry of Power to reduce stake of PGCIL in PTC
Oil & Gas	
Structural Issue	
Dominance of Public Utilities	Highlight to the Ministry the possibility for abuse of dominance
Policy and Regulatory Issues	
1. PNGRB focuses on only one aspect of natural gas pricing – transportation tariffs. However, there exist multiplicity of prices in other segments.	Take-up the issue of streamlining the natural gas pricing with Regulator/Government
2. Slow pace in establishing an independent downstream regulator and ambiguities in the PNGRB Act 2006	Impress upon the Government to hasten the constitution of the downstream regulator and sensitize the regulator on competition issues.
Barriers to Entry	
1. Number, Procedure and Duration of Clearances burdensome	Discuss with the concerned ministries on institutionalising a 'single window clearance mechanism' for speedy disposal
2. Lack of sound pricing policy	Discuss the competition implications of the current policy with the MoPNG and Ministry of Finance
Lack of level playing field	
1. Government support to NoCs for their under-recoveries through the issue of oil bonds, assistance from upstream NoCs and discounts from refineries etc. No such facility is available to private companies.	Discuss the competition implications of the current pricing policy with the MoPNG and Ministry of Finance

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Coal			
Structural Issue			
Dominance of Public Utilities	Highlight to the Ministry the possibility for abuse of dominance	.	
Policy and Regulatory Issues			
1. Despite deregulation, pricing decision of PSEs is still guided by the Ministry of Coal	Advocate with the Government on streamlining the coal pricing mechanism and examine the case for bringing the sector under regulatory oversight.	.	
2. Vision 2025 document is CIL centric and gives limited emphasis to private participation	Advocate with the Government on revisting the vision, clearly emphasizing the role of private sector in the coal sector	.	
Barriers to Entry		.	
1. Delay in passage of the Coal Mines (Nationalization) Amendment Bill 2000 that allows private participation in commercial coal mining without the existing restriction of captive mining.	Advocate with the Government/other stakeholders on early passage of the Bill by highlighting the positive implications it could have on competition in the sector.		
Lack of level playing field			
1. Prospective private player has to purchase geological information from the Government. The same is available to CIL without cost.	Ensure level playing field among various players irrespective of their ownership	.	.
2. Under CBAADA Act 1957, the PSEs do not have to obtain coal mining leases for land acquired	Examine the possibility of extending the provisions of the Act to private playres as well. Take-up the issue with the Ministry of Coal		.
3. CIL can take re-course to the Land Acquisition Act 1894 for full acquisition of tenancy land for 'public purposes'.	Advocate the possibility of extending the provisions of the Act to private players as well to the Government.		.
4. Contract Labour (Regulation and Abolition) Act 1970 prohibits the outsourcing of perennial jobs. This makes private mining inefficient and less cost-effective.	Examine the provisions of the Act to allow outsourcing in select cases		.
Abuse of Dominance			
Instances that indicate that CIL is abusing its dominant position (e-booking, consumer grievances on quality, pricing and allocation)	Advocate with Ministry of Coal for resolution of this issue. Highlight the benefits such measure could have on competition in coal-consuming sectors and the economy.	.	
Institutional Issues			
1. Lack of integrated and coherent planning in view of inter-linkages among energy sub-sectors	Advocate with the government the merits of constituting and operationalizing a 'Single Energy Regulator'	.	
2. Non-existence of interface mechanism between energy regulatory authorities and CCI	Impress upon the Government to introduce amendments to sector legislation and Competition Act 2002 to bring about better coordination between the agencies		.
3. Limited capacity and understanding among stakeholders on competition issues	Initiate/intensify discussion among stakeholder groups on competition issues through forums, media and specialized courses	.	.

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Within these time dependent phases, as suggested above, the Competition Commission could further prioritise the segment(s) that have a high impact on competition.

In terms of priority, in the electricity sector, it is suggested that the CCI could initially concentrate on the generation segment, followed by the distribution and retail supply segment and lastly, the transmission segment. However, while undertaking the above discussion on certain policy issues cannot be avoided. For example, during discussion on generation, certain issues such subsidy, cross subsidy in the downstream segment that entails viability of the utilities, cannot be avoided.

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In the Oil & Gas sector, the CCI could at the outset focus on pricing issues and sensitisation of the regulator on competition issues. Subsequently, the Commission and MoPNG could jointly advocate streamlining the environmental clearance mechanism, which is currently considered extremely onerous.

In the coal sector, the monopoly power of CIL and the incumbency benefits it enjoys need to be discussed by the CCI on priority. Simultaneously, the Commission could impress upon the government on the benefits of bringing the sector under regulatory oversight.

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Among the institutional issues, the Commission could on priority consider to re-focus and fine-tune its capacity building initiatives in order to meet the specific training needs of each stakeholder category (highlighted in Chapter 6).

For CCI to effectively undertake its advocacy role in the energy sector, it needs to have a well-researched and structured case on each competition issue. This could be initially presented to the Government or regulators in the form of an advocacy paper. Subsequently, a Policy Discussion Forum (PDF) could be organized so as to initiate discussion and evolve consensus on these issues on the basis of the advocacy papers. It is suggested that the paper could highlight the underlying argument of an issue and the potential quantitative/qualitative benefits from resolution of the same. TERI will be especially interested to provide the required support to prepare the advocacy papers and coordinate the PDF activity.

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Annexure 2.1 Perception Survey on 'Assessment of Competition in India's Energy Sector'

The first phase of the Project on 'Competition issues in India's energy sector' identified the impediments to greater competition and private participation in the electricity, oil & gas and coal sectors. One of the key mandates of the second/current phase is to validate the identified issues and gauge opinion of various stakeholders on competition concerns. To achieve this objective, TERI undertook a Perception Survey from October 2006 to February 2007 to assess the existing regulatory and structural hurdles to competition and to investigate future strategies for enabling a competitive environment in the sector. The survey was modelled not only to gather opinion on critical barriers to competition but also to identify the need to reform the existing statutory and non-statutory clearances in energy sub-sectors. Further, to cover the entire gamut of activities in the energy sector, the survey was categorized into three distinct parts as follows:

(i) Perception on overall competition in the energy sector

- Progress towards deregulation and greater PSP
- Existing level and likelihood of competition
- Barriers to competition
- Impact that greater private involvement can have on sectoral and economic growth

(ii) Sector Specific issues

(a) Electricity sector

- Impact of competition-enabling provisions of Electricity Act 2003
- Progress made in addressing issues having critical bearing on competition
- Statutory/non-statutory clearances that need to be reformed

(b) Oil & Gas sector

- Impact of key sector characteristics on competition
- Important policy initiatives and their potential competition impact
- Clearances/Licenses needing reforms

(c) Coal sector

- Factors that potentially inhibit competition
- Reasons for limited private participation in Captive Mining
- Statutory provisions for coal project needing reforms

(iii) Measures to enable a competitive environment

TERI identified and approached 150 representatives of private utilities, public sector enterprises (PSEs), consumer groups, academic institutions and electricity regulatory commissions to undertake this survey. Till date, we have received 48 responses that represent the views of a cross-section of stakeholders. Although the response rate was 32%, the diversity of respondent profile ensured that stakeholder views were adequately represented in this survey. It is also worth noting that the survey includes opinion of consumer groups and not individual consumers. This was primarily based on the logic that consumer groups are more acclimatised to regulatory framework in the energy sector and provide wider coverage to the survey.

To specifically gauge the difference in consumer perception on competition issues, we have segregated the responses into two parts i.e. consumers and non-consumers. Till date, 12 consumer groups and 36 non-consumers have participated in this survey. An overview of the respondent profile is presented in Table 2.1.1. In terms of turnover of non-consumers, especially private utilities and PSUs, the respondent profile varies from Rs. 0.10 billion to Rs. 86.0 billion. On account of the staff strength, the respondent organizations (non-consumer) vary from under 50 to over 2000 employees.

Table 2.1.1 Respondent Profile – TERI Perception Survey

Non-consumer respondents	
Private Utilities	
Aditya Birla Management Corporation Limited	Petronet LNG Limited
North Delhi Power Limited (NDPL)	C K Power Solutions Private Limited
Aditya Birla Power Company Limited	IL&FS Transport Networks Limited
Konaseema Gas Power Limited	Tata Group
Reliance Energy Limited	Bharat Petroleum Corporation Limited
Rabo India Finance Limited	**Electricity Regulatory Commissions**
CESC Limited	Rajasthan Electricity Regulatory Commission (RERC)
TCE Consulting Engineers Limited	Assam Electricity Regulatory Commission
Synergy Global Private Limited	Punjab Electricity Regulatory Commission
Noida Power Company Limited	Central Electricity Regulatory Commission
Academic Institutions/Think-tank	Karnataka Electricity Regulatory Commission (ERC)
The Energy and Resources Institute (TERI)	Madhya Pradesh ERC
Indian Institute of Technology, Kanpur	Chhatisgarh ERC
Madras School of Economics	Kerala ERC
Shriram Fertilizers and Chemicals	Andhra Pradesh ERC
Numaligarh Refinery Limited	West Bengal ERC
Tata Chemicals Limited	Punjab ERC

Conzerv Systems Pvt Ltd	J&K ERC
Powerlinks Transmission Limited	Tamil Nadu ERC
Consumer Respondents	
Consumer Education Centre (CEC)	Madhya Pradesh ERC
Consumer Protection Council	Consumer's Association (PDCA)
Orissa Consumers Association	Consumers Association
All India Chamber of Consumers Mr. Ganga Prasad G Rao, Arumbakkam	Consumer Education & Research Centre Consumer Advisory Committee of Karnataka Electricity Regulatory Commission
Indian National Consumer's Federation	Mettur Consumer Welfare Association

Annexure 2.2 Clearance/Approval Mechanism in the Indian Oil and Gas Sector

Exploration and Production (E&P)

Subsequent to introduction of New Exploration Licensing Policy (NELP)[132] in 1997 (effective from 1999), private players are treated at par and are required to compete with each other for acquiring exploration blocks. Major clearances required for an E&P project are listed below:

a. **Obtaining PEL and PML:** While the Petroleum Exploration License (PEL) and Petroleum Mining License (PML) for shallow and deep water areas are granted by the central government, those for on-land areas are granted by the respective state government. Without the grant of these licenses, no legal right can flow for E&P of crude oil & natural gas.

b. **Defence Clearance:** Operators have to take clearances from naval authorities in the Ministry of Defence for operating within the territorial waters of India.

c. **Explosives License:** For on-land blocks, the operator needs to obtain an Explosive License from the Chief Controller of Explosives.

d. **Environmental Clearance:** E&P projects are required to obtain an environmental clearance from the Ministry of Environment and Forests (MoEF), Government of India. For obtaining this clearance, the operator needs to carryout an Environmental Impact Assessment (EIA) study both prior and subsequent to the drilling activity.

e. **Essentiality Certificate:** Initially, an operator needs to obtain an import-export code from the Directorate General of Foreign Trade (DGFT) for importing/exporting any petroleum product. To obtain exemption from customs duty on petroleum equipment, an operator has to necessarily obtain an 'Essentiality Certificate' from the Directorate General of Hydrocarbons (DGH). It takes a minimum of three weeks to obtain this certificate.

[132] A detailed write-up on NELP, its status and competition implications is given in Chapter 4 on 'Competition in India's Oil & Gas sector'

Apart from these, an operator needs clearance from the Ministry of Home Affairs (MOHA) for oilfield personnel and permission from the Director General of Shipping for offshore blocks.

Oil Refining

The clearances required for refining activity mainly fall under two categories viz. Environmental Clearances and State Governments clearances.

a. **Environmental Clearances:** These clearances are not only considered cumbersome and time-consuming but also believed to encourage rent-seeking opportunities. This clearance mechanism is initiated at the state level, where the risk analysis of a project is conducted so as to grant a No-Objection Certificate (NoC). The procedure to get this NoC requires the operator prepare a Feasibility Report and conduct an EIA study. Subsequently, the state holds a public hearing in which stakeholders present their opinion on impact the refinery could have on local environment. The state-level NoC is granted after the operator makes a presentation at an Expert Committee Meeting of environmental experts. Previously, the refining project had to approach the state government prior to obtaining central level environmental clearance. According to new guidelines issued by the MoEF, the operator can simultaneously approach the central and state government.

b. **State level clearances:** These permissions pertain to issues related to land acquisition, taxation matters, local authorities, State Electricity Board (SEB) etc. Other clearances include consents obtained from the Central and State Pollution Control Board under Air (Prevention and Control of Pollution) Rules 1983 and Water (Prevention and Control of Pollution) Rules 1975.

c. **Explosives Clearance:** This clearance is obtained from the Chief Controller of Explosives after due evaluation of parameters such as plot plan, standard layout and distance between two pressure vessels and between the furnace and tanks. It typically takes 3-4 months to obtain the explosives clearance.

d. **Boiler Clearance:** This clearance is primarily required for registration and operation of boilers under the Indian Boiler (Amendment) Act 1962.

Oil Marketing

There currently exist a number of approvals, clearances and registrations for establishing a new oil & gas depot/terminal or installation. The major clearances and the significance of each are listed in Table 2.2.1.

Table 2.2.1 Major clearances in petroleum marketing

Sl.No	Type	Significance
1.	Registration for Land take-over from Office of the District Collector and Industries Development Board	Formalities for acquisition of land
2.	Approval for Layout from Chief Controller of Explosives (1 – 1.5 months)	Prepared immediately after taking-over of land. Validates whether layout in conformity with norms and distances stipulated under Petroleum Act 1934/Petroleum Rules 1976
3.	No Objection Certificate from District Magistrate (DM)/District Collector (DC)/Police Commissioner (2 months)	Approval of no-objection from the authority under whose jurisdiction the land is located. The NoC by DC is issued after Police, Fire, Revenue and PWD departments give clearance
4.	Approval for layout from Port Authorities (1 – 1.5 months)	Essential when the land falls under the jurisdiction of the Port Authorities
5.	Construction Approval from Airports Authority of India (AAI) (1 – 1.5 months)	Essential for Air Fuelling Station (AFS) Depots and terminals within 15 km. radius from the airport. Ensures that facilities conform to norms related to height, distance of facility from boundary.
6.	Approval from Village Panchayat/ Local Municipality (2-3 months)	Required for assessment of property/ building tax
	Town Planning/Development Authority (3-5 months)	Required for locations that fall under the jurisdiction of these authorities
7.	Risk Analysis (45 days)	Risk Analysis study is conducted to assess hazards from storing of petroleum products for facilities within the premises and surroundings
	Environmental Impact Assessment Study (4 months)	EIA study is carried out to assess existing environmental status /impact of project/pollution control measures/ monitoring programmes etc.
8.	Approval from Pollution Control Board – Accorded in the following 2 stages:	
	Consent to Establish (2-3 months)	Pre-project activity that is required prior to commencement of construction activities
	Consent to Operate (3 months)	Accorded prior to commissioning of a project
9.	Environment and Ecology - Less than Rs. 0.50 billion: Department of Ecology and Environment, State Government - Beyond Rs. 0.50 billion – MoEF (4 months)	To ensure compliance with various environmental legislations
10.	Approval from Inspectorate of Factories (3-4 months)	This approval provides go-ahead for construction of new factory and license for premises
11.	Contract Labour Registration from central-level Assistant Labour Commissioner (10 days)	Ensure compliance to regulations on Contract labour
12.	Construction approval from Railways (3 months)	This approval is taken at the commencement of site activities for putting up railway siding works
13.	Sanction of Electrical Power (3-5 months) from SEB	Required for sanction of required demand from the SEB based on loads proposed to be connected in the plant
14.	Permission to operate DG sets (1.5-2 months) from SEB	Permission required to use stand-by source of power during shut-downs

15.	Earthing Certificates from Factory Inspectorate and CEA	Permission for use of all metallic structures and electrical equipment at the plant
16.	Safety Certificate for electrical installation from CEA (2-3 months)	Site inspection of all equipment/layout of installation as per the Indian Electricity Rules
17.	Weights and Measures (1-1.5 months)	Required for use of flow meters/ calibration vessels/weight bridges/ measuring scales etc.
18.	Storage License from Chief Controller of Explosives (7-10 days)	Statutory requirement as per petroleum rules/act
19.	Disaster Management Plan from Factory Inspectorate (1.5 months)	Checks preparedness and management of emergency/disaster on site
20.	Clearance from Oil Industry Safety Directorate (1 month)	An important pre-commissioning clearance
21.	Clearance from Directorate General of Civil Aviation (10-15 days)	Essential for locations handling aviation products

SOURCE Personal Interviews with officials of Indian Oil Corporation (IOC) Limited

In addition to the above, there are certain site-specific clearances required from agencies such as the Forests Department, Public Works Department (PWD), and National Highway Authority of India (NHAI) etc. Clearly, there are a large number of clearances and agencies to be approached before a project can be commissioned. Our stakeholder interactions revealed that the duration for obtaining clearance as stipulated above indicates the minimum time as any clearance is subjected to objections and counter-objections by the concerned authority. This substantially increases the opportunities for rent seeking and hence impedes competition.

Crude and Product pipelines

The major clearances/ approvals required for installing crude and product pipeline are summarized below:

a. **Land acquisition:** The land acquisition process begins with an operator conducting detailed engineering, cadastral, soil and right of way survey. Subsequently, for purposes of acquiring land and establishing Right of Way (RoW), the operator has to approach the state government for deputing an official (Assistant District Magistrate rank) as competent authority. The ADM liaises with the concerned government (depending on ownership) for obtaining RoW and getting the details of identified landowners published in the Official Gazette. Once the necessary objections are heard in public hearings, the ADM serves notices to land owners for purchase of land. The entire process of land acquisition takes 6-9 months.

b. **Permissions from various authorities** such as NHAI, State Highway Authority, Railways etc. are required in case the proposed pipeline passes through a national or state highway, railways, canals or rivers. While there is no statutorily

prescribed time for obtaining these clearances, the Railway crossing permission, for instance, can take between 1 to 1-1/2 years to obtain.

c. In case of cross-country pipelines, there is a high possibility that such pipelines necessarily cross forest or roadside forested areas. In this situation, there is a long-drawn and prohibitively expensive approval process that might take more than a year to complete. The approval process commences with the local district forest officer (DFO) inspecting the forest area that might be reasonably impacted by the pipeline network. Thereafter, the assessment report is submitted to the state-level Chief Controller of Forests, the Principal Chief Controller of Forests and the Secretary of Ministry of Forests (for area less than 5 hectares). For forest area above 5 hectares, the report is finally submitted to the MoEF. Depending on the assessment report, the first-stage approval is granted and a forest diversion fee of Rs. 6-9.5 lacs levied on the operator.

d. Explosive License from the Chief Controller of Explosives (CCOE)

e. Environmental Clearance based on a Risk Analysis/EIA study from State Pollution control Board/MoEF

f. Approval from the Central/State Coastal Zone Authority for pipelines along the coastlines.

g. Defence clearance for pipelines in border areas.

It can be observed from above that environmental and forest clearances are the most time-consuming. While the EIA clearance procedure is being re-engineered by MoEF, the operators do not foresee a substantial improvement over the existing mechanism.

Annexure 3.1 Models of competitive electricity markets

There exist various competition models that represent an evolution over the vertically integrated monopolistic structure. These are discussed below:

The wholesale competition model

In the wholesale competition market model, the generation function is completely deregulated, with multiple independent generating companies competing to sell power to distribution companies. The basic assumption of this model is that the generation segment has enough real or potential participants to enforce workable competition. Moreover, the competing generation utilities must have access to critical facilities (transmission) that enable them to reach potential customers in the wholesale market. Market power in a wholesale competition model is mitigated either by existence of many generating companies, or by individual generating units operating under long-term contracts with many customers such that the economic interest in plants gets dispersed. Figure 3.1.1 illustrates the broad design of a wholesale competitive market.

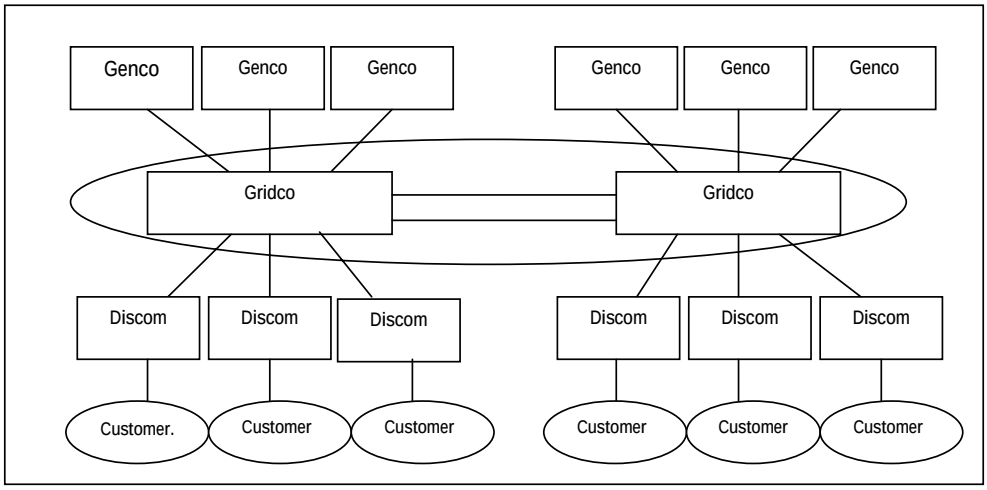

Figure 3.1.1 Basic architecture of the Wholesale Competition Model

SOURCE Hogan W. William, A Competitive Electricity Market Model, Harvard University

As shown above, while the generation activity is competitive, the transmission and distribution functions are regulated. Furthermore, transmission has been segregated into Grid

Company (Gridco[133]) and Pool Company (Poolco[134]). This division is important, as a free-flowing grid generally requires coordination of short-term operations to maintain system stability and achieve least cost dispatch. This coordination function operates through a 'power pool' or 'power exchange', which facilitates the economic dispatch of electricity. In a pool system, transactions are scheduled some time in advance of physical delivery, the time period varying from five minutes to one day. Imbalances and demand-supply differential is generally handled through predetermined procedures. In the existing pool systems in some developed countries, the pool purchase price is established by auction ahead of physical delivery. On the other hand, the pool sale price is ascertained by aggregating the pool purchase price with cost of imbalances, ancillary services and other demand related charges. As scheduled demand and supply is used to determine prices, these are known as ex-ante pools. Alternatively, there are ex-post pools in which prices are determined from actual generator schedules and demand.

Outside the organized markets, trading could take place through bilateral contracting, which is by definition more flexible than centralized pool trading. This form of contracting is allowed in Norway, Sweden, Finland and Denmark (part of NordPool), New Zealand, Spain, the US and Germany. However, bilateral contracting has been criticized on the following parameters:

(a) As bilateral contracting is not compatible with centralized optimisation of dispatch, it is inherently not based on merit order of bids or costs. In the absence of central optimiser, doubts are generally cast on the efficiency of markets.
(b) There might be lesser transparency or higher distortion of pool prices to the end-users, if a large fraction of traders enter into bilateral contracts.
(c) Long-term bilateral contracts could result in vertical integration between generators and distributors, in systems where explicit integration is not allowed.

Retail competition model

In the retail model, all customers have access to competing generators either directly or through their choice of retailer. In other words, end-users are free to choose their supplier and negotiate their contracts, which can be either short-term or long-

[133] Gridco constructs and maintains a network of transmission wires. Under wholesale competition model, this segment is regulated to provide non-discriminatory connections, comparable service and cost recovery (William H Hogan, 1993)

[134] Poolco dispatches existing generation capacity and operates a short-term market. This segment is regulated to provide open access, comparable service and cost recovery. (Hogan 1993)

term in nature. On the supply side, generators can sell their electricity to any other market player. The retail model is also characterized by unconstrained transactions between generators, intermediaries (power exchanges & brokers), retailers and the end-users.

With retail competition, there is generally unrestricted entry and exit to generation markets. Further, the model relies on the marketplace to provide incentives for producing sufficient generation reserve margins. Price signals play an important role in enforcing adequacy of generation in the retail markets. This model recognizes that transmission and distribution wires are natural monopoly segments, in which economies of scale & scope are important. Network activities and prices are therefore regulated and are supported by non-discriminatory third party access and by an independent regulatory framework. Furthermore, central coordination and generation dispatch is essential to preserve the stability and integrity of the retail supply model. In this direction, an Independent System Operator (ISO) helps control the dispatch of generation plants by matching the load to the available generation. The basic structure of retail competition model is summarized in Figure 3.1.2:

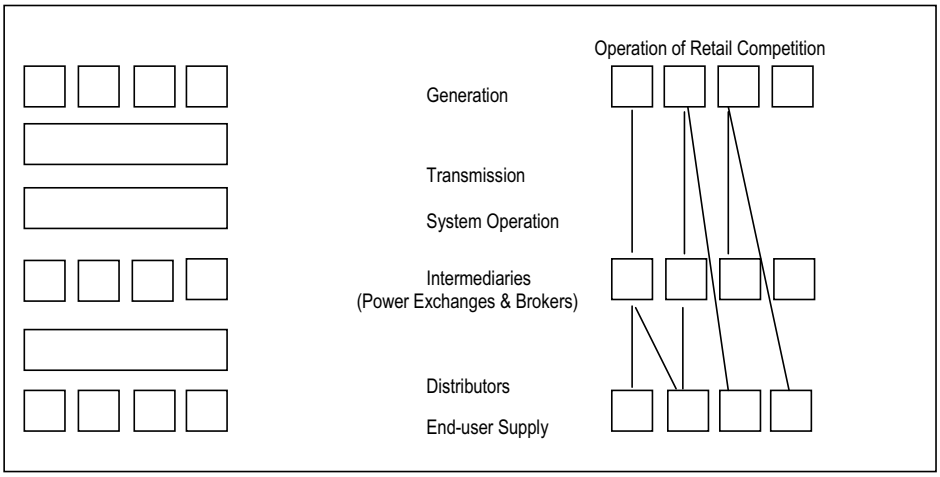

Figure 3.1.2 Basic architecture of the retail competition model

SOURCE Competition in Electricity Markets, The International Energy Agency (IEA)

It can be observed from above that the retail competition model combines deregulation, lifting constraints on potentially competitive activities in the ESI, with regulation of the network and related activities.

The implementation of retail competition model is confronted with certain impediments, the most important being the prohibitive cost of metering. Retail competition inherently requires time-of-use

metering to enable unbundled billing of energy and grid prices. The cost of improving metering services (especially for small consumers) is often considered prohibitive, even though advancements in information technology have brought costs down. To reduce the costs associated with introduction of retail competition, some countries have adopted 'Load Profiling'[135]. The underlying idea is that statistical inference procedures can be utilized for precise estimation of aggregate load of 'many' small consumers.

Portfolio manager model

There are certain market designs that combine the characteristics of both, the retail and the monopoly model. One such modern approach to competition in electricity markets is the 'Portfolio Manager Model' or 'Generation Procurement Competition Model'. Under this model, the building and operation of generation facilities is competitive, often through an auction. For all other activities, there is regulation and the monopoly utilities continue to supply electricity to end-users within their franchise area. The advantage of this approach is that it could provide incentives for cost efficiency in operation and management of generation facilities, especially when the tendering process is transparent and competitive. However, like in the vertically integrated monopoly model, the end-user could be at a disadvantage on account of the prices, investment risks and costly & binding long-term procurement contracts. The basic architecture of the 'Portfolio Manager' model is presented in Figure 3.1.3:

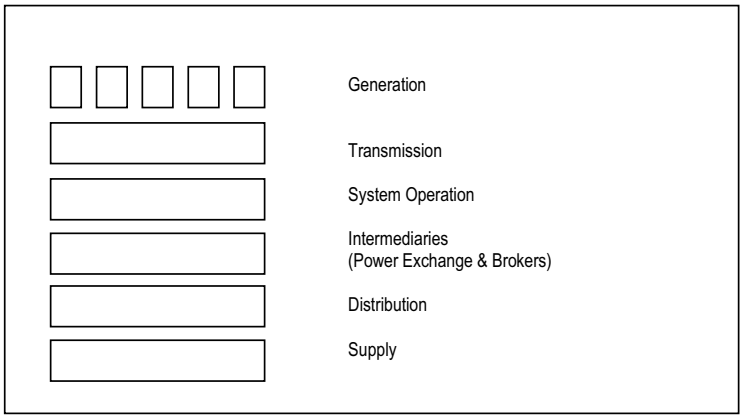

Figure 3.1.3 Basic architecture of Portfolio Manager Model

SOURCE Competition in Electricity Markets, The International Energy Agency (IEA)

[135] 'Load Profiling' is the study of consumption habits to estimate the amount of power used at various points of the day and for which they are billed. This is being used as an alternative to actual load metering

Annexure 3.2 Determinants of electricity market structure

Successful design of competitive markets and regulatory framework in the electricity sector requires due consideration of the underlying physical and economic attributes of electricity supply. The key attributes of electricity supply are as follows:

a. Non-storability: Electricity is a flow (rather than a stock) variable, which must be cleared with 'just-in-time' production and consumption.
b. Physical laws governing electricity networks: The physical laws of electricity network operations (i.e. frequency & voltage), make it imperative that demand and supply be cleared continuously at each location. This factor constrains the ability of remote suppliers to compete and hence enhances market power of utilities.
c. Short-term inelasticity of electricity demand & supply: The inflexible demand and supply characteristics of electricity in the short run creates highly volatile spot market prices. As a result, the utility supplying electricity has opportunities to exercise market power unilaterally.
d. Temporal variability of electricity demand: It has been estimated that the difference between peak and lowest demand over the course of a year is generally a factor of three[136]. This implicitly means that some generating capacity operates only for a few hours (to fulfil peak demand), the same remaining idle for rest of the year. Therefore, the price formation process during periods of high demand critically determines the ability of generators to recover their investment and ancillary costs.
e. Maintenance of stand-by generators: All the above-mentioned factors suggest that some source of real time 'inventory' is required to keep the system in balance. This inventory, generally in the form of 'stand-by generators', needs to respond almost instantly to the fluctuating electricity demand and supply requirements. The need for maintaining ancillary services to ensure network reliability that is consistent with the above attributes is an extremely challenging task. Moreover, as the number of units supplied by a utility increases, the operating and capital costs per unit reduces implying increasing returns to scale, which can only be realized by monopoly market structure.

Additionally, factors such as immobility of generation and transmission facilities and scale economies in the generation segment complicate the design of markets in the electricity industry.

[136] Joskow Paul L, Professor, Department of Economics, University of Cambridge; "The difficult transition to Competitive Electricity Markets in the U.S"

Apart from the unique characteristics of electricity itself, each functional segment of the electricity industry also possess certain key technical and economic features that lend to the underlying market structure. These are discussed in greater detail below:

Generation: Electricity production may use coal (thermal), hydropower, oil, gas, nuclear sources, renewable fuels and photovoltaic technologies. Since the cost of electricity generation varies according to the fuel mix as well as the performance of generating technology, a 'least cost merit order' for generating plants is structured. The 'merit order' primarily signifies the sequence in which different kinds of generators are operated according to their variable cost of operation. While there are related economies of coordination at the overall system level, the importance of economies of scale in generation is being progressively reduced by technological innovations. Therefore, the generation segment is considered potentially competitive.

Transmission & Distribution: Transmission refers to the transportation of electricity at high voltage levels over an interconnected network, which is shared by all end-users. A transmission network is characterized by two distinct features:

a. Network Externalities: These externalities arise primarily because investments in grid augmentation benefit all interconnected parties. Therefore, lower value is potentially realized from each successive investment in transmission up-gradation.
b. Existing high voltage alternating current (AC) networks are inherently costly to duplicate.

Owing to such factors, transmission is generally considered a 'natural monopoly' segment. Similarly, distribution, which is the low-voltage transportation of electricity from an interconnected network to a specific end-user, is also considered a 'natural monopoly'. This is because competition in distribution function would result in duplication of the existing set of 'wires'.

Finally, supply of electricity refers to its delivery/sale to end-users. This function includes metering, billing and marketing, and could be wholesale or retail. End-user supply, in most countries, is bundled with distribution but can nevertheless be performed separately. The suppliers primarily perform two functions. First, they buy and sell electricity with the aim to make profits by assuming the risk of price volatility and adjusting prices to consumption patterns. Second, the suppliers also provide 'value added services' to the end-users, such as supplying differentiated electricity (e.g. Green Electricity) and with varying reliability and quality attributes. Supply of electricity is neither considered a natural monopoly, nor is there progressively reduced by

technological innovations. Therefore, the generation segment is considered potentially competitive[137] .

The basic structure for transition to competitive electricity markets has already been developed in theory and applied in practice in other countries (e.g. England and Wales, Norway, Argentina)[138]. It involves:

a. Vertical separation of competitive segments (e.g. generation, marketing and retail supply) from regulated segments (distribution, transmission, system operations) either structurally or functionally.
b. Horizontal integration of transmission and network operations to encompass the expanse of wholesale markets and the designation of a single independent system operator to manage the operation of the network.
c. The creation of wholesale spot energy and operating reserve market institutions to support requirements for real time balancing, to respond quickly and effectively to unplanned outages of transmission or generating facilities consistent with the need to maintain network voltage, frequency and stability parameters within narrow limits, and to facilitate economical trading opportunities among suppliers and between buyers and sellers.
d. Creation of institutions to facilitate access to the transmission network by buyers and sellers to facilitate economical production and exchange, including mechanisms efficiently to allocate scarce transmission capacity.
e. Horizontal restructuring, forward supply commitments and/or behavioral rules to mitigate regional and localized market power in wholesale markets.
f. Unbundling retail tariffs to separate retail power supplies and associated support services to be supplied competitively from distribution and transmission services that would continue to be provided by regulated monopolies.

[137] Competition in Electricity Markets, International Energy Agency & Organization of Economic Cooperation & Development (OECD)

[138] Joskow L. Paul, "The difficult transition to competitive electricity markets in the U.S.", Joint Center, July 2003

Annexure 3.3 Electricity market structure and competition experience in UK and US

United Kingdom[139]

Reform process

The British model of electricity restructuring involves a combination of unbundling, privatisation, competition and regulation. The electricity supply industry in England and Wales was under public ownership from 1948 to 1990. For most of this period, a single company, the Central Electricity Generating Board (CEGB), operated all generation and transmission as a vertically integrated statutory monopoly, while twelve area boards acted as regional distribution monopolies. In 1990, the CEGB was restructured and privatized. The restructuring of the CEGB involved dividing it into four successor companies on 31st March 1990 - three of which were soon sold to the general public— creating a power pool, and liberalizing entry into the generation market. The CEGB was split into two privatised generators, National Power and Powergen, a publicly-owned nuclear generator, Nuclear Electric and a transmission company, National Grid Company (NGC). The twelve regional distribution/retail companies became Regional Electricity Companies (RECs).

The six main elements of the 1990 British electricity restructuring model were:

i. Creation of a wholesale spot market as the main price-setting arena
ii. Creation of retail competition so that all consumers can choose their electricity supplier
iii. Corporate separation of network activities from activities that would be market-driven
iv. Corporate separation between generation and retail supply
v. Adoption of incentive regulation to set the prices for monopoly activities
vi. Sale of publicly-owned assets to private investors

[139] Newberry M. David and Pollitt G. Michael, The Restructuring and Privatization of the U.K. Electricity Supply – was it worth it?", Public Policy for the Private Sector, Note No.124, September 1997, The World Bank Group (Finance, Private Sector and Infrastructure Network) and Thomas Stephen, "British experience of electricity liberalization: a model for India", Economic and Political Weekly, 10th December 2005

Generation

The Government's commitment to nuclear power prevented the creation of a competitive field of generators. The Government believed that Britain's nuclear plants, then providing 15% of electricity, could be privatised if they were "sheltered" in a large company owning two-thirds of the capacity. The fossil fuel generating plants were allocated in such a manner that National Power had 30GW, Powergen had 20GW and Nuclear Electric had 8GW. About half of Nuclear Electric's income came through subsidy and therefore, the generation market was, effectively a duopoly.

In 2000, National Power got into financial difficulties and was split into a UK business, Innogy (trading as Npower), and an independent power producer, International Power. Innogy and Powergen were taken over by German companies, RWE and EON, in 2001. EDF entered the market taking over RECs and buying some of the capacity released by the duopoly. TXU, a US utility that built an integrated business around its ownership of the Eastern REC and the purchase of generating plant, made poor power purchase deals, got into severe financial difficulties in 2002, and was taken over by EON Centrica (the retail business of the former national gas company) which had about 24% of the household electricity market but only a small share of the market for large electricity consumers.

As indicated in Table 3.3.1, the generation market in Britain appeared competitive in 2004 as compared to 1990. Eight companies had more than 3% of the market and no company had more than 15%.

Table 3.3.12 Ownership of generating capacity in Britain: 1990 and 2004

1990 (capacity GW)		2004 (Capacity GW)	
National Power	30	British Energy (nuclear)	9.6
Powergen	20	Innogy (RWE)*	8.0
Nuclear Electric	8	Powergen (EON)*	8.3
		Scottish and Southern	5.3
		Scottish Power*	4.7
		EDF*	4.7
		BNFL (nuclear)	2.7
		Centrica*	2.2
		Others	9.2
		Plant repossed by banks, etc	7.9
		Plant for sale	6.3
Total	58	Total	68.9

NOTE: *Companies with generation and retail supply

SOURCE "British experience of electricity liberalization: a model for India", Stephen Thomas, Economic and Political Weekly, 10th December 2005

Retail supply, distribution and transmission

The RECs had to make an accounting separation between distribution and retail. In 1997, the Regulator became concerned about the scope for cross-subsidy between distribution and retail. A significant proportion of staff and systems were common to both businesses. The Regulator feared that companies would cross-subsidise retail from distribution choking off competition.

By 2004, the distribution businesses of half of the regions of England, Wales and Scotland were owned by companies other than the owner of the retail business. A priority for the Government in 1990 was to ensure that transmission was not owned by a generator, as this would have led to fears that access to the network would not be fair. The National Grid Co was owned by the RECs, with limitations on how far they could influence its policy. In 1995, they were required to sell their shares. In 2003, NGC merged with its gas industry equivalent, Transco, to form National Grid Transco (NGT). The strong regulatory requirement for de-integration of retail and distribution and the independence of NGT mean that all generators and retailers have equal access to networks on non-discriminatory terms.

Wholesale competition – Power pool and New Electricity Trading Arrangements (NETA)

Wholesale competition was institutionalized in the generation segment with the setting up of power pool in 1990. The operationalization of pool was vested with the NGC. Pool was designed as a short term market where generators bid prices for quantities of electricity every half-hour for the following day. A merit order was constructed based on these bids, and combining with load forecast, a market-clearing price was determined for each half hour of the following day. This price was called the system marginal price (SMP). In addition to SMP, the generators were also paid capacity payments in order to ensure more generating capacity that could be available on call in order to avert sudden outages and demand surges. The retailers were mandated to meet their supplies from the pool only. In short, the main principles of the pool were:

- Á Supply and demand would be balanced every half hour
- Á All generators would have to make a successful bid into the pool to operate their plants
- Á The pool price would be set by the highest successful bid and paid to all successful bidders
- Á Retailers would have to buy all their supplies from the pool

Though the pool had advantages in terms of minimising the entry barriers for generators and retailers, this advantage was

circumvented by allowing bilateral contracts. This resulted in a situation wherein a significant portion of electricity supplied was traded outside the pool. According to Stephen Thomas (2005), if the contribution of coal contracts, nuclear energy generated power, the REC's plants and imports is added up; more than 95% of RECs' needs were supplied from sources that did not compete in the pool. Against such circumstances, the Government replaced the pool by new electricity trading agreements (NETA) in 2001. Under the new system, bidding into the pool is not mandatory and electricity is allowed to be traded through long term confidential contracts.

Retail competition

Retail competition was introduced in three stages – in 1990 for 'above 1MW' category of consumers, in 1994 for 'above 100kW' category followed thereon by full retail competition in 1998. This enabled consumers to select their supplier and to negotiate their contracts; and on the supply side, generators could sell their electricity to any other market player.

Regulator

The electricity market in the UK was regulated by a Director-General of Electricity Supplies with the support of Office of Electricity Regulation (Offer) until the latter was merged with Ofgas to form Office of Gas and Electricity Markets (Ofgem) in 1998, which now regulates the electricity markets in the UK. The various activities carried out by Ofgem include regulating the monopoly activities, ensuring effective functioning of the markets and complying with social and environmental compulsions. The historical record indicates that the regulator has intervened from time to time for promoting and sustaining competition in the market including ensuring equal and non-discriminatory access to networks.

Table 3.3.2 gives a snap-shot of the current electricity market structure along with the legal and regulatory framework in UK.

Table 3.3.13 Overview of British electricity market structure and, legal and regulatory framework

Generic market structure	
Main Legislations and legal documents	Electricity Act 1989, Utilities Act 2000, Energy Act 2004, Electricity Order (NI) 1992 modified by Order 335/ 2005, Energy Order (NI) 2003
Unbundling	In United Kingdom, both the electricity and gas transmission system operator are totally separate companies owned by the National Grid. The introduction of the British Electricity Transmission Trading Arrangements (BETTA) introduced a single system operator, independent of generation and supply interests for the whole of UK. The transmission network in Scotland is owned, but not operated, by the gas and electricity suppliers and electricity generators in a legally separate holding. Regarding distribution, legal unbundling has been in place since 2000. Some local networks are fully ownership unbundled. Electricity suppliers and generators also now own part of the gas distribution network. In Northern Ireland the regulations have just been signed which will provide for legal unbundling of the TSO (Transmission System Operator).
Regulator	OFGEM's role is to protect the interests of consumers, wherever appropriate by promoting effective competition. It regulates the monopoly companies that own the gas pipes and electricity wires. OFGEM is an independent non-ministerial government department with a Chairman and a Board of at least two members. Regulation is incentive based with allowed revenues normally set for a five year period. OFGEM also issues all licences and most regulatory policy is conducted through licence conditions. Detailed industry codes (e.g. network operation, balancing code) are also approved by OFGEM. The government may provide OFGEM with general guidance on social and environmental policy. Large generation plant requires authorisation from the Ministry.
Specific features	
General/ Customer Service	There are around 26 million UK electricity customers. The market has been fully open since 1998 and all price controls were removed in 2002. Apart from incentives to improve network performance, there are arrangements for compensation payments for poor service. A range of consumer protection guidelines is also in place in supply licences including: - a code of practice on billing and late payment - protection of vulnerable customers - transparency relating to contract conditions - rules for terminating contracts
Switching	Customers can easily change supplier and around 45% have so far changed from the incumbent supplier. Some have changed back to their old supplier also. Almost all industrial and commercial customers have changed supplier at least once.
Competition	The wholesale market in UK is a bilateral trading market, with brokered deals. There is also more than one power exchange, although UKPX (UK Power Exchange) has the largest volume. Ownership of generation capacity is rather diverse with eight (8) companies sharing around 70% of capacity. There are six (6) main suppliers active in the household market with additional companies active in the large user sector.
Prices	Electricity prices have risen in the last two years and the UK prices are above the EU average for households and slightly below for the industrial and commercial customers. €/MWh Ig(commercial) Ib(industrial) Dc(domestic) UK price 46 99 108 EU average 56 101 96
Network Access	Approved revenues are set by OFGEM, however the individual charges submitted by companies are approved by the regulator. Network charges are usually lower than European average levels. A well developed balancing market is in place so that imbalance prices reflect the costs imposed on the system. The 2004/05 average TSO buy and sell prices were 27.5€/MWh and €40.1/MWh respectively, a spread of €12.5/MWh.

SOURCE "Report on Progress in Creating the Internal Gas and Electricity Market", Commission of the European Communities, Commission Staff Working Document, Brussels 2005; also available at - http://ec.europa.eu/energy/ electricity /report_2005/ doc/2005_report_en.pdf

Impact of reforms in the British electricity market

Reforms in the power sector in England introduced competition that led to significant efficiency gains at the generation and distribution levels. Plant availability also improved markedly. In the generation segment of the British electricity sector, there were major cost reductions for generators after privatization, but very little of these cost reductions were passed on to consumers. The primary reasons for reduction in generation costs were:

- Removal of the nuclear subsidy in 1996 reduced prices by 10%;
- Real fossil fuel prices paid by British generators fell by 50% for coal and 30% for gas from 1999-2001;
- The electricity industry was privatized for about a third of its asset value so that the generators bought their power stations for only a third of their value; and
- A more efficient generating plant option, the combined cycle gas turbine (CCGT) became available in UK.

The retail supply of electricity has been separated from distribution function by issue of separate retail supply licence through the existing distribution network. All electricity customers are allowed to change their suppliers. With the issue of multiple licences, consumers have been provided with a choice of suppliers.

Data from the retail supply segment of the British electricity sector from 1998 show that price reductions that were gained by large consumers had been paid for by small consumers. Retailers allocated expensive power purchases to the residential market and cheap purchases to the competitive market. Small consumers were paying 30% more for the generation part of their bill than large consumers. Power UK (2002) reported that wholesale prices went down by 35% from January 1999 to January 2002, but the price paid by large consumers for their generation and retail elements of their bill went down by 22% while the amount paid by small consumers had gone up by 5%.
In 2003, the electricity retailers began to increase prices. From the beginning of 2004 to March 2005, electricity prices for small consumers rose on an average by 15% while gas prices increased by 18%.

One of the most notable results of the British reforms is the reduction in prices for use of the network. These make up about a third of the total retail price of electricity and prices had almost halved by 2002. Even presently, British Network prices are usually lower than European average levels.

Price regulation is carried out using "incentive" regulation through the "RPI–X" formula. Under this, the supplier of a monopoly service is allowed to increase its prices in line with inflation (RPI is the Retail Price Index) minus X%. The "X" factor, set initially by government would subsequently be revised by the Regulator at five-year intervals. If the company improves its efficiency by more than X%, it keeps the extra earnings, if it does not, its profit fall. The Regulator would have no interest in how the targets were met, by productivity improvements or by capital investments.

The X factor set for transmission prices in 2001 only required the transmission company to reduce its prices over the following five

years by 6%. In 2004, the distribution charges that were to be applicable from 2005 for the following five years were announced. The settlement varied from region to region, but, on average, the companies were allowed a small price increase in the first year with X factors of zero for the following four years. This indicates that the cost of replacing the pre-privatisation assets is now having a major impact on network costs and for the next decade or more, few if any price reductions in network costs are likely [Stephan Thomas, 2005].

According to Stephan Thomas, *the British wholesale electricity market is not competitive. Confidential contract and self-dealing within integrated generator/retailers dominate wholesale purchases leaving the spot market with no liquidity and unreliable prices. The failure to develop a competitive wholesale market has placed the onus on the retail consumers to force competition on the industry through consumers switching regularly to the cheapest supplier. While large consumers have done this and reduced their costs as a result, there would be huge switching costs for small consumers.*

United States of America (USA)[140]

Reform process

The growth of the electricity sector in USA is characterized by four main phases. The first phase covers early years from the time electricity was first introduced up to 1910, when George Westinghouse demonstrated high-voltage transmission of alternating current (AC) power, and fierce competition between Westinghouse's AC power and Edison's DC power developed rapidly. In the end, the AC model was more widely accepted, but led to a rather chaotic competition as numerous electric-power companies built redundant infrastructure, attempting to compete for the same customers. The end of this phase was marked by the establishment of the Chicago Edison company, which replaced a large number of rivals from business and emerged as the dominant monopoly power utility.

The second phase from 1910 to 1970 was marked by the 'natural monopoly' consensus. Vertically-integrated electric utilities were given monopoly rights over a certain geographic area and in return, the utilities were required to allow their prices and profits to be regulated. The third phase from 1970 to 2001 is commonly referred to as the era of reform of the USA electricity market. However, in comparison to other country experience, regulatory reform in USA

[140] Seth Blumsack, Jay Apt, Lester B Lave, "A Cautionary Tale: US Electricity Sector Reform", Economic and Political Weekly, 10th December 2005

was not aimed at changing the existing industry structure that was characterized by a large number of private vertically integrated utilities. In 1978, the Public Utility Regulatory Policies Act (PURPA) was passed by the USA Congress. Prior to PURPA, only regulated utilities could own and operate power plants. PURPA paved the way for unregulated independent power producers (IPPs) to begin operating in the USA and obligated electric utilities to purchase energy from these IPPs under long-term contracts. In 1992, the Congress expanded the field of eligible players in the electric power industry with the passage of the Energy Policy (EP) Act. The EP Act allowed for unregulated IPPs that did not have long-term contracts. These generators were allowed to generate electricity and sell to traditional utilities at whatever price the market could bear. To promote risk management and competition in the electricity market-place, the EP Act also allowed for the wholesale trading of electric power as a commodity.

Despite the above efforts, neither PURPA nor the EP Act was able to successfully bring down electricity prices. Two states, California and Pennsylvania, decided to take more drastic measures to promote competition. Among other measures, both states established centralised spot markets for electricity (Pennsylvania's market was actually part of a larger regional market known as the Pennsylvania-New Jersey-Maryland Interconnection or PJM), and both opened retail markets to competition, allowing individual customers to choose their electricity supplier. The states which did not pursue any sort of restructuring can be broadly divided into two groups: (i) those states with abundant resources of low-cost fuel, such as hydro in the Pacific north-west and coal in the south-east and (ii) those states representing sparsely populated (and agricultural) areas of the mid-west, where demand centres are not large or concentrated enough to support competition.

During the period from 2001 onwards, the Federal Energy Regulatory Commission (FERC) proposed a Standard Market Design (SMD) concept that would have forced the entire USA to develop electricity markets similar to those operated by PJM. However, based on the opposition raised towards various provisions of SMD, FERC formally withdrew its proposal in July 2005.

Although electricity reforms in the USA happened largely at a state level, all restructuring plans have shared a number of common traits that include, (a) vertical disintegration of the generation, transmission, and distribution businesses of regulated utilities; (b) creation of centralised hourly spot markets for wholesale electricity, ancillary services and capacity; (c) designation of a single entity to manage regional transmission grids and to operate the hourly spot market.

These entities are known as Independent System Operators (ISO) or Regional Transmission Organisations (RTO); (d) introduction of retail competition, where individual consumers are required to choose between the utility and a third-party supplier for their electric generation needs.

Impact of reforms in the USA electricity market

Presently, individual states in USA are not entirely free to design their own reform programmes. FERC Order 888, passed in 1996, required that all transmission owners provide non-discriminatory access to their transmission lines. This rule appears to have been aimed at promoting interregional trade between the south-eastern USA, which has the lowest power prices in the country, with the north-eastern USA, which has some of the highest prices in the country.

The FERC Order passed in 2000, required all transmission owners to form or join an RTO. While most areas appear to be compliant with the open-access directive under Order 888, the formation of RTOs has been somewhat slower. At this point, the entire north-eastern US and the Midwest have FERC approved RTOs. Texas and California have ISOs which operate nearly identically to RTOs, but have not been approved by the FERC.

States of California and Pennsylvania that took drastic measures to promote competition established centralised spot markets for electricity and both opened retail markets to competition, allowing individual customers to choose their electricity supplier. However, these pioneer states of electricity deregulation, namely, California and Pennsylvania, had electricity prices 45% and 20% respectively above the national average when the EP Act was passed in 1992. Figure 3.3.1 shows the decision of each state to restructure or remain regulated and the price of electricity in that state in 1992.

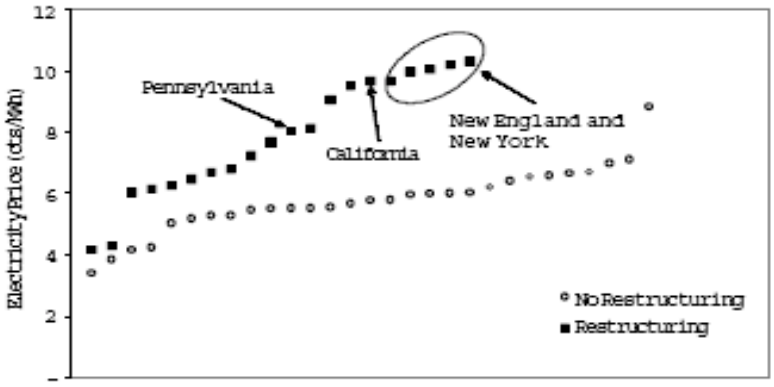

Figure 3.3. 9 Average electricity prices for restructured and regulated states in USA, 1992

SOURCE Energy Information Administration 2000; Seth Blumsack, Jay Apt, Lester B Lave, "A Cautionary Tale: US Electricity Sector Reform", Economic and Political Weekly, 10th December 2005

The USA electricity industry is currently in a hybrid state of market structure. Two-thirds of the states have retained their regulated utility structure, while few have moved towards deregulation and spot markets. Others have attempted to introduce competition in the retail sector and regulate all other functions of the utility. Market micromanagement by RTOs and federal regulators has replaced regulators and cases related to tariffs at the state level. At this point, two-thirds of states choosing to remain regulated with vertically-integrated utilities are refusing to restructure, despite FERC's efforts for them to do so. These states are concentrated in the south-east and the north-west, where power costs have traditionally been among the lowest in the USA, and the Great Plains areas dominated by rural and agricultural areas.

Annexure 3.4 MYT Regulations issued by different SERCs

Table 3.4.1 Detailed description of MYT regulations issued by different SERCs

States	Regulation	Control Period	First Year of Control Period	Generation/Transmission/Distribution/Retail Supply	Contents of MYT filing	Controllable Factors	Uncontrollable factors	Targets and Trajectory for controllable factors	Sharing of gains and losses	Incentives/ penalties
Andhra Pradesh	å	First control period = 3 years and subsequent control period = 5 years	FY 2006-07	Separate MYT framework regulation for (a) wheeling and retail sale of electricity and (b) transmission	Components of ARR separately mentioned for Distribution Business, Retail Supply Business and Transmission Business	1.Operation and Maintenance expenses, 2.Return on capital employed, 3.Depreciation, 4.Non-tariff income	1.Taxes on Income, 2.Cost of power purchase	Targets are to be set by the Commission for O&M costs, financing costs and distribution losses; Trajectory for specific variables 'may' be set in case performance can be improved through incentives/ disincentives	No specific mechanism specified; only aggregate gains or losses for the control period as a whole will be considered by the Commission	Incentive/ penalty in the case of transmission losses has been indicated
Assam	å	Generation = First control period, 5 years from 1st April 2006; Transmission = First control period, 3 years from 1st April 2006; Distribution = First control period, 3 years from 1st April 2006	FY 2006-07	Single MYT framework regulation for G,T,D with separate components of ARR specified for generation, transmission, bulk supply and distribution	Components of ARR separately mentioned for Generation (thermal and hydro), Transmission, Bulk Supply and Distribution Business	Not specifically mentioned	Not specifically mentioned	A loss reduction trajectory is required to be submitted by the licensee for each year of the control period; if the divergence in losses is more than 10% of the initial assumption of losses, Commission will make suitable	Gains = 50% of additional profit earned from all sources to be retained by licensee/ generating company, 25% to be credited to the contingency reserve of licensee/ generating	Incentive specified in case transmission licensee achieves weighted annual availability beyond the target availability as per a specified formula; incentive to be payable by distribution licensee and open access customers in the ration of their average contracted transmission capacity for the year

States	Regulation	Control Period	First Year of Control Period	Generation/Transmission/Distribution/Retail Supply	Contents of MYT filing	Controllable Factors	Uncontrollable factors	Targets and Trajectory for controllable factors	Sharing of gains and losses	Incentives/ penalties
								adjustments based on a review study undertaken by a third party	company, 25% to be passed on to consumers; such gains are to be shared at the end of the control period; In case of distribution losses, distribution licensee shall be allowed to retain 50% of gains arising out of higher loss reduction than target and 50% shall be passed on to consumers	
Delhi	å (draft)	First control period = 4 years and subsequent control period = 5 years	FY 2007-08	Separate MYT framework regulations for generation, transmission and Wheeling & Retail Supply	Components of ARR separately mentioned for Generation tariff, Transmission tariff, Wheeling tariff and Retail Supply tariff	1.Availablity of transmission system, 2.Transmsission loss, 3.O&M expense, 4.Financing cost, 5.Depreciation and 6.Quality of supply	Not specifically mentioned	Performance targets are to be set for availability of transmission system, transmission loss, O&M expense, financing cost, depreciation and quality of supply	Wheeling and Retail Supply: Aggregate profits after annual adjustments will be shared annually as, 1/3 of the gain to be shared with consumer, 1/3 of gain to be credited to tariff control reserve	Incentive specified in the event of implementation of intra-state ABT @ 25 paise/kWh for ex-bus scheduled energy

States	Regulation	Control Period	First Year of Control Period	Generation/Transmission/Distribution/Retail Supply	Contents of MYT filing	Controllable Factors	Uncontrollable factors	Targets and Trajectory for controllable factors	Sharing of gains and losses	Incentives/ penalties
									and 1/3 to be retained by licensee; Transmission: profit sharing formula is to be applied on aggregate profits and losses on account of individual controllable factors are not to be included, no cap is imposed on profits	
Jharkhand	å (draft)	First control period = 3 years and subsequent control period = 5 years	Not specified	Single MYT framework regulation for G,T,D with separate components of ARR specified for generation, transmission, distribution and retail sale	Components of ARR separately mentioned for Generation, Distribution Business, Retail Supply Business and Transmission Business	1.Capital expenditure variations, 2.AT&C losses including bad debts, 3.R&M expenses, 4.A&G expenses, 5.Employee cost, 6.Interest charges, 7.Return on Equity	Force Majeure events, changes in law, inflation rate, taxes and statutory levies	Trajectory will be specified by the Commission from time to time which may cover one or more control periods for specific parameters	Gains = 1/3 to be passed as rebate in tariffs, 1/3 to be retained in special reserve, balance amount to be utilized at the discretion of the utility; Losses = 1/3 to be passed on as an additional charge in tariff and balance to be absorbed by the utility	Not specified

States	Regulation	Control Period	First Year of Control Period	Generation/Transmission/Distribution/Retail Supply	Contents of MYT filing	Controllable Factors	Uncontrollable factors	Targets and Trajectory for controllable factors	Sharing of gains and losses	Incentives/ penalties
Kerala	å	First control period = 3 years and subsequent control period = 5 years	FY 2007-08	MYT framework regulation specified for Distribution and Retail Sale of electricity	Components of ARR separately mentioned for Distribution Business, and Retail Supply Business	1.O&M expenses, 2.Return on Equity,3.Depreciation, 4.Non-tariff income	1.Power Purchase costs, 2.Expenses on account of inflation, 3.Taxes on Income	Not specified	No specific mechanism specified	Not specified
Madhya Pradesh	å	First control period = 3 years	FY 2006-07	Separate MYT framework regulation for (a) generation, (b) transmission, (c) wheeling and retail sale of electricity	Components of ARR separately mentioned for Generation (thermal and hydro), Transmission, Wheeling and Retail supply Business	Not specifically mentioned	Not specifically mentioned	Target norms set for thermal generating stations viz. availability, PLF, gross station heat rate, secondary fuel oil consumption, auxiliary consumption; Transmission system availability fixed at 97% for first 2 years of control period and 97.5% for the last year, O&M expense targets specified for transmission and distribution (to be split between wheeling and retail sale activity) business, distribution loss targets	Gains = Transmission licensee shall be allowed to retain 50% of additional gains and 50% shall be passed on to consumers; Distribution licensee allowed to retain 50% of profits and no specific mention of treatment of remaining 50%	Target PLF values eligible for incentive specified for each year of first control period; Incentive specified in case transmission licensee achieves weighted annual availability beyond the target availability as per a specified formula; incentive to be payable by distribution licensee and open access customers in the ration of their average contracted transmission capacity for the year; Rebate to consumers for maintaining appropriate power factor, achieving higher load factor or for implementation of energy conservation measures and seasonal surcharge/Time of use surcharge, power

States	Regulation	Control Period	First Year of Control Period	Generation/Transmission/Distribution/Retail Supply	Contents of MYT filing	Controllable Factors	Uncontrollable factors	Targets and Trajectory for controllable factors	Sharing of gains and losses	Incentives/ penalties
										factor/load factor surcharge and reactive energy charges to be specified by the Commission
Maharashtra	å	First control period = 3 years and subsequent control period = 5 years	FY 2006-07	Single MYT framework regulation for Generation, Transmission, Wheeling and Sale of electricity	Components of ARR not separately mentioned for G,T&D	1.Capital expenditure variations, 2.AT&C losses including bad debts, 3.Number of mix of consumers, variations in working capital requirements and labour productivity	Force Majeure events, changes in law, inflation rate, taxes and statutory levies, cost of power purchase	The Commission "may" specify a trajectory for determination of tariff of a generating station	Gains = 1/3 to be passed as rebate in tariffs, 1/3 to be retained in special reserve, balance amount to be utilized at the discretion of the utility; Losses = 1/3 to be passed on as an additional charge in tariff and balance to be absorbed by the utility	Not specified

States	Regulation	Control Period	First Year of Control Period	Generation/Transmission/Distribution/Retail Supply	Contents of MYT filing	Controllable Factors	Uncontrollable factors	Targets and Trajectory for controllable factors	Sharing of gains and losses	Incentives/ penalties
West Bengal	å (draft)	First control period = 1 year; Second control period = 3 years; Subsequent control periods = 5 years	FY 2007-08	Single MYT framework regulation for Generation, Transmission, Wheeling and Sale of electricity	Components of ARR not separately mentioned for G,T&D	1. Repair and Maintenance expenses, 2. Administration and General expenses, 3. Return on Equity, 4. Depreciation, 5. Non-tariff income	1. Fuel cost, 2. Power Purchase cost, 3. Employee cost, 4. Interest rate and finance charges, 5. Energy Sales volume, 6. Rate of interest on working capital	Trajectory will be specified by the Commission during the control period for specific parameters viz. station heat rate, PLF, Auxiliary consumption, Oil consumption rate, T&D losses	No specific mechanism of sharing gains/ losses; any variation arising out of controllable factors is to be borne by the licensee/ generating company	From time to time the Commission is to specify the set of performance target on different parameters for incentive; such norms are to be applicable from the second control period

Annexure 3.5 Rural electrification

The status of rural household electrification across Indian states as on 12th December 2005 is summarized in Table 3.5.1.

Table 3. 5.1 Status of rural electrification in Indian states

State	Total rural households	Balance un-electrified Households to be given access to electricity under RGGY Bharat Nirman Plan.	% Rural households un-electrified
Lakshwadeep	5,351	14	0.3
Daman & Diu	22,091	562	2.5
Chandigarh	21,302	552	2.6
Himachal Pradesh	1,097,520	60,551	5.5
Goa	140,755	10,650	7.6
Punjab	2,775,462	292,537	10.5
Delhi	1 69,528	24,580	14.5
Dadra & NH	32,783	5,695	17.4
Pondicherry	72,199	13,713	19.0
Haryana	2,4 54,463	527,649	21.5
Sikkim	91,723	22, 915	25.0
Jammu & Kashmir	1,1 61,357	293,016	25.2
Karnataka	6,675,173	1,858,260	27.8
Gujarat	5,885,961	1,641,203	27.9
Tamil Nadu	8,274,790	2,384,419	28.8
Andaman & Nicobar	49,653	15,846	31.9
Kerala	4,942,550	1,703,651	34.5
Maharashtra	10,993,623	3,829,566	34.5
Madhya Pradesh	8,124,795	3,061,371	37.7
Andhra Pradesh	12,676,218	5,114,485	40.3
Nagaland	265,334	114,405	43.1
Manipur	296,354	140,675	47.5
Uttaranchal	1,196,157	593,902	49.7
Chattisgarh	3,3 59,078	10,152 1,8	53.9
Arunachal Pradesh	164,501	91,251	55.5
Mizoram	79,362	44,334	55.9
Rajasthan	7,156,703	4,006,147	56.0
Tripura	539,680	368,323	68.2
Meghalaya	329,678	229,916	69.7
West Bengal	11,161,870	8,899,353	79.7
Uttar Pradesh	20,590,074	16,505,786	80.2
Orissa	6,782,879	5,470,135	80.6
Assam	4,220,173	3,522,331	83.5
Jharkhand	3,802,412	3,422,425	90.0
Bihar	12,660,007	12,010,504	94.9
Total / Average	138,271,559	78,090,874	56.5

SOURCE Ministry of Power 2005
(http://www.powermin.nic.in/rural_electrification/electrification_of_rural_households.htm)

The GOI has initiated several measures for aiding access to rural areas. These are discussed in Box 3.5.1.

Box 3.5.1 Government of India programmes of rural electrification

1. Kutir Jyoti Programme
This programme was launched by the GoI in 1988-89 for the electrification of poor households.

2. Pradhan Mantri Gramodaya Yojana (PMGY) and Minimum Needs Programme (MNP)
The PMGY was launched in 2000-01 in order to achieve the objective of sustainable human development at the village level. It envisaged allocation of additional central assistance to the states for selected basic minimum services which includes rural electrification.
The Central plan assistance by way of 100% loan for last mile connectivity had been made available to states under the MNP and an amount of Rs. 775 crore was released during the period 2001-03 for rural electrification.

3. Accelerated Rural Electrification Programme (AREP)
In the year 2004-05, the Kutir Jyoti Programme and Accelerated Rural Electrification Programme (AREP) were replaced by 'Accelerated electrification of one lakh villages and one crore households' programme.

4. Remote Village Electrifiction (RVE) Programme
The objective of the RVE programme is to electrify remote census villages and remote hamlets of electrified census villages through non-conventional energy sources, such as solar energy, small hydro power, biomass, wind energy, hybrid systems, etc. This programme was launched by the Ministry of Non-conventional Sources (MNES) in 2005.

5. Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY)
The Prime Minister of India launched a new scheme, namely, RGGVY scheme for rural electricity infrastructure and household electrification in April 2005 with the objective of providing 100% household coverage in next five years.. *This scheme replaced the existing 'Accelerated electrification of one lakh villages and one crore households' programme, the MNP, and the rural electrification component of PMGY.* The RGGVY has been launched to fulfil the commitment of the National Common Minimum Programme) of completing the household electrification in the next five years and modernizing rural electricity infrastructure. The new programme involves providing access for electricity to 78 million uncovered rural households and electrifying 125,000 unelectrified villages in five years. The scheme, to be implemented through the REC (Rural Electrification Corporation) will provide 90% of the capital cost of the programme by the central government as grant for creating the following-

- REDB (rural electricity distribution backbone) with at least one 33/ 11 kV (or 66/ 11 kV) sub-station in each block
- VEI (Village electrification infrastructure) with at least one distribution transformer in each village/ habitation
- DDG (decentralized distributed generation) systems where grid supply is not feasible or cost effective.

SOURCE TERI Compilation

Annexure 3.6 Reasons for high AT&C Losses

The main reasons for high AT&C losses in the electricity sector in India are:

Technical Losses

- Overloading of existing lines and substation equipments: The transmission lines and substations are designed for optimal use. However, in most of the cases, the consumers draw higher load than the sanctioned one, resulting in overloading of transmission lines and equipments, which results in higher losses.
- Absence of upgradation of old lines and equipments: Due to high growth rate in demand of power supply, the line and equipments get overloaded and require frequent upgradation, relocation of distribution substation and for provision of additional transformers. The overloading of lines and equipments result in heavy technical loss.
- Low HT: LT ratio: The higher current flow in the system result in higher losses. Higher current flows in the LT lines for the same amount of power in comparison to HT line. Therefore technical losses are more in LT lines. Ideally, for optimum level of loss, HT: LT ratio should be closer to 1. Presently, the HT/LT ratio in state utilities ranges from 0.1 to 0.4.
- Poor repair and Maintenance of equipments: Due to poor financial health of state utilities, they are not able to take up regular maintenance of transmission lines and equipments, which result in higher technical loss and frequent failure of equipments.
- Non-installation of sufficient capacitors: Installation of sufficient capacitors is essential in the system to maintain the power factor closer to 1, so that technical losses can be kept at minimum. However, due to non- availability of sufficient funds, utilities are not able to install sufficient capacitors.

Commercial Losses

- Low metering/ billing/collection efficiency: The metering efficiency of the utilities ranges from 50% to 84%. The gap is on account of supply of unmetered supply to agriculture and to some other select consumers, who are billed on flat rate and theft and pilferage. In many cases meters are faulty and bills are raised on average consumption. The accuracy of the old electromechanical meters is also low. Further, bills are not raised to many consumers timely. Similarly, revenue collection is not effective, especially from the Government Departments, agriculture & rural consumers etc.
- *Theft & pilferage and tampering of meters:* Electricity is stolen & pilfered through bypassing & tampering of meters and by

hooking the LT lines. The majority of commercial losses are due to this reason.

- *Absence of Energy Accounting & Auditing:* In the absence of effective energy accounting and auditing, utilities find it difficult to determine the causes and locations of the technical or commercial loss. Effective energy audit with use of Information Technology is essential for effective action against theft and avoidable technical losses.

Annexure 3.7 Demand-Supply Gap in India's Electricity Sector

Presently, there exists a considerable demand-supply gap in the electricity sector, in India. The primary reasons for this demand-supply gap are:

- Generation: There has been inadequate generation capacity addition as per plan schedules. The growth in demand for power has been outstripping the growth in availability of power, thus aggravating the situation. While the energy availability grew by only 5.6% during 2005-06, the increase in energy requirement was of the order of 6.8%. Similarly, the rate of growth in peak demand in 2005-06 was 6.1% vis-à-vis 5.3% growth in peak met. An overview of the region-wise power supply position from 2004-05 till January 2007 is given below:

Table3.7.1 Status of Energy Requirement and Availability (2004-05 to Jan. 2007)

Region	2004-05			2005-06			April 2006 – January 2007		
	Energy			Energy			Energy		
	Requirement	Availability	Surplus /Defi99cit	Requirement	Availability	Surplus/ Deficit	Requirement	Availability	Surplus (+)/Deficit (-)
	(MU)	(MU)	(MU/%)	(MU)	(MU)	(MU/%)	(MU)	(MU)	(MU/%)
Northern	175498	159358	-46140 (-9.2%)	188794	168611	-20183 - (10.7%)	172190	152628	-19562 (-11.4%)
Western	204048	181010	-23038 (-11.3%)	215983	186904	-29079 (-13.5%)	189904	162133	-27771 (-14.6%)
Southern	147672	145395	-2277 (-1.5%)	157179	155790	-1380 (-0.9%)	147190	143669	-3521 (-2.4%)
Eastern	57036	55678	1358 (-2.4%)	62347	60706	-1641 (-2.6%)	56942	55256	-1686 (-3.0%)
NE Region	7119	6674	-445 (6.3%)	7534	6888	-646 (-8.6%)	6586	5970	-616 (-9.4%)
All India	591373	548115	-43258 (-7.3%)	631757	578819	-52938 (-8.4%)	572812	519656	-53156 (-9.3%)

Table: Status of Peak Demand and Peak Met (2004-05 to January 2007)

Region	2004-05			2005-06			April 2006 – January 2007		
	Peak Demand (MU)	Peak Met (MU)	Surplus /Deficit (MU/%)	Peak Demand (MU)	Peak Met (MU)	Surplus /Deficit (MU/%)	Peak Demand (MU)	Peak Met (MU)	Surplus/ Deficit (MU/%)
Northern	26834	24125	-2709 (-10.1%)	28154	25200	-2954 (-10.5%)	31516	26644	-4872 (-15.5%)
Western	31085	24128	-6957 (-22.4%)	31772	25257	-6515 (-20.5%)	36453	26882	-9571 (-26.3%)
Southern	23075	22364	-711 (-3.1%)	24889	23372	-1517 (-0.1%)	25165	23520	-1645 (-6.5%)
Eastern	8816	8533	-283 (-3.2%)	10161	9677	-484 (-4.8%)	10491	10058	-433 (-4.1%)
NE Region	1272	1188	-144 (-11.3%)	1385	1192	-193 (-13.9%)	1407	1166	-241 (-17.1%)
All India	87906	77652	-10254 (-11.7%)	93255	81792	-11463 (-12.3%)	100403	86425	-13978 (-13.9%)

Energy shortage increased during 2005-06 in all regions except the Southern Region as compared to the previous year i.e. 2004-05 and peak shortage increased during 2005-06 in all the regions except Western Region as compared to the previous tear, i.e. 2004-05.

- Plant Load Factor (PLF) – Generation Efficiency: There has been marginal decline in the average PLF of thermal power stations operating in the country from 74.8% (2004-05) to 73.6% (2005-06) primarily due to decrease in the PLF of State owned Thermal Power Stations (TPS) from 69.6% to 67.1%.

- Fuel Supply: One of the most critical factors responsible for the demand-supply gap in the power sector at the supply end is the shortage of key fuel inputs in thermal power generation, specifically, coal and gas. There is considerable loss in generation due to shortage of coal even though coal continues to be the dominant source for meeting the power generation needs of the country accounting 54.8% of the total generation.

  Shortage of gas continues to be a major problem facing the country. Ministry of Petroleum and Natural Gas is making efforts to augment the production of natural gas from the gas fields/wells. Also, efforts are being made to increasing availability of gas from domestic sources by awarding gas blocks for exploration and production (E&P) activities in various sedimentary basins of the country under the New Exploration Licensing Policy (NELP). Import of gas in the form of Liquefied Natural Gas (LNG) is also being pursued.

- Transmission and Distribution (T&D): Transmission and distribution level bottlenecks hamper the effective supply of

power to end-consumers. There is need for proper planning and implementation of T&D system strengthening and augmentation.

- Aggregate Technical and Commercial (AT&C) losses: High levels of AT&C losses affect the rightful use of available power. The rates of AT&C losses continue to be high across the country. These losses are as high as 67% in Jammu & Kashmir, 60% in Manipur, 53.8% in Arunachal Pradesh, 50% in Madhya Pradesh, 46% in Rajasthan and 43% in Haryana, mainly because of poor collection efficiency, high rate of failure of distribution transformers and low level of investment in the upgradation of transmission. In UP, Bihar, Jharkhand and Nagaland, the losses are well above 40% while it was between 30-40% in Karnataka, Kerala, Chhattisgarh, Assam, Meghalaya, Mizoram and Sikkim.

Annexure 4.1: Minutes of discussions with Reliance Industries Limited (RIL) officials

A TERI team met officials of Reliance Industries Limited (RIL) on March 20, 2007 with the objective of gauging stakeholder perspective on competition issues in the Indian Oil and Gas sector. The key issues raised by RIL officials during this meeting are summarized below:

- *Prevailing petroleum pricing in the downstream sector*: This concern has been examined in detail in the chapter on competition issues in the oil and gas sector. RIL termed the current pricing policy as '*forced predatory pricing' by the government.*
- *Grant of Market Exclusivity in City Gas Distribution*: RIL officials were of the view that market exclusivity in case of city gas distribution (CGD) network shall be in the consumer's interest. Marketing exclusivity for a limited period may encourage the operator to use accelerated depreciation to recover all capital costs within a limited period. Instead, the regulator should determine the CGD pipeline capacity[141] and may consider bidding on the basis of the least network tariff for granting CGD licenses. However, it was noted that internationally not many countries have adopted such a model especially where the natural gas market is at a nascent stage (as is the case in India*)*. In most countries, a phased competition model has been adopted. Hence, it was suggested a detailed study could be undertaken to review the merits and demerits of both the models suggested above. In addition, it was felt that after the exclusivity period, policies should aid in creating an enabling environment in order to initiate healthy competition among the new entrants and the incumbent operator.

During the meeting the officials also provided TERI with a few documents detailing other competition impacting issues. These are highlighted below:

Upstream Sector

Income Tax Holiday

Operators having Production Sharing Contract (PSC) with the Government of India should have the flexibility to choose the seven-year period of tax holiday from the date of commencement of commercial production.

100 %Customs Duty Exemption

[141] This pipeline capacity would need to be determined on a case to case basis as the demand for natural gas will be dependent on a number of area specific factors such as population, lifestyle, urbanization, income levels etc.

Some vital goods and equipment based on new technological developments (especially sub-sea development in deep waters) are not yet included in the list of goods for duty exemption. This defeats the motive of 100% customs duty exemption benefit on exploration activities.

Service Tax

Operators with limited budgets for exploration in various rounds of NELP get disincentivised due to incidence of 12% service tax rate.

Royalty payment

In order to maintain consistency in the provisions of PSC, ORDA and PML, RIL feels that there is a need for policy on maintaining stability in terms of fixed ad-valorem rate.

Downstream

VAT and Central Sales Tax issue

- Uniform VAT rate on MS and HSD would not only reduce the under recoveries but also eliminate interstate trade distortions.
- There is also a need to accelerate the planned phase out of Central Sales Tax on inter company transactions for petroleum products.

Petroleum Product Marketing/Retailing

RIL has highlighted the following issues on this subject:

- Level playing field in petroleum product retailing and marketing of HSD to Government sectors like Railways etc.
- Access to Marketing/Distribution of PSU's infrastructure for retailing of MS/HSD by private players for optimum utilisation of these assets.
- Permission to export LPG and for use of domestic LPG as Auto LPG.
- Level playing field for bidding in ATF sector including access to Airport Hydrant Systems.

Natural Gas

Declared Goods Status

Natural gas should also be extended the declared goods status like crude oil or coal.

Geographical Coverage

The board on the basis of applications should define "Authorised Geographical Area" properly for prospective operators delineating "geographical areas".

Gas Pricing

Board should allow free and competitive marketing of gas from different sources on the same network to arrive at least retail sales price of PNG and CNG.

Network Tariff Determination

- The board may consider Cost of Service Approach as it will incetivise the operator to invest more to make the infrastructure more wide and robust.
- At least 14% post tax return should be allowed to attract investment in the city gas distribution.

Annexure 5.1 PSEs under Ministry of Coal

Coal India Limited

Coal India Limited is the apex body in the Coal Industry and is responsible for laying down policy guidelines and coordination work of subsidiaries. It does the investment planning, manpower management, financial budgeting etc. on behalf of its following eight (8) subsidiaries.

1. Bharat Coking Coal Limited (BCCL),
2. Central Coalfields Limited (CCL),
3. Western Coalfields Limited (WCL),
4. Eastern Coalfields Limited (ECL)
5. Mahanadi Coalfields Limited (MCL)
6. Northern Coalfields Limited (NCL)
7. South Eastern Coalfields Limited (SECL)
8. Central Mine Planning and Design Institute Limited (CMPDIL).

CIL is mainly responsible for laying down corporate objectives, approving and monitoring performance of subsidiary companies in the fields of long-term planning, conservation, research and development, production, sales, finances, recruitment, training, safety, industrial relations, wages, material for all operational matters, commissioning and execution of new as well as on-going projects, man management, production, consumer satisfaction etc. In addition, subsidiary companies perform related functions, such as maintaining liaison with concerned State Governments, acquisition of land, execution of welfare programmes, maintenance of safety standards, improvement of industrial relation etc. In addition, CIL has directly under its control the development and exploitation of the coalmines in the North-Eastern States, and the coal-marketing network spread throughout the country.

Central Mine Planning and Design Institute Limited (CMPDIL), a subsidiary of CIL is engaged in the work of exploration, project planning, detailed designing of system and sub-systems, co-ordination and integration of applied research and development, absorption of new techniques of coal mining, beneficiation and utilisation of coal, perspective planning and demand assessment, environment related services and caters to the total planning and designing needs of new coal projects and re-organisation of existing mines for optimal production of coal. The company has its headquarters located at Ranchi and has 7 Regional Institutes located at Asansol, Dhanbad, Ranchi, Nagpur, Bilaspur, Singrauli and Bhubaneshwar to render doorstep service to the coal producing companies located in these areas. In addition, to satisfy the planning and design requirements of CIL and its subsidiary

companies, CMPDIL also offers consultancy services to outside organizations.

Neyveli Lignite Corporation (NLC)

NLC is entrusted with the exploration and production of lignite in Tamil Nadu, Rajasthan, Gujarat and Jammu and Kashmir.

Singareni Collieries Company Ltd (SCCL)

SCCL is a joint undertaking of Government of Andhra Pradesh and the Government of India. The equity capital is shared in the ratio of 51: 49 between Government of Andhra Pradesh and the Central Government respectively.

Annexure 5.2 Guidelines for allocation of Coal Blocks

Guidelines that have to be adopted for allocation of coal mining blocks (2007)

1. Blocks already identified for development by CIL where adequate funding is on hand or in sight should not be offered to the private sector.
2. The blocks offered to private sector should be at a reasonable distance from existing mines and projects of CIL in order to avoid operational problems.
3. The areas where CIL has invested in creating infrastructure for opening new mines should not be handed over to the private sector, except on reimbursement of costs.
4. Blocks that are explored in detail and where Geological Report with assessment of extractable reserves is available should normally be put in the offer list. Public/private sector shall bear full cost of exploration in blocks which may be offered for captive mining.
5. For identifying blocks, the requirement of coal for about 30 years or such other period as may be decided in the Ministry, would be considered.

Annexure 5.3 Stakeholder Interactions on Competition Issues in India's Coal Sector

This annexure details out the views of various stakeholders in the coal sector. A TERI team met the officials of following government departments/organizations during the course of the project.

1. Ministry of Coal
2. Ministry of Steel
3. Ministry of Power
4. NTPC Limited
5. Sponge Iron Manufacturers Association

Apart from discussions on various issues in the sector, our interaction with officials of the above organisations covered on the following aspects:

- Possible hurdles in the passage of Coal Mines (Nationalization) Amendment Bill, 2000
- Criteria of allocation of captive blocks through Screening Committee and status of government's move towards introducing a competitive bidding mechanism for the captive coal block allocation process
- Price determination mechanism after complete de-regulation of prices since 2000
- Specific measures taken by government in the direction of introducing a coal sector regulator and its proposed mandate
- How prohibition on the use of contractual labors [Contract Labor (Regulation and Abolition) Act, 1970] affecting mining industry

The views of officials were largely coherent with the research findings of the team. Some of the important points of deliberations are discussed below.

Coal Mines (Nationalisation) Amendment Bill 2000

With regard to the possible hurdles in passage of the above said Bill, the Ministry of Coal was of the opinion that fair progress has been made in this direction. However, the officials did acknowledge that resistance from trade unions was one of the major hurdles to the passage of this bill. On the other hand, coal consumers opined that it is primarily due to the lack of political will that this Bill has not yet been ratified.

Captive coal block allocation process

On the coal block allocation process, the Ministry of Coal informed that captive coal block allocation is done through a Screening Committee. Further, a proposal to introduce competitive bidding procedure is under consideration. The same has also been indicated in our report. However, the Ministry officials also indicated that by the time the competitive bidding procedure would be put in-place, most of the blocks would have been allocated through the ongoing procedure.

Most of the consumers of coal were against the competitive bidding process but insisted on a more transparent mechanism for coal block allocation. However, they did mention that absence of any policy on how and who would create the infrastructure for the captive coal blocks is one of the major issues.

Pricing mechanism

The Ministry of Coal when enquired on the existing pricing mechanism, i.e. post-deregulation of prices, informed that the prices are being calculated through the BICP (Bureau of Industrial Costs and Prices) formula by CIL and is approved by Ministry before notifying. They were also of the view that coal prices have not risen since last three years. Any increase, if any, has been due to increase in the freight charges.

Some major non-core consumers had a strong view against the ongoing 'e-booking' system. According to them, in such a system, traders are likely to get involved. In the current situation, when supply is short of demand, these traders purchase coal at a high price and later sell it to actual users at much higher price.

Coal sector regulator

The stakeholders had a mixed view towards the need of a regulator in the sector. The coal consumers were of the view that the present state where prices and distribution have been decontrolled in a monopoly requires an independent body to regulate the sector. Such a body is required till the time the coal market gets matured.

Affect of prohibition on use of contractual labours

The consumers who have been allocated captive coal blocks informed that prohibition on the use of contractual labourers as mentioned in Contract Labour (Regulation and Abolition) Act 1970 may not actually affect the mining industry. The industry is able to outsource the coal mining activity through an indirect route. Most companies purchase equipments for mining activities. The equipments are such that can be used only by trained persons and hence workforce to use these equipments and carry out mining exercises is indirectly involved. The provisions are same for public and private sector enterprises.

Annexure 6.1 Role of CCI in India's Electricity Sector

Sector-specific and cross-sectoral impediments to promote competition in the electricity sector that have been identified in Chapter 6, pave the way for the Competition Commission of India (CCI) to play an important role. The critical areas where competition rules interact with industry-specific rules are interconnection or access, monopoly-pricing, anti-competitive agreements and merger control[142].

As per section 60 of the EA 2003,

Quote

Market domination- *The Appropriate Commission may issue such directions as it considers appropriate to a licensee or a generating company if such licensee or generating company enters into any agreement or abuses its dominant position or enters into a combination which is likely to cause or causes an adverse effect on competition in electricity industry.*

Unquote

This implies that the legal framework of the electricity sector in India allows the sector specific regulator to deal with anti-competitive practices. However, there are certain areas where the CCI can contribute as an advocacy role to help promote competition in the sector. These are discussed below.

(i) Network access and interconnection: In integrated monopoly enterprises, regulatory rules essentially seek to establish barriers of entry to the markets of the incumbent utility. However, in such network industries where the monopoly segments have been separated from the potentially competitive elements, the issue of access to the monopoly 'essential facility' would require regulation to ensure free and non-discriminatory entry. It would also be important to restrict the incumbent operator of the essential facility from acting in a manner that would be disadvantageous to rivals in the newly developed competitive sectors. This is particularly true in the Indian electricity sector, where as per the Act, non-discriminatory open access needs to be introduced in the transmission segment at the outset and SERCs have been mandated to introduce open access in distribution in a time bound manner after taking into consideration state specific conditions.

[142] Briefing paper on "Competition and Sectoral Regulation Interface", CUTS Centre for Competition, Investment and Economic Regulation, No. 5/2003

Keeping in view the legal mandate of the Act, in support of competition, CCI may take action as per section 4 (2) (c)[143] of the Competition Act, 2002 or else advise the regulatory commission to initiate appropriate action against any discriminatory practice inhibiting open access.

However, in this context, it is imperative to note that since the sector-specific regulatory commission is responsible for defining 'entry conditions', their actions directly affect the nature of competition, after entry has taken place. An example of this can be seen in the case of SERCs formulating open access surcharge that has in some cases, to an extent hampered implementation of real open access in the state.

(ii) Monopoly pricing: One of the essential prerequisites to ensure competition is to monitor and restrict excessive or unjust prices. EA 2003 aiming to promote competition in the electricity industry has provided that regulatory commissions are required to adopt the tariff, which has been determined through a transparent process of bidding. As per section 63 of the Act, Ministry of Power, GoI has issued guidelines of competitive bidding for power procurement by the distribution licensee. In continuation to the Act, the National Tariff Policy has also provided that power procurement by distribution licensees has to be on a competitive basis except for public sector generation and transmission projects, where bidding may be envisaged after a period of five years or when the regulator is satisfied that the situation is ripe to introduce competition.

Taking into account the legal mandate of the Act and the Tariff Policy, in support of competition, CCI may take action as per section 4 (2) (a)[144] of the Competition Act, 2002 or else advise the regulatory commission to initiate appropriate action against any discriminatory pricing that would restrict competition in the near future.

(iii) Anti-competitive agreements: When an industry/sector is unbundled or liberalized and opened up to competition, the potential for anti-competitive agreements or conduct that could restrict or lessen competition emerges. For instance, institutional bottlenecks such as existence of payment security mechanism for central generating stations and financial institutions finding it less risky to fund those projects that are backed by state guarantees

[143] Section 4 (2) (c) of Competition Act, 2002 – "There shall be an abuse of dominant position, if an enterprise indulges in practice or practices resulting in denial of market access"
[144] Section 4 (2) (a) of Competition Act, 2002 – "There shall be an abuse of dominant position if an enterprise directly or indirectly, imposes unfair or discriminatory condition in purchase or sale of goods or service."

may inhibit competition and limit new entrants into the generation segment.

To encourage competition, CCI can operate as per section 3 (4)[145] and take action against any entity that enters into anti competitive agreements that restricts entry to a new player.

(iv) Merger control: In a new unbundled environment, common ownership of generation, transmission and distribution firms is normally restricted.

Since the electricity sector in India is presently in the process of being unbundled into generation, transmission and distribution across states, the monitoring of merger control will be possible only once unbundling has been completely undertaken in the country. Once unbundling has been achieved at a country level and there are instances of combination and common ownership of generation, transmission and combination, CCI may take appropriate action as per section 5 of the Competition Act, 2002.

[145] Section 3 (4) of Competition Act, 2002 – "Any agreement amongst enterprises or persons at different stages or levels of the production chain in different markets, in respect of production, supply, distribution, storage, sale or price of, or trade in goods or provision of services."

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