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ADAPTING TO SHIFTING GOVERNMENT PRIORITIES: AN ASSESSMENT OF THE PERFORMANCE AND STRATEGY OF INDIA'S ONGC

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About the National Oil Company Platform

While the role of the state is declining in nearly every sector of world economic activity, in hydrocarbons the pattern is quite different. State-controlled oil companies—so-called national oil companies (NOCs)— remain firmly in control over the vast majority of the world's hydrocarbon resources. Some NOCs are singular in their control over their home market; others engage in various joint ventures or are exposed to competition. PESD's study on National Oil Companies focuses on fifteen NOCs: Saudi Aramco, NIOC (National Iranian Oil Co), KPC (Kuwait Petroleum Co), PDVSA (Petróleos de Venezuela) , ADNOC (Abu Dhabi National Oil Company), NNPC (Nigerian National Petroleum Co), PEMEX, Gazprom , Sonatrach, CNPC, Petrobras, Petronas, ONGC, Sonangol, and Statoil.

These enterprises differ markedly in the ways they are governed and the tightness of their relationship with government. NOCs also vary in their geological gifts, as some are endowed with prodigious quantities of "easy" oil while others must work harder and apply highly advanced technologies; some have sought gas, which requires different skills and market orientation than oil, while others stay focused on liquids. These case studies explore whether and how these and other factors actually explain the wide variation in the performance of NOCs.

About the Author

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1. INTRODUCTION AND OVERVIEW

The state-owned company Oil and Natural Gas Corporation Limited (ONGC) is India's largest company devoted to exploration and production (E&P). Founded in 1956, ONGC has seen a remarkable growth in the last five decades. In 2007-08, ONGC group's total production of oil and oil-equivalent gas (o+oeg) was about 60 million metric tonnes per annum (MMTPA) or 1.2 million barrels per day, thus accounting for nearly 80% of India's oil and gas (O&G) production. In 2007 *Energy Intelligence Top 100* ranked ONGC at 31 among global oil and gas companies.

ONGC's evolution is a remarkable story of how state-owned firms respond and adapt to shifts in owner (government) priorities, which in turn are strongly influenced by macroeconomic and political conditions. Historically, ONGC has been the Government of India's (GoI's) trusted custodian of India's oil and gas reserves. As such, ONGC enjoyed a near monopoly in this sector for nearly four decades (1955-1995), during which good luck and easy oil elevated ONGC to stardom. During those years ONGC also functioned as the *de facto* regulator of the oil and gas sector. The oil ministry (the government ministry in charge of the sector) depended heavily on ONGC for coordinating activities in the sector. But changing economic priorities and soaring domestic demand for oil and gas in India have significantly changed the dynamic of ONGC's relationship with the government in many ways. Through a series of reforms since the mid 1990s, the Government of India has increasingly tried to maintain an arm's length relationship with ONGC. ONGC is exposed to more competition in the sector than ever before and it has also lost its regulator status, which is now a separate arm within the government.

This paper attempts to unpack the dynamic of the government-ONGC relationship. Focusing specifically on how government ownership and control has influenced ONGC's performance and strategy, this paper makes four main arguments.

First, ONGC exists, just as with NOCs in many other countries, because of a legacy of suspicion about outsiders. It performed well when it was tasked with things that were not that difficult and when it had help for the more difficult ventures, such as frontier E&P and development.

Two factors were critical in the Indian government's decision to put a state-owned company (ONGC) in charge of India's O&G exploration and production (E&P) efforts: the government's socialist bent; and fears of opportunism of the international oil companies (IOCs). In the years following India's independence in 1947 a large fraction of India's production was under government ownership, reflecting the strong bias of the GoI for a Socialist-like development of India. Additionally, by the mid 1960s GoI's fears of possible opportunistic behavior of the IOCs seemed to be justified, as there was increasing evidence of unfair products pricing internationally by the IOCs. The past baggage of imperial control and fears of opportunistic behavior of the IOCs convinced GoI to have government ownership of oil and gas E&P.

The GoI set up ONGC in 1956 to lead India's indigenous E&P efforts, but the breakthrough for India's indigenous oil plans and ONGC came from Russia. Russia transferred technology and equipment to kick start ONGC's exploration work. In the 1970s ONGC and its Russian partners began exploration in offshore areas and soon found the giant Mumbai High field in February 1974. The subsequent years, from 1975 and 1990, were ONGC's golden era. Production went up from 4.5 MMT (O+OEG) in 1974-75 to nearly 48 MMT (O+OEG) in 1989-90. Starting barely from 450 employees at formation in 1956, ONGC swelled to over 47,000 employees by 1990.

Second, ONGC has run into trouble as it matured, and the roots of its troubles are mainly in its interactions with the GoI and secondarily in its management.

The years of expanding production masked severe and growing performance problems emerged at ONGC. Among other problems, financial profligacy, organizational and planning difficulties, declining reserves, and the deteriorating health of producing fields

brought much flak and negative attention to ONGC in the 1990s. These troubles became more apparent with India's foreign exchange crisis in 1991. The crisis forced a fiscal probity on the Indian government that also required a fresh look at the ownership and management of state enterprises.

ONGC's performance and strategy largely owe to its interactions with the government. The rule-based monitoring and regulated rate-of-return mechanisms (until the late 1990s) that the GoI has employed for ONGC have led to serious financial and corporate culture atrophy at ONGC. The most harmful impact of using indirect and pre-established (*ex ante*) rules to monitor ONGC's performance is the lack of a performance-based incentive structure, which is at the heart of ONGC's inefficiencies.

Being a government company ONGC has been exposed to political demands and exigencies to a significant degree. Those demands focus on managing ONGC's free cash flow in an ad hoc and politicized way, but from time to time the government (or powerful individuals in government) attempt to reassert direct government control on ONGC. The government has charged multiple government oversight agencies with auditing ONGC's accounts and verifying the transparency of business dealings of ONGC. The process for selecting ONGC's chairman-cum managing director (CEO-equivalent) and the Board of Directors is also prone to political interference. Those demands were more direct and stifling pre-reforms (before the mid 1990s).

As the GoI's preferences and methods of controls have shifted over time, ONGC has adapted its strategy to pacify those demands. For the most part, ONGC's response has been reactionary. Working within the incentive structure and constraints that government ownership and control entails, ONGC has tried to adopt strategies that not only serve the GoI's demands but also preserves its (ONGC's) corporate freedom.

Third, a slew of reforms instituted since the mid 1990s have fundamentally changed the landscape of the E&P sector in India and the dynamic of government-ONGC relationship. Targeted at improving corporate governance, enhancing competition in E&P, and

eliminating price controls, those reforms have had a mixed impact on ONGC's performance and strategy. They also highlight the difficulties the GoI has had in encouraging higher efficiencies in ONGC and the oil and gas sector.

In efforts to improve corporate governance of ONGC, in 1999 the GoI accorded ONGC a *Navratna* status, which gave ONGC a wide range of financial and organizational independence from the government. Subsequently, ONGC's stock-listing in 2004 has also contributed to reducing government influence over and interference with ONGC's corporate affairs.

One of the most important results of the GoI's reform efforts has been the introduction of competition in E&P through the New Exploration and Licensing Policy (NELP). The NELP has certainly weakened ONGC's monopoly status in the upstream sector. By bringing more competition to the sector, the NELP has also enabled the greater use of benchmarks and industry standards for monitoring ONGC's performance.

But the impact of competition on ONGC's performance is significantly diluted by the large free cash flow at ONGC's disposal. High oil prices in the international markets since 2002 and the successful adoption of a market-oriented pricing scheme for crude oil in India have sent ONGC's revenues and profits soaring. Distribution of large dividends and concessions by ONGC seems to be largely influenced by the GoI's motive to take away any extra cash that cannot be productively employed by ONGC. Yet, ONGC is debt-free and has significant cash reserves, which gives it enough leeway to employ its own resources in a range of projects without having the need to go through close scrutiny of third parties and the financial markets.

Fourth, given the deep interconnects of the oil and gas sector with India's political economy, fixing the oil and gas sector essentially entails fixing the larger political economy within which the sector is embedded. Uncertain government policies and continued government intervention in politically sensitive matters (such as petroleum pricing) have stymied critical components of the reform process. The situation is

exacerbated by insider dealings and favoritism by the government, including with private companies as the beneficiaries. That the GoI's reform efforts have been limited in impact is a manifestation of the fact that those reforms have often tried to address issues specific to the oil and gas sector without also reforming the larger system. By design, such partial reform will fail to enhance the efficiency and performance of the sector.

The rest of the paper is organized as follows. Section 2 provides an overview of the origins and operations of ONGC. Section 3 discusses how ONGC's relationship and interactions with the government influence ONGC's performance and strategy. Finally, Section 4 presents the conclusions of the study and offers some insights for improving the efficiency and performance of ONGC and also of India's oil and gas sector.

2. THE ORIGINS AND OPERATIONS OF ONGC

2.1. Formation and Initial Years of ONGC (1947-1970)

Two factors were critical in the GoI's decision to assume full control of the oil industry by the end of the 1960s. First, at the time of India's independence in 1947 there was a clear bias in favor of government ownership of industries of strategic importance. Since India's independence, the energy sector in India—notably oil and gas, coal, and electricity industries—has largely been organized through SOEs, which operate (even today) in tightly regulated price regimes. India's first Prime Minister, Jawaharlal Nehru, himself was convinced of the increasingly greater role the State would play in India's development. Second, there was suspicion about outsiders. The dominant thinking, based on India's past experience, was that foreign investments end up meddling in national politics, and, in general, are detrimental to the national development. At the time of independence, the small amount of petroleum products used in the country was imported from the Abadan island refinery in Iran, which was owned by the British Anglo-Iranian Oil Company (AIOC), and was marketed in India by the American companies Standard Vacuum and Caltex, and the British company Burmah Shell. These three oil-

marketing companies then had monopoly distribution rights. By the mid 1960s the GoI's fears of possible opportunistic behavior of the IOCs seemed to be justified, as there was increasing evidence of unfair products pricing internationally by the IOCs. India's hostile relations with its largest neighbors, China and Pakistan, made it very uncomfortable in leaving so much market power with the IOCs, who were not averse to using that power to boost profits.

Importance of oil in India was recognized early on. A pre-independence sub-committee on power and fuel emphasized the importance of liquid fuel for India's defense and development. When the Industrial Policy Resolution of 1948 was revised in 1956 to grant equal status to the private sector vis-à-vis the public sector, mineral oil was placed in the Schedule A, a list of industries to be exclusively developed under the State. This was a clear indication of that the government considered oil a matter of strategic national importance.

2.1.1. Disappointing Results of India's First Engagement with the IOCs

Unlike many other countries who built national oil companies by nationalizing existing operations, in India the logic of state ownership applied to building new firms, as there wasn't much industry in place already. But developing oil single-handedly was fraught with huge financial risks. There was very little, if any, experience within the GoI about the politics and economics of the oil industry. Despite reservations about foreign participation in oil exploration and production, the high perceived risks of the oil business pushed the government to engage the IOCs. In the early 1950s the GoI started negotiations with Standard Vacuum (Stanvac) for oil exploration in the Bengal Basin. Preliminary survey of this area indicated high chances of large quantities of oil, both on the Indian and the East Pakistani side of the border. The possibility of Pakistan taking the lead on oil exploration in the area hastened the GoI to start oil exploration in the Bengal Basin. The agreement with Stanvac was finalized in December 1953 granting Stanvac exploration rights to 10,000 square miles in the Bengal Basin. The GoI made generous concessions to clinch the exploration agreement. High depreciation rates of

80% and above were permitted for equipments within the first year. Depletion allowances and write-off provisions against the company's oil-marketing business were, as found in later investigations, unjustifiably generous compared with similar agreements elsewhere in the world.[1]

The first round of interactions of independent India with the IOCs was disappointing at best. While Indian geologists had assessed the need for two-dozen wells to be drilled by Stanvac in the Bengal Basin, Stanvac drilled only seven wells there between 1953 and 1957. The GoI ended up sharing over 60% of the losses from the operations instead of the 25% that was planned at initiation. There was virtually no cost to Stanvac, as it wrote-off the losses against its revenue from the marketing business. From Stanvac's perspective there was not much incentive to take unnecessary risks in the Bengal Basin given the cheap oil in West Asia. But this was not in line with the GoI's plans, which wanted to quickly develop India's domestic resources. The experience with Stanvac underscored that GoI had little ability, on its own, to steer development of the oil industry unless it was more firmly in control.

Mistrust of the IOCs was blowing up also due to increasing evidence of unfair petroleum-products pricing. Investigations by the GoI into the products pricing by the IOCs found that to earn higher profits these prices were padded up with unreasonable freight and insurance charges linked to the Mexican Gulf prices even though the crude was imported from the Persian Gulf. Neither did the IOCs take into account the discounts they obtained at the source of supply for the crude oil they purchased. "Tricks" like this allowed the IOCs to sell the imported products at a hefty profit—by using questionable accounting practices the IOCs had managed to earn profits in the high 20s% against the initial 7.5% that they had sought.[2] Moreover, when faced with these allegations the IOCs issued a veiled threat to cut off supply of products, that too at a time when India was at the brink of war with China around 1960. This progression of

[1] *K.D. Malaviya and the Evolution of India's Oil Policy*, Kaul, H.N., Allied Publishers, 1991.
[2] *K.D. Malaviya and the Evolution of India's Oil Policy*, Kaul, H.N., Allied Publishers, 1991.

events brought GoI's worst fears of IOC opportunism to life, and more than ever, solidified its resolution to bring all aspects of the oil industry under firm state-control.

2.1.2. Push for Government Ownership and Russian Help

Amid all this, K. D. Malaviya, first the deputy minister and then the minister of the Natural Resources and Scientific Research (NR&SR) ministry, was pushing hard for an indigenous oil program. Malaviya strongly supported a state-run oil industry in India.

The breakthrough for Malaviya and India's indigenous oil plans came from Russia. The Russians were very keen not only to help India develop its oil industry but also in developing overall relationships between the two countries. This was hardly surprising given the aura of the Cold War and the Sino-Soviet tensions of that time. In 1956, India bought several rigs from Rumania and Russia, a move that further strengthened Indo-Russian ties in oil, and also in the heavy engineering industry in general. A unique feature of these purchases was that India was allowed to pay Russia in Indian rupees, which Russia could use to buy Indian products. Thus, in effect a modern barter system came to be employed. This came as a huge relief for India that was already reeling under the pressure to meet its prior foreign exchange commitments. Interestingly, the Russian assistance also brought in more willingness of the West to assist India in the oil industry, but that was limited, in some ways, by how much foreign exchange India could provide. In any case, arrival of the Russian help was a boon for ONGC: "[I]t broke the monopoly of the big oil companies [for supply of equipment to India]…[and] India got the equipment along with the know-how."[3]

2.1.3. ONGC as a Government Department: Focus on Rules and Regulations

With the support of two senior geologists at the geological survey of India (GSI), Malaviya succeeded in establishing the Oil and Natural Gas (ONG) division as a department in the Ministry of NR&SR in October 1955. Purpose of this department was the exploration and production of oil and the learning and acquisition of the techniques

[3] *K.D. Malaviya and the Evolution of India's Oil Policy*, Kaul, H.N., Allied Publishers, 1991.

of the oil industry.[4] On the recommendations of a high-level Russian team and the revised Industrial Policy Resolution of 1956 the ONG division was raised to the status of a commission in August 1956, and became the Oil and Natural Gas Commission (ONGC). The commission, though it still had limited financial powers, had a much wider scope of operations including surveying, exploration, and advising to the GoI. This was the beginning of the present day Oil and Natural Gas Corporation (ONGC).

Being a government department also meant that ONGC's activities were subject to burdensome red tape. The government paid all of ONGC's Rs. 343 crores[5] equity capital. Besides, financial requirements of ONGC were met through annual appropriations from the revenues deposited in the treasury.[6] Accordingly, government rules, regulations, and procedures were closely followed to monitor financial prudence of ONGC's operations. ONGC was directly responsible to the parliament for day-to-day operations and decision making authority lay with the bureaucrats who ran the department but had limited or no technical knowledge of oil business. This restricted the flexibility that ONGC needed to develop its operations.

But perhaps the most lasting impression on ONGC of being a government department was on its organizational culture:

"Initially, when the ONGC was functioning as a government department, it failed to inculcate work culture and create initiatives among employees, which [is] an essential input for improving efficiency of an organization."[7]

Seeing that ONGC was finding it difficult to behave strategically and flexibly, the government reformed the enterprise as a public corporation by the ONGC Act 1959. But in reality ONGC had very limited financial and operational autonomy even as a public corporation. Government advisors and appointees to ONGC often were in clash with

[4] *K.D. Malaviya and the Evolution of India's Oil Policy*, Kaul, H.N., Allied Publishers, 1991.
[5] 1 Crore = 10 million.
[6] *Public Sector Reforms in India*, Singh, A.B. and Singh, A., A.P.H. Publishing Corporation, New Delhi, 2004.
[7] *Public Sector Reforms in India*, Singh, A.B. and Singh, A., A.P.H. Publishing Corporation, New Delhi, 2004.

ONGC's governing board. Bureaucrats in the ministry, working with the politicians, ensured that ONGC remained entangled in red tape.

2.1.4. E&P Activities

ONGC made its first sizeable discovery of oil in 1958 in the (onshore) Cambay basin in the western state of Gujrat. Through the 1960s ONGC explored mostly in onland basins and made a string of discoveries in the Cambay basin (Cambay, Ankleshwar, Kalol, Sanand, North Kadi etc.) and in the Assam-Arakan Fold Belt in the country's eastern region (Galeki, Lakwa, Rudrasagar etc.).[8] By 1970 ONGC's crude oil production had reached 3.5 MMTPA.

2.2. Discovery of Mumbai High: ONGC Comes of Age (1970-1990)

In the 1970s ONGC began exploration also in offshore areas. Working with Russian explorers, ONGC discovered the giant Mumbai High field in February 1974, and production from Mumbai High started in 1976.[9] The rapid development of Mumbai High was remarkable even by international standards of those days. Besides the Russian help in exploration and later in development, two factors contributed to the Mumbai High success. First, the French IOC CFP-Total was also deeply associated in the initial development of Mumbai High. That association imparted much needed technical expertise and training to ONGC. Second, the GoI and the Prime Minister at that time (Indira Gandhi) fully supported a fast and efficient development of Mumbai High under ONGC. That was largely motivated by the need to reduce pressure on foreign exchange by cutting the oil import bill. The GoI brought in as ONGC's chairman Mr. N.B. Prasad, who was a true technocrat. Previously Prasad had been at India's Atomic Energy Commission, where he was associated with the country's nuclear program. With the GoI's support, during Prasad's tenure best practices in E&P were promoted at ONGC.

[8] (i) ONGC History (http://www.ongcindia.com/history.asp) (ii) Sharma, N.C., "History of Seismic Prospecting In ONGC - A Chronological Sketch of Events", Geohorizons, January 2002/1.

[9] These fields were originally named Bombay High. Later when the city of Bombay was renamed to Mumbai that change was also reflected in the name of the fields. For consistency, throughout this study we use Mumbai High.

Further, association with the Russians and CFP-Total charged ONGCians with a meticulous technical culture. Under Prasad's leadership ONGC became a focused, goal-oriented company.

Subsequently, the years between 1975 and 1990 were ONGC's golden years. Total oil and oil-equivalent gas production went up from 4.5 MMTPA in 1974-75 to nearly 48 MMTPA in 1989-90. Thanks to ONGC's production, India's crude-oil import dependency (ratio of imports to consumption) dropped from 65% in 1974-75 to 38% in 1989-90, even as consumption increased nearly three-fold over the same period to 55 MMTPA. ONGC also grew dramatically in size. Starting from just 450 employees at formation in 1956, ONGC swelled to over 47,000 employees by 1990.

ONGC's rapid success during these years was timely for India, as it helped reduce the import bill for oil. Since independence India had embarked on an agenda of self-reliance in economic affairs. This agenda intensified post-1965. Among other policies, the government imposed significant trade barriers, supported a heavily subsidized capital-intensive industry in the public sector, and ran a tight licensing regime for businesses. When the world was hit by spiraling high oil prices starting in 1973 following OPEC's oil embargo, India's economy was nearly in shambles. Per-capita GDP grew at an average of less than 1% between 1965 and 1980 and foreign debt and interest payments were dangerously high.[10] These repressive and insular macroeconomic policies made India's balance of payment situation precarious during this period: "India's debt servicing obligations have been showing a progressive increase during recent years and have absorbed about 20-25 per cent of the country's annual export earnings thereby impinging on the country's ability to deploy the external resources…for financing vital import needs".[11] Correspondingly, foreign exchange was of paramount significance to

[10] *India's Political Economy: 1947-2004*, Frankel, F.R., 2nd Ed., Oxford University Press, 2005.
[11] "Foreign Trade and The Balance of Payments", Indian Economic Survey, 1975-76. Accessed at: http://indiabudget.nic.in/es1975-76/7%20Foreign%20Trade%20and%20The%20Balance%20of%20Payments.pdf

the government. In a much politicized process, every year the Finance Ministry allocated available foreign exchange on a priority basis to select sectors.

Efforts were made on all fronts to manage the tough foreign-exchange situation. Reducing imports of crude oil and petroleum products were top on the list, as those imports alone formed 26% of the import bill in 1975-76.[12] Rapid development of Mumbai High and other fields and a greater emphasis on exploration to increase domestic reserves appeared to the GoI as an obvious step in reigning in the tough foreign exchange situation.

As the balance of payment and foreign-exchange situation of India remained quite poor during 1975-1990, the overarching policy goal remained focused on increasing domestic exploration and production of oil. To support ONGC in rapidly developing Mumbai High the capital outlay in the Fifth Five-Year Plan (1975-1980) was increased to Rs. 1056 crores as compared to Rs. 420 crores in the Draft Fifth Plan. Subsequent Five-year plans also allocated significant capital to finance ONGC's plans (Table 1).

Table 1: Capital outlay allocated for ONGC in five-year plans between 1975 and 1990.

Plan Period	5th Plan (1975-1980)	6th Plan (1980-1985)	7th Plan (1985-1990)
Capital Outlay (in Rs. Crores)	1056	2853.6	8752.7

Source: Planning Commission, Government of India. 1 Crore = 10 million.

Loans from international crediting agencies, particularly the World Bank, were instrumental in financing ONGC's foreign exchange needs, but also in broadly supporting development of oil and gas infrastructure in India. Table 2 shows the external assistance that ONGC received for development of the Mumbai High fields. A complete list of external assistance to India's oil and gas sector between 1975 and 1991 is presented in Appendix A.5.

[12] "Foreign Trade and The Balance of Payments", Indian Economic Survey, 1975-76. Accessed at: http://indiabudget.nic.in/es1975-76/7%20Foreign%20Trade%20and%20The%20Balance%20of%20Payments.pdf

Table 2: External assistance received by ONGC for development of the Mumbai High fields

Project	Donor	Year of Approval	Amount
Bombay High I	World Bank	1977	US$150 million
Bombay High II	World Bank	1980	US$400 million
Bombay Offshore I	Japan (OECF)	1979	¥6.2 billion
Bombay Offshore II	Japan (OECF)	1979	¥8.6 billion

Source: "Report and Recommendation for the Gandhar Field Development Project", Asian Development Bank, 1991.

By the late 1980s ONGC had become the shining star of the public sector. Starting from just a few hundred barrels of oil per day (bopd) production in 1976-77, at its peak (between 1984-85 and 1990-91) production from Mumbai High reached over 400,000 bopd. Had it not been for ONGC's increasing crude-oil production, the foreign-exchange situation would have been worse given that oil demand in India grew at nearly 7% annually between 1975 and 1990. (Absent ONGC, India's foreign reserves crisis of 1991 might have happened a decade earlier. It is interesting to speculate whether that would have ushered in the country's economic reforms earlier, or if the country was not ready for such innovation until other factors were in place in the early 1990s.) Thanks to Mumbai High, ONGC became the role-model of indigenously nurtured, self reliant government company that was successfully delivering energy security to the nation. And because of the difficulties in opening the countries oil fields to outside bidders, ONGC faced no competition and thus there was no sense of whether the firm actually performed well.

2.3. From Spoiled Kid to Shunned Step Child: Crisis and Reforms (1991-1998)

2.3.1. ONGC's Problems at Mumbai High

Amidst adulation from all sides and the pressure to produce as rapidly as possible, ONGC had pushed its luck too far. In 1990 ONGC started having problems with the Mumbai High field. Flogging (overproduction) of several production wells caused erratic

behavior of the hydrocarbon reservoir. In consultation with ONGC and an international consultant, a government committee recommended to immediately stop production from the flogged wells (90 in total) in order to build reservoir pressure. The problem was so severe that the government accepted the recommendations. The deputy oil minister Satish Kumar Sharma stressed that the action was necessary "so that the reservoir is not permanently damaged."[13] The shut downs resulted in 30% reduction in ONGC's crude oil production, which came down from 21.7 MMT in 1989-90 to 15.38 MMT in 1993-94 (Table 3).

Table 3: Declining crude oil production in early 1990s. Numbers in million metric tonnes.

1989-90	1990-91	1991-92	1992-93	1993-94
21.71	20.38	18.96	15.75	15.38

Source: http://www.indiastat.com

2.3.2. Neelam Fields

ONGC started development of the Neelam fields off India's west coast in 1989. By the time the development project was completed in 1994 reservoir issues similar to Mumbai High had erupted (but not due to flogging). Grossly inaccurate technical planning of the Neelam fields led to a production peak in 1994-95 instead of ONGC's predictions of a several years long production plateau at 4.5 MMTPA (Table 4). An audit report found that despite the availability of 3-D data and data processing technology, ONGC had used old 2-D seismic data (taken between 1977 and 1984) to prepare the technological scheme for the field development program. Shortly after, 3-D data analysis reports completed in March 1991 found that the reservoir was steeper than originally thought, which suggested lesser reserves than predicted by the 2-D reserves.[14]

[13] Speech by Captain Satish Kumar Sharma, Parliament of India, 1993. Accessed at: http://parliamentofindia.nic.in/ls/lsdeb/ls10/ses6/0111039302.htm

[14] "Avoidable Expenditure on Creation of Excess Capacity", Report by Comptroller and Auditor General of India, 2001. Accessed at: http://www.cag.gov.in/reports/commercial/2001_book4/chapter6.htm

Table 4: Projected and actual oil production from ONGC's Neelam fields

Oil Rate (MMTPA)	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
Projected	0.5044	0.379	4.485	4.5	4.5	4.5
Actual	0.54	0.6	3.81	3.54	2.29	1.92

Source: "Avoidable Expenditure on Creation of Excess Capacity", Report by Comptroller and Auditor General of India, 2001. Accessed at: http://www.cag.gov.in/reports/commercial/2001_book4/chapter6.htm

2.3.3. Financial Crisis of 1991 and Foreign Loans: Origins of Oil Sector Reforms in India

The problems at Mumbai High coincided with India's foreign-exchange crisis of 1991. By late 1980s India's delicate balance-of-payment situation had snowballed to disastrous proportions as India came on the heels of defaulting on international debt repayments. Special assistance loans of $150 million each from World Bank and ADB (see Appendix A.5) helped India avert the crisis.

The crisis opened the floodgate of reforms in India. Some of these reformist ideas were already in place but they were finally successful because reform-oriented bankers held the country hostage. The oil and gas sector, which at that point was dominated by state-owned companies, was one of the top items that the World Band and the ADB emphasized for introducing reforms and increasing private participation. The World Bank and the ADB required India to improve economic efficiency through "support for structural reforms, promotion of competition, and private sector participation"[15] as a precondition for providing the assistance loans and a separate $350 million loan from World Bank for ONGC's gas flaring reduction projects. With no other choice left, the government acquiesced to these demands.[16] It was the outside banks that devised the main strategic reforms. With inputs and advice from the banks, the GoI took the lead on implementing the proposed reform measures. It is noteworthy that the GoI has

[15] *Program Performance Audit on the Hydrocarbon Sector Program Loan*, Asian Development Bank, January 2001.
[16] *Reports of the Comptroller and Auditor General of India*, 1996. Accessed at: http://www.cag.gov.in/reports/commercial/1996_book5/chapter1.htm

continued its reform efforts in the oil and gas sector even after the engagement of the banks on this issue has waned. That is a manifestation of a pro-reform mindset of the GoI, partly motivated by the tremendous economic benefits of the broader economic reforms in India since 1991. A detailed description of the progress on these reforms is presented in Sections 3.1-3.4.

The Hydrocarbon Sector Plan (HSP) loan was approved by ADB in December 1991 with the main objective "to promote accelerated exploration and development of domestic hydrocarbon resources through increased participation of the private sector and enhanced operational efficiency of public sector enterprises."[17] The program loan of $250 million was planned to be disbursed in two tranches of $125 million each; the first tranche was disbursed by February 1992. The second tranche, planned for closing on 30 June 1995, was cancelled when it became clear that the GoI could not meet one of the key covenants of the loan, namely the divestment of 20% of the GoI's equity in ONGC.

2.3.4. Oil Sector Policy Changes: New Rules of the Game

Among other things, pushing for the introduction of the New Exploration and Licensing Policy (NELP) was perhaps the one of the most important contributions of the ADB HSP. The NELP envisioned expanding exploration in geologically challenging areas requiring huge risk capital and cutting-edge technologies by increasing competition in the E&P sector and attracting private capital. In the pre-NELP era, India had provisions that allowed private companies to search for oil. But those efforts to attract private capital to the sector were not successful, as the bidding provisions were opaque and covered only small areas. The NELP envisioned changing all that. Under the NELP, which India instituted in 1998, all new exploration acreage is offered only through an open-for-all competitive bidding process. Importantly, the state-owned firms (ONGC and OIL) are also required to compete for these new exploration areas. The NELP allows 100% foreign direct investment (FDI) and offers improved contractual terms to make business

[17] *Program Performance Audit on the Hydrocarbon Sector Program Loan*, Asian Development Bank, January 2001.

in the oil sector attractive in India. Further, under the NELP the Directorate General of Hydrocarbons (DGH; the upstream technical regulator) replaced ONGC as the overseer of the exploration blocks, bids, and the associated exploration work.

Before the first NELP round in 1999, only 15% of the Indian sedimentary basins were moderately or well explored and 50% were unexplored. NELP has contracted 162 blocks via six bidding rounds (NELP-I to VI).[18] As a result, in 2006-07 20% of the sedimentary basinal area is moderately or well explored, while exploration has been initiated in 44% of the remainder areas. Participating companies have committed to invest over $8 billion in these blocks.[19] During NELP-VII, bidding for which closed in June 2008, the ministry of petroleum and natural gas (MoPNG) offered another 57 oil and gas blocks. Of those 45 blocks received bids, and finally contracts were signed for 41 blocks in December 2008. Overall, the actual investments from NELP-VII auctions are expected to be about $1.5 billion, in contrast with the initial hopes for $3.5 billion.[20]

2.4. Adapting to the New Rules (1999-2008)

The wave of reforms and policy changes started in the aftermath of the 1991 economic crisis have significantly changed the conditions under which ONGC was used to operating. amid rising import bill and import dependency of crude oil, the GoI has been increasingly vocal in asking ONGC to improve performance and production. Further, with the NELP ONGC has lost its status as the GoI's *de facto* regulator of the oil and gas sector and has also lost the right to preferential access to acreages.

2.4.1. Pressure from Rising Imports

Rapidly growing imports have put tremendous pressure on the GoI to increase domestic production. In 2007 India consumed 2.8 million bopd,[21] making it the fifth largest consumer of oil in the world. It imported over 76.7% of its crude oil requirements in

[18] Annual Report 2006-07, Directorate General of Hydrocarbons (DGH), Government of India.
[19] "India to attract $4 bn in oil exploration", www.rediff.com, 13 December 2007.
[20] "44 blocks awarded under NELP VII", The Hindu, 21 November 2008.
[21] 1 Million Metric Tonnes Per Annum (MMTPA) ~ 20,000 bopd.

2006-07, compared with about 43.4% in 1995-96 and 31.7% in 1985-86. The rapid increase in oil import dependency has occurred because of a dramatic growth in India's oil demand since 1995, while domestic production has remained flat around 0.66 million bopd (Figure 1). As shown in Figure 2, over 70% of India's crude oil imports come from Middle East countries, which are geographically close and thus favored suppliers.

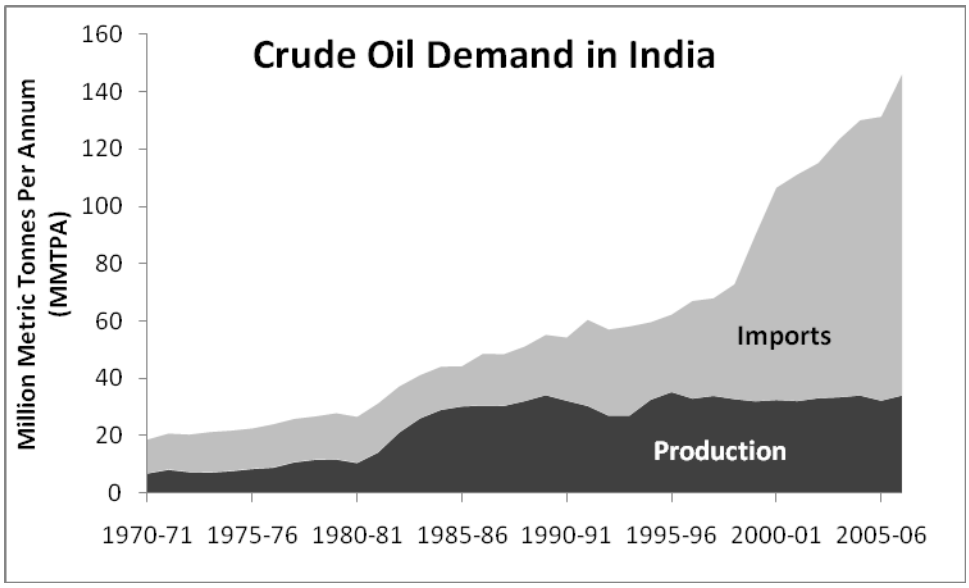


Figure 1: Crude oil import and production in India. Note: 1 MMTPA ~ 20,000 bopd.
Source: Petroleum Planning and Analysis Cell (PPAC), Ministry of Petroleum and Natural Gas, India, and IndiaStats.com.

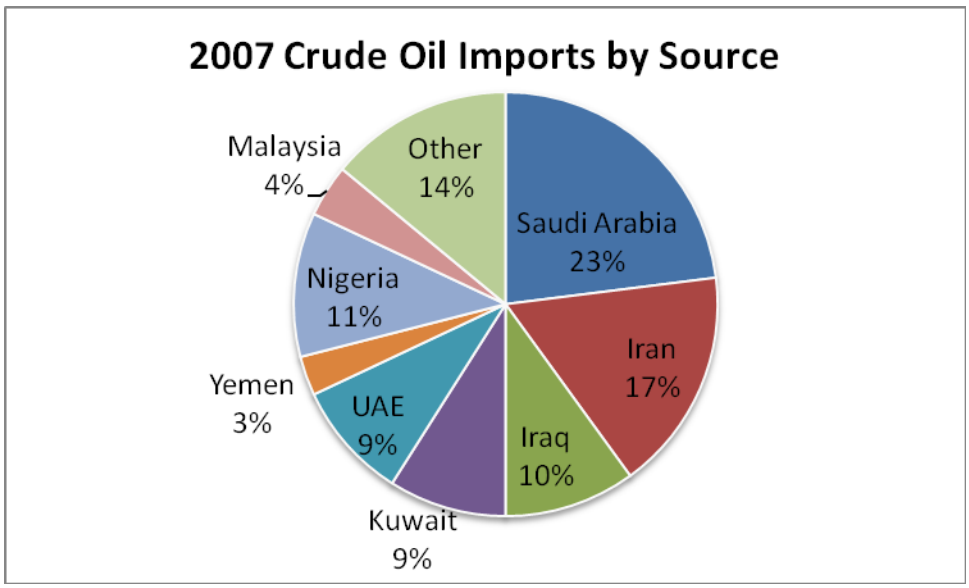


Figure 2: India's crude oil imports in 2007 by source.
Source: EIA, March 2009. Accessed at: http://www.eia.doe.gov/emeu/cabs/India/Full.html

Due to both increased demand and prices and a booming domestic refining industry, India spent about $68 billion to import crude oil in 2007-8 (Figure 3).[22] Earnings from exported petroleum products (Figure 4)—notably naphtha, petrol, and diesel—partly reduced that burden: the *net* oil import bill was about $57 billion in 2007-08.[23] As in the past, the substantial burden on India's trade position and foreign exchange from crude oil imports is a key reason why the GoI continues to emphasize greater domestic exploration and production.

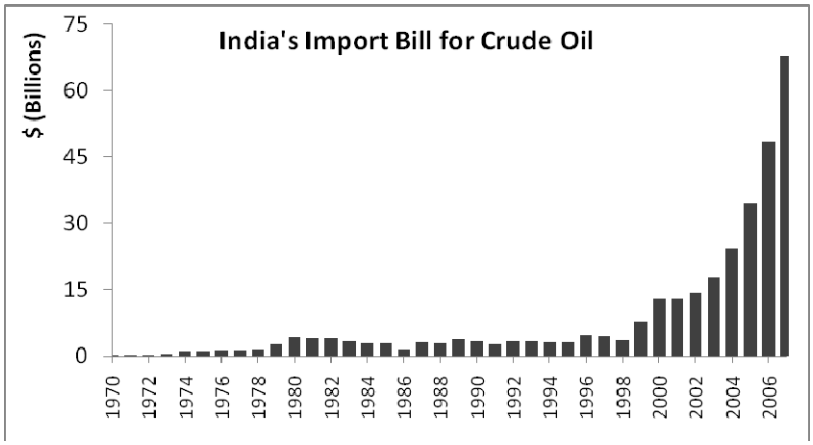


Figure 3: Indian import bill for crude oil.
Source: Petroleum Planning and Analysis Cell (PPAC) and Ministry of Petroleum and Natural Gas, Government of India.

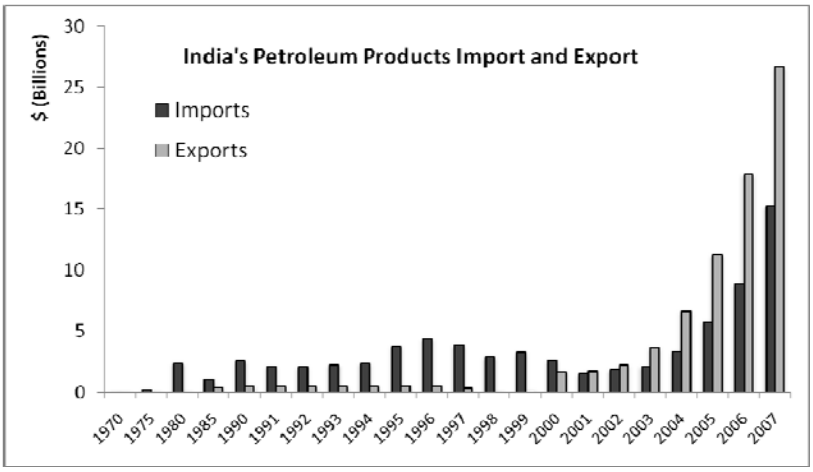


Figure 4: Import and export of petroleum products by India. Note that only data for petroleum products is reported here; that does not include crude oil. Thus, as this figure shows, India is a net exporter of petroleum products.
Source: Petroleum Planning and Analysis Cell (PPAC), Government of India and IndiaStats.com.

[22] Petroleum Planning and Analysis Cell (PPAC), Ministry of Petroleum and Natural Gas, India.
[23] Close to the Persian Gulf sources of crude, India is well-positioned to become a refining hub; some of its refinery infrastructure is already oriented entirely for re-export.

2.4.2. Production Plateau and Exploration Troubles

But ONGC's E&P record has disappointed the GoI on both fronts. ONGC's yearly domestic oil production has hovered around 25-30 MMTPA since 1990 (Figure 5) and its annual gas production too has plateaued near 23 BCM since 1995 (Figure 6). That is, ONGC's combined oil and gas production has been stagnant around 50 MMTPA (oil and oil-equivalent gas). If ONGC's foreign productions are taken in account, between 2000-01 and 2006-07 ONGC's oil and oil-equivalent gas production increased from 49.08 MMTPA to 60.72 MMTPA.

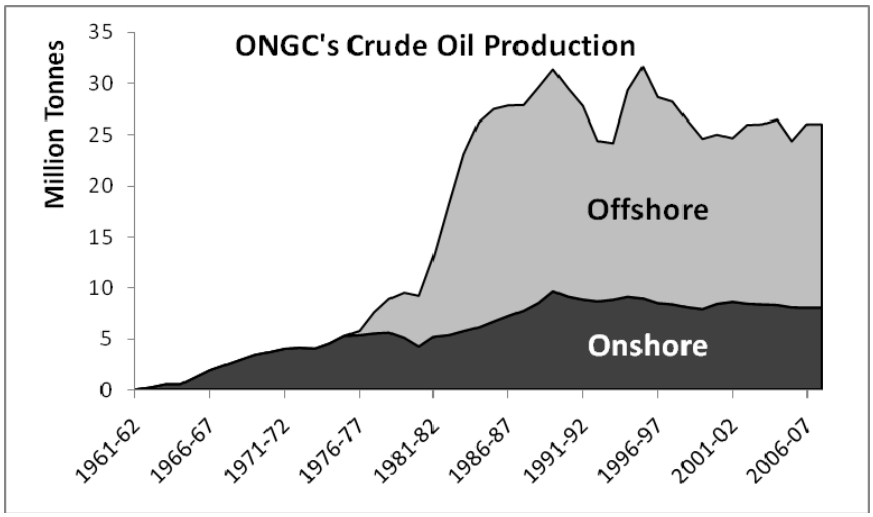


Figure 5: Crude oil production by ONGC, 1960-2007.
Source: http://www.indiastat.com and Ministry of Petroleum and Natural Gas, Government of India.

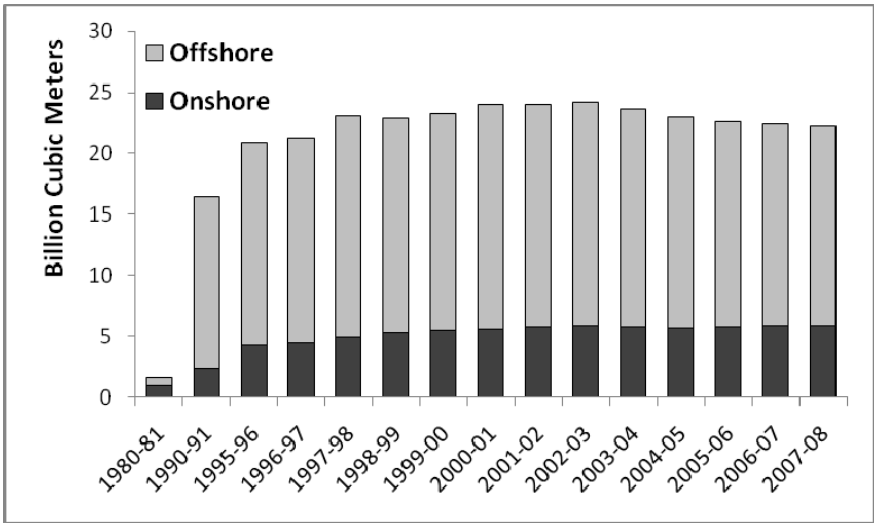


Figure 6: Natural gas production by ONGC, 1980-2007.
Source: http://www.indiastat.com and Ministry of Petroleum and Natural Gas, Government of India.

ONGC's reserves have also remained flat. As shown in Figure 7, the combined oil and gas reserves of ONGC stood at 938.8 MMT as of 31 March 2007, increasing somewhat from 857.7 MMT on 31 March 2001. At current levels of production ONGC's reserve life is about 15.5 years. In terms of combined oil and gas reserves in 2004 ONGC ranked 32 among global oil and gas companies. It ranked below most other major NOCs (among others Pemex, Petrobras, and Petrochina), almost at par with StatoilHydro, and ahead of Sonangol.[24]

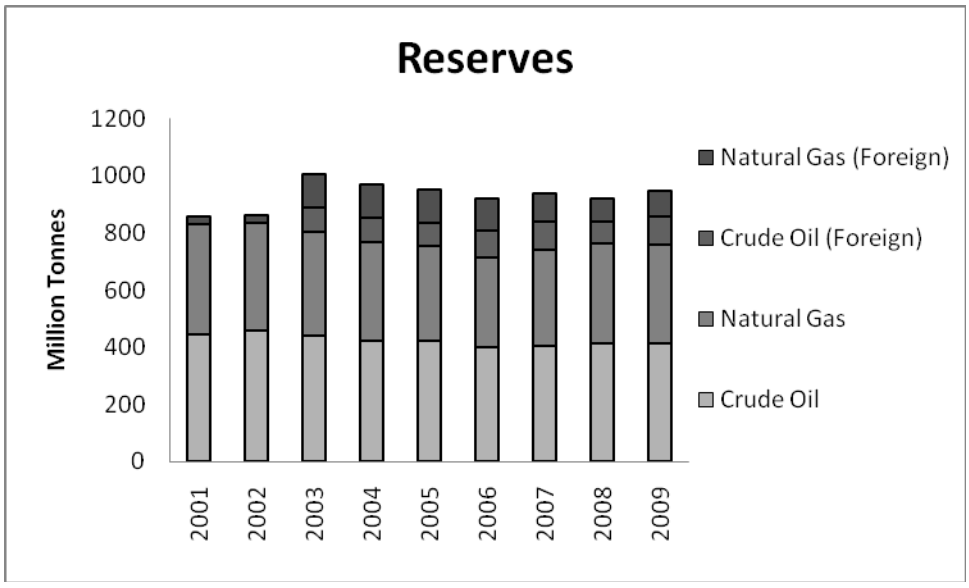


Figure 7: Hydrocarbon reserves of ONGC (Proven reserves).
Source: ONGC Annual Reports.

While declining reserves and the deteriorating health of producing fields brought negative attention to ONGC in the 1990s, over the last decade ONGC's biggest performance troubles have revolved around exploration. Much of that flak has been spearheaded by the DGH, which has publicly criticized ONGC's poor performance in the recent past.[25] Until 2000 nearly all of ONGC's exploration work was either onland or in shallow water. Since the initiation of the NELP rounds of competitive bidding for exploration acreage in 1999, India opened up several prospective areas offshore, especially in deepwater. ONGC and Reliance (separately) won the bids for most of those

[24] Victor, N. M., "On Measuring the Performane of National Oil Companies", PESD Working Paper #64, Stanford University, Septermber 2007.
[25] "ONGC pumping more air than oil: DGH", Moneycontrol.com, 24 November 2004.

deepwater blocks. But ONGC's lack of deepwater capabilities and poor risk management have significantly impeded ONGC's deepwater exploration program. A 2006 report of the DGH showed that of the 47 blocks (including onland and offshore) awarded to ONGC at that point the company's had not made any discoveries. All the 32 wells that ONGC drilled in those blocks turned out to be dry.[26] As a result, in a few deepwater exploration blocks for which ONGC was the highest bidder, the DGH recommended to the MoPNG to not award them to ONGC in view of ONGC's poor track record in such projects.[27]

Short-term focus of the top management and a weak R&D program are at the root of ONGC's recent problems in deepwater explorations. Although ONGC has over five decades of experience in exploration, its expertise and capabilities in oil & gas exploration are far behind the international level of exploration geosciences and technologies that most international oil companies and some national oil companies like Petrobras and StatoilHydro develop and employ.[28] During the 1960s and 1970s ONGC received significant E&P help on technology and equipment from the Russians and ran a focused R&D program.[29] Besides, the major oil & gas discoveries of ONGC (mostly in 1970s and 1980s) were in relatively simple geology, either onland or shallow offshore. ONGC's early success in E&P gave it a substantial oil and gas production base by early 1980s. As cash flow from those operations was adequate, ONGC did not have to conduct much R&D on exploration sciences to stay in business. In the midst of its much celebrated E&P success through 1980s, ONGC's focus had already started shifting towards developing the discovered fields, partly in response to government pressure (see Sections 2.2 and 2.3). An intensive focus on developing discovered fields and urgent need to maintain existing production brought ONGC's exploration and associated R&D "almost to a halt."[30] More recently, even though ONGC's yearly expenditure on R&D has

[26] "ONGC pumping more air than oil: DGH", Moneycontrol.com, 24 November 2004.
[27] "ONGC may be denied NELP blocks", The Financial Express, 23 November 2006.
[28] PESD interviews
[29] (i) PESD interviews (ii) Sharma, N.C., "History of Seismic Prospecting In ONGC - A Chronological Sketch of Events", Geohorizons, January 2002/1.
[30] Modak, S., "Right on Top", Business India, 30 September - 13 October, 2002. Accessed at: http://www.ongcindia.com/archives1.asp?fold=archives\oct802&file1=Feature_article&file2=feature_article1.txt

hovered around 0.3% of revenues during 2001 and 2007 (Figure 8), its R&D program[31] is poorly managed and not well targeted to its business. Consequently, ONGC's exploration capabilities have significantly eroded since 1990.

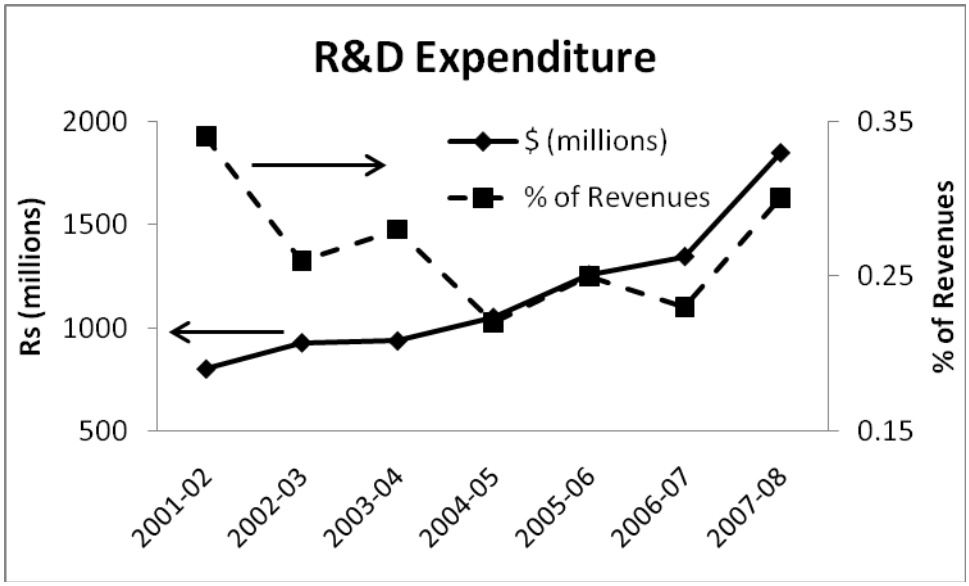


Figure 8: R&D expenditure of ONGC.
Source: ONGC Annual Reports.

2.4.3. E&P Strategy

Pressure from the GoI to alleviate the worsening oil supply situation is also evident on ONGC's strategy, both domestically as well as internationally. At a strategy meet in 2001 ONGC devised a two-prong strategy to enhance production and put its exploration program back on track. Per the strategy, one track would accelerate efforts to find and produce oil at home. The other would intensify the efforts of ONGC Videsh Limited (OVL; ONGC's oversees arm) to find equity oil abroad.

[31] ONGC conducts most of its R&D work through its nine research centers, all of which are independently managed: Geodata Processing and Interpretation Centre (GEOPIC), Keshav Deva Malaviya Institute of Petroleum Exploration (KDMIPE), Institute of Drilling Technology (IDT), Institute of Engineering and Ocean Technology (IEOT), Institute of Management Development (IMD), Institute of Biotechnology & Geotectonics Studies (INBIGS), Institute of Oil & Gas Production Technology (IOGPT), Institute of Petroleum Safety, Health & Environment Management, and Institute of Reservoir Studies (IRS). As the names suggest, each center is allocated the responsibility of a major portion of the E&P value chain. Of these, GEOPIC and KDMIPE are involved more with research on the exploration side; the others are focused mostly on oil & gas development and production.

2.4.3.1. Domestic

Domestically, as new production has not come online in the last few years, ONGC's strategy has been to monetize marginal fields and to invest in the maintenance and redevelopment of its declining fields, particularly Mumbai High. These investments have been obviated by the need to save face domestically amidst rising concerns of dropping production. Some of these efforts are paying off, at least in the short-term. After a lackluster period in the 1990s, reserves replacement (RR) record of ONGC has improved since 2000 (see Figure 9 and Table 5),[32] partly because of reinvigorated exploration efforts at home and partly because of the successful acquisition of overseas assets (discussed in detail later). Interestingly, though ONGC has declared a RR ratio of greater than one in the past several years that has done little to enhance ONGC's production of oil or gas. That itself raises questions about the methods of reserve assessment as well as managerial issues in translating discoveries to production.[33]

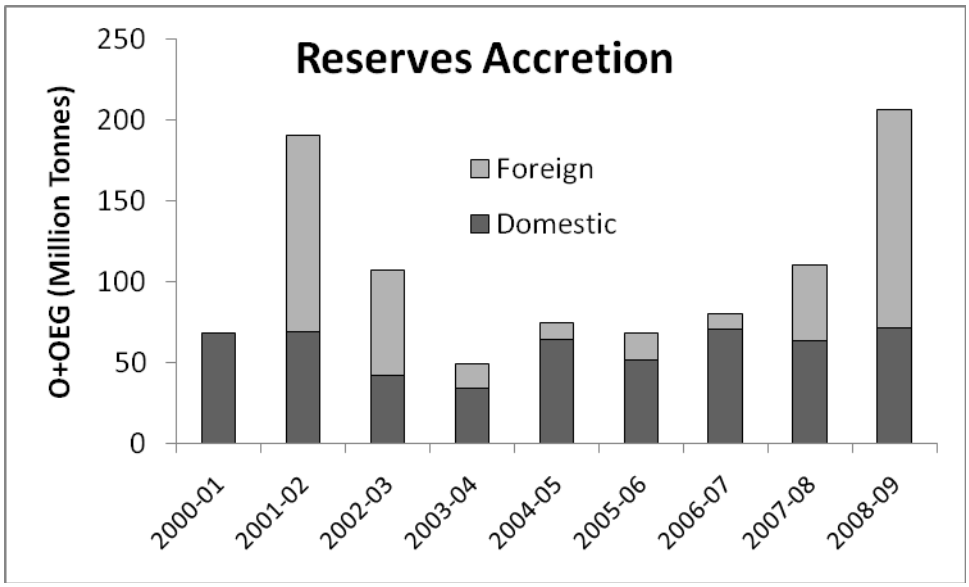


Figure 9: Ultimate reserves accretion by ONGC (3P reserves: Proved+Probable+Possible).
Source: ONGC Annual Reports.

[32] Note though that the data in Figure 8 and Table 5 are based on 3P reserves (proved+probable+possible) and hence are prone to large uncertainty. See for example, Simmons, M.R., "Proving Proven Reserves are Proven: An Art Form or a Science?", February 2005. Accessed at: http://www.simmonsco-intl.com/files/SPE%20GCS%20Reservoir%20Study%20Group.pdf
[33] PESD interviews.

Table 5: ONGC's reserves replacement ratio. Reserves-replacement ratio is defined as the ultimate reserves added divided by the production during a year

2003-04	2004-05	2005-06	2006-07	2007-08
0.65	1	1.1	1.35	1.32

Source: ONGC presentation at the ABN Amro Asian Conference, November 2008.

Besides domestic redevelopment, new exploration has also received renewed interest from ONGC. Armed with extensive experience in the domestic business environment and geology, and a very strong cash flow situation (discussed in detail later), ONGC has bid aggressively for exploration blocks in all the seven NELP rounds that have been held so far. As a result, ONGC has won over half of all the NELP blocks offered so far.

2.4.3.2. Equity Oil and Gas Abroad: ONGC Videsh Limited (OVL)

In addition to efforts to accelerate domestic E&P, another idea has gathered significant traction within ONGC: obtaining equity oil abroad. The government also believes that oil production owned by Indian companies, whether at home or abroad, enhances energy security by securing supply.[34]

Leading this quest for oversees assets is ONGC Videsh Limited (OVL), the overseas arm of ONGC. OVL aims to "tie-up" 60 MMPTA (1.2 mbd) oil and gas production overseas by 2025. As of 31st March 2007, OVL's assets had grown to about $4.5 billion—mostly in loans from its parent company, state-owned ONGC—from virtually nothing in 2001. By March 2008 OVL had 38 projects in 18 countries, giving it a proven reserve base of 194.6 MMT (95.7 MMT oil and 98.9 MMT oil-equivalent gas) and an annual o+oeg production of 8.8 MMT (Figure 1).[35]

[34] (i) *Integrated Energy Policy, Report of the Expert Committe*e, Planning Commission, Government of India, April 2006 (ii) Press release on Petroleum minister Mr. Murli Deora's speech on 14 January 2008.
[35] Annual report 2007-08, ONGC Videsh Limited.

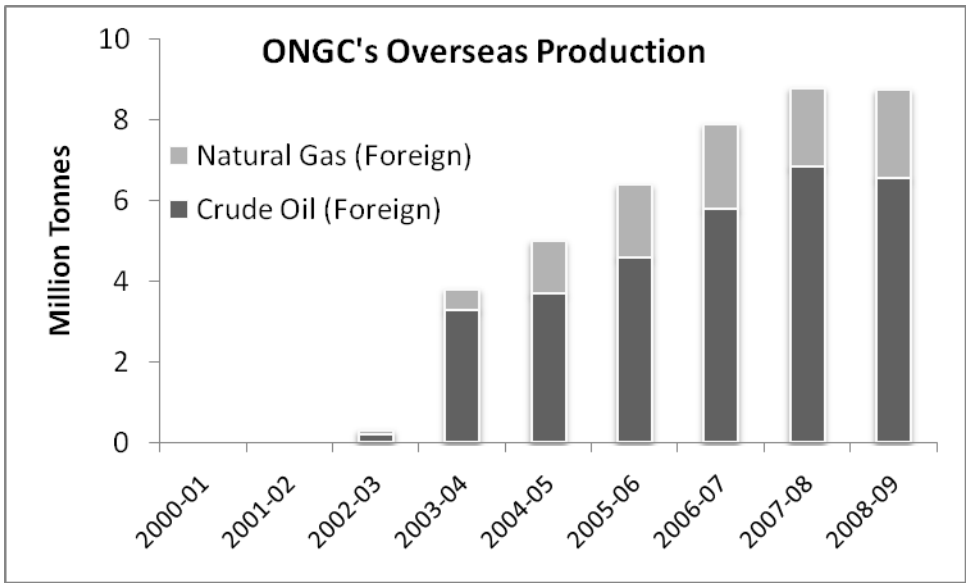


Figure 1: ONGC's overseas oil and natural gas production.
Source: ONGC Annual Reports

2.4.4. Finances

Until April 2002 prices of crude oil and petroleum products in India were determined as a weighted average of international prices and the domestic cost of production. But, in line with the HSP's objective of moving towards market-determined prices, since April 2002 the GoI has linked the price of crude oil to international prices. That has been a big boost for ONGC's finances. Like other oil companies with an established production base, high oil prices in the international markets since 2002 have sent ONGC's revenues and profits soaring (Figures 11 and 12).

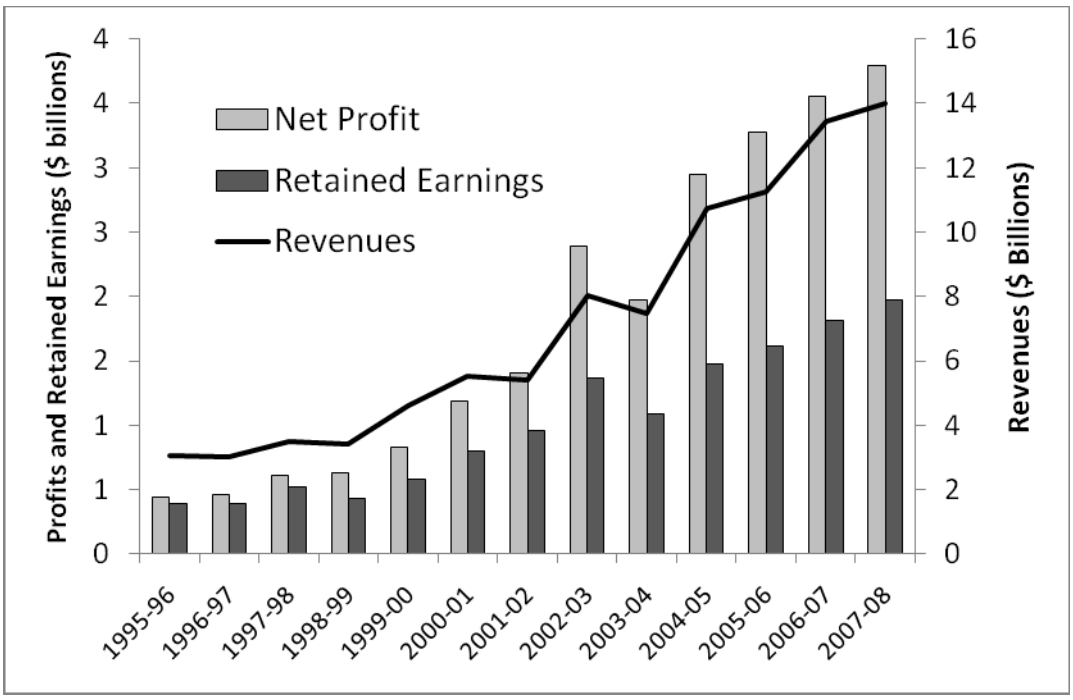


Figure 11: Financial performance of ONGC during 1995-2007.
Source: ONGC Annual Reports.

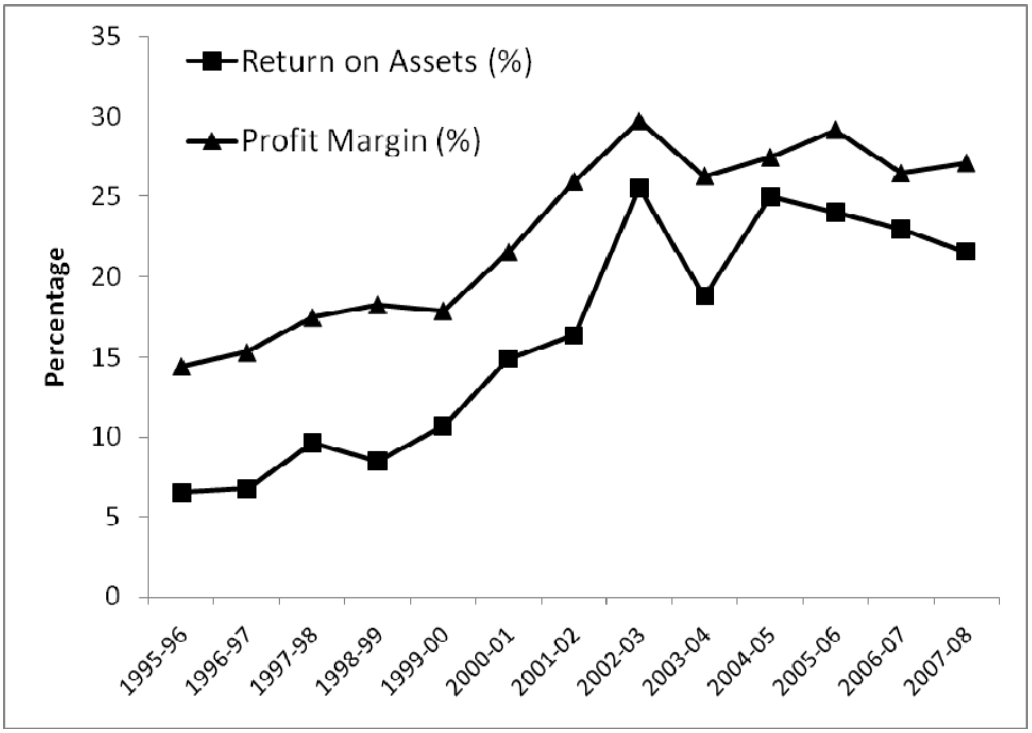


Figure 12: ONGC's return on assets and sales.
Source: ONGC Annual Reports.

2.4.5. Financial Efficiency and Project Management

Amid growing pressure to improve performance and production and a stronger-than-ever financial position, ONGC's financial efficiency continues to be questionable. Its contracting system (for awarding contract work to outsiders) and project management of exploration work for the NELP blocks are good examples of the more general problem of financial inefficiency that runs across ONGC's operations.

2.4.5.1. Weak Contracting System

ONGC's poor contracting system—including contract tendering, bidding, award and performance appraisal—have enabled contractors to escape with poor equipment and supply deliveries, while leaving the consequent financial risks and losses with ONGC. For example, in one case a contract was awarded to a financially sick party (with prior knowledge of the contractors weak financial position), eventually leading to the failure of ONGC to meet the minimum work program (MWP)-- the exploration work *committed* in the production sharing contracts—associated with the contract.[36]

Even though there is a standard procedure for awarding contracts (the *L1 process*[37]), that process is thoroughly abused by ONGC personnel and contractors for rent-seeking.[38] A particular strategy is particularly well suited to exploit the L1 process. In this gaming strategy, first the contractor bids very low to ensure winning the tender. On grant of the contract, the contractor works in cahoots with ONGC personnel to see that critical steps of the contract for which ONGC is responsible are not completed on time. Sometimes ONGC has to pay the contractor for "delays" that hinder work by the contractor, but often many contracts are renegotiated successfully by contractors after award because they were poorly framed in the first place![39]

[36] *ONGC Deepwater Exploration Audit*, Report by Comptroller and Auditor General of India, 2008.
[37] In the L1 process bidders must satisfy certain minimum financial and technical criteria. Of the qualifying bidders, the lowest quote (hence L1) bidders wins the tender.
[38] PESD interviews.
[39] PESD interviews.

The weak contracting system of ONGC is one of the prime causes for significant project delays and cost overruns—it takes away from ONGC the main levers of enforcing risk-abatement strategies that are industry standards.

2.4.5.2. Poor Planning and Coordination

One of ONGC's biggest organizational issues relates to overlapping responsibilities between different functional groups (technical, exploration, onland, and offshore). As a result there is no single point of responsibility for core exploration and development activities.

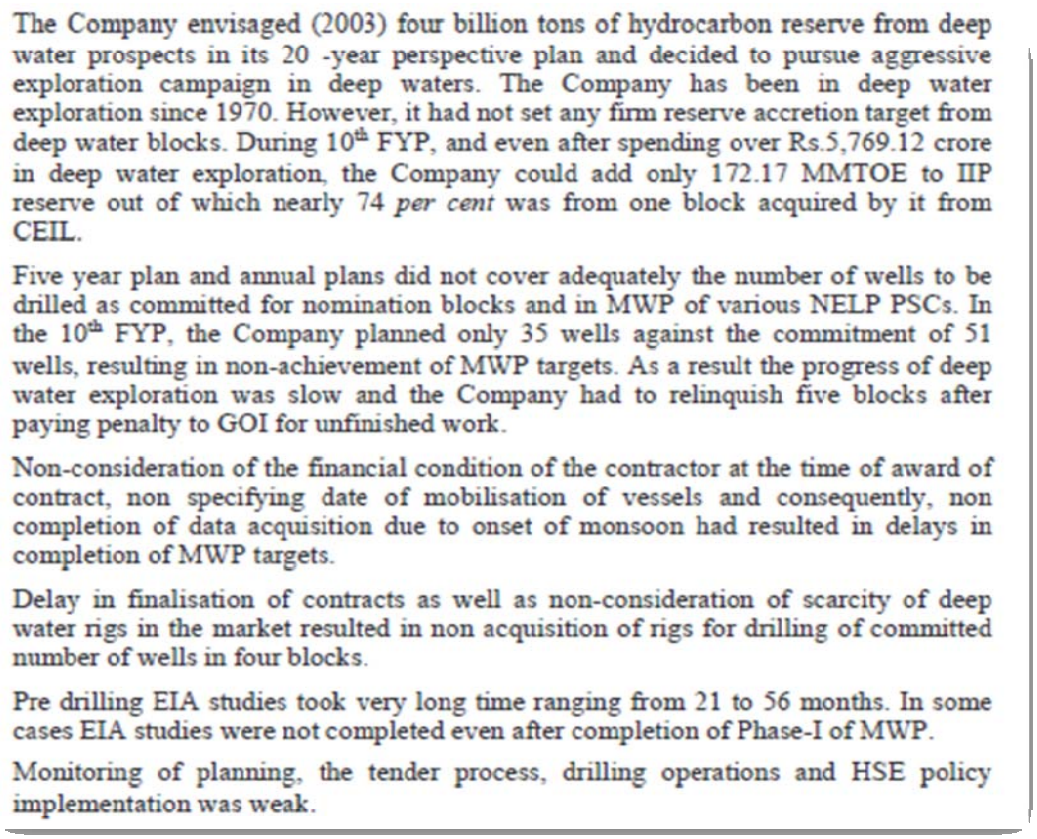
As part of its efforts to benchmark ONGC's performance since mid 1990s, the MoPNG has required ONGC to develop five year plans (FYP). The first such ONGC FYP was prepared during India's IXth FYP (1997-2002). Among others, the two main items in the FYPs are (i) number of wells to be drilled during the period and (ii) targets of reserve accretion. For the period from 2002-03 to 2006-07 (the Xth plan period) ONGC committed to drill 51 exploration wells, but planned for only 35. This not only highlights internal coordination issues, but also suggests aggressive bidding by ONGC.[40] ONGC's aggressive bidding has resulted in a series of shortfalls by ONGC on MWP in various blocks. In the aftermath ONGC has had to surrender several NELP blocks besides paying fines to both the DGH and the MoPNG.[41]

In general, activities needed for the completion of the MWP are not well planned and clear targets are not set (Figure 13). Poor planning and action for chartering and mobilizing of vessels for seismic surveys have led to delays in data acquisition and interpretation in many cases. Under the PSCs for the NELP blocks the contractor needs

[40] This incongruity of the proposed *vs.* the feasible MWP in bidding for NELP blocks seems to have escaped the DGH as well, as none of these issues were raised when the blocks were awarded to ONGC. Although the situation seems to have corrected itself and the DGH is much smarter now, this episode highlights the weak institutional capability of the DGH in the early years of the NELP (before 2005). To some extent this is expected as with any new regulatory or monitoring agency. But this episode imparts the lesson of accepting the existence of information asymmetries suffered by the regulator, especially in the formative years. One way of avoiding similar events in future—and the DGH has already started doing so—is to enshrine the accountability of the contractors in the PSCs in unambiguous terms.

[41] *ONGC Deepwater Exploration Audit*, Report by Comptroller and Auditor General of India, 2008.

to begin exploration work within six months of signing the contract. It has taken ONGC nearly two years in many cases, and sometimes up to four years, to begin exploration in NELP blocks. Deepwater drilling has also suffered tremendously on account of delays in finalization of hiring contracts. Further, in the last few years when getting rigs have been difficult, ONGC chose to forgo the option of hiring two rigs. That decision has cost it an estimated Rs. 900 crores (~$200 million).



- The Company envisaged (2003) four billion tons of hydrocarbon reserve from deep water prospects in its 20 -year perspective plan and decided to pursue aggressive exploration campaign in deep waters. The Company has been in deep water exploration since 1970. However, it had not set any firm reserve accretion target from deep water blocks. During 10th FYP, and even after spending over Rs.5,769.12 crore in deep water exploration, the Company could add only 172.17 MMTOE to IIP reserve out of which nearly 74 *per cent* was from one block acquired by it from CEIL.
- Five year plan and annual plans did not cover adequately the number of wells to be drilled as committed for nomination blocks and in MWP of various NELP PSCs. In the 10th FYP, the Company planned only 35 wells against the commitment of 51 wells, resulting in non-achievement of MWP targets. As a result the progress of deep water exploration was slow and the Company had to relinquish five blocks after paying penalty to GOI for unfinished work.
- Non-consideration of the financial condition of the contractor at the time of award of contract, non specifying date of mobilisation of vessels and consequently, non completion of data acquisition due to onset of monsoon had resulted in delays in completion of MWP targets.
- Delay in finalisation of contracts as well as non-consideration of scarcity of deep water rigs in the market resulted in non acquisition of rigs for drilling of committed number of wells in four blocks.
- Pre drilling EIA studies took very long time ranging from 21 to 56 months. In some cases EIA studies were not completed even after completion of Phase-I of MWP.
- Monitoring of planning, the tender process, drilling operations and HSE policy implementation was weak.

Figure 13: Conclusions of an audit report of ONGC's deepwater exploration activities. Notes: 10th FYP is the plan period from 2002-2007. MWP: Minimum Work Program. CEIL: Cairns Energy India Limited. *Source: ONGC Deepwater Exploration Audit, Report by Comptroller and Auditor General of India, 2008.*

3. EXPLAINING ONGC'S PERFORMANCE AND STRATEGY

In its five-decade long history ONGC has had remarkable successes, notably the discovery and development of Mumbai High between 1974-1985 (see Section 2.2), a string of significant oil and gas discoveries during the late 1970s and 1980s (see Section

2.2), and a praiseworthy revival and salvation of Mumbai High since significant reservoir issues surfaced around 1990. Until the late 1980s ONGC was a huge success story and GoI accorded it a star status.

But since 1990, ONGC has been notorious for serious performance issues. It grossly mismanaged some of its major oil fields, significantly impacting ONGC's production during mid 1990s. By the time (around 2000) ONGC got its act together to reclaim its production, its poor exploration record and declining reserves became objects of severe criticism by the GoI and the media alike. What has not changed in the last five decades is the question mark over ONGC's financial prudence and efficiency.

ONGC's performance and organizational problems have long been recognized by the GoI. But, despite tremendous economic pressures and a worsening supply-demand situation, the GoI has had a very hard time devising a strategy to encourage higher efficiency in ONGC and the oil and gas sector. Between 1970 and 2000 the GoI set up seven review committees for organizational restructuring of ONGC. Although themes of the individual reviews varied, each of them highlighted that "there is no evidence of cost consciousness or cost effectiveness in the operations in general."[42] The last major reorganization effort was started in 2001 based on the recommendations of McKinsey & Co. Although ONGC implemented the changes that McKinsey suggested for hierarchical restructuring, it left out McKinsey's core recommendation of establishing a performance-based incentive structure across the hierarchy. Additionally, since the 1991 economic crisis, which also coincided with ONGC's serious technical problems, the GoI has tried to introduce a number of reform measures in the oil and gas sector. Those reforms have been targeted at making the sector more competitive, changing the monitoring mechanisms to incentivize performance, improving corporate governance, and increasing the transparency of pricing and taxation.

[42] Kaul Committee Report, 1992.

While well intended, those reforms have been half-hearted, and therefore have proven inadequate. In all, the GoI's reform agenda has been punctured by its *ad hoc* interventions motivated by political exigencies. The result is a complex web of institutional and business actors interacting in a partially reformed system that is a hybrid of market-oriented policies in some parts and strong state intervention and control in others.

Similarly, for the most part ONGC's strategy has been a reactive response to government priorities and demands rather than a proactive agenda ensuing from a long-term vision. Amid shifting priorities and preferences of the GoI, ONGC has adapted its corporate strategy best suited to pacify the GoI. Further, even as the boundary conditions of GoI-ONGC relations have evolved over time, ONGC's organizational behavior—the way ONGC's managers and other employees approach the conduct of business—has exhibited a remarkable inertia towards maintaining organizational slack, rent-seeking, and managerial discretion.

While at a first glance ONGC might appear to be the prime actor behind these performance and strategy outcomes, in reality the main determinant of ONGC's technical and financial performance is the interaction between ONGC and the GoI, in particular the incentive structure and constraints that government ownership has entailed for ONGC. In this section we discuss the main elements of this dynamic, while emphasizing how ONGC's long and close associations with the GoI has deeply influenced ONGC's performance and strategy.

3.1. Competition

Although never one of the top items on the GoI's agenda until the late 1990s, making the oil and gas sector more competitive has always been on the GoI's radar. Nearly all of the GoI's attempts prior to the NELP at increasing competition by bringing in more private participation in the sector have either been unsuccessful or controversial. A heavy reliance on ONGC as the *de facto* regulator of E&P activities afforded ONGC the

opportunity to keep competition at bay. And wherever the GoI has run the show without ONGC's assistance powerful "dual firms"—private firms with deep political connections and financial clout—have been able to get very favorable contractual terms, thus leaving little benefit to the GoI and the public.

3.1.1. Early Attempts to Increase Competition

Between 1979 and 1991 the government made several unsuccessful attempts at getting private and international companies involved in oil E&P. With the rapid development of Mumbai High being the topmost priority, ONGC's plate was full. The government decided to enlist the services of others for exploring new areas to keep reserves accretion rolling. Four exploration bidding rounds ("pre-NELP" rounds[43]) were launched between 1979 and 1991. But, as shown in Table 6, the response was lukewarm at best.

Table 6: Blocks offered, bid received, and contracts signed for exploration blocks during pre-NELP rounds.

Year	Round	Number of Blocks Offered			Bids Received	Contracts Signed		
		Offshore	Onshore	Total		Offshore	Onshore	Total
1980	One	17	15	32	4	1	0	1
1982	Two	42	8	50	0	0	0	0
1986	Three	27	0	27	13	0	0	0
1991	Four	39	33	72	24	2	3	5
1993	Five	29	16	45	15	4	2	6
1993	Six	17	29	46	20	2	3	5
1994	Seven	17	28	45	12	2	3	5
1994	Eight	15	19	34	38	1	3	4
1995	Nine (JV)	10	18	28	22	1	1	2

Source: Review of E&P Licensing Policy, Petroleum Federation of India, 2005.

[43] In 1997 India instituted the New Exploration and Licensing Policy (NELP), a comprehensive policy under which all new blocks were to be offered on competitive bidding. The two government E&P companies, ONGC and OIL, are also required to compete for these blocks. The competitive bidding rounds between 1979 and 1991 that preceded the NELP rounds are commonly referred as the pre-NELP rounds.

Three factors contributed to the failure of these pre-NELP bidding rounds. First, by the time the first exploration round was held in 1980 international oil markets had begun easing off, partly due to the lower demand that arose from high oil prices and economic recession induced by the oil shocks of the late 1970s and partly due to large new supplies of oil from non-OPEC countries, particularly Norway and Mexico. By the mid 1980s oil prices had declined further and international companies were interested only in very prospective areas—India was certainly not one of them. Second, around 1980 China too offered offshore exploration blocks to international companies, as part of its plan to open up its economy. Chinese blocks were generally considered more promising than the Indian blocks. Third, the bidding process was handled by the Exploration Contract Monitoring Group (EXCOM), which was a part of ONGC. The exploration blocks and associated data packages were formulated mostly under the aegis of ONGC, and in a few instances blocks advertised for bidding were removed later on from the list of available blocks. This lack of transparency created a perception that promising blocks were being held for ONGC or OIL and only high-risk acreage was being offered for bidding.

3.1.2. Joint Venture Development of Oil Fields with Private Firms

The coincidence of ONGC's troubles with Mumbai High and the reform agenda that was beginning to grab the nation around 1991 provided an entry point for private players. Development of some already discovered fields was held up due to lack of funds and adequate foreign exchange:[44] "The issue here is that we just don't have the requisite money to invest in the already discovered fields…Even in the area of already discovered oil fields we require additional induction of fund[s]...."[45] Besides, after being bogged with the development of Mumbai High during the 1980s, it was clear that Mumbai High's maintenance and redevelopment would keep ONGC busy through the 1990s.

[44] *Reports of the Comptroller and Auditor General of India*, 1996. Accessed at: http://www.cag.gov.in/reports/commercial/1996_book5/chapter1.htm

[45] Speech by Captain Satish Kumar Sharma, Parliament of India, 1993. Accessed at: http://parliamentofindia.nic.in/ls/lsdeb/ls10/ses6/0111039303.htm

Under these circumstances, the idea of opening the oil and gas sector to private players gained traction.

In the spirit of assurances given by the GoI to World Bank and ADB via the Hydrocarbon Sector Plan (HSP), in 1992 the government offered several medium and small sized fields for development by private companies in joint ventures (JV) with ONGC or OIL, the two state-owned companies. These fields were already discovered by ONGC or OIL, and in some case were also under development. The response to these offers was good, especially for the medium-sized fields (30 bids for 7 fields). PSCs were executed between October and December 1994 for 5 medium-sized fields and 13 small-sized fields. The government followed up with a second round of offers for joint development in 1993. Table 7 shows the breakup of fields offered by size, bids received, and contracts signed.

Table 7: Fields offered under Joint Venture development rounds.

Year	Round	Medium-size Fields		Small-sized Fields		Bids received	Contracts Signed
		Offshore	Onshore	Offshore	Onshore		
Aug 1992	One	6	6	10	21	117	18
Oct 1993	Two	2	6	4	29	29	12

Source: Review of E&P Licensing Policy, Petroleum Federation of India, 2005.

A particular event in the JV rounds illustrates the troubles with bringing private players in the E&P sector. In December 1994 the GoI signed a 25-year Production Sharing Contract (PSC) for the development and production of the proven Panna, Mukta, and Tapti (PMT) fields with an unincorporated JV between ONGC, Enron Oil and Gas India Ltd (EOGIL),[46] and Reliance Industries Limited (RIL).[47] PMT fields were discovered and partially developed by ONGC. Per the suggestions of the World Bank, extra capital needed to further develop PMT was sought through the sale of Participating Interests

[46] As part of its asset rebalancing, Enron sold its entire PMT stake in 2002 to British Gas (BG).
[47] Padmanabhan, R., "A Deal Questioned", Frontline, Vol. 15, No. 05, March 7 - 20, 1998. Accessed at: http://www.hinduonnet.com/fline/fl1505/15050950.htm

(PI) in the fields. The 1994 PSC gave Enron and RIL a 30% PI each; the remaining 40% was retained by ONGC.

Subsequently, the PSC generated a lot of criticism for the GoI and the prudence of the JV PSC was questioned. In 1995 the Comptroller and Auditor General (CAG) of India released a scathing audit report thoroughly criticizing the MoPNG in the award of PSCs for the medium-sized fields.[48] The audit found that the bidding process was very opaque and that the parameters on which the selection was made (to maximize the projects' NPV to GoI) were poorly defined. Besides, there was no specific language in the final contracts to hold the contractors accountable to the capital and operating expenditure estimates presented in the bids. The audit found further that the contractors were given several very favorable concessions.

The CAG observations were examined by the Central Bureau of Investigation (CBI) and were also the subject matter of public interest litigation in the Delhi High Court and thereafter in the Supreme Court. The CBI and the Supreme Court ultimately upheld the PSCs awarded in the JV round and the allegations made by the CAG were found to be unsubstantiated. Many of these complaints may actually have resulted out of corporate rivalries. Later on, both PMT and the Ravva JVs established far higher reserves and have been able to maintain production at far higher levels that envisaged by ONGC. Over their lives these projects have returned substantial revenues to the Government as profit share on top of royalty payments. This episode in not surprising, as ONGC officials always have rankled at the thought of their discovered fields having been divested.

3.1.3. Competition under the NELP

With the introduction of the NELP in 1998 (see Section 2.3.4), the GoI's efforts to inject competition in India's oil and gas upstream (E&P) have finally been successful, albeit only partially. As shown in Figure 14 ONGC and RIL have won most of the exploration acreage auctioned through the NELP, but several other national and international

[48] Audit Report, Comptroller Auditor General of India, December 1995 and June 1996. Accessed at: http://www.cag.gov.in/reports/commercial/1996_book5/chapter1.htm

companies have also initiated E&P bases in India. At present, India's E&P is really a duopoly between ONGC and Reliance, with only a few other players. Over the past decade Reliance, India's largest private sector conglomerate, has emerged as ONGC's major competitor in oil and gas E&P. Starting in 2002, Reliance has made a series of discoveries, largely gas, in the eastern offshore Krishna-Godavari (KG) basin. By 2011-12 Reliance is projected to become India's largest gas producer.[49]

Reliance's strong emergence on India's oil and gas E&P scene, along with the successes of other companies, has changed ONGC's operating environment and its relationship with the GoI in fundamental ways. By bringing more competition the NELP has enabled benchmarking of performance in the E&P sector in India. As several companies are now engaged in exploration work, the GoI and the upstream regulator (the DGH) have more information about the true costs of oil and gas discovery in India. This has, for the first time, allowed the GoI to start using benchmarks and industry standards for monitoring ONGC's performance.[50] Effects of competition are already showing on ONGC's performance and strategy. ONGC has started forming technology partnerships and joint ventures with international companies both in exploration and development projects.[51] It is also increasingly using and adopting international best practices in exploration efforts and benchmarking of its technical performance.[52]

[49] "India can save $8.3 bn annually on Reliance KG-D6 gas", Business Standard, 10 July 2009. Accessed at: http://www.business-standard.com/india/news/india-can-save-83-bn-annuallyreliance-kg-d6-gas/67326/on

[50] "Among forces that mitigate the manager-stockholder conflict are competitive labor and product markets, managerial compensation plans, the structure of equity ownership, and the threat of corporate takeovers." Mitchell, M.L. and Lehn, K., "Do Bad Bidders Become Good Targets", Journal of Political Economy, Vol. 98, No. 2, 1990.

[51] Among others, (i) "ONGC, BP Tie-Up For Oil & Gas Exploration", TopNews.in, 9 January 2007. Accessed at: http://www.topnews.in/ongc-bp-tie-oil-gas-exploration-21264 (ii) "ONGC and Rocksource sign Agreement for Partnership in Deepwater Block", 17 September 2008. Accessed at: http://frontierindia.net/cae/ongc-and-rocksource-sign-agreement-for-partnership-in-deepwater-block/76/ (iii) "ONGC Signs MoU with Weatherford for Enhancing the production from their matured fields", ONGC Press Release, 16 Februrary 2009. Accessed at: http://www.ongcindia.com/press_release1.asp?fold=press&file=press381.txt

[52] (i) PESD interviews (ii) In 2008 ONGC conducted a post-drill analysis of 350 wells drilled between 2002-2005. The analysis was done by an international consultant (DeGolyer MacNaughton).

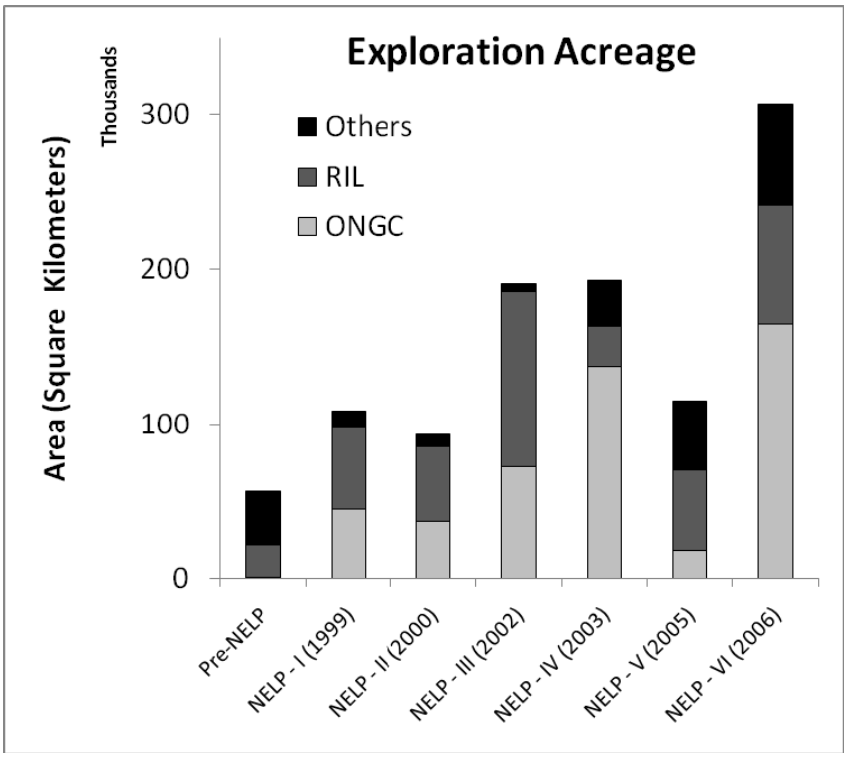


Figure 14: Distribution of pre-NELP and NELP acreage by winning bidder.
Source: Annual Report 2006-07, Directorate General of Hydrocarbons (DGH), Government of India.

3.2. Ownership and Corporate Governance

3.2.1. Corporatization of ONGC

The undercurrent of reforms that began in 1991, both economy-wide and in the oil sector, signaled a move towards a more competitive E&P scenario in India. That also needed public sector enterprises (PSEs) like ONGC to be nimble in responding to market demands. In that spirit, one of the covenants of the ADB's HSP (see Section 2.3.3) was for the government to divest 20% of its equity in ONGC. The main motive of that covenant was to provide flexible decision-making powers (financial and organizational) to ONGC, which so far had been entangled in government red-tape.

The rate of divestment has been much slower and the quantity much smaller than envisioned in the HSP, as the GoI has found it hard to let go the reigns of ONGC. In line with the HSP, the GoI started divesting in ONGC starting 1994. In October 1994 the

government sold 2% of its ONGC holding, mostly to domestic financial institutions.[53] And in December 1994 shares for about 2% of ONGC holding were issued to ONGC employees. In 1999 the government sold another 12% of its equity, this time to two other public sector units (PSUs) under a cross-shareholding scheme: Indian Oil Corporation (9.6%) and Gas Authority of India Limited (2.4%). That continued until March 2004 when the government put on sale 10% of its ONGC equity.[54] But even after several rounds of divestment the GoI still owns about 88% of ONGC—74% directly and 14% through other government companies. There are two main reasons for the GoI's slow divestment in ONGC. First, state ownership of ONGC provides flexibility to the GoI in controlling downstream prices (of petroleum products), which is an issue of paramount political importance. Second, the GoI still views its control of ONGC as a critical factor in pursuing India's energy security agenda. To its surprise, the GoI has found that even with the present 12% divestment its control over ONGC has waned significantly. The fear of losing further control over ONGC, and consequently of the oil and gas sector more broadly, has also kept forces of further divestment in ONGC at bay.

3.2.2. Impact of Corporatization on the GoI's Control over ONGC

Post reforms, concomitant with changes in ONGC's ownership structure have been changes in ONGC's corporate governance, which has shown positive signs of improvement generally. The government took a big step in reducing its grips on ONGC and enhancing ONGC's financial and organizational independence when in 1999 it granted the *Navratna* status to ONGC,. The Board of Directors of PSUs with Navratna status exercises all powers of capital expenditure, proposal for acquisition of technology, strategic alliances, organizational restructuring, formation of joint ventures, and investment of funds.

[53] *Program Performance Audit on the Hydrocarbon Sector Program Loan*, Asian Development Bank, January 2001.
[54] 2% was reserved for ONGC employees and directors. The remainder was sold to domestic and foreign institutional investors (~4%), non-institutional bidders (~2%), and to retail investors (~2%).

But it was not until April 2002 that ONGC received real financial autonomy. Until then ONGC was dependent upon the MoPNG and the Oil Coordination Committee (OCC) for having its costs scrutinized and returns approved. The OCC mechanism was in fact a very detailed *ex-ante* mechanism of cost control and monitoring which enabled the MoPNG to keep a check on ONGC. Thus, even though it became a Navratna Board as far back as 1999, prior to 2002 ONGC did not really have true financial autonomy. After April 2002 crude prices payable to ONGC became independent of the assessments of costs and returns done by the OCC. With ONGC no longer dependent on OCC assessments for its cash flows, April 2002 marked a major turning point in ONGC's financial independence from the GoI.

Public listing too has given ONGC another way of reducing government intervention. As a publicly-listed company many individuals of the general public are shareholders of ONGC (~2%). This group has a clear interest in ONGC's stock price, which is linked with profitability. In the recent past when ONGC has gone public with its grievances about undue government interference this interest group (public stockowners) has been vocal in its support for ONGC's independence from the political process. Thus, public-listing has served as a potent weapon in ONGC's efforts to dampen government control.

3.3. The GoI's Continued Intervention in ONGC's Corporate Matters

While by granting ONGC the Navratna status the GoI has handed ONGC near complete autonomy in matters of finances, capital expenditure, strategy, and organizational structure, it continues to exert direct and indirect influence over ONGC through hiring restrictions, monitoring exercises such as audits, and appointment of Board members and the Chief Managing Director (CMD; the CEO-equivalent at ONGC). Such controls have engendered new challenges for ONGC, particularly in those aspects of the sector that are exposed to greater competition, such as the labor market for skilled personnel.

3.3.1. Multiple Vigilance and Monitoring Bodies

Historically, the GoI has employed *ex ante* procedures—a system with prescribed rules for the conduct of business—for monitoring ONGC's performance. To implement that system the GoI has charged multiple government oversight agencies with auditing ONGC's accounts and verifying the transparency of business dealings of ONGC. This is typical of how governments generally monitor state-owned companies: "[R]epresentative governments typically give oversight authority or opportunity to more than one official so that public organizations often must respond to conflicting and unstable political demands."[55] Consequently, ONGC has to regularly encounter inquiries from oversight agencies such as the Central Vigilance Commission (CVC) and Comptroller and Auditor General (CAG). Top ONGC managers, including the CEO, are often summoned by the ministry and various parliamentary committees, and are expected to be available on demand.[56]

Being a PSE also means that members of the parliament can ask questions (to the petroleum minister) about ONGC's operations. The MoPNG must answer these questions either orally or in written, and the response is in the public domain. This too is a checks-and-balances measure to ensure transparency of ONGC's operations. Although it could not be firmly established in this study, several interviewees said that to get business information from ONGC "private interests" (private oil and gas companies) get members of the parliament to raise issues in the parliament.[57]

3.3.2. Appointment of the Board of Directors and the CMD[58]

ONGC's 14 member Board of Directors has Executive (Functional) and Non-executive members. The Securities and Exchange Board of India (SEBI) requires publicly traded companies to have at least half of the board members to be non-executives. In

[55] Vining, A.R. and Weimer, D.L., "Government Supply and Government Production Failure: A Framework Based on Contestability", Journal of Public Policy, Vol. 10, No. 1, 1990.
[56] PESD interviews.
[57] PESD interviews.
[58] The Chairman-cum Managing Director (CMD) is the CEO equivalent

compliance with this requirement, ONGC usually has a 7-7 split between executive and non-executive board members. Two of the non-executive members are government appointees (*official* directors)—one each from the MoPNG and the Ministry of Finance.[59]

Appointment of the non-official directors on ONGC's board is made by the MoPNG based on the recommendations of a search committee comprised of (i) Chairman, Public Enterprises Selection Board (PESB) (ii) Secretary (top bureaucrat) of the MoPNG, and (iii) Secretary, Department of Public Enterprises.[60]

A similar selection committee selects ONGC's Chairman-cum Managing Director (CMD) too. But given the much publicized selection process for CMD, the CMD-selection committee usually has more members representing diverse interests.[61] Once the committee makes its selection the Appointments Committee of Cabinet (ACC), which the Prime Minister's office (PMO) controls, must also approve of that selection. The CMD's tenure is normally for five years. At the end of that period the tenure may be extended by the government, subject to superannuation limits (60 years of age).

The process for selecting ONGC's CMD and Board of Directors leaves room open for political interference. Two recent episodes in the CMD/Board-Director selection process highlight the nature of political interference involved.

In September 2005 petroleum minster Mani Shankar Aiyar was involved in a public controversy with the then CMD of ONGC, Subir Raha. After Aiyar rejected a list of candidates recommended by the selection committee for non-official, non-executive director posts at ONGC Raha took the controversy public by discussing the issue openly

[59] ONGC Annual Report 2006-07.
[60] "Turning selected PSEs into global giants—Restructuring of the Boards—setting up of a Search Committee for selection of non-official part-time Directors", Department of Public Enterprise. Accessed at: http://dpe.nic.in/newgl/glch093.htm
[61] The last selection committee for ONGC CMD constituted in Febrauary 2007 comprised of the chairman of PESB, two other members of PESB, secretary of MoPNG, and two non-government persons of distinguished repute.

at ONGC's annual general meeting. In doing so, Raha leveraged the sentiments of ONGC's common shareholders to generate broad support for opposing Aiyar's actions. Subsequently, the selection committee rejected the petroleum minister's nominees and a few nominees withdrew from the process. Partly because of the events that followed this controversy, Raha was denied an extension at ONGC when his term expired in May 2006.

After Raha's extension as CMD was declined in May 2006, R.S. Sharma, then finance director and the senior most official in ONGC, was appointed as the acting director. Based on interviews, a PESB panel selected Sharma as the regular CMD in August 2006. But in February 2007 the CCA scrapped that appointment and set up a wider search committee. This led to outrage and uproar in ONGC. The government portrayed its move as an effort to expand the search for the CMD by also including candidates from the private sector (in the name of energy security!).[62] Apparently much of this political jugglery involved Najeeb Jung, who was formerly the Joint Secretary (Exploration) in the MoPNG. At the time of these events Mr. Jung was serving as Director of the Observer Researcher Foundation, a non-profit think tank backed by Reliance Industries. After interviewing 28 candidates, the reconstituted selection committee reselected Sharma as the top choice, but also indicated that Mr. Jung was its second choice for the post.[63] Finally in July 2007 the government too gave its approval to Sharma's appointment as ONGC's CMD with tenure through 31 January 2011.

3.3.3. Hiring Constraints and Post-reforms Changes

Being a public sector enterprise (PSE) ONGC has to follow rules for hiring and compensation guidelines prescribed by the government. The most restrictive limitation faced by ONGC is in compensation of its employees. For all PSEs, salaries are pre-

[62] (i) "Sharma formally appointed ONGC chief", 4 July 2007. Accessed at: http://www.business-standard.com/india/news/sharma-formally-appointed-ongc-chief/25098/on (ii) "Process of selecting ONGC Chief", 13 April 2007. Accessed at: http://www.hinduonnet.com/2007/04/13/stories/2007041300581400.htm

[63] "Panel for Sharma as ONGC chief", 7 June 2007. Accessed at: http://www.hindu.com/2007/06/07/stories/2007060714851100.htm

determined by the GoI for all job levels; ONGCs employees also receive these salaries. The pay scale for an executive director (E-9), the highest salaried level in ONGC, is only about thrice that of an assistant officer (E-0), the lowest technical level in ONGC. Inclusive of perks and additional benefits, the entry level jobs are comparatively well placed vis-à-vis jobs in the private sector. But the difference is glaring at higher levels, sometimes over an order of magnitude higher in E&P companies in the domestic private sector and in the Middle East.[64]

These salary restrictions were not an issue until 1995 or so, when almost the entire workforce in the oil and gas E&P industry in India was employed by ONGC.[65] But the situation has changed rapidly as labor markets have become more competitive and fluid. With the rapid rise of private companies in the domestic E&P industry and high demand for skilled personnel in the O&G sector in the Middle East the opportunity cost of working at ONGC has become high. ONGC has mostly remained a spectator in the job market while its competitors have bid skilled manpower away.

Figure 2 shows the number of employees in ONGC categorized by technical skills (technical, non-technical) and managerial skills (executive, non-executive). Total number of personnel in ONGC has decreased by 14% between 2003 and 2007, decreasing from 39352 in March 2003 to 33810 in March 2007. The 'Technical Non-executive' category has seen the most dramatic attrition: manpower in this category saw a reduction of 30% in just four years, coming down from 7267 in March 2003 to 5072 in March 2007. Figure 3 shows the demographics of this category. The two youngest age groups, less than 31 years of age and between 31 and 40 years of age, have shed most manpower. In a booming job market for technical skills, the manpower in these two age groups has

[64] "40% Peanuts; We Want 100% Hike: PSU Employees", Business Standard, 26 March 2008. Available at: http://www.business-standard.com/india/news/40-%5Cpeanuts%5C-we-want-100-hike-psu-employees/318035/

[65] ONGC recruits young engineers in various major disciplines, fresh out of college with little or no industry experience in oil and gas E&P. These "trainees" are then placed in training assignments across the country. Historically, these entry level engineers have stayed on with ONGC, in most cases for the entire span of their careers. Many of these trainees rise through the ranks at ONGC, and usually form the top level of ONGC's management.

chosen to maximize the opportunities afforded by its greater mobility compared with more aged employees.

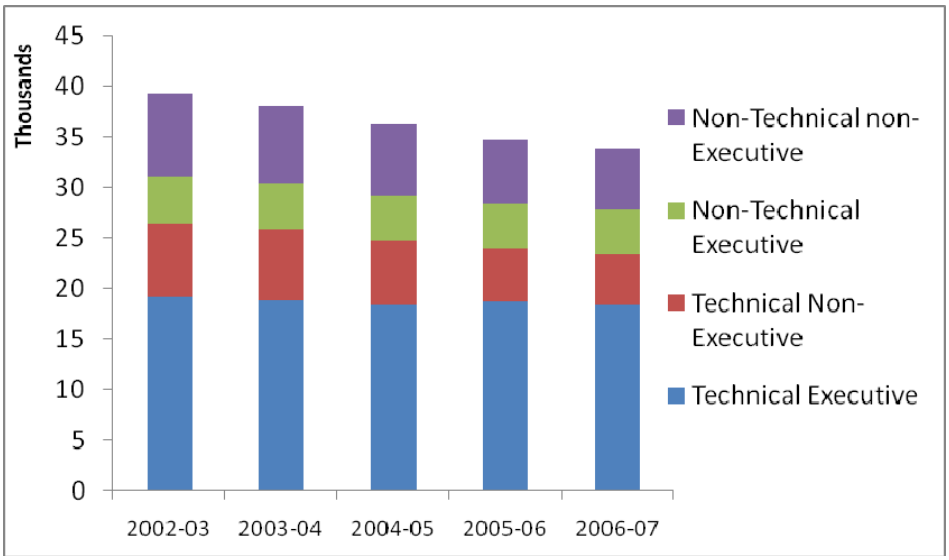


Figure 2: Number of Employees at ONGC by technical and managerial skill levels.
Source: ONGC Annual Reports.

Figure 3: Demographics of 'Technical Non-Executive' employees of ONGC. The two youngest age groups, less than 31 years of age and between 31 and 40 years of age, have shed most manpower. While the '<31' age group has slimmed down by 86.5% losing nearly 500 employees between 2003 and 2007, the '31-40' age group is down from 3000 to just above 1000 during the same period, a reduction of 65.25%.
Source: ONGC Annual Reports.

Although even as a *Navratna* PSE ONGC is not free to set salaries of its employees, the post-reforms structure has afforded ONGC enough flexibility to revamp employee perks and benefits (Figure 17). In just five years between 2002 and 2007, ONGC's expenditure on employees nearly tripled to Rs. 60 billion in 2007, while the number of employees declined from over 39000 to little under 33000 during the same period. Although it is hard to separate and pinpoint the underlying causes, two factors explain such massive increase in ONGC's manpower costs. First, as discussed above, over the last decade or so the labor market for ONGC has become very competitive. In the face of rapid employee attrition making the overall compensation package attractive is a practical choice to retain employees. Second, the large free cash flow during these years (discussed in detail later) has provided ONGC the opportunity to take advantage of the financial flexibility as a Navratna PSE for increasing salaries and benefits of its employees.

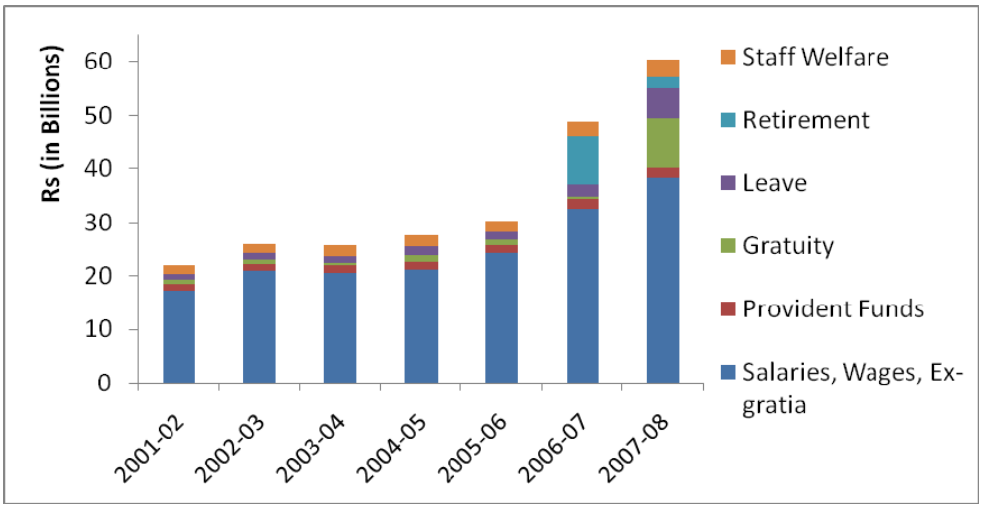


Figure 17: ONGC's expenditure on employees (manpower cost).
Source: ONGC Annual Reports.

While compensation of ONGC employees have become attractive post-reforms, not much of that manpower cost increase is linked to performance. Performance evaluation and monitoring methods largely remain the same as in pre-reforms period.66

[66] PESD interviews.

3.3.4. Social Spending

The GoI does not require ONGC to spend heavily on social and developmental programs. That is mainly because the GoI has a fully functioning bureaucracy (with its own competences and rent-delivering activities) for most parts of the economy. Thus, unlike many other NOCs, ONGC is left to focus, more or less, on oil operations. As per ONGC's policy, 0.75% of net profit is allocated for Corporate Social Responsibility (CSR) activities. Some of ONGC's CSR work involves supporting programs for education of women, local entrepreneurship, healthcare initiatives, and water management in drought-prone areas.[67] One of ONGC's biggest CSR projects is the Rajiv Gandhi Institute of Petroleum Technology (RGIPT), for which ONGC has committed about $33 million over several years.

Notwithstanding these programs, there is a shortfall in ONGC's CSR expenditure as per the allocation of 0.75% of net profit, as shown in the Table below. CSR expenditure in recent years has hovered around 0.25% of net profit, or about a third of the amount planned for this category. This has raised some questions in the Parliament.[68] But as the amount involved is relatively small compared with ONGC's profits the issue of CSR does not pose significant operational difficulties for ONGC.

Table 8: CSR expenditure by ONGC. Expenses and profits in USD (millions). Rs/USD=44.

	2003-04	2004-05	2005-06
Social Expense	4.76	10.11	7.16
Net Profit	1969.18	2950.68	3279.73
% of Profits	0.24	0.34	0.22

Source: ONGC Annual Reports.

[67] ONGC Annual Report 2006-07.
[68] Lok Sabha Unstarred Question No 5036 Answered on 10 May 2007, Government of India.

3.4. Price Controls and Difficulties for Reform

Pricing of crude oil, gas, and petroleum products have always been a thorny issue in India, which has still not been able to develop a coherent policy for price determination.

Until April 1998 oil and gas prices in India were largely determined based on the cost-to-producer principle ('cost plus'). This mechanism is popularly known in India as the Administered Price Mechanism (APM). The guiding principle of APM was to insulate the domestic market from volatility in international oil prices. Under APM, ONGC and OIL were allowed to recover operating cost and a 15% post tax return on the capital employed for production of domestic crude. The refiners were allowed operating costs and return on capital too, but the allowed return was 12% for net worth (equity capital plus free reserves) and the rate of interest on borrowings.[69] APM was cumbersome, as it involved actual auditing of the cost of domestic production, and pricing of gas was more cumbersome and *ad hoc* than oil.[70] Further, cross-subsidization under APM to provide subsidies for kerosene, LPG, and naphtha created a complex web of distortions across the entire petroleum industry.[71]

For improving efficiency in pricing and market allocation, the ADB's HSP (see Section 2.3.3) suggested phased dismantling of APM towards fully market-based prices. Dismantling of APM was also considered necessary for attracting private capital and technology. In 1995 the Strategic Planning Group on Restructuring of the Oil Industry (the 'R' Group) recommended the GoI to adopt the suggestions of the HSP. The 'R' Group concluded that APM was a breeding ground for inefficiencies across the O&G sector, as the cost-plus approach of APM provided little incentive for technological innovation or financial prudence. Also in its view, the APM failed to generate enough financial resources for expanding investments by the companies. Subsequently, phased

[69] *Report of the Committee on Pricing and Taxation of Petroleum Products*, Government of India, February 2006.
[70] Joshi, S. and Jung, N., "Natural Gas in India", in *Natural Gas in Asia* (2nd Ed.), Edited by Stern. J, Oxford University Press, 2008.
[71] *Report of the Committee on Pricing and Taxation of Petroleum Products*, Government of India, February 2006.

dismantling of APM was started by GoI in April 1998 and APM stood completely dismantled in April 2002.

3.4.1.1. Pricing of Gas from the PMT Fields

One of the first major efforts to break away from the APM was the pricing of gas from the PMT fields (see Section 3.1.2 for background information on PMT). But the GoI's *ad hoc* interventions made this scheme a burden upon ONGC. In 1994 when the PSC for PMT was signed price for all domestically produced oil and gas was administered by the MoPNG. But given the involvement of private companies with PMT and in the spirit of the ADB's HSP, the price of oil and gas produced from PMT was not administered. Instead, it was linked to international prices: "Whereas the national oil companies are paid for the crude oil they produce at an administered price, the joint venture [ONGC-BG-RIL] receives international-market prices for its output…the Government had been buying crude [oil] from the joint venture at $24 a barrel, including a premium of $4 over the international price."[72]

But pricing of gas from PMT was far from market-based. It involved complicated juggling between producer and consumer prices (note the two distinct prices). Based on recommendations of the Sankar Committee, the GoI chose a pricing formula that set consumer prices to 75% parity with a basket of fuel oils in 1999-2000, with a ceiling of Rs.2850/mcm, or $1.76/mmbtu.[73] The ceiling in effect fixed the consumer price of gas at $1.76/mmbtu through 30 June 2005, even in the face of dramatically rising gas prices internationally. As per the PSC, the gas price received by the PMT JV was linked to a basket of fuel oils, with a floor of $2.11/mmbtu and a ceiling of $3.11/mmbtu,[74] but mostly on the higher side of the range owing to high prices internationally. Thus, while the PMT gas was being sold at $ 1.76/mmbtu, the JV was being paid around $3/mmbtu.

[72] Padmanabhan, R., "A Deal Questioned", Frontline, Vol. 15, No. 05, March 7 - 20, 1998. Accessed at: http://www.hinduonnet.com/fline/fl1505/15050950.htm
[73] Joshi, S. and Jung, N., "Natural Gas in India", in *Natural Gas in Asia* (2nd Ed.), Edited by Stern. J, Oxford University Press, 2008.
[74] Joshi, S. and Jung, N., "Natural Gas in India", in *Natural Gas in Asia* (2nd Ed.), Edited by Stern. J, Oxford University Press, 2008.

The balance of somewhere between $1-$1.5/mmbtu was being paid for by ONGC.[75] (Quite dear a price for discovering the fields in the first place!)

Discouraged by this discriminatory treatment by its owner (the GoI), ONGC had little incentive in investing further in gas E&P. At the administered customer price ONGC found the internal rate of return on capital investment in development of new or additional gas to be lower than the Bank Rate[76]: "ONGC seeing diminishing and then negative returns from its producing fields saw little, if any, incentive to invest in exploration, development, or improved recovery of domestic gas."[77]

3.4.1.2. Concessions to Oil Marketing Companies

Following the dismantling of the APM in April 2002, the pricing of crude oil and petroleum products (at refinery gate) have been fully liberalized by linkage to import parity prices. The refinery-gate prices (the import-parity based price that oil marketing companies (OMCs) pay) for petroleum products are high due to a large tax component—about 50% of the price of petrol (gasoline) and diesel in India is comprised of different taxes levied by the central and the state governments.[78] On the contrary, the retail selling price (RSP) of petroleum products, or the price that consumers pay, is tightly regulated by the government. In the face of high crude oil prices, since 2005 RSP of petrol and diesel has been set by the GoI well below the cost of purchase by the OMCs. Consequently, OMCs in India were losing nearly $60 million/day in 2007 even as the average Indian customer paid some of the highest prices in the world for petroleum products (over $5/gallon for gasoline).

But those losses did not reflect on the bottom lines of the OMCs. Indeed, the OMCs made large net profits even as they "lost" money in their marketing operations.[79] Each

[75] Author estimates and PESD interviews.
[76] ONGC Annual Report 2004-05.
[77] Joshi, S. and Jung, N., "Natural Gas in India", in *Natural Gas in Asia* (2nd Ed.), Edited by Stern. J, Oxford University Press, 2008.
[78] Misra, N. *et al.*, "Petroleum Pricing in India", The Energy Resources Institute, 2005.
[79] Most OMCs in India are publicly traded and produce independently audited accounts annually.

year the GoI grants oil bonds (government debt) to the OMCs to recoup about two-thirds of their "under-recoveries"—the difference between the RSP and the notional price of the products the OMCs would have sold them had not the government fixed prices—from selling oil. For FY 2007-08, OMCs received over $7 billion in oil bonds. At the behest of GoI, the remaining one-thirds of the under-recoveries are shared by state-owned upstream companies (ONGC and OIL), mostly ONGC. Figure 18 shows the contribution of ONGC's in helping OMCs recoup under-recoveries. In 2007-08 ONGC received on the average only $52.9/bbl of oil compared with $85.54/bbl price of the international benchmark that year. In total ONGC gave concessions of about $5 billion in 2007-08.[80] Although, in theory, the GoI could ask ONGC to cover a larger share of the oil subsidies, that has not happened. As mentioned in Section 2.4.4, ONGC's return on assets and return on sales (profit margin) have hovered around the 25% mark despite very volatile international oil prices and the *ad hoc* oil-subsidy policies of GoI. This suggests that the overall concessions that ONGC is required to provide are tailored so that its financial indicators remain healthy, which is important for ONGC's attractiveness to the capital markets.

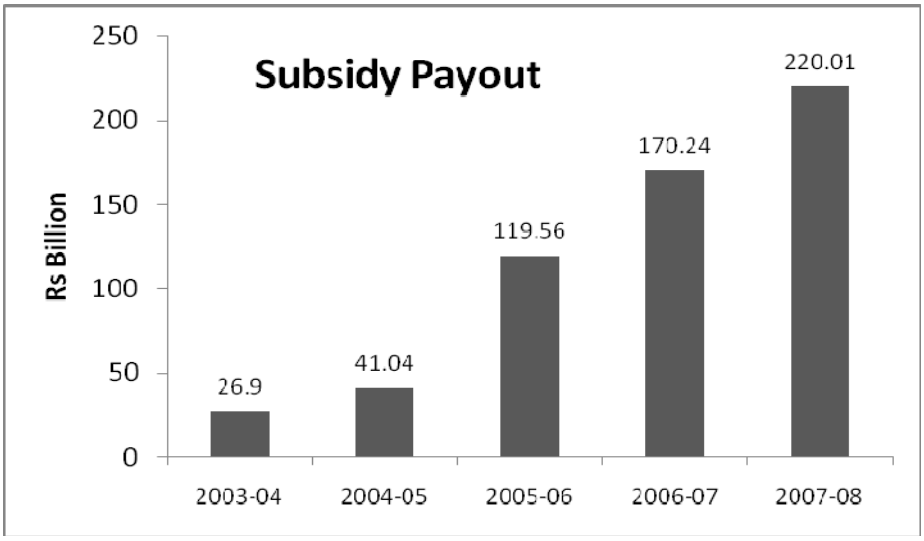


Figure 18: Concessions given by ONGC to downstream companies.
Source: E&P Performance, Presentation by ONGC, New Delhi, May 2008.

[80] *E&P Performance*, Presentation by ONGC, New Delhi, May 2008.

3.5. ONGC's Free Cash Flow

A great challenge that the GoI has faced is managing ONGC's free cash flows. Successful dismantling (for the most part) of price controls for crude-oil prices and high oil prices since 2002 have resulted in high revenues and profits for ONGC: ONGC's revenues more than doubled to $14 billion between 2001 and 2007. In general, such large free cash flows create a conflicting situation between the owners (shareholders) and the management of a company. While owners want maximum performance (for example, returns on investments or some other criteria), the management of a company may have other motives, for example maximizing growth of the company, that are at loggerheads with the owner's expectations. If not properly managed, large free cash flows provide the management with the opportunity to engage in potentially wasteful projects. The difficulty for the GoI really has been how much cash to leave with ONGC so as to enhance E&P performance, while also improving financial efficiency.

One way the GoI has tried to manage ONGC's large free cash flow is by having ONGC pay out large dividends. Thus, the government's take from ONGC increased from $2.5 billion in 2000 to about $7 billion in 2007, mostly on account of higher corporate tax (on profit) and dividends paid by ONGC. By reducing free cash flows, high dividend payments are a way of reducing the conflicting situation described above between the owners and the management of a company. Thus, the distribution of large dividends by ONGC seems to be largely influenced by the GoI's motive to take away any extra cash that cannot be productively employed by ONGC.

Notwithstanding, ONGC is still left with huge amounts of cash (Figure 19). That has afforded ONGC the opportunity to forgo proper risk assessment and due diligence on its ventures, many of which are quite outside ONGC's core competency in the E&P business. ONGC's working capital, i.e., net current assets, has increased dramatically in the last few years—in 2007-08 ONGC's working capital was about $8 billion (of which $3.5 billion in cash); this was less than $1 billion in 1995-96. With sufficient funds at its own command neutral third party assessments by financial institutions have not been a

requirement and the job has largely been left to in-house teams or financial consultants who themselves have a stake in commitment to the project by ONGC.[81]

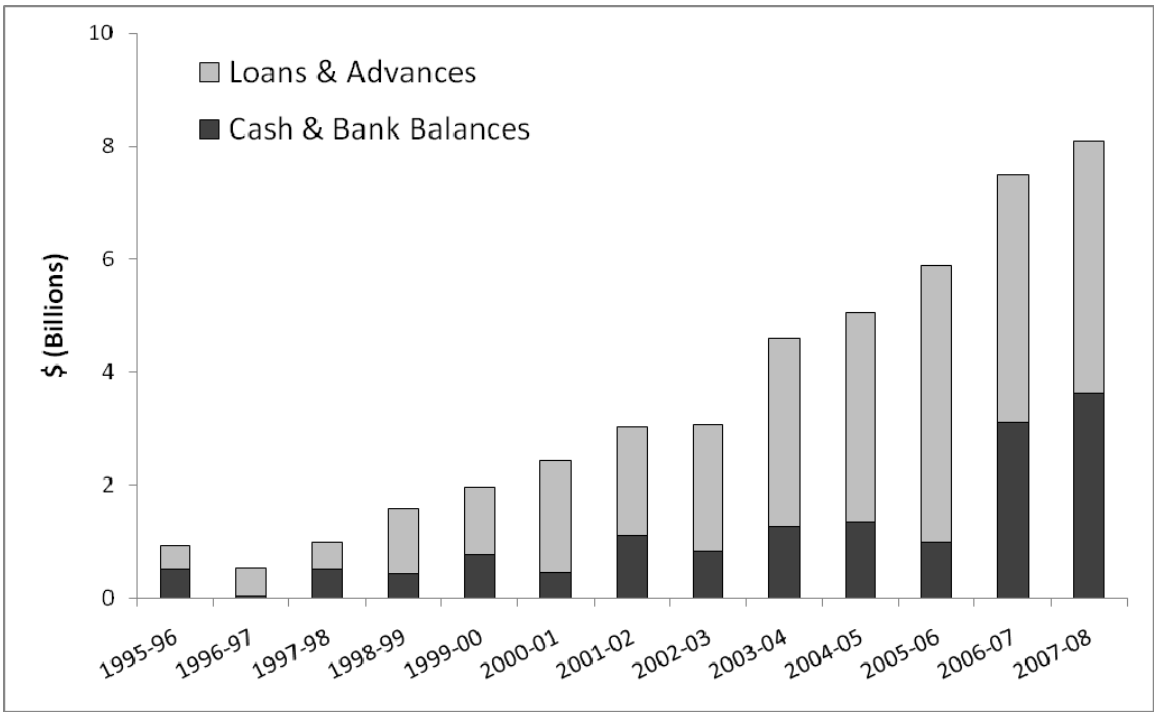


Figure 19: Distribution of ONGC's working capital into loans and advances, and cash and bank balances. *Source: ONGC Annual Reports.*

In the absence of sufficient sound domestic upstream projects, a strong cash position has led ONGC to pursue an aggressive overseas exploration agenda and a range of diversification plans at home. Since 2002 ONGC has tried to enter several unrelated businesses including compressed natural gas, retailing, petrochemicals, power, and shipping. These diversification attempts have brought ONGC in conflict with downstream state-owned companies as well as the GoI itself. Additionally, ONGC has used its strong financial position to purchase new reserves both at home and abroad and to win a large share of exploration blocks offered under the NELP by bidding aggressively. ONGC has also used its cash flow to pay off most of its debt. At present ONGC is nearly a debt-free company (Figure 20). By comparison, the debt-equity ratio of

[81] PESD interviews.

international oil companies is significantly higher: In 2006 it was 0.12 for both Chevron and Shell, and 0.28 for BP.

ONGC's use of its cash flow position is well described by the industrial organization theory, which "implies that managers with unused borrowing power and large cash flows are more likely to undertake low-benefit [projects] or even value-destroying mergers."[82] This managerial behavior is referred to as the 'Agency Costs of Free Cash Flow'. Managers much rather prefer using free cash flows to fund projects internally than to payout the cash to shareholders because using debt to finance projects is concomitant with monitoring of the capital markets, which managers try to avoid.

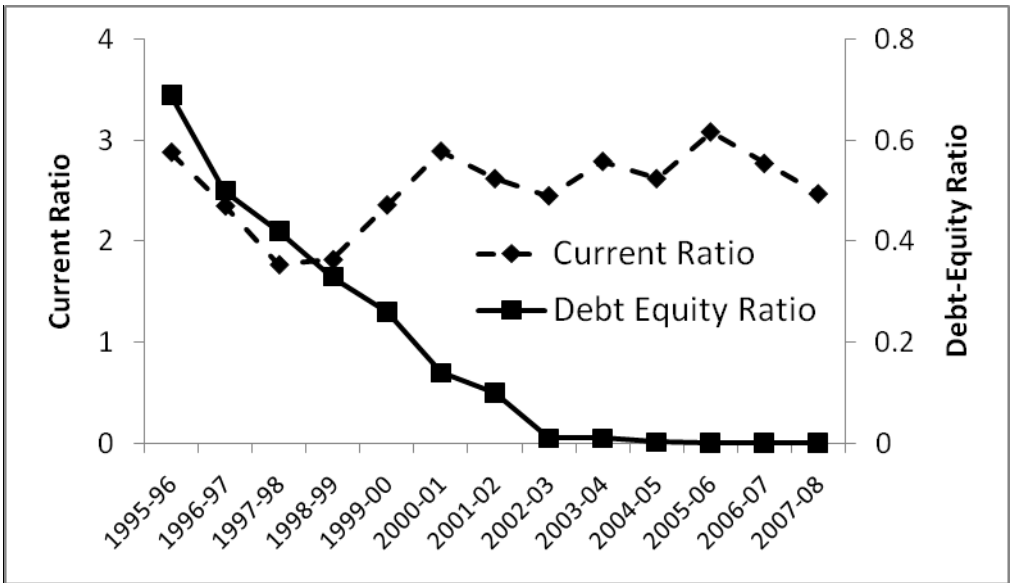


Figure 20: ONGC's current ratio (net current assets divided by current liability) and debt-equity ratio. Between 1995 and 1998 ONGC used cash flows to pay back debt (both current and debt-equity ratios decline together). But since 1998-99, besides paying off the remainder debt, ONGC has also built up significant cash reserves (also see Figure 10 above).
Source: ONGC Annual Reports.

3.6. ONGC's Overseas Operations

ONGC is also spending large sums for acquiring exploration blocks oversees, thus allowing it (at least in the short-term) to claim coherent exploration efforts—by 2007-08 ONGC had extended about $4.5 billion interest-free loan to its overseas subsidiary OVL.

[82] Jensen, M.C., "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers", American Economic Review, Vol. 76, No. 2, 1986.

But OVL's operations provide little evidence of a good E&P business strategy built on strong technical competence. Nearly all of OVL's production comes from properties that were already discovered at the time OVL entered the project or were subsequently discovered by the project operator. Besides having secured a large number of exploration blocks, OVL has had little success in international projects based on its own technical competence.

The two projects that account for most of OVL's proven and producing assets are Sakhalin-I (Russia) and the Great Nile Oil Project (GNOP; Sudan). Both these acquisitions were made early on when OVL was just waking up to the equity-oil-abroad game—OVL acquired 20% stake in Sakhalin-I in February 2001 by buying half of Rosneft's equity (Rosneft is a Russian state-owned company), while contracts for acquiring 25% equity in the GNOP project were signed in September 2002 by taking over the entire stake of Talisman Greater Nile BV (a subsidiary the Canadian company Talisman Energy).[83] When OVL acquired them, at a time when average crude-oil price was around $25/barrel, both these assets had proven reserves. Spiraling crude prices since then have made both these investments profitable for OVL.

ONGC has been selling OVL's overseas ventures to the GoI under the agenda of energy security. But, at present, OVL's operations do not enhance India's energy security by much. OVL's unimpressive technical competence, especially in the international arena, puts severe limits on its ability to run a successful E&P business. Most of OVL's manpower is drawn from ONGC, which has a dubious technical-performance record since the late 1980s even in India, where it has been the main E&P company for over five decades. Further, in the present era of fiercely competitive bidding for promising prospects (in locations with low political risk; see below), it is doubtful that OVL has the technical competence to assess the risk-reward scenarios well enough to put it in an advantageous situation. Indeed, many of the exploration blocks acquired by OVL are in

[83] (i) "The Sakhalin Venture", Frontline, Vol. 22, Issue 22, 2005 (ii) "3 MT Sudan Crude for OVL Annually", Business Line, 14 March 2003.

the "very high risk" category.[84] Such a portfolio is particularly poorly matched for OVL's technical skills.

Partly because of ONGC and OVL's desperate need for good technology, ONGC acquired Imperial Energy, a British company with significant hydrocarbon assets in Russia and Kazakhstan. In an often overlooked matter, ONGC's acquisition of Imperial was driven not only by Imperial's established and prospective reserves base but also by Imperial's exploration prowess. Thanks to its technological edge, Imperial has been very successful in oil and gas exploration. Not surprising, then, that ONGC fought a fierce battle directly with Sinopec and indirectly with Gazprom in order to acquire Imperial. Subsequently, the OVL-Imperial deal was reached in late 2008 when international crude prices were around $130/barrel. ONGC paid a whopping $1.89 billion to acquire Imperial.[85]

OVL's main asset is not technological but political and financial, and the firm's best prospects are in places where competition is limited, for example due to the associated political risks. Indeed, the two major successes of OVL, Sakhalin-I and GNOP, have more to do with politics than technical capability. The now much-vaunted Sakhalin-I investment was made possible only by serious lobbying by the MoPNG, and reportedly needed direct consultations between President Putin and Prime Minister Vajpayee to seal the deal.[86] And the GNOP deal panned out because Talisman Energy was selling its GNOP assets to reduce the political risk of its portfolio. The lack of other competitors to assume these risks offered a rare window for OVL's entry (Chinese firms already had significant investments in Sudan.

[84] *Equity Oil and India's Energy Security*, Dadwal and Sinha, *Strategic Analysis*, Vol. 29, No. 3, 2005
[85] "ONGC chairman defends acquisition of Imperial Energy", Thaindian News, 3 January 2009. Accessed at: http://www.thaindian.com/newsportal/business/ongc-chairman-defends-acquisition-of-imperial-energy_100137817.html
[86] "The Sakhalin Venture", Frontline, Vol. 22, Issue 22, 2005.

3.7. Agency Costs of Monitoring: Counterproductive Monitoring Mechanisms

The choice of government ownership of oil and gas E&P in India through a single dominant firm (ONGC) has had two major implications for the efficiency of the sector. First, the incentive for the MoPNG (the political agent) to effectively monitor ONGC is inherently very low in comparison to a market-monitored firm. This arises due to the paramount difference in the incentives and constraints that political agents (the MoPNG in India's oil and gas sector) face from those that market agents (stockowners) face. Second, ONGC's predominant position in O&G production in India has meant lack of any market benchmark against which ONGC's performance evaluation could be based. Thus, the only choice for the government to monitor ONGC was through indirect and pre-established (*ex ante*) rules. The above two factors, in turn, have meant a lack of an incentive structure to encourage efficiency and performance in ONGC.

3.7.1. Reduced Incentives to Monitor: GoI-ONGC as a Multi-layered Principal-Agent Problem

ONGC's ownership and management structure can be best described as a multi-layered Principal-Agent situation (Figure 21). The real owner of majority equity in ONGC is the general public (Principal1), which in turn has employed the government (the Parliament and the MoPNG) as its *agent* (Agent1) to manage oil and gas production. The government (Principal2) in turn entrusts ONGC's operations with ONGC's management (Agent2), while assuming the responsibility to monitor ONGC's functioning.

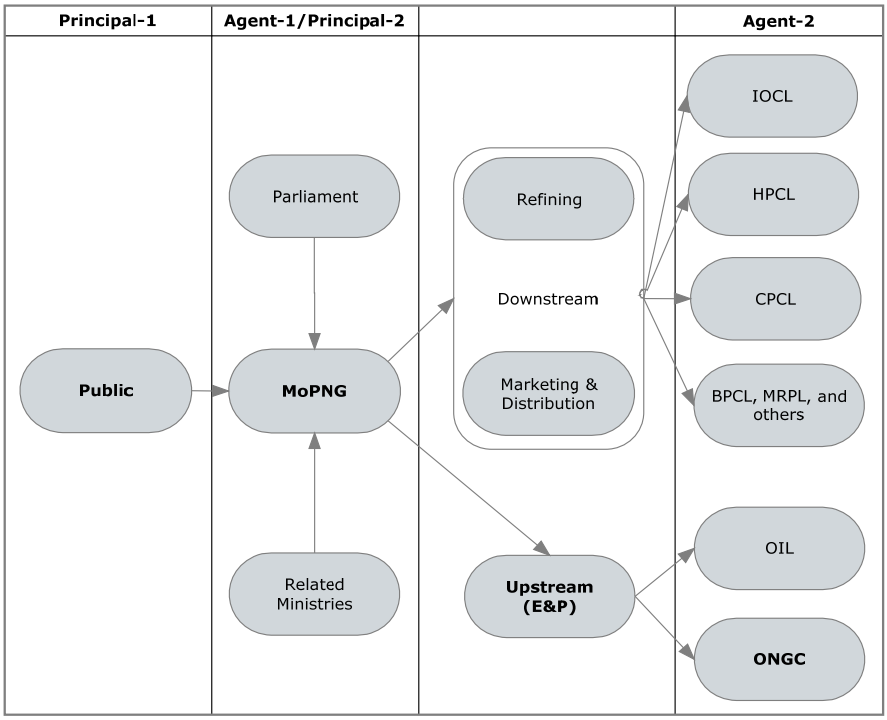


Figure 21: Multi-layered principal-agent structure of ONGC ownership and management.

Principals in the market (stockholders), where the prime motive is profit making, have high incentives to monitor and control costs, as higher costs come at the expense of reduced profitability. But those incentives are significantly weakened in the multi-layered principal-agent situation described above.[87]

Political agents (Agent1) are best described as self-interested actors, whose interests are likely very different from the interests of the public in maximizing the efficiency of a government firm's operations.[88] First, the political agents can themselves not receive directly any benefits (say dividends or bonuses) from the improved efficiency of a government firm. Second, as political agents are normally concerned about maintaining

[87] Tollison, R.D., "Rent Seeking: A Survey", Kyklos, Vol.35, 1982. "A paramount difference between politics and the market consists of the different constraints that confront self-interested actors in the two cases…The point is that political agents face different constraints than private agents because their principals (e.g., voters and stockholders) face different incentives to control the behavior of their agents. Managers of private firms have increased incentives to control cost because increased costs come at the expense of firm profitability. Managers of political firms do not have similar incentives to control costs because they cannot receive personally any savings that they effect in their agencies and since it is costly for voters to delimit shirking by political managers."

[88] Vining, A.R. and Weimer, D.L., "Government Supply and Government Production Failure: A Framework Based on Contestability", Journal of Public Policy, Vol. 10, No. 1, 1990.

position in office they are likely to focus more on politically sensitive issues (like pricing and subsidies) than on mundane day-to-day monitoring of government firms, which is a much more strenuous task. Finally, while in a market principals can easily remove or replace agents (for e.g., through firing or takeovers) it is very costly for principals of government firms (voters) to remove political agents (for e.g., through elections). The end effect of these vast differences between the incentives of market and political agents is that due to lack of incentives there is limited effective monitoring of government firms (by the government) to ensure operational efficiency.

3.7.2. The Lack of Performance-based Incentive Structure

Another key aspect of the GoI-ONGC relationship is the use of a rule-based oversight system by the government (see Section 3.3.1). This choice of oversight system was not intended to make life difficult for ONGC, but it was concomitant with the government's decision to have state-ownership of oil and gas production through ONGC. This is best described by Vining and Weimer:[89]

"An oversight system can be thought of as a combination of *ex ante* rules and *ex post* monitoring. When attributes of output such as quality, quantity, and true marginal cost can be readily observed, *ex post* monitoring tends to be the most efficient way to control organizational performance. In contrast, when quality, quantity, and marginal cost are costly to discover, *ex ante* rules tend to be more efficient. Therefore, we expect an efficient oversight system to rely relatively more on *ex ante* rules than *ex post* monitoring when supply is less contestable because less information about marginal cost is conveyed by price."

Indeed the market to which ONGC supplies is not contestable, as ONGC still produces about 80% of oil and gas in India. As such, the government has little benchmark from the market against which it could judge ONGC's performance. Hence, the government resorts to other, usually more tortuous and time consuming (and thus expensive), sources of information such as internal audits and parliamentary committee reviews.

Higher monitoring costs result in greater use of *ex ante* rules to set boundaries for managerial behavior. Examples of such rules include little discretion over selection and dismissal of employees or rewards and punishments given to them. The idea is to make

[89] Vining, A.R. and Weimer, D.L., "Government Supply and Government Production Failure: A Framework Based on Contestability", Journal of Public Policy, Vol. 10, No. 1, 1990.

it difficult for executives to use the public company's financial residual for personal gains (for example, through selectively favoring subordinates) (Vining and Weimer, 1990, p. 14). But such rules usually engender operational inefficiencies throughout the hierarchy by making it harder to respond to dynamic production demands. For example, *ex ante* rules may prohibit transfer of resources between different functions, thus preventing potential efficiency gains that could be possible through such internal transfers.

But perhaps the most harmful impact of using sweeping *ex ante* procedures for nearly all functions at ONGC is the lack of an incentive structure that encourages efficiency. There is extensive evidence in the literature that shows that management needs to be motivated not only to innovate new ways of improving efficiency but also to even apply existing knowledge, "[W]here the motivation is week, firm managements will permit a considerable degree of slack in their operations and not seek cost-improving methods."[90] For example, the possibility of receiving a higher bonus or a promotion based on performance acts a positive motivating factor, and helps increase productivity. Thus, incentive structure plays an important role in increasing the efficiency and profitability of a firm.

For ONGC *ex ante* rules have precluded it from leveraging efficiency gains offered by a flexible incentive structure to promote a performance-based work culture. For example, if the incentive structure awards better performance then "managers move to better jobs by superior performance on present jobs" and "managers have incentives to try to gain personal advancement by eliminating "inefficient" behavior in others connected with the firm's operations."[91] But, largely as a consequence of *ex ante* rules, managerial promotions at ONGC (and other Indian PSEs) are based less on performance and more on age and years of service.[92] Such practices restrict the use of penalty-reward mechanisms by managers at all levels, thereby denying the management one of the

[90] Leibenstein, H., "Allocative Efficiency Vs. "X-Efficinecy"", The American Economic Review, Vol. 56, No. 3, 1966.
[91] Furubotn, E.G. and Pejovich, S., "Property Rights and Economic Theory: A Survey of Recent Literature", Journal of Economic Literature, Vol. 10, No. 4, 1972.
[92] PESD interviews

most potent methods to improve efficiency. As illustrated in Figure 22, the lack of performance-based incentive structure, then, is the root cause of ONGC's inefficiencies.

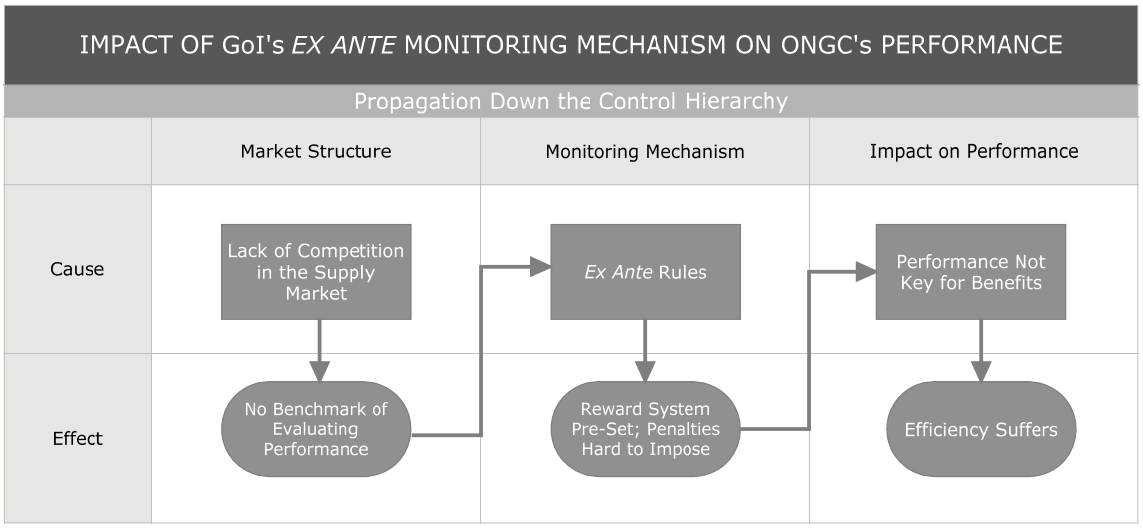


Figure 22: Impact of GoI's ex ante monitoring mechanism on ONGC's performance.

3.7.3. Impact of Nonexistent Ex-post Wage Settlements (Penalty Mechanisms)

Managerial discretion, or a managers' ability to take actions in self-interest that do not serve the interests of the shareholders, is often an issue in state-owned firms and firms with large free cash flows.[93] In general, though, the problem of managerial discretion is less pronounced for firms that operate in liquid labor markets: "If managerial labor markets function properly, any deviation of the firm's actual performance from stockholders' optimum should be settled up in managers' compensation, namely the agency cost will be fully borne by the agent (manager). The existence of such a [*ex post*] settling-up mechanism would deter managers from engaging in risk-reduction activities detrimental to stockholders."[94]

But, it is possible that *ex post* wage settlements may not be practical to restrict such persistent deviations of managers' actions. This is especially true if the managers do not expect to be in the labor market for many future periods. In that case, as the threat of

[93] Davis, G.F., "Agents without Principles? The Spread of the Poison Pill through the Intercorporate Network", Administrative Science Quarterly, Vol. 36, No. 4, 1991.
[94] Amihud, Y. and Lev, B., "Risk Reduction as a Managerial Motive for Conglomerate Mergers", The Bell Journal of Economics, Vol. 12, No. 2, 1981.

significant wage reductions is little, managerial discretion will not be limited on account of fears of *ex post* settlements.[95]

The possibility of *ex post* wage settlements of top managers at ONGC is limited, as nearly all top managers of ONGC (including the CMD) are relatively older. By the time they reach the top rung of ONGC's management they have less than 10 years (often only 5-6 years) of professional career left, which they likely spend at ONGC. As these managers do not expect to be in the job market for long, there is little threat of *ex post* penalties for them. Thus, the present system of promotions and selection of top managers at ONGC provides opportunities for managerial discretion, especially at the top level. Having older executives at the top creates another issue. As the senior-most executives know they will not continue in their positions after a few years they are reluctant to make decisions that will face strong opposition or for which benefits will accrue only after their own tenure is over.

4. CONCLUSION

ONGC is India's fading star. Its first three decades between 1960 and 1990 were spectacular. But since then financial and operational mismanagement have been rampant at ONGC. Its technological capabilities, especially in exploration for oil and gas, have also eroded significantly over the last two decades. ONGC's strategy has nearly always been a reactive response, either to deal with its troubles or to display action consistent with the shifting demands of its owner, the government. The lack of a coherent long-term strategy, but more so ONGC's inability and unwillingness to act on one has meant a continued attrition of ONGC's core capabilities.

The GoI's influence on ONGC is the single most important determinant of ONGC's performance and strategy. In 1956 GoI formed ONGC mainly because of the GOI's socialist bent but more importantly because of fears of opportunism of IOCs. After what

[95]Fama, E.F., "Agency Problems and the Theory of the Firm", Journal of Political Economy, Vol. 88, No. 2, 1980.

appeared to be a glorious success of state-owned business, serious performance troubles emerged in ONGC in the 1990s. Those troubles were a direct consequence of the GoI's largely ineffective oversight of ONGC's operations and a poor incentive structure that government ownership has meant for ONGC. That has bred at ONGC a culture of complacence, slack, and rent-seeking, which continues even today. In an effort to address the underlying causes of ONGC's troubles and for improving the efficiency of the oil and gas sector. While those reforms have fundamentally changed the dynamic of the government-ONGC relationship by making ONGC more independent, the GoI still continues to influence ONGC's performance and strategy in important ways.

The GoI's reform efforts to improve ONGC's efficiency have met with mixed results. Among those, the reforms that have addressed the underlying causes of inefficiency, such as the lack of competition and the overlap between ownership, regulation, and operations, have successfully encouraged efficiency gains. But those that are still mired in the larger political economy of *ad hoc* government intervention have not only failed to achieve their own intended results but have also undercut positive gains elsewhere. In effect, the GoI's hybrid approach of (successful) reforms on one hand and continued intervention and control on the other has failed to unlock the potential efficiency gains in ONGC.

Parts of the GoI's reforms have addressed some key fundamental issues related to ONGC's performance. The GoI's reforms, particularly the policy for empowerment of centrally-owned public sector units, have significantly improved ONGC's financial and operational freedom. As a result, government meddling with ONGC's investments, organizational matters, and day-to-day operations has reduced significantly. But perhaps the most positive impact of the GoI's reform efforts has come from the competition that the GoI injected in India's oil and gas upstream (E&P) sector since 1998 through the NELP. The competition in E&P is still limited—India's E&P is really a duopoly between ONGC and Reliance, with only a few other small players. Yet, even that limited competition has induced ONGC to increasingly adopt international best practices and to

benchmark its technological performance. The NELP has also stripped nearly all of ONGC's regulatory functions and established the DGH as a largely independent technical regulator. That has not only improved oversight of ONGC's operations but also enhanced the trust and transparency in the oil and gas sector, at least in matters of acreage allocation, bidding, and regulation thereafter. Thus, elements of the GoI's reform efforts over the last decade represent substantial positive strides in improving the transparency and efficiency of ONGC's operations.

But three factors have limited the full benefits of the GoI's reform efforts from accruing to India and ONGC. First, the reforms have achieved little in establishing a sound incentive structure at ONGC to encourage efficiency. As the GoI continues to be the majority owner of ONGC many of the problems of multi-layered principal-agent interactions discussed in Section 3.7 still remain. Second, the GoI's continued intervention in several aspects of ONGC's corporate governance and oil and gas sector policy continues to present challenges to ONGC. Those interventions are largely motivated by the GoI's political exigencies and the desire to maintain control over ONGC. By requiring ONGC to devote corporate resources in dealing them, such interventions have often been counterproductive for ONGC's performance. Third, ONGC's large free cash flow has acted as a war chest against the pressures that the reforms have impressed upon it (ONGC). (Ironically, ONGC's large free cash flow owes largely to successful reform in the sector elsewhere, namely in the pricing of crude oil.) As its exploration record has come under the GoI and public scanners ONGC has flexed its financial muscles to purchase new reserves and exploration acreage both at home and abroad. ONGC's extremely strong financial position is a major reason for its success in winning a large fraction of NELP exploration blocks, thus suppressing true completion under the NELP. Large free cash flow has also encouraged managerial deviation at ONGC—over the last decade ONGC has forayed into a range of non-core and unproductive national and international ventures.

Addressing the above issues lies at the heart of driving true efficiency improvements at ONGC and hinges around two items. First, the GoI needs to become a better regulator of ONGC's activities and set the incentive structure at ONGC right. Becoming a better regulator involves developing strong independent regulatory bodies (such as the DGH) across the oil and gas sector, a process of which the GoI has only scratched the surface. And providing right incentives to ONGC involves the increasing use of a performance-based evaluation mechanism (as opposed to rule-based evaluation) both by the GoI to evaluate ONGC's performance and by ONGC internally. As discussed above, the developments over the past decade suggest that ONGC's performance and the GoI's ability to effectively monitor it are positively correlated with competition. Accordingly, progress on the first item depends on the ability of the GoI in fostering more effective competition in the oil and gas sector. Second, ONGC's free cash flow must be tightened.[96] So far the GoI has tried to do that in an *ad hoc* manner, for example through having ONGC pay out large dividends and provide subsidies to downstream companies. But those measures have been inadequate—as discussed above, there is ample evidence of free-cash-flow induced managerial deviation at ONGC. Moving forward, the GoI should require ONGC to use more debt from the capital markets such that ONGC's debt-equity ratio is broadly in line with other companies in the industry.

Finally, it is interesting to speculate how further privatization, if possible at all, might impact ONGC's performance. In theory, further privatization of ONGC, say to reduce the GoI's stake down to below 50%, could help both in establishing an effective incentive structure at ONGC and in reigning ONGC's free cash flow. As in the case with all publicly traded companies, a high degree of exposure to the equity markets would make ONGC's ownership contestable, which in turn would increase the threat of corporate takeover in the event of persistent poor performance. As corporate upheavals put senior managers' jobs and compensation at serious risk, this structure of ownership provides inherent incentives for the company's top management to enhance performance and efficiency

[96] Viewed *only* from the perspective of reducing free cash flow, ONGC's large dividend payouts to shareholders and concessions given to oil marketing companies are good for ONGC's efficiency.

in order to avoid such upheavals.[97] But in practice such a reduction in the GoI's stake in ONGC seems improbable. The GoI continues to regard ONGC as a necessary vehicle for enhancing India's energy security and is nervous about losing further control over ONGC. ONGC itself is financially stronger than ever, which helps mitigate concerns about performance issues but also enables ONGC to resist calls for further privatization. Besides, with Reliance, ONGC's main competitor, having its plates full with the management of its massive natural gas discoveries pressure from the private sector for the GoI to further divest in ONGC has waned. Putting all this together, it is likely that the GoI will continue to maintain a high stake in ONGC. In the absence of any major changes to the equity structure of ONGC, then, ONGC's performance and strategy will continue to depend upon the choices and demands of the GoI.

[97] "Among forces that mitigate the manager-stockholder conflict are competitive labor and product markets, managerial compensation plans, the structure of equity ownership, and the threat of corporate takeovers." Mitchell, M.L. and Lehn, K., "Do Bad Bidders Become Good Targets", Journal of Political Economy, Vol. 98, No. 2, 1990.

APPENDIX A.1: ABBREVIATIONS

ADB: Asian Development Bank
AIOC: Anglo-Iranian Oil Company
APM: Administered Pricing Mechanism
BOPD: Barrels of Oil Per Day
CAG: Comptroller and Auditor General of India
E&P: Exploration and Production
EIA: Environmental Impacts Assessment
EOGIL: Enron Oil and Gas India Limited
GoI: Government of India
GSI: Geological Survey of India
HSP: Hydrocarbon Sector Plan
IBM: Indian Bureau of Mines
O+OEG: Oil and Oil Equivalent Gas
IOC: International Oil Companies
MMT: Million Metric Tonnes
MMTPA: Million Metric Tonnes Per Annum
MoPNG: Ministry of Petroleum and Natural Gas
MWP: Minimum Work Program
NELP: New Exploration and Licensing Policy
NR&SR: Natural Resources and Scientific Research
PESB: Public Enterprise Selection Board
PMT: Panna-Mukta and Tapti
PSC: Production Sharing Contract
PSE: Public Sector Enterprise
RIL: Reliance Industries Limited
RSP: Retail Selling Price

APPENDIX A.2: LIST OF INTERVIEWEES

- Swagat Bam, Vice President (Corporate Strategy E&P), Reliance Industries Limited
- Board of Directors, ONGC (interviewed in a group)
- R.S. Butola, Managing Director, ONGC Videsh Limited (over email)
- Ruchika Chawla, Associate Fellow and Area Convener, The Energy Resources Institute (TERI), New Delhi, India
- Parag Diwan, Vice Chancellor, University of Petroleum and Energy Studies, India
- Anurag Gupta, Head of Department (NELP), Directorate General of Hydrocarbons, Government of India
- Sunjoy Joshi, Senior Fellow, Observer Research Foundation, New Delhi, India
- Sanjiv Kumar, Chief Manager (Finance and Corporate Planning), ONGC
- Sudha Mahalingam, Member, Petroleum and Natural Gas Regulatory Board of India
- Basudev Mahanty, Director, Petroleum Planning and Analysis Cell, Government of India
- Anshuman Maheshwary, Manager, A.T. Kearny Limited, India
- Sashi Mukundan, Country Head, BP India
- R.K. Narang, Ex Chairman, Indian Oil Corporation Limited, Distinguished Fellow, The Energy Resources Institute (TERI), New Delhi, India
- A.S. Popli, Head of Department (Production), Directorate General of Hydrocarbons, Government of India
- Subir Raha, Ex Chairman & Managing Director, ONGC
- Ashish Rana, Energy Resources Group, Reliance Industries Limited, India
- Udayan Sen, Finance Director (Africa, Middle East, Turkey & South Asia), BP
- Pramod Seth, Executive Director (Corporate planning), ONGC
- Suresh Chandra Sharma, Planning Commission, Government of India
- Uma Shankar Sharma, Observer Research Foundation, New Delhi, India
- Vinod K. Sibal, Director General, Directorate General of Hydrocarbons, Government of India
- Manak Singhi, Advisor, Department of Economic Affairs, Ministry of Finance, Government of India
- Ajay Tyagi, Ex Joint Secretary, Petroleum and Natural Gas Regulatory Board of India

APPENDIX A.3: OIL AND GAS MINISTRY AND COMPANIES

Figure A.3.1 shows the structure of energy governance and business in India. Separate ministries are in charge of coal, power, environment and forestry, non-conventional energy resources, and oil & gas. On behalf of the GoI, the Ministry of Petroleum and Natural Gas (MoPNG) leads oil and gas policy and regulation (right side of Figure). The MoPNG is responsible for overseeing all aspects of oil and gas in India, including upstream, refining, marketing, and transport (of crude oil, gas, and petroleum products). A number of other government bodies assist the MoPNG in its functions. In upstream the Directorate General of Hydrocarbons (DGH), an arm of the MoPNG, is the most important government body. The DGH is the technical regulator for O&G upstream activities, and oversees all exploration and mining leases.

In O&G exploration and production (E&P) ONGC is India's largest company, with a production of about 60 MMTPA oil and oil-equivalent gas in 2007-08 (including overseas productions). Besides ONGC, Oil India Limited (OIL) is the other state-owned company in E&P. OIL's oil and gas production is roughly a tenth of ONGC's production. The upstream business (E&P) was dominated completely by ONGC and OIL until mid 1990s when GoI initiated reforms to encourage private investments. Over the past decade Reliance Industries Limited (RIL), India's largest private sector conglomerate, has emerged as ONGC's major competitor in oil and gas E&P. RIL holds over one-third of O&G exploration acreage auctioned under the New Exploration and Licensing Policy (NELP), only behind ONGC which has nearly half of NELP acreage. Starting in 2002, Reliance has made a series of discoveries, largely gas, in the eastern offshore Krishna-Godavari (KG) basin. RIL began gas production from KG-D6 gas fields in April 2009. KG-D6 production is likely to reach a peak production of 29.3 billion cubic meters (bcm) per year in 2011, making RIL India's largest gas producer.[98]

[98] "India can save $8.3 bn annually on Reliance KG-D6 gas", Business Standard, 10 July 2009. Accessed at: http://www.business-standard.com/india/news/india-can-save-83-bn-annuallyreliance-kg-d6-gas/67326/on

The downstream business for O&G (refining and marketing) has a greater number of large companies than the upstream business (Figure A.3.1). Total installed refinery capacity stood at 180 MMTPA in 2008. Reliance Petroleum Industries (RPL, 62 MMTPA) and Indian Oil Corporation Limited (IOCL, 47.3 MMTPA) are the top two refiners, followed by Hindustan Petroleum Corporation Limited (HPCL, 13 MMTPA). MRPL, an ONGC subsidiary, has an installed refining capacity of 9.69 MMTPA. The revenue turnover of the downstream sector is about 4-times that of the upstream sector.[99] Further, in a reversal of trend from 1990, the number of persons employed in the downstream sector (75,000) is over twice that in the upstream sector (34,000) (Table A.3.2). Most Indian refiners also have distribution and marketing operations. As petroleum pricing is a politically sensitive issue, the downstream companies are more exposed to government interference in financial matters. Given the larger size and immediate political importance of the downstream sector, the GoI and the MoPNG tend to focus more on downstream issues.

[99] Petroleum Statistics 2007-08, Ministry of Petroleum and Natural Gas, Government of India.

Figure A.3.1: Energy-related government ministries and state-owned companies in India. *Source: "Energy Situation and Policy in India", Presentation by Hiroyuki Ishida, Institute of Energy Economics Japan, July 2006.*

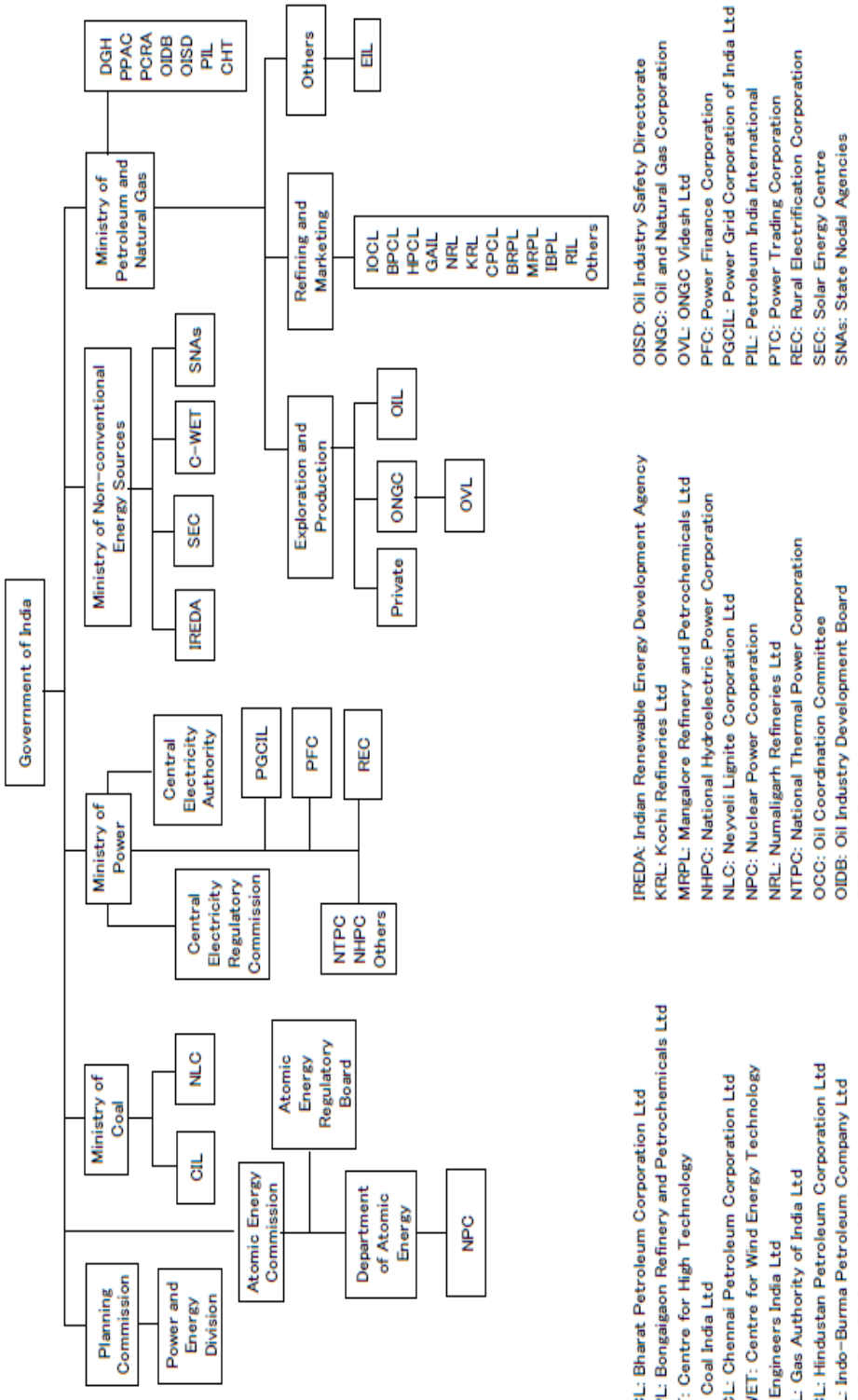


Table A.3.2: Number of persons employed in the oil and gas sector.

SECTOR	1990	2000	2002	2003	2004	2005	2006	2007	2008
1. Exploration and Production	56477	50942	49540	48237	44943	41415	39694	38948	33935
2. Refining	25751	27019	25322	26451	25640	26859	30262	28151	30128
3. Marketing	36261	41110	41865	40561	40232	40628	43317	42970	44995
4. Pipelines	3189	4180	4094	4092	3829	7318	7816	7510	8933
5. Research & Development	@	2858	2797	2330	2278	2096	2071	2029	1964
6. Others	8268	13293	9992	8256	9780	15055	15151	15707	19868
Total	129946	139402	133610	129927	126702	133371	138311	135315	139823

Source: Petroleum Statistics 2007-08, Ministry of Petroleum and Natural Gas, Government of India.

APPENDIX A.4: GOVERNMENT REVENUES FROM THE OIL AND GAS SECTOR

Oil and gas sector revenues form a significant portion of GoI's annual receipts (Figure A.4.1): in 2007-08 central government revenues from O&G sector were about $23 billion compared with total receipts of about $110 billion. Of those $23 billion, ONGC's contribution was about $7 billion. Excise and sales taxes constitute the bulk of government revenues from this sector. Various taxes form about 50% of the retail selling price of gasoline India; for diesel the tax component is about 30%.[100] For April 2009, gasoline (petrol) price in India[101] was $3.1/gallon and diesel price was $2.35/gallon. The corresponding numbers for USA were $2.04/gallon for gasoline and $2.23/gallon for diesel.

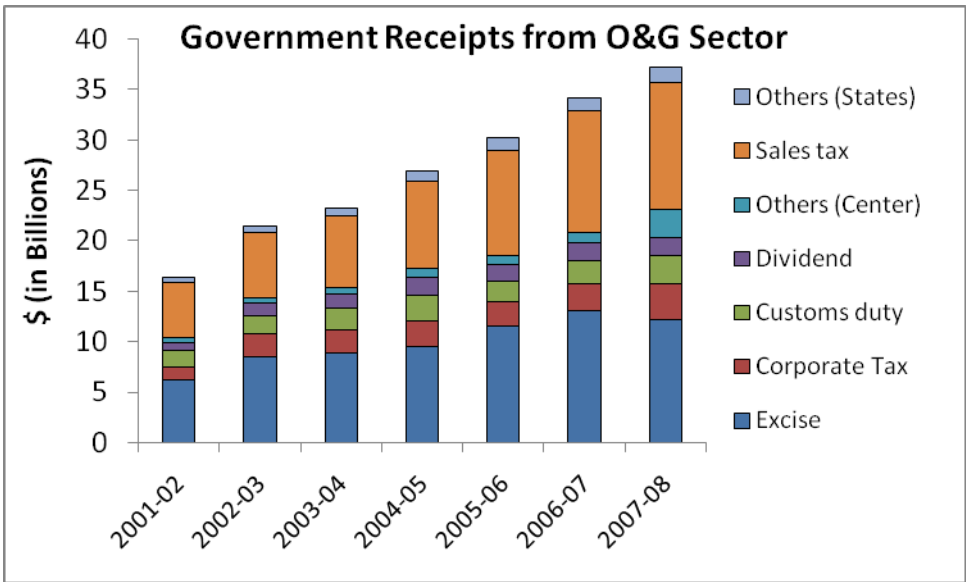


Figure A.4.1: Components of government receipts from the oil and gas sector. 'Sales tax' and 'Other (States)' accrue to the State governments. All other heads are received by the central government. *Source: Petroleum Planning and Analysis Cell (PPAC), Government of India.*

The rapid increase in oil prices has also increased government's take from ONGC from $2.5 billion in 2000 to about $7 billion in 2007, mostly on account of higher corporate tax (on profit) and dividends paid by ONGC (Figure A.4.2).

[100] Petroleum Planning and Analysis Cell (PPAC), Government of India.
[101] Based on prices in Delhi. *Source*: Petroleum Planning and Analysis Cell (PPAC), Government of India.

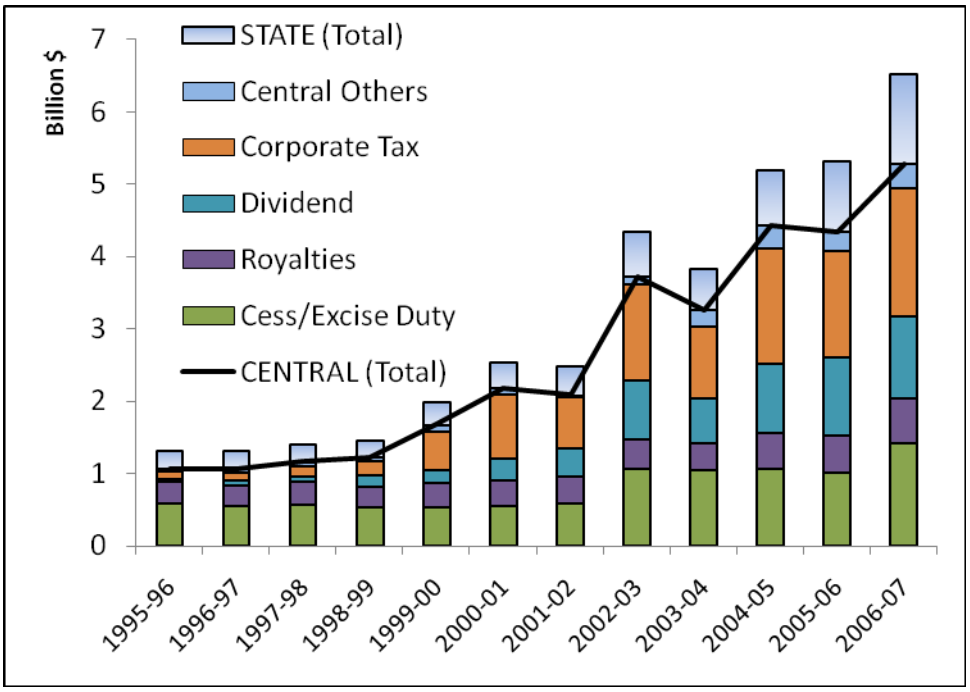


Figure A.4.2: Government revenues through ONGC.
Source: ONGC Annual Reports.

APPENDIX A.5: EXTERNAL ASSISTANCE TO INDIA'S OIL AND GAS SECTOR BETWEEN 1975 AND 1991.

Project	Donor	Year of Approval	Amount
Bombay High I	World Bank	1977	US$150 million
Bombay High II	World Bank	1980	US$400 million
Godavari Petroleum Exploration	World Bank	1982	US$165.5 million
Refineries Rationalization	World Bank	1982	US$200 million
Offshore Gas Development	World Bank	1983	US$222.3 million
Cambay Basin Petroleum	World Bank	1984	US$242.5 million
Oil India Petroleum	World Bank	1987	US$140 million
Western Gas	World Bank	1988	US$295 million
Petroleum Transport	World Bank	1989	US$340 million
Gas Flaring Reduction	World Bank	1991	US$350 million
Oil and Gas Sector Development	World Bank	1991	US$150 million
Special Assistance	ADB	1991	US$150 million
Gandhar Field Development	ADB	1991	US$267 million
Hydrocarbon Sector Plan	ADB	1991	US$250 million
Oil and Gas I, Line of	Canada (CIDA)	1986	C$65 million

Credit			
Oil and Gas II, Line of Credit	Canada (CIDA)	1987	C$198 million
Oil and Gas III, Line of Credit	Canada (CIDA)	1988	C$75 million
Offshore Supply Vessel	Japan (OECF)	1982	¥2.1 billion
Gas Pipeline I	Japan (OECF)	1984	¥20 billion
Gas Pipeline II	Japan (OECF)	1985	¥15.8 billion
Gas Pipeline III	Japan (OECF)	1986	¥18.9 billion
Bombay Offshore I	Japan (OECF)	1979	¥6.2 billion
Bombay Offshore II	Japan (OECF)	1979	¥8.6 billion
Special Assistance	Japan (OECF)	1991	US$150 million
Gas Pipeline	France	1986	FF 624 million

Source: *"Report and Recommendation for the Gandhar Field Development Project", Asian Development Bank, 1991.*

APPENDIX A.6: ONGC'S PRODUCTION

Figure A.6.1 shows ONGC's major exploration areas (basins) and producing areas (assets). In 2007-08, about 70% of ONGC's crude oil and 75% of natural gas production came from offshore areas, mostly off the western coast of India (Table A.6.2).

Figure A.6.1: Production (assets) and exploration (basin) areas held by ONGC.
Source: ONGC website (http://www.ongcindia.com/offices.asp).

Table A.6.2: ONGC's oil and gas production from different regions in 2006-07.

Basin	***Production***		
	Oil (MMT)	Gas (MMSCM)	O+OEG (MMT)
Rajasthan	--	17.17	0.02
Cambay (Western Onland)	6.12	2185.12	8.31
Cauvery Onland	0.35	1130.13	1.48
KG Onland	0.25	1525.07	1.776
Assam-Arakan	1.33	1018.62	2.35
Mumbai Offshore	17.99	16566.62	34.56
Total	26.04	22442.73	48.48

Source: Petroleum Statistics 2007-08, Ministry of Petroleum and Natural Gas, Government of India.