



The Brookings Foreign Policy Studies Energy Security Series

India by Tanvi Madan

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The Energy Security Series

The rise of China and India as major global economic powers, the continued growth in U.S. energy demand, and instability in key oil-exporting regions are dramatically affecting international energy markets. Prospects for stable production are increasingly linked to internal political issues and the regional ambitions of major suppliers. These dynamics will affect the global balance of power, as energy security is becoming a more important factor in countries' national security and economic development calculations.

The Brookings Foreign Policy Studies Energy Security Series is examining four key energy-consuming nations—China, India, Japan, and the United States—and several major producing countries—Russia to start, and then the Gulf States and others as resources become available. The Series will analyze the implications of these nations' policies for the global energy security environment. Initial funding under this project has supported a set of baseline papers focused on oil. Future analyses on this topic will cover the full spectrum of energy security issues.

This report, a study of India's energy demands and policymaking, was written by Tanvi Madan, formerly a senior research analyst at the Brookings Institution and currently a Harrington Doctoral Fellow at the University of Texas at Austin. Brookings Senior Fellow Stephen P. Cohen also contributed to this monograph, as did Sidney Kwiram, Johns Hopkins University School of Advanced International Studies, Washington, DC, and Arti Trehan of the University of Michigan, Ann Arbor.

EXECUTIVE SUMMARY

A Growing Appetite for Energy

Growth demands energy. It is no wonder that India—with an economy expected to grow at over 5 percent a year for the next twenty-five years—has developed a ravenous appetite for energy. India is the world's fifth largest consumer of energy, and by 2030 it is expected to become the third largest, overtaking Japan and Russia.

The country's demand for oil alone is expected to increase at an average rate of 2.9 percent annually over the next quarter century. Yet India has only 0.4 percent of the world's proven oil reserves, and domestic production is expected to remain constant, if not decline. Absent the discovery of major reserves—which most analysts view as unrealistic—it is clear that India will remain a net importer of oil. If consumption follows the current trajectory, India is also projected to run out of coal, its primary source of energy, in forty years. Its domestic natural gas reserves are limited as well.

India's import dependence has intensified concerns that without reliable, affordable energy it will be unable to sustain high economic growth. India imports (to varying degrees) its three major sources of energy, and its dependence on imported oil is expected to increase even further. The situation is complicated by a number of factors: 1) major oil suppliers are in unstable regions in the Middle East and Africa; 2) oil prices are high, spurring higher gas prices; 3) geopolitical uncertainty stokes fears of a possible supply disruption and volatility in oil prices; 4) slow market reform has limited investment; and 5) few or no viable energy alternatives currently exist: India's civilian nuclear program has regularly fallen behind schedule and large-scale development of hydroelectricity generation facilities has been stymied. Development of nonconventional energy sources has progressed, but their use is currently limited.

The Search for an Energy Strategy

To date, India has developed a cluster of energy policies rather than an overarching energy strategy. Ideology, politics, and processes have complicated the country's quest for energy. Attempts at integrating energy policies have been hindered by separate entities overseeing each type of energy source, as well as by stove-piped policymaking on related issues of foreign affairs, economics, and the environment. And the realities of domestic politics and socioeconomic concerns have curbed policymakers' willingness to make tough, yet necessary, choices.

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To date, India has developed a cluster of energy policies rather than an overarching energy strategy.

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Now at a critical juncture, India's policymakers are increasingly aware of the need for an effective and diversified energy strategy—or at least an integrated set of policies to balance foreign policy, economic, environmental, and social issues with the rising demand for energy. While there is little consensus over how best to proceed, there is no doubt that India's need for oil and other forms of energy will continue to grow. Meeting this need will have a decisive impact on the country's actions not just in the energy sector, but in its efforts to achieve its broader strategic goals at home and abroad.

This monograph focuses on India's need for oil and how this demand fits within its broader set of energy policies. The paper is divided into three sections. Part 1 surveys the country's overall energy demand-supply situation, the "energy security" debate in the country, and the issues, actors, processes, and politics involved in energy policy and decisionmaking. Part 2 focuses on India's search for oil, including its supply-side policies, such as efforts toward domestic E&P, acquisition of upstream assets abroad, supply and fuel diversification, and the development of strategic oil stocks. It also examines India's demand-side policies, including regulatory, price and tax reform, fuel conservation, and efficiency measures. The concluding section offers observations about India's likely actions in the energy sector at home and abroad and suggests further areas for research. A number of key findings result:

- India is likely to continue to have a set of separate energy policies formulated by different entities rather than an overarching energy strategy. Integration of these policies will likely improve over time.
- Reform of India's energy sector will continue—but at a slow pace. Implementing policies will be harder than formulating them.
- Unless there is a non-BJP or non-Congress-led government at the center, India will continue to encourage private participation in its energy sector, as much out of necessity as out of choice.
- India's energy-related actions in the global arena will reflect its current foreign policy path of "enlightened self-interest" and maintaining diverse options. It will be cooperative or competitive, as suits its interests—in acquiring assets or pursuing partners—when it thinks it needs to be. However, India would much rather cooperate than compete.
- India would be more inclined to cooperate with the international community (rather than focusing on a particular country or region) in the energy sphere if it were given a seat at the decisionmaking table. Global players should find a way to bring India into the International Energy Agency (IEA) or at least find a place for it in an "energy half-way house" en route to full membership.
- For the foreseeable future, however, India will hesitate to rely completely on global markets. As a consequence, its country-by-country energy diplomacy and purchase of overseas assets will continue. However, its energy interests are not likely to trump the country's larger strategic goals.
- India's energy interests are also likely to factor into its military strategy and behavior in the future. For example, India might be willing to take on a greater share of the international security burden related to protecting oil and gas supply lines.

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Acronyms

AOC	Assam Oil Company
APM	administered price mechanism
AR&T	Assam Railways & Trading Company Limited
bcm	billion cubic meters
BIMSTEC	Bangladesh-India-Myanmar-Sri Lanka-Thailand Economic Cooperation Group
BJP	Bharatiya Janata Party
BOC	Burmah Oil Company
BPCL	Bharat Petroleum Corporation Limited
bpd	barrels per day
CIL	Coal India Limited
CNG	compressed natural gas
CNOOC	China National Offshore Oil Corporation
CNPC	China National Petroleum Corporation
CPI (M)	Communist Party of India (Marxist)
CPM	coal-bed methane
DGH	Directorate General of Hydrocarbons
DPE	Department of Public Enterprises
E&P	exploration and production
ECC	Energy Coordination Committee
EOL	Essar Oil Ltd.
FBR	fast-breeder reactors
GAIL	Gas Authority of India Ltd
GDP	gross domestic product
GNOP	Greater Nile Oil Project
HPCL	Hindustan Petroleum Corporation Limited
IAS	Indian Administrative Service
IEA	International Energy Agency
IOC	Indian Oil Company
IPR	Industrial Policy Resolution
ISPR	Indian Strategic Petroleum Reserves Ltd.
IT	information technology
KG	Krishna-Godavari
LNG	liquefied natural gas
LOC	line of credit
LPG	liquid petroleum gas
LWR	light water reactor
MBI	Myanmar-Bangladesh-India

mmbtu	per million btu
mmtpa	million metric tons p.a.
MNES	Ministry of Non-Conventional Energy Sources
MoU	memorandum of understanding
MPNG	Ministry of Petroleum and Natural Gas
MRPL	Mangalore Refinery & Petrochemicals Limited
mtoe	million tons of oil equivalent
MW	megawatts
NELP	New Exploration Licensing Policy
NPCIL	Nuclear Power Corporation of India Limited
NTPC	National Thermal Power Corporation Limited
OIDB	Oil Industry Development Board
OIL	Oil India Limited
OMCs	oil marketing companies
NDA	National Democratic Alliance
NOCs	national oil companies
OMEL	ONGC-Mittal Energy Limited
ONGC	Oil and Natural Gas Corporation
ORF	Observer Research Foundation
OVL	ONGC Videsh Ltd
p.a.	per annum
P&NG	petroleum and natural gas
PCRA	Petroleum Conservation Research Association
PESB	Public Enterprise Selection Board
PHWR	pressurized heavy water reactor
PPAC	Petroleum Planning and Analysis Cell
PSU	public sector undertaking
R&D	research and development
RBI	Reserve Bank of India
RIL	Reliance Industries Limited
Rs.	rupees
SPR	strategic petroleum reserve
TERI	The Energy and Resources Institute (formerly Tata Energy and Research Institute)
UAE	United Arab Emirates
UPA	United Progressive Alliance
WTO	World Trade Organization

Introduction

At the start of the current century, the author of a book on energy in Asia referred to India as a “lumbering elephant.”¹ Six years later, while it may not be galloping at quite China’s pace, India definitely has moved on from its days of seemingly aimless plodding. As a former senior Indian official noted, India is at a “new threshold of growth.”² Energy is fueling the sped-up Indian economy, which in turn is fueling demand for even more energy.

Rapid urbanization, industrialization, rising incomes, and the growing use of energy-intensive products are driving India’s demand for energy.³ A few sets of figures provide a picture of how the landscape is changing.

- In 2005, 27.2 percent of India’s population lived in urban areas. By 2030 this figure is estimated to grow to 45.8 percent.⁴
- The country’s per capita annual income is set to increase from \$728 today to \$5,930 by 2030.⁵
- In 2003–04 India had 5.7 million cars; by 2030 there are expected to be 200 million cars on the roads.⁶
- India’s primary commercial energy consumption is also predicted to jump—from 375.8 million tons of oil equivalent (mtoe) in 2004 to 812 mtoe in 2030 (India’s own planners estimate that this figure will be higher).⁷

Over the last several decades, India developed a cluster of energy policies rather than an overarching energy strategy. In addition, it created distinct policies for national security, foreign affairs, economic issues, and the environment. Although the issues overlap, policymaking processes were largely “stove-piped” or segregated, especially at the lower levels. Today, there is increasing recognition in India—as in other rapidly growing states with complex security environments—that these issues are closely interlinked. This monograph is a preliminary survey of India’s energy policies and policymaking processes—preliminary because it primarily focuses on a single, albeit very problematic, source of energy for India: oil. Further analysis of this issue should encompass an “all-sources” approach and take a deeper look at the relationship between India’s energy policies and its overall strategic policymaking.

India finds itself at a critical juncture where its policymakers’ decisions on strategic, political, economic, social, and environmental issues will have an impact on the country (and its citizens), and on its role in the world for years to come. Each of these issues, in turn, could be affected by policymakers’ decisions on how to meet India’s growing energy needs. Yet when it comes to the subject of energy in general, and oil in particular, there is little consensus in the country. The one point of agreement is that in the midst of high oil and rising gas prices, India’s thirst for energy will continue to grow. How this thirst is quenched will have a crucial impact not just on India’s economic growth, but also on its internal political and social stability, as well as its relations with other states.

Concern about India's energy requirements is not new—at least in India. The degree of concern, however, has increased recently, as has the fact that this sentiment is now echoed abroad—albeit for different reasons. This concern has resulted in not so much a debate as a cacophony over optimal Indian energy and oil policy. This monograph examines reasons for the concern, as well as where the debate is likely to lead India—at home and abroad. It is divided into three parts.

- Part 1 first presents a snapshot of India's overall energy demand-supply picture. Second, it discusses what Indian analysts and decisionmakers mean when they talk of “energy security;” why there is so much concern about the subject; the themes of the debate; and the sets of other issues that the government has to consider before it can adopt any major energy policy. Third, it offers an overview of the still-complicated process by which India makes its energy policies—a process that is becoming even more complex as more actors start to play a role in it. The monograph considers players and how they interact. Finally, it examines the question of whether India has, indeed, developed an energy strategy.
- Part 2 focuses on India's continuing search for oil, a source of energy that has been the subject of great concern. First, it provides a brief history of this quest and the situation as it stands today. Second, it considers India's supply-side policies, including measures related to domestic exploration and production, acquisition of upstream assets abroad, supply and fuel diversification, and strategic oil stocks, as well as their limitations, and regulatory reform. Third, it examines India's policies on the demand side, including price and tax reform, fuel substitution, and conservation and efficiency measures.
- The final part of this monograph offers some preliminary observations about India's likely domestic and international behavior as its decisionmakers try to balance its strategic, political, socioeconomic, environmental, and energy needs. While the chief focus of this study is oil, our preliminary judgment is that further work on additional sources of energy may not alter the broad conclusions that have been reached here.

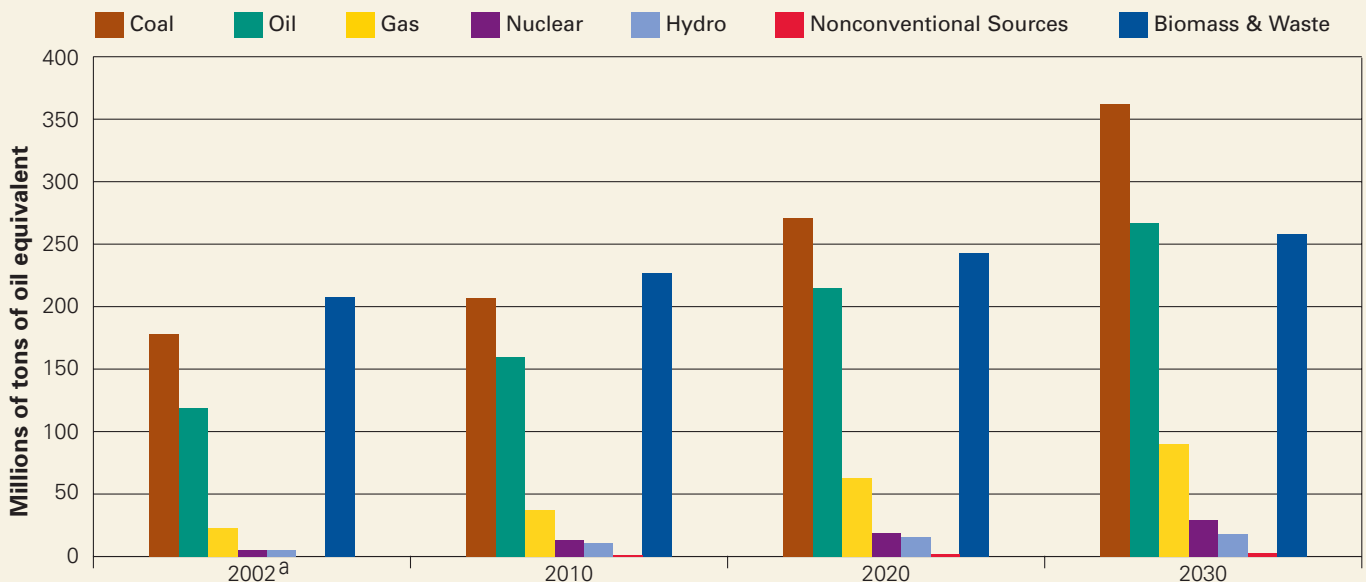
Part 1. Energy: A Snapshot

Energy Consumption Patterns

India today is the fifth largest consumer of energy in the world, accounting for 3.7 percent of the world's consumption. Its total primary energy demand is expected to almost double by 2030 (fig. 1). Its primary commercial energy consumption in 2004 stood at 375.8 mtoe and involved coal, oil, gas, and electricity generated from nuclear, hydroelectric, and renewable sources.⁸ India's commercial energy consumption is expected to more than double to 812 mtoe in 2030.⁹ These figures do not even include the energy that is consumed from traditional sources by 66 percent of Indian households.¹⁰ Estimates of energy use from traditional sources tend to be approximate, but figures indicate that in 2002, 184 mtoe of energy came from such sources as fuel wood, dung, crop residue, biogas, and waste (while 354 mtoe came from the sources mentioned above).¹¹ This use is expected to grow to 215 mtoe by 2030, though as a percentage of the total primary energy consumption, its share will drop from 34 percent to 21 percent.¹²

Per capita primary energy consumption is still fairly low in the country (520 kilograms of oil equivalent—less than a third the world average),¹³ with large disparities in the energy consumption pattern. India's energy intensity, however, is still fairly high. This is particularly true of its oil intensity, which in 2004 was double the world average—the country consumed 1.5 million barrels of oil for every \$1 billion of gross domestic product (GDP).¹⁴ This is, however, expected to change for the better. There already has been a declining trend with a 30 percent reduction in the country's energy intensity from 1994 to 2003.¹⁵

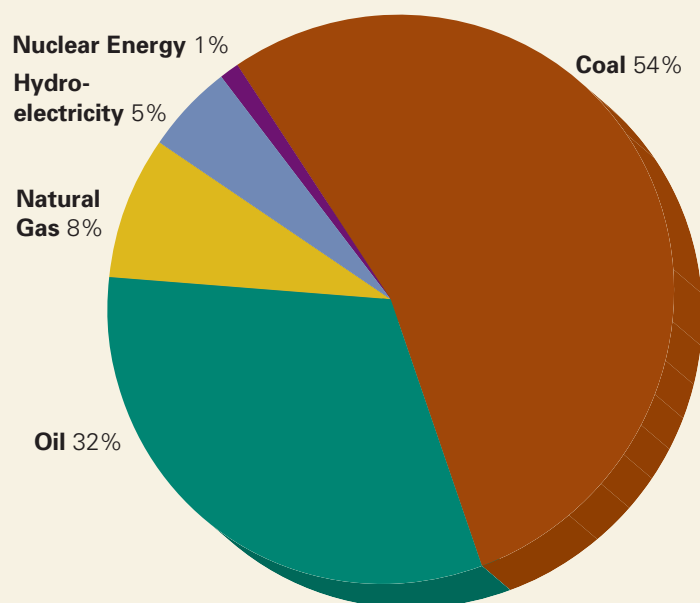
Figure 1. India's Primary Energy Demand



a. In 2002 nonconventional sources equaled 0 percent of total production.

Source: *World Energy Outlook 2004*

Figure 2. India's Energy Mix



Source: BP Statistical Review of World Energy, 2005

The Energy Mix

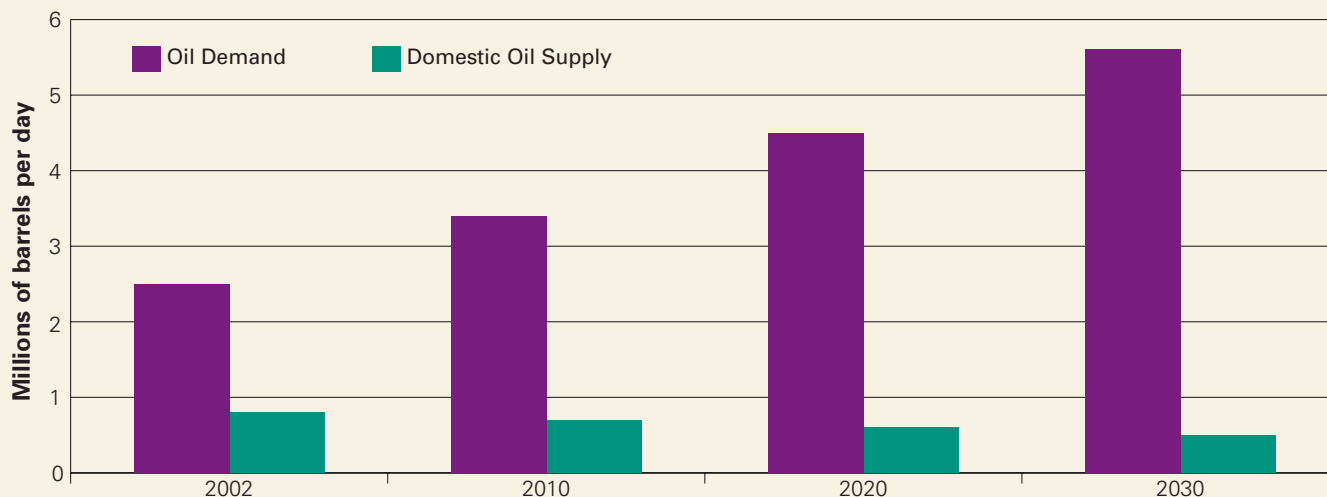
India's energy mix is (and has long been) coal dominant, with coal accounting for more than half of primary commercial consumption and oil accounting for almost a third (fig. 2). Below is a brief look at each of these sources. Part 2 details Indian government policies related to these energy sources.

Oil

While India's addiction to oil might not be as strong as that of the United States (both in terms of actual oil consumption and oil as a percentage of total energy consumption), its consumption of oil is growing. It will soon be the world's fourth largest consumer of oil, currently it is the sixth. India has been guzzling increasing amounts of oil fueling an economy that has been growing at over 7 percent a year since 2003 (fig. 3). While this growth rate is expected to slow, the Indian economy is still expected to grow at over 5 percent a year over the next twenty-five years.¹⁶ Corres-

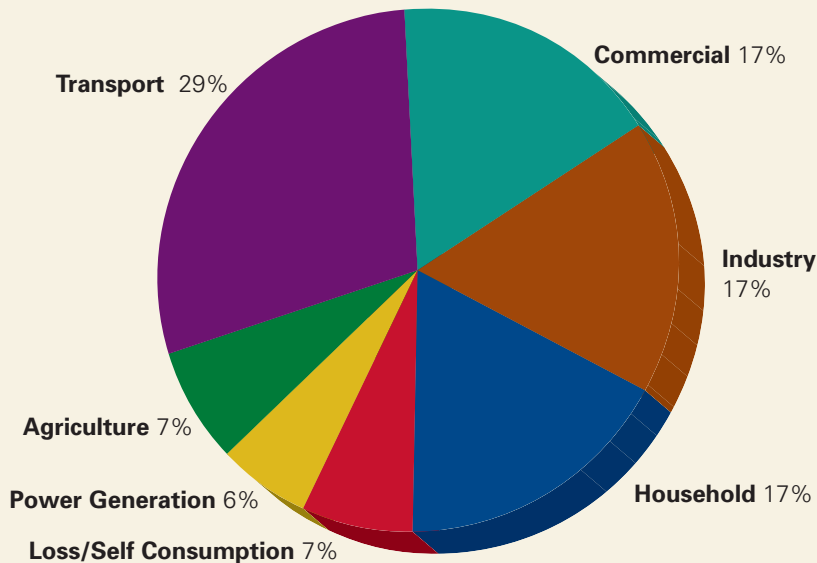
pondingly, while global oil demand is expected to increase at an annual average rate of 1.6 percent, India's demand for oil is expected to increase at an average rate of 2.9 percent annually from 2002 to 2030.¹⁷ However, at that point oil will constitute a smaller share of its overall commercial energy consumption.

Figure 3. India's Projected Oil Demand and Domestic Supply



Source: World Energy Outlook 2004

Figure 4. Oil Consumption in India by Sector, 2003–04



Source: Expert Committee on Energy Policy, *Draft Report of the Expert Committee on Integrated Energy Policy*, 2004, p. 54

Oil and its products are consumed in the transport, commercial, industrial, and domestic sectors.¹⁸ As India's power grids fail to provide a reliable and consistent source of electricity, oil is also being used in captive power generation, as well as to power irrigation for agriculture (fig. 4).

There is a widening gap between India's consumption and production of oil. With India's domestic production of crude oil standing at just 819,000 bpd in 2004,¹⁹ contributing only 1 percent of the world's total oil output, the bulk of India's supply comes from beyond its borders.²⁰ Domestic production is expected to remain constant, if not decline, over time. There have been a few new discoveries, but production from these fields is merely replacing that of older oilfields. Thus, while oil is expected to account for a smaller portion of India's energy supply, India is likely to import a greater portion of the oil it does use. In 2004

India imported 68 percent of its oil. With only 0.4 percent of the world's proven reserves²¹ and production estimated by the International Energy Agency (IEA) to be less in 2030 than it is currently, this dependence on foreign oil is projected to grow to 91 percent by then.²² One hears of hopes (and even resigned humor) about the possibility of the discovery of major oil reserves in India;²³ some analysts even contend that India sits on "a veritable hoard waiting to be tapped."²⁴ Overall, however, there is acknowledgement that this is improbable—that when it comes to oil, India will likely be "a net importer till global reserves run out."²⁵

India's dependence on foreign oil is longer standing than that of China. India either buys its oil through spot purchases (for example, from Nigeria), short-term contracts (generally of three months) or longer-term contracts (of a year, for example, from Saudi Arabia). It imports its oil mainly from the Middle East, which in 2004–05 was the source of 67 percent of India's foreign oil purchases. India's largest oil suppliers are Saudi Arabia (providing 25 percent), Nigeria (15.7 percent), Kuwait (11.9 percent), Iran (10 percent) and Iraq (8.7 percent).²⁶

Natural Gas

India is a relative newcomer to the use of natural gas. In the 1970s and 1980s, it accounted for a negligible part of Indian energy consumption; the use of natural gas picked up after the 1987 Bombay High field went into production. More recently it accounts for about 29 mtoe, constituting just about 8 percent of India's total commercial energy consumption. Today, it is one of the fastest growing sources of energy in India. While the IEA estimates that over the course of 2002–30 Indian oil consumption will grow at 2.9 percent a year, it

expects the use of natural gas in the country to grow at a rate of 5 percent a year over the same period.²⁷ By 2030 natural gas is expected to account for more than 10 percent of India's energy consumption.

In India, natural gas is used mainly for power generation and in the manufacture of fertilizers. Transportation and agricultural and domestic users account for the rest of consumption, with these sectors' consumption expected to increase as demand for vehicular compressed natural gas (CNG) increases and more homes are supplied with piped gas.

As recently as 2004, 29.9 billion cubic meters (bcm) of the 32.1 bcm of gas consumed annually in India were sourced domestically. Most of India's domestic sources are offshore (off the western coast), where a couple of major discoveries have been made recently. Most of India's onshore fields are located in the states of Assam, Gujarat, and Andhra Pradesh.

India imported gas for the first time in 2004, in the form of liquefied natural gas (LNG) from Qatar.²⁸ Currently the country has two LNG terminals at Hazira and Dahej. With only 0.5 percent of the world's proven gas reserves, however,²⁹ and consumption expected to increase, the dominance of domestic gas is likely to change, with India becoming increasingly dependent on imported gas.

Coal

India is the world's third largest consumer of energy from coal, consuming 204.8 mtoe (in 2004), which accounts for more than half of the country's total commercial energy consumption.³⁰ While coal is probably the most polluting source of energy, it is abundant (India has the fourth largest reserves of coal in the world) and relatively cheap, and it is considered easier and safer to transport than oil or gas.

In India, coal is used for power generation and in steel and cement mills. While coal's dominance as an energy source in India has slowly been decreasing, it is expected to continue, still accounting for more than 40 percent of consumption in 2030.³¹ The IEA estimates that 362 mtoe of India's commercial energy will come from coal by then.

The majority of India's coal reserves are located away from the major energy consumption areas in the north and west—in the country's eastern and central states (Madhya Pradesh, Bihar, Jharkhand, and West Bengal). Recently, India has had to start importing coal, as production has struggled to keep up with consumption. The domestic coal shortage is expected to persist for at least another four years,³² with India projected to spend \$6 billion a year importing coal until 2015.³³

Hydroelectric

India is the eighth largest consumer of hydroelectricity in the world, and this power supply accounts for 5 percent of the country's total consumption of commercial energy. India is estimated to have the potential to produce 150,000 megawatts (MW) of energy through hydro sources. Currently, there is installed capacity to produce only about 31,000 MW of energy.³⁴ This hydroelectricity is produced using a number of rivers around the country as well as in neighboring Bhutan.

Nuclear Energy

Nuclear energy accounts for only 1 percent of India's primary commercial energy consumption. In 2002 it accounted for five mtoe of the commercial energy supply; by 2030 this is expected to increase to at least 29 mtoe (though these projections could change depending on the fortunes of the U.S.-India nuclear "deal").³⁵ There are currently fourteen nuclear power plants run by the state-owned Nuclear Power Corporation of India Ltd. (NPCIL) in the states of Karnataka, Gujarat, Tamil Nadu, Uttar Pradesh, Rajasthan, and Maharashtra. Together they have a capacity of 3,310 MW.³⁶

A Note on "Power"

Indian discussions of energy are invariably dominated by its "power" usage and needs. Today, India's installed power capacity is 127,423 MW. By 2030 the government projects that the capacity needed will be 400,000 MW, especially if it meets its goal of providing every citizen access to electricity. In the last quarter (April–September 2006), peak demand stood at 95,583 MW, only 87.8 percent of which was met.³⁷

Most of India's electricity is produced from fossil fuels (56 percent from coal, 10 percent from gas, and 1 percent from oil). The rest comes from hydroelectric plants (25 percent), nuclear power stations (3 percent), and the exploitation of renewable sources such as biofuels, biomass, solar, tidal, and wind (5 percent).³⁸ According to government calculations, even in a best-case scenario, fossil fuels will continue to dominate, with 75 percent of power being generated from coal, oil, and gas by 2020.

India has been experiencing a shortfall of electricity (of 11 percent at peak supply). According to the governor of the Reserve Bank of India (RBI), India's central bank, this lack of power, along with poor infrastructure, is hobbling investment and growth.³⁹ One of the major reasons for the shortfall has been a shortage of coal and gas. In July 2005 twenty-two of seventy-five coal power stations (with a capacity of 61,000 MW) faced severe coal shortages even though all stations are required to maintain fifteen to thirty days of coal stocks for emergencies.⁴⁰ The National Thermal Power Corporation Ltd. (NTPC), India's largest thermal power generator, has reported shortages of gas for its power plants as well and has resorted to using the more expensive fuel naphtha at some of them.⁴¹

The government has asked both NTPC and the Gas Authority of India Ltd. (GAIL) to develop options for power generation to address shortages.⁴² It has also liberalized the sector somewhat, though generation is still dominated by the public sector, as is transmission. Distribution in a few states has been privatized, and despite fears, this has not resulted in huge price increases. Another option that analysts have discussed is power grids from Central Asia, though experts have not assessed the financial and technological viability of these proposals in detail.

Energy Security

What Does it Mean?

"Energy security" is a phrase that is heard increasingly often in India. A former official noted that discussions that in the 1990s would have been about "energy," are now about "energy security."⁴³ It was the theme of the Indian president Abdul Kalam's 2005 Independence Day speech⁴⁴ and has been the subject of a number of Prime Minister Manmohan Singh's speeches. It has also been the concern of a number of related committees set up by the government, including one of eminent persons to provide advice on energy issues, another on reforming the coal sector, and another on the pricing of petroleum products. Energy security has also been the focus of a number of reports, including one by the Planning Commission of India on the need for an integrated energy policy. Politicians, current and

former officials, think-tank professionals, and the business community have all expressed concern about the issue. Governmental and nongovernmental entities have convened a number of conferences and workshops related to energy and energy security; these topics have been the subject of reports from a number of consulting firms as well.⁴⁵

But “energy security” means different things to different people. Indeed, the deputy chairman of the planning commission has said that “it was never clear in anybody’s mind what energy security (is).”⁴⁶ While talk of “energy security” has increased, clarity about its meaning has not necessarily improved and includes a wide range of interpretations:

- Security of supply of oil and natural gas; secure lines of interdependence.
- Oil security—some in this camp further believe energy security is more than merely protecting against temporary disruptions; it should take into account price volatility, which poses a risk to India’s economic security.⁴⁷
- Independence from imports, or “oil self-sufficiency,” though most experts dismiss this idea as one promoted by people who either have not assessed India’s situation realistically or have little grasp of technical facts.⁴⁸
- Going beyond the country’s overall requirements as a whole and looking at the requirements of individuals.⁴⁹

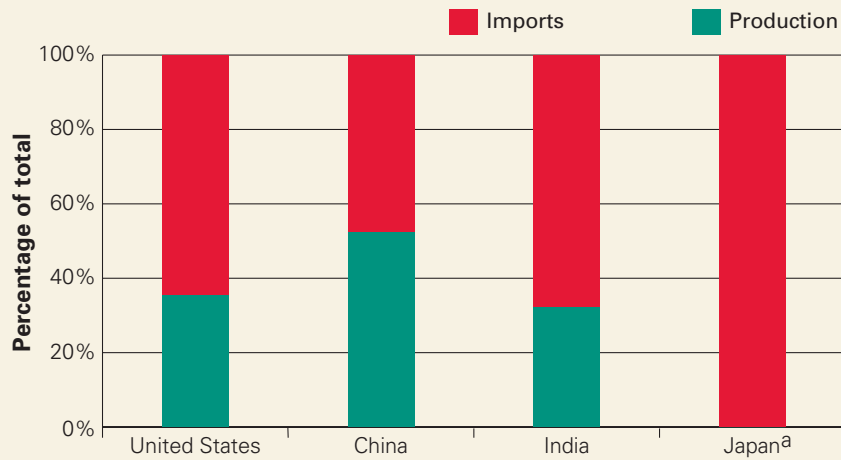
Though the phrase is used extensively without a definition, some in government do elaborate on what energy security means to them. There have been references to the *Wall Street Journal* piece in which Daniel Yergin defined energy security as “the security and integrity of the whole supply chain and infrastructure, from production to the consumer.”⁵⁰ The Indian president defines it as “ensuring that our country can supply lifeline energy to all its citizens, at affordable costs at all times.” He sees energy security as based on a few principles: conservation; secure access to all sources of energy globally (even though he believes “the end of the fossil fuel era is fast approaching”); and access to “reliable, affordable, and environmentally sustainable energy.” But he views energy security as merely a transitory step toward what he believes should really be India’s first and highest priority—energy independence—which he thinks should be achievable by 2030.⁵¹ Others in government disagree, asserting that energy independence is unattainable, at least in the short-to-medium term.

The Planning Commission of India has probably come closest to providing a comprehensive and official Indian definition of energy security to date: “The country is energy secure when we can supply lifeline energy to all our citizens as well as meet their effective demand for safe and convenient energy to satisfy various needs at affordable costs at all times with a prescribed confidence level considering shocks and disruptions that can be reasonably expected.”⁵²

Causes for Heightened Concern

By 2030 India is expected to overtake Japan and Russia to become the third largest global consumer of energy. However, if consumption follows the current pattern and trajectory, the country is projected to run out of coal, its primary source of energy, in forty years.⁵³ Furthermore, its domestic reserves of oil and gas are limited.

Figure 5. Dependence on Imported Oil



a. Percentage of total production equals zero.

Source: BP Statistical Review of World Energy 2005

Today, India is importing a portion of three of its major sources of energy: oil, gas, and coal. And its dependence on imported oil (fig. 5), which is already greater (as a percentage of oil consumed) than that of the United States and China, is expected to increase even further.

The situation is complicated by a number of factors:

- Though India imports oil from more than two dozen countries, almost three quarters of its oil is imported from five countries, all located in regions that are considered fairly unstable⁵⁴ (this trend is likely to continue).

- High oil prices, which in turn seem to spur high gas prices.
- Continuing geopolitical uncertainty stoking fears of a possible supply disruption or volatility in oil prices.
- Few or no obvious viable energy alternatives—progress in its nuclear program has regularly fallen behind schedule; large-scale development of hydroelectricity generation facilities has been stymied by financial, social, and environmental concerns; and non-conventional sources are not yet considered affordable or reliable.

India's appetite for energy is showing no signs of slowing down and its growth rate is expected to continue to be fairly high. Concern about where the energy is going to come from has been increasing as the realization grows that India is not alone in this high-speed quest for energy—it is competing with China, Japan, Europe, and the United States. Finally, in addition to concern that supply routes could be disrupted by instability in the Middle East, Africa, or the Indian Ocean region, worries persist about the potential for domestic disruption due to the vulnerability (by accident, attack, or natural disaster) of onshore and offshore facilities, union strikes, and potentially vulnerable rail and pipeline links.

While a few analysts dismiss energy security as an overhyped concern, overall there is alarm that without “clean, convenient and reliable energy,” India will not be able to sustain a high growth rate across all sectors of the economy.⁵⁵ Vulnerability to volatile prices adds to the problem, causing increases in India's fiscal and trade deficits. There is also a certain amount of discomfort that India's economic growth “stands hostage” to imported energy.⁵⁶

The reason for heightened concern goes beyond the need to satisfy India's “growth compulsions.”⁵⁷ It involves political, social, and strategic dimensions as well. India's leaders have learned that “India Shining” for just the upper and middle classes is not good enough—that

Broad Themes of India's Possible Energy Solutions

- An overall vision and integrated approach
 - Altering the energy mix
 - Self-sufficiency
 - Diversifying sources of supply
 - Actions on the international level
 - Conservation and efficiency
 - Restructuring, rationalization, and reform
 - Improved access to technology
 - Information and analysis
-

the benefits (and drivers) of growth, including access to energy, must be more widely distributed. As the leadership seeks to “alleviate poverty”⁵⁸ and involves more of India’s citizens in the country’s emergence, it has to plan for an increasing number of energy consumers. It also has to factor in a number of households that are likely to transition from using traditional sources of energy to commercial ones, a change that will need to be managed in an efficient manner. Finally, energy security has been a concern because a number of people see an energy-insecure country as one that will be unable to take its “rightful place” as a great power.

Issues in India's Energy Policy Debate

It is almost de rigueur to blame earlier governments for shortages and inefficiencies, but most of India’s energy-related problems are long-standing. For years, India’s concern was tempered by the fact that it had abundant coal reserves and that its energy requirements were not as substantial as they are today and are projected to be in the future. With its high economic growth, supply can no longer keep up with demand. The country has run fiscal deficits for a number of years, and increasingly, there are limitations on how much the public sector can spend. A consulting firm has estimated that India will need an investment of \$225 billion across its energy sector until 2012 to meet demand.⁵⁹ There is indeed a need for massive private investment in the various energy sectors. But private investors have been hesitant to enter the market because they consider it an unlevel playing field. They see preferential treatment for state-owned companies that have dominated the sector, little clarity in terms of market structure, and lack of reform on issues such as pricing, which has made it unprofitable for them to invest.

A number of themes are evident when Indians discuss solutions to the present and predicted energy predicament. Most policy prescriptions include the same elements, but to varying measures and degrees of emphasis. What they stress often reflects organizational or sectoral affiliation (in the same vein as “where they stand depends on where they sit”). Nine broad themes can be identified.

1. AN OVERALL VISION AND INTEGRATED APPROACH

India has a long tradition of state-dominated planning, wherein the state assumed responsibility for the livelihood of its citizens (during the British Raj, authorities similarly claimed responsibility for the livelihood of the Crown’s subjects). Elements of the Indian nationalist movement, notably the Indian National Congress, were strongly influenced by socialist notions of centralized planning, often in five-year increments, and India continues to have five-year plans.

When it comes to the subject of energy, however, there has been criticism that this mode of planning, and especially its implementation, has not produced the best results. A number of observers do not criticize the idea of planning per se, rather they object to its having been “directionless,” “fractious,” and “ineffective” with implementation being “dismal.”⁶⁰ Many Indian analysts emphasize the need for a clear vision and an overall Indian energy strategy. Yet while some of them call for increased strategic planning and prioritization, others think that given the complexities of energy issues and decisionmaking in India, a single strategy

may not be desirable, necessary, or for that matter likely.⁶¹ Instead some experts call for an integrated set of energy policies that are efficient and cost-effective.⁶²

2. ALTERING THE ENERGY MIX

Analysts put forth various recommendations with regard to India's energy mix:

- The solution lies in hydrocarbons. India should encourage private investment at home, acquire overseas assets, conduct oil diplomacy, and participate in projects like transnational pipelines to gain access.
- Natural gas should be the preferred choice.
- India should reduce its dependence on oil by turning to coal, since its coal reserves are abundant.
- There should be a differentiated sourcing plan. Such a plan would take into account geographical, technical, economic, and ecological factors, and involve looking toward coal as the dominant source in eastern India, where it is available, and gas in the western and northwestern parts of the country.
- India needs to decrease its dependence on fossil fuels in general and emphasize nuclear, hydro, or solar energy over the longer term.
- No solution can be comprehensive or effective if it does not factor in both traditional and nonconventional sources.

3. SELF-SUFFICIENCY

Self-sufficiency is a key theme in Indian political discourse. It flows from the desire of Indian nationalists to break away from the shackles of empire; the mind-set and the term continue to have resonance even today. For a few observers and decisionmakers, the solution, at least rhetorically, lies in developing “a strong, self-reliant hydrocarbon sector,” which they aver “must be a national imperative.”⁶³ The Indian president, for example, believes that energy independence with “total freedom from oil, gas, or coal imports” is possible, although he acknowledges that it will take a lot of hard work to achieve. There is great confusion about self-sufficiency and what it would mean in practice in the energy sector. The fact that some India policymakers still consider it an option affects and skews the debate. Most experts and decisionmakers think energy self-sufficiency is impossible to achieve barring a major breakthrough in exploiting solar or nuclear energy (and even this, they argue, could require foreign participation for maximum effect).⁶⁴ They assert that imported energy is going to be a fact of life in India—a fact that should be factored into its energy security plans.

4. DIVERSIFYING SOURCES OF SUPPLY

A number of decisionmakers continue to see solutions abroad. While some experts have called for limiting dependence on oil imports,⁶⁵ others recommend diversifying the sources of India's oil and gas. At the first meeting of the Energy Coordination Committee, the Indian prime minister, for example, emphasized the need to diversify energy supplies in order “to insulate the economy from any future shock.”⁶⁶

5. ACTIONS ON THE INTERNATIONAL LEVEL

A few experts have called for the government to take more initiative abroad by competing and cooperating more intensely in the international arena, and through “enlightened diplomacy and negotiations.”⁶⁷ Other analysts call for more coordination, stating that in a globalized, interdependent world, no country can form an energy policy independently without considering the concerns and actions of others.

6. CONSERVATION AND EFFICIENCY

There have been a number of suggestions (but not much action) on conserving energy and using it more efficiently. Among other things, this would include better technology, improved equipment maintenance, and increased availability and use of mass transit. In addition to recommending that the government provide better incentives and resources for efficiency measures and related research and development, experts have also suggested that India alter its economy to shift to low-energy intensity sectors. They point to France, which they say successfully changed supply (to nuclear energy) and demand (through mass transit like the TGVs). Others, however, feel that it is “unrealistic” to try to alter the energy intensity of India’s growth.⁶⁸

7. RESTRUCTURING, RATIONALIZATION, AND REFORM

There have been a number of related suggestions:

- The energy sector should be restructured and liberalized. Experts, for example, have recommended reforming the coal sector through deregulation, removing government control over the allocation of blocks and the approval process for coal mining, improving operational efficiency, strengthening coal distribution logistics, or focusing on future technology.
- The tax and pricing systems should be reformed, for example, by using relative rather than independent pricing of different kinds of fuels. There have also been calls for an end to government subsidies or at least a transition to targeted subsidies.
- Greater investment—especially through increased private participation—is an oft-proposed solution. Suggestions have included providing incentives, the clarification of policy frameworks (in terms of energy pricing, market structure, cross-border investments, and import and exports of energy products) and the introduction of independent regulatory mechanisms (to initially set prices and then ensure a level playing field).⁶⁹ Experts emphasize that increased energy sector growth will require investment not only in exploration and production facilities, but also in distribution infrastructure: ports, railways, pipelines, and power transmission grids.
- There have also been calls for privatization—of everything from public sector undertakings to ports to pipelines—to bring in capital, technology, and skills.

8. IMPROVED ACCESS TO TECHNOLOGY

A few noted experts have focused on the need for increased technological research. There have, in fact, been some improvements, for example, in clean-coal technology, better nuclear power generation, enhanced oil recovery programs, conversion of natural gas into liquid, coal-bed methane extraction, and heavy oil extraction. Analysts are adamant that there must

be a technological vision to move the country toward renewable sources and to use fossil fuels more cleanly and efficiently.⁷⁰

9. INFORMATION AND ANALYSIS

There has been some talk of the need to collect and dispense information about energy requirements, use, and projections, and to undertake scenario planning. The scenarios that have indeed been developed, say critics, may take into account various growth rates, but they do not factor in the effect that price changes for certain types of energy could have on consumer behavior.⁷¹ For this and other reasons, many experts call for increased funding to support additional independent analysis.

Clearly, India does not suffer from a shortage of proposed “solutions,” and there is rich debate about the best course for energy strategy and policymaking. While this is not a new discussion, there are now an increased number of (and more vociferous) participants, with the popular press and strategic community joining what were once arcane dialogues among a few experts.

Deciding on or implementing any of the proposed energy “solutions,” however, is complicated by other policy considerations. While India’s decisionmakers agree that it is critical to meet the country’s energy needs, they have to balance energy demands with other considerations—strategic, political, economic, social, and environmental—that often trump the quest for energy. Below is a brief look at some of these considerations.

The Government’s Other Considerations STRATEGIC ISSUES

Today, India’s foreign policy is following what the current prime minister calls a path of “enlightened self-interest.” India is forming partnerships—though not alliances—with multiple countries. In a variation on the Palmerstonian axiom, India’s policy seems to be “no permanent allies; lots of good friends.” The country is forming these relationships to serve a number of different interests, including energy security. But each partnership is designed to attain the goal of a strong, respected, independent India that can shape its environment (globally as well as regionally) and protect its core interests.

However, India has conflicting interests that may indeed clash in the future. While it is engaging in more aggressive oil diplomacy with a few countries, considering more acquisitions of oil and gas assets abroad, and thinking about participating in the construction (and use) of a number of pipelines, these attempts are not played out in a vacuum. They occur in the context of India’s developing strategic relationships with a number of other countries, including the United States, that might view some of these other “energy relationships” with concern.

A good example of this clash is the proposed Iran-Pakistan-India gas pipeline, which has been discussed for over a decade and a half. Over the last few years the proposal has taken on new momentum, but the budding U.S.-India strategic partnership complicates any Indian decision to participate. While the United States did not ask India to choose between

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the pipeline and their bilateral relationship, it has made its views on the former quite clear (and offered to open wider the door to another option: nuclear energy). India is also likely to run into conflicts of interest with the United States when considering potential energy suppliers like Myanmar, Sudan, and Venezuela. While India is loath to act under pressure (and often reacts badly if pressured—especially publicly—rather than persuaded), in each of these cases, before acting on its energy security imperatives, the country will have to consider its other strategic interests.

POLITICAL

India, as one often hears these days, is the largest democracy in the world. Over the last decade, the country has held four national elections. Its last two governments have been formed by coalitions—first the National Democratic Alliance (the NDA coalition), which governed from 1999 until 2004 and was led by the Bharatiya Janata Party (BJP), and then the United Progressive Alliance (the UPA coalition), which has ruled since 2004 and is led by the Congress Party.

India's politicians—no less than their American counterparts—are sensitive to the prospect of being punished at the polls for high energy prices. Thus “affordability” is not simply an altruistic goal. There is always a great deal of hand wringing before any energy price hike is approved by a sitting government, even if it is clearly required. India is frequently in the midst of an election or preparing for one. Elections for the central Lok Sabha (Lower House of Parliament) are held every five years (and more often if a government falls prematurely) and India's twenty-nine states and six union territories have assembly elections every five years in groups of four or five. More recently, because of the logistics involved (India has an electorate of more than 650 million), these elections have been held over an extended period. The 2004 national elections, for example, were held in four phases over three weeks; recent state assembly elections were held in eight phases over a month.⁷² India's national political parties also operate at the state level. Conversely, its regional parties have increasingly been playing a role (and indeed participating in the government) at the national level. All this translates to elections frequently on the horizon, and consequently, a strong need to appeal to the electorate.⁷³

In addition, coalition governments, which have become the norm in India, compel the sitting prime minister to contend with a number of views on energy policy. Electoral majorities in India have become thinner over time and governments are afraid to act in any way that might lead to a popular (or indeed party) backlash or the defection of a coalition partner.

Because of political calculations, Indian governments have tended not to pass on the rising prices of energy (especially oil), to the consumer—particularly at election time. Price increases, when implemented, are small and timed extremely carefully. The result is that public sector energy firms (and eventually the government, which bails them out) absorb the losses, adding to India's persisting deficits. Thus there was no commensurate increase in the price of petroleum products for Indian consumers from September 2005 to June 2006, despite the increase in world crude oil prices during that period and a government-appointed committee calling for price reform. While the government denied that elections were the reason for the lack of a price increase, there were indeed state elections in April–May 2006.

Sampling of Indian Newspaper Headlines from 2000 and 2006 (in chronological order)⁷⁴

2000 (BJP-led NDA coalition in power)

Petrol hike not ruled out • Delaying oil price hike may not be possible • Left warns against petrol price hike • Indian Govt Postpones Decision on Domestic Oil Prices • India prepares to hike fuel prices, cut duties • Steep fuel price increase inevitable: Indian PM • Decision on petrol price hike by month end—Naik • India to consider oil price hike after by-election • India orders 18.6 percent hike in fuel costs to offset global prices • CPI(M) to launch campaign against proposed hike in fuel prices

2006 (Congress party-led UPA coalition in power)

Fuel price hike likely • Oil price hike cannot be deferred for long • Chidambaram; Left cautions against fuel price hike • No immediate hike in fuel prices; Indian Oil Min, Fin Min To Meet On Oil Prices; PM makes case for fuel price hike; Petrol price hike next week • Petro-goods prices may rise after polls • Indian cabinet approves fuel price hike; India fuel price rises lead to nationwide protest threats • Finally, fuel prices are up, Govt says no rolling back • BJP takes hike protest to the streets • CPI-M firm on fuel price rollback, says all options open

A set of Indian newspaper headlines from earlier this year (above) offers a succinct look at what tends to occur before and after an energy price increase in India.

As these two sets of headlines illustrate, the government's behavior concerning price increases tends to follow a pattern irrespective of which party or coalition is in power. First, there is speculation about a price rise and subsequent warnings by the Left parties; decisions are postponed. Next, the government tries to prepare the public by saying that a price rise is inevitable, and prices are raised. The opposition protests, as do the government's coalition partners and even dissenting voices in its own party. Then the government denies there will be a rollback. Finally, either the government or its allies back down, or the opposition gives up and higher prices hold.

Political sensitivities are also evident in subsidization. When asked why the government subsidized the price of liquid petroleum gas (LPG) used by the middle and upper classes (mostly in urban areas), Mani Shankar Aiyar, the former Indian minister of petroleum and natural gas (henceforth in this document referred to as "petroleum minister") responded that while it made "little economic sense, it does make abundant political sense."⁷⁵ This is true for power as well, which parties—both at the central and state level—promise to their constituents at subsidized rates (or even free), skewing prices and the demand picture.

Thus no matter how obvious or necessary some solutions seem—like price adjustments—they often appear to be further from implementation than they should be. A former petroleum minister's sentiment that solutions must combine "sound economics and sensitive politics" is a common one among his counterparts.⁷⁶

SOCIOECONOMIC ISSUES

The government's energy policies are also affected by powerful social considerations. With 28–35 percent of India's population still living below the poverty line (as of 2000),⁷⁷ most policymakers in India—from across the political spectrum—make it a point to emphasize that affordability must be part of any energy solution. A number of policymakers mention that affordability is relative, and therefore the country's conception of energy security cannot be defined in anyone else's terms. This view is prevalent outside government as well. A

Political, socio-economic, and energy imperatives, in turn, have to be balanced with fiscal requirements (though these often lose out).

leading analyst has talked of the need not only to obtain enough energy and secure supply, but to do so at a “steady and reasonable cost.”⁷⁸

Both bureaucrats and politicians are conscious that they must work toward enhancing the availability of energy for socioeconomic development. Especially important is the provision of basic modern energy services to the poor in rural areas.⁷⁹ Emphasizing this priority, an official pointed out that wealthier citizens were likely to have access to energy services or at least the means to gain that access.⁸⁰

The government is sensitive to criticism that it is “wedded to the policy of market economy” and accusations that it is focused on making energy available to the elite, especially in urban areas.⁸¹ To dodge such accusations, some of the current government’s own ministers have emphasized that they would not indulge in “mindless liberalization.”

Some analysts have argued that decisionmaking on energy should take into account “distributive justice.”⁸² Thus when the government makes its choices, it has to consider the need to get “reliable supply at reasonable prices.”⁸³ There are also very real tradeoffs that the government has to weigh (and make) in terms of balancing energy and food security, as the exploitation of some energy sources reduces arable land.

FISCAL CONSIDERATIONS

Political, socioeconomic, and energy imperatives, in turn, have to be balanced with fiscal requirements (though these often lose out). A case in point is the pricing of petroleum products (like LPG, kerosene, diesel, and petrol).

Whether out of genuine concern for large sections of society or out of fear that voters will make them feel their pain—or both—India’s decisionmakers have chosen to keep petroleum product prices low, as mentioned above. An example:

- Between September 7, 2002 and September 7, 2005, the price of Dubai crude rose almost 111 percent.
- The retail price of regular gasoline in the United States, during the same period, increased 124 percent; in India, the retail price of petrol rose only 49 percent.⁸⁴

In India, the true cost of international price increases is borne largely by the public sector oil companies, which absorb the losses and by the government, which bails them out. With private interests now permitted limited participation in the energy sector, they also assume a share of the burden.

Recently, the Petroleum Secretary indicated that state-owned oil marketing companies (OMCs) were losing \$51 million a day.⁸⁵ The state-owned Indian Oil Company (IOC)—India’s largest downstream company—announced that it lost nearly \$270 million in April 2006 alone because it could not pass on high prices.⁸⁶ Subsidies also create a burden, though the government has substantially reduced expenditures on them over the years. Central government subsidies on petroleum products are still equivalent to 2.5 percent of the government’s fiscal deficit. In the last fiscal year, the Ministry of Petroleum and Natural Gas

estimates that the state-owned oil companies have subsidized \$8.7 billion in petroleum products.⁸⁷ With cross-ownership, even the upstream companies absorb subsidy burdens. The Oil and Natural Gas Corporation (ONGC) absorbed about \$2.5 billion worth of them in 2005–06.⁸⁸

The government bails out state-owned OMCs when they suffer underrecoveries due to retail price controls. It does so by issuing them oil bonds, which they can liquidate to ensure that losses are limited (or absent) on the companies' balance sheets. In 2005–06 these oil bonds were equivalent to almost 4 percent of the fiscal deficit. So even if the effects of high global oil prices do not show up at the gas pump, in inflation statistics, or on the companies' balance sheets, they are contributing to the country's fiscal deficit. This is true of its trade deficit as well. In 2005–06 India spent \$38.8 billion to import crude oil, up from \$25.9 billion the previous year. Its import bill for crude oil and petroleum products constituted almost a third of India's total import bill and contributes significantly to India's persisting trade deficit, which stood at \$51.5 billion.⁸⁹

The governor of the RBI expressed concern about keeping prices artificially low and the impact this has on the Indian economy, stating that the "government has to take some decision on oil price pass-through."⁹⁰ A senior IOC official, while loath to be openly critical of the government, lamented that the company could not participate in the boom that the Indian economy was experiencing because the government kept prices low. He said that while the government periodically bailed out the firm, such measures might not be sustainable over the long term.⁹¹ There is also a broader understanding that subsidization cannot be continued indefinitely, especially in its current form.⁹² But there is widespread concern about the political, economic, and social effects of removing subsidies completely. Some decisionmakers point to the fact that when Thailand and Indonesia dismantled their subsidy system, it led to high inflation and slower growth rates.

Observers have noted that if governments continue to resist price rationalization, "the price of today's procrastination will . . . be paid by future generations."⁹³ Therefore policymakers also have to keep in mind fiscal worries when formulating and implementing energy policies.

ENVIRONMENTAL FACTORS

India's powerful environmental groups are deeply rooted in its society and have strong ties to various international environmental movements. Environmentalism has recently gone mainstream amid visible signs of increasing pollution in many Indian cities, growing numbers of cases of respiratory illnesses, shrinking forest cover, and reports that India's carbon dioxide emissions have been increasing "alarmingly."⁹⁴ India's president has warned of immense environmental problems if China and India maintain their dependence on fossil fuels.⁹⁵ The prime minister has quantified the losses that environmental problems would entail.⁹⁶ And the Planning Commission's report on India's energy policy has an entire chapter on linkages between energy and the environment.

Policymaking

There are well over a dozen organized agencies, institutions, and sectors that can affect decisions related to energy policy in India. Some of these groups are within the government, which is not monolithic and has many voices on energy policy; some are outside it. The number is growing rapidly, as the private sector plays a larger role in energy decisions and as environmental and political groups expand their influence. Below is an overview of the actors involved.

The Government FEDERAL LEVEL

First and foremost are the ministries and the independent departments directly associated with energy at the federal (or in Indian parlance “central”) level.⁹⁹ There is no longer a single central ministry of energy in India (one did exist before 1992, and it had separate departments for coal, power, and nonconventional energy sources). Instead there are a number of ministries involved that are responsible for policymaking related to various energy sources (described below). An assessment of the effectiveness of the policy process can be found in the Coordination section (page 27).

Each of the ministries is headed by a union minister (who is a member of the cabinet) and usually has a deputy, the minister of state. These ministers are almost always members of the ruling coalition and have to be elected members of either the upper or lower houses of the Indian Parliament. The leadership of the ministries also includes a secretary, the senior-most bureaucrat in that ministry. The post is usually assigned to a career civil servant, who is technically appointed by the cabinet; in reality his or her appointment can be fairly dependent on the associated minister.

Department of Atomic Energy. This independent department has all matters related to atomic energy under its purview, and is responsible for designing, commissioning, constructing, and operating nuclear power plants.

Ministry of Coal. This ministry is “responsible for development and exploitation of coal and lignite reserves in India.”¹⁰⁰ It sets the “policies and strategies” for the sector and has administrative control of Coal India Ltd., a state-owned corporation, and its eight subsidiaries, which together control most coal mining in the country.

Ministry of Petroleum and Natural Gas (MPNG). The purview of this ministry includes exploration and production of oil and natural gas; refining, distribution, and marketing of petroleum products; and the conservation, import, and export of oil and natural gas. It also has administrative control of the state-owned oil and gas companies including ONGC, IOC, GAIL and Oil India Limited (OIL). The Directorate General of Hydrocarbons (DGH), which could be described as the regulator of the upstream sector, also falls under this ministry, as does the Oil Industry Development Board (OIDB), which provides financial assistance (in the form of loans and grants) to the industry. The central government provides the funds that OI DB distributes from the cess (a term for tax) that is collected from firms producing oil domestically. The Petroleum Planning and Analysis Cell (PPAC, formerly the Oil Coordination Committee) within the ministry administers sub-

dies, and is responsible for analysis and forecasting related to the oil sector. The MPNG tends to be the most coveted of the energy-related ministries among potential ministerial candidates (and coalition members). Some analysts say that this is because it is a high-profile posting; others simply refer to it as a “party fundraising machine.”¹⁰¹

Ministry of Nonconventional Energy Sources (MNES). This ministry is responsible for the policies for all nonconventional energy sources including wind, solar, small hydro, biogas, and biomass. It is the first of its kind in the world, a fact many of its officials like to highlight. However, it is probably also the most neglected of the energy ministries.

Ministry of Power. It has responsibility for policy and planning related to power projects and for enacting laws related to thermal and hydroelectric power generation, transmission, and distribution.

Other Ministries. A number of other related ministries have authority touches on energy-related decisions. The more directly related agencies are the Ministry of Heavy Industries and Public Enterprises and the Ministry of Commerce and Industry. Also involved are the Ministry of Finance, the Ministry of External Affairs (MEA), the Ministry of Environment and Forests, the Ministry of Railways, the Ministry of Shipping, the Ministry of Road Transport and Highways, the Ministry of Water Resources, and the Ministry of Science and Technology.

The Planning Commission. One of Jawaharlal Nehru’s most important legacies was to institute centralized planning through the Planning Commission of India. At one time the Commission was centrally important in shaping Indian economic policy. Today, the prime minister remains the chairperson of the Commission, which also has an appointed deputy chair (currently Montek Singh Ahluwalia, a distinguished economist and close associate of the prime minister), who for all intents and purposes runs the Planning Commission. The Commission also operates as the government’s think tank, conducting research and analysis and laying out plans, policies and targets. The Commission’s Power and Energy Division is responsible for the energy sector. The Planning Commission also coordinates plans with the chief ministers of India’s states (together they compose the National Development Council).

While the Commission has a coordinating (and limited monitoring) role, it does not implement policies. Besides the chair and deputy chair, the Commission has seven other members—currently three of them are economists, one is a women’s rights activist, one is a biotechnologist, and two are former members of the Indian Administrative Service (IAS). In addition, the Commission has a number of advisers and consultants.

The role and clout of these ministries and the Planning Commission vary over time, depending on who leads them, how close that person is to the prime minister or the governing party’s coalition’s leaders, and the personal interests of the prime minister. Decisions emanating from these entities stem from a number of the imperatives mentioned above, but they also depend on other factors like the political parties the minister belongs to (or owes his position to) the personalities associated (and their proclivities and interactions), and the processes involved.

Political Parties. There is consensus among the Indian political parties that India has an energy problem. An insightful observer pointed out that there is also, in effect, a political consensus on energy policy because of the way politics plays out these days. When parties are in the opposition, making noise about prices and geopolitics is painless. When they come to power—as most do at some point or another—the realities of India’s energy and economic needs hit them, and they realize that their options are limited.

This is especially true in the case of the two major national parties—the BJP and the Congress party—that have led coalitions over the last few years. There might be different emphasis on issues like privatization, for example, which the BJP tends to favor more than Congress. But the general trend in terms of how they approach energy solutions tends to remain the same. What the parties actually do depends on the kind of coalitions they have. The parties that support but remain outside of a government—as the Left parties are currently doing—tend to be more vocal and sometimes less realistic about potential solutions.

STATE LEVEL

India’s constitution divides responsibilities between the federal and state governments according to three lists:

- the Union List provides the issues the federal government takes care of;
- the State List provides those for which the state governments is responsible; and
- the Concurrent List provides those for which both have shared responsibility.

For example, the Union List includes “atomic energy and mineral resources necessary for its production . . . regulation and development of oilfields and mineral oil resources; petroleum and petroleum products; other liquids and substances declared by Parliament by law to be dangerously inflammable” and “regulation of mines and mineral development to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public.” Power, however, falls under the Concurrent List.

Beyond the responsibilities that the Constitution directly assigns them, there are other reasons the states play a role in energy policy. While major energy resources are subjects of the center, their development can have an impact on issues that fall under one of the other lists. Forests, for example, come under the Concurrent List and agriculture falls under the State List—both of which can be affected by policies made by the MNES.¹⁰²

Additionally, some Indian states own energy firms, like the Gujarat State Petroleum Corporation, which dominates exploration and production in the oil and gas sectors in the state of Gujarat, and is also the parent company of gas transporter Gujarat State Petronet Ltd., which has a network of pipelines across the state.¹⁰³ State governments own stakes in some refineries as well.¹⁰⁴

Finally, with national parties sometimes governing at the state level and regional parties (who are also present or potential coalition partners at the national level) competing at the state level, the states have an indirect way of influencing policies and politics at the national level.

The cross-cutting nature of energy issues and the various entities' responsibilities mean that there is always a need for coordination—among the ministries (and departments) responsible for energy-related issues, as well as between the center and the states.

COORDINATION

India's diversified official decisionmaking does have some advantages—including more and different inputs as well as cheerleaders for each energy source, ensuring that none are totally neglected—but it comes at a cost. The cross-cutting nature of energy issues and the various entities' responsibilities mean that there is always a need for coordination—among the ministries (and departments) responsible for energy-related issues, as well as between the center and the states. This obligation even extends to ministries that normally would not be considered energy related. For example, any large-scale biodiesel project would require coordination with the Ministry of Rural Development and the Ministry of Panchayati Raj (which deals with village-level governance), among others, to promote and implement the project.

The kind and scale of coordination that takes place among the various government entities depends on the issue, as well as on the level of government and the people involved. At higher levels of government there are processes and mechanisms in place. Issues of cross-cutting impact are brought up in Cabinet Committee discussions, where the concerned ministries have representation.¹⁰⁵ This setting is the venue for coordinating policies and resolving conflicts. The government can also constitute Committees of Secretaries that bring together the senior-most bureaucrats from ministries involved in certain issues. The Planning Commission also offers a venue for coordination (or at least discussion). However, one senior official, lamenting the lack of an integrated approach, indicated that he did not think that the Commission was the ideal forum for coordination.¹⁰⁶

At the middle and lower levels—where the details of the policies are often developed and processed—coordination is often more ad hoc and personalized. Such a case might simply involve a joint secretary in one ministry calling his or her counterpart in another and soliciting their views on a particular policy. While this system manages to work, it can sometimes mean that a policy that emanates from one ministry does not get feedback from the others till it reaches a higher level. If others at that level disagree, it is back to the drawing board for everyone.

The ministries can and do call together ad hoc meetings. Recently, for example, the MEA brought together the energy-related ministries and departments to discuss energy initiatives abroad.¹⁰⁷ The joint MEA-MPNG task force offers another example of this type of cooperation. It was created by the ministries in preparation for the petroleum minister's January 2006 visit to China, during which the two countries signed a number of memorandums of understanding (MoUs).¹⁰⁸

However, these instances of cooperation are ad hoc and inconsistent. Lack of coordination among and within the various ministries and departments causes delays in implementing policies. In one instance, while the MPNG announced tax incentives to encourage investment in exploration and production in India, the income tax department had not been brought on board and turned down some of the exemptions the ministry had proposed, causing delays. When the law ministry disagreed about the criteria for evaluating bids as part of this initiative and about the bidding format, there were further delays.¹⁰⁹

A lack of coordination and cooperation can also be seen in the effort to encourage power generation from nonconventional sources. The senior bureaucrat responsible for the ministry has pointed out that while such sources have immense potential, implementation proves to be an obstacle “due to [the] multiplicity of agencies” and the lack of a uniform policy framework across the states.¹¹⁰

Economic and energy analysts say that the fallout goes beyond delays, that the structure of the government makes it slower to adapt to situations and tends to engender a piecemeal response.¹¹¹ Furthermore, they have described the government’s structure and its way of functioning as “disorganized.”¹¹² Some critics have even called for a “super political entity” to oversee the functioning of the various related ministries and departments.¹¹³

Responding to some of these criticisms, in July 2005, the prime minister set up the Energy Coordination Committee (ECC), as recommended by the “Synergy in Energy” panel, to coordinate the government’s policy response and address India’s energy security concerns.¹¹⁴

Its membership includes the ministers of finance, power, P&NG, coal and nonconventional energy sources, the chairperson of the prime minister’s Economic Advisory Council, the deputy chairperson of the Planning Commission, the national security advisor, and the cabinet secretary. The ECC has met a number of times already, with the principal secretary acting as convener. The planning commission’s Energy Division conducts the prep work and policy analyses for the ECC.¹¹⁵

Just as the ECC represents an opportunity for coordination at a higher level, some have also suggested the creation of an inter-ministerial task force at the joint secretary level—possibly coordinated by an additional secretary from the Power Ministry. But these suggestions seem to have been shelved for now.¹¹⁶ Because implementation has been a problem, the planning commission also suggested that the prime minister create a body that would “operationalize” the policies being developed.¹¹⁷

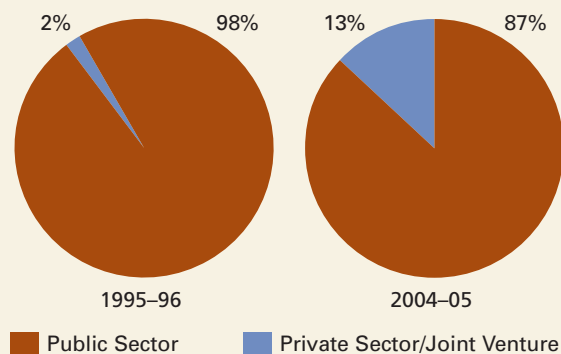
The Companies

Two decades ago, a list of the companies involved in the Indian energy sphere (especially in oil) would have been quite short and dominated by the public sector. Today, as a result of the reentry and rise of the private sector, it is much larger and still growing (figs. 6 and 7).

STATE-OWNED COMPANIES

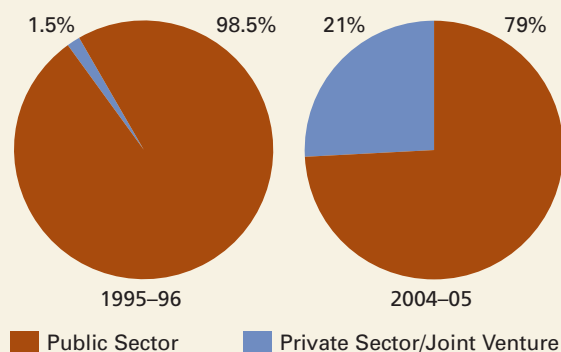
Estimates are that Indian state-owned companies own and operate 75 percent of India’s energy assets and infrastructure.¹¹⁸ The level of government ownership varies across these companies, as does their profitability, quality of leadership and management, and function.

Figure 6. Domestic Oil Production by Sector



Source: Ministry of Petroleum and Natural Gas, India (petroleum.nic.in/petstat.pdf)

Figure 7. Domestic Natural Gas Production by Sector



Source: Ministry of Petroleum and Natural Gas, India (petroleum.nic.in/petstat.pdf)

The latter used to be much more clear-cut, particularly when it came to the national oil companies (NOCs); it was easy to categorize them as upstream, midstream, and downstream. Increasingly, a number of NOCs have been transitioning to become integrated companies. The major state-owned oil and gas companies include the Oil and Natural Corporation (ONGC), its subsidiary ONGC Videsh Ltd., Oil India Limited (OIL), Gas Authority of India Limited (GAIL), Indian Oil Corporation Limited (IOC), Bharat Petroleum Corporation Limited (BPCL), and Hindustan Petroleum Corporation Limited (HPCL).

(A brief survey of some of the major state-owned oil and gas companies is included in Appendix A).

Major state-owned non-oil and gas companies include Coal India Limited (CIL) and its subsidiaries operate almost all the mines in the country. The Nuclear Power Corporation of India Limited (NPCIL) constructs and operates all of India's civilian nuclear reactors. The National Thermal Power Corporation Limited (NTPC) is the state-owned thermal power-generating company that operates coal and gas-based power plants. The National Hydroelectric Power Corporation Limited develops hydroelectric power projects.

RELATIONS BETWEEN THE GOVERNMENT AND STATE-OWNED COMPANIES

A government official noted that the government “provides general direction” to the state-owned companies. Though experts believe that there have been positive changes in government-company relations, there is some concern (even among a group of experts appointed by the government) that these changes have been too “incremental.”¹¹⁹ Government interference has lessened and the companies have become more independent. But the government's influence is still unmistakable. It can be seen in personnel appointments and extensions, as well as in price setting and production targets, among other things.

State-owned companies in India are under the administrative control of designated ministries. The oil and gas companies, for example, come under the MPNG. All state-owned companies are not created equal, nor are they treated equally. Of the many state-owned oil and gas companies, four—BPCL, HPCL, IOC, ONGC—have been designated *navratnas* (literally this term means nine precious stones).¹²⁰ This gives these companies a little more financial and operational autonomy than other PSUs enjoy in their ability to form joint ventures, strategic alliances, and subsidiaries; in the amount of capital expenditure they can incur; in ensuring that each has an audit committee; and in the composition of their board of directors.¹²¹

Personnel. The boards of the companies have both independent and government directors. Since the government is the main promoter, it typically can nominate two persons on the board, although this can vary. The government also has a role in approving the other directors of the board. These so-called independent directors are eminent persons or professionals appointed by the cabinet from a list put forward by the Public Enterprise Selection Board (PESB). Assessments indicate that this has made for “quicker decisionmaking,” brought in a fresh outlook, motivated employees, and improved overall performance in a number of these companies.¹²²

But there is widespread criticism that the boards of these companies are not truly empowered and that appointments are politically motivated.¹²³ Critics contend that the government

role in their appointment means that even the independent directors are independent in name only. The government also has the dominant role in appointing the management of state-owned companies. Those appointing personnel have to take into account not just the recommendations of the PESB and the preferences of the minister concerned, but often also politics, regional, and union sentiment.

(For further detail on personnel, see Appendix B.)

Processes. There has also been concern (including by a government-appointed committee) that the government continues to interfere in the day-to-day affairs of companies, particularly in purchasing decisions, and this gives rise to accusations of corruption and delays. The government persists in controlling most management travel, and a number of proposals—even from the *navratnas*—still require approval. It also conducts quarterly performance reviews of the companies.¹²⁴

Production Targets and Pricing. The government also plays a role in determining prices and production targets. Production targets for all *navratna* NOCs, for example, are set annually through MoUs between the MPNG and the companies.¹²⁵

The government also affects the pricing of products produced by the PSUs. Some companies are affected more adversely—for example, companies marketing petroleum products, which sometimes lament that they get the short end of the stick (while the upstream companies suffer less from the burden of subsidies and artificially low prices). These OMCs—like IOC, HPCL, and BPCL—sometimes have to sell their products below cost. This year, for the first time, these companies reported losses in the first quarter as a result of the government holding retail prices artificially low despite increasing global crude oil prices. While the government attempted to offer them some aid, differences between the Finance and P&NG ministries over what was acceptable delayed the process.

Benefits. Companies also derive benefits from their association with the government, as many private sector players will be quick to point out. Therefore they may not want to totally disavow their association, even if it sometimes seems as if leadership is straining at the leash. Robert Manning, in fact, has called the relationship between the energy bureaucracy and the state-owned companies “mutually reinforcing.” The government exercises control. The companies get preferential treatment and still operate in a closed market.¹²⁶ Even when markets are cracked open a bit, the state-owned companies find it easier to absorb losses because of government support. For example, in the downstream oil sector, private companies like Reliance Industries Limited (RIL) and Essar—which priced their products at the high end of government limits to avoid losses—have seen their market share fall since the end of December 2005.¹²⁷ However, state-owned companies have been able to sustain lower prices (even at a loss) and gain market share.¹²⁸ As mentioned above, the government issues oil bonds to the state-owned oil companies to rescue their balance sheets from these losses.

PRIVATE ENERGY COMPANIES

A number of private energy companies operate in India today. In the oil and gas sector, these include the Indian companies Essar Oil Limited (EOL), Reliance Industries Limited (RIL)

In general, the government is giving private companies a warmer welcome, and they are becoming savvier players.

and Videocon Industries. Foreign companies operating in the oil and gas sector include the BG Group, BP, Cairn Energy Limited, and Royal Dutch Shell.

(For a more detailed overview of the major private energy companies operating in India, see Appendix C).

Private energy companies operating in India, especially in the mid- and downstream oil sector, continue to face the challenge of certain unfavorable government policies. Nonetheless, their role across the energy sector is increasing. While some companies have tried and given up on the energy sector, others are rediscovering it. Recent figures indicate that private sector or public-private joint ventures control about 13 percent of oil production and more than one-fifth of natural gas production. In 2004-05, the private sector owned a quarter of the installed refinery capacity. They also marketed 15.2 percent of petroleum products; in 1990-91 their market share was nil.

In general, the government is giving private companies a warmer welcome, and they are becoming savvier players. Recently private firms demanded financial support from the government. Both RIL and Essar asked for oil bonds like the ones PSUs receive from the MPNG to support the burden placed on their retailing operations.¹²⁹ In the past, RIL has also demanded a discount on the crude supplied to them by state-owned upstream companies, similar to discounts benefiting the downstream PSUs.

But these companies continue to tread cautiously and are careful to maintain good relations with both the central and state governments (wherever they are operating). They still require licenses from the government or approval for their development plans in the E&P sector.

RELATIONSHIPS AMONG THE COMPANIES

Although competitors, the state-owned energy companies are interlinked. As mentioned above, there has been cross-holding across the PSUs since 1999 (though the government recently said that PSUs could sell these holdings).¹³⁰ Leadership and personnel move across PSUs as well. For example, the former ONGC and the current GAIL chairman and managing director originally worked at IOC.¹³¹ This is not an isolated case—in 2004 all the top candidates for the job of IOC chairman and managing director in 2004 were either from one of the other oil and gas PSUs or from IOC itself.¹³²

While the government has already restructured some of the state-owned companies (IOC, for example, bought out retailer IBP and refiner BRPL), there have been other proposals to merge the PSUs, but these have been dismissed. Instead the government seems more inclined to suggest policy and management improvements to strengthen individual companies.¹³³ But it is not all smooth sailing—a former minister, for example, talked of “serious personality clashes among the honchos” of the companies.¹³⁴

State-owned companies are being encouraged to develop partnerships with other PSUs as well as the private sector. They are already doing the latter—ONGC and Mittal Investment SARL are working together, as are GAIL and RIL. Private and public sector companies are submitting joint bids and working together in consortiums for E&P projects. In the pro-

gram allotting blocks for E&P: GAIL and Gazprom; ENI, ONGC, and GAIL; and Cairn Energy and ONGC took up stakes in the same exploration blocks. In the last round of the program, seven of eighteen blocks were awarded to such consortia, with the private sector partners acting as operators in five of the seven. They bring better technology and know-how to the table; the PSUs bring access and local knowledge. Personnel recruiting creates another linkage. Private sector companies hire executives from firms like IOC (as RIL and Essar have done).

Other Stakeholders

Other stakeholders can (and do in varying degrees) affect decisionmaking on energy issues in India:

- The judiciary in India can play a role. The Supreme Court, for example, affected the demand side by specifying emission norms in Delhi and Mumbai. But its “activism” tends to be limited and ad hoc—it is dependent on someone filing suit. The number of petitioners, however, is increasing.
- Unions and other political interest groups can also influence issues like privatization.
- The environment lobby has the ability to derail projects.
- Think tanks can affect the debate as well. The Energy and Resources Institute (TERI), formerly the Tata Energy and Research Institute, is India’s most prominent and influential energy-related think tank. Many consider TERI to be a world-class organization, and it has offices across India as well as overseas. Central and state governments in India have frequently consulted TERI, and it has played a major role in shaping Indian debate over energy, environment, and sustainable growth. The Centre for Fuel Studies and Research and the RIL-backed Observer Research Foundation (ORF) are also well known in this field. ORF has conducted specialized research on energy modeling in cooperation with the Brookings Institution. Some of the results were used by the Planning Commission in its draft report on an integrated energy policy. The Indian government consults with other think tanks on an as-needed basis. For example, it included the Institute for Defense Studies and Analyses (which it funds) in discussions about the need for a strategic petroleum reserve.¹³⁵ Economics-focused think tanks like the National Council of Applied Economic Research can also affect the debate.
- Domestic and international financial institutions play a role through existing and potential funding of projects.
- The media is increasingly vocal about India’s energy scenario and is quick to criticize the government and companies for what it sees as their shortcomings in this regard.
- Indian consumers voice opinions through their vote, consumer groups, or litigation.

There is skepticism in some quarters—especially from stakeholders outside the government and public sector—about the state’s ability to deal with the energy challenge. Some have said that the legacy of state control and economic nationalism has biased policy and limited its ability to deal with these challenges.¹³⁶ Others criticize the “lack of technological dimension in India’s energy decisionmaking.”¹³⁷

India does not have an overarching energy strategy—instead it has a number of disparate policies.

There is also a feeling that lack of interaction and coordination within the government is rivaled only by the lack of interaction with stakeholders outside the government. And some of these stakeholders have criticized the government for not reaching out to them.¹³⁸ A leading analyst has pointed out that that it will be harder to gain support for energy policies if key stakeholders are not included in the decisionmaking process.¹³⁹

The government does reach out at times—a case in point is the Planning Commission constituting a committee to draft a report on integrated energy policy. The group consisted of representation from some states, economic and energy research institutions, financial institutions, and the business community.

A Strategy?

India does not have an overarching energy strategy—instead it has a number of disparate policies. Because many politicians and analysts use the terms “strategy” and “policy” interchangeably, it is not always an obvious distinction. Separate vision statements have emerged from the different energy-related ministries and departments. The Hydrocarbon Vision 2025 report, for example, focused exclusively on oil and gas. Even within ministries, the emphasis tends to be on specific and limited policies rather than a long-term, integrated strategy. A former minister remarked that his job was “to make policy for next year,”¹⁴⁰ which begs the question: whose job is it to make strategy?

The current prime minister has said that India “must learn to think strategically,” however, there is a good deal of debate about whether an energy strategy is essential.¹⁴¹ Having a number of policies is not thought to be a bad thing in and of itself. Meeting the country’s energy needs is considered a complex problem, requiring different solutions. “There is no silver bullet,” is a common refrain—especially in a country with intricate internal politicking and an energy sector that is neither purely market-driven nor entirely state-controlled.¹⁴²

While there continues to be debate about whether an overarching strategy is necessary, India’s decisionmakers recognize that—at the very least—the country’s disparate energy policies need to be integrated. This notion has proved problematic so far.¹⁴³ There has been little indication of how policies should be prioritized, no plan for funding them, and often a gap between policymaking and implementation.

Despite these incongruities, there does seem to be a dominant policy trend toward diversification of sources, suppliers, pricing, and technologies. Diversification is also evident in the number and variety of proposals to increase energy security for India. At its most basic level, policy diversification offers India more options, not just in terms of energy security, but in foreign policy as well. Pursuing multiple tracks also helps ensure that India is not affected by area-specific shocks.¹⁴⁴

Policy diversity is not just a question of choice, but of necessity. A number of decisionmakers admit (though perhaps not publicly) that growing energy demands require India to explore every option—because it must, not necessarily because it wants to. This trend is evident in India’s oil-related policies, which this paper examines in Part 2.

Part 2. The Search for Oil

A Brief History of India and Oil

The quest for oil in India started in the 1860s with exploration in Assam, in the north-eastern part of what was then British India. The Assam Railways & Trading Company Limited (AR&T) made the first commercial discovery in that region at Digboi in 1889.¹⁴⁵ In 1899 the Assam Oil Company (AOC) was formed to take over AR&T, which in turn was taken over by the Burmah Oil Company (BOC) in 1921.

Before 1947 only two companies operated in British India—AOC-BOC in the Northeast and the Attock Oil Company in the Northwest. Following independence, the Indian government issued the Industrial Policy Resolution (IPR) of 1948, which laid out its approach to industrial growth and development and highlighted the need to develop the country's petroleum industry. Seven years later the government set up the Oil & Natural Gas Directorate under the Ministry of Natural Resources and Scientific Research to develop natural resources within the country. In 1956 the government elevated the Directorate to a commission, which gave it additional powers and made it independent of the ministry (toward the end of the decade the government assigned it even greater powers).¹⁴⁶ In the same year, another IPR placed the mineral oils industries under Schedule-A, which meant that the state would undertake all new development in this industry (with a few exceptions).¹⁴⁷

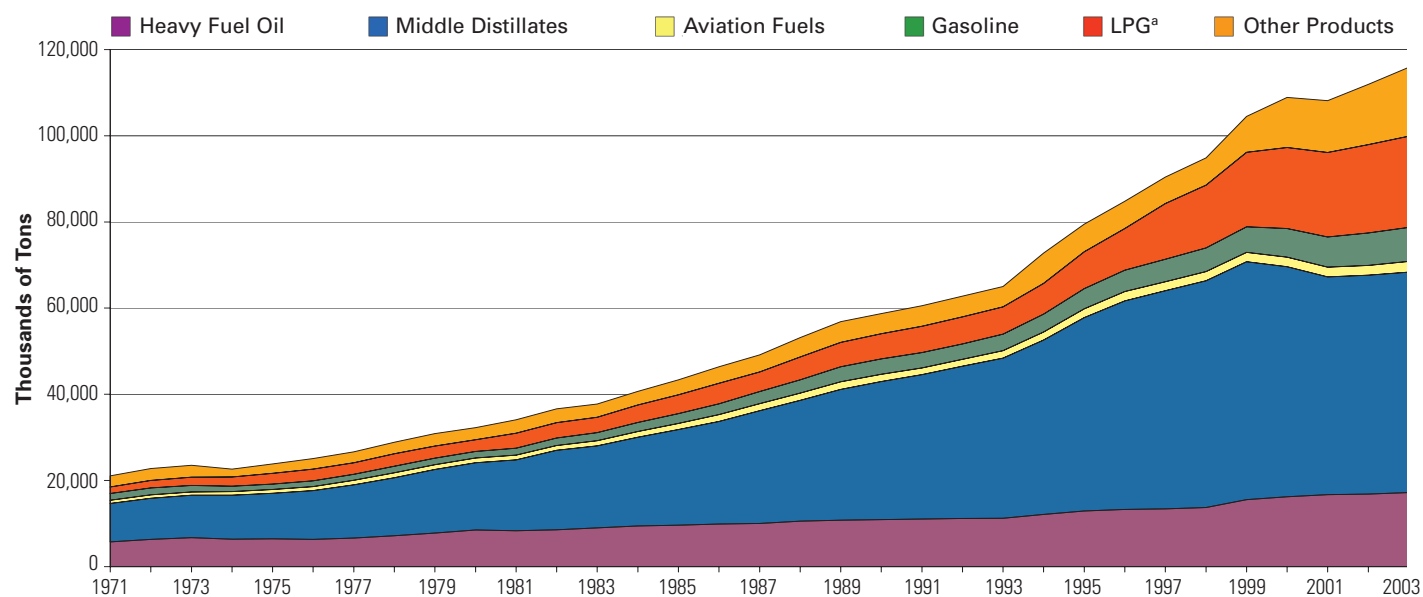
The Government of India went into the oil business during the 1950s via a joint venture with Standard Vacuum Oil Company in 1955 for exploration in West Bengal (which was unsuccessful). Then in 1959 it formed OIL and held a one third ownership, with AOC-BOC owning the rest of the company. A couple of years later, the government increased its ownership to 50 percent.

The importance of oil in Indian planning grew over time (fig.8). The initial two Five-Year Plans (covering the 1950s), laid out development programs for various sectors—planning for oil was subsumed under the larger section on “Development of Mineral Resources.” By the third Five-Year Plan, this section evolved into “Minerals and Oil.” By the sixth Five-Year Plan (starting at the end of the 1970s), “Energy” was finally entitled to its own section, which now covers planning for India's oil needs.

In the 1960s and early 1970s, the government tried to attract private investment in exploration to India, welcoming in a few foreign companies (including Carlsberg, and Reading and Bates), almost all of whom withdrew after being unsuccessful.¹⁴⁸ In 1974, though, the Oil and Natural Gas Commission made the first offshore discovery at Bombay High.

The 1970s was a busy decade in the region. It started with a war between India and Pakistan, during which foreign oil companies suspended supply to the Indian military. The first oil crisis followed in 1973–74, during which foreign producers maintained supplies to “friendly states.” India found that it was not one of them. Its import bill rose, as did inflation, which in 1974–75 reached 25 percent. At that time, however, India did not import sig-

Figure 8. Evolution of Oil Products Consumption in India from 1971 to 2003



a. Includes LPG, NGL, ethane, and naphtha.

Source: IEA Energy Statistics (www.iea.org/Textbase/stats/noncountryresults.asp?nonoecd=India)

nificant amounts of oil, and analysts assert that its rising inflation was due more to drought than the oil price spike.

In 1974 and 1976, Prime Minister Indira Gandhi nationalized Esso and Burma Shell (Caltex and IBP were also nationalized). She formed the Oil Coordination Committee to ensure a steady oil supply and keep prices stable, and introduced the Administered Pricing Mechanism to set the price of petroleum products.

By the second oil shock in 1979, India was importing a greater quantity of oil and suffering again from drought. As a result, India's GDP shrank by 5.2 percent following the oil crisis. More companies were nationalized following this shock, including OIL in 1981.¹⁴⁹

During the years 1970–81, the country imported two thirds of its oil needs. By the mid-1980s the balance had flipped, with two thirds of oil coming from indigenous sources.¹⁵⁰ But the domestic oil sector went through a period of stagnation with little competition, increasing inefficiency, outdated technology, and less than adequate funding. By the beginning of the 1990s, India was again more dependent on imported oil.

In 1990–91, India's economy was already suffering. When the first Gulf War sent oil prices above \$40 a barrel, inflation in India topped 13 percent. Furthermore, with barely \$1 billion in foreign exchange reserves, India's balance of payments went deep into deficit.¹⁵¹

Spurred by this shock, the government decided to open up the E&P sector to private investment. As part of the restructuring, in 1993, the Oil and Natural Gas Commission was incor-

... there is fear
that lack of
affordable and
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India's growth.

porated. From 1993 to 1997, the government awarded twenty-eight blocks to private companies or joint ventures for exploration; eighteen remain in operation today. While the government invited private players into E&P during this period, there was little interest because of what remained a poor investment climate. In 1997, as India's dependence on imported oil continued to grow, the government introduced the New Exploration Licensing Policy to encourage greater private sector participation (discussed in detail below).

While nuclear energy is increasingly a topic of discussion in India, oil continues to dominate the country's dialogue about energy. There is special anxiety about oil prices, India's dependence on oil, and the country's lack of domestic reserves. Although not unanimous, this concern is widespread. Because oil is viewed as "a strategically indispensable mineral" for "any economy,"¹⁵² there is fear that lack of affordable and reliable supplies of oil can put the brakes on India's growth. Recently, a financial daily starkly presented the question, "Will India skid on oil prices?"¹⁵³

Today, India is attempting to close the gap between the demand and supply of oil through what one observer has called "a series of measures."¹⁵⁴ On the supply side, this includes encouraging domestic exploration and production, acquiring upstream assets abroad, oil diplomacy, fuel diversification, maintaining strategic oil stocks, and regulatory reform. On the demand side, this comprises regulatory reform, rationalizing prices and taxes, fuel substitution, and conservation and efficiency measures.

Supply-Side Policies

Ironically, India's supply-side oil policies are decidedly Churchillian. Churchill's thoughts on oil—"on no one quality, on no one process, on no one country, on no one route and on no one field must we be dependent. Safety and certainty in oil lie in variety and variety alone"—are shared in India.¹⁵⁵ The rider in India's case is "on no one fuel must we be dependent." And Indian policymakers have taken a number of steps to try to ensure that India achieves each of those goals.

Domestic Exploration and Production (E&P)

As noted above, India's domestic oil production figures have been dismal and unable to keep up with demand. ONGC, India's largest producer, has decreased production over the last few years. While its profits have grown, it failed to meet its production targets during 2005–06, falling short by 8 percent.¹⁵⁶ There was a major disruption last year due to a fire at the offshore Bombay High field, which accounts for a significant portion of ONGC's production. The shortfall had to be made up through increased imports.¹⁵⁷ With ONGC accounting for three-fourths of India's domestic crude output, its poor domestic production performance has had a significant impact.¹⁵⁸

ONGC has also had a poor record of discoveries of late. The discoveries it has made do little more than replace the existing fields that have been going offline.¹⁵⁹ Former petroleum minister Aiyar even mocked ONGC for being unable to find new fields while others, like Cairn Energy, have made discoveries. He accused ONGC of focusing more on foreign

activities than domestic ones (a criticism often leveled at him as well). Critics from other quarters have stated that ONGC's ventures into retail and other services have also taken away from its core business of E&P, which is suffering from lack of attention and resources.¹⁶⁰ ONGC's discovery-to-exploration record from 2000 to 2005 stood at 42 percent, while others, like RIL and Cairn, had far better records of 71 percent and 80 percent, respectively.¹⁶¹ But even their discoveries have been few and far between.

In addition, a number of areas that could hold potential reserves have not been explored. As of 1999, only six of India's twenty-six sedimentary basins had been explored in depth.¹⁶²

The government has tried to increase domestic exploration and production through at least three different policies designed to:

- encourage investment,
- strengthen the NOCs, and
- improve recovery.

Encourage investment. In 1997–98, India's NDA coalition government realized that the state-owned companies did not have sufficient technological or financial resources, as banks are often unwilling to finance exploration ventures in India. Private investors—both foreign and domestic—were also put off by the operating restrictions in India's oil and gas sector. Accordingly, the government instituted the New Exploration Licensing Policy (NELP) to encourage investment in the E&P sector. Since then five licensing rounds have been completed and a sixth is underway. The Directorate General of Hydrocarbons—the de facto upstream regulator—monitors implementation of the policy.

NELP aims to fast track the government's system for awarding oil and gas exploration licenses and to provide greater transparency. In theory, it provides equal treatment to public and private sector companies, paying market-driven prices for the crude they produce. It also provides tariff concessions for companies. NELP does not require that proposed energy projects include state participation or a minimum investment commitment.

Once the government announces a licensing round, they accept bids for six months. To attract foreign companies and funding, petroleum ministers routinely go on international road shows. For the current round (February–September 2006), the minister or ministry officials have visited Australia, Canada, Dubai, Malaysia, the United Kingdom, and the United States. Their pitch can sometimes be exaggerated—a former minister admitted to an audience of former diplomats that his referring to the Bay of Bengal as South Asia's North Sea in a briefing to foreign investors was “hype.”¹⁶³

It takes two to four months to announce the winners after the bidding is closed. It then takes about two months to negotiate and finalize production sharing contracts with the winning companies or consortiums.¹⁶⁴ A company is given a specific period of time to explore a block. If a discovery is not made within the specified time frame, either the company has to file for an extension or the block reverts back to the government, which can then

put it up for sale again. If a company does not make promised investments, the Directorate General of Hydrocarbons can also recommend to the Ministry of Petroleum and Natural Gas that the company be asked to surrender its blocks, as happened recently with RIL and ONGC.

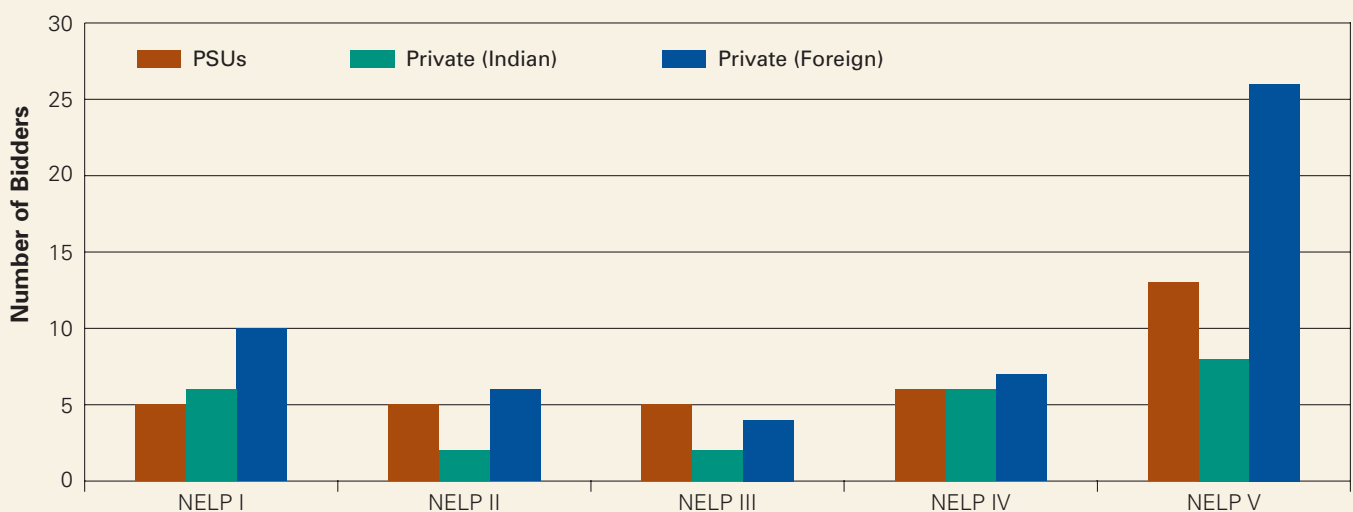
NELP has been seen as a way of bringing in much-needed technology, skill, and capital to the E&P sector.

NELP has been seen as a way of bringing in much-needed technology, skill, and capital to the E&P sector. Initial interest was limited partly due to bad timing—oil prices were low at the time and demand was slow. There were also delays due to the still complex bureaucratic process and a lack of clarity on the tax structure. MPNG delayed announcing tax incentives. When it did make an announcement, the Ministry could not get the Income Tax Department to approve some of the tax features in time (including equalizing corporate tax with the NOCs' rate, which was 10 percent lower).

NELP has attracted greater attention recently. Three years ago under the offer of twenty-four blocks for NELP-IV, the government received forty-six bids; last year, under NELP-V offering twenty blocks, there were sixty-nine bids; and in the round ending in September 2006 that offered fifty-five blocks, there were 165 bids. Cairn Energy's 2005 discovery of oil in the Mangala field in Rajasthan (which is expected to be producing by the end of 2007) as well as the spike in oil prices has sparked somewhat more interest. The number of private (particularly foreign) participants in bidding has especially increased in the recent rounds (fig. 9).¹⁶⁵ Of the sixty-six companies bidding in the sixth round, thirty-five are foreign.

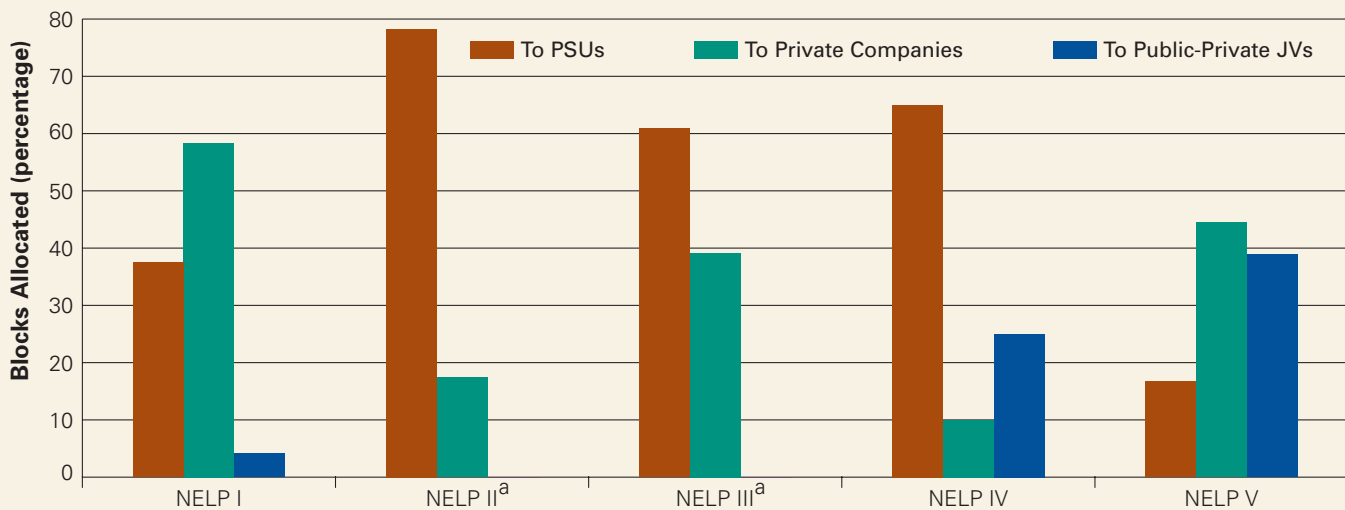
While a greater number of companies want to participate, progress has been limited. In the current round, despite government expectations, with a few exceptions, the oil majors stayed away. Of the 165 bids in NELP-VI, 110 came from the public sector. Potential foreign investors do not perceive India as having much oil; they have preferred to put their money

Figure 9. Profile of NELP Bidders



Source: Data from Directorate General of Hydrocarbons and Press Information Bureau, India

Figure 10. Blocks Allocated in NELP Rounds by Sector



a. Blocks allocated to Public-Private JVs in NELP rounds II and III equalled zero.

Source: Data from Directorate General of Hydrocarbons and Press Information Bureau, India

into safer bets. This appears to be true of Indian companies as well—in fact, the NOCs seem to be increasingly focused abroad, where they consider returns to be better.

Furthermore, there have been delays in awarding contracts and little or poor seismic data available. Delays in gaining required approvals from other departments like the Ministry of Environment and Forests have also frustrated the participants. Regulatory procedures are still unclear and concerns remain that despite its best intentions, the Indian government is loath to give up total control. The majors thus have stayed away (except for BP), though smaller independent companies have continued to take part in the bidding process.

Private players are concerned about political changes and how they might affect their interests. There is also a perception that state-owned companies still get preferential treatment and better acreages. This was the case initially, at least, when state-owned companies were awarded what were considered the best blocks and the rights to more than 60 percent of all the blocks offered in the second, third, and fourth rounds (fig. 10). On the other hand, they were not offered some of the concessions and terms that private participants were given and state-owned companies had to sell their oil at a much lower rate at home than on the global market.¹⁶⁶ Some analysts argue that state-owned companies' success in bidding rounds might owe in part to their knowledge of how the system works. This has, in fact, led to a number of private companies submitting joint bids with the NOCs and in the fourth and fifth rounds, 25 and 39 percent respectively of the blocks were awarded to such consortiums. The government meanwhile is learning along the way—in the recent round, it obtained environmental clearances in advance for the blocks being offered. It is also considering an open acreage policy, which would make blocks available year-round outside the NELP framework.

Although there tends to be political agreement on the need to reform the state-owned companies, the main political parties disagree about how to achieve reform.

Strengthen the National Oil Companies (NOCs). While the navratna NOCs have tended to generate profits, some consider them inefficient and uncompetitive. There are indications that these NOCs need improved exploration technology, better management, and the ability to meet global benchmarks for efficiency. Some have suggested that if the government reduced its role (by setting up a holding company to manage its interest), this could strengthen the NOCs and allow them to attract better talent and make better alliances.¹⁶⁷

The companies have been losing talent to the private sector due to uncompetitive salaries and benefits. The administrative ministries recognize this problem, though reform on this front has been slow—to the extent that the 45,000 officers in the oil public sector undertakings (PSUs) have threatened to go on strike because of their compensation.¹⁶⁸ This state of affairs is partly a result of the nature of the Indian system—even if one ministry (the MPNG in this case) recognizes the problem, it is the Department of Public Enterprises (in the Ministry of Heavy Industries) that has to agree to a hike in salaries.¹⁶⁹

Although there tends to be political agreement on the need to reform the state-owned companies, the main political parties disagree about how to achieve reform.¹⁷⁰ While the previous NDA coalition government had a Ministry of Disinvestment and privatized some state-owned companies, the UPA coalition government has stated in its National Common Minimum Programme (the coalition’s manifesto) that no profit-making PSUs would be privatized. In other words, the government would not reduce its stake to below 51 percent. Instead, it intends to reform PSUs. Following the UPA line, the new Petroleum Minister, Murli Deora, has pledged to make the state-owned oil companies competitive with industry leaders, listing this as one of his highest priorities.¹⁷¹

Improve recovery. There is also a push to get better recovery from existing fields. ONGC, for example, is aiming to improve its recovery factor from 28 percent to 40 percent. There are plans for greater investment, including \$2 billion in fourteen oilfields as part of an Enhanced Oil Recovery program.¹⁷² OIL plans both to develop discovered fields faster and increase recovery from existing fields and has set higher targets for the future.¹⁷³

Increased domestic exploration and production alone, however, are unlikely to quench India’s thirst for oil. A former petroleum minister acknowledged that even if more oil is found, India will likely find further use for it; therefore, the country would have to continue to look abroad for additional sources.¹⁷⁴

Acquisition of Upstream Assets Abroad

There is increasing concern about India’s susceptibility to volatile international oil prices because of its dependence on foreign oil. But the solution proposed by a number of decisionmakers and experts—and being implemented by Indian NOCs—also seems to lie abroad in stakes in overseas E&P companies and equity in oil and gas blocks.

There is some debate about the wisdom of this policy. Some decisionmakers consider equity oil cheaper and therefore “worthwhile” to acquire.¹⁷⁵ They believe that equity oil abroad will

“ensure cheap and reliable oil supply” and they point to OVL getting equity oil at \$10 to \$14 a barrel.¹⁷⁶ The NOCs have ambitious plans—OVL has set a long-term target of producing 60 million tons of oil a year from overseas properties by 2025. ONGC aims to double its reserves by 2020,¹⁷⁷ with 20 million tons coming from OVL, which has spent about \$4.5 billion abroad. These targets have already been pushed back from those set in 2004, when the aim was to produce 20 million tons by 2010.¹⁷⁸

Critics point out that currently only 3.23 million tons a year of equity oil from Sudan is coming into the country. They assert that instead of spending money and other resources on acquiring assets, one should invest in solutions like improved technology.¹⁷⁹ Other critics contend that India would be better served by concentrating on building foreign exchange reserves to pay for imported oil.¹⁸⁰

Estimates are that only 25 percent of India’s oil needs could be met even if all its companies’ overseas assets were producing oil.¹⁸¹ There are also occasional murmurs of concern that acquisitions abroad cause companies like ONGC to divert their resources and attention away from investing domestically. For example, ONGC had to provide an offshore rig to OVL for drilling in the Farsi block of Iran.¹⁸² Detractors contend that the companies are merely using the rubric of “energy security” to get government (and public) support for these investments. Interestingly, when asked about how the companies fit into the quest for Indian energy security, the chief of a major state-owned company replied that it would be a question best answered by the petroleum minister.¹⁸³

From the companies’ point of view, these efforts reflect a desire to both expand supply and enhance revenue. Even detractors acknowledge that, at the very least, this policy provides better returns for companies like ONGC than their investments at home.

There are officials who point out that while it is definitely not “the silver bullet,” acquiring upstream assets abroad is a “necessary but not sufficient” element of India’s oil security strategy. They explain that India must pursue every possible option to diversify sources of supply (adding that even if these investments do not bring oil, they offer solid returns). But they acknowledge that all this will be of little help in a real crisis.¹⁸⁴

There has been criticism and concern from abroad about some of India’s international deals. The oil majors see Indian companies (like Chinese ones) as making transactions on terms that they would not find commercially viable or winning deals because of their government’s support.¹⁸⁵ The Indian government and companies argue that such arrangements provide much needed investment in the oil sector. Critics counter, however, that while the Indian NOCs bring funding, they do not have access to advanced technology that would ensure that these overseas resources are exploited to their maximum potential.

With more than \$160 billion in foreign exchange reserves in the bank, whatever the criticism, the Indian government has given state-owned companies its blessing to go forth and explore. And they have done so. Box 3 shows selected activities of various Indian companies abroad, by region.

Acquisitions—Selected Activities of Indian Companies Abroad

(For a more comprehensive list, see Appendix D.)

Africa

Egypt. OVL has a 70 percent stake in the North Ramadan Block, as well as a 60 percent stake in Block 6.

Sudan. OVL made a one-time investment of \$690 million¹⁸⁶ for a 25 percent stake in the Greater Nile Oil Project (GNOP). ONGC created a subsidiary in the Netherlands, ONGC Nile Ganga BV, to manage what is its first producing overseas oil property. It produces 300,000 bpd.¹⁸⁷ India gets about 3 million tons of crude oil annually from this property.

The Americas

Brazil. *(in the pipeline)* Making an entry into South America, OVL will be acquiring a 15 percent stake of Block BC-10 in Brazil from Royal Dutch Shell (which operates the project) for \$170 million. The field is expected to begin production in 2009; OVL is paying another \$234 million in development costs. Shell blocked its attempt to purchase double the stake. The field has a production potential of 100,000 bpd.¹⁸⁸

Canada. *(in the pipeline)* Indian companies are looking to invest \$1 billion over the next year in oil sands in Canada.¹⁸⁹

United States. OIL acquired 100 percent equity shares of Sakhalin India Inc., which has a 10 percent participating interest in the North Hellhole Bayou Prospect in Vermillion Parish, offshore Louisiana.¹⁹⁰

Asia-Pacific

Australia. OVL has a 55 percent stake in Block WA 306P. Videocon and GSPC equally share a 40 percent in Block EPP 277.

Vietnam. OVL acquired 100 percent rights to offshore Blocks 127 and 128.

The Middle East

Iran. In 2002 Indian companies acquired the rights for the offshore Farsi block and signed an exploration service contract with the National Iranian Oil Company. OVL is the operator and has a 40 percent stake in the block; OIL owns 20 percent and IOC 40 percent.¹⁹¹ Drilling began recently.¹⁹²

Iraq. OVL has full exploration rights to Block 8.

Syria. OVL has a 60 percent stake in Block 24. OVL, jointly with CNPC, has acquired PetroCanada's stake in thirty-six producing fields in Syria (the OVL-CNPC joint venture is called Himalaya Energy Syria BV).

Russia and Eurasia

Russia. OVL has a 20 percent stake in the Sakhalin-1 Production Sharing Agreement and has invested \$1.77 billion in the offshore field—the single largest foreign investment by India in any overseas venture. ONGC has announced that the field will begin producing in October 2006.

THE PROCESS

Proposals for acquiring stakes or assets are usually generated by the interested companies, though sometimes Indian embassy officials alert them about possible opportunities. Overseas projects proposed by a state-owned company that are above a certain amount must be approved by the government (the amount depends on what kind of company). This is not simply a formality—in September 2004, OVL lost out to China in acquiring producing assets in Ecuador (producing 75,000 bpd) when the government did not let it raise its bid of \$1.4 billion. In December 2005 the government also blocked OVL from acquiring a

There is a feeling that setbacks are due to India's late start in the acquisitions game, as well as its lack of ability and willingness to offer more direct and indirect incentives.

45 percent stake in Nigeria's Akpo field—which is expected to begin production in 2008—on security grounds. The China National Offshore Oil Corporation (CNOOC) picked up the stake instead.

There is a good deal of unhappiness on the companies' part when this occurs. According to some observers, the government has a tendency to be more focused on security considerations, while the companies are more focused on commercial considerations. However, security presents real concerns—for example, there have been reports of work having been delayed in one of OVL's Sudanese blocks for security reasons.

SETBACKS

The companies have had a number of other setbacks as well. OVL has drilled dry wells in Australia, Libya, and Cote d'Ivoire. They have also lost out to other companies (often Chinese) on a number of bids. In 2004 an Indian company lost Block 18 in Angola to a Chinese firm. In August 2005 OVL lost the opportunity to acquire majority stakes in two blocks in Nigeria to the Korean National Oil Company, despite a higher bid.

In August 2005 ONGC-Mittal Energy Limited (OMEL) lost a bid to CNPC for PetroKazakhstan despite making a higher bid (\$3.6 billion vs. the \$3.2 billion offered by CNPC). There was much consternation in Delhi about the bidding process (especially when OMEL was denied an opportunity to rebid) along with speculation about what China had offered to sweeten the deal. There may have been legitimate reasons for OMEL having lost the bid despite having made a higher offer—China and Kazakhstan share a border, so it would be easier to export the oil; in India's case, the oil would have to be exported through Russia.¹⁹³ Most recently, in June 2006, OVL lost out to Sinopec for the producing OAO Udmurtneft fields in Russia.¹⁹⁴

There is a feeling that such setbacks are due to India's late start in the acquisitions game, as well as its lack of ability and willingness to offer more direct and indirect incentives. Something of a blame game is often played out in the media; the companies have learned how to use the press to berate the government for every deal they lose. The race to acquire assets has generally captured the imagination of the media, which follows the matter closely, sometimes chiding the government and sometimes the companies for losing out on bids. They often ask whether India is being aggressive enough.¹⁹⁵

There is a widespread feeling that India lags behind China¹⁹⁶ and a perception that Chinese companies get the benefit of quicker decisionmaking. When OVL lost out to KNOC in Nigeria, company officials blamed the government for not clearing its \$1.4 billion bid in a timely fashion.¹⁹⁷ Other reports indicated that it was also because the KNOC offer came with a South Korean pledge to invest more in infrastructure. Former ONGC chairman and managing director Raha had publicly complained that India has lost out on deals because of bureaucratic red tape—one of the reasons that apparently spurred the public-private partnership between ONGC and Mittal that gained some exploration blocks in Nigeria.¹⁹⁸

There are certainly problems on the government side with delays and a lack of coordination. A minister once remarked that the biggest hurdle to overcome to win overseas deals is the government of India: “dealing with foreigners is always a cakewalk compared to dealing with our own ministries.”¹⁹⁹

Others say that the spotlight should extend beyond government shortcomings to the companies as well. Some quarters of the government have suggested that Indian companies are not as competitive as their Chinese counterparts—in fact, the idea to merge the various NOCs into a few major companies was suggested, in part, to close the gap between the competitiveness of the two countries’ firms.

Critics compare Indian companies to their Chinese counterparts and find them lacking networks and presence in producing countries. Indian firms do not yet have an extensive network of permanent offices in countries of interest. An observer cites an official at the Indian Embassy in Kazakhstan who pointed out that OVL did not have any offices there, while the Chinese companies did.²⁰⁰ Companies are also criticized for not having developed local knowledge in a number of regions.

Outside observers are even more forceful, stating that both the government and the companies have “lousy game plans, obsolete strategies, and a parsimonious mindset.”²⁰¹ Both lack specialized teams of technical and business-savvy professionals to plan and undertake bids on projects (though the Indian companies do not lack experienced and trained professionals to embark on the projects). A number of Indian NOC bids have been submitted without offers of aid or investment or with offers that pale in comparison to those from other countries. In Angola, for example, China promised development assistance totaling \$2 billion, whereas India offered to undertake a \$200 million rail project.

There has also been criticism about the lack of guidelines surrounding acquisitions as well as suggestions for more rigorous and regular assessments to decide which projects to undertake and which to offload. Parliamentary oversight has also been proposed, but companies would be apt to argue that such an arrangement would slow the process even further.²⁰²

A STRATEGY?

Setbacks do not seem to have dissuaded Indian companies; they have changed and adapted. The NOCs have taken a few steps to be more competitive. OVL was formed as an ONGC subsidiary in 1996 to focus on acquiring and developing overseas assets. Late last year, the government decided to form a comparable unit under OIL, with similar financial powers.²⁰³

The NOCs have also formed partnerships with other domestic and foreign companies, both public and private. In December 2004 IOC-OIL formed a consortium, in which OIL acts as operator. In July 2005 ONGC and Mittal decided to jointly pursue oil and gas projects (exploration, development, and production-related activities) in Central Asia and Africa. With Mittal having a presence in Malaysia, Indonesia, CIS, and Angola, this partnership offered some advantages.²⁰⁴ In December 2005 RIL and CNOOC agreed to explore for oil in Africa together. And in January 2006 Shell Exploration and ONGC signed an MoU.²⁰⁵

The government clearly sees the acquisition of upstream assets abroad as a priority and realizes that better integration on its part is needed.

In January 2006 Chinese and Indian NOCs also agreed to bid jointly for stakes in companies and blocks as part of a larger set of cooperative energy agreements signed by India and China. According to former petroleum minister Aiyar, the motivation for cooperation was that the two countries had “realised that when we compete in an unhealthy manner to acquire oil fields in third countries, we only end up driving costs for each other We have ended up paying billions of dollars more by trying to outbid each other everywhere.”²⁰⁶

Neither country views the relationship as exclusive. They have more of an understanding than an agreement, and it seems to operate on a case-by-case basis—even the former minister said that in practice the countries would “in some case[s] bid against each other, in some case[s] bid together.” There was talk about setting up “some form of a mechanism of mutual consultation regarding third-country properties,” but this has not yet materialized.²⁰⁷ There also seems to be a clearer interest in cooperating on India’s part. And China might eventually decide that it is better to partner with the oil majors. Even within India, many considered the MoU merely a pet project of the petroleum minister at the time, and therefore not apt to generate much activity.

The state-owned companies are learning to cope with the challenges of dealing with local politics, leaders, and social groups who want to have a say in how they develop these ventures. As part of this process, the NOCs are developing new projects in host countries—OIL, for example, runs an E&P consultancy service in Nigeria, helping companies—including local ones—evaluate and submit bids (though this service has recently run into trouble).²⁰⁸ OVL is taking up refinery upgrades and pipeline contracts in Sudan, and private company RIL has decided to take a 30 percent stake in a refinery construction project in Yemen.²⁰⁹

Private Indian companies are getting into the act as well and are organizing themselves accordingly. Reports indicate that RIL has created a twenty-person group that will search for potential investment assets in Nigeria, Congo, Cameroon, Mauritania, Namibia, Ivory Coast, Gabon, Sierra Leone, Guinea Bissau, and Angola.²¹⁰ The company tends to create local subsidiaries for its international operations to minimize friction and manage more efficiently. RIL is also being careful not to compete directly with ONGC—part of the reason might be that they do not want to run up against government interests, especially since most of their refinery output still goes to the state-owned OMCs.

The government clearly sees the acquisition of upstream assets abroad as a priority and realizes that better integration on its part is needed. The first meeting of the ECC focused primarily on overseas activities and the need to acquire additional assets to meet shortages.²¹¹ Though much remains to be done, procedural progress has been made over the last few years. And there is growing recognition that more active diplomacy and different kinds of investment may be required to clinch deals. This may include offering more capital, skills, and technology, for example, to improve roads or power infrastructure.²¹²

Oil Diplomacy

“Oil diplomacy” has become a catchphrase in government circles in Delhi—not just in the MPNG but also in both North Block and South Block, where the ministries of Finance and

India is out to woo
oil producers and,
more broadly,
energy suppliers.

External Affairs are housed. The business sector is not far behind with the chairman of Shell India calling for the creation of a cadre of “oil diplomats . . . people who can combine professional understanding of the industry with the capability to work across different cultures and a plurality of sovereignties.”²¹³ Former petroleum minister Aiyar even formed a group to advise the government on oil diplomacy.

India is out to woo oil producers and, more broadly, energy suppliers. Former minister Aiyar has said that oil diplomacy is aimed at “mitigating the risks of our inevitable and growing dependence on imported hydrocarbons.”²¹⁴ His comments highlight India’s intention to use oil diplomacy to achieve diversified sources of supply (as well as supplement its current sources).²¹⁵ The country’s dependence on Middle Eastern oil is considered a “critical bottleneck.”²¹⁶ Some policymakers think that this dependence has restricted India’s foreign policy and created economic vulnerability. They point out that India’s support for Arab nations as well as Iran over the last five decades (while keeping Israel at arm’s length, though this has changed more recently²¹⁷) has not just been a consequence of historical ties or the sensitivities of its large Muslim population. It reflects the fact that India’s leaders realized long ago that the country would need Middle Eastern oil.²¹⁸

There is a sense that in an oil crisis, relationships will count for more than ownership of assets. For the time being, oil diplomacy is intended to help on a number of fronts: aiding Indian companies to win deals, ensuring secure supply, laying the groundwork for cooperation, attracting investment and technology, and encouraging investment from producer countries in India’s downstream sector to ensure that they have a vested interest.

Diplomats and petroleum ministry officials point to instances where diplomacy has borne fruit. In early 2005 Saudi Arabia invited India to set up a refinery. It also prequalified ONGC to bid for projects to develop oil fields. Oman offered to consider HPCL’s request for 10,000 bpd of oil, to take another look at the LNG contract previously held by Enron, and to consider continuing to provide LNG to those now running Dabhol.

Some officials also point to India’s relationship with Venezuela as a successful example of diplomacy. The two countries signed an energy cooperation agreement in March 2005. Hugo Chavez visited India the following month when he announced that Venezuela would invest in ONGC’s Mangalore refinery. He also offered Indian companies a 49 percent stake in the San Cristobal field in his country. Critics point out that Venezuelan oil will probably not help India’s energy security because it would not be economical to ship. In any case, they add that given regional instability, Venezuela might not merit a great deal of investment.

Contrarians worry that the benefits of oil diplomacy are exaggerated. With the level of instability in a number of countries where it is being exercised, it is unlikely to ensure stability, security, and sustainability in hydrocarbon supplies. They also question India’s effectiveness and wonder whether diplomats’ efforts are actually resulting in greater “oil security.” A number of observers felt that, for example, during twin visits by the Saudi king to China and India, China got a better deal from Saudi Arabia than India did.

The government seems convinced for now, however, that the benefits of diplomacy outweigh any risks. And in many regions it sees oil diplomacy serving a dual purpose of advancing India's influence more generally.

THE CONDUCT OF OIL DIPLOMACY

A former diplomat described successful oil diplomacy as “getting in first with exploration contracts, negotiating bilateral, trilateral and multilateral agreements, and ensuring that our future energy security is safeguarded through all this.”²¹⁹ In pursuit of these aims, government officials have conducted oil diplomacy through visits, conferences, cooperative agreements, and offers of various kinds of aid.

Bilateral Visits

Whether from the Prime Minister's Office, the MPNG, or the MEA, Indian officials have increased their visits to oil-rich countries. Similarly, they have upped the number of invitations issued to leaders and officials from these countries to visit New Delhi.

Just in the last two years, for example, the Indian minister of state for external affairs (June 2004), the Indian petroleum and natural gas minister (March 2005), and the Indian finance minister (April 2005) have visited Saudi Arabia. In turn, India welcomed the Saudi minister of petroleum and mineral resources in January 2005, and a year later, Saudi King Abdullah. The king had been invited to be the guest of honor at India's Republic Day celebrations and arrived with a delegation that included the Saudi oil minister. It was the first visit by a Saudi monarch to the country in fifty-one years. In what some considered a break with protocol, the Indian prime minister even went to receive the king at the airport.

Although declarations stemming from bilateral visits now often include an energy component, results have been mixed.

Conferences

Officials from the Indian MPNG and MEA participate in a number of energy-related conferences around the world. Recently, India has also hosted a number of these conferences. A brief list:

- **January 2005, Delhi:** Roundtable of Asian consumers and producers from West and Southeast Asia to talk about developing an Asian petroleum and petroleum products market and to encourage importing countries to invest in the producing countries' upstream sector and vice versa. The meeting was originally called to protest the Asian oil premium, but by the time it took place the differential pricing system was working in favor of the Asian countries. The participants agreed to meet annually.
- **February 2005, Delhi:** Third Asia Gas Buyers Summit
- **October 2005, Delhi:** Bangladesh-India-Myanmar-Sri Lanka-Thailand Economic Cooperation Group (BIMSTEC) Ministers' Conference on Energy Cooperation
- **November 2005, Delhi:** Roundtable of Asian consumers and producers in North and Central Asia

■ **April 2006, Delhi:** EU-India Business Conference on Energy

■ **May 2006, Delhi:** Conference with oil executives from fifteen African nations

Cooperative Dialogues and Agreements

India has signed cooperative agreements or memorandums, or discussed energy partnerships with a number of countries including Japan, South Korea,²²⁰ Romania,²²¹ the Gulf Cooperation Council, the Association for South-East Asian Nations,²²² the South Asian Association for Regional Cooperation, BIMSTEC, and Australia. The usefulness of some of these discussions has been questioned. The Memorandum of Cooperation signed in Romania, for example, agreed on the need to increase energy productivity and prevent pollution, seemingly self-evident points.

India has also started broader energy dialogues with both the EU and the United States. After the fifth Hague summit, India and the EU established a panel to discuss energy issues, with working groups to discuss coal and conversion of coal-related technologies, energy efficiency and renewables, and energy associations including India's participation in ITER.²²³ India and the United States started an energy dialogue in May 2005; it has five working groups including one that will focus on oil and gas.

In Central Asia, India is looking toward purchasing assets and participating in pipeline projects. In the long term, it is also seeking to acquire oil from the BTC pipeline through the Suez Canal or the Israeli Ashkelon-Eilat pipeline.²²⁴ Earlier this year, the Indian prime minister visited Uzbekistan, following a trip to India last year by the Uzbek president. Two of the seven memorandums they signed were energy related. The two countries agreed to form a joint working group on hydrocarbons. GAIL will explore the possibility of constructing LPG factories, gas pipelines, and gas processing facilities in Uzbekistan.²²⁵ Kazakhstan is also a country of great interest to India.

While India wants to be part of the “new great game,” it is being careful not to step on any toes—especially influential Russian ones—in the region. Central Asian countries might view India's entry as the addition of an alternate player. But India believes that it needs Russia's cooperation—or at least acquiescence—to be successful in the region. Indeed, energy cooperation is an increasing piece of India's long-standing relationship with Russia.

In January 2006 India also signed five memorandums of cooperation in the energy sector with China. They involved upstream and downstream sectors, pipeline projects, R&D, non-conventional sources of energy, and environmental concerns. There was also the much-talked-about agreement between CNPC and ONGC to jointly bid on projects in Central Asia, South America, Africa, and the Caspian region.

Other Instruments

India is deploying military and economic tools to gain an advantage in oil diplomacy. When acquiring assets, India is emulating China by putting resources beyond than the bidding amount on the table. It is trying to be both reactive, by acting on requests (Kazakhstan, for example, expressed interest in India helping develop the port of Aktau,²²⁶ and African coun-

There is little consensus on what should constitute oil diplomacy and who should conduct it.

tries have asked for refineries and railway projects) as well as proactive—sweetening the package when bids are made.

India has been making a variety of offers to complete deals and agreements, including greater investment. For example, the Indian government promised to encourage its companies to invest in Uzbekistan, including in the information technology sector. NTPC and Reliance Energy (a different company from RIL) will develop joint power projects in Saudi Arabia and the UAE.²²⁷ India's Exim Bank is also extending lines of credit (LOCs). In January 2006 the bank extended two LOCs to Sudan worth \$391 million to set up power plants. Compare this to the \$50 million given to Sudan two years before as well, as to the LOCs extended to other African countries (all under \$100 million).²²⁸

In addition, India can offer the prospect of military cooperation, though agreements in that arena tend to be more understated. Several examples illustrate such cooperation: in 2002 India signed a memorandum with Kazakhstan to help with military training and naval development;²²⁹ the head of the Indian army visited Nigeria in November last year (the first to do so in thirty years) and pledged to help train and modernize the Nigerian military,²³⁰ and in January 2006 Uzbek troops began training at India's Counter Insurgency and Jungle Warfare School.²³¹

The "Oil Diplomats"

There is little consensus on what should constitute oil diplomacy and who should conduct it. Grumbling broke out in South Block when former petroleum minister Aiyar (an ex-foreign service officer) was racking up frequent flyer miles traveling around the globe, along with jibes about how he was "playing foreign minister"—a post many feel he had wanted. On a more substantive level, there were complaints that the "independent foreign policy" conducted by Aiyar (and some of his ministry's bureaucrats) was not always coordinated with the MEA and created complications with some of its diplomatic efforts. The MEA contended that it had to look out for all India's global interests—not just energy—and balance them. A case in point was the discussion (on gas, not oil) with Bangladesh about a potential natural gas pipeline to India from Myanmar through Bangladesh. As Aiyar tells it, he had explicit instructions from the MEA for initial negotiations with his Bangladeshi counterpart specifying promises that could be made and language that could and could not be used in any declaration that might emerge from the meetings. Aiyar changed the language somewhat, and when the MEA expressed consternation, said that he could not understand what all the fuss was about. He later admitted that the very issue that MEA had been concerned about—that Bangladesh would block the trilateral negotiations about the pipeline over bilateral issues that it wanted to discuss with India—subsequently came to pass.²³²

The MEA's critics, in turn, have argued that the ministry treads too cautiously—so slowly that it almost brings things to a grinding halt. They criticize the MEA for not understanding the urgent need for oil diplomacy and therefore not giving it the priority it deserves. Like foreign ministries in a number of countries, the MEA does tend to move warily. When the MPNG bid to join the Energy Charter Treaty, for example, the MEA was the only ministry urging further, careful consideration before a decision was made.

Despite the possibilities for a fuel diversification “solution,” fossil fuels are projected to continue to be dominant sources of energy.

The rifts between the two ministries can be exaggerated. A number of the MEA’s clashes with the MPNG seem to have been personality-driven. More often than not, the two ministries have a cordial working relationship and have been known to coordinate their operations. For example, when MPNG officials visit a country to discuss a deal or a cooperative agreement, an MEA official (from the relevant embassy or headquarters in Delhi) participates in meetings as well. The degree of communication and interaction can be ad hoc and tends to be dependent on personal relationships, especially at the middle level. At the senior level, there are also formal venues for coordination, including the Committees of Secretaries, Cabinet Committees, or the ECC.

Reports indicate that consideration was given to setting up an “overseas operations cell” within the MPNG, staffed by MEA officials.²³³ Critics of that proposal say that just the opposite would make sense—creating an energy cell in the MEA to handle oil diplomacy since energy and oil issues have permeated India’s foreign policy. These priorities have led to new relationships, as well as what one observer has called “fresh forms of association with partners.”²³⁴ However, this reality does not sit well with all interested parties. There are those who argue that India should separate its political relationships from its economic and energy relationships—needless to say, a difficult feat.

Fuel Diversification

The government has been looking at fuel diversification as another way to meet India’s energy needs—not just in terms of replacing oil, but also to satisfy additional demand. Despite the possibilities for a fuel diversification “solution,” fossil fuels are projected to continue to be dominant sources of energy. Even if nuclear and renewable sources meet optimistic projections, they are not expected to contribute more than 15-17 percent of the country’s energy supply by 2031–32.²³⁵ However, by 2050, technological advances are expected to make nuclear and solar major contributors of energy.

(For further detail on fuel diversification, see Appendix E.)

NATURAL GAS

The MPNG’s Hydrocarbon Vision 2025 report indicated that natural gas should be India’s preferred source of energy. To encourage investment in domestic exploration and production, natural gas blocks are being offered as part of NELP. In total, 70 bcm of reserves are said to have been discovered through NELP.²³⁶ However, despite development efforts, domestic production alone is unlikely to meet demand in the country. So to increase and improve imports, India intends to add LNG terminals, encourage pipelines, acquire assets abroad, and conduct aggressive “gas diplomacy.”

There continue to be problems that could inhibit the greater availability and consequently the use of natural gas. Existing producing fields in the country are expected to witness a declining trend in production. In terms of India’s efforts to acquire natural gas from abroad, questions of logistics, politics, cost-effectiveness, and security issues have continued to dog proposed pipelines. India has experienced setbacks in its quest for LNG abroad as well. While there have been efforts to increase the number of LNG terminals, there have also

been delays and problems. India's LNG search has disproved some observers' contention that one of LNG's advantages is that it is "free of politics."²³⁷

COAL

Given the country's large coal reserves, the government has been trying to encourage more efficient mining and greater coal production. However, estimates indicate that reserves will be exhausted in forty years if there is a 5 percent growth rate in production. At the current rate of consumption, proven reserves will be exhausted in eighty years.²³⁸ Importing coal is more expensive than using domestic coal and requires additional investment in ports and railroads, which would raise the cost of power generation.

Most officials recognize the biggest problem for the coal sector, though few will admit it publicly: CIL's monopoly. The company is considered inefficient (production costs are estimated at 50 percent higher than in leading countries),²³⁹ with too many employees (it is the second largest employer in the world), strong unionization, too few funds, and low productivity. The company lacks the technical (and sometimes financial) capacity to mine efficiently and access coal in deeper areas.

NUCLEAR ENERGY

The government is moving ahead with various plans to increase the country's capacity to produce nuclear energy. Currently, eight nuclear reactors are under construction, with a total capacity of 3420 MW. Earlier this year, eight more reactors (which would have a total capacity of 6800 MW) were cleared for construction.

The recent nuclear "deal" between President Bush and Prime Minister Manmohan Singh—which would allow the sale or transfer of nuclear technology, equipment, and materials for India's civilian nuclear program—brought to the fore the potential for nuclear energy in India. On the basis of this prospect and subsequent international cooperation, the prime minister doubled the nuclear energy production target to 40,000 MW.

But nuclear energy may not prove to be the fix that some purport it to be. India has limited quantities of uranium (only enough to produce 10,000 MW), and reactors using thorium—of which India has large reserves—are probably still decades away. Officials acknowledge that it is going to take a while for nuclear energy to make a significant impact in India.²⁴⁰ Nuclear energy also involves a number of waste disposal and safety issues that have not been fully thought through. Finally, relative to other sources, nuclear energy remains an expensive proposition.

HYDRO SOURCES

Because of high initial set-up costs and risks, the government is providing financial support to some development projects in hydroelectricity generation. It is trying to attract private sector investment (currently at just 3 percent), and is considering a proposal that would put state-owned companies in charge of projects until they are approved. The projects would then be transferred to private companies or operated in a joint venture with them. The government is also trying to rationalize tariffs, accurately assess completion costs, and provide investment incentives.

Yet problems persist with this energy source as well. The World Bank and other funders have become reluctant to fund hydroelectric projects. Project clearances take time and involve land acquisition and dealings with state governments, which have their own agendas. There has also been opposition on environmental and social grounds, as these projects can displace large numbers of people.

NONCONVENTIONAL SOURCES

With limited proven oil and gas reserves, rising oil prices, depleting coal deposits, increasing greenhouse gas emissions, an endangered ecosystem, and significant amounts of nuclear energy still years away, the government has been encouraging the development of nonconventional energy sources. In the long run, these sources are considered cleaner and more viable than fossil fuels and their external costs are less extensive. Below is a brief look at some of the options in this sector:

Biodiesel. The government has supported establishment of a \$10 million biodiesel production facility in Mysore that aims to produce 10 million liters a year (from jatropha and other oil seeds). It is estimated that India has 50 million hectares of wasteland and 34 million hectares of protected forest areas that could be used to cultivate such crops.²⁴¹ There is talk of producing about 100,000 MW of power from biodiesel.

Solar Energy. India is considered to have the largest decentralized solar energy program in the world.²⁴² With estimates of about 300 clear sunny days annually, this program is considered to have vast potential.

Wind Energy. By 2004 India was the fifth largest producer of wind energy, with 95 percent of the investment coming from the private sector.²⁴³ The total installed capacity was 3595 MW. By 2007 it is estimated that an additional 3,000 MW of additional capacity of wind energy will be installed.²⁴⁴ The Planning Commission estimates that India has the potential for grid-connected wind capacity of around 20,000 MW.²⁴⁵

Others Sources. The government is also looking to encourage energy development from tides, biomass, and hydrogen.

As the Planning Commission has said, it would require a “more visionary plan” for India to get more than a modest energy contribution from nonconventional sources.²⁴⁶ Data on these sources and evaluation of their potential are not up to speed. But there are significant problems to overcome. Biodiesel and biomass projects divert much-needed water (as well as fertilizer, the production of which in turn requires natural gas). Solar energy remains expensive. As for wind energy, there are limited regions in the country where wind speeds allow effective harnessing of this resource. There are also logistical issues and trade-offs that will have to be weighed by planners, producers, and users. The development of almost all nonconventional energy sources requires land, which is limited in India. This gives rise to food security concerns (which some have called the food vs. fuel dilemma²⁴⁷) in addition to potential environmental problems.

STRATEGIC OIL STOCKS

To hedge against short-term supply disruption, India is considering the establishment of a strategic petroleum reserve (SPR). The country has stored oil for some time now. Reports indicate that India's current reserves offer a cushion of twelve to thirteen days.²⁴⁸ In addition, India has access to thirty-five to forty days of refined products. Indian oil companies are required to maintain these crude oil reserves and petroleum products. As a precautionary measure, in anticipation of a crisis or a substantial price hike, they sometimes also buy up additional oil supplies. For example, in June 2004, Indian downstream companies bought 25 million barrels reportedly for such purposes.²⁴⁹ The downstream companies were also formerly required to maintain "military stock levels" to supply the military.

The original proposal for creating an SPR was put forward in 1998. But the government took the next few years "studying the issue,"²⁵⁰ and only made an announcement about the SPR in 2003, when the Iraq war had created a renewed sense of urgency. While the Indian Planning Commission suggested a reserve that would store ninety days of the country's oil imports, the government decided that the reserve would hold 5 million metric tons p.a. (mmtpa) or fifteen days of the country's oil imports. India has been seeking advice on the construction and operation of SPRs from countries like Japan and the United States.²⁵¹ Indian officials also met with IEA officials to discuss IEA aid and ideas about coordinating the use of such stocks.

In 2004 Indian Oil established the Indian Strategic Petroleum Reserves Ltd (ISPR) to take the project forward (its equity has since been transferred to the OIIB) and build and operate the reserve. However, there have been delays. When this project was initially announced, the minister in charge said it would take two years (until 2006) to construct the SPR.²⁵² Now the plan is to begin constructing the reserve in July 2007 and have it operating by 2011–12.²⁵³

REGULATORY REFORM

In 2002 the NDA government proposed a Petroleum Regulatory Board Bill that called for the creation of an independent regulator for the downstream petroleum sector. There was skepticism about how independent such a regulator would really be, not least because the bill contained clauses indicating that the government could "give direction," a rather all-encompassing term, if this were in the public interest. Concerns also surfaced about the government influencing the appointment of members of this board, whose functions are outlined very loosely. A Parliamentary Standing Committee suggested amendments, including limiting the government's ability to give direction only in cases of war and natural calamities and extending the regulation to the gas sector as well. The bill, however, went nowhere. Late last year, the UPA government reintroduced the bill as the expanded Petroleum and Natural Gas Regulatory Board Bill to incorporate a number of changes.²⁵⁴

The bill was passed in March 2006, and contains provisions to regulate the refining, processing, storage, transportation, distribution, marketing, and sale of petroleum and natural gas products.²⁵⁵ The board was expected to be in place by September but has not yet been constituted. However, it was not structured to have authority to regulate the upstream sec-

tor, a fact that is highly criticized because a number of the companies involved are integrated or on their way to becoming integrated.²⁵⁶ Taking it a step further, there have been recommendations to establish one regulating agency for the entire energy sector. On the flip side are those who call for separate regulation—even for the gas and oil sectors. There also continue to be questions about the board's independence (since every regulation it introduces will have to be put forward in each House of Parliament), and whether it will have any teeth when it comes to the issue of pricing.²⁵⁷

Demand-Side Policies

Demand-side management has taken a backseat to supply-side management in India—in terms of official attention, resources, and even media coverage. Below is a look at a few of the related areas in which the government has formulated policies. While this paper does not take a more detailed look at the policy initiatives related to R&D and education, it should be noted that the government has been trying to promote them to encourage fuel substitution and efficiency measures.

Price Reform

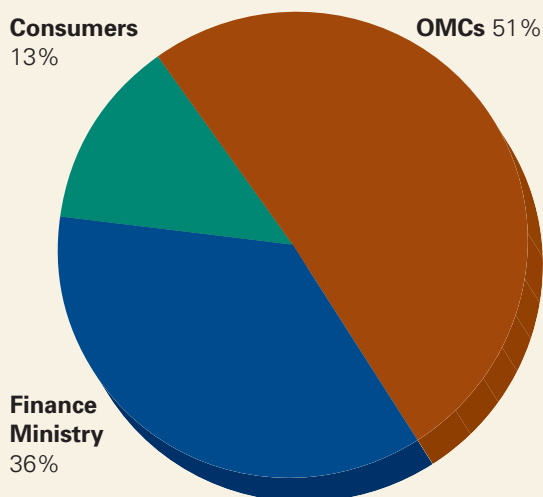
In some ways price reform has been the toughest nut to crack because it runs up against a number of other interests. Perhaps most important is the fact that in a democracy a politician's worst nightmare is to be blamed by the electorate for their economic woes. As one analyst indicated, the government is in a no-win situation. If it passes on the increasing price of oil to consumers, inflation is likely to rise, making the situation difficult for the poorer sections of society—a socioeconomically and politically unpalatable situation. However, if the government does not pass rising oil costs on to the consumer it ends up footing the bill.²⁵⁸

According to former petroleum minister Aiyar, the crude oil price increase in September 2005 resulted in “equitable burden sharing (fig. 11).”²⁵⁹ In fact, the state-owned OMCs tend to bear the brunt—to the extent that some of them are seeking to expand operations abroad, where they get better returns. However, as mentioned above, the government issues oil bonds to bail them out.

Skewed pricing also discourages new private entrants to the downstream sector. For example, despite the 2002 deregulation of oil marketing and the issuing of 11,500 licenses for retail fuel outlets, only 1,855 outlets have been established.²⁶⁰

There is a realization that price reform is necessary—both to lessen the burden on state-owned oil companies and the central exchequer, as well as to change consumer behavior. Time and again the prime minister has talked of the need to pursue a “rational pricing policy.”²⁶¹ It has been suggested

Figure 11. Burden Sharing of Crude Oil Price Increase, September 2005



Source: Mani Shankar Aiyar, "Interview," *Seminar* #555 (November 2005)

There is a realization that price reform is necessary—both to lessen the burden on state-owned oil companies and the central exchequer, as well as to change consumer behavior.

that subsidies be removed altogether, but many feel that a more realistic solution would be to implement a targeted and transparent subsidy system.²⁶²

Analysts have indicated that what is required is a set of comprehensive, transparent steps to price reform. While it has not undertaken a comprehensive approach, the government has been taking small steps toward reform as suggested by various committees and reports. A former MPNG official noted that over the last few years, governments have created an environment in which tough price decisions can be taken.²⁶³

For years, there was an administered price mechanism (APM) in place that determined prices for petroleum products. In 2002, to rationalize oil and gas prices, the NDA government dismantled the APM (with the Congress party supporting the move). The government also reduced—but did not eliminate—subsidies for LPG and kerosene. As a result, even though crude oil prices increased by over 90 percent between April 2002 and April 2005, subsidies on petroleum products were reduced by 68 percent. However, there continued to be a price ceiling and the retail price of petrol at the pump only increased 43 percent during that period.²⁶⁴

The APM thus is yet to be fully dismantled and the shift to a market-based pricing system is incomplete. Prices are based on the principle of import parity (the government announced recently that they would shift to the trade parity principle), but in reality the government continues to set retail prices.

In October last year, the government set up the Rangarajan Committee, a panel of experts that makes recommendations on fuel pricing and taxation policy. The head of the committee called for the government to stay “at arm’s length from price determination.”²⁶⁵ Its report, released in February, called for greater freedom for OMCs to set prices for their products and subsidization of kerosene based on the economic situation of the consumer. The Committee recommended substantially increasing the price of LPG, with complete removal of the subsidy in the future. It added that the government should cease asking its upstream companies to bear a direct portion of the subsidy burden. It recommended funding subsidies through levies that the upstream companies are already required to pay to the Oil Industry Development Board (and which the Committee suggested could be increased) and from the government’s budget. It further suggested that a uniform freight charge be discontinued—currently this charge on petroleum products is the same across India, regardless of the distance transported. Very few of these recommendations have been implemented amidst criticism that they would make for a more profitable industry, but would not address underlying problems.

Recently, the petroleum minister announced that the government would allow the OMCs to hike petroleum product prices if crude oil prices rose above \$73 a barrel. The regulatory board appointed under the Petroleum and Natural Gas Regulatory Board Act would—if the Act were implemented—“formulate and regulate the pricing mechanism and ensure competitive structure of this sector.”²⁶⁶ The OMCs are hoping that the board involves itself

in pricing issues. However, the Act gives the regulator monitoring authority, but not price-setting authority.

Fuel Taxation

One third of the Indian government's tax income is estimated to come from petroleum products. In addition, states also tax these products at differing rates. Estimates indicate that levies and taxes on petroleum products—including state taxes, custom duties, and excise levies—constitute more than half the price the Indian consumer pays for them.

The government benefits, at least financially, from increases in the price of petroleum products since taxation is based on a percentage of the basic value. Critics argue that it is these high taxes—more than price hikes reflecting the higher cost of crude oil—that cause inflation. When the federal government is denounced for higher prices at the pump, it asks states to cut their taxes to minimize the burden on the consumer. When the MPNG raises the price of petroleum products, it also often negotiates with the Finance Ministry to reduce central taxes to minimize the effect of the price hike. (Because it affects revenue in a less direct way, there are those who contend that the government prefers issuing oil bonds to the OMCs over reducing taxes.) Sometimes the Finance Ministry also decreases customs duty when global crude oil prices increase.

Over the years, there have been cuts on taxes and duties on some petroleum products (WTO commitments have required some of these). In the 2005–06 budget, the government announced custom duty cuts for crude (from 10 to 5 percent) and petroleum products (from 15 to 20 percent down to 10 percent).²⁶⁷ However, there were no further reductions this year.

Fuel Substitution

Along with finding energy alternatives to oil for production, the government is looking toward substitutions for oil as a fuel at the consumption end. The president has called for replacing oil in transportation. He has touted the jatropha plant (which has a crop life of fifty years) and said that half of India's sixty million hectares of wasteland should be used to cultivate it. According to his calculations, each acre could produce two tons of biodiesel, which could be available at Rs. 20 a liter. He sees potential production of sixty million tons annually, but acknowledges that unless there is money put aside for R&D (to make engines and other equipment), it will remain only a *potential* benefit. Advocates for biofuels argue that increased employment would be an added benefit of a well-planned effort. The president also talks of electric vehicles, hydrogen vehicles, electrification of railways, and increased urban mass transportation. But he realizes that all of these options will require cooperation among laboratories, academic institutions, and the automobile industry.

There have been some attempts to encourage the availability and use of biofuels—especially biodiesel and ethanol. States like Chhattisgarh have announced that they intend to become biofuel self-reliant by 2015, and are encouraging the cultivation of jatropha in all districts.

While India is the world's fourth largest producer of ethanol and the largest user of imported ethanol from Brazil, the ethanol is often used for purposes more profitable than fuel. Inspired by Brazil's success, however, the Indian government is looking anew at ethanol to alleviate the demand pressure on oil. Among other things, it is encouraging investment in ethanol production plants. ONGC, for example, is currently setting up an ethanol refinery, in which it has offered equity to Petrobras.²⁶⁸ Furthermore, a five percent ethanol blend has been used in about a third of Indian states since 2004, and the government recently announced that starting in October 2006, all refiners will have to produce such a blend. If the program is successful, it might increase this requirement to a ten percent blend (which has been under testing) in 2007.²⁶⁹

Another proposal being considered is to blend diesel with 20 percent biodiesel. The Indian Railways has already been using a 5 percent biodiesel blend.

The government has also been trying to encourage the use of LNG and has discussed customs duty exemptions on LNG imports.

The judiciary has played a role in increasing fuel substitution, for example, by mandating the use of CNG (initially by 2001—in the case of public transportation in Delhi—and later applied to a larger set of cities). Egged on by the Supreme Court, which was acting on the filing of public interest litigation, Delhi replaced its entire fleet of diesel buses with CNG buses in 2002. Today, all public transportation in Delhi is required to run on CNG. The Energy Information Administration estimates that this has replaced about a quarter of a million gallons of diesel and gasoline.

Apart from substituting transportation fuels, the Electricity Act 2003 tried to accelerate the development of power generation from nonconventional sources (and away from the increased use of petroleum products to produce power). States are requiring power distributors to purchase power generated from renewable sources.²⁷⁰ Karnataka requires 5–10 percent generation from renewable sources; Maharashtra, Orissa, and Gujarat (which has required 2 percent since 2004–05, increasing 0.5 percent a year) have also joined the bandwagon.²⁷¹

Conservation and Efficiency

The Planning Commission's Vision 2020 on Energy and the Environment emphasized that future growth should be as "resource-efficient and environmentally benign" as possible.²⁷² Looking ahead, it said that more efficient use of energy is a major necessity. Some estimates indicate that by 2031–32, efficiency measures by end users could reduce India's overall energy requirements by 5.3 percent. Increased efficiency in the transport sector—through mass transport, better use of vehicles, and better fuel efficiency—could reduce needs by another 4.2 percent.²⁷³ Official estimates indicate an even higher potential energy savings of 20 percent countrywide.²⁷⁴

The Indian president has listed conservation as one of the key foundations on which to base India's energy security, stating that security cannot be achieved unless the minimum possi-

While many policy-makers recognize the importance of conservation and efficiency, these seem to be orphan issues—there is something of a “pass the buck” attitude.

ble energy is used and India cuts down on energy losses. The head of one of India’s main business confederations has estimated that India could shave more than \$2 billion off its oil import bill if it cut consumption by 7 percent.²⁷⁵

India’s tenth Five Year Plan set a target for 13 percent savings through efficiency, though it did not lay out which sectors should achieve these savings. It also called for benchmarking the Indian hydrocarbon sector’s efficiency against that of other countries.

A number of efficiency efforts and initiatives have been concentrated in the power sector. Realizing that the transportation sector is going to continue to depend on petroleum products for the near future, the Planning Commission has called for efficiency on the oil demand side through use of more efficient automobiles, availability of increased public transport, electrification of railways (to move away from diesel), and encouragement of the use of biodiesel and coal-to-liquid efforts.²⁷⁶

In theory, the Petroleum Conservation Research Association (PCRA) under the Petroleum Ministry is responsible for conservation issues related to petroleum products. The PCRA’s role is supposed to include creating awareness, promoting the use of efficient equipment and vehicles, and supporting R&D efforts. The Bureau of Energy Efficiency under the Ministry of Power has been given the responsibility of coordinating overall efficiency efforts, but so far it has been neglected.

While many policymakers recognize the importance of conservation and efficiency, these seem to be orphan issues—there is something of a “pass the buck” attitude. When asked about the lack of conservation (or a plan for it), former petroleum minister Aiyar agreed that it was a problem but said, “unfortunately this is not really a matter for my ministry. It’s really more for those involved in automobiles or manufacturing to find out about energy savers of various kinds.”²⁷⁷ He listed what needed to be done, but said that it was beyond his scope. He was not sure what the government could do beyond “setting a good example.”²⁷⁸

The Asian Development Bank has pointed out that there is indeed a great deal the government can do, not least because the private sector in India is not apt to focus on conservation or energy efficiency measures without legislation requiring standards in these areas. Also, to spur additional conservation, the government must let consumer energy prices reflect their true cost.²⁷⁹

There has been some movement on this front. Authorities are working toward phasing out older vehicles in cities like Delhi and requiring Bharat-III emission standards (which are also more fuel efficient) in at least eleven cities, which were to have upgraded to Bharat-III by April 2005 and Bharat-IV five years after that. By 2005 Bharat-II standards were required to have been adopted for cars, light commercial vehicles, and bus and trucks across the country. There have been some delays. The government has announced that starting in 2010, Euro-II equivalent norms (Bharat-II) would be implemented in the entire country and Euro-III norms (or their equivalent) in select cities. The government has also announced cuts in excise on small cars.

Public transport in Delhi, which has almost one-fifth of the cars in the country, received a boost with a metro rail system (in operation since 2002) that continues to be expanded. Kolkata (formerly Calcutta) has had a metro system in use since 1984. Mumbai and Bangalore metro systems are expected to begin operation in 2010 and 2011, respectively.

The government has also directed its oil companies to produce and market higher grade lubricants and encouraged state-owned refineries to upgrade facilities to make their use of petroleum products more efficient and to minimize losses in the production of those products. The PCRA, along with the NOCs, has also been conducting annual Oil Conservation Weeks since 1991, which have now become Oil and Gas Conservation Fortnights. These are used to acknowledge companies' conservation and efficiency improvement efforts and to create awareness about related issues.

Conservation and efficiency efforts have already paid some dividends. Petrol and diesel consumption growth has slowed (Between 1980–81 and 2003–04, the petrol consumption growth rate stood at 7.4 percent a year, while that of diesel was 5.7 percent a year. Between 2000–05, petrol consumption grew at the rate of 6.9 percent and diesel at 3.1 percent annually). These improvements have been attributed to better roads and more efficient vehicles.²⁸⁰

India is reaching outside its borders for help with improving energy efficiency. It has, for example, joined the U.S.-led Clean Development Initiative with China, South Korea, Japan, and Australia. One of the initiative's major areas of emphasis is energy efficiency.²⁸¹

The stumbling block to effective change

tends to be implementation, which has often been slow (some prefer the term “measured”) and reactive.

Part 3. Observations

This monograph provides only a snapshot of India’s energy policies, with a focus on oil, but a number of points are evident. They can be grouped into two broad categories:

- India’s domestic policies and behavior and
- its interactions and policies abroad. These concluding observations are necessarily tentative and include important areas for further research and analysis.

The Home Front: Continuity or Change?

“Official” and “unofficial” India are keenly aware of energy-related problems and potential solutions. The stumbling block to effective change tends to be implementation, which has often been slow (some prefer the term “measured”) and reactive.

Future changes in the energy sector are also not likely to be drastic. Reform will continue, as much a result of necessity as of choice. It will be a slow process, primarily for political and social reasons, but also because of the difficulty of developing an energy *strategy* as opposed to a cluster of (sometimes contradictory) energy *policies*. Integrating these policies is apt to be a difficult task.

Politics will continue to have an effect on Indian energy (and especially oil) policy for the foreseeable future. For example, energy price increases will be incremental and will require labored negotiations among the ministries and members of the coalition governments. Disinvestment will be hotly debated (though not likely to be implemented, especially by a coalition government). In an era of coalition politics, when the support of every member of parliament counts, the prime minister needs to keep all the coalition partners happy; this makes it tougher for him to instruct others to toe the line. This situation means that coalition governments in India will be more apt to make changes that require cabinet approval rather than legislative action, because it is harder to build legislative political consensus.²⁸² The scenario will continue unless and until there is greater willingness by the two major national parties, the BJP and the Congress Party, to work together to pass key legislation.

The current government, and any probable successor (unless it is formed by what in India is called the “Third Front”—a non-BJP or non-Congress-led coalition of the Communist parties and some of the regional or caste-based parties), will continue to encourage investment in the domestic exploration and production of oil and gas. Without major finds and greater incentives, however, the private sector is not apt to follow this encouragement. Even the government’s own companies will continue to be focused abroad, rather than at home. They will likely continue to show streaks of independence, only to be periodically reined back.

This government will also continue to encourage private participation in the energy sector in general, mostly because the Indian exchequer cannot afford the kind of investment that is essential. Privatization of the state-owned companies, however, is improbable, though the government might divest some of its shares in these companies. Another Congress-led coali-

As India increasingly looks abroad to meet its energy requirements, a key question arises: How, if at all, will India's quest for energy resources change its international behavior?

tion with different partners or a strengthened Congress position within the coalition could make this more probable. If there is another BJP-led government, the situation could change and privatization could make a comeback as an option (depending on the BJP's coalition partners—if any—and how much clout they have). A majority Congress government (which at this point seems a very remote possibility) could also be more inclined toward privatization. Either way, private, and more specifically, foreign participation is in India to stay. So too the fact that India will continue to import a significant portion of the energy needed to meet its requirements. Even observers who hark back to the days when, they claim, India was energy self-reliant acknowledge that those days are gone. India has a different economy and tremendously greater energy requirements, which barring a sudden, massive discovery of oil or large-scale fuel substitution, it is unlikely to meet from domestic sources.

On the demand side, the government will continue to pay lip service to fuel substitution, especially in the transport sector. But until it allows the price of petroleum products to more accurately reflect international crude oil prices, consumer behavior probably will not change. As long as controlled pricing continues, renewable sources will also probably remain commercially unviable. Fuel substitution might get a boost from the judicial action. Such action would also have the effect of making tough decisions more politically palatable for the government. But legal intervention is unlikely to be comprehensive and would be enacted on a case-by-case basis. The country could also witness increasing use of cleaner fuels if the government efficiently manages the ongoing transition from traditional to commercial sources of energy by a large portion of its population.

On the institutional front, there will probably be no major restructuring to create a single energy ministry—which, in any case, some think would not be helpful or necessary—without major political initiative (or a crisis). Part of the reason consolidation is improbable is simply political: With so many coalition members to please these days, reducing the number of ministerial positions that could be handed out might not be seen as a smart tactic, and there would be resistance from the bureaucracy as well. Finally, even if such a ministry were created, it is likely that interministerial friction would simply be replaced by interdepartmental friction.

Cooperation within the government will continue to be ad hoc, though it will probably improve over time. The ECC, if used properly, could serve as a formal mechanism to exchange information and coordinate plans. But India's energy policies will remain rather segregated—and accordingly less effective—without greater efforts toward integration.

India Abroad: Cooperation or Competition?

As India increasingly looks abroad to meet its energy requirements, a key question arises: How, if at all, will India's quest for energy resources change its international behavior? Discussions in the United States have tended to focus on China as a new energy player, because China has a higher demand for energy than India and its intentions are not as transparent to other nations. However, India has only just entered the energy game in a major way, and its role in the international arena could prove to be either constructive or that of a spoiler.

Over the last decade and a half, more confident Indian leadership has pursued a progressively pragmatic foreign policy. Whereas one still hears voices espousing nonalignment and emphasizing moral strength and leadership among developing nations, India is now aiming higher. The focus is on the country's interests, with the goal a strong India with a seat at the international table and an expanded idea about the kind of power it wants to achieve strategically, militarily, economically, and culturally. And the country is more willing now to explore options to achieve this position. While there is no single, overarching strategy, India's aspirations are widely shared at home, and governments led by different political parties over the last fifteen years have not differed substantially on this goal.

Overall, India's international policymaking (both active and reactive) has become more flexible in pursuit of its aspirations. And its leadership has realized that they must be willing and able to adapt to achieve their goals. This attitude is likely to be reflected in India's global behavior in the energy sphere as well. India's energy policies abroad are apt to follow its general foreign policy path of enlightened self-interest and diversified options. It will consider, if not pursue, every option. This strategy will translate to India acting cooperatively when it thinks it suits its interests, but also acting competitively—in acquiring assets or pursuing partners—when it thinks it needs to be.

There are broadly four different schools of thought in India about how the country should behave internationally in relation to energy issues:

- The first asserts that self-sufficiency should remain the mantra and India should “go it alone” (and preferably look inward) in its search for energy.
- The second school believes that India should cooperate with Asia, but not with the West, of whom they are suspicious.
- The third emphasizes deeper integration into global energy markets and systems.
- The fourth believes in pursuing any and all policies to achieve the country's interests, and in moving beyond a focus on energy issues to subsume energy policy within consideration of India's broader strategic interests.

At the moment, the latter focus on broad strategic interests holds sway, encouraging India to pursue energy policies that include developing its own resources, as well as acting on its interests in the “near abroad” in Asia and in the broader international community.

Despite an emphasis on weighing all options, there are many indications that India would prefer cooperation to competition in its quest for energy. New Delhi would rather be—and be perceived as—a responsible stakeholder; in addition, most Indian officials (and the private sector) realize that India still lacks the resources to win in a competitive atmosphere. So the question remains: With whom will India cooperate in the future?

Until recently, there was more talk of cooperation within Asia than about working with the broader international community. This was due in part to decisionmakers dominating the ministries (and the airwaves) who were more inclined to be suspicious of the West and a West-dominated international system. (The term “West” is rarely defined and is often used

as a euphemism for the United States.) A former minister epitomized this sentiment, saying “We cannot let the international markets control our destiny.”²⁸³

The view that “the global energy regime remains to be emancipated from [America’s] hegemony” is not restricted to certain sections of academia.²⁸⁴ It is still not uncommon to walk into a mid-level bureaucrat’s office in New Delhi and hear him or her rant about “the West” and its “conspiracy” to keep India down. There is resentment that the West treats the Persian Gulf and Central Asia as its “fiefdom.”²⁸⁵ As a result, this set of people see cooperating with other Asian countries outside the international energy system as a better option. There are even calls for an Asian collective mechanism—“an Asian counterpart to the International Energy Agency”—to acquire more bargaining power and coordinate import policies.²⁸⁶ However, knowledge of other Asian countries’ policies and intentions is slim, and proponents of these ideas are assuming a great deal about the willingness of other Asian nations to join such a community.

Among those pushing for more Asian cooperation, there is also a much higher level of support for Indian cooperation with China—both before and since the two countries signed memorandums of cooperation. These agreements had raised hopes and fears (depending on political outlook) about an “Asian axis of oil.”²⁸⁷

In many spheres, India’s relationship with China is infused with elements of both competition and cooperation. This holds true in the oil and energy sector as well. Indian observers—official and otherwise—have been keeping a keen eye on what China has been doing in its search for energy. They are watching China’s policies and actions closely, and with a mixture of admiration and wariness. India has made attempts to emulate China’s successes. Other pundits call for India to “get its act together” and develop a comprehensive energy strategy, fearing that otherwise it will lose in “direct competition” with China.²⁸⁸

While India will attempt to collaborate with China, any visions of “complementary strategies executed by their state-owned energy enterprises, unique bilateral E&P programs, specialized division of labor, [and] financial burden sharing” are probably premature.²⁸⁹ The level of trust and institutional mechanisms required for that kind of cooperation do not exist at this stage. There is a tendency in some quarters to blame “non-Asian interests” and private actors for the lack of trust between the two countries. However, the distrust is rooted in history and persists to this day, though to a lesser degree.²⁹⁰ Sino-Indian energy cooperation will continue but on an ad hoc basis, as will concerns that this is a one-sided relationship, which India is more interested in pursuing than China.

Indian policymakers’ positions on the issue of cooperation with the West tend to coincide with their general strategic or political inclinations. Those who mistrust the United States and are apt to push for a Russia-China-India axis, including many members and supporters of the Left parties in India, are prone to be vociferous in their support for exclusive cooperation with Asia, and especially China. However, politics and proclivities must take a back seat to reality. India’s decisionmakers realize that the country cannot afford to be too picky—it has needs that can only be met by the West or in collaboration with the broader international community.

To ensure that India's participation in the global system is more consistent and constructive, the international community needs to address another and more prevailing reason for India's hesitation to cooperate with the West—resentment that India has been left out of international decisionmaking up to this point. The Indian elite does not feel threatened by the international energy order, since they did not help create it. But there is a sense that India is shortchanged by the current system. India would be more inclined to cooperate if it were given a seat at the table and saw the benefits of cooperation firsthand. Without direct inclusion, Indian policymakers will only view the international system's institutions (especially if created or dominated by the West) as a method for reducing its flexibility. Whether through creation of an "energy halfway house" or some other solution, the international community should find a way to bring India into the system as soon as possible. India's energy decisionmakers are going through a crucial learning phase and India's becoming a spoiler or a supporter will depend not just on how New Delhi decides to respond to the international energy system, but on how the international energy system reacts to India.

The international community also needs to realize that India's energy diplomacy and overseas assets purchases are here to stay. India will continue to practice oil and gas diplomacy, though the style, substance, and extent of its actions may depend on the personalities and organizations involved. Under the current Indian petroleum and natural gas minister, for example, the Petroleum Ministry's efforts are liable be somewhat understated, involving networking more than diplomacy. Efforts will be coordinated with the Ministry of External Affairs, which will again dominate the conduct of diplomacy. Politics may affect diplomatic stance to a certain degree as well. But as long as the Congress Party or BJP are the largest members of any coalition government, energy diplomacy will continue to be diverse in nature—with the country acquiring no permanent allies, but lots of good friends.

India may not go on a whirlwind buying spree for energy assets (and indeed it cannot afford to). But the government will continue to support Indian companies in their efforts however it can, particularly because there is a feeling that they need to play catch-up. When faced with accusations that such support is unfair, the retort will always be that India is merely doing what the West did in decades past. In response to criticism from the West that in its quest for energy, India is dealing with regimes that have poor human rights records, India will point to the American relationship with Saudi Arabia and suggest that Western states have double standards.

Within India, few academic discussions of prospecting abroad seem to take into account the consequences of involvement with unstable or politically charged regimes. However, the Indian government is beginning to consider the indirect costs of such investments. It is aware that diversification has associated costs as well advantages. On the one hand, it allows India greater freedom in some cases (to renew its relationship with countries like Israel, for example). On the other, its relationships with some of these regimes can also limit India's flexibility (since India cannot afford to upset and subsequently lose an energy supplier unless it gains another). India is also aware that reaching out to these regimes to ensure a "secure" supply has not proven so secure. Iran's reliability as a supplier, for example, recently came into question when it cancelled an LNG supply deal. Because of these inherent instabilities,

if India can be persuaded (rather than pressured) that there are more secure means of attaining its energy requirements, it might gravitate toward them.

Today, almost all India's major geopolitical relationships involve an oil or energy dimension. However, India's energy interests are not expected to trump its larger goals. Its international energy initiatives will have to fall in line with its efforts to become more influential globally. India will not completely reorient its foreign policy to gain (or maintain) access to energy sources. India's voting against Iran's disputed nuclear program (and then abstaining) at the IAEA was a good example of the country exercising its priorities. If New Delhi can be convinced that a certain path of action holds long-term strategic benefits—even if it hurts its energy interests in the short term—it is likely to take that path.

Energy interests will also affect India's military behavior in the future. They will be factored into national military strategy, whether through the necessity to safeguard the country's SPR or in the undertaking of cooperative relationships (such as the training of Uzbek soldiers). The Indian military has already decided that it will deploy a fleet of Mig-29s in Tajikistan to establish a foothold in a region that it considers significant not only for strategic reasons, but because it could be a door to additional energy sources (though Tajikistan itself is not such a source). In the right political climate and with broad international consensus, India might also be willing to send troops to deal with instability in the Middle East, which is liable to continue to be the major source of Indian oil supply. If India's energy engagement with its neighbors grows, the likelihood for political or military intervention in the region might also increase—for example, in the event that there is a disruption of the pipelines that bring gas to India.

In the Indian Ocean region, India has been content (though not necessarily happy) to reap the benefits from U.S. policing of the sea lines of communication. As its force projection capabilities grow—especially if in the context of increased U.S.-India naval cooperation—India might seek to take on a greater share of the security burden. India has already sought an extended role in the area, picking up the slack when the United States had to divert some of its ships to the Persian Gulf in 2001, and in the aftermath of the tsunami, when it joined with Australia, Japan, and the United States for relief operations in the area.

Whereas increased regional collaboration by India with the United States might create some concern in China, it would not mean that India was joining an anti-China front. In India's view, a potential U.S. confrontation with China would cause as much—if not more—disruption in the region than would terrorist or pirate activities.

Observations and Questions

A number of key observations stem from the research for this monograph:

- India is likely to continue to have a set of separate energy policies formulated by different entities rather than an overarching energy strategy. Integration of these policies will likely improve over time.

- Reform of India's energy sector will continue—but at a slow pace. Implementing policies will be harder than formulating them.
- Unless there is a non-BJP or non-Congress-led government at the center, India will continue to encourage private participation in its energy sector, as much out of necessity as out of choice.
- India's energy-related actions in the global arena will reflect its current foreign policy path of "enlightened self-interest" and maintaining diverse options. It will be cooperative or competitive, as suits its interests—in acquiring assets or pursuing partners—when it thinks it needs to be. However, India would much rather cooperate than compete.
- India would be more inclined to cooperate with the international community (rather than focusing on a particular country or region) in the energy sphere if it were given a seat at the decisionmaking table. Global players should find a way to bring India into the International Energy Agency (IEA) or at least find a place for it in an "energy half-way house" en route to full membership.
- For the foreseeable future, however, India will hesitate to rely completely on global markets. As a consequence, its country-by-country energy diplomacy and purchase of overseas assets will continue. However, its energy interests are not likely to trump the country's larger strategic goals.
- India's energy interests are also likely to factor into its military strategy and behavior in the future. For example, India might be willing to take on a greater share of the international security burden related to protecting oil and gas supply lines.

Questions for Further Review

The world is only beginning to be aware of the impact of India's energy needs, which will increase over time. It is important to consider the issue further, and particularly the following questions:

- As Indian companies acquire more assets abroad and increase their resources accordingly, will there be suspicion, accusation, finger pointing, and anger, similar to sentiments that characterized the "worldwide acquisition hunts" after the 1979 oil crisis? Will this antagonism occur not only between Indian NOCs and other international companies, but also among the Indian NOCs themselves as more of them venture abroad?²⁹¹
- Where are India's energy and larger strategic goals likely to clash?
- How does India's military view its future role, if any, in the country's quest for energy abroad?
- What terms and conditions would be acceptable—both to current members of the IEA and to India—for bringing India into the international energy decisionmaking community? What is the probability that this will occur?

Appendix A.

Major State-Owned Oil and Gas Companies

The Oil and Natural Gas Corporation (ONGC)

India's largest oil and gas company is the state-owned ONGC. While mostly involved in upstream activity, more recently it has tried to become an integrated company, dabbling in refining and retailing as well. It has the highest market capitalization of all corporations in India and ranks 95th on the list of Fortune Global 500 companies.²⁹² As India's largest exploration and production (E&P) company, it accounts for more than three quarters of Indian production and holds more than half of the hydrocarbon blocks in the country. Having purchased a majority share of Mangalore Refinery & Petrochemicals Limited (MRPL), now considered a subsidiary, it today also controls 10 percent of the country's refining capacity. In addition, it owns and operates pipelines across the country and offshore as well.²⁹³

As of 2005 the Indian government owned about 74 percent of the company with foreign institutional investors holding another 8.3 percent. In addition, in a pattern of cross-holding that is mirrored across the state-owned or "public sector undertaking" (PSU) spectrum, the Indian Oil Corporation Ltd. (IOC) and the Gas Authority of India Ltd. (GAIL) own 9.61 percent and 2.4 percent of ONGC, respectively.²⁹⁴

ONGC Videsh Ltd. (OVL) is an ONGC subsidiary that operates exclusively overseas. In terms of reserves, it claims to be India's second largest E&P firm. It has invested more than \$4 billion abroad (which it claims is the largest amount by a corporate Indian firm abroad) and has assets in a number of countries including Australia, Vietnam, Russia, Iran, Iraq, Sudan, Myanmar, Syria, Libya, and Angola.²⁹⁵ It is looking to Algeria, Indonesia, Venezuela, and the United Arab Emirates (UAE) as additional countries of interest.²⁹⁶

OIL INDIA LIMITED (OIL)

OIL is one of India's largest upstream companies, with a dominant presence in the oil sector in the Northeast of the country. It is seeking to move beyond domestic exploration and its overseas forays have included stakes in Iran and Russia. OIL is now interested in establishing what it calls a "selective presence" across the oil and gas value chain, increasingly engaging in the production and transportation of petroleum products like LPG.²⁹⁷ It already markets all the gas it produces in Assam.

Other Oil "Navratnas" (state-owned star performers)

The Indian Oil Corporation Limited (IOC) is India's largest downstream company. It is involved in refining, marketing, and pipelines. It has a number of subsidiaries including Lanka IOC, which operates (and will refurbish) 100 retail outlets in Sri Lanka. IOC is now also involved in E&P activities and has been assigned domestic blocks. It is collab-

orating with OIL for assets abroad and together the firms have acquired a stake in two blocks in Libya.

Bharat Petroleum Corporation Limited (BPCL) is India's second largest downstream company. **Hindustan Petroleum Corporation Limited (HPCL)** is also a mid- and downstream company involved in retailing overseas. Both companies are (separately) getting into E&P in collaboration with ONGC.

Gas Authority of India Limited (GAIL)

The Indian government set up GAIL in 1984 and gave it responsibility for transporting, distributing, and marketing gas produced by ONGC as well as some of the gas produced by other consortiums. It operates a number of pipelines including the country's two main interstate pipelines—HVJ and DVPL—which take natural gas to Delhi from western India. GAIL (along with ONGC, IOC, and BPCL) also owns part of the joint venture company **Petronet LNG Limited**, which constructed and operates the LNG terminal at Dahej in Gujarat.

Appendix B.

Relations between Government and State-owned Companies—Personnel

Boards of India's state-owned companies have both independent and government directors. The government can nominate two people to the board (this can vary). It also has a role in approving the other directors. These independent directors are eminent persons or professionals appointed by the cabinet from a list put forward by the Public Enterprise Selection Board (PESB). Assessments indicate that their presence has made for "quicker decisionmaking," brought in a fresh outlook, motivated employees, and improved overall performance in a number of these companies.²⁹⁸

However, there is widespread criticism that the boards are not empowered and that appointments are politically motivated.²⁹⁹ Critics contend that the government role in their appointment means that even the independent directors are so in name only. Governments have often politicized these decisions. The current UPA coalition government had said that it would devolve complete managerial and commercial powers to the *navratnas*. However, last year reports indicated, for example, that they were planning to replace independent directors on the *navratna* boards who had been appointed by the previous government.³⁰⁰ The petroleum minister had reportedly asked the secretary to consult the law ministry about how almost all the independent directors—who still had time left in their assigned terms—could be replaced.³⁰¹

The government also has the dominant role in appointing the management of state-owned companies. Senior appointments in all such companies are handled by the PESB. It receives proposals from the administrative ministry for vacant posts, invites applications for these positions, and then generates a short list for senior positions in the PSUs. This list is then forwarded to the administrative ministry. In the case of ONGC, for example, this list would go to the MPNG. The PESB cannot enforce its own suggestions, and a minister can derail them, often through delaying tactics. The PESB often also has to tangle with ministries on other issues, like the need to send reminders to the ministries to submit proposals for vacant posts.³⁰² The PESB itself has not been without controversy—there have been accusations that the body has lowered criteria for certain positions to allow a preferred candidate to be appointed.³⁰³

Once the administrative ministry decides on a candidate, it makes a recommendation. Following clearances that recommendation is sent to the Appointments Committee of the Cabinet for final approval. This process has brought out differences between the committee and the administrative ministry, including conflicts over preferred candidates.

Personnel appointments must take into account not only the recommendations of the PESB and the preferences of the minister concerned, but often also political, regional, and union sentiment. The case of OIL's chairperson and managing director illustrates this dance. Earlier this year a number of union leaders and local groups—everyone from the


Guwahati Senior Citizens' Association to the All Assam Students' Union—made it quite clear that they were displeased with the government's choice for the post and launched an unsuccessful protest against it. Unsuccessful candidates can take their case to the courts, which have been known to direct the government to conduct a new hiring process if they determine that there were irregularities in the process.³⁰⁴

A performance review by the leadership of the appropriate ministry provides the basis for government appointments and grants extensions (management positions are generally filled for a period of five years). This is not a mere formality, as was made evident by the case of Subir Raha, chairman and managing director of ONGC. Reportedly, Raha lost out on a full extension (to 2008) because of not-so-flattering reviews from the former petroleum minister Aiyar and Petroleum Secretary S.C. Tripathi (with whom he frequently clashed), as well as objections to his handling of the fire at the Bombay High field.³⁰⁵ Though Raha more than doubled ONGC's profits during his tenure, Tripathi contended that he had done nothing to increase the country's energy security.³⁰⁶ Aiyar castigated Raha for "insubordination and indiscipline" and for not being a team player.³⁰⁷ Despite Raha's objections that Tripathi was prejudiced against him, and his contention that he had been exonerated in an investigation into the Bombay High fire, he was denied an extension.³⁰⁸

Raha's tenure has been an interesting case study of government-PSU relations. While running one of the country's largest companies, Raha had resisted government control stating that "no company can function with multiple bosses."³⁰⁹ He clashed with former petroleum minister Aiyar over spinning off OVL into an independent company, and even managed to resist the appointment of two directors to the ONGC board. In the latter case, Raha unusually took his differences with Aiyar public, placing full-page advertisements in English-language newspapers.

Typically, heads of PSUs whose tenure ends before they turn sixty (retirement age) are given an extension till they reach that age, and it is unusual for the government to formally consult former ministers about these extensions. While there was questioning of Raha's effectiveness, other former secretaries gave him good reviews, including the current cabinet secretary, who stated that the accusations against Raha were unverified.³¹⁰ The current petroleum secretary recommended that Raha be given at least a three-month extension (which he was subsequently given). Some analysts believe that the unusual step of soliciting the views of an ex-minister was taken not only because the current minister had not had much experience with Raha. They posit that the current minister and the secretary (who interestingly was one of the two people that Raha had resisted being put on ONGC's board, even threatening to resign if this was done) might have wanted to replace Raha. But they did not want to bear the brunt of criticism for discontinuing the service of a successful chairman and managing director.

Denying Raha an extension was an atypical step, and probably the ministry's way of asserting itself as the boss. In fact, the interim chief of ONGC quickly went out of his way to state that his priority would be to "resolve all conflict issues" and work for better relations with the MPNG. Raha, meanwhile, is unlikely to be deeply concerned. He will most likely be



hired by either a private Indian or multinational company. Coupled with ONGC's bottom line, this option no doubt encouraged his independent streak. But the government can present obstacles even in private companies' personnel arrangements. In a number of cases—like joining a competitor within a certain period after retirement, for example—appointments require government permission, which can be delayed.

Apart from appointments and extensions, the government can also start investigations of company officials, which can be (and some experts indicate has been) used to apply pressure.

Appendix C.

Private Energy Companies

Domestic

Essar Oil Limited (EOL). This firm is an integrated company and part of the Essar Group controlled by the Ruia family (steel, shipping, and power are the group's other interests). It has three divisions: E&P, refining, and marketing. The company has considered spinning off the E&P wing as a subsidiary. EOL has E&P contracts for oil and coal-bed methane in India and has signed oil and gas exploration contracts in Myanmar (Blocks A2 and L for gas). EOL has a total of six blocks, one of which is expected to begin production by the end of this year.

EOL's 210,000 bpd refinery at Vadinar in Gujarat is expected to begin operations in October. It has bids on overseas assets, including, most recently, a refinery in Nigeria. More recently, it has entered the retail sector, selling gas and diesel. It also intends to set up a trading division to negotiate long-term contracts and exports of refined products.

RELIANCE INDUSTRIES LIMITED (RIL). RIL produces petrochemicals and petroleum products. It is the largest private sector company in India. With production accounting for 3 percent of India's GDP and indirect tax revenues from the group constituting almost 8 percent of the total the Indian exchequer receives, RIL typically has more clout than other private sector players in the country.³¹¹ According to some analysts (and competitors), this translates to speedier clearances and tax breaks that others cannot command. Even some state-owned companies are envious of the access that RIL has to the Indian leadership.

RIL operates a major refinery at Jamnagar (660,000 bpd), which has the ability to process low-quality crude, bringing in much higher margins than its domestic and even some foreign competitors. It also promotes Gas Transportation and Infrastructure Co. Ltd., which intends to lay a product pipeline (of almost 6,000 km) around India. RIL has recently ventured into E&P in both the oil and gas sectors.³¹² It has the greatest number of domestic exploration blocks of any private sector company (over thirty) as well as two oil and gas producing blocks—Panna-Mukta and Tapti. It has also gotten into overseas investments with stakes in blocks in East Timor, Oman, and Yemen.

The company has a reputation of “building ambitious projects and creating shareholder value.”³¹³ Analysts expect them to live up to it with the construction of an export refinery at Jamnagar at a cost of \$6 billion. Slated to be completed in 2008, it is expected to make Jamnagar the largest petroleum refinery complex in the world.³¹⁴ Reliance's petroleum division recently went public, making the company's head, Mukesh Ambani, the richest person in India. Chevron took a 5 percent stake in the company at a cost of \$300 million (and may buy an additional 24 percent in the future), which analysts expect could help RIL market and sell their products.

VIDEOCON INDUSTRIES. As part of the RAVVA consortium, Videocon has a 25 percent interest in the producing RAVVA oil and gas field (of which ONGC owns 40 percent). This field accounts for some 7 to 8 percent of the country's total. Videocon has exploration rights to five other blocks within India. It is also considering venturing into gas distribution and overseas E&P (it already has interests in blocks in Australia and Oman, and has applied for a block in Yemen).³¹⁵

Foreign

THE BG GROUP. BG's involvement in India started in 1995, when British Gas and GAIL together formed Mahanagar Gas Limited, which set up and runs a piped gas distribution system in Mumbai. Since 2000 BG has owned a 30 percent stake in India's Tapti and Panna-Mukta gas fields, which together account for 10 percent of the country's domestic oil and gas production. While BG continues to sell the oil produced to IOC, since April 2005 it has been allowed to sell the gas directly to the market instead of through GAIL. BG owns the largest private-sector gas distribution and transmission company in India—Gujarat Gas Company Limited—and is now thinking of venturing into power generation.³¹⁶

CAIRN ENERGY. A Scotland-based independent E&P company focusing on South Asia, Cairn made one of the biggest recent discoveries in India when it found fields in Rajasthan with a total potential of 1 billion barrels of oil. The Mangala field is estimated to have the potential to produce 100,000-110,000 bpd and the Aishwarya field, 5,000-15,000 bpd.³¹⁷

One of the first foreign companies to take advantage of the Indian government's program to attract private sector investment, Cairn has interests in eight oil blocks in the country, including two that have reached the production stage. It has used the revenue from these latter blocks to fund its exploration in other parts of the country. Cairn also has producing gas fields, and is allowed to sell this gas at market-determined prices.³¹⁸

ROYAL DUTCH SHELL. Shell has eight companies in India. These companies produce lubricants, market LPG, operate one of India's two LNG terminals (at Hazira), develop solar energy technology, and retail automobile fuels (as the only international company to be given a license to do so).

BP. The company has a stake in one of the largest lubricant manufacturers in India and has invested in solar energy and biofuels projects in the country. It is also looking to get into the E&P sector, and was the only oil major to bid for a block as part of the government's program to encourage private sector participation in the Indian E&P sector.

Other companies operating in the energy sector in the country include ExxonMobil (through its part ownership of RasGas, which supplies LNG to India), Total (lubricants and joint ventures with HPCL) and Gaz de France (it has a stake in Petronet). In addition, Niko Resources, Gazprom, Premier Oil, Hardy Exploration and Production, and Canoro Resources have stakes in oil and gas blocks in India. Finally, there are a number of other foreign companies that have joint ventures with federal- and state-owned companies in the various energy sectors.

Appendix D.

Acquisitions—Activities of Indian Companies Abroad, by Region

Africa

Egypt. OVL has a 70 percent stake in the North Ramadan Block, as well as a 60 percent stake in Block 6.

Gabon. In March 2006 the IOC-OIL consortium acquired a 90 percent participating stake in an oil and gas block for \$12.5 million (they share ownership evenly). They plan to spend \$50 million to develop it, with OIL to act as operator.³¹⁹

Libya. In January 2005, while OVL lost in the first round of bidding, IOC-OIL won Block 086, which OIL operates.³²⁰ In another round of bidding in October 2005, IOC-OIL won Block 102-4 in the Sirte Basin, for which they paid a \$3 million signature bonus. They have promised to give 10.5 percent of future production to the Libyan National Oil Company. This time around, OVL won Block 81-1 in the Ghadames Basin, for which it paid a \$6 million bonus, and it has promised to give 11.8 percent of its future production to the Libyan NOC. It also won 49 percent of Blocks NC 188 and 189.³²¹

Nigeria. OVL has a 15 percent stake in Block 2, currently under exploration. It also has 25 percent equity in Blocks OPL 321 and OPL 323. ONGC-Mittal Energy Limited (OMEL) has a stake in Blocks OPL 209 and OPL 212.

Sudan. OVL made a one-time investment of \$690 million³²² for a 25 percent stake in the Greater Nile Oil Project (GNOP). China's CNPC—which has a 40 percent stake—originally resisted OVL's inclusion in the project. ONGC created a subsidiary, ONGC Nile Ganga BV, in the Netherlands to manage what is its first producing overseas oil property. It produces 300,000 bpd.³²³ India gets about 3 million tons of crude oil annually from this property.

OVL also has interests in Block 5a (24.125 percent) and 5b (23.5 percent) in Sudan.

The Americas

United States. OIL acquired 100 percent equity shares of Sakhalin India Inc., which has a 10 percent participating interest in the North Hellhole Bayou Prospect in Vermillion Parish, offshore Louisiana.³²⁴

Asia-Pacific

Australia. OVL has a 55 percent stake in Block WA 306P. Videocon and GSPC equally share a 40 percent in Block EPP 277.

East Timor. RIL was one of only two companies to recently be awarded an exploration block in East Timor, offshore Area K.³²⁵ It had bid for two blocks but lost the bid for the other block to Eni because the work program it had laid out was not considered as extensive.

Vietnam. OVL acquired 100 percent rights to offshore Blocks 127 and 128.

The Middle East

IRAN. In 2002 Indian companies acquired the rights for the offshore Farsi block and signed an exploration service contract with the National Iranian Oil Company. OVL is the operator and has a 40 percent stake in the block; OIL owns 20 percent and IOC 40 percent.³²⁶ Drilling began recently.³²⁷

Iraq. OVL has full exploration rights to Block 8.

Oman. RIL has rights to a deepwater block, Block 18, off the Batinah coast in Gulf of Oman. A consortium led by Videocon has rights to Block 56. The other members of the consortium are Oilex (25 percent), GAIL (25 percent), HPCL's subsidiary Prize Petroleum (12.5 percent), and BPCL (12.5 percent).

Qatar. OVL has a 100 percent stake in the Najwet Najim block.

Syria. OVL has a 60 percent stake in Block 24. OVL, jointly with CNPC, has acquired PetroCanada's stake in thirty-six producing fields in Syria (the OVL-CNPC joint venture is called Himalaya Energy Syria BV).

Yemen. RIL has a 25 percent stake in the Calvalley Petroleum-operated Block 9, which in December 2005 started producing 2,000 bpd.

Russia and Eurasia

RUSSIA. OVL has a 20 percent stake in the Sakhalin-1 Production Sharing Agreement and has invested \$1.77 billion in the offshore field—the single largest foreign investment by India in any overseas venture. Production began in mid-November, with 673,000 barrels subsequently on its way to India.

Purchases in the Pipeline

Making an entry into South America, OVL will be acquiring a 15 percent stake of Block BC-10 in Brazil from Royal Dutch Shell (which operates the project) for \$170 million. The field is expected to begin production in 2009; OVL is paying another \$234 million in development costs. Shell blocked its attempt to purchase double the stake. The field has a production potential of 100,000 bpd.³²⁸

Also in the region, RIL has been offered a 26-30 percent stake of Ecopetrol's San Gabriel block in Colombia.³²⁹ OVL and Petroleos de Venezuela have agreed to develop the San Cristobal field in Venezuela. OVL has also agreed to purchase a 30 percent share in seven blocks in Cuba.

HPCL has shown interest in acquiring a 20 percent stake in a couple of blocks in Guinea Bissau.

Indian companies are also looking to invest \$1 billion over the next year in oil sands in Canada.³³⁰

Appendix E.

Fuel Diversification

Natural Gas

The MPNG's Hydrocarbon Vision 2025 report indicated that natural gas should be the preferred source of energy; a former Indian official has called gas the “energy of the future.”³³¹ Gas is considered preferable to oil for a number of reasons: oil prices are unpredictable and India has low reserves of oil; gas is seen as having more development potential, while oil production is expected to peak; although gas still has to be imported, it is closer in terms of sources of supply; and gas is cleaner than coal.

INCREASE DOMESTIC EXPLORATION AND PRODUCTION. To encourage investment in domestic exploration and production, natural gas blocks are also being offered as part of NELP. Recent discoveries have buoyed hopes, including finds by RIL in the Sohagpur West and East blocks of Madhya Pradesh and in the Krishna-Godavari (KG) basin.³³² In total, 70 bcm of reserves are said to have been discovered through NELP.³³³

These domestic discoveries are also seen to help in price negotiations. For example, an LNG deal with Qatar was renegotiated after RIL discovered gas in the KG basin in 2002.³³⁴

It was difficult to encourage investment in the domestic sector when market prices for natural gas were capped (especially to supply the power sector), and there was little incentive to produce for the domestic market. However, increasing demand and power sector reform could well change this scenario.

The recent Petroleum and Natural Gas Regulatory Board Act, which lays out the creation of an independent regulator, is also expected to encourage investment by creating a more level playing field. In addition, there is a pending gas pipeline policy that would create a national gas grid.

The government is particularly encouraging deepwater exploration, following RIL's discovery in the KG basin. Reports estimate that there are 1 billion tons of oil equivalent of hydrocarbon reserves in India's deep waters.³³⁵ Of the fifty-five blocks on offer in NELP-VI, twenty-four are deepwater blocks. ONGC's deepwater program involves an investment of \$750,000 a day and one of its priority projects is the development of the Sagar Samriddhi field.

INCREASED IMPORTS. Despite development efforts, domestic production alone is unlikely to meet the country's demand. To increase and improve imports, India intends to add LNG terminals, encourage pipelines, acquire assets abroad, and conduct aggressive “gas diplomacy.”

Exploration & production abroad: OVL has a 45 percent stake in a production sharing contract in Vietnam for a gas field (Block 6.1), which began production in January 2003. Gas has also been discovered in Block A1 in Myanmar, where OVL has a 20 percent stake.

In addition, it has a 20 percent stake in Block A-3. Essar Oil has an exploration contract for two blocks in Myanmar as well.

Importing LNG. Indian companies currently purchase LNG on the spot market. Qatar's RasGas also has a twenty-five year contract (starting in 2004) to supply Petronet, which operates the terminal at Dahej.

In January 2005 India signed a deal with Iran, which would have supplied 7.5 million tons of LNG by 2015. According to the deal, the price was linked for two years to Brent crude "on a sliding scale," and then fixed at \$3.21 per million btu (mmbtu).³³⁶ Forty percent of the natural gas would have gone to GAIL and the rest would have been shared by IOC, ONGC, and OIL. The deal recently fell through.

The government is trying to build additional receiving capacity and has discussed locations for more LNG terminals at Kochi, Ennore, and Mangalore. It is also looking into getting the Dabhol plant restarted—Enron had been importing LNG from Oman, Abu Dhabi, and Malaysia to supply the power plant. Currently, GAIL is close to reaching an agreement with an Algerian company, Sonartach, for a long-term supply contract to Dabhol. Finally, OVL is looking into the possibility of liquefying gas from Sakhalin-1 for shipment to India.

Pipelines. The government has considered three major natural gas pipelines, each coming from a different direction:

■ **Iran-Pakistan-India.** This pipeline has been discussed over the last decade and a half. Arguably first suggested in 1989, various routes have been suggested to transport gas from Iran to India (through pipelines): deep-sea via the Persian Gulf and the Gulf of Oman, skipping Pakistan; onshore and then offshore along the coast of Pakistan; and onshore through Pakistan. The first option was considered to have too many technical obstacles (though with the construction of the Bluestream pipeline from Russia to Turkey, some say another feasibility study should be conducted); experts considered the second likely to meet with technical obstacles and the cost of transmission was calculated to be \$4 billion more than if it was taken over land.³³⁷ While considered the most economically viable, the third option through Pakistan was thought to have "serious security" obstacles. Many in the Indian strategic community thought that Pakistan could potentially disrupt (or at least threaten) India's natural gas supply. With a somewhat changed political climate (due to the India-Pakistan Composite Dialogue) and willing leadership on both sides—including a gung-ho minister who said he refused to be "paralysed by paranoia,"³³⁸—the third option came back into play.

The pipeline would certainly have benefits for each country. Iran would find markets for its gas; India would receive much-needed gas; and Pakistan would get natural gas for itself, as well as transit fees (\$8 billion), taxes (\$1 billion); and savings in energy costs (\$5 billion). The proposed pipeline was also seen by its proponents as having the potential to contribute to peace in the region,³³⁹ but so far it seems to have brought only chagrin.

Proponents of the pipeline have suggested ways of mitigating security risks: building gas power plants near the India-Pakistan border that would supply both countries; establishing provisions whereby Pakistan would pay (65 percent of total) if it were responsible for disrupting gas supply to India; creating a consortium of the countries, companies, and financial institutions involved that would have the power to terminate supply to Pakistan if it cut off supply to India; and even having India supply diesel to Pakistan through a pipeline that could act as a counter-guarantee.³⁴⁰

Others have suggested extensions to the proposed pipeline. Former petroleum minister Aiyar, for example, put forth his “private dream” of an Iran-Pakistan-India-Myanmar-China pipeline. Aiyar saw tacking China on as an insurance policy, so that “if Pakistan gets funny with us, the Chinese and we could get together and clobber them.”³⁴¹ Of course, as the negotiations for an Iran-Pakistan-India pipeline have shown, this is easier said than done. It is also not clear what India would do if Iran acted “funny” as it did in the case of the aborted LNG deal mentioned above.

- **Turkmenistan-Afghanistan-Pakistan-India.** Initial feasibility studies on such a pipeline were done by ADB and Unocal. For the longest time, the MEA had objections to India’s participation (it has recently withdrawn these objections). The proposed pipeline would bring gas from Daulatabad in Turkmenistan through Herat, Kandahar, Quetta, and Multan to India where it would link up with India’s HVJ pipeline. It is estimated that this would bring 1.6 bcf of gas to the country at \$2.4 to \$3 per mmbtu. India would offer a large market for gas from Daulatabad (and the pipeline would allow Turkmenistan to diversify its options). Some have proposed adding Russia and Kazakhstan to the beginning of the pipeline.³⁴²
- **Myanmar-Bangladesh-India.** The three countries reached an agreement in January 2005 to discuss the proposed pipeline. It would take gas from Myanmar (including fields in which ONGC and GAIL have a stake) through the Indian states of Tripura and Mizoram through Bangladesh to the Indian state of West Bengal. The pipelines as initially proposed had benefits for all three parties: Myanmar would find a market for its gas and thus a source of revenue; India would get natural gas from Myanmar and a way to transport gas from its own Tripura state; and Bangladesh could transport natural gas from its own fields in the East to its western half (but not to India because of domestic opposition) and collect transit fees from India.

There is a debate about whether LNG imports or pipelines should be the preferred method of importing natural gas. Importing LNG is considered to be more cost-effective and less apt to be affected by geopolitical problems and supply disruptions.³⁴³ An observer has noted that “pipelines do not buy diversity” meaning that because of the enormous investment required in pipelines, a country is then locked into that option.³⁴⁴ Aiyar, who is a strong proponent of pipelines, admitted that conventionally shipped LNG could be a better option in the case of Bangladesh and Myanmar, especially if they became “impossibly difficult.”³⁴⁵ LNG advocates have also argued that it provides more secure supply than pipelines, which can be disrupted along the way.

Proponents assert that pipelines offer greater supply security than either equity oil or LNG because the supplying country makes infrastructure investments and would find it difficult to divert the gas elsewhere. But there is debate about whether there is enough political cooperation to make pipelines projects feasible. It is something of a chicken-and-egg scenario. Which comes first? Is it an environment of political cooperation or the pipeline itself, which in turn, can create cooperation and codependency?

These issues were highlighted by the Russia-Uzbekistan situation, which sparked questions, especially about the IPI pipeline. One observer stated that “the Russians demonstrated—through their stand off with Ukraine in early January—the vulnerability of energy dependent countries like India.”³⁴⁶ Pipeline supporters dismissed such parallels, saying that international guarantees could provide a remedy. They point to the Indus Water Treaty, which has been in place between India and Pakistan for years, as proof that a dispute resolution mechanism can be worked out. Naysayers pointed out that such guarantees could reduce, but not eliminate the chances of a supply cutoff.³⁴⁷

Pipeline supporters further argue that economic interests can outweigh security concerns and that pipelines are more economical over short distances. LNG involves additional transport and storage costs as well as losses in the liquefaction process. They point out that the price of LNG is linked to oil pricing in some long-term contracts (India’s deal with Qatar, for example, links the cost of LNG to a predetermined basket of crude). This arrangement means that LNG’s price tends to be volatile, while the price of pipeline gas is fixed for a longer term and determined by negotiations.³⁴⁸

A third option has been suggested. Rather than importing gas, this alternative would involve constructing gas-fired power plants in the exporting countries, with power being transmitted over high-voltage direct current lines. Advocates have suggested that a comparative analysis be conducted to determine the most economical option.³⁴⁹

COAL-BED METHANE GAS (CBM). This energy source is being considered as an alternate to natural gas. (India’s CBM potential is estimated to be between 1260-2540 mtoe).³⁵⁰ The government has offered CBM blocks in a process similar to that of NELP. Two rounds of bidding have been completed and a third is underway; thirteen blocks have been awarded for exploration and production. Indian corporations such as GAIL are forming joint ventures to develop CBM projects encouraged by the government.³⁵¹ GAIL has signed a MoU with Australian company Arrow Energy (a coal seam gas producer), which is also thinking of bidding for a CBM block.³⁵²

Private companies like RIL have announced that they will be investing funds to start production by 2008 from the CBM blocks they have been assigned. GAIL, OIL, and ONGC are expected to begin production from their blocks in 2010.³⁵³

STRATEGIC GAS RESERVES. The government has also considered proposals by GAIL to build a fifteen-day strategic gas reserve to hedge against supply disruptions.³⁵⁴

LIMITATIONS

There continue to be problems that could inhibit greater availability (and therefore use) of natural gas. Existing fields in India are expected to experience declining production. And obtaining natural gas from abroad is not a sure option. Questions of logistics, politics, cost-effectiveness, and security issues have continued to dog proposed pipeline efforts. Negotiations have proven tricky in every case—what a former minister called “needless argument” has seemed to others to be quite necessary.³⁵⁵ Apart from these problems, the more general criticism arises that if India is searching for supply security and reliability, pipelines through Afghanistan, Pakistan, and Myanmar might not prove an effective solution.

The proposed Myanmar-Bangladesh-India (MBI) pipeline has met with resistance from Bangladesh, which wants to link its participation to Indian concessions on other commercial fronts. Bangladesh has been reluctant to participate due to domestic opposition, which has developed despite the fact that the proposed pipeline would help transport the country’s own gas from its eastern to its western side and would bring in hefty transit fees. The alternate option is a route that would circumvent Bangladesh, which would mean a longer distance (five times greater than in the original proposal) and higher costs.³⁵⁶ In Myanmar there has also been opposition to the pipeline from some local communities, environmental groups, and civil society organizations.³⁵⁷ At the end of the day, the proposal may break down over costs. The current price being discussed is \$4-5 per mmbtu plus transit fees, which might be more than India is willing to pay. Delays have already caused Myanmar to look to China, which will receive gas from the Block (A1) originally slated for the pipeline. Myanmar has offered to supply the MBI pipeline from another block, but that would also add to the length of the pipeline.³⁵⁸

Difficulties dog the other proposed pipelines as well. The Iran-Pakistan-India pipeline may now be curtailed to the Iran-Pakistan pipeline. Prime Minister Singh had always acknowledged that there would be difficulties in implementing this project. Differences on project structure (India wanted a sales purchase agreement at the India-Pakistan border), price, fees, route, and management structure have caused India to suspend its involvement in the discussions. Earlier there were concerns that Pakistan was overcharging transit fees. Since Pakistan would also be a recipient of natural gas from the pipeline, it was argued that India would be subsidizing Pakistan’s gas use. In addition, supply security questions continued to trouble the project. India-Pakistan relations tend to wax and wane; when they are in a slump, as is currently the case, pipeline naysayers protest even louder.

Iran’s involvement added its own complications to the project. With the Iran-Libya Sanctions Act (or potentially its replacement—the Iran Sanctions Extension Act) in effect, a number of multinational companies were hesitant to participate in the pipeline project. For India, there were also political complications with pipeline negotiations occurring in the context of discussions about a potential U.S.-India nuclear “deal” and the international community’s bid (which India supported) to limit Iran’s ability to develop a nuclear weapons program.³⁵⁹

While India has instead decided to join the Turkmenistan-Afghanistan-Pakistan pipeline talks, questions of security and lack of an up-to-date feasibility study³⁶⁰ have troubled those

discussions as well. In addition, with Russia and China co-opting most of the natural gas from Turkmenistan, there are worries that there would not be much left for export to India, especially with Russia scheduled to take over the Daulatabad field. To the argument that Turkmenistan would want to diversify its markets, the retort has been that this could take a while. There are also some doubts about how much gas is actually available from the field (in the past, doubts about reserves as well as technical feasibility shelved an Oman-India pipeline)³⁶¹ and how much of the natural gas flowing through the pipeline would go to Pakistan.

India has experienced setbacks in its quest for LNG abroad as well. While there have been efforts to increase the number of LNG terminals, there have also been delays and problems. India's LNG search has disproved some observers' contention that one of LNG's advantages is that it is "free of politics."³⁶² Despite India's diplomatic efforts to balance its relationships with the United States and Iran, the latter showed that LNG imports could be "impossibly difficult," recently cancelling a \$22 billion deal to supply India with LNG. Many think this was Iran's way both of making clear its displeasure with India's growing relationship with the United States and pressuring India to agree to its terms on the pipeline. Instead, India has had to resort to buying LNG on the spot market at a much higher rate.

Coal

INCREASED DOMESTIC PRODUCTION. Given the country's large reserves of coal, the government has been trying to encourage more efficient mining and greater coal production. It attempted to take itself out of decisions on pricing; broadened the definition of captive coal mining, allowing it in major sectors that use coal (like steel and power generation); and permitted state government companies to mine coal.

OTHER USES OF COAL. There has also been some interest in coal gasification that could exploit coal at greater depths. ONGC and CIL have joined forces for efforts in this arena, and GAIL is also working in this sector. At the moment, however, this option is of limited value because available technology applies largely to high-grade coal, which India does not have. Companies are also considering pursuing coal liquefaction.

INCREASED IMPORTS. To facilitate imports, the government has reduced customs duty on imported coal to 5 percent. The Planning Commission has also suggested looking at acquiring equity coal.

LIMITATIONS

Importing coal is not an easy option. It is more expensive than using domestic coal and requires additional investment in ports and railroads, which would raise the cost of power generation. Estimates indicate that imported coal is \$5-\$7 per million kilocalories more expensive. There are also concerns that importing coal in large quantities will expose it to the same supply disruption risks as oil. These limitations could make coal a less competitive energy source.

On the domestic side, shortages persist. By 2012 the coal shortfall is expected to be 100 million tons (currently, it is about 30 million to 40 million tons).³⁶³ A consulting company esti-

mates that this shortfall could cut India's growth rate by 1 percent.³⁶⁴ Coal shortages have meant higher prices. And if oil prices continue to rise, officials expect coal prices to rise further as well—one official observed that while coal might be cheaper than oil, it is not cheap per se.

Most officials recognize CIL's monopoly as the biggest problem for the coal sector, though few will admit it publicly. The combination of CIL's monopoly and the coal shortage translates to profits for the company. But CIL is considered inefficient (production costs are estimated at 50 percent higher than in leading countries),³⁶⁵ with too many employees (as the second largest employer in the world), strong unionization, too few funds, and low productivity. It is estimated that CIL delivers on only 89 percent of its commitments.³⁶⁶ Apparently, even prospective job applicants do not have a high opinion of the company—half of the six candidates short-listed for its top job by the Public Enterprise Selection Board did not show up, and those who did, did not have appropriate technical qualifications.³⁶⁷

CIL's solution to “[bring] online new mines and [make] existing ones more efficient” seems more readily said than done, and many observers think it is unlikely to be achieved if left to CIL.³⁶⁸ The company lacks the technical (and sometimes financial) capacity to mine efficiently and access coal in deeper areas. In addition to CIL's self-generated troubles, the market itself is skewed. There continues to be little transparency in price determination and a lack of independent regulation. It has been suggested that the government take a page from the oil and gas sector and deregulate the coal mining industry.³⁶⁹

Reform has been painfully slow. The earlier NDA government attempted to open the sector to private participation—in 2000 it introduced the Coal Mines (Nationalization) Amendment Act in Parliament, but it has been stuck there since. Instead, the government opened the sector to captive mining, which allowed coal mining for a corporation's own consumption. While the Act remains logjammed in the legislature due to lack of political consensus, the government has also tried to crack the market open a bit recently by allowing companies owned by some states to mine coal in nineteen blocks and to sell the coal to other consumers.

In lieu of more “radical” reform—which seems improbable at present—it has been suggested that the government consider breaking up CIL into smaller, independent PSUs that at the least would have to compete with each other. An expert committee, constituted by the government in 2004, has suggested additional reforms including some amount of deregulation and more autonomy for CIL's subsidiaries. Considering the record of reform to date, even small steps would be a positive sign. But the only real solution, many say, is to establish a truly open coal market.

Problems are not restricted to lack of market reform and efficient production. While India might have large coal reserves (though there are analysts who consider it a “myth of abundance”),³⁷⁰ these reserves are concentrated in a few geographic areas. Some reserves cannot be extracted with the technology currently being used by CIL. Other reserves are inaccessible or in areas where coal mining comes up against concerns about environmental security (because of the potential for forest depletion) or food security (if the coal is under agricul-

tural land). The reserves contain high-ash content coal, which is more polluting and has lower thermal efficiency. In addition, estimates indicate that these reserves will be exhausted in forty years if there is a 5 percent growth rate in production. At the current rate of consumption, proven reserves will be exhausted in eighty years.³⁷¹

Adding to the mix is the problem of inadequate transport infrastructure—both to support increased imports and to transport domestic coal. Most of India’s coal is located in the eastern part of the country, so it has been suggested that it makes more sense to transport power than coal.³⁷² The scenario is exacerbated by inadequate coordination among the coal ministry, the railways, and shipping ministries.

Nuclear Energy

INCREASING CURRENT POTENTIAL. The government is moving ahead with various plans to increase the country’s capacity to produce nuclear energy. Currently, eight nuclear reactors are under construction—six pressurized heavy water reactors or PHWRs and two light water reactors or LWRs, with a total capacity of 3420 MW—with Russian assistance for the construction of the LWRs. Earlier this year, eight more reactors, which would have a total capacity of 6800 MW, were cleared for construction.

Advocates are pushing for the development of fast-breeder reactors (FBRs).³⁷³ The Department of Atomic Energy has set up a company, Bhavini, to construct its prototype 500 MW fast-breeder reactor, which will use plutonium (produced from uranium). This is stage two of India’s nuclear program. The third involves development of FBRs that would use thorium. Unlike uranium, India has large reserves of thorium. The country is also looking at developing Advanced Heavy Water Reactors as an alternate third stage (India’s Bhabha Atomic Research Center has been assigned responsibility for the R&D efforts).

SIGNING AGREEMENTS. The recent nuclear “deal” between President Bush and Prime Minister Manmohan Singh, which would allow sale or transfer of nuclear technology, equipment, and materials for India’s civilian nuclear program, has brought to the fore discussion about the potential of nuclear energy in India. Both countries have made the case that the deal will “enhance energy security,” with President Bush even arguing that it will result in lower gas prices for American consumers (a subject of much debate).³⁷⁴

The deal could also open the door for greater cooperation in this field with countries other than the United States³⁷⁵—India has been aggressively courting members of the Nuclear Suppliers’ Group, who could potentially supply it with much-needed uranium as well as technology.

There are a number of companies—U.S. and others—waiting to participate in the nuclear energy sector in India.³⁷⁶ With the country aiming for twenty-five to twenty-eight more reactors, official estimates over the next decade and a half indicate that the nuclear reactor business in India could be worth up to \$40 billion.³⁷⁷ The government anticipates interest from companies like General Electric, Westinghouse, Atomstroy Export, and Areva (the latter has said it would offer a third generation 1600 MW evolutionary power reactor).³⁷⁸ Indian companies like Reliance Energy, Tata Power, and the National Thermal Power

Corporation (NTPC) have also shown interest in participating in the sector, although the government has yet to decide whether they would be allowed to invest in it (recent reports indicate that the government has agreed to allow NTPC to participate). At the moment, the Nuclear Power Corporation of India Limited has a monopoly on producing nuclear energy in the country, and it is likely to stay involved through joint ventures, among other vehicles.

India also recently joined a consortium that includes the EU, China, Japan, South Korea, Russia, and the United States as a partner in the ITER (originally International Thermonuclear Experimental Reactor) project. Based in France, the project will conduct R&D “to demonstrate the scientific and technical feasibility of fusion power.”³⁷⁹ India’s 10 percent contribution is expected to be in the form of manufacturing equipment.

LIMITATIONS

There are many proponents of nuclear energy in India, including the country’s president. But nuclear energy may not prove to be the fix that some believe it to be. India has fallen short of its own, mostly rhetorical, targets (see box below). And there has been ensuing criticism that “nuclear energy advocates have long promised much and in exchange for huge budgets and unstinted government support, delivered little.”³⁸⁰

The latest aim is to produce 20,000 MW of nuclear energy by 2020.³⁸¹ However, under the current circumstances, India has limited quantities of uranium (only enough to produce 10,000 MW), and thorium reactors are still some years away. Lack of access to advanced technology, skilled professionals, and funding further hinders the process of achieving these ambitious targets.

Some of India’s existing reactors already need external uranium supply. A number of experts realize that without outside assistance—financial, technological, and material—visions of bountiful nuclear energy are unlikely to materialize. It is one of the reasons the current Indian government is interested in a nuclear agreement with the United States. On the basis of the potential of such of an agreement and the prospect of subsequent international cooperation, the prime minister doubled the nuclear energy production target to 40,000 MW.

Predictions for Nuclear Energy Development			
Person or Organization	Target Year	Targeted Electricity Generation from Nuclear (in MW)	Actual Electricity Generation from Nuclear
Atomic Energy Commission in 1954	1980	8,000	600
Dept. of Atomic Energy chief in 1962	1987	20,000–25,000	950
Dept. of Atomic Energy chief (1960s)	2000	43,500	2,720
Raja Ramanna (Dept. of Atomic Energy) in 1984 (post-sanctions)	2000	10,000	2,720
Source: MV Ramana (http://www.npec-web.org/Presentations/Ramana-IndiaNuclear%20Energy.pdf).			

While nuclear power proponents are looking to the U.S. agreement to open the door to technology, high-tech skills, and uranium supplies, it is not a done deal. Resistance persists in the U.S. Senate amid concerns about the agreement's effect on the nonproliferation regime and its potential to spark an arms race in the region. In India there is opposition from some of the political parties, as well as the nuclear bureaucracy. Finally, Indian legislators (like their U.S. counterparts) will have to make changes in the Atomic Energy Act to allow private investment.

Officials acknowledge that it is going to take a while for nuclear energy to make a significant impact in India.³⁸² It is viewed as a medium-term if not a long-term source. Thorium exploitation technology is not yet available for commercial use, and its use is likely decades away. Even commercial viability for the ITER project is not expected to be realized until 2040.³⁸³ Nuclear energy also involves a number of waste disposal and safety issues that have not been fully thought through. Finally, relative to other sources, nuclear energy remains an expensive proposition.

Hydro Sources

Because of high initial set-up costs and risks, the government is providing financial support to some development projects in hydroelectricity generation. It is trying to attract private sector investment (currently at just 3 percent), and is considering a proposal that would put state-owned companies in charge of projects until they are approved. The projects would then be transferred to private companies or operated in a joint venture with them. The government is also trying to rationalize tariffs, accurately assess completion costs, and provide investment incentives. A number of people have also suggested that India look to countries like Nepal (where India has helped build generation capacity) as sources of hydroelectricity.³⁸⁴ Energy export to India has already powered Bhutan's economic development.

LIMITATIONS

Problems persist in this sector as well. India's water resources are not evenly distributed or developed. The rivers used for hydroelectric projects have different characteristics—in North India, the rivers are snow-fed; in South and Central India, they are rain-dependent and therefore more prone to disruption. (One official commented that if India does not want to be dependent on oil, it should hardly want to depend on nature.) A number of the projects are in areas with rough terrain, and a lack of surveys for some of the sites adds to this problem.

Project developers have had to search harder for funding because sources like the World Bank (which has become reluctant to fund hydroelectric projects) have dried up though others funders, like the European Union, have expressed an interest. Project clearances take time, and involve land acquisition and dealing with state governments, which have their own agendas. Some of these problems could be sorted out through the government's proposal to have two phases of development—pre-clearance, with the PSUs heading the efforts, and post-clearance—however, this option leaves open the possibility that the state-owned companies will control the sector and be unwilling to give up control. There has also been opposition on environmental as well as humanitarian grounds because large numbers of people

are displaced by these projects. Differences among two or more states as to which controls river resources have also proved a major stumbling block for such projects. Finally, when looking abroad, countries like Nepal, which has a vast untapped energy potential in its Himalayan river system, have been reluctant to export hydroelectricity to India.

Nonconventional Sources

India has limited proven oil and gas reserves and is facing rising oil prices, depleting coal deposits, increasing greenhouse gas emissions, and an endangered ecosystem. With significant amounts of nuclear energy still years away, the government has been encouraging the development of nonconventional energy sources. These sources are considered cleaner and more viable in the long run (because India is considered to have great potential for their development and most of them are renewable). And they do not have the kind and extent of external costs that fossil fuels do.³⁸⁵ Below is a brief look at some of the options in this sector:

BIODIESEL. References to jatropha are bandied about a good deal these days in Indian energy circles. Jatropha is a plant used in the production of biodiesel. The government has supported the establishment of a jatropha technology center, as well as a \$10 million biodiesel production facility in Mysore, which is aiming to produce 10 million liters a year (from jatropha and other oil seeds). It has made land available for the project.³⁸⁶

There is also a government proposal to cultivate 11 million hectares to aid the production of biodiesel.³⁸⁷ It is estimated that India has 50 million hectares of wasteland and 34 million hectares of protected forest areas that could be used to cultivate such crops.³⁸⁸ Talk is of producing about 100,000 MW of power from the cultivation of 40 million hectares.

SOLAR ENERGY. India is considered to have the largest decentralized solar energy program in the world.³⁸⁹ With estimates of about 300 clear sunny days, this program is considered to have a vast potential.

WIND ENERGY. By 2004 India was the fifth largest producer of wind energy with 95 percent of investment coming from the private sector.³⁹⁰ The total installed capacity is 3595 MW in the states of Andhra Pradesh (120.6 MW), Gujarat (253.53 MW), Karnataka (410.75 MW), Rajasthan (284.76 MW), and Tamil Nadu (2036.92 MW). From 2005–07 it is estimated that an additional 3,000 MW of additional wind energy capacity will be installed.³⁹¹ While the initial investment is high, it takes only ten years to recover costs and wind generating machines last twenty years. Estimates of India's potential for wind energy vary, but the Planning Commission projects that India has the potential for grid-connected wind capacity of around 20,000 MW.³⁹² Companies like Bajaj Auto (also Tata, Birla, RPG, and Godrej) are setting up wind energy farms—these investments give them official license to write off their entire energy bill.

OTHERS. Tides, biomass, and hydrogen are other nonconventional sources that the government is looking to encourage.

LIMITATIONS

As the Planning Commission has said, it would require a “more visionary plan” to make the contribution of nonconventional sources more than modest.³⁹³ It would also require massive public and private sector commitment to biomass power, biogas, and biofuels. Data on these energy sources and evaluations of their potential are not up to speed. With so many options in this sector, it is also difficult to figure out how to divvy up the resources that are available and to decide which sources will be most likely to succeed commercially. Advocates continue to maintain that the economics of nonconventional energy can work, adding that these sources are viable alternatives, if adequately subsidized. Their counterparts have also argued that the government would be better off subsidizing the development of nonconventional energy sources than petroleum products.

Overall, the nonconventional energy sector is still largely undeveloped. It suffers from lack of attention and resources. Government officials often promote the fact that MNES is the first dedicated ministry of its kind, but at the moment it has little clout. This could change—with oil prices touching unexpected highs, a number of nonconventional sources that were once considered too expensive to bring into play are being looked at anew.

In addition to financial and technological issues, there are logistical problems and trade-offs that must be considered. The development of almost all nonconventional energy sources requires land, which is limited in India. This gives rise to food security concerns (which some have called the food vs. fuel dilemma³⁹⁴), in addition to potential environmental problems.

Biodiesel and biomass projects also divert much-needed water (as well as fertilizer, the production of which, in turn, requires natural gas). Solar energy remains expensive. And there are a limited number of regions in the country where wind can be exploited effectively because energy production requires specific wind speeds. However, the potential for wind power has yet to be explored in many parts of India.

Additional limitations include technological constraints. Scientists admit that the “bio-energy fantasy” is still dependent on external technology—a situation that is unlikely to change.³⁹⁵ India’s planners have therefore suggested that the country direct its research to areas where it can piggyback on technology developed by others.

Notes

1. The title of his chapter on India. See Robert A. Manning, *The Asian Energy Factor* (New York: Palgrave, 2000), p.119.
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5. From data derived by analyst Gerald Walsh using data from the Central Statistical Organization. EIU Data Services, EIU Country Data, (eiu.bvdecom/cgi/template.dll?product=101 [May 23, 2006]).
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7. International Energy Agency, *World Energy Outlook 2004* (Paris: OECD, 2004), pp. 498–99.
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11. International Energy Agency, *World Energy Outlook 2004*, p. 498.
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13. *Ibid.*, p.1.
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16. EIU Data Services, *EIU Country Data*.
17. International Energy Agency, *World Energy*, p. 82.
18. Expert Committee on Energy Policy, *Draft Report*, p. 54.
19. BP, *BP Statistical Review*, p. 9.
20. *Ibid.*, p. 6.
21. *Ibid.*, p. 4.
22. International Energy Agency, *World Energy*, p. 106.
23. At a conclave held in New Delhi in February 2006, Kirit Parikh, chair of the Planning Commission of India's Expert Committee, which was charged with drafting a report on an integrated energy policy, joked that Allah had blessed most of his followers with large reserves of oil; with the second largest Muslim population in the world, he might have blessed India with bountiful reserves as well. Kirit S. Parikh, "Valedictory Address," to conference on "India's Energy Security: Major Challenges National," Observer Research Foundation, New Delhi, February 14, 2006.
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