

The Geopolitics of Natural Gas

Natural Gas in India: Difficult Decisions

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NATURAL GAS IN INDIA: DIFFICULT DECISIONS

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ABOUT THE STUDY

Some of the most dramatic energy developments of recent years have been in the realm of natural gas. Huge quantities of unconventional U.S. shale gas are now commercially viable, changing the strategic picture for the United States by making it self-sufficient in natural gas for the foreseeable future. This development alone has reverberated throughout the globe, causing shifts in patterns of trade and leading other countries in Europe and Asia to explore their own shale gas potential. Such developments are putting pressure on longstanding arrangements, such as oil-linked gas contracts and the separate nature of North American, European, and Asian gas markets, and may lead to strategic shifts, such as the weakening of Russia's dominance in the European gas market.

Against this backdrop, the Center for Energy Studies of Rice University's Baker Institute and the Belfer Center for Science and International Affairs of Harvard University's Kennedy School launched a two-year study on the geopolitical implications of natural gas. The project brought together experts from academia and industry to explore the potential for new quantities of conventional and unconventional natural gas reaching global markets in the years ahead. The effort drew on more than 15 country experts of producer and consumer countries who assessed the prospects for gas consumption and production in the country in question, based on anticipated political, economic, and policy trends. Building on these case studies, the project formulates different scenarios and uses the Rice World Gas Trade Model to assess the cumulative impact of country-specific changes on the global gas market and geopolitics more broadly.

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Introduction

In a speech in March 2012, Indian Prime Minister Manmohan Singh declared “expanding the use of natural gas in India is one of the most important and immediate ways of responding to the challenges of energy security and the management of climate change.”¹ Although the sentiment was not new—the Indian government pushed natural gas as the fuel of the future in a 1997 hydrocarbon policy review—it reflected India’s growing commitment to a new fuel source.² The International Energy Agency (IEA) projects that India’s natural gas demand will grow by 4.2 percent per year to 2035.³ At this rate, domestic natural gas demand will grow from 5.3 billion cubic feet per day (bcf/day) in 2012 to nearly 18 bcf/day by 2035.⁴ While coal and oil, which account for roughly two-thirds of India’s energy demand, will remain the pillars of India’s energy sector, policies relating to India’s natural gas sector will be important to maintain the country’s economic growth.

The rising demand for natural gas from the power, fertilizer, industrial, and transportation sectors was stoked by changes to India’s natural gas supply. In 2004, Reliance Industries, an Indian energy company, discovered large gas reserves in the Krishna-Godavari (KG) Basin, off India’s east coast. This discovery encouraged the expansion of natural gas pipelines, power, and industrial infrastructure. The development of a global liquefied natural gas (LNG) market also enabled India’s burgeoning gas sector. As the country’s gas demand growth outstripped supply, it imported gas through LNG import terminals, largely from new major LNG exporters such as Qatar. The first two import facilities were commissioned in 2004, while India’s third plant was commissioned in 2013. As will be discussed later in this chapter, by the end of this decade there could be as many as five new LNG terminals.

Despite these positive supply developments, political stasis has prevented significant energy policy reform, and as a result, the country suffers from acute natural gas shortages. Production

¹ Manmohan Singh, “PM’s address at the inaugural function of the 7th Asia Gas Partnership Summit” (speech, New Delhi, India, March 23, 2012), Prime Minister of India, <http://pmindia.nic.in/speech-details.php?nodeid=1149>.

² Ministry of Petroleum and Natural Gas, *India Hydrocarbon Vision 2025*, Government of India, 1999.

³ *World Energy Outlook 2012* (Paris: International Energy Agency, 2012), 128.

⁴ See *Statistical Review of World Energy 2013*, (BP, 2013), <http://www.bp.com/en/global/corporate/about-bp/statistical-review-of-world-energy-2013.html> and *World Energy Outlook 2012*.

from the lynchpin block of the KG Basin, the D6 block, has fallen well below expectations partly resulting from a poor investment and fiscal environment. The investment environment is equally troubling for investors in LNG facilities. The same energy and subsidized pricing policies, however, continue to lead to skyrocketing demand for natural gas even though much of India's gas transportation infrastructure is short of supplies.

This case study analyzes the domestic political, regulatory, and economic considerations that affect the development of India's natural gas market. It examines how the Indian government plays a central role in shaping natural gas policy and how such centralized political decisions affect domestic exploration and production, domestic consumption patterns, and international gas markets. It explains that two economic factors will direct the development of India's natural gas sector: the policy of gas allocation and government-controlled pricing. It demonstrates that while political decisions will drive the direction of the country's domestic natural gas production, consumption, and import demand, such decisions will not have much bearing on geopolitical affairs.

Background

Natural Gas Reserves and Domestic Supply

India has roughly 44 trillion cubic feet of discovered natural gas reserves and consumes about 5.3 bcf/day of gas, 3.9 bcf/day of which is produced domestically.⁵ The remainder of gas consumption is imported in the form of LNG; India does not currently share a natural gas pipeline with a neighboring country. Since the 1980s, domestic natural gas production has increased steadily from about 150 million cubic feet per day in 1980-1981 to nearly 5 bcf/day in 2010-2011, with offshore production accounting for roughly 84 percent of India's total domestic gas supply.⁶

India's oldest offshore gas field, the Bombay High, and the KG Basin are the two most productive gas fields in India, together accounting for almost all of India's offshore production.

⁵ *Statistical Review of World Energy 2013*.

⁶ Ministry of Petroleum and Natural Gas, Economic Division, *Indian Petroleum & Natural Gas Statistics* (New Delhi: Government of India, 2012), 29-30.

Production at the Bombay High field has reached a plateau and now accounts for a smaller share of India's domestic production. In 2003, production from the field was 58 percent of India's total production; by 2011, this figure had dropped to 33 percent.⁷ This was in part owing to an initial surge in production from the KG Basin, in particular the D6 block, which is owned and operated by Reliance Industries Limited and BP. Since production at the KG-D6 block began in 2009, India's natural gas production has increased by an average of 28 percent per year.⁸ However, production rates at the block have declined unexpectedly, dropping to less than 1 bcf/day, well below the expected output of 2.7 bcf/day.⁹ Given the centrality of gas from KG-D6 to meet domestic demand, the supply shortfalls have hurt domestic gas consumers. As a result, the production shortfalls have received significant scrutiny from the government. The lower production figures are in part due to the reserves being smaller than previously expected as well as to technical difficulties experienced during production.¹⁰ However, attempts on the part of the operator to stem the drop in production require government approval, which was only recently received.¹¹ Reliance also has plans that were recently approved by the government to expand drilling at the block in order to return production to initially projected levels. Taken together, the maturing Bombay High field and the problems at the KG-D6 block has caused gas production to decline by 16 percent, from an average of 4.5 bcf/day in 2011 to 3.8 bcf/day in August 2012.¹²

Unconventional Gas

Indian companies are gaining exposure to shale gas both domestically and in the United States, where Indian companies such as Reliance, GAIL, and BPCL have made investments in shale "plays" to develop relevant expertise and technical capacity. Domestically, in January 2011 the Oil and Natural Gas Corporation (ONGC), with the help of Schlumberger, completed drilling its first shale gas well in the Damodar Valley in West Bengal and has announced other investments

⁷ Ibid.

⁸ Ministry of Petroleum and Natural Gas, Economic Division, *Indian Petroleum & Natural Gas Statistics, 2010-2011* (New Delhi: Government of India, 2012), 30.

⁹ "Gas output in eastern offshore KG-D6 fields falls further: Reliance Industries," *Economic Times*, November 14, 2012, http://articles.economictimes.indiatimes.com/2012-11-14/news/35110595_1_mmcmd-d1-d3-kg-d6.

¹⁰ "KG-D6 reserves 80% less than estimate," *The Hindu*, June 21, 2012, <http://www.thehindu.com/business/kgd6-reserves-80-less-than-estimate/article3555517.ece>.

¹¹ According to the author's interviews with industry officials. Also see "Reliance Industries gets nod to raise KG-D6 production," *The Hindu*, October 25, 2012, <http://www.thehindu.com/business/companies/reliance-industries-gets-nod-to-raise-kgd6-production/article4028321.ece>.

¹² August 2012 data according to India's Petroleum Planning and Analysis Cell, Ministry of Petroleum and Natural Gas, <http://ppac.org.in/>.

in shale gas production elsewhere in West Bengal and in Jharkhand. New reports of India's potential shale gas reserves have stirred India's shale fever. In April 2011, the U.S. Energy Information Administration released a study on shale gas reserves suggesting that India's technically recoverable shale gas reserves equal 63 trillion cubic feet.

The shale gas "revolution" that has swept the United States, however, is far from gathering momentum in India. Beyond the uncertainty surrounding India's shale reserve estimates are more obstacles, including water availability and adequate physical and institutional infrastructure. Regarding the former, shale gas production is a water-intensive process, and India is a water-starved nation with some regions experiencing crippling water shortages. Other obstacles to development include a lack of wastewater storage solutions, inadequate technical and regulatory capacity, and infrastructure constraints.

Coal-bed methane (CBM) has a longer history in India. Since the government established a policy for CBM exploration and development in 1997, there have been four rounds of bidding. According to the Directorate General of Hydrocarbons, the regulator of India's upstream oil and gas sector, the country has a total CBM resource base of 92 tcf though it is only producing 150 Mcf/day.¹³ Despite the potential for higher CBM production, recent pricing proposals by Reliance and Essar, companies involved in CBM production in India, have not received approval from the government. Finally, uncertainty surrounding land acquisition and environmental opposition likely will impede the allocation of both shale and CBM fields.

LNG Imports

With sluggish domestic production and persistent demand growth, India is becoming increasingly dependent on LNG imports. India first became an LNG importer in 2004 and in 2012 imported about 2.0 bcf/day of natural gas into two regasification facilities in Gujarat, at Dahej and Hazira. With the commissioning in 2013 of its Dabhol facility in Maharashtra, India now has three import terminals: Dahej, with a capacity to import 10 million tons a year (MMTPA) of LNG (approximately 1.3 bcf/day); Hazira (3.5 MMTPA, or 0.46 bcf/day); and Dabhol (5 MMTPA, or 0.66 bcf/day).

¹³ Christine Forster, "Asia Pacific Looks to Unconventional Gas," *Platts Insight*, November 2011, 12.

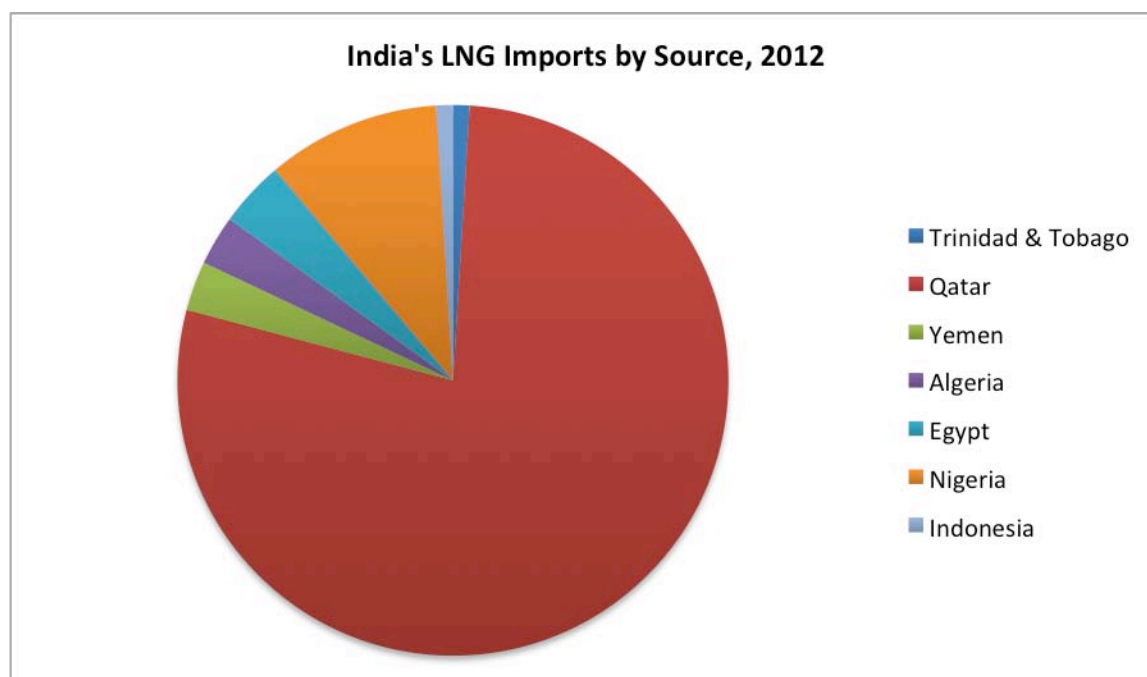
India is embarking on an ambitious plan to expand its LNG regasification capacity at Dahej and Hazira. In addition, a number of new import facilities are either under construction or in the planning phase. (India's LNG supply scenario is detailed in Table 1.)

Table 1. India's Projected LNG Import Capacity (2014-2025)

Facility	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Dahej	10	10	10	15	15	15	15	15	15	15	15	15
Hazira	3.7	5	5	5	5	5	5	5	5	5	5	5
Dabhol	2	2	5	5	5	5	5	5	5	5	5	5
Kochi	1	2.5	5	5	5	5	5	5	5	5	5	5
Andhra	0	0	1.75	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Mundra	0	0	0	2.5	5	5	5	5	5	5	5	5
Ennore	0	0	0	0	2.5	5	5	5	5	5	5	5
Gangavaram	0	0	0	0	1.25	2.5	5	5	5	5	5	5
Total (MMTPA)	16.7	19.5	26.75	36	42.25	46	48.5	48.5	48.5	48.5	48.5	48.5
Total (bcf/day)	2.20	2.57	3.52	4.74	5.56	6.06	6.39	6.39	6.39	6.39	6.39	6.39

Source: ICRA Limited and company reports

Figure 1.



Source: BP

As Figure 1 illustrates, the majority of India's LNG imports come from Qatar. Petronet has two twenty-five year, oil-indexed contracts with Qatar to import 7.5 MMTPA of LNG into its Dahej facility. The remainder of the Dahej terminal's imports is purchased on short-term and spot markets.¹⁴ In contrast, the Hazira facility, which is majority-owned by Shell, is a merchant terminal that is not currently bound to any long-term contract. Instead, it uses Shell's and Total's (the minority stakeholder in the project) global LNG supply portfolios to supply Indian consumers with gas on a spot basis, when such a transaction is competitive.¹⁵

As India's regasification capacity increases, consumers are confronting the need to enter into long-term contracts with LNG suppliers. To date, such contracts are limited to the aforementioned agreement with Qatar; Petronet's twenty-year agreement to import 1.44 MMTPA of LNG from ExxonMobil's Gorgon facility in Australia; and GAIL's twenty-year contract with Cheniere Energy to import 2.5 MMTPA of LNG from Cheniere's Sabine Pass facility in Louisiana. Some analysts suggest that the practice of Indian LNG importers relying more on short-term deals and spot market imports than long-term contracts occurs because India's gas market is still evolving: given the uncertain outlook for domestic production, domestic consumers have not entered into many long-term commitments with LNG importers, therefore importers have been reluctant to commit to long-term supply contracts.¹⁶

Given the projected growth in the imbalance between natural gas supply and demand, however, there exists a growing sense that some exposure to long-term contracts will be necessary.¹⁷ In the mean time, companies like GAIL have secured several short-term LNG contracts, including a one year agreement to import 0.6 MMTPA of LNG from GDF Suez's LNG portfolio, and a three-year agreement to import 0.22 MMTPA of LNG from Gazprom's trading portfolio.

Pipeline Imports

India has long pursued—albeit with inconsistent interest—multilateral cooperation with its neighbors over natural gas pipelines. Over the last twenty years, a number of different projects

¹⁴ *Annual Report 2011-2012* (New Delhi: Petronet LNG Limited, 2012), 12.

¹⁵ James Jenson. Interview by Charles Ebinger, Washington D.C. November 3, 2011.

¹⁶ Anil Jain, *Natural Gas in India: Liberalisation and Policy*, Oxford University Press for the Oxford Institute for Energy Studies, Oxford (2011), 73-74.

¹⁷ Boston Consulting Group analysts, interview by the author, August 28, 2012.

have surfaced that would connect India to various gas-rich countries in Central, South, and East Asia and the Middle East. Such projects include the Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipeline, the Iran-Pakistan-India (IPI) pipeline, the Myanmar-Bangladesh-India pipeline, and an undersea pipeline linking India and Oman. While all four of the pipelines have long histories, all are unlikely to come to fruition in the near-term.

TAPI, previously known as TAP until India officially joined the consortium in 2008, has been mired in geopolitical drama and conflict since it was first proposed in 1992. The project has gone through a number of owners and champions, and efforts to develop the pipeline have been dogged by internal and regional conflicts, starting with the Afghan civil war that prevented any initial construction on the project.

Although there have been promising developments in recent months, prospects for TAPI remain dim. The security situation in Afghanistan and in Pakistan's Balochistan province remains precarious and securing financing and insurance will prove difficult. The security challenges of the project receive, perhaps deservedly, the most attention. The project traverses some of the most violent regions of Afghanistan (Herat and Kandahar) and Pakistan (Balochistan). Making matters more difficult, pipeline protection largely will be the responsibility of the nations involved in the project. As Jaap De Hoop Scheffer, then NATO's secretary general, stated in January 2009, "Protecting pipelines is first and foremost a national responsibility. And it should stay like that. NATO is not in the business of protecting pipelines in Afghanistan."¹⁸

The Baloch in Pakistan will be difficult to appease as Islamabad has a long history of exploiting Balochi gas resources while paying locals nothing or only token royalties. Further, in spite of a recently-signed gas sales and purchase agreement between Turkmengaz, the Inter State Gas Systems of Pakistan, and GAIL, some security analysts in India are uncertain about depending on Pakistani transit routes for supply. Finally, with an estimated cost of between \$7.5 billion and

¹⁸ Jaap Hoop de Scheffer, "Transatlantic Leadership for a New Era," (speech, Brussels, Belgium, January 26, 2009), North Atlantic Treaty Organization, www.nato.int/docu/speech/2009/s090126a.html.

\$12.5 billion, additional financing will be necessary to supplement funding from the Asian Development Bank.¹⁹

In the geopolitical scramble to secure natural gas supplies, the Iran-Pakistan pipeline project has generated the most controversy. The project was originally conceived as a link between Iran and India, with Pakistan serving primarily as a point of transit. However, negotiations over the project met many setbacks owing to, among other issues, conflicts over wellhead prices, transit fees, security, and pressure from the United States, which has explicitly endorsed TAPI as the preferred gas pipeline to South Asia. Following the introduction of more robust sanctions on the Iranian government by the United States and Europe, it appears that India no longer has official interest in the project.

Existing Domestic Pipeline Infrastructure

India's immature gas market is underscored by an unevenly distributed natural gas pipeline infrastructure and insufficient LNG regasification capacity. Until the government decided to pursue a significant build-out in India's natural gas transmission infrastructure, the backbone of India's natural gas pipeline network was GAIL's Hazira-Vijaipur-Jagdishpur (HVJ) pipeline, a 1,600-mile pipeline commissioned in 1997 that takes gas from the industrial port city of Hazira through five north and northwestern states. Between the HVJ pipeline and the Dahej-Vijaipur (DVPL) pipeline, a 750-mile pipeline also in India's northeast, GAIL services over 400 companies, power plants, fertilizer producers, industries, and cities between the main lines and associated spur pipelines.²⁰ Finally, RGTEL, a subsidiary of the private sector energy giant Reliance Industries, owns the 900-mile East-West pipeline that takes gas from Reliance's KG-D6 field in the Bay of Bengal to Maharashtra on India's west coast and then north to the major demand centers in Gujarat.

Pipeline infrastructure determines who can consume natural gas and where they can consume it. For that reason, much of India's natural gas-based industrial capacity is located in the country's

¹⁹ Alexandros Petersen, "TAPI Pipeline: Bigger is not better," *Foreign Policy*, June 12, 2012, http://afpak.foreignpolicy.com/posts/2012/06/12/tapi_pipeline_bigger_is_not_better.

²⁰ See Petroleum Planning and Analysis Cell of India, <http://ppac.org.in/>, and "Gas Transmission: HVJ," GAIL Online, <http://www.gailonline.com/gailnewsite/businesses/gastransmissionhvj.html>.

northwestern states, particularly in Gujarat. As the government attempts to increase the share of natural gas in the country's energy mix, it is focused on improving the distribution of gas to previously untouched and energy-starved regions in the south and east. The new downstream gas regulator, the Petroleum and Natural Gas Regulatory Board (PNGRB), has called for bids for new pipelines to connect previously un-served regions.²¹

The PNGRB, which was established in 2006 as the regulator for natural gas pipelines, has improved the process of permitting new pipeline networks and is establishing new pricing and competitive bidding procedures. The government also established a national natural gas pipeline policy in 2006 to support private sector participation in the distribution sector.²² Since then, a number of new pipeline projects have been proposed, including some that will connect to a number of previously un- or under-served regions of India.²³ However, investments in new pipelines may not continue at the projected rate. The risk of continued supply shortages will reduce the commerciality of pipeline projects. Some existing pipelines, such as the East-West pipeline, are running significantly below capacity.²⁴

Demand

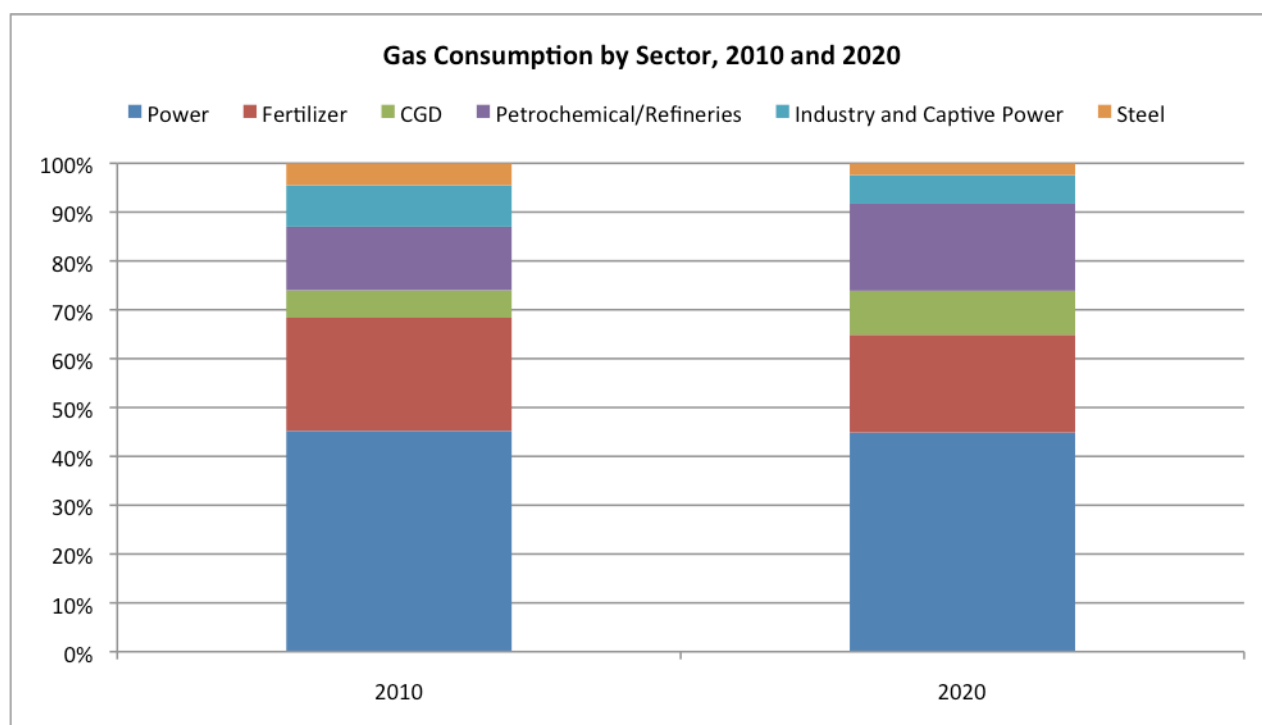
Demand for natural gas is spread over a number of sectors including power generation (which accounts for roughly 45 percent of domestic gas demand), fertilizer (23 percent), petrochemical production and refineries (13 percent), industry and captive power generation (8 percent), city gas distribution (CGD, 6 percent), and steel production (5 percent). (See Figure 2 for a sector-by-sector breakdown of India's gas consumption.)

²¹ "India's Downstream Natural Gas Sector: Ballooning Natural Gas Supply-Demand Deficit to Fuel LNG Imports," *ICRA Rating Feature*, October 2011, <http://www.icra.in/Files/ticker/Indian%20Downstream.pdf>.

²² Ministry of Petroleum and Natural Gas, "Policy for Development of Natural Gas Pipelines and City or Local Natural Gas Distribution Networks," Government of India, December 20, 2006, <http://petroleum.nic.in/policy%20of%20pipelines.pdf>.

²³ According to the PPAC, as of March 2012, GAIL had either proposed or began construction on 3,000 miles of new pipelines, including an interconnection between Kochi, the site of a future LNG terminal, and the southern cities of Bangalore and Mangalore, and a pipeline between Dabhol, the site of another forthcoming LNG import terminal, and Bangalore. RGTIL had proposed another 1,700 miles of pipeline from its KG-D6 block to the southeastern city of Chennai, and from Chennai, the site of another potential LNG import facility, to other parts of southern India.

²⁴ In November 2011, the East-West pipeline was running at 60 percent of its capacity of 2.7 bcf/day and given the continued decreases in output since then, its throughput is likely to be even lower this year.

Figure 2.

Source: ICRA

Consumption of natural gas by each sector is determined by a government-driven gas allocation policy unique to India. According to this policy, the fertilizer and electricity sector are considered the priority sectors (with the fertilizer sector being the primary priority, allowing it greatest access to cheaper domestic supplies) for gas allocation. Gas is then allocated to producers of city gas distribution (CGD) networks and for consumption as CNG, and to the industrial sector, petrochemical producers, and steel manufacturers.

Pricing Regime

The defining characteristic of India's system of gas allocation is the complex pricing structure that underlines it. Together, private and public sector-produced gas is marketed in an intricate web of pricing structures that reflect different prices for gas based on who produces it, where it is produced, and where it is sold. In 2012, there were at least twenty-five different prices of natural gas (detailed in Table 2), all of which are governed by various pricing regimes: Administered

Pricing Mechanism gas (APM), pre-NELP/non-APM gas, NELP gas, LNG imports, and CBM.²⁵ In each case other than for imported LNG, the government plays a central role in either setting or approving each price point depending on the producer and consumer. For instance, gas produced at the Panna and Mukta gas fields off India's west coast sells for different prices depending on the consumer.

Table 2.

Various Prices of Natural Gas in India, by Pricing Regime			
Producer	Field	Customer	Price (\$/MMBtu)
APM			
ONGC/OIL	Various	Customers outside the Northeast	\$4.20
		Customers in the Northeast	\$2.52
Non-APM/pre-NELP			
ONGC/OIL	Western offshore	West/North (non-priority, HVJ customers)	\$5.25
	KG Basin	Non-priority	\$4.50
	Cauvery Basin	Non-priority	\$4.75
	Western Onshore	South Gujarat, Rajasthan; non-priority	\$5.00
JV: BG Group, Reliance, ONGC	Panna and Mukta	RRVUNL (power generation)	\$4.60
		Torrent (power generation)	\$4.75

²⁵ NELP stands for New Exploration Licensing Policy. The NELP program was established in 1997 to encourage private sector investment in India's upstream oil and gas sector. The policy was critical to begin the deregulation of the sector and was an effort by the government to improve the incentives for private sector investment in exploration and production.

Natural Gas in India: Difficult Decisions

	Panna and Mukta	GAIL	\$5.73
	Tapti	GAIL	\$5.57
Hindustan Oil Exploration Corp.	North Balol	GSPC	\$2.71
	Palej	Small consumers	\$3.50
Cairn Energy and various partners	Ravva	GAIL	\$3.50
	Ravva Satellite	GAIL	\$4.30
	CB/OS-2	GPEC	\$4.75
	CB/OS-2	GSPC	\$5.50
	CB/OS-2	GTCL	\$6.22
Canero	Amguri	AGCL (Northeast consumer)	\$2.15
		GAIL	\$1.29
NELP			
Reliance-BP	KG-D6	All consumers	\$4.20
Niko Resources	Hazira	Various consumers	\$4.612
	Surat	GGCL	\$5.50
CBM			
Various Producers	CBM	Various consumers	\$5.50
LNG Imports			
Petronet, Shell Hazira	LNG Import		Various prices
Note: Prices are not inclusive of transportation or pipeline tariffs.			

Source: GAIL, Nomura, Platts, and Brookings Research

It is important to note that the Government of India has agreed to change the pricing formula in an effort to improve the prospects for investment in domestic production. Following a multi-year

study by the Rangarajan Committee—and in consultation with a number of Ministries and Departments—the government has agreed on a new formula for the domestic price of natural gas. The agreed upon formula, which will go into effect in April 2014, states that the domestic price will reflect the trailing 12-month average of the volume-weighted netback prices of India’s LNG imports and the volume-weighted price of the US’ Henry Hub, the UK’s National Balancing Point, and Japan’s Japan Crude Cocktail price.²⁶ As of July 2013, it is estimated that this formula results in a natural gas price of approximately \$8.40/MMBtu.²⁷

The reforms to the upstream pricing regime will be helpful in boosting both reserves and domestic production as companies have greater incentives to invest in exploration and production. ICRA, an Indian ratings agency, estimates that Indian reserves can be boosted by 35 tcf following the pricing revisions.²⁸

Downstream Pricing Structure

The Indian government must also rationalize downstream prices. The two most important consumers of natural gas in India—the fertilizer and power sectors—are either directly or indirectly subsidized by the central and state governments. Direct central government subsidies for fertilizer cost New Delhi nearly 1 percent of GDP.²⁹ While electricity is not directly subsidized by the central government, state electricity distributors control the prices at which electricity is sold. Most distributors sell electricity at below-cost rates. Indeed for the agriculture sector, electricity is often consumed free of charge.³⁰ Selling electricity at artificially low rates also encourages electricity waste, exacerbating India’s chronic electricity shortages.

Natural gas accounts for roughly 70 percent of the cost of fertilizer therefore the size of the subsidy will rise with any increase to upstream gas prices.³¹ Similarly, rising prices of natural gas

²⁶ K. Ravichandran, et al., “Gas Price Hike: Impact Analysis,” *ICRA Limited*, July 2013, <http://www.icra.in/Files/ticker/Gas%20Price%20Hike%20Impact.pdf>.

²⁷ The new price of natural gas will be provided to all domestic producers of natural gas except those that will still be under contract at the time of the change.

²⁸ Ravichandran, et al., “Gas Price Hike.”

²⁹ *Staff Report for the 2013 Article IV Consultation*, (Washington, DC: International Monetary Fund, 2013).

³⁰ Ebinger, Charles K. *Energy and Security in South Asia: Cooperation or Conflict?* The Brookings Institution, Washington D.C. 2011, 51.

³¹ Ravichandran, et al., “Gas Price Hike.”

will hurt natural gas power plants that do not have the ability to pass on additional costs to consumers. If increases in the natural gas price are not passed through to consumers, the revised natural gas price could increase the government's annual subsidy burden by approximately \$7 billion for power generation and \$2.2 billion for fertilizer production, according to a report by the Parliament's Standing Committee on Finance (chaired by the head of the opposition Bharatiya Janata Party).³²

Regulation

India has two regulators responsible for natural gas development. The Directorate General for Hydrocarbons is India's upstream oil and gas regulator with responsibility over the allocation of licenses for exploration and production and over matters pertaining to Production Sharing Contracts (PSCs) for NELP allocated leases.³³ The important recent development for India's natural gas sector pertains to the 2006 establishment of the PNGRB, which is responsible for gas pipeline networks in India as well as for the development of CGD infrastructure. In recent months, the role and jurisdiction of the PNGRB has been clarified to ensure that it has full authorization for the approval of natural gas pipelines and CGD networks, an important step, as it will help streamline the process for pipeline application and authorization.

There is, however, a broader concern regarding the role of regulators in India. Unlike US regulators, which are institutionally required to be independent from government, both the DGH and the PNGRB have instead assumed roles as "technical advisors," ceding much of the regulatory decision-making to the central government, preventing expedient and transparent decisions. Moreover, there is a sense among private sector players that regulators are infringing upon market negotiations for natural gas prices and imposing third-party access requirements upon regasification facilities.³⁴ Together, regulatory uncertainty and the regulatory "creep" have obstructed private sector investment in India's natural gas sector.

³² See "Gas Prices on the Rise," *Albright Stonebridge Group*, July 30, 2013, <http://www.albrightstonebridge.com/gasjuly29/>; and "Parliament panel might oppose Rangarajan formula on gas pricing," *Business Standard*, July 22, 2013, http://www.business-standard.com/article/economy-policy/parliament-panel-might-oppose-rangarajan-formula-on-gas-pricing-113072100446_1.html.

³³ A PSC, or Production Sharing Contract, refers to an oil and gas contract structure wherein companies involved in the exploration and production of oil and gas are allowed to own all or part of the reserves they produce.

³⁴ From Brookings interviews with two different private-sector oil and gas companies operating in India, 2011.

Political Trends/Drivers of Change

The government has been the dominant player in India's energy sector since independence, when India's first Prime Minister, Jawaharlal Nehru, established the parameters for public and private involvement in industry through the Industrial Policy Resolutions (IPRs) of 1948 and 1956, which either wholly or partially nationalized a number of key sectors including energy, and the Electrification Act of 1948. (India's petroleum industry was partially nationalized in 1956.) Nehru and his advisors believed that India's "fragile" economy would be shielded from the effects of conflicts between the Cold War powers by a foreign policy of nonalignment that promoted domestic industrial growth and investment and did not depend on foreign actors.³⁵

State control of India's energy institutions became entrenched further in the 1960s and 1970s, following the full nationalization of the energy sector. The administration of then-Prime Minister Indira Gandhi was stridently introverted and deeply skeptical of market liberalization and the West. After the oil price shocks of 1973-1974, all upstream activities were entrusted to ONGC while the government nationalized all downstream operations, pushing out significant refining and marketing operations by multinationals such as Caltex, Esso, and Shell.

An economic and balance of payments crisis and the 1991 oil price shock (prompted by the Gulf War) required Prime Minister Narasimha Rao and his Finance Minister, Manmohan Singh, to overhaul the energy sector in the early 1990s. As a result, ONGC was incorporated in 1993, the government opened up domestic exploration to private firms, and downstream petroleum markets were opened to private investment.³⁶ In 1997 the government established NELP to increase private sector investment in the oil and gas sector; several years later it enacted the Electricity Act of 2003 and the National Electricity Policy (in 2005) to give further impetus to the ongoing reforms and restructuring of the power sector initiated in 1991.

Many private sector stakeholders, however, complain that the reforms do not go far enough in liberalizing the energy sector. Such stakeholders have a valid argument: government control over

³⁵ Stephen Phillip Cohen, *India: Emerging Power* (Washington, DC: Brookings Institution Press, 2001), 95.

³⁶ *Ibid.*, 24-26.

the pricing of energy and energy products is still commonplace, particularly as it relates to fossil fuels and politically sensitive consumers. As will be discussed in the forthcoming sections, the extent to which future reform occurs depends on the government's balancing of political considerations and macroeconomic signals: while economic indicators fuel the push for reform, politicians are cautious not to liberalize markets so quickly as to endanger political stability.

Political Stability

The vibrancy of India's democracy suggests the continuation of two likely trends regarding the country's political stability: first, the country is unlikely to be vulnerable to major upheaval outside of the peaceful, democratic electoral process; second, owing to a decentralized governance framework and parliamentary representation of an alarmingly diverse set of interests, regime stability is not always guaranteed. While the Indian National Congress has historically been the most powerful political party, alliances are often hastily assembled and fragment equally quickly and ruling parties face frequent referendums on their leadership. Given the deeply fractured nature of Indian politics today and the apparent growing decentralization of politics to the state level, it is likely that coalitions will remain fragile.

The fragmentation within India's political system extends to inter-ministerial conflicts within cabinets. Individual ministries in India often have competing agendas and therefore often propose and support conflicting policies. In the natural gas sector, pricing reform has been pushed by both the Ministry of Finance and, occasionally, the Ministry of Petroleum and Natural Gas, but is often opposed upon by the Ministry of Agriculture, the Ministry of Power, the Planning Commission, and the Department of Fertilizers.³⁷

Stakeholders

While the Indian government controls the development of the energy sector, the introduction and passage of policies and reforms are dependent on the major political parties, the smaller state-based coalition partners, and—most importantly—the major voting blocs. The interplay between these various stakeholders explains the political stalemate that exists in India today.

³⁷ Energy and Resources Institute (TERI), interview by author, New Delhi, India, February 17, 2012.

The two main political parties—the Indian National Congress and the Bharatiya Janata Party (BJP)—have lead India’s governments since independence and have fierce rivalries on many social and economic issues. It is important to note, however, that ideology regarding energy policy does not exist among political parties. Both Congress and the BJP have encouraged reforms in energy and other sectors when in power and both have campaigned against reform while in opposition.³⁸

Given the rich history of the role of states in Indian government, central government decisions are rarely sufficient to implement reforms and state groups must also be on board in order to avoid fueling anti-federalist sentiment. Coalition partners, many of which are state-led political parties, often view central government reforms as infringements on states’ rights.³⁹ In this regard, politicking in India is also dependent on the support of smaller, state-based political parties, such as West Bengal’s Trinamool Congress or Bihar’s Janata Dal, that help give the larger parties a parliamentary majority, but are often uncooperative when it comes to implementing national laws or reforms.

Important stakeholders that shape political decisions around energy are India’s poor and India’s agriculture sector. Owing to their size and impressive record in voter turnout, India’s poorest citizens represent an important political ally in Indian elections, making market reforms to issues such as pricing politically difficult.⁴⁰ Opposition politicians often cast reformist proposals in efforts to exacerbate the problems confronting India’s poor. With effective governance over welfare and subsidy programs, however, governments simultaneously can rationalize prices while minimizing the impact on the poorest segments of the population. For instance, the International Monetary Fund (IMF) predicts that by the 2016-2017 fiscal year, the expansion of a government direct cash transfer program is “expected to be in place for key subsidies, which will reduce the fuel and fertilizer subsidy bill.”⁴¹

³⁸ The BJP, which was a pro-reformist government when in power, recently protested increases to the price of CNG in Delhi. “BJP Protests All Over Delhi Against Hike in CNG Prices,” *The Hindu*, July 11, 2012, <http://www.thehindu.com/news/cities/Delhi/article3626844.ece>.

³⁹ Pratap Bhanu Mehta, “How India Stumbled: Can New Delhi Get its Groove Back?” *Foreign Affairs*, 91, no. 4 (July/ Aug. 2012): 64-75.

⁴⁰ Diego Maiorano, “Mrs. Gandhi’s Final Term and the Remaking of the Congress (I)’s Social Base,” *India Review* 11, no. 1 (2012): 36.

⁴¹ *Staff Report for the 2013 Article IV Consultation*.

Another important issue is the agricultural sector's outsized role in India's policy making. India's agriculture sector employs roughly half of the country's workforce but accounts for 16 percent of its Gross National Product (GNP).⁴² The sector's population and historical role in society and the country's economy make it one of the most important blocs in Indian politics and has encouraged the government to align energy consumption with agricultural interests, including, in the case of natural gas, prioritizing the electricity and fertilizer sectors. Although other consumers enjoy inexpensive electricity, the agricultural sector enjoys the cheapest, if not free, electricity. Fertilizer producers receive first priority over domestically produced gas (largely protecting them from India's gas supply shortages) at subsidized, below-market prices, and benefit from a government directive that the country be self-sufficient in the production of urea, the primary component of fertilizer.

However, given the economic boundaries of maintaining heavy subsidies for certain groups, the government has recognized that certain reforms to pricing and regulation are needed. How such reforms are implemented depends primarily on how the government balances the priorities of sustaining a domestic agriculture sector and providing cheap energy and electricity with the economic realities and constraints provided by adhering to a system based on subsidies and government-driven resource allocation.

Fragmented Politics

India's political system is deeply fragmented. Not only are the ruling Congress party and the main opposition Bharatiya Janata Party (BJP) deeply distrustful of one another and uncompromising, but the Congress party also faces strident opposition within its own alliance. A number of Congress-proposed reforms, including liberalizing the Indian market for multi-brand retailers such as Wal-Mart and reforming prices for petroleum products such as diesel, were initially stymied by opposition from resolute alliance members such as the Trinamool Congress. The recent passage of reforms on both issues was met with widespread consternation and protest from both political stakeholders, with the Trinamool Congress even threatening to leave the

⁴² Agricultural output in India declined from 21 percent of GDP in 2002 to 16 percent in 2010-2011. However, in terms of total employment, agriculture is still key: 51 percent of total employment in India is accounted for by the agriculture sector. Data according to the Ministry of Statistics and Program Implementation and the World Bank database, <http://data.worldbank.org/country/india>.

ruling coalition. To that end, the Congress itself is vulnerable to infighting, particularly with regards to economic issues. Economic liberalization and reforms proposed by some in the party, such as Finance Minister Palaniappan Chidambaram, are opposed by party members, such as party head Sonia Gandhi, who prefer more populist measures.

Public Support for Governance

India's political system suffers from a loss of public support. A 2012 survey found that 59 percent of Indians polled are not satisfied with the ruling United Party Alliance (UPA, the Congress-led coalition) and that only 13 percent thought that Manmohan Singh, India's Prime Minister, is doing a good job in his second term. More worrying for the Prime Minister and his Congress Party is that 66 percent of those polled believed that his government has lost credibility.⁴³ While the loss of support in the performance of the Congress party can partly be blamed on its coalition partners and the fragmentation of the alliance on key issues, the government has also presided over a number of high-profile corruption allegations and scandals that have severely damaged its credibility. Moreover, the loss of support can be blamed on the government's inability to convey a coherent vision for the short, medium, and long-term. Instead, as one India scholar notes, the Congress party has proven inept at navigating the complexities of Indian politics, conveying messages of political indecision and uncertainty.⁴⁴

Economic Reform: Driving Changes to Energy Policy Reform

Despite politically powerful opponents to reform, many politicians now think market liberalization measures are necessary in order to restart economic growth, which has slipped from over 10 percent in 2010 to an estimated 5.7 percent in 2013.⁴⁵ In June 2012, Standard & Poor's (S&P), the government and sovereign debt-ratings agency, issued a stark warning for India's economic outlook, asking: "will India be the first BRIC fallen angel?"⁴⁶ In its report,

⁴³ "UPA-II at three has lost India's faith," *CNN-IBN*, May 22, 2012, <http://ibnlive.in.com/news/upaii-at-three-losing-indias-faith/260033-37.html>.

⁴⁴ Mehta, "How India Stumbled."

⁴⁵ Data according to the IMF World Economic Outlook Database, April 2013, <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx>.

⁴⁶ Joydeep Mukherji and Takahira Ogawa, "Will India Be the First BRIC Fallen Angel?" *Standard & Poor's*, June 8, 2012, http://www.standardandpoors.com/spf/upload/Ratings_US/IndiaFirstBRICFallenAngel080612.pdf.

S&P argued political paralysis has pushed the government to support poor economic policies, damaging the investment climate and business confidence in the country while making policy reform difficult, all in the face of a deteriorating macroeconomic climate.

Two economic factors could hasten energy-sector reform. First, in the past, budget deficits have pushed India's politicians toward unpopular reforms. India's previous economic crisis in 1991 was sparked in part by a balance of payments crisis. Between 1985-1986 and 1989-1990, India's central and state combined fiscal deficits averaged 10.1 percent of GDP.⁴⁷ Much of this was due to the continuation and growth of direct and indirect subsidies, particularly for the energy sector.

The government is once again battling excessive expenditures and Chidambaram has staked his reputation on reducing India's budget deficit to 5.3 percent of GDP from nearly 8 percent in 2009. Reducing the subsidy burden, which currently accounts for 2.4 percent of India's GDP, will be integral to this effort. In its 2012-2013 budget, the Indian government allocated roughly \$11 billion to fertilizer subsidies, with another \$8 billion allocated to fuel subsidies. (More importantly, the budget allocation for subsidies is typically less than what the government actually spends. In 2011-2012, India's total subsidy bill was \$13 billion more than budgeted.)⁴⁸ While natural gas plays a minor role in India's overall budget deficit, it appears India's energy sector—both upstream and downstream—will undergo reforms.

The second factor that should encourage reform—both across the economy and specifically in the gas sector—is the deterioration of India's investment climate. As reforms in a number of sectors remain unaddressed, industry and businesses have buckled under the infrastructure and regulatory burdens of doing business in India. Electricity prices for industry and businesses are higher owing to a *de facto* tax compensating for the subsidy afforded to the agriculture sector.⁴⁹ Not only is electricity more expensive, but it is also unreliable. According to the CEA,

⁴⁷ Panagariya, Arvind. *India: The Emerging Giant*. Oxford University Press, Oxford, New York, 2008, 102-103.

⁴⁸ "Union Budget 2012-2013," *Union Budget and Economic Survey*, Government of India and Aman Malik, "Subsidy bill reduction target 'ambitious,'" *Live Mint*, March 17, 2012, <http://www.livemint.com/Politics/LAOMZ15cTJuuJ0wZDBQzRP/Subsidy-bill-reduction-target-8216ambitious8217.html>.

⁴⁹ Central Electricity Authority, "Electricity and Tariff Duty and Average Rates of Electricity Supply in India," March 2010.

nationwide transmission and distribution losses average 27 percent.⁵⁰ Private sector corporations continue to complain that controls on domestic prices hamper earnings and adequate returns on investment.⁵¹

Moreover, lack of fuel supply—owing to both upstream pricing reforms and downstream subsidies that encourage waste—are having a deleterious financial impact on a number of newly constructed power plants. Without electricity pricing reform, many power plants cannot afford to import more LNG to meet gas shortages as they cannot pass on the higher cost of imports—which were roughly \$14.50/MMBtu in July 2013—down to consumers. By one analyst’s estimate, as much as 40GW of new power assets could be stranded without fuel.⁵² According to another, the power sector had a gas shortage of roughly 1.9 bcf/day in March 2013.⁵³ Indeed in July 2012 Lanco Infratech Limited, a large developer of power plants, began negotiations for debt restructuring, as fuel supply shortages left many of its assets running well below full capacity.⁵⁴ There are concerns that such problems are pervasive throughout the energy sector, a problem that would result in a significant increase in the cost of capital for new projects. Without reforms that address some of these issues, economic growth will slow considerably, forcing politicians to implement bolder reforms to pricing and market structure.

Consequences of Historical, Political, and Economic Trends for Natural Gas Development

Because political gridlock often occurs in the face of macroeconomic pressures, energy policy reform in India is erratic. For instance, in July 2005 the government increased the price of natural gas to \$1.79/MMBtu. A second increase was rejected in 2007 before eventually being accepted in May 2010, as losses by the public sector producers ballooned. (It was reported that in 2008-2009 ONGC lost nearly \$900 million from the sale of natural gas below market prices.) The

⁵⁰ Central Electricity Authority, “Highlights of power sector,” *Monthly Power Report*, May 2012. (http://www.cea.nic.in/reports/monthly/executive_rep/dec12/1-2.pdf)

⁵¹ According to the authors’ interview with an executive at a private sector corporation involved in gas development in India in March 2012.

⁵² Boston Consulting Group, interview, Brookings Institution, July 2012.

⁵³ K. Ravichandran, et al., “Indian Downstream Natural Gas Sector: Import dependence of natural gas to increase despite increase in domestic supply,” *ICRA*, July 2013.

⁵⁴ “Lanco Infratech in talks for Rs 23,000 crore loan recast,” *Economic Times*, July 20, 2012.

government increased the price of APM natural gas to \$4.20/MMBtu, the same price that was given in 2007 to natural gas from Reliance's KG-D6 block.⁵⁵

Energy policymaking likely will follow this uneven trajectory. At the time of writing, politicians and analysts were still unclear whether or not the Congress party would call an election before the one scheduled for 2014. Regardless of how or when the elections occur, it is unlikely that either the Congress party or the opposition BJP will capture enough seats to hold a strong coalition. A recent independent poll found that the two parties would win roughly equal support in the lower house, likely resulting in a hung parliament.⁵⁶

In the most recent example of India's energy-policy formulation, the government, facing critical shortages of domestic gas and increasing imports, agreed upon a new pricing formula that will result in a natural gas price of roughly \$8.40/MMBtu. Some analysts are concerned that the reform does not represent a move to market pricing, rather another ad-hoc decision. A pricing regime that reflects market prices, they argue, would not only help boost domestic exploration and production, but it would also encourage private investment in India's state-owned natural gas producers and distributors, such as ONGC and GAIL.

Unlike pricing, some progress of India's natural gas sector will be delayed by technical, not political, factors. For instance, the process by which companies bid for oil and natural gas leases is in the process of being liberalized to encourage more foreign investment and likely will occur without political opposition. Analysts, however, expect that the new licensing regime will be delayed until the government has robust and available data on India's sedimentary basins.⁵⁷

Unconventional gas development will not be impeded only because below-market prices reduce the incentive for investment in exploration and production. As mentioned earlier, the development of India's shale gas sector will be slow as a result of a lack of technical knowledge

⁵⁵ Jain, 2011.

⁵⁶ Liz Mathew, "Congress tally to decline, but BJP will fall short in 2014: survey," *Live Mint*, July 19, 2013, <http://www.livemint.com/Politics/vBSbJI9snYW5BX5wlHWUP/Congress-tally-to-decline-but-BJP-will-fall-short-in-2014.html>.

⁵⁷ "India moves toward open E&P licensing," *Oil and Gas Journal*, August 28, 2012, <http://www.ogj.com/articles/2012/08/india-moves-toward-open-ep-licensing.html>.

and because the upstream, midstream (pipelines), and downstream (wastewater storage and recycling) infrastructure is insufficient.

Scenario Analysis

The development of India's natural gas sector will depend heavily on how India's political climate develops in the coming years, and how the government approaches potential reforms to policies such as gas allocation and fixed-pricing regimes. It is important to note that reforms are clearly necessary in India's natural gas market; the unknown factor is the rate at which they will occur.

Given that historical context, with respect to natural gas, there are two likely outcomes for India's approach to natural gas development. The first, more likely approach, is a continued effort to implement piecemeal but earnest reforms at a rate fast enough to placate industry and financial markets while still prudent enough to maintain socioeconomic and political stability. The government's agreement on a new price for natural gas is evidence that the government is moving in this direction: the government recognized the need for higher prices of natural gas, but was unable to embrace market-determined pricing. In such a scenario, the government would also agree to implement modest pricing reforms to fertilizer production and to mandates that states charge more for electricity. Gas consumption may slow as coal backs out gas in the power sector, and imported fertilizer from potash or potassium replaces domestic urea. Demand for LNG imports may also be lower than expected as increased domestic production and reduced consumption back out additional cargoes of LNG.

In an alternative scenario, India's efforts to revise upstream prices are not coupled with downstream sector reforms, in particular to the fertilizer and electricity sectors. Although higher gas prices boost domestic production, supply shortages will continue as demand for gas-based products grows too large for the central and state government to continue their fiscal support. In such a scenario, natural gas demand likely will continue to grow relatively unchecked. A growing dependence on imports to meet demand will continue to be a significant burden for the central and state governments. Prioritized sectors will struggle even more to source supply:

fewer power plants will receive gas and there may even be greater supply shortages of gas for fertilizer producers. The priority sectors will have to absorb the higher global LNG price. As the subsidy burden grows on power-generators and fertilizer producers, investor confidence will deteriorate with the consequence, that the government and regulators will be forced to pass a greater share of the cost down to consumers.

Conclusion

This case study demonstrates the extent to which domestic political and economic forces among the new growing gas markets in Asia will have an impact on global gas markets. The Indian government's overwhelming role in the allocation and pricing of natural gas throughout the energy sector has enabled gas to become a cheap source of energy for politically important uses, such as power generation and fertilizer production. By controlling the domestic natural gas sector, however, the government inadvertently has constrained domestic production while boosting consumption. As a result, the country is projected to become a major LNG importer for years to come.

This case study also serves to demonstrate that, in some unique circumstances, geopolitics are a secondary consideration to gas supply. To a certain extent, India will have to rely on diplomats to ensure access to new supply: India's Ministry of External Affairs has been in active negotiations with the United States in order to ensure that the US government does not limit its exports of LNG. Access to new sources of gas from the United States, East Africa, or even prospective supplies of Russian LNG would limit the economic case for pipelines from Iran and Turkmenistan. India is also exposed to geopolitical risks from exogenous geopolitical events that will have an impact on global LNG markets, particularly given its inability to engage in a cross-border pipeline. The primary driver of India's gas sector as it pertains to global production and consumption, however, is the pace and scale of reforms that occur domestically. As the gas supply and demand imbalance grows to levels unsustainable for the balance sheets of the central and state governments, allocation and pricing policies are likely to experience reforms, which will ultimately play a positive role in a more reliable and successful natural gas market.