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# Principal Recommendations

The principal recommendations resulting from this study are:

- Gas supply security, with the main challenges being exploration, development, and production capacity build-up acceleration. It is believed that increased seismic mapping, particularly in the offshore blocks, will reduce investment risk and thus improve international investment.
- Gas use strategy, with the main challenge of limiting new customers and progressively retiring old customers based on efficiency in gas energy recovery use, conservation approaches used, and total return on investment from the gas use by the customer. It is believed that the power sector should become the dominant user of gas, by way of modern combined cycle gas turbine technology.
- Gas pricing and subsidies, with the main challenge of basing the business of the gas sector on a market-driven model, and the removal of all indirect and cross-subsidies.
- System losses and transparency in business, with the main challenge of reducing system losses to a world level by providing an accurate monitoring system, and by implementing field management accountability and reward for gas unaccounted for and for reduction in system losses, respectively.
- Regulatory and institutional structure, with the main challenge of adequate support by the energy sector for the recently formed Bangladesh Energy Regulatory Commission (BERC), and keeping the BERC office operations independent of the government of the country.

The subsequent sections of this chapter elaborate on these recommendations, while the next chapter provides their rationale.

## Gas Supply Security

Bangladesh belongs to the handful of countries in the world endowed with large gas reserves which, if developed, produced in a controlled manner, and used by the market in an efficient way, can become the key element in the country's reduction of extreme poverty, improvement of environmental conditions, and modernization of the country's economy. The economic analysis by numerous sources shows great dependence between the gas consumption in Bangladesh and its gross domestic product (GDP) increases. At the same time, the country consumes gas alarmingly close to its production/delivery capabilities. The amount of certain and probable gas

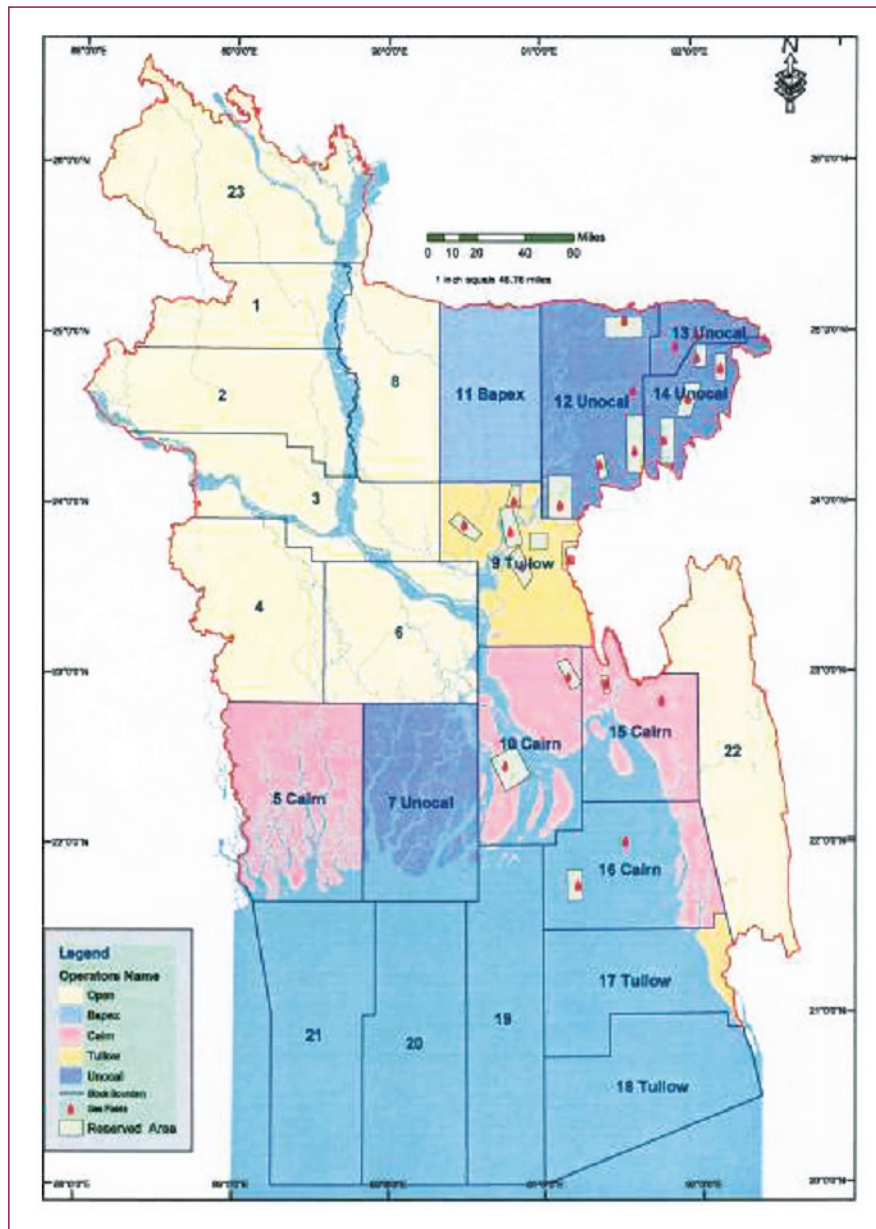
reserves available today does not provide a sufficient base for the desirable economical growth of the country beyond the 2011, or at most, 2018 period. Thus, a key challenge is to assure, through much more intense exploration, development, production planning and development, the availability and reliable delivery of gas to critical sectors of the economy. It is a challenge for the Government of Bangladesh, for the gas sector operators, and for the independent regulators, to create an environment which will provide the optimum amount of funding for activities carried out by domestic companies, and attract investment of capital and know-how by foreign companies. It is recommended that pricing for gas discovered and delivered to the market create a return on investment consistent with opportunities available to energy companies elsewhere in the world.

All the potential uses of natural gas in the country are expected to be served by the yet discovered gas deposits, those currently defined, and/or in the production stage (Figure 1). However, the proven and probable gas reserves provide only a minor portion of the gas on which the plans for the national economy are based. Thus, a major effort in exploration, development, and production setting is urgently needed. Bangladesh has developed a cadre of well educated, competent professionals working in the production, transportation, and distribution of natural gas at the current demand level. However, geological exploration, sophisticated drilling, and production setting, at the rate which will be needed to satisfy the predicted gas consumption growth, by far exceed the present expert resource capacities of the country and will require support from the international community.

The currently known gas reserves of Bangladesh, defined as 1P (proved or with probability of 90% of equal or greater volume) and 2P (probable or with probability of 50% exceeding) are sufficient to satisfy the domestic gas market until the 2011, or at most, 2018 period. The estimates as to the maximum (down to probabilities of 5%) gas discoverable and viable for production suggest a maximum horizon of domestic supply up to 2050. Thus, eventually Bangladesh will need to resort to energy supplies other than domestically produced natural gas. It is difficult to predict the real domestic need for hydrocarbons in such a long time-span considering the changes in energy technology expected in the next two decades. A significant confusion in the energy needs is caused by the studies conducted by such authoritative sources as the United States (US) Department of Energy and Energy Information Administration (EIA), as those institutions cannot adjust their forecasts by relying on energy technologies not yet commercially implemented let alone undiscovered. Thus, for example, despite the rapid and significant change in the price per kilowatt capacity of solar panels, and major developments in nuclear energy technologies and in hydrogen production and energy transport, the need and pricing for hydrocarbon generated energy are carried out based on past performance statistics. This conservative position of EIA is aimed primarily at controlling speculative activities on the US energy market. However, Bangladesh, which has to overcome a major gap between its economy and that of its neighbors (and eventually of developed countries), should view these forecasts as guidance only and avoid stranding of its natural resources for any period of time. The ultimate decision is in the hands of the people of Bangladesh: faster growth today or constriction of growth with potentially higher gas supply security in some two decades.

The international companies involved in gas exploration, development, and production will either have to be hired for a fee (an unlikely scenario in the near future under the current financial capability of the country), or encouraged to make an investment based on reasonably safe expectations of return on investment through gas sales. These sales will have to be domestic (to the country's gas sector, most notably electric power generation) to satisfy the growing needs, and may be international to provide investment guarantee. A price structure for the domestic market, and possibly boundary amount of gas export, should be determined so that the investors are motivated to assist the country in discovering and developing new reserves. In particular, it should address increased risk and cost of development in the deep-water parcels which are the principal areas of the upcoming third round of international oil company (IOC) bidding.

Figure 1. Location of Gas Fields in Bangladesh



Source: Petrobangla.

It is in the interest of Bangladesh to have international gas transit lines crossing the country, thus providing potential routes for gas export, providing additional security for domestic supplies, and creating an income stream through transit licensing or transmission service. Similarly, it is in Bangladesh's interest to trade electrical energy with nearby neighbors, thus increasing the energy security of the region, increasing cooperation across the borders, and receiving additional value for its gas energy when delivered by wire. It is in the interest of all the countries of the region to develop a robust energy interdependence, thus avoiding duplication of investment near the border areas and creation of redundancy in individual country systems.

## Gas Use Strategy

The definition for optimal use of natural gas provides in itself a major socio-economical challenge. From 19th century Europe, where the primary use of gas was to provide lighting, the world moved to gas heating of homes (primarily North America), domestic use of gas for cooking (majority of Europe), gas in industrial processes (heating and chemical feedstock), to electrical energy generation either through gas turbines or through gas fired steam boilers. Supplying gas to individual industrial and domestic users might seem tedious, but it is relatively inexpensive under low cost labor. This is how the Soviet Union gasified its most remote villages and towns. However, the use of gas as fuel by individual users results in the least efficient consumption of the resource. With only 5% of the population having direct access to natural gas, Bangladesh has the option to strategically direct gas use expansion. Compressed natural gas can be a desirable substitute for gasoline and diesel fuel in automobile transportation - today a source of major pollution in Bangladesh cities, and a potential source for long-term health problems of the population.

The preferred method of recovering energy stored in the gas is by converting it into electricity which then opens a broad range of opportunities for improvement in home conditions; use of electric equipment in small manufacturing; climate control of commercial buildings, hospitals, and schools; and street lighting. Bangladesh, like many other emerging economies, manifests a direct relationship between growth in GDP and the generation of electricity. With less than 20% of the population having access to electricity, and the per capita use of some 112 kilowatt-hours (kWh) (about one fourth of India),<sup>1</sup> a massive capital investment is needed to meet the required generation and distribution of electricity. The balance between gas production capacities and electrical energy power generation needs to be well planned so as not to saddle the country with unproductive debt through power plants with unreliable gas supply, or electricity generation capacities incapable of covering the cost of fuel and capital consumed. The recommendation of this report in emphasizing available gas diversion to efficient electricity production versus other uses is consistent with the “3-Year Road Map for Power Sector Reform” by the Government of Bangladesh. The role of a politically independent energy regulator to coordinate that aspect of national strategy is critical and needs to be endorsed by the National Legislature.

## Gas Pricing and Subsidies

Natural gas provides Bangladesh with a source of clean burning fuel pivotal to its national economy. Sufficient supply of natural gas, and safe and reliable transmission and distribution are thus centric to energy supply security and economic growth of the country. The ample, albeit not unlimited, reserves of gas known today and expected to be found in the future, along with the massive investment needed to monetize the gas, requires the most efficient use of the gas available and a recovery of its value through appropriate pricing at the end use. It is well known that proper pricing prevents wasteful use of the resource. Today Bangladesh consumes its gas at a price five-fold lower than the equivalent liquid fuel cost in Bangladesh. Apropos, the liquid fuel is offered to key end users in Bangladesh at about a 40% lower price than to consumers in other countries of the region. It is imperative that gas pricing be brought, in the nearest future, to an acceptable level of parity with equivalent fuel pricing. Such a development will

- generate the additional income for domestic gas sector companies to carry out exploration and development, to expand the gas transmission and distribution, and to improve the maintenance/safety of the operation;

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<sup>1</sup> Energy Information Administration. 2005. *Country Analysis Brief on Bangladesh*, August.

- generate higher interest among foreign gas companies to invest in gas exploration and production in Bangladesh; particular consideration should be given to the significant higher cost and risk level for the deep-water blocks; and
- provide stimulus for a more coherent energy policy in the country.

It is recommended that through linear price increases, the gas price be brought to parity with equivalent oil prices by 2015, with the cap of the 3 previous years' average crude oil price in the formula.

Gas pricing does not have a single formula or methodology accepted as the “best approach” even by the most mature gas economies. As discussed in Appendix E of this report, the most critical element in gas pricing is the correlation with the price of displaced or substituted fuel and the cost of production and delivery, with the consideration given to cost sunk into discovery and production. The concept of stranded gas is an important element in the consideration of gas price.

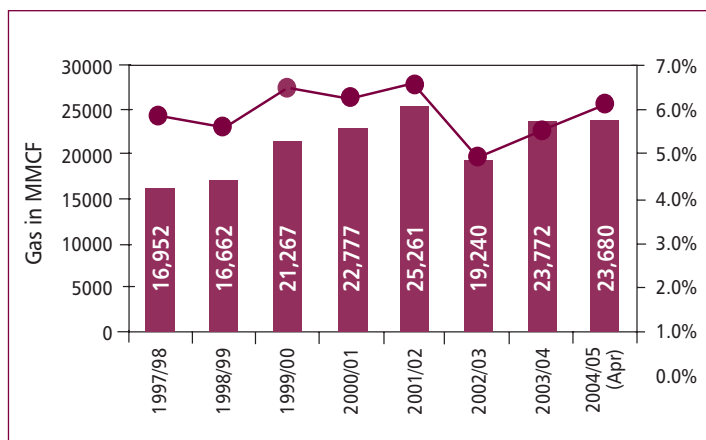
At present, gas pricing in Bangladesh is based on a complex system of cross-subsidies. These subsidies are a clear handout by the Government to a privileged minority with access to gas and electricity, given at the cost of delaying access to modern energy supply to the poorest in the country. It is well understood that the domestic economy, particularly in the poorer regions, might not be able to support the proposed gas price increases. It is therefore recommended that subsidies, when necessary, be applied directly for the end-consumer without involving the gas industry in social service activities.

## System Losses, Transparency in Business and Regulatory Structure

It can well be argued that the artificial suppression of gas prices creates a basis for insufficient funding not only for sustainable, safe and reliable operation of the companies in the gas sector, but also for performance and commitment of their employees. This strategy in turn creates an undeniable atmosphere of tolerance for system losses often traceable not only to inadequate book keeping and collection procedures but even to blatant dishonesty (Figure 2). Companies such as Titas continue operating in a system which does not provide incentives for regional management teams to lower losses, thereby increasing profit. The regional managers cannot be left in a position lacking checks and balances. The transparency of transmission quantities and delivery to individual off-take points, and collections associated with those points, will undoubtedly create a massive improvement in the integrity of financial transactions and a reduction in system losses.

The current gas economy of Bangladesh is fraught with conflict. Petrobangla (Bangladesh Oil, Gas and Mineral Corporation), the principal buyer of gas produced by the country, is also a principal entity in defining its uses and pricing, and in the distribution of revenue (after the exurban governmental tax levy is extracted). Petrobangla also represents the interests of the Government, the owner of all but the foreign gas companies in the country. It is apparent that Petrobangla's knowledge gained through its central role in gas sector development needs to be better utilized as the country moves toward a commercial-based gas sector

Figure 2. System Losses



Source: Petrobangla.

economy. Petrobangla would best become the clearinghouse, or buyer, of available gas from the domestic and international production companies, and thence the seller of gas to the distribution companies. This central role would allow Petrobangla to act as the gas supply and gas pricing averaging entity.

The need for the Bangladesh Energy Regulatory Commission (BERC) to maintain a stronger role in defining, through direct audits and negotiations with the individual gas companies, their cost, profit, and obligation for efficient operations, is apparent when the question of service pricing and gas delivery security is studied. It is BERC, not the Government, that is typically facing budgetary shortcoming challenges, that must define the portion of revenue needed by the energy companies to provide a secure and sustainable growth in gas supplies.

The present study revealed the unquestionable need for improvement of communication/decision-making cooperation between the gas governance entities (Petrobangla) and the Electric Power Board. The bilateral commission is reportedly dysfunctional and holds joint working sessions with months of down time between each meeting. It is recommended that BERC assume a leading role in assuring full and continuous cooperation between these entities. BERC's role as a financially and politically disengaged entity will assure objectivity in deliberations and planning.

The value chain of the gas discovery, development, production, transmission, distribution and monetization should be simplified, cross-subsidies removed, and an adequate percentage of gas price left with the involved gas companies. BERC, and not a governmental entity, should be the traffic regulator and rules enforcer in such a system.