

**Bangladesh Development Research Working Paper Series
(BDRWPS)**

BDRWPS No. 3 (December 2008)

**Mineral Extraction in Bangladesh:
Some Fundamental Reform Suggestions**

Bernhard G. Gunter
Bangladesh Development Research Center (BDRC)

Bangladesh Development Research Center (BDRC)



The views and interpretations in this paper are those of the author(s) and do not necessarily represent those of the Bangladesh Development Research Center (BDRC).

Copyright© 2008

Bangladesh Development Research Center (BDRC) for the overall Working Paper Series. The copyright of the content of the paper remains with the author(s) and/or the institution(s) submitting the content.

Bangladesh Development Research Center (BDRC)

2508 Fowler Street
Falls Church, VA 22046-2012, U.S.A.

Tel. +1 703 532 4893

E-Mail: contact@bangladeshstudies.org

<http://www.bangladeshstudies.org>



Rights and Permissions

All rights reserved.

Text and graphics may be reproduced in whole or in part and in any form for educational or non-profit purposes, provided that credit is given to the source. Reproductions for commercial purposes are forbidden.

The Bangladesh Development Research Center (BDRC) disseminates the findings of work in progress to encourage the exchange of ideas about development issues in Bangladesh. Our main objective is to disseminate findings and ideas quickly, so we compromise to some degree on quality. The papers are signed by the author(s) and should be cited and referred accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s). They do not necessarily represent the view of the BDRC.

Working Papers are available online at <http://www.bangladeshstudies.org/wps/>

Mineral Extraction in Bangladesh: Some Fundamental Reform Suggestions

Bernhard G. Gunter*

Abstract

This paper proposes some fundamental reforms of the way the extraction of minerals are managed in Bangladesh. It suggests a Mineral Management Initiative that consists of three components: (i) the creation of Mineral Oversight Committee, (ii) the establishment of a Mineral Revenue Program, and (iii) a comprehensive Mineral Capacity Building Program. The purpose of the Mineral Oversight Committee (MOC) would be to oversee all decisions of Petrobangla's Board of Directors as well as to monitor all major transactions of Petrobangla, including especially the use of mineral revenues and royalties. The establishment of a Mineral Revenue Program (MRP) is proposed to ensure that the revenues and royalties from the extraction of Bangladesh's minerals will accrue to all the people of Bangladesh, while a comprehensive Mineral Capacity Building Program (MCBP) would provide specialized resource and management training.

* President, Bangladesh Development Research Center (BDRC). This paper is based on an essay submitted by Dr. Gunter in his personal capacity to The Anwarul Quadir Prize of 2008. Comments are welcome; please send any communication to president@bangladeshstudies.org.

I. Introduction

During the last 15 years, about 20 percent of Bangladesh's total public investment was allocated for the development of the energy sector. Despite these efforts, per capita production and consumption of commercial energy and electricity in Bangladesh is one of the lowest among developing countries. While Bangladesh has substantial resources of natural gas, demand for natural gas is growing fast. It is expected that Bangladesh will face a sharp energy crisis by 2011. Lacking domestic resources, it is the government's policy to offer special incentive packages for the exploration of oil and gas to the world's leading oil and gas companies,¹ none of which pays any taxes to the Bangladeshi government.²

As is well-known, government officials of many developing countries are colluding with national and international oil, gas, and mining companies to skim off profits that could help lift these nations out of poverty. While it is not clear to which degree Bangladesh is affected by such collusion, the fact that all of Bangladesh's mineral resources are controlled by one powerful company, the state-run Bangladesh Oil, Gas and Mineral Corporation, also called Petrobangla,³ make it highly susceptible to such collusion, especially as Petrobangla is governed by an eight-member Board of Directors, which (as of March 16, 2008) comprised five senior officers of Petrobangla (i.e., the Chairman of Petrobangla and its Directors of Finance, Planning, Mines and Minerals, and Operations) and three representatives of the Government of Bangladesh (i.e., the Ministries of Energy and Mineral Resources, Finance, and Planning).⁴

This paper proposes to create a Mineral Oversight Committee (MOC), whose purpose would be to oversee all decisions of Petrobangla's Board of Directors as well as to monitor all major transactions of Petrobangla, including especially the use of mineral revenues and royalties. The use of mineral revenues and royalties would be allocated according to a Mineral Revenue Program (MRP) in order to ensure that the revenues and royalties from the extraction of Bangladesh's minerals will accrue to all people of Bangladesh. Complementary to the MOC and the MRP will be a comprehensive Mineral Capacity Building Program (MCBP). We will subsequently refer to this combination of MOC, MRP, and MCBP as the Bangladesh Mineral Management Initiative (BMMI).

The remainder of this paper is structured as follows. Section II provides the necessary background to better understand the proposed initiative. Section III provides some details of the proposed BMMI, while Section IV provides some conclusions.

¹ The foreign companies present in Bangladesh include: Asia Energy, Cairn, Chevron, Niko Resources, Royal Dutch Shell, and Tullow Oil & Gas Exploration.

² See <http://energybangla.com/index.php?mod=article&cat=EBReport&article=681>.

³ There also exists (formally since 2003) the Bangladesh Energy Regulatory Commission (BERC), whose mandate is to regulate Bangladesh's Gas, Electricity and Petroleum products. While the BERC had been established with the vision "to make provisions for the establishment of an independent and impartial regulatory commission for the energy sector", the BERC has limited its activities to energy tariff regulations. Furthermore, there have been significant delays by the government to appoint the commission's five members, for example, the commission's chairman was appointed more than two years after BERC's formal establishment.

⁴ See Bangladesh Oil, Gas and Mineral Corporation - Petrobangla (2008), p. 9.

II. Snapshot of Bangladesh's Oil and Gas Sector

II.1. Some Historical Facts

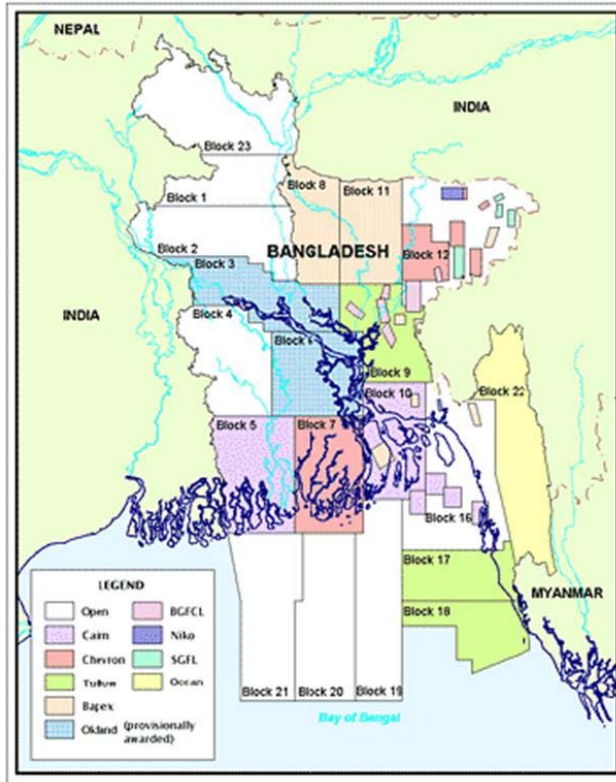
The search of oil and gas in the area constituting Bangladesh began in the later part of the 19th century through some scattered exploration efforts undertaken by private ventures. The first oil discovery in the region was made in 1890 in Digboi, Assam. However, it was not until about two decades later in 1908, that the Indian Petroleum Prospecting Company undertook some more systematic attempts to find oil and gas, however without any major success. The promulgation of Pakistan Petroleum Act in 1948 infused the interest of international oil companies in oil and gas exploration of what is now Bangladesh. A handful of international oil companies took up concessions during the early fifties and carried out exploration till the end of sixties. These operations saw the drilling of 16 exploration wells including the first offshore well and resulted in the discovery of 7 gas fields. In 1961, the then Pakistani government established the Oil and Gas Development Corporation (OGDC) as the first public oil and gas organization in Pakistan.⁵

After gaining independence in 1971, energy exploration activities increased among both national and international companies. The part of OGDC that was in operation in Bangladesh was reorganized as the Bangladesh Mineral Oil and Gas Corporation (Petrobangla) and continued its predecessor's exploration efforts. In 1974, the Bangladesh Petroleum Act was enacted to facilitate international participation in the exploration and extraction of Bangladesh's oil and gas. In 1985, all of Bangladesh's mineral extraction and management were merged under the new Bangladesh Oil Gas and Minerals Corporation, once again short named Petrobangla, which since then is in charge of managing all of Bangladesh's oil and gas exploration, development, transmission, distribution and conversion, as well as the development and marketing of Bangladesh's other minerals. Between 1974 and 1993, some 23 onshore / offshore exploration blocks were delineated. In 1993, a first more formal licensing round was launched and resulted in awarding six production sharing contracts (PSCs) with the government, whereby Petrobangla is the sole purchaser of oil and natural gas and the sole provider of transmission and distribution services.

The first National Energy Policy (NEP) was introduced in 1996 with the purpose to ensure proper exploration, production, distribution and rational use of energy sources to meet the growing energy demand of different zones, consuming sectors and consumers groups on a sustainable basis. The NEP was followed by a highly protracted second licensing round in 1997, from where a further four PSCs were eventually awarded. In May 2004, the government decided to update the NEP, reflecting the changes in the global as well as domestic environment. Figure 1 shows the license holding blocs for oil and gas as of mid-2006. More details on Bangladesh's natural gas, oil, and coal resources can be found in Imam (2005); further details on gas exploration activities in Bangladesh from 1910 to 2004 are provided in Wahid and Rawshan (2004).

⁵ For further details on the origin of petroleum in Bangladesh, see Curiale et al. (2002).

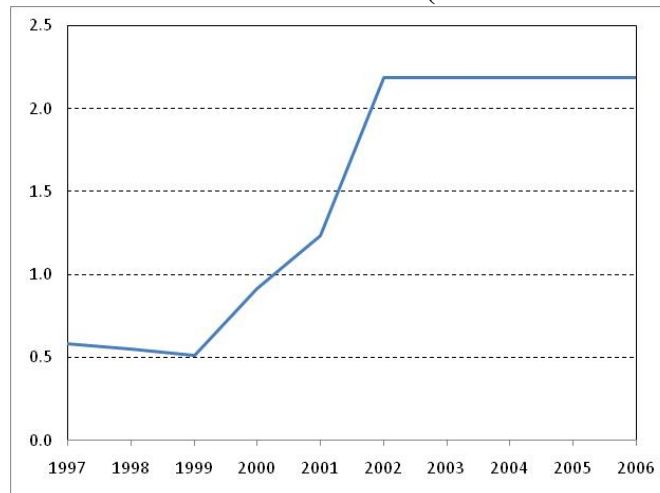
Figure 1: License Holding Blocs for Oil and Gas as of Mid-2006



Source: Blakeley (2006)

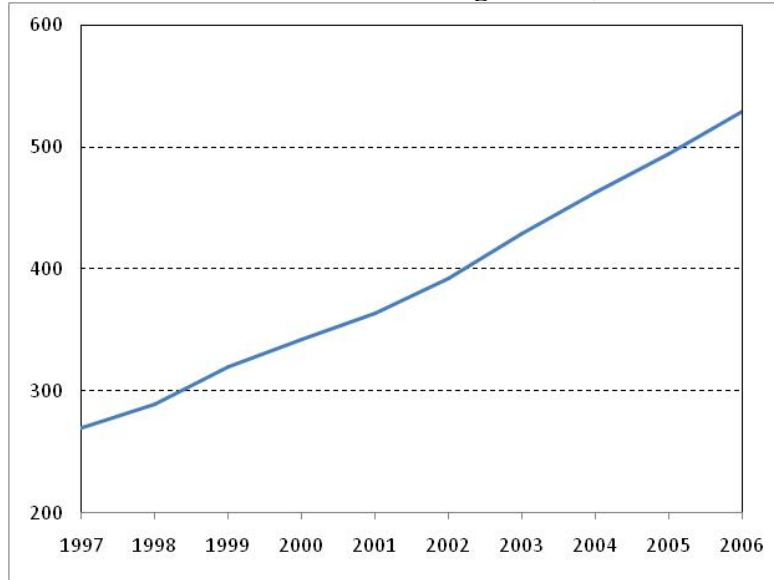
As Figures 2 and 3 show, the production of crude oil has sharply increased from 1999 to 2002, but remained stable at 2.2 million of barrels since then; while the production of natural gas has increased continuously over the last ten years, reaching about 530 billion cubic feet in 2006, about twice its 1997 value.⁶

Figure 2: Production of Crude Oil (in millions of barrels)

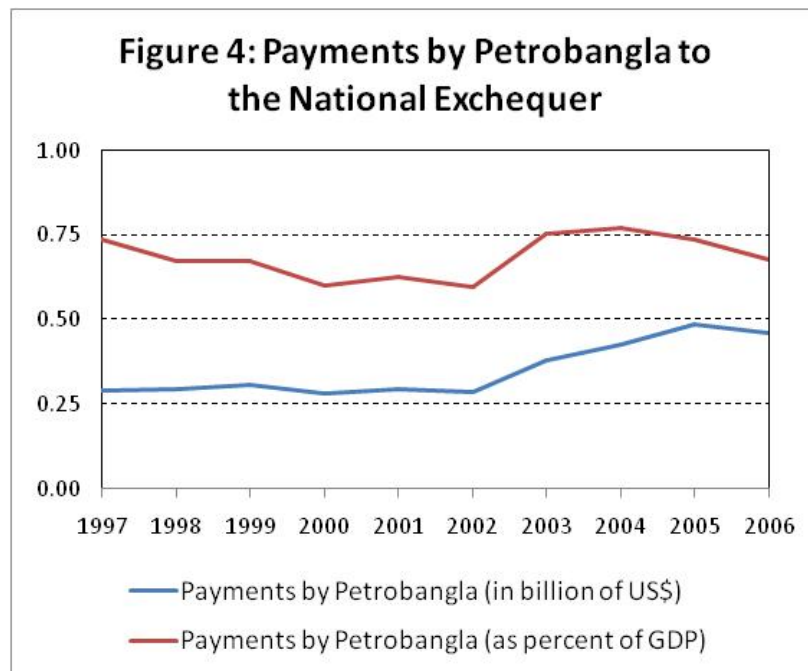


⁶ Data based on the U.S. Energy Information Administration database as of June 2008.

Figure 3: Production of Natural Gas in Bangladesh (in billions of cubic feet)



However, as Figure 4 shows, the payments made by Petrobangla to the National Exchequer have not kept up with the increase in production, especially if taking into account the considerable increases in oil and gas prices during this period. In terms of nominal US\$, the payments increased from just below US\$300 million (in 1997) to US\$461 million (in 2006). In terms of percent of Bangladesh’s gross domestic product (GDP), the payments actually decreased over the ten year period from 74 percent to 68 percent.



Source: Calculations by the author based on Petrobangla (2008) data on payments in taka and International Monetary Fund (IMF) data on GDP and exchange rates.

II.2. Current Situation of Bangladesh's Gas Sector

Given that natural gas is currently Bangladesh's only significant source of commercial energy,⁷ the subsequent analysis concentrates on this sector. At present, two national companies (both are 100 percent subsidiaries of Petrobangla) as well as a number of international companies supply local demand. In 2005, natural gas production in Bangladesh amounted to 494 billion cubic feet, of which about 48 percent were consumed for the purpose of power generation, about 32 percent for fertiliser production, and the remaining 20 percent were consumed for other industrial, commercial and domestic purposes. In 2006, the production of natural gas increased by 7 percent, amounting to about 530 billion cubic feet. Furthermore, while consumption of natural gas has followed the production (Bangladesh is not importing any natural gas, though it imports most of its petroleum consumption), 20 percent of total demand for natural gas goes currently unmet; resulting in extensive power shedding throughout the country.

Given this situation, the Government of Bangladesh and Petrobangla invited international oil and gas companies in a third round of bidding between February-May 2008 to bid for acreages within twenty-eight offshore blocks, ranging from 2,611 square kilometers to 7,703 square km. The terms for this third bidding imply the full repatriation of profits, no payments by the bidder of any signature bonuses or royalties, and no customs duty for equipment and machinery imported for petroleum operations during exploration, production and development phases. International oil companies will get up to nine years for explorations in deep sea blocks and eight years for shallow sea blocks. The price of oil from deep sea blocks will be 100 percent of the so-called high sulfur fuel oil (HSFO) in the Singapore market with an upper ceiling of \$180 per ton. The highest price for gas from deep sea blocs would be around \$4.70 per 1000 cubic feet, while it would be around \$4.40 per 1000 cubic feet for gas from shallow sea blocks.⁸ The oil and gas companies are supposed to share 55 percent of their profits with Petrobangla, and—unlike in the past—they are also supposed to pay some corporate taxes.

While these terms constitute some improvements over previous terms, there remain a variety of shortcomings in the management of the mineral sector which imply that most of the benefits from Bangladesh's natural gas extraction will continue to accrue to powerful international corporations and the wealthiest sections of Bangladesh's population. It is possible to group these shortcomings into three groups:

- a) shortcomings related to a lack of effective control over Petrobangla and its officials, including non-transparency and improper accounting, which invites (i) collusions between various public officials and international oil and gas companies to skim off profits, (ii) corruption/bribery and (iii) mismanagement and inefficiencies at all levels;

⁷ Bangladesh has substantial bituminous coal deposits in the north western region and mining them is under consideration by the Government. The indication of the British company Global Coal Management to develop an open pit coal mine at Phulbari (in the Dinajpur District) has drawn critique from various national and international civil society organizations.

⁸ Currently, the highest producer price for onshore gas in Bangladesh is \$2.9 per 1000 cubic feet and the price for the currently lone offshore block is \$3.6 per cubic feet.

- b) shortcomings related to a lack of regulations on how to spend the revenues from the extraction of non-renewable resources in a more egalitarian way across the population and generations; and
- c) shortcomings related to lacks of expertise and domestic capacity within Petrobangla and government officials, which allow international oil and gas companies to (i) hide profits in accounting tricks and (ii) twist the terms to their preferences and benefits.

There also are considerable environmental concerns related to oil and gas extraction in Bangladesh, even though Petrobangla has taken some initiatives to provide environment-friendly energy, see Bose (2006) for further details.

II.3. Future Outlook

In the short-term, domestic demand is projected to increase from 701 billion cubic feet in fiscal year 2008 to 1039 billion cubic feet in fiscal year 2012. Over the next two decades, demand is predicted to increase at six percent per year, especially in the industrial and household consumption sectors, shifting the demand shares for 2012 to a projected 51 percent for power, 11 percent for fertilizer, and 38 percent for other industrial, commercial and household purposes.

Petrobangla's official estimates put the known discovered reserve of natural gas at 29 trillion cubic feet in 23 gas fields. Of this amount, 21 trillion cubic feet are considered to be recoverable. The government has referred recently to 13.5 trillion cubic feet of proven and recoverable gas reserves.⁹ The U.S. Geological Survey estimated that Bangladesh has potentially 32 trillion cubic feet of undiscovered reserves.¹⁰ Despite these differences in estimates of Bangladesh's natural gas reserves and the general uncertainty related to any such number, it is clear that Bangladesh would be able to satisfy its demand for natural gas over the medium-term if the above shortcomings can be reduced drastically. In any case, Bangladesh also needs to intensify its efforts in using renewable resources, which – as the recent experience of Grameen Shakti has shown – would also provide a variety of new green jobs.¹¹

III. The Bangladesh Mineral Management Initiative

As Miyan and Richards (2004) have pointed out, managing the energy sector is a demanding activity for governments in all countries as it entails coordinating the activities of various government agencies and of the relevant state-owned enterprises (SOEs), while there is also an important role for private firms. Miyan and Richards (2004) have suggested that the nature of required reforms can be described by six reform

⁹ See the Reuters news report of April 2008, available at: <http://in.reuters.com/article/domesticNews/idINL1514297620080415>.

¹⁰ See United States Energy Information Administration (2006).

¹¹ Micro loans provided by Grameen Shakti have helped to install more than 100,000 solar home systems in Bangladesh over the last few years. Grameen Shakti plans to install 1 million solar home systems by 2015, which is estimated to create some 100,000 jobs. Grameen has already started with training local youth and women as certified solar technicians. See Barua (2008) for further details.

elements: First, hire well trained managers able to make efficient decisions, and protect them from undue political interference, which means that SOEs engaged in production and distribution of energy should be expected to cover costs and that SOEs engaged in exploring for and producing primary energy products must realize reasonable unit costs and transfer surpluses to the government. Second, investments in better safety nets for employees displaced from SOEs, and thereby lessen political pressure to maintain inefficient employment levels. Third, enable a much larger level of investment in the energy sector. Fourth, allow the private sector to participate in these investments. Fifth, create a credible regulatory authority able to provide a stable, predictable legal framework for the energy sector, whereby the regulatory authority should (a) supervise both SOEs and private firms in the energy sector, (b) assure investors that they can invest with confidence, and (c) assure customers that both private and state-owned firms will behave responsibly with respect to prices charged and reliability of service. Sixth, enable the judicial system to address corrupt practices in both private and public firms in the energy sector.

Bangladesh is far away from adopting such a comprehensive set of reforms. As Alam, Kabir, Rahman, and Chowdhury (2004) have shown, there have been a number of reforms in the power sector in Bangladesh since her independence. However, these reforms failed to bring desired improvements in the power sector. As their analysis shows, the recent reform activities in the power sector focused on the generation and transmission of power, while the most pressing problems have been related to the heavy system losses and poor collection performance of the distribution system. Alam et al. (2004) suggested that the distribution system must be restructured and its performance should be monitored continually on the basis of particular performance indicators. Indeed, over the last few years, the Asian Development Bank (ADB) has repeatedly provided technical assistance to the Government of Bangladesh and the Dhaka Electric Supply Authority (DESA) with the aim to (i) corporatize Dhaka Electric Supply Authority DESA, (ii) introduce modern management information systems in the new company, and (iii) integrate the new company into the power network as a distinct power distributor. While a new corporation and a computerized financial and management information systems established has been established recently, progress lacks behind the plans in many aspects. For recent reform proposals specifically for the governance of the electricity sector, see Asaduzzaman (2008).

Reflecting the three main shortcomings in Bangladesh's mineral extraction described in Section II above, the following suggestions focus on three fundamental reforms with regards to the management of Bangladesh' mineral extraction, which jointly define the Bangladesh Mineral Management Initiative (BMMI).

III.1. Mineral Oversight Committee (MOC)

Purpose: The purpose of the MOC would be to oversee all decisions of Petrobangla's Board of Directors as well as to monitor all major transactions of Petrobangla, including especially the use of mineral revenues and royalties. Petrobangla's mineral revenues could be neither allocated nor disbursed towards specific programs without the approval of the MOC.

Constituency: The MOC would have nine members, of which six are representatives of respected civil society organizations (like the Grameen Bank and BRAC), one representative of the parliament, one representative from the government, and one representative from Petrobangla. The six civil society representatives would get compensated for their services, the representatives of the parliament, government and Petrobangla would provide their services as part of their paid public employment.

Selection of Members: The representatives from the parliament, government, and Petrobangla will always be determined by, respectively, the parliament, government, and Petrobangla. The initial six civil society representatives would be determined by the Supreme Court, based on applications received from civil society organizations. Any subsequent replacement of civil society representatives would be determined by a majority of at least three civil society representatives.

Replacement of Members: The maximum a person can be a member of the MOC is six years. While the first six civil society representatives would each serve on the MOC for a different period (ranging between one and six years), subsequent civil society representatives would typically serve on the MOC for six years. This would imply that one of the six civil society representatives would need to be replaced every year. The MOC would keep a shortlist of at least three potential civil society representatives to ensure that any necessary replacement of a civil society representative could be made within one week.

Decision-making: The MOC would make decisions by requiring that at least 5 members agree. All decisions taken by the MOC, including the voting by each member, would be posted on the MOC's website within 24 hours after taking the decision. To further minimize the risk of collusion, all nine members would be required to publicly disclose all their income every six months for the time they are members of the MOC as well as for the subsequent five years.

Professional Secretariat: The MOC would have a professional secretariat to assist its members with their official duties.

III.2. Mineral Revenue Program (MRP)

The MRP would be a time-limited program until 2020, with the main purpose to ensure that the revenues and royalties from Bangladesh's mineral extraction will accrue to the low- and middle-income people of Bangladesh. The limitation to allocate mineral revenues until 2020 to programs that solely benefit the low- and middle-income people is justified as natural resource revenues belong to the country as a whole but have so far been limited to the high-income people, who are directly and indirectly the main energy consumers of Bangladesh's subsidized energy products. Indeed, access to electricity in Bangladesh is now about 33 percent, access to natural gas is far lower, and the tariff subsidies and other energy expenditures by the government far exceed Petrobangla's

payments to the National Exchequer.¹² All revenues and royalties from the extraction of oil, gas, and other minerals would need to be deposited in an escrow account of a major bank (which would pay positive real interest on such deposits), and as already mentioned, these funds could be neither allocated nor disbursed without the formal approval of the Mineral Oversight Committee. The program would also include some aspects of (i) stabilization funds (which shield the economy from revenue instability), (ii) savings funds (which limit the current consumption of revenues from the extraction of natural resources to maintain wealth for future generations), and (iii) precautionary funds (which deal with uncertainties related to resource prices and resource availability).¹³

III.3. Mineral Capacity Building Program (MCBP)

Both, the MOC and the MRP, will need to be complemented by comprehensive Mineral Capacity Building Program (MCBP) for (a) members of the MOC, (b) members of Petrobangla's Board of Directors, as well as (c) Petrobangla's staff. Some of this training could be provided by specialized courses at, for example, the World Bank Institute. Other training components would include management training as it is already taught at some of Bangladesh's top public and private universities. To ensure that persons receiving such training will not leave their official functions/positions after receiving the training, trainees would be responsible for all costs of such training if they leave the MOC or Petrobangla within three years of receiving the training.

IV. Conclusions

A new principle is emerging around the globe that changes are needed at the national as well as international levels to reallocate the benefits from the extraction of natural resources away from international oil and gas companies and their wealthy allies within a country towards the low- and middle-income people. The proposed Bangladesh Mineral Management Initiative (BMMI) makes concrete suggestions in terms of creating a Mineral Oversight Committee (MOC), adopting a Mineral Revenue Program (MRP) and a Mineral Capacity Building Program (MCBP) which would ensure that the extraction of Bangladesh's minerals will benefit all the people of Bangladesh.

While the idea for some elements of such changes is not new, the combination of the suggested MOC, MRP, and MCBP goes beyond existing international initiatives by practically changing the ownership and control over Bangladesh's mineral resources (instead of limiting the changes to improving transparency and accountability in the mineral sector).¹⁴

¹² For an appraisal of the demand for electrical power and power tariffs in Bangladesh, see Chowdhury and Farooque (2002).

¹³ See Bennett (2002) for further details.

¹⁴ For brief summaries of existing international initiatives, like the Extractive Industries Transparency Initiative (EITI) and the Publish What You Pay (PWYP) campaign, see Wurthmann (2006). For a review of and suggestions for institutional arrangement for sustainable management of natural resources in terms of land, water, crops, fish, trees, fruits, vegetables, etc., see Rahman et al. (2002), Sultana and Barr (2005), and Nishat (2007).

Looking at purely financial impacts, using a conservative estimate of 21 trillion cubic feet of recoverable gas reserves in Bangladesh and a producer price of US\$3 per 1000 cubic feet natural gas implies that Bangladesh's natural gas is valued at US\$63 billion. To put this figure into perspective, it is about the same as a) Bangladesh's current gross domestic product (GDP), b) eight times the amount of the government's total revenues, or c) 93 times the amount Petrobangla paid to the National Exchequer in 2006 (US\$676 million). Taking rising energy prices into account, the value of Bangladesh's natural gas is obviously much higher.

Finally, the BMMI would also imply various indirect benefits, like job creation, linkages to the local economy through procurement of goods and services, investments in physical infrastructure and human and social capital, as well as various environmental benefits.

References

- Alam, M. S.; E. Kabir; M. M. Rahman; and M. A. Chowdhury (2004) "Power Sector Reform in Bangladesh: Electricity Distribution System", *Energy*, Vol. 29, No. 11, pp. 1773-1783.
- Asaduzzaman, Md. (2008) "Power to the People: Reform and Governance of the Electricity Sector", in: Nurul Islam and M. Asaduzzaman (eds.) *A Ship Adrift: Governance and Development in Bangladesh* (Dhaka, Bangladesh: Bangladesh Institute of Development Studies (BIDS), Chapter 8).
- Bangladesh Oil, Gas and Mineral Corporation—Petrobangla (2008) *Annual Report 2006* (Dhaka, Bangladesh: Petrobangla).
- Barua, Dipal Chandra (2008) *Grameen Shakti: Pioneering and Expanding Green Energy Revolution to Rural Bangladesh* (Dhaka, Bangladesh: Grameen Bank Bhaban, April).
- Blakeley, Ian A. (2006) *Monthly Newsletter of the Petroleum Exploration Society of Great Britain (PESGB)* (London, U.K.: Petroleum Exploration Society of Great Britain (PESGB)).
- Bennett, Juliette (2002) *Conflict Prevention and Revenue Sharing Regimes*, Paper prepared for the United Nations Global Compact; available at: http://www.unglobalcompact.org/docs/issues_doc/7.2.2/RevenueSharingRegimes.pdf.
- Bose, Sudipta (2006) "Environmental Accounting and Reporting in Fossil Fuel Sector: A Study on Bangladesh Oil, Gas and Mineral Corporation (Petrobangla)", *The Cost & Management (Journal of the Institute of Cost and Management Accountants of Bangladesh)*, Vol. 34, No. 2 (March-April), pp. 53-67.
- Chowdhury, Muhammad Abdul Mannan and A. J. M. Farooque (2002) "Demand for Electrical Power and Power Tariffs in Bangladesh - A Preliminary Appraisal", *Bangladesh Journal of Political Economy*, Vol. 17, No. 2 (December), pp. 183-200.

- Curiale, J. A.; G. H. Covington; A. H. M. Shamsuddin; J. A. Morelos; and K. M. Shamsuddin (2002) “Origin of Petroleum in Bangladesh”, Tulsa, Oklahoma, USA: American Association of Petroleum Geologists (AAPG), *AAPG Bulletin*, Vol. 86, No. 4, pp. 625-652.
- Imam, Badrul (2005) *Energy Resources of Bangladesh: Natural Gas, Oil, Coal* (Dhaka, Bangladesh: University Grants Commission of Bangladesh).
- Miyan, M. Alimullah and John Richards (2004) *Energy Policy for Bangladesh* (Dhaka, Bangladesh: International University of Business Agriculture and Technology (IUBAT), Center for Policy Research); available at: <http://www.researchsea.com/html/article.php/aid/132/cid/4?PHPSESSID=74mrt74e9pg3vrvmuvb5flgmp2>.
- Nishat, Ainun (2007) “Natural Resource Management in Bangladesh: Existing Policy Regime and Institutional Framework”, Dhaka, Bangladesh: UNDP Bangladesh, Policy Dialogue, No. 11 (April 17); available at: <http://www.undp.org.bd/library/policypapers/Policy%20Dialogue%20Series%2011.pdf>.
- Rahman, A. Atiq; D. L. Mallick; Nasimul Haque; and Ainun Nishat (2002) “Trends in Natural Resource Management in Bangladesh: Looking for Integration and a New Institutional Framework”, Dhaka, Bangladesh: Bangladesh Centre for Advanced Studies, *NRM Workshop Paper Series*, No. 2 (Draft), prepared for the Natural Resource Management Workshop held in Dhaka on October 10, 2002); available at: <http://www.bcas.net/Publication/Documentation/TRENDS.PDF>.
- Sultana, Parvin and Julian Barr (2005) “Community Based (Natural Resources) Management”, Hove, U.K.: Rural Livelihoods Evaluation Partnership (RLEP), *Thematic Lessons Papers (TLP)*, No. 3 (April); available at: http://www.livelihoods.org/lessons/Asia/RLEP_CBM_Summary.pdf.
- United States Energy Information Administration (2006) Bangladesh (Washington, DC, USA: U.S. Energy Information Administration, Country Analysis Briefs); available at: http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=BG.
- United States Energy Information Administration (2008) Live Database (Washington, DC, USA: U.S. Energy Information Administration); available at: http://tonto.eia.doe.gov/country/country_time_series.cfm?fips=BG.
- Wahid, Adnan Al and Nadia Rawshan (2004) “Exploration Activities in Bangladesh Gas”, *BRAC University Journal*, Vol. 1, No. 1, pp. 33-40; available at: <http://www.bracuniversity.net/journal/contents/112004/EXPLORATION%20ACTIVITIES%20IN%20BANGLADESH%20GAS.pdf>.
- Wurthmann, Geerd (2006) “Ways of Using the African Oil Boom for Sustainable Development”, Tunis, Tunisia: African Development Bank, *Economic Research Working Paper*, No. 84 (March); available at: http://www.afdb.org/pls/portal/docs/PAGE/ADB_ADMIN_PG/DOCUMENTS/ECONOMICSAN_DRESEARCH/ERWP_84.PDF.