Technical Assistance Report

Project Number: 45273
Capacity Development Technical Assistance (CDTA)
October 2012

People's Republic of Bangladesh: Supporting Brick Sector Development Program

(Financed by the Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility)

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 9 October 2012)

Currency unit	–	taka (Tk)
Tk1.00	=	$0.01229
$1.00	=	Tk81.345

ABBREVIATIONS

$\mu g/m^3$	–	micrograms per cubic meter
CO_2	–	carbon dioxide
DOE	–	Department of Environment
FCK	–	fixed chimney kiln
GIZ	–	Deutsche Gesellschaft für Internationale Zusammenarbeit
HHK	–	hybrid Hoffman kiln
MOEF	–	Ministry of Environment and Forests
PFI	–	participating financial intermediary
$PM_{10/2.5}$	–	particulate matter smaller than 10/2.5 micrometers
VSBK	–	vertical shaft brick kiln

TECHNICAL ASSISTANCE CLASSIFICATION

Type	–	Capacity development technical assistance (CDTA)
Targeting classification	–	General intervention
Sector (subsectors)	–	Finance (small and medium-sized enterprises finance and leasing), energy (energy efficiency and conservation), industry and trade (small and medium-sized enterprises development)
Themes (subthemes)	–	**Environmental sustainability** (eco-efficiency), private sector development (policy reforms), and capacity development (institutional development)
Climate change	–	Mitigation and adaptation
Location (impact)	–	National (high)
Partnership	–	Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility

NOTE

In this report, "$" refers to US dollars.

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I. INTRODUCTION

1. The brick manufacturing process is energy intensive and is a major source of greenhouse gas emissions and fine particulate pollution in Bangladesh. The Asian Development Bank (ADB) has provided financial intermediary loans equivalent to $50 million in local currency to support the construction of more energy-efficient and environmentally superior brick kilns.[1] As a part of the loans processing commitment, a capacity development technical assistance (TA) project will complement the lending facility and support a comprehensive brick sector development program in Bangladesh.[2] During the ADB TA fact finding mission, the Government of Bangladesh concurred with the impact, outcome, outputs, and implementation agreements, cost and financing arrangements, and consultant terms of reference. The design and monitoring framework is in Appendix 1.[3]

II. ISSUES

2. Promoting energy efficiency and environmental sustainability is a major component of Bangladesh's sixth five year plan (2011–2015). However, continuous economic growth and rising industrial activities have led to an increased consumption of carbon-based fuels and a doubling of per capita carbon dioxide (CO_2) emissions from 40 tons in 1990 to 80 tons in 2008.[4] In urban centers, the air quality has become extremely poor. A 2011 report indicated that, during the dry season from November to April when industrial activities were the highest, Dhaka's PM_{10} and $PM_{2.5}$ levels were up to 250 μg/m^3 and 165 μg/m^3 respectively.[5] These figures far exceeded the World Health Organization air quality standards of PM_{10}<20 μg/m^3 and $PM_{2.5}$<10 μg/m^3. Brick kilns around Dhaka contributed to the most fine particulate pollution in the city, more than vehicle exhaust and road dust combined.[6]

3. Brick manufacturing is a major business sector in Bangladesh. There are 4,880 brickfields throughout the country (footnote 6). Together, they contribute to about 1% of gross domestic product (GDP), or $245 million (2010).[7] Among the six available types of brick kiln,[8]

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[1] ADB. 2012. *Report and Recommendation of the President to the Board of Directors: Proposed Loans to the People's Republic of Bangladesh for Financing Brick Kiln Efficiency Improvement Project*. Manila (Loans 2865/2866-BAN). The loans were approved on 10 May 2012 by the ADB Board of Directors. These loans are intended to establish a credit facility of $50 million equivalent in local currency at Bangladesh Bank (central bank) for relending to participating financial intermediaries for the construction of more energy-efficient and environmentally superior brick kilns.

[2] The proposed TA project was not attached to the ADB loans 2865/2866-BAN. TA approval in Bangladesh is subject to the government's technical proposal process, which is time consuming, while the financial intermediary loans are not subject to such a process; in order to conclude the loan negotiations before 1 April 2012 to avoid ADB maturity-based pricing, the government requested that ADB separate the loans and the TA processing.

[3] The TA first appeared in the business opportunities section of ADB's website on 12 October 2012.

[4] T. Boden, G. Marland, and B. Andres. 2011. *National CO_2 Emissions from Fossil-Fuel Burning, Cement Manufacture, and Gas Flaring: 1751–2008.* Oak Ridge. Carbon Dioxide Information Analysis Center. Oak Ridge National Laboratory. http://cdiac.ornl.gov/ftp/trends/emissions/ban.dat

[5] $PM_{10/2.5}$ refers to particulate matters smaller than 10/2.5 micrometers (in the air), and μg/m^3 refers to micrograms per cubic meters (in the air). These are key measures of air pollution. M.A. Rouf et al. 2011. *Trend of Particulate Matter PM 2.5 and PM 10 in Dhaka City.* Bangladesh Journal and Scientific and industrial Research. Dhaka.

[6] World Bank. 2011. *Introducing Energy-efficient Clean Technologies in the Brick Sector of Bangladesh.* Washington, DC.

[7] Brick sector size data are from footnote 6. The GDP figure is based on a purchasing power parity measure: ADB. 2011. *Key Indicators*. Manila (pp 161).

[8] The six basic designs in the order of their energy efficiency are (i) bull's trench kiln, (ii) fixed chimney kiln (FCK), (iii) improved zigzag kiln, (iv) vertical shaft brick kiln (VSBK), (v) hybrid Hoffman kiln, and (vi) tunnel kiln. The bull's trench kiln is the least energy efficient and most polluting, and the tunnel kiln is the most energy efficient and the least polluting.

92% of the 4,880 brickfields use the highly polluting fixed chimney kilns (FCKs) (footnote 6). More energy-efficient improved zigzag kilns, vertical shaft brick kilns (VSBKs), hybrid Hoffman kilns (HHKs), and tunnel kilns are rare. This is mostly due to the lack of a comprehensive brick sector road map and development plan. As a result, the brick sector is poorly regulated and ill-informed of the latest technologies. Instead of a small number of highly efficient modern brickfields, a large number of unqualified small businesses operate on the back of outmoded technologies, severe industrial pollution, and poor labor standards. Without new energy efficiency solutions, at the current annual production volume of 17 billion bricks and a demand growth rate at about 8% per year, the brick sector will continue to emit at least 9.8 million tons of CO_2 and 170 billion $\mu g/m^3$ of particulate pollution.[9]

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

4. The impact of the TA is improved environmental conditions in Bangladesh, measured by a reduction in greenhouse gas and fine particulate pollution from the brick sector. The outcome of the TA is expedited brick sector modernization, measured by a higher than expected reduction of FCKs and construction of modern and energy-efficient brick kilns.

B. Methodology and Key Activities

5. To improve the brick sector's energy efficiency, the Ministry of Environment and Forests (MOEF) issued a directive on 15 July 2010, requesting that all FCKs cease to exist from September 2013 and environmental clearance favor more energy-efficient improved zigzag kilns, VSBKs, and HHKs.[10] ADB loans 2865/2866-BAN complement this government directive by providing targeted finance to build energy-efficient kiln replacement capacity to facilitate the phase-out of FCKs. The TA will further complement the loans by (i) creating a long-term brick sector development road map, with accompanying sector policy strategy, and action plans; (ii) enhancing market awareness of more energy-efficient brick kilns; (iii) supporting and facilitating ADB loans effective implementation; and (iv) promoting research and development of advanced new building materials. Since the World Bank, United Nations Development Programme, and Deutsche Gesellschaft für Internationale Zusammenarbeit are actively involved in development of Bangladesh's brick sector, the TA will coordinate with the ongoing and planned brick sector assistance programs to share resources and avoid duplication of efforts. In addition, the TA consultants will work toward the creation of a joint-donor supported Bangladesh national brick technical and information center (the brick center) as a one-stop-shop to meet the brick sector's development needs. The TA is a critical part of the ADB loans (footnote 1) implementation arrangement.[11] TA activities are as follows:

6. **Government delivers a long-term brick sector policy, strategy, and action plan for adoption.** The TA will cover a comprehensive range of capacity development activities to help government agencies, including the MOEF and Department of Environment (DOE), to develop a

[9] S. Ferdausi, S. Vaideeswaran, and S. Akbar. 2008. *Greening Brick Making Industries in Bangladesh*. Dhaka: The annual growth rate of the construction sector was 8.1%–8.9% from the early 1990s to 2010.

[10] Government Directive to Phase Out Fixed Chimney Kilns (Government directive No. Paribesh/Circular/Notice/169/ 2002(2nd)/ 357).

[11] The design of the TA, to provide a comprehensive brick sector development program, could benefit ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Industrial Energy Efficiency Finance Program*. Manila which has a similar brick sector financing component. For detailed information on the coordination of the loans 2865/2866 and PSOD Loan 8024, please see the report and recommendation of the President (footnote 1).

brick sector policy, strategy, and action plan.[12] The TA component will provide training to government officials on (i) international best practices in brick sector development; (ii) the environmental, technical, and commercial benefits of advanced brick kiln technologies; (iii) innovations in low energy-intensive construction materials; and (iv) preparation of a long-term brick sector development roadmap. The TA consultant will help to facilitate the government's stakeholder consultation process and ensure government ownership. The effectiveness of this TA component will be measured against the government's adoption of proposed sector policy, strategy, and action plan. In addition, the TA will assess, as a part of the long-term brick sector development road map, the likelihood of establishing a joint-donor funded national brick center, which could also ensure the sustainability of the subsequent brick sector development work and serve as the TA's exit strategy.

7. **Market awareness for energy-efficient brick kilns and provision of business support to subborrowers improved.** The TA will provide intense campaigns on the advanced, more energy-efficient brick kiln technologies to (i) existing FCK owners, (ii) potential energy-efficient brick kiln investors, and (iii) other stakeholders including staff from government agencies and financial institutions. The goal is to raise critically needed product awareness on the cleaner technologies' environmental, technical, and commercial benefits, thereby enticing market demand for funds. Successful ADB-funded pilot projects will be promoted to further demonstrate their superiorities. Workshops, conferences, and an internet web portal will provide the platform for disseminating financial, operational, and technical information on energy-efficient brick kilns.[13] Finally, the TA consultants could provide business support to prospective subborrowers, assisting them in preparing a business plan to access market funding. The effectiveness of this TA component will be measured against the pace at which the ADB funds are disbursed.

8. **Effective ADB loans implementation.** The TA will strengthen the capacities of the ADB loans' implementing agency, Bangladesh Bank, and some participating financial intermediaries to ensure smooth project implementation.[14] The TA will provide on-the-job training to (i) support environmental and social safeguard screening and categorizations; (ii) ensure review and compliance with ADB's environment and social safeguards, gender action plan, core labor standards, procurement requirements, and prohibited investment activities; and (iii) review loans disbursement and market conditions and revise on-lending terms.[15] Technical consultants will also provide operational support, including through the technical support desk located at DOE, to energy-efficient brick kiln owners, with preference given to operators of the most energy-efficient and modern tunnel kiln and HHK and those who have successfully obtained funds from the ADB credit facility. The technical consultants will provide training to DOE staff on the verification of energy-efficient brick kiln design standards.[16] Technical and operational manuals will be prepared to ensure TA sustainability. The effectiveness of this TA component will be measured against the level of compliance with the stated subloan requirements. Finally, since the brick sector modernization process will inevitably lead to the loss of livelihoods for some

[12] The World Bank's clean air and sustainable environment project is working on the improvement of existing brick sector legislation. The ADB TA will not cover the same area, to avoid the duplication of efforts.

[13] The TA intends to closely coordinate with development partners working in development of Bangladesh's brick sector whenever a workshop or seminar is proposed, and join forces or combine resources if possible.

[14] Participating financial intermediaries are selected based on the eligibility criteria specified in the ADB loans' Project Administration Manual (footnote 1).

[15] Refer to the compliance sections of the report and recommendation of the President (footnote 1).

[16] The World Bank will provide the design standards for improved zigzag kilns and VSBKs. For HHKs and tunnel kilns, or in the absence of any reliable technical design standards, the consultants will train the DOE staff on the approval of funding applications in accordance with international best practices that demonstrate equivalent energy and technical efficiency.

inefficient and poorly capitalized brickfields, the TA will help enhance the DOE's capacity to develop an alternative livelihood program, in coordination with other line ministries, to alleviate the potential social pressure.

9. **Research and development in advanced building materials promoted.** The extraction of fertile topsoil (up to 20 centimeters of the upper-most layer of soil) for brick-making is a common industrial practice and a major environmental hazard. Even with an improved technical efficiency, brick kilns will continue to use up the existing topsoil to meet the rising demand for bricks, affecting the ecosystems and agricultural production. The solution is to promote perforated and hollow bricks that consume less clay, and develop alternative building materials such as compressed bricks made from fly ash and other solid waste. Abundant river basin sediments could also be developed into alternative construction materials to replace the bricks. The TA will coordinate with development partners including the World Bank, the United Nations Development Programme, and GIZ, to enhance the DOE's capacity to promote perforated and hollow bricks, and develop a research and development program for alternative and low energy-intensive building materials. This TA component should eventually be integrated into the work plan of the proposed national brick center. The effectiveness of this TA component will be measured against the pace at which alternative brick materials are developed and adopted.

C. Cost and Financing

10. The TA is estimated to cost $750,000, all of which will be financed on a grant basis from the Multi-Donor Clean Energy Fund[17] under the Clean Energy Financing Partnership Facility, and administered by ADB. The government will provide counterpart support in the form of office accommodation, staff from ministries and departments to benefit from the consultants' capacity building, establishment of a designated web portal for information dissemination, organization of workshops and meetings, facilitation of policy and regulatory approvals, and other in-kind contributions. The cost estimates and financing plan are in Appendix 2.

D. Implementation Arrangements

11. The TA executing agency will be the MOEF. The MOF will also support the preparation and submission of the brick sector policy, strategy, and action plan. The implementing agency will be the DOE, which will carry out the day-to-day TA administration. In addition, the DOE will verify brick kiln technical design and monitor associated environmental benefits (e.g., reduction of CO_2 emissions and fine particulate pollution). Bangladesh Bank's Agricultural Credit and Financial Inclusion Department will be a part of the implementation arrangement to enhance its capacity in administering ADB-funded projects. The MOEF, Bangladesh Bank, and the DOE have committed to provide dedicated counterpart staff and resources. A project director will be selected by the MOEF to head the project management unit, which will be based in the DOE. The TA steering committee will comprise Bangladesh Bank, the DOE, the MOEF, and the Bank and Financial Institutions Division of Ministry of Finance. The TA will be implemented for 24 months during December 2012–December 2014.

12. ADB will be responsible for the recruitment of consultants. Four international consultants (36 person-months on an intermittent basis) and five national consultants (44 person-months on an intermittent basis) will be recruited through a firm. The consulting firm will be selected through a quality and cost-based selection method, based on a simplified technical proposal

[17] Contributors: the governments of Australia, Norway, Spain, and Sweden.

with a quality–cost ratio of 80:20. The consultants will be engaged by ADB in accordance with its Guidelines on the Use of Consultants (2010, as amended from time to time). Disbursements under the TA grant will be made in accordance with ADB's *Technical Assistance Disbursement Handbook* (2010, as amended from time to time). TA fund recipients will follow the specific Clean Energy Financing Partnership Facility implementation guidelines. Procurement of goods will follow ADB's Procurement Guidelines (2010, as amended from time to time), and any equipment purchased under this TA will be handed over to the MOEF at the closure of the TA.[18] The DOE and Bangladesh Bank are expected to provide in-kind support in the form of office accommodation, counterpart staff resources, internet web portal hosting, facilitation of stakeholder consultation, facilitation of the submissions and adoptions of vision documents, and any other support to best implement the TA.

13. The effectiveness of the expected outcome will be reflected in a decline in the number of polluting FCKs from 2013. The evaluation of the expected outputs and outcome will be disseminated through the web portals hosted by the DOE and Bangladesh Bank. The sustainability of the TA will be achieved through enhanced institutional capacity and the proposed national brick center for continued information and knowledge sharing.

IV. THE PRESIDENT'S DECISION

14. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of $750,000 to the Government of Bangladesh to be financed on a grant basis by the Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility for Supporting Brick Sector Development Program, and hereby reports this action to the Board.

[18] The equipment procured under the TA will include office equipment unable to be accommodated by the government counterpart agencies, and rentals of conference and workshop facilities during the course of TA implementation. Any single item costing over $1,000 needs to be justified and approved by the DOE. Personal computers are generally not included in the equipment.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Improved environmental conditions in Bangladesh	10% reduction in annual greenhouse gas emissions from the brick sector in 2018 (2010 baseline: 9.8 million tons CO_2[a]) 20% reduction in fine particulate pollution from the brick sector in 2018 (2010 baseline: Suspended particulate matter emission load: 17.1 kilograms per 10,000 bricks produced[a])	Second National Communications Report on Inventory of Greenhouse Gas Emissions, studies conducted by other development partners, including the United Nations Development Programme and the World Bank. Suspended particulate matter (e.g., US EPA method 17) for brick kilns	**Risk** Continued economic growth leads to rising consumption of carbon-based fuels
Outcome Expedited brick sector modernization	At least 15% annual decline in FCKs from 2013 to 2014 (2011 baseline: 4,490) At least 10 additional HHKs and tunnel kilns being constructed annually from 2013 to 2014. (2012 baseline: 0[b])	Survey and statistics from Bangladesh Brick Manufacturing Owners Association Government statistics, e.g., from the MOEF and/or the Ministry of Industries	**Assumption** The ADB credit facility (project loan) in the amount of $50 million is successfully implemented to construct more energy-efficient brick kilns **Risk** Inadequate regulatory enforcement to phase out the FCKs
Outputs 1. Government delivers a long-term brick sector policy, strategy, and action plan for adoption 2. Market awareness for energy-efficient brick kilns and provision of	Proposed brick sector policy, strategy, and action plan adopted by relevant bodies by December 2014 A signed memorandum of understanding for setting up a national brick center signed, with committed funding, by participating donors by December 2014 Disbursement of ADB loans of at least 20% and 30% during the first 2 years of implementation	For all indicators: Government statistics and government gazette publications, national and development partners' brick sector reports, and ADB TA review mission MOEF and DOE review reports, ADB TA review mission consultant report (from firsthand data	**Assumption** Continued improvement in market conditions to ensure business interest in the brick sector **Risk** Change of political priorities in addressing climate change and the submission and adoption of new legislation

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
business support to subborrowers improved		collection), and ADB project audit reports	
3. Effective ADB loan implementation	100% compliance with subloan environmental, social, gender, labor, and other safeguard measures during 2013–2014 DOE's establishment of a technical support desk and publication of brick kiln operation and trouble shooting manuals by December 2014 At least 30 subborrowers benefit from the training on operating new brickfields by December 2014 (2011 baseline: 0) An alternative livelihood scheme is developed by DOE by December 2014	For all indicators: ADB project loans and MOEF and DOE TA review reports, ADB TA review mission consultant report (from firsthand data collection), and ADB project audit reports	
4. Research and development in advanced building materials promoted	Government's adoption of perforated or hollow bricks as construction standards by December 2014 At least three alternative construction materials developed by DOE by December 2014	For all indicators: Brick sector and industry press releases	

Activities with Milestones	Inputs
1. Government delivers a long-term brick sector policy, strategy, and action plan for adoption 1.1 Provide training to the MOEF, DOE, and other officials on all aspects of brick sector development during January 2013–December 2013 1.2 Provide training to the MOEF, DOE, and other officials on how to formulate a brick sector policy, strategy, and action plan during June 2013–June 2014 1.3 Consult with development partners and develop a proposal to establish a national brick center and prepare a joint memorandum of understanding (continuous) 1.4 Help the government to submit the proposed policy, strategy, and action plan for adoption	Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility: $750,000 **Item** — **Amount** ($'000) Consultants: 500.00 International and local travel, and reports and communications: 45.00 Equipment: 20.00 Training and workshops: 100.00 Miscellaneous and contingency: 85.00

Activities with Milestones	Inputs
(July 2014 – December 2014) **2. Market awareness for energy-efficient brick kilns and provision of business support to subborrowers improved** 2.1 Organize awareness-raising workshops to promote more energy-efficient brick kilns (continuous) 2.2 Create information dissemination portal (June 2013–December 2014) 2.3. Provide business support to subborrowers (continuous) **3. Effective ADB loans implementation** 3.1 Conduct training for Bangladesh Bank and participating financial institutions on compliance with ADB environmental and social safeguards, gender action plan, core labor standards, procurement guidelines, and prohibited investment activities (continuous) 3.2 Provide technical backstopping and on-the-job training for energy-efficient brick kilns (continuous) 3.3 Provide training to DOE staff on verification of brick kiln design standards submitted from subborrowers to Bangladesh Bank (continuous) 3.4 Support the DOE's preparation of technical and troubleshooting manuals (continuous) 3.5 Provide training to the DOE on the design of a corresponding alternative livelihood strategy to help some unqualified FCK owners and workers gradually exit the brick sector (June 2013–December 2014) **4. Research and development in advanced building materials promoted** 4.1 Conduct training for the DOE on the development of advanced, cleaner building techniques to replace the energy-intensive bricks (continuous) 4.2 Help the DOE develop standards for perforated and hollow bricks (continuous) 4.3 Assist the DOE in developing at least 3 alternative construction materials other than bricks (June 2013–December 2014)	Consultants: 36 person-months (international) 44 person-months (national) Note: The government will provide counterpart support in the form of office accommodation, staff from ministries and departments to benefit from the consultants' capacity building, establishment of a designated web portal for information dissemination, organization of workshops and meetings, facilitation of policy and regulatory approvals, and other in-kind contributions.

ADB = Asian Development Bank, CO_2 = carbon dioxide, DOE = Department of Environment, FCK = fixed chimney kiln, HHK = hybrid Hoffman kiln, MOEF = Ministry of Environment and Forests, TA = technical assistance, USEPA = US Environmental Protection Agency.

[a] The World Bank Energy Sector Management Assistance Program South Asia. 2011. *Introducing Energy-Efficient Clean Technologies in the Brick Sector of Bangladesh*. Washington, DC.

[b] There is no formal stocktaking of the total number of HHKs and tunnel kilns in the country.

Source: Asian Development Bank.

COST ESTIMATES AND FINANCING PLAN
($'000)

Item	Total Cost
Multi-Donor Clean Energy Fund[a] under the Clean Energy Financing Partnership Facility	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	250.00
ii. National consultants	250.00
b. International and local travel	40.00
c. Reports and communications	5.00
2. Equipment[b]	20.00
3. Training, seminars, and conferences	
a. Facilitators	30.00
b. Training program	70.00
4. Miscellaneous administration and support costs	47.50
5. Contingencies	37.50
Total	**750.00**

Note: The technical assistance is estimated to cost $750,000 of which contributions from the Asian Development Bank are presented in the table above. The government will provide counterpart support in the form of office accommodation, staff from ministries and departments to benefit from the consultants' capacity building, establishment of a designated web portal for information dissemination, organization of workshops and meetings, facilitation of policy and regulatory approvals, and any other in-kind contributions. The value of government contributions is estimated to account for 15% of the total TA cost.

[a] Contributors: the governments of Australia, Norway, Spain, and Sweden. Administered by the Asian Development Bank.

[b] The equipment procured under the technical assistance will include office equipment unable to be accommodated by the government counterpart agencies, and equipment rentals for conferences and workshops during the technical assistance implementation. Any single item costing over $1,000 needs to be justified and approved by the Department of Environment. Personal computers are not included in the equipment. $10,000 will be available for equipment purchase to establish an emission monitoring laboratory and enforcement facility at the Department of Environment.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

Individual Consultants

1. Policy Advisor, Team Leader (1 international, 6 person-months, intermittent)

1. The consultant preferably has at least a master's degree and 20 years' work experience in developing industrial policy in an advanced economy, with sector-specific knowledge in brick or related sectors, such as construction materials. An in-depth knowledge of the South Asian economic and business context is essential. The expert will carry out, but not be limited to, the following tasks:

(i) Conduct a comprehensive review of Bangladesh's brick sector development, including, but not limited to, sector history, market size and composition, technology evolution, financing constraints, operational efficiency, environmental and social impact, development obstacles, and outlook.
(ii) Maintain constant dialogue with development partners on their work in the brick sector and realign Asian Development Bank work with them, if necessary.
(iii) Prepare case studies on international best practices in brick sector development in developed and developing economies.
(iv) Analyze the existing brick sector policy and regulatory environment and propose a long-term brick sector road map with the consideration of all technical, commercial, environmental, and social issues.[1]
(v) Based on the sector road map, provide 10 training sessions to dedicated government officials to prepare the brick sector policy, strategy, and action plan.
(vi) Support the government's preparation and submission of the brick sector policy, strategy, and action plan to relevant bodies for approval.
(vii) Monitor overall implementation of ADB's credit facility at Bangladesh Bank and advise the (loans) project management unit on such issues as reviewing market conditions and adjusting relending terms to ensure smooth disbursement and compliance with the participation agreement.
(viii) Undertake discussions with development partners on the possible establishment of a Bangladesh national brick technical and information center as a one-stop-shop to meet all the brick sector's development needs, develop a corresponding national brick center proposal, and sign a memorandum of understanding.
(ix) Facilitate the consultation on the government's brick sector policy, strategy, and action plan, and submission of these for approval by the relevant bodies.
(x) Produce a final report by December 2014 on the work progress.
(xi) Provide any other support as needed to achieve the technical assistance objectives.

2. Brick Kiln Technical Specialists (2 international, 12 person-months each, intermittent)

2. The consultants preferably have at least 15 years of experience in operating advanced brick kiln facilities in other countries, including improved zigzag kilns, vertical shaft brick kilns (VSBKs), hybrid Hoffman kilns (HHKs), and tunnel kilns. They also need to be experienced fire masters.[2] The consultants will serve as the technical focal points of the TA. They will carry out, but not be limited to, the following tasks:

[1] Including strategic decisions such as the phasing out of the extraction of fertile topsoil.
[2] In the event that the technicians are recruited from non-English-speaking countries, the consulting firm should factor in the translators' cost within the total allocated budget.

(i) Establish a brick technical support desk based at the Department of Environment (DOE) with a constant staffing presence to provide both remote technical consultation and onsite support.
(ii) Consolidate technical support requests and prioritize them in the order of tunnel kiln, HHK, VSBK, and improved zigzag kiln; give preference to applicants who have successfully applied for ADB credit line (project loan) funds.[3]
(iii) Coordinate with development partners and realign the work if necessary.[4]
(iv) Provide onsite technical backstopping through on-the-job training or twinning arrangement for at least 30 brickfields that require capacity development on kiln operations.
(v) Produce a clay preparation manual, operations manuals and management guidebooks for energy-efficient kilns (tunnel kiln, HHK, and VSBK), including a troubleshooting manual (all documents should be translated to Bangla).
(vi) Provide at least five technical training sessions to the DOE on technical and operational aspects of the improved zigzag kiln, VSBK, HHK, and tunnel kiln and work with the World Bank team to publish the design standards on the DOE and Bangladesh Bank internet web portal.
(vii) Work with World Bank counterparts on the development and publication of the standard brick kiln designs.
(viii) Provide on-the-job training to designated DOE staff on verification of proposed brick kiln design standards by the subborrowers in accordance with the published design standards to facilitate the approval of the subloan applications from the ADB credit facility (project loan) or, in the absence of such standards, in accordance with design standards, specifications, and construction methods that reflect international best practices.
(ix) Support the consultant team leader on any technical aspects of their work.
(x) Produce a final report by December 2014 on the work progress.
(xi) Provide any other training sessions on advanced brick kiln operations to the more energy-efficient brick kiln design, construction, installation, testing, and other support throughout the TA implementation period.

3. Business Development Specialists (2 national, 12 person-months each, intermittent)

3. The consultants preferably have a university degree and at least 15 years' commercial experience, preferably in banking and finance, with significant exposure to advanced brick kiln technologies such as hybrid Hoffman kiln and tunnel kiln. The consultants preferably have strong marketing skills to host conferences and other awareness workshops to promote the more energy-efficient brick kiln technologies. The consultants should also provide business development support to potential brickfield owners who apply for market funding. The expert will carry out, but not be limited to, the following tasks:

(i) Coordinate with the rest of the consultant team on preparing presentation materials, including all environmental, technical, and commercial benefits of the energy-efficient brick kilns.
(ii) Coordinate with development partners and realign ADB work, if necessary.

[3] Onsite support should be provided in the most effective manner: to train the designate employees to operate the energy-efficient brick kilns, not to replace existing capacities. The consultants need to consult with ADB and the project management unit on the prioritization of service request list.
[4] The consultants should coordinate with the World Bank, which provides two TA programs to support the piloting of seven improved zigzag kilns and seven VSBKs, including design, construction, and operation.

(iii) Organize at least one workshop per month, by bringing together government agencies, commercial banks, brick kiln equipment suppliers, potential investors, and development partners to promote the more energy-efficient kilns.
(iv) Provide business consulting services (e.g., preparation of business plans, financial analysis, and loan proposals) and training to requesting subborrowers.
(v) Support the team leader in monitoring ADB loan implementation at Bangladesh Bank and adjust the pace and contents of the awareness raising process accordingly.
(vi) Support both the DOE and Bangladesh Bank in the development of their internet portals to disseminate brick sector development information for launch by the end of December 2014.
(vii) Support the team leader in the consultation with development partners on the establishment of a joint-donor funded national brick center.
(viii) Produce a final report by December 2014 on the work progress.
(ix) Provide any other support as needed to achieve the TA objectives.

4. Social Sector Specialist (1 national, 10 person-months, intermittent)

4. The consultant preferably has at least a university degree and 15 years of work experience in implementing donor-funded projects in Bangladesh, and could independently formulate social policies. The consultant will be stationed at the Bangladesh Bank Agricultural Credit and Financial Inclusion Department, and will carry out, but not be limited to, the following tasks:

(i) Familiarize themselves with the ADB loans' environment and social management system (ESMS), gender action plan, summary poverty reduction and social strategy, core labor standards, overall ADB project and loans agreements, and more broadly the Asian Development Bank's Safeguard Policy Statement (2009).
(ii) Support Bangladesh Bank in conducting quarterly reviews of participating financial intermediaries (PFIs) and subborrowers on their compliance with the required ESMS, gender action plan (GAP), summary poverty reduction and social strategy (SPRSS), core labor standards, and ADB loans and project agreements; build their capacities to prepare environmental and social safeguard compliance reports, including indigenous people and involuntary resettlement screening and categorization in line with ADB guideline and ESMS.
(iii) Build capacities at Bangladesh Bank and PFIs to identify and mitigate any other major social risks associated with the ADB project, by training staff to prepare mitigation plans or other measures during the ADB loan implementation phases.
(iv) Provide consolidated training on poverty and social impact assessments in accordance with ADB's Poverty Handbook and Handbook on Social Analysis[5], and conduct consultation and workshops on project benefits for vulnerable groups.
(v) Identify potential alternative livelihood opportunities for affected fixed chimney kiln owners and workers, and provide an alternative livelihood training program for affected groups, including female workers.
(vi) Build capacity at the DOE, by working with Ministry of Social Welfare, Ministry of Health and Family Welfare, and/or Ministry of Labour and Employment if appropriate, to design and produce an alternative livelihood scheme by

[5] ADB. 2006. The *Poverty Handbook - Analysis and Processes to Support ADB Operations: A Working Document*. Manila; and ADB. 2007. *Handbook on Social Analysis: A Working Document*. Manila.

December 2014 to help affected fixed chimney kiln owners and workers gradually exit the brick sector.

(vii) Provide other support, such as the integration of social and gender features in the policy, strategy, and action plan and the preparation of a social training module.

(viii) Produce a final report by December 2014 on the work progress.

(ix) Provide any other support as needed to achieve the TA objectives.

5. Environmental Specialist (1 national, 6 person-months, intermittent)

5. The consultant preferably has at least a university degree and 15 years of work experience in implementing donor-funded projects in Bangladesh. The consultant should be familiar with ADB environmental policy and operational guidelines and also have the technical background to conduct environmental assessment. The expert will carry out, but not be limited to, the following tasks:

(i) Provide training to the DOE and Bangladesh Bank on conducting environmental assessments required for financial intermediary loans.

(ii) Help review Bangladesh Bank's lending portfolio and determine the types of subborrowers in need of further environmental audit.

(iii) Train DOE and Bangladesh Bank staff in the evaluation of its internal environment management system, and environmental assessment and review procedures in accordance with ADB's Safeguard Policy Statement, and produce and/or improve internal manuals.

(iv) Train DOE and Bangladesh Bank staff in the conduct of regular reviews on PFIs' compliance with the required ESMS, ADB loans, and project agreements, including environment screening and categorization in line with the ESMS and ADB guidelines, and finally the reporting of environment.

(v) Build capacities at the DOE, Bangladesh Bank, and PFIs to identify and minimize any environmental safeguard risks associated with the ADB project, including the preparation of appropriate mitigation plans, and to prepare review reports.

(vi) Provide on-the-job training for DOE counterparts on measuring project benefits, such as reduction in CO_2 emissions and fine particulate pollution.

(vii) Support the team leader to better formulate the brick sector road map by providing specialized environmental safeguard-related technical backstopping.

(viii) Produce a final report by December 2014 on the work progress.

(ix) Provide any other support as needed to achieve the TA objectives.

6. Procurement Specialist (1 national, 4 person-months, intermittent)

6. The consultant preferably has at least a university degree and 15 years of work experience in project administration and procurement, and strong working knowledge of Bangladesh's private sector and commercial procurement practices. The expert will carry out, but not be limited to, the following tasks:

(i) Review established private sector or commercial procurement practices in Bangladesh, with a focus on general practice related to financial intermediaries.

(ii) Conduct annual procurement audits on selected PFIs and subborrowers against ADB project and facility agreements and ADB's Procurement Guidelines (2010, as amended from time to time).

(iii) Prepare a procurement manual based on international best practices, established in the local context where possible, to satisfy ADB that procurement procedures to be applied to subborrowers are appropriate, including but not

limited to reasonable prices being paid, procurement from eligible source countries, and fair canvassing when selecting suppliers.

(iv) Explain ADB's Anticorruption Policy (1998, as amended to date) to Bangladesh Bank, PFIs, and subborrowers to ensure compliance.

(v) Assist Bangladesh Bank to (a) monitor project procurement practices among PFIs and subborrowers against ADB procurement procedures, (b) review PFIs' procurement reports, and (c) disqualify any PFI that does not comply with the procedures approved by ADB.

(vi) Produce a final report by December 2014 on the work progress.

7. Advanced Building Material Specialist (1 international, 6 person-months, intermittent)

7. The consultant preferably has a university degree and at least 15 years of experience in a world-leading construction material firm or research center. The consultant should have worked in developing advanced alternative building materials including perforated and hollow bricks, hollow blocks, and other innovative eco materials or energy saving technologies. The consultant should have a strong research capacity to independently develop alternative building materials. The consultant will carry out, but not be limited to, the following tasks:

(i) Provide capacity building to the Ministry of Environment and Forests (MOEF) and the DOE on international best practice in developing innovative, low energy-intensive alternative building materials to support the development of Bangladesh's construction and brick sectors.

(ii) Deliver a comprehensive report to the MOEF and DOE on the potential use of nonconventional brick techniques, including compressed bricks made from fly ash and solid wastes, and the use of alternative energy sources, such as fuels from wastes, methane gas from landfills and sawdust from furniture manufacturers, by December 2013.

(iii) Conduct consultations with local stakeholders, particularly local and international academics and research institutes, on the possibility of utilizing river basin sediments or other cheaply available materials to manufacture bricks, by July 2013.

(iv) Coordinate with German development cooperation through GIZ and other development partners on the development of perforated and hollow bricks, and realign the work, if necessary.

(v) Prepare an alternative wall material handbook by adopting more energy-efficient technologies, disseminate the report throughout Bangladesh, and submit it to the DOE for acceptance and adoption by December 2014.

(vi) Support the team leader in formulating a comprehensive brick sector road map by factoring in the cleaner brick manufacturing options and by mapping out the long-term sector development strategy.

(vii) Help MOEF and DOE staff conduct consultations with relevant institutions including interested brickfields and entrepreneurs, the Bangladesh Brick Manufacturing Owners Association, and other local entities in order to develop a long-term alternative brick material program.

(viii) Support the team leader in incorporating the alternative brick material initiative into the proposed joint-donor funded national brick center.

(ix) Produce a final report by December 2014 on the work's progress.

(x) Provide any other support as needed to achieve the TA objectives.