CLEAN DEVELOPMENT MECHANISM ASSESSMENT REPORT

A. Executive Summary

1. The National Grid Improvement Project will involve high voltage direct current (HVDC) interregional transmission system between western and northern regions OF India. The HVDC transmission lines will lower transmission losses as compared to existing low voltage alternating current transmission lines. Conservation of electricity will help avoidance of grid electricity and will contribute to carbon dioxide (CO_2) emission reduction.

2. The project will be planned and implemented by the Power Grid Corporation of India (POWERGRID). It is in line with the Asian Development Bank's (ADB) overarching goal of poverty reduction through sustainable economic development. Besides the main objective, the HVDC transmission system between the western and northern regions will help mitigate adverse effects of climate change by avoiding greenhouse gas (GHG) emissions with the use of high efficiency transmission line to reduce transmission losses. The project will thus meet the objective of United Nations Framework Convention on Climate Change (UNFCCC) and would be eligible to gain carbon credits under its Clean Development Mechanism (CDM) of the Kyoto Protocol if the project is registered with the CDM Executive Board. This report assesses various aspects of the project's CDM potential and process to be considered for CDM. If the project is successfully registered and implemented as planned, it would generate about 536,000[1] certified emission reductions (CER) annually. This would generate revenue of around $5 million[2] with an assumed CER price of $10 per CER.[3] ADB considers providing the project with the Asia Pacific Carbon Fund (APCF) and Future Carbon Fund (FCF) which could purchase carbon credits from projects financed by ADB up to and beyond 2012 respectively.

B. Clean Development Mechanism Framework

3. The Kyoto Protocol, which was signed in 1997 under the UNFCCC, specifies a GHG emissions cap for 38 industrialized countries. The Kyoto Protocol also provided the market based mechanism of CDM as one of the means to assist the industrialized nations to meet their commitments. CDM allows entities in the industrialized nations to support GHG mitigation projects in developing countries and purchase the GHG credits generated by these projects. Projects involving use of clean energy sources are eligible for consideration under CDM.

4. Being Kyoto Protocol signatories, majority of ADB's developing member countries (DMCs) are eligible to host CDM projects. Thus, almost all the DMCs of ADB can take advantage of potential CDM benefits from eligible projects. The proposed project is in India, one of the Kyoto Protocol ratified country, eligible for CDM benefits.

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[1] Certified Emission Reduction (CER) estimation is approximate based on preliminary analysis and applicable UNFCCC guidelines. There has been no approved CDM methodology available for this type of project activity. The estimation reductions are based on the proposed new methodology of an Indian project promoter applying a similar project for CDM. If it is approved, this methodology may be used for the POWERGRID's project and if the applicant's version does not fits to the project, then a new methodology may be required to submit to UNFCCC.

[2] The current market for CERs is up to the end of first commitment period ending 2012. The negotiations for the second Kyoto Protocol commitment period are in progress at present. Should there be an agreement on the modalities the CER post 2012 may fetch a higher price (e.g. current price of pre 2012 CERs is around 8-9 Euro).

[3] As the carbon market is dynamically changing like any other commodity markets, the price mentioned above is only indicative, based on recent trends. However, no guarantee can be given with regard to the revenues from carbon offsets.

5. The projects involving use of clean energy sources like wind, biomass, hydropower, solar energy, cleaner fossil fuels like natural gas, urban infrastructure projects involving solid waste treatment through technologies like composting, anaerobic digestion, sanitary landfill with landfill gas recovery, wastewater treatment with biogas recovery and use, urban energy efficiency improvement projects, coal mine methane recovery/use are eligible for consideration under CDM.

C. ADB Mission

6. ADB's mission is reducing poverty in the Asia and Pacific and a key to achieve this mission is through financing infrastructure and other projects in ADB's developing member countries. CDM promotes sustainable development in developing countries. CDM rules require certification from the host country governments that the projects are voluntary initiatives that help them in achieving sustainable development.

7. ADB is managing funds from several European governments to purchase carbon credits. The APCF and FCF purchase and pay upfront for carbon credits from projects assisted by ADB, and so addresses the investment barrier in countries with limited recourse to market based finance. The project will help to deliver power generated from 14 independent power producers (IPP) in Chhattisgarh to the main load centers in the northern region of India.[4]

D. Project Description

8. GHG mitigation activities in the National Grid Improvement Project comprise energy efficiency improvement via implementation of about 1,300 kilometer a 800-kV HVDC interregional transmission system between the western and northern regions (states of Haryana and Chhattisgarh).

9. To implement the project, POWERGRID plans to invest the following investment components:

(i) HVDC interregional transmission system (about 1,365 km) between the western and northern regions (states of Haryana and Chhattisgarh):
   (a) a ±800 kV (3,000MW) bipole (about 1,365 km) HVDC transmission system between existing pooling station at Champa (western region) and new substation at Kurukshetra (northern region); and
   (b) establishment of ±800kV (3,000MW) bipole terminal for each pooling station at Champa (western region) and Kurukshetra (northern region) with provision to upgrade the terminals to 6,000MW.

(ii) Transmission strengthening in the northern region (states of Haryana and Punjab):
   (a) establishment of the 440/220kV, 2X500MVA substation at Kurukshetra (Haryana);
   (b) 400kV D/C (Quad) one circuit between the Kurukshetra substation and the existing Jallandhar substation (via the existing 440/220kV Nakodar substation); and
   (c) loop-in loop-out (LILO) Abdullapur to Sonepat 400kV D/C (triple) at the Kurukshetra substation.

[4] HVDC transmission technology will improve efficiency and reduce transmission loss when compared with existing interregional alternating current transmission system. Out of over 15,000 MW to be generated by the IPPs in total, the new HVDC system is to deliver 3,000 MW initially and will be increased to 6,000 MW by adding upgraded terminals later. The rest of power generated from IPPs will be supplied within the western region.

E. CDM Rationale

10. **Basic assumption.** Anthropogenic GHG emissions in the baseline scenario are sourced from excess transmission losses in the inefficient transmission line. The HVDC transmission system will provide an efficient power transmission between the western and northern regions and effect significant savings on power losses during transmission. This will also result in commensurate abatement of GHG emissions as compared to those in an alternative conventional alternating current transmission system that would be installed in the absence of the project activity.

11. **Additionality**. A CDM project is expected to result in real measurable emission reductions that are additional to any that may occur in its absence. In other words, the project participants have to demonstrate that a baseline scenario would have occurred in the absence of the project with CDM benefits. This needs to be done by applying a tool for demonstration and assessment of additionality that has been approved by the CDM Executive Board. The tool provides two alternate approaches: investment analysis and barrier analysis. The National Grid Improvement Project will be demonstrating additionality by means of investment analysis.

12. **Demonstrating serious consideration of CDM at investment stage**. The project participants are expected to have considered CDM seriously while taking the investment decisions on the project. This must be demonstrated with documentary evidence. Projects with starting dates[5] after 2 August 2008 must inform the designated national authority and/or UNFCCC Secretariat within six months of the project starting date, with precise geographical location of the project. For project activities that started before 2 August 2008, the project documentation must indicate awareness of the CDM prior to the project activity start date, and must show that the anticipated benefits of CDM were a decisive factor in the decision to proceed with the project. Evidence to support this would include, inter alia, minutes and/or notes related to the consideration of the decision by the Board of Directors, or equivalent, of the project participant, to undertake the project as a CDM project activity.

13. **Starting date vis-a-vis project implementation**. Under the recently elaborated rules in case, the starting date should be prior to beginning of validation of the project, the project participants have to provide documentary evidence to show that they were aware of CDM and seriously considered CDM registration necessary for implementing the project. The starting date of the National Grid Improvement Project is based on the financial closure date. The timeline of the processing of project is as indicated in the Table below.

Event	Date
Concept Clearance	March 2011
Due Diligence	April-May 2011
Credit Committee	June 2011
Board Consideration	September 2011
Loan Documentation	September-October 2011
Financial Closure / Loan Signing	March 2012

14. **Methodology for estimating baseline of project emissions and leakage.** CDM projects are expected to establish a baseline scenario, which would have prevailed had the CDM project not been undertaken. To do this, the CDM Executive Board has approved several

[5] As per the CDM Glossary of terms, a starting date is defined as earliest date at which either the implementation or construction or real action of a project activity begins. It is the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity. This, for example, can be the date on which contracts have been signed for equipment or construction/operation services required for the project activity. [Paragraph 67, EB 41 report].

methodologies from which the project participants have to select the most appropriate one for the scope of the proposed project. In case there is none that is directly applicable to the project, the project participants may propose either a new methodology or request the revision of an existing approved methodology which with some modifications could be applied to the scope of the proposed project. The National Grid Improvement Project falls under the sectoral scope "*02: Energy distribution*" but there is no approved large scale methodology which addresses the scope of the proposed project. However, a new methodology "*NM334: Installation of high efficient technology for power transmission*" is under the advance stage of finalization and which can be applied to the project, if approved by UNFCCC.

15. **Potential/estimate of emission reductions from project**. Based on the application of the above mentioned methodology, the National Grid Improvement Project is likely to result emission reductions of 536,000 tons of CO_2 emission each year.

16. Operational and monitoring arrangements for CDM. CDM is a performance based mechanism, which means that CERs will only be issued which are properly monitored, verified and certified by an independent agency called designated operational entity (DOE). The project will have to establish an operation and monitoring plan, as required by the applied approved methodology. This operation and monitoring plan will be defined in the project design document (PDD), which will need to be validated by the DOE.

F. Support from ADB

17. ADB has taken several initiatives to mainstream climate change considerations into its funding. The current CDM support program of ADB is administered through the Carbon Market Initiative (CMI), managed by the Sustainable Infrastructure Division of the Regional and Sustainable Development Department. CMI has three components:

(i) upfront carbon financing through the APCF and the FCF;
(ii) CDM related technical support through the Technical Support Facility (TSF); and
(iii) marketing support for residual carbon credits through the Credit Marketing Facility (CMF).

18. The APCF is a fund established and managed by ADB that co-finances CDM projects in its DMCs by securing a portion of the expected future CERs from CDM-eligible projects (that are generated up to 31 December 2012) in exchange for upfront finance. The FCF can similarly provide upfront finance by purchasing credits that will be generated during the period 2013–20. The TSF provides comprehensive technical support to project sponsors to develop CDM-eligible projects, thus contributing to a continuous pipeline of "viable" clean energy projects that may be considered for ADB financing and upfront funds from the APCF. The CMF provides marketing support services to project sponsors in obtaining optimal prices and sale terms for CERs in the open market. The CMI assistance covers the following:

(i) PDD preparation;
(ii) assistance in validation/registration;
(iii) purchase of part of CERs by APCF/FCF and upfront funding;
(iv) assistance in marketing of balance CERs; and
(v) capacity building.

19. ADB CMI shall support the National Grid Improvement Project through its national expert in India as well as through CDM experts based at ADB headquarters.

G. Potential Transaction Costs and Revenue Relating to CDM Registration

20. The CDM development has transaction costs at various stages from PDD preparation which may require consultancy services. In some countries, the DNAs charge fees for according host country's approval. In India, no fees are charged by the DNA. For validation of the project, the third party of DOE will charge fees, which vary according to the complexities in the project. Depending on quantum of CERs generated by a CDM project annually, registration fees will have to be paid to the UNFCCC Secretariat.

21. Once the project is implemented, the project participants will have to monitor the parameters as required by the CDM methodology that is being utilized. The monitoring cost will depend on the required level of instrumentation and the level of skill of the people undertaking the monitoring. The project could internalize the cost of monitoring or hiring an independent agency for monitoring of the project. For verification/certification, the project operation and the monitoring report prepared by the project entity will be verified by either the same DOE who validated the project (for small scale CDM projects) or by another DOE (for normal scale CDM project) before being certified. The DOE will charge fees for each verification.

22. Revenues: the implementing agency (or the project participant) will generally enter into a CER purchase agreements (CERPA) with a buyer at an appropriate stage of processing. The price of CERs contracted will normally be stated in the CERPA or could be set by spot market CER prices. In case of the proposed National Grid Improvement Project, the implementing agency can enter into CERPA where FCF can be considered.

H. Timeline and Responsibilities

TSF will help carry out the detailed CDM assessment of the project activities. Based on the request from POWERGRID, TSF can consider providing support for preparation of project CDM documents required for project registration with UNFCCC for CDM benefits.

23. It may take around 10 to 16 months to complete a process of large scale project's CDM methodology development and its approval by the UNFCCC Executive Board. Furthermore, even after methodology approval, it may take around another 8 to 10 months to register the project with use of new approved methodology. Therefore, the project may require 18 to 26 months for new large scale CDM methodology development and registration. But if the new methodology is approved, it can reduce the entire timeline of the registration to around 8-12 months.

24. It should be noted that the project implementation will not be affected by these CDM activities, which can go on parallel with project implementation schedule. It is expected that the project activities of installation of the HVDC transmission system will be completed and commissioned by 2017. To generate CER could start after commissioning and start of electricity transmission through the system under the project registered by CDM.