The World Bank
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April 17, 2007

DNV, Oslo
Mr. Lehmann
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Dear Mr. Lehmann

Clarification request for "Allain Duhangan Hydroelectric Project (ADHP)" by A.D. Hydro Power Ltd. (ADPL) (reference no 0862)

With reference to the request for review raised by Executive Board members for the project "Allain Duhangan Hydroelectric Project (ADHP)" by AD Hydro Power Ltd. (ADPL); (Reference No 0862). Please find enclosed our clarifications on the comments raised for your consideration and provision to the Executive Board. These documents include the PDD, excel spreadsheet containing ER calculations and reservoir data.

Mr. Chris Warner is the contact person from project participant side for the review process. His contact details in Washington DC are 202 458 1735; mobile 202 3758974. E-mail is cwarner @worldbank.org.

Should you require further information please do not hesitate to contact me

Yours sincerely,

Chris Warner
Senior Technical Specialist

Bank Response to questions relating to AD Hydro from the EB: April 2007

1. OM question

"The calculation of the OM is not clear. Import of power from Western and Eastern grids are given in the excel sheet along with the grid emission factors. However the PDD on page 8 states that for electricity imports Ci,j,imports from **other connected electricity systems** has been considered as "0" tCO2/MWh as a conservative approach. Since the Western and Eastern grid also are to be considered "other connected electricity systems" this is confusing. **Excel sheets don't show how imported electricity at "0" tCO2/MWh is taken into the calculations.**

If import is not included (as it seems from excel calculations) in current generation, then after including these imports the OM-EF would go down to from 0,750 to 0,696 tCO2/MWh for the year 2004-05. This needs further clarification."

Response:
As per the methodology ACM0002, with reference to the project activity, **Project Electricity System** is Northern Region Grid in India, where the project activity is located and **Connected Electricity System** include other regional grids exchanging power with Northern Region grid, which are Western and Eastern Region grids in this case.

As per the methodology, For the purpose of determining the Operating Margin (OM) emission factor, as described below, use one of the following options to determine the CO2 emission factor(s) for net electricity imports (COEFi,j,imports) from a connected electricity system within the same host country(ies):

(a) 0 tCO2/MWh, or
(b) the emission factor(s) of the specific power plant(s) from which electricity is imported, if and only if the specific plants are clearly known, or
(c) the average emission rate of the exporting grid, if and only if net imports do not exceed 20% of total generation in the project electricity system, or
(d) the emission factor of the exporting grid, determined as described in steps 1,2 and 3 below, if net imports exceed 20% of the total generation in the project electricity system.

Case 1: Considering no power import and no associated emissions (existing case)

As the Western and Eastern region grids are more emission intensive (Central Electricity Authority Data; Western Grid = 0.89 tCO2e/ MWh and Eastern region grid = 1.04 tCO2/MWh; Source: *http://www.cea.nic.in/planning/c%20and%20e/user%20guide%20ver1.1.pdf)* compared to Northern Region grid, inclusion of imports in northern region grid will effect an increase in emissions for power generation in Northern Region grid. For conservative estimates, imports from the two grids were not taken (power imports as well as associated emissions) into account earlier.

Year	OM value

OM 2002-03	0.970
OM 2003-04	0.972
OM 2004-05	0.972
Simple OM	**0.971**

Unit: tCO2/ MWh

Case 2: Considering power import and associated emissions (available to PP as 'option c' above as net import are less than 20% of the total electricity generation in project activity)

Northern Region grid drew power from Western and Eastern grids in the years 2002-03, 2003-04, 2004-05. Power imports and emission factors in respective years are tabled as below –

Power Imports:

Year	Western Grid	Eastern Grid
2002-03	140.78	1520.02
2003-04	282.02	2616.78
2004-05	1495.78	3581.79

Unit: GWh

Relevant Average Emission Factors:

Year	Western Grid	Eastern Grid
2002-03	0.910	1.19
2003-04	0.910	1.18
2004-05	0.920	1.05

Unit: tCO2/MWh

Year	OM value
OM 2002-03	0.973
OM 2003-04	0.977
OM 2004-05	0.974
Simple OM	**0.974**

Unit: tCO2/ MWh

Case 3: Considering only power import and no associated emissions (proposed in revised PDD)

If only power imports are considered with no associated emissions, then the new OM values for 2002-03, 2003-04 & 2004-05 are 0.955, 0.947 & 0.931 respectively. Based on these values, Simple OM comes out to be 0.945.

Year	OM value
OM 2002-03	0.955
OM 2003-04	0.947
OM 2004-05	0.931
Simple OM	**0.945**

Unit: tCO2/ MWh

*Among the 3 cases above, now **Case 3** has been selected for the estimation of combined margin in the Northern Region grid.*

BM value is not affected by import of power from other grids as spatial extent is limited to only project electricity system.

Hence, the new value of **Combined Margin (CM) is 0.737tCO2/MWh** and PDD is revised (version 1.4) based for corrected value of CM.

This may be noted that 0.750 as suggested above in query raised during request for review is not the value of OM but that of CM.

2. Reservoir information

"Furthermore information on the hydro reservoirs and its capacity are missing in the PDD."

Response:
Main characteristic of reservoir of the project ie power density was provided in response to queries raised by DOE during validation (refer CL1 of Validation report). The power density of the project activity is 6508 W/m2. The calculation sheet along with the digital raster graphic (DRG) for the storage area of water in the allain barrage and intermediate reservoir had been verified by DOE (refer validation report).

The power density and following additional details have now been also included in revised PDD (section A.2 and Annex-5)

3. IPPC default values

"Finally it is not clear why in table 1.2 of the PDD the IPPC default value for the Fuel emission factor is used, since this is not the preferred option."

Response:
IPCC default values for emission factor for fuels have been considered as authentic plant/ country specific values for fuel emission factors in India are not available. As per ACM0002, in case on unavailability of this data, IPCC default values could be used. Unavailability of authentic plant/ country specific values for fuel emission factors is also evident from the fact that Central Electricity Authority (CEA) in India has also used IPCC default values for recently conducted estimation of grid emission factor for regional grids in India (http://www.cea.nic.in/planning/c%20and%20e/user%20guide%20ver1.1.pdf).

A footnote regarding unavailability of data and use of IPCC default has been included now in revised PDD (section B.2).