






### Validation opinion

**Combined notification / request for approval of changes from the project activity as described in the registered project design document and request for revision of the monitoring plan**

Title of project activity:			
13 MW Grid Connected Dandela Mini Hydel Scheme, Karnataka State, India.			
CDM reference number:		DNV project No.:	
3568		PRJC-329105-2011-CCS-IND	
Type of request of changes from the project activity as described in the registered PDD::	<input checked="" type="checkbox"/> Notification of changes from project activity as described in the registered PDD (i.e. changes do <u>not</u> raise any concerns with regard to i) additionality, ii) the scale of CDM project activity and/or iii) the applicability and application of baseline methodology <input type="checkbox"/> Request for approval of changes from project activity as described in the registered PDD		
Type of revision for revision of monitoring plan:	<input type="checkbox"/> Proposed revision only includes the request by the CDM EB <input type="checkbox"/> Proposed revision includes not only the request by the CDM EB but also additional revisions proposed by the PP/DOE <input checked="" type="checkbox"/> Proposed revision includes revisions proposed by the PP/DOE		
Date	Work carried out by:	Work verified by:	Approved by:
23 November 2011	Ravi Kumar Prabhu 	G. Murali 	Ole A. Flagstad 

## 1 Description of the changes as compared to the description in the registered PDD and description of the changes to the monitoring plan

### *Description of the changes as compared to the description in the registered PDD:*

The project activity entails installation of 13 MW mini hydel project to produce clean electrical energy in a sustainable manner, under the Clean Development Mechanism of the Kyoto Protocol. The power project utilises water discharge of Dandela falls in Netravathi River, Dakshina Kannada District, Karnataka state, India. The project was commissioned on 19 July 2009 and was synchronized with Karnataka State Electricity Grid, which is a part of the southern grid of India.

This notification of change is with respect to,

- The marginal difference in the name plate capacity of the turbines installed, 13.05 MW (3x4.35 MW) compared to the capacity of 13 MW (3x4.33 MW) stated in the registered PDD.

- b) The marginal difference in the design water flow to the turbines installed, 104.55 m<sup>3</sup>/sec against 105 m<sup>3</sup>/sec stated in the registered PDD.

***Description of the changes to the monitoring plan:***

A revision of the monitoring plan has been proposed to a) include the parameters  $EG_{\text{export}, y}$  - Electricity exported (to grid) by the project activity during the year y, b) editorial changes in parameters  $EG_{\text{gross}, y}$  - Total electricity generated by the project during the year y and  $EG_{\text{Auxiliary}}$  - Auxiliary electricity consumption of the project during the year y and c) to provide clarity with respect to the monitoring of the parameters (under section 7.1) and description of monitoring plan (under section 7.2) of the registered PDD.

The registered PDD included the monitoring of the following parameters:

- $EG_y$ - Net electricity supplied to the grid by the project during the year y,
- $EG_{\text{import}, y}$  - Electricity imported (from the grid) by the project activity during the year y,
- $EG_{\text{gross}, y}$  – Total electricity generated by the project during the year y,
- $EG_{\text{Auxiliary}}$  - Auxiliary electricity consumption of the project during the year y and
- $Fi, y$  - Quantity of fossil fuel type i combusted in the project plant during year y.

The registered PDD does not clearly state which are the parameters used for calculation of net electric supplied to the grid  $EG_y$  used for emission reduction calculations and the formula used for its calculation. In actual practice the net electricity export to the grid is calculated as a difference of the electricity export and import, measured by the main and check meters located at the grid interconnection point and recorded through the monthly joint meter reading (JMR). Hence it is proposed to include the parameter  $EG_{\text{export}, y}$  - Electricity exported (to grid) by the project activity during the year y” in the monitoring plan, which was not included in monitoring plan earlier. The gross and auxiliary meters are used by the project participants for internal use and comparison of the net electricity exported, reported in JMR. The use of parameters  $EG_{\text{gross}, y}$  and  $EG_{\text{Auxiliary}}$  and its QA/QC plan is also defined in the revised monitoring plan.

***Proposed revision in Monitoring Plan (MP) :***

a) Inclusion of Electricity exported (to grid) by the project activity during the year y,  $EG_{\text{export}}$ : The electricity exported by the project activity to the grid,  $EG_{\text{export}}$  was not included in the monitoring plan of the registered PDD. In actual practice it was noticed that the state utility calculates the net electricity supplied to the grid by deducting measured electricity import (from the grid)  $EG_{\text{import}}$  from the electricity export (to the grid)  $EG_{\text{export}}$  recorded by the meters located at the grid interconnection point. Thus monitoring of  $EG_{\text{export}}$  needs to be included in the monitoring plan to reflect the actual practice in vogue in the state of Karnataka. The  $EG_{\text{export}}$  is monitored by the two way dedicated main and check meters of accuracy 0.2% provided at the grid interconnection point and the meter readings are recorded monthly in Joint Meter Reading (JMR) by PP and state utility.

b) Editorial changes to  $EG_{\text{gross}, y}$  - Total electricity generated by the project during the year y: The total electricity generated by the project activity during the year,  $EG_{\text{gross}, y}$  was included in the monitoring plan of the registered PDD. In actual practice it was noticed that only one meter of accuracy class 0.5 was installed for  $EG_{\text{gross}, y}$  against the main and check meters of accuracy class 0.2 stated in registered PDD.  $EG_{\text{gross}, y}$  will be used for monitoring the total electricity generated for internal purposes and not for calculation of net electricity exported. The calibration frequency of once in 3 years is also specified in revised monitoring plan.

These changes have been made in the revised monitoring plan to reflect the actual practice at site.

c) Editorial changes in  $EG_{\text{Auxiliary}}$  - Auxiliary electricity consumption of the project during the year y:

The auxiliary electricity consumption of the project activity during the year y,  $EG_{\text{auxiliary}}$  was included in the monitoring plan of the registered PDD. In actual practice it was noticed that only one the meter of accuracy class 0.5 was installed for  $EG_{\text{Auxiliary},y}$  against the main and check meters of accuracy class 0.2 stated in registered PDD.  $EG_{\text{Auxiliary}}$  will be used for monitoring the auxiliary consumption for internal purposes and not for calculation of net electricity exported. The calibration frequency of once in 3 years is also specified in revised monitoring plan. These changes have been made in the revised monitoring plan to reflect the actual practice at site.

e) Editorial changes in  $EG_y$  - Net Electricity supplied (to grid) by the project activity during the year y

The registered PDD does not clearly state which are the parameters used for calculation of net electricity supplied to the grid  $EG_y$  and the formula used for its calculation. In actual practice, the net electricity supplied to the grid is calculated as a difference of the electricity export  $EG_{\text{export},y}$  and import  $EG_{\text{import},y}$  measured by the main and check meters located at the grid interconnection point and recorded through the monthly joint meter reading (JMR). This has been described in the revised monitoring plan to reflect the actual practice at site.

d) Editorial changes to the other parameters monitored and the description of monitoring plan (section 7.1 & 7.2 of the registered PDD:

Editorial changes have been made to the description of monitored parameters stated under section 7.1 of the PDD to bring out further clarity on the description, measurement method and QA/QC procedures. The editorial changes are also made to the description of monitoring plan stated under section 7.2 of the PDD with respect to the responsibilities of the management personnel. These changes were made to reflect the actual practices implemented at the site.

## 2 Assessment of the changes to the project design

### *Assessment of when the changes occurred.*

The minor deviations in the design from registered PDD were noticed at the time of commissioning of the turbines. The purchase order were placed by the project developer for 3x 4.33 MW equipment on M/s Boving Fouress Limited on 27 April 2006. However, the marginal difference in capacity was noted on the equipment name plate at the time of installation in 2009. The difference in design water flow of the equipment was noted from the drawing no. 2340201 with title "Station arrangement elevation" issued by the supplier Boving Fouress Limited.

### *Assessment of the reasons for these changes taking place*

The total capacity of the turbines installed is 13.05 MW against the capacity of 13 MW stated in the registered PDD. The increase in capacity of the project activity by 0.05 MW is marginal, an increase of 0.38%.

The capacity of the equipment installed has been verified from the following documents:

1. Copy of Synchronisation Letter dated 4 August 2009, issued by 'Mangalore Electricity Supply Company Limited', stating the synchronisation of 3 x 4.35 MW (13.05 MW) generators.
2. Copy of the approval letter for commissioning of the project activity from Chief Electrical Inspector, Government of Karnataka, showing capacity of hydro generators to be 3 x 4.35 MW (13.05 MW).
3. Name plate details of installed Generator, showing output of 5437.5 kVA (4.35 MW).

The design water head of the equipment installed has been verified from the drawing no. 2340201 with title "Station arrangement elevation" issued by the supplier Boving Fouress Limited, according to which the design water flow of the turbines is stated to be 3 x 34.85 m<sup>3</sup>/sec (104.55 m<sup>3</sup>/sec). The change in design water flow from 105 m<sup>3</sup>/sec to 104.55 m<sup>3</sup>/sec is marginal, a decrease of 0.43%.

***Assessment of whether the changes would have been known to the project participants prior to registration of the project activity***

The marginal change in capacity and design water flow of the equipment was noticed by project participants at the time of installation in 2009. The project participant was aware of the changes prior to the registration of the project activity, but the same was not included in the PDD, since the project participant was unaware of its importance in CDM documentation.

***Assessment of how the changes may impact the overall operation/ability of the project activity to deliver emission reductions as stated in the PDD***

The project is a hydro power plant. DNV confirms that the change in installed capacity is to a tune of 0.38% increase and a decrease in the water head by 0.43%. It is DNV's opinion, the change in capacity and water flow do not in any way impact the operation/ability of the project activity to deliver emission reductions as stated in the PDD.

### **3 Assessment of the impact of the changes to the project design**

*Do the changes raise concerns with regard to any of the following aspects?*

- ☐ Additionality
- ☐ Scale of CDM project activity
- ☐ Applicability and application of baseline methodology
- ☒ Not applicable (the changes do not raise any concerns)

***Assessment of impacts of the changes on additionality***

The project activity is a hydro power generation unit. The minor change in the capacity of the project activity can marginally improve the electricity generation. At the same time the small decrease in design water flow can reduce the electricity generation. The changes have no impact on the additionality of the project as the all critical parameters to assess the additionality remain unchanged.

The potential impact on PLF due to change in capacity of the machines installed was assessed. The PLF applied for demonstration of additionality was 33.54%, which is higher than the value of 30% considered by Karnataka Electricity Regulatory Commission (KERC). The 0.38% increase in project capacity will improve the PLF to 33.67%. In registered PDD, it was demonstrated that the IRR will cross the benchmark only when the PLF increases by 16.3%. Thus the 0.38% increase in capacity of the project activity does not impact additionality.

***Assessment of impacts of the changes on the scale of the CDM project activity***

The project is hydro power plant and the installed capacity of the project activity has only been changed marginally from 13 MW to 13.05 MW and hence there will not be any impact of the scale of the CDM project activity.

***Assessment of impacts of the changes on the applicability and application of baseline methodology***

Applicability: The PDD is based on AMS-I.D “Grid connected renewable electricity generation” version 13. Since the project still continues to be a hydro power project, is grid connected and the installed capacity is below 15 MW, the scale of the methodology does not change.

Monitoring plan: As the project is based on ASM-I.D version 13, the parameter to be monitored is the net electricity exported from the project activity, which has been covered under the monitoring plan already. Thus the changes will not have any impact on the applicability and the application of the monitoring methodology.

#### **4 Assessment of the revision of the monitoring plan**

***The proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions***

a) Inclusion of Electricity exported (to grid) by the project activity during the year,  $EG_{\text{export}}$ :

The state utility calculates the net electricity supplied to the grid by deducting electricity import (from the grid)  $EG_{\text{import}}$  from the electricity export (to the grid)  $EG_{\text{export}}$ , measured by the main and check meters located at the grid interconnection point and recorded through monthly joint meter readings. The net electricity supplied to the grid can be cross checked from the invoice raised for the electricity supplied to the grid by the project participant to the state utility company. Further, this will also be compared with the difference of the  $EG_{\text{gross}}$  and  $EG_{\text{Auxiliary}}$  internally. The calculation of  $EG_y$  requires the monitoring of the parameters  $EG_{\text{export}}$ . This actual practice of monitoring the electricity exported to the grid has been appropriately incorporated thereby removing the inconsistency in the registered PDD.

The  $EG_{\text{export}}$  is monitored by the Bi-way electronic meters with accuracy of 0.2%, installed at the grid interconnection point and the meter readings are recorded monthly in joint meter reading.. However, this change is to reflect the actual monitoring practice at site. This will also bring in more clarity in monitoring. Two meter, one main meter and one check meter have been installed for measuring the electricity export to the grid. In case on any failure of the main meters the check meters will be used.

b) Editorial changes in parameters “ $EG_{\text{Gross}}$  and  $EG_{\text{Auxiliary}}$ ”:

The state utility calculates the net electricity supplied to the grid by deducting electricity import (from the grid)  $EG_{\text{import}}$  from the electricity export (to the grid)  $EG_{\text{export}}$ , measured by the meters located at the grid interconnection point. The parameters  $EG_{\text{gross,y}}$  and  $EG_{\text{Auxiliary}}$  are used for comparison of net electricity generated monitored by meters located at grid interconnection point. The slightly lower accuracy (0.5) of the meters will not have any impact on emission reduction calculations, since these meters are only used for internal purposes. The main and check meters used for calculation of net electricity exported are of higher accuracy class of 0.2. The revision in frequency of calibration of once in 3 years (as

per CDM SSC guidelines) will improve clarity in the statement of “Meters will be calibrated as per industry standards” in registered PDD.

This change is to reflect the actual monitoring practice at site and to bring in more clarity in monitoring.

e) Editorial changes in EG<sub>y</sub> - Net Electricity supplied (to grid) by the project activity during the year y

The registered PDD does not clearly state which are the parameters used for calculation of net electric exported EG<sub>y</sub> and the formula used for its calculation. The revised monitoring plan states that the net electricity export to the grid is calculated as a difference of the electricity export and import measured by the main and check meters located at the grid interconnection point and recorded through the monthly joint meter reading (JMR). This change is to reflect the actual monitoring practice at site and to bring in more clarity in monitoring.

c) Editorial changes to the other parameters monitored and the description of monitoring plan (section 7.1 & 7.2 of the registered PDD):

The editorial changes made in section 7.1 of the PDD will further improve the description, measurement method and QA/QC procedures of the monitored parameters. Few changes in the responsibilities of the management personnel have been made under section 7.2 of the PDD to reflect the actual practices implemented at the site.

The editorial changes to sections 7.1 and 7.2 will not have any impact on level of accuracy or completeness of the monitoring and verification process. However, this change is to reflect the actual monitoring practice at site. This will also bring in more clarity in monitoring.

***The proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity whilst ensuring the conservativeness of the emission reductions calculation***

The emission reductions generated by the project activity are calculated by multiplying net electricity supplied (to grid) by the project activity during the year y, EG<sub>y</sub> and the grid emission factor fixed ex-ante. The net electricity export to the grid EG<sub>y</sub> is calculated as a difference of the EG<sub>export</sub> and EG<sub>import</sub>, monitored through the electricity meter of 0.2% accuracy, installed at the grid interconnection point and calibrated by the state utility.

According to AMS-I.D version 13 “Monitoring shall consist of metering the electricity generated by the renewable technology” is the parameter to be monitored. The gross electricity will be monitored by a separate meter in the monitoring plan. The proposed revision in the monitoring plan also include monitoring of Net Electricity supplied (to grid) by the project activity during the year y, EG<sub>y</sub>, monitored by main and chack meters of accuracy class 0.2, located at the grid interconnection point . Therefore the proposed revision in the monitoring plan is in line with AMS-I.D version 13 requirements.

***The findings of previous verification reports, if any, have been taken into account***

As this is the first verification activity, the findings will be taken into account in the revised monitoring report and verification report.

## 5 Validation opinion

DNV checked and verified complementary data and related information related to the changes made in the project activity and the impact of such changes in the project’s implementation,

emission reductions, additionality, project's scale and applicability and application of baseline methodology.

The revised PDD clearly and transparently indicates the actual practices at site and changes in capacity of the generators and the design water flow. The changes made in the revised PDD are related to the marginal increase in capacity of the project and slightly less design water flow to the turbines. The justification and assumptions made in the project activity are considered reasonable and acceptable.

The changes in the monitoring plan does not affect negatively or significantly the operation or emission reduction calculations of project activity. The changes do not either have any impact on the additionality of the project and the applicability/application of AMS-I.D (version 13).

Hence, it is DNV's opinion that the changes to the project activity do not raise any concerns with regard to i) additionality, ii) scale of the CDM project activity and/or iii) applicability and application of baseline methodology.

Moreover, DNV recommends the approval of the revised monitoring plan submitted by the project participants.

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