



VALIDATION OPINION

THANH THUY HYDROPOWER PROJECT

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GHG Certification Office

KOREA ENERGY MANAGEMENT CORPORATION



1 INTRODUCTION

Bunge Emissions Holdings Sarl commissioned Korea Energy Management Corporation (KEMCO) to perform the first verification of the “Thanh Thuy Hydropower Project”. But the KEMCO audit team has identified the project has undergone a permanent change in the project design as compared to the registered project design document. So the audit team validated the revised project design document of the “Thanh Thuy Hydropower Project” in Viet Nam to ensure that the revised project is in conformity with all applicable CDM requirements.

During the assessment, the Team validated, using objective evidence, the completeness and accuracy of the claimed emission reductions and conservativeness of the assumptions made in the revised project design document (PDD). In addition, based on its sectoral and regional expertise, the Team assessed whether the revised project activity complies with the relevant requirements set out in the CDM modalities and procedures, the applicability conditions of the selected methodology and guidance issued by the CDM Executive Board.

In summary, KEMCO has completed the validation on the changes in the registered PDD in line with the all applicable UNFCCC requirements for the CDM and the applied methodology. Hence, KEMCO requests approval of changes from the “Thanh Thuy Hydropower Project” as described in the registered project design document according to the “Procedures for notifying and requesting approval of changes from the project activity as described in the registered project design document” (EB48, Annex 66).

2 VALIDATION OPINION

2.1 Identification and Types of Changes

In line with the paragraph 3 of the “Procedures for notifying and requesting approval of changes from the project activity as described in the registered project design document”(hereafter called “the procedures”), if the DOE determines that the changes raise concerns with respect to aspects outlined in following aspects of paragraph 10(c) of the procedures, the DOE shall submit a request for approval of changes with relevant documentation ;

- (i) Additionality of the project activity;
- (ii) Scale of CDM project activity;
- (iii) Applicability and application of Approved Baseline Methodology under which the project activity has been registered.



And according to the paragraph 5 of the “Guidelines on assessment of different types of changes from the project activity as described in the registered PDD” (hereafter called “the guidelines”), the changes on the additionality of the project activity, (i) in the above category include;

- (a) Changes in the effective output capacity due to increased installed capacity or increased number of units, or installation of units with lower capacity or units with a technology which is less advanced than described in the PDD;
- (b) Addition of component or extension of technology;
- (c) Removal or addition of one (or more) site of a project activity registered with multiple-sites;
- (d) Different values of those actual operational parameters relevant to determination of emission reduction which are within the control of project participant and which result in the IRR passing the benchmark as described in the registered PDD.

The Thanh Thuy project has undergone a permanent change in the project design as compared to the registered project design document. The change is in terms of capacity of the Thanh Thuy hydropower plant from 18 MW to 20 MW without changes in number of installation generators. It also causes the differences in expected electricity generation and emission reductions during the crediting period. It was concluded that the changes of the project are included in paragraph 5(a) of the guidelines and 10(c)(i) of the procedures. And it was also concluded that the change does not apply to paragraph 10(c)(ii) and 10(c)(iii) of the procedures because the change has no impact on the scale of the CDM project activity and the applicability of the methodology under which the project has been registered.

2.2 Description of the Changes

The revised PDD was compared with the registered PDD to ensure which changes have been done as compared to the registered PDD. It was confirmed that total capacity of the Thanh Thuy hydropower plant has changed from 18 MW to 20 MW describing that capacity of the cascade 1 hydropower plant was increased to 11MW from 10MW and capacity of the cascade 2 hydropower plant was increased to 9MW from 8MW without:

- Changes in number of the generation sets.
- Technology less advanced than that described in the registered PDD.

The audit team checked the new upgraded FSR and the application for change in project capacity to verify parameters and values of the changes. It was confirmed that the project participant has upgraded the FSR (Feasibility Study Report) by an engineering company in 2009 to change the capacity of the project and submitted application for change in project capacity based on the new FSR to the local authority. The application was approved by the authority, Ha Giang Province People Committee on November 2011. The new upgraded FSR and the application were also compared with the original FSR approved by the local authority on July 2008 to check the changes. The audit team concluded that the registered PDD was revised in the installation capacity and electricity generation, and the changes in the PDD are based on the upgraded FSR and the application.



And the PP removed powerhouse locations from the revised PDD to avoid confusion but the audit team confirmed that the locations followed the old and the upgraded FSR and it is not necessary according to the latest PDD Completing Guidelines.

2.3 Impact of the Changes

The audit team implemented an assessment on when the changes occurred, reasons for these changes taking place, whether the changes would have been known prior to registration of the project activity, and how the changes would impact the overall operation/ability of the project activity to deliver emission reductions as stated in the PDD.

The project was changed in terms of capacity of the Thanh Thuy hydropower plant from 18 MW to 20 MW. The PP has claimed, the reason for the change is to compensate the loss of total generation due to over estimation of the PLF in the original FSR. In order to maintain similar level of electricity generation as was envisaged in the original FSR they needed to increase the capacity by 2 MW.

The audit team checked the original FSR and the upgraded FSR to verify the reason. It was confirmed that the hydrological data to estimate total energy generation were same between the reports but the PLF of the new FSR is estimated to be 44.65% as compared to the 50.16% in the original FSR. The total net average electricity generation figure (excluding the auxiliary consumption) for the new capacity of 20 MW is 70,642 MWh as compared to the 71,357 MWh mentioned in the original FSR corresponding to the capacity of 18 MW. Considering the fact that the difference in average electricity generation (excluding the auxiliary consumption) between the original and the new FS is only about 1%, the audit team concludes that the reason for the changes is to maintain the originally envisaged total electricity generation (excluding auxiliary consumption), as claimed by PP.

The date of the change in the installation capacity was considered to be on 14/11/2011 by the project participant, when the competent legal authority of Viet Nam has provided its approval for the change in capacity of the Thanh Thuy hydropower plant.

And the project participant (PP) additionally explained the date of the change; Potential for the changes was known to the PP prior to the registration of the project activity. However, these potential changes could not be considered to have been taken place, unless the approval for the same is given by the competent authority. And the PP could not be sure whether the application of the changes would be approved by the government. This is the reason for choosing 14/11/2011 as the date for changes in the project activity.

The audit team checked timeline to identify the time of changes. It was confirmed by the upgraded FSR made in 2009 that the PP has known the potential for the changes before the registration of the project, 03/05/2011. It was also identified that the PP submitted application for new upgraded FSR on 25/10/2011 stipulating the changes in capacity and the application was approved by the local authority, Ha Giang Province People Committee on 14/11/2011. It was concluded that the effective action to change the registered PDD occurred after the PDD



registration even though the PP has known the potential for the changes before the registration.

The changes in the capacity make the differences in generated electricity and emission reductions. The annually expected average electricity generation in the revised PDD was modified to 70,642 MWh/y (auxiliary consumption excluded) from 71,357 MWh/y (auxiliary consumption excluded) when it was compared to the registered PDD and the original FSR. It was confirmed by cross-checking the registered PDD and the original FSR with the revised PDD and the upgraded FSR. And in case of annually expected average emission reductions, it was confirmed by the revised PDD and the registered PDD that it was changed to 40,718 tCO₂e/y from 41,130 tCO₂e/y due to changes in the electricity generation. The audit team also checked whether all the parameters, assumptions and calculations used for changing emission reductions are in accordance with the applied methodology and the relevant guidelines. The emission reductions were calculated by multiplying the generated electricity by the electricity grid emission factor which is equal to the value used in the registered PDD according to the methodology, and the project emissions and leakage emissions are considered as zero according to the applied methodology and the registered PDD. It was concluded that the emission reductions were properly changed.

The audit team assessed how the change in capacity and electricity generation as stipulated above impact the additionality of the project activity.

The PP revised the excel sheets for investment analysis because the project selected investment analysis to demonstrate the additionality. The additionality of the project has been re-assessed by changing the input parameters to the IRR affected by the change in capacity. Two parameters, capacity and gross annual electricity generation were changed.

The audit team checked the upgraded FSR approved by the local authority to confirm the suitability of the revised electricity generation. The power generation is estimated properly by the engineering company, Ba Dinh Construction Consulting JSC considering hydrological data of the Thanh Thuy stream which approved by the local authority. And the PP said that consultancies approved by government in Viet Nam are only allowed to prepare FSRs and so all FSRs are independently produced and officially approved. In addition the plant load factor (PLF) of the total electricity generation, 44.65% was cross checked with the 69 Viet Nam hydropower CDM projects that were extracted from the UNFCCC CDM website at the early January 2012 as below. It is confirmed that the PLF of the project is reasonable describing that the value is a little lower than the average PLF of the 69 projects, 46.74%. And even in case of the average PLF, 46.74%, the project IRR does not increase much from 9.31% to 9.93% which is quite lower than the benchmark value, 12.54%. The audit team concludes that the expected electricity generation is acceptable.

Registration date	Ref. No.	Registered HPP	PLF	Registration date	Ref. No.	Registered HPP	PLF
2009-06-05	2367	Phu Mau	45.50%	2010-01-24	4279	Ta Lat	40.60%
2009-06-05	2371	Muong Sang	39.00%			Namgie	57.20%
2009-07-27	2368	Suoi Tan	51.22%			Dakgret	49.51%
2009-08-17	2372	So Lo	35.11%			Daklay	46.11%



2009-09-05	2627	Nam Pia	46.67%	2011-01-20	3532	Song Chung	37.10%
2009-11-21	2891	Ta Niet	57.39%	2011-03-16	4392	Dak Hnoi	54.52%
2009-12-14	2878	An Diem 2	57.28%	2011-03-08	4417	HaNang	45.95%
2010-03-07	2971	Nam Gion	46.49%	2011-07-02	3954	Ho Bon	46.53%
2010-03-12	2978	Nam Khoa 3	48.06%	2011-02-21	4210	Dak Srong 2A	37.29%
2010-03-02	3034	Nam Khot	46.17%	2011-04-11	4384	Dak Doa	45.91%
2010-05-08	3051	Yan Tann Sien	46.05%	2011-03-29	4626	La La	46.04%
2010-05-27	3255	Ha Rao Quan	43.16%	2011-04-13	4656	Dak Psi 5	49.91%
2010-05-30	3256	Coc Dam	49.62%	2011-07-26	3843	Muong Kim	43.81%
2010-08-20	3457	Chieng Cong	44.78%	2011-05-03	4338	Thanh Thuy	50.16%
2010-08-28	3484	Dak Ne	53.50%	2011-05-03	4714	Doc Cay	47.70%
2010-09-04	3505	Dak Rung	45.39%	2011-04-20	4720	Nam Phang	46.44%
2010-09-11	3530	Suoi Sap 3	40.06%	2011-05-13	4755	Ia Puch 3	52.95%
2010-09-03	3589	Ea Drang 2	45.73%	2011-05-24	4823	Ba Thuoc 2	41.43%
2010-08-27	3514	Pa Khoang	57.08%	2011-06-08	4537	DakRTih	50.49%
2010-10-27	3667	La Hieng 2	43.30%	2011-06-22	4544	Nam Soi	42.01%
2010-10-29	3711	Thai An	49.77%			Nam Cong	44.73%
2010-11-03	3421	Song Quang	45.37%	2011-06-02	4550	Dak Pone	51.28%
2010-11-06	3682	Na Hau	41.62%			Dak Pone Expansion	44.24%
		Nam Tang	41.36%	2011-06-16	4577	Ngoi Xan 1	45.87%
2010-11-27	3745	Su Pan 2	46.60%			Ngoi Xan 2	48.34%
2010-12-02	3810	Tra Linh 3	47.30%	2011-06-11	4703	Vinh Son 5	41.95%
2010-10-11	3442	Nam Chien 2	46.97%	2011-06-20	4765	H'Mun	45.65%
2010-12-13	3858	Nam Ngan	49.06%	2011-08-16	4829	Nam Trai 4	43.94%
2010-12-18	3944	Dak Nong 2	45.79%	2011-08-22	5115	Srepok 4	47.76%
2010-12-18	3942	Dak N'Teng	58.79%	2011-09-02	5164	Nam Hong1	45.83%
2010-12-18	3872	Ngoi Phat	49.83%			Nam Hong2	44.09%
2010-12-25	3396	Chau Thon	47.38%	2011-09-05	5030	Nam Khanh	46.52%
2011-01-08	3980	Da Den	41.20%	2011-09-13	5056	Dak Mi 4C	43.84%
2011-02-04	4117	Song Ong	57.10%	2011-10-25	5183	Nam Khat	46.96%
2011-02-19	3557	Ngoi Hut 1	48.00%			Lao Chai	48.98%
2011-02-19	3552	Dak Rung 1	50.08%			Vuc Tuan	41.11%
2011-02-23	3389	Dak Srong 2	44.59%	2011-10-18	4970	Dak Mi 4	46.02%
2011-03-05	4156	Nam Mu	45.15%	2011-09-30	5273	Nam Chanh	45.06%
		Khuoi Luong	50.87%	2011-10-11	3908	Dasiat	48.82%
2011-12-22	4259	Group of Nam Tha	44.23%	2011-10-28	4974	Song Tranh 3	42.48%
2010-01-24	4236	Ban Coc	47.86%			Average	46.74%

It was also confirmed by the upgraded FSR that the estimated total cost for the project has also gone up due to increase in capacity but the same is not included for IRR estimation for the sake of conservativeness.

Finally, IRR was a little decreased to 9.31% from 9.45% showing that the changes in capacity and total electricity generation induced a revenue decrease due to electricity sales. And result of the sensitivity analysis shows that the project IRRs are still quite below than the benchmark value in all the items of the sensitivity analysis including PLF. So the audit team concluded that the revised project activity is still additional in line with the applied methodology and relevant guidelines.



Regarding the common practice, the audit team checked again the source lists that were used for the PDD registration. It was confirmed that the capacity change does not impact on the common practice because there was no project with the capacity of 18MW to 20MW in the lists.

In conclusion, the validation opinion is that:

- Changes have been made to the project design as per EB48, Annex 67, paragraph 5(a)
- The data in the originally registered PDD was derived from an FSR produced by an independent company which over-estimated the annual energy of the 18MW plant. In order to maintain the annual energy originally predicted, the PP investigated the possibility of upgrading the capacity of the plant
- The re-assessment of additionality has taken into account the changed parameters "capacity" and "annual energy". Even though capacity has increased, the annual energy is still very much in line with that of the registered PDD (1% less emissions reductions claimed than in the originally registered PDD). The changed parameter of annual energy was also compared with other registered projects and found to be reasonable. Finally, project costs are expected to increase as a result of the change but PP kept the original costs as in the registered PDD to be conservative.
- The change to the project does not make the project non-additional and the fact that the changes result in no overall significant change to emissions reductions claimed is borne out by the volume of emission reductions showing in the first monitoring report.

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