RESPONSE TO POINTS RAISED DURING 1st COMPLETENESS CHECK

Subject : Request for registration of the proposed programme of activities INCOMPLETE: Climate Action Response Enterprise (CARE) for Energy Efficiency in Chiller Plants (6600)

Bureau Veritas Certification had performed the validation of the PoA Project 6600 - " Climate Action Response Enterprise (CARE) for Energy Efficiency in Chiller Plants". Subsequently, there were 06 points raised by the UNFCCC secretariat during completeness check on 24/08/2012. We would like to provide our responses to the issues raised as given below.

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1. With regard to the additionality demonstration of PoA, the DOE shall explain how it has validated that (i) the prevailing practice is a barrier given that the prevailing practice is a common practice rather than a barrier which would prevent the PoA from being implemented, in doing so, the DOE may refer to EB 50, Annex 13, paragraph 7; and (ii) the proposed PoA is the first of its kind in Singapore given that few buildings (i.e. Singapore Post and Gallon) had already achieved chiller plant efficiency of 0.60 – 0.65 kW/RT prior to implementation of the proposed PoA.

Response:

During Validation of Programme of Activities "Climate Action Response Enterprise (CARE) for energy Efficiency in Chiller Plant", CME has demonstrated the additionality of the Project at PoA level and decided to adopt prevailing practice barrier in accordance with SSC guideline Annex A to Appendix B.

While writing validation report on additionality of prevailing practice barrier, validator inadvertently used term "Common Practice", which seems to have created confusion on additionality of the PoA. To avoid any further confusion, the PoA Validation Report Section 3.7 is now corrected in accordance with EB Guideline on "Demonstration of additionality of small scale project activity", (version 09.0, EB 68 Annex 27). To explain further, how achieving chiller plant efficiency of 0.60 – 0.65 KW/RT faces prevailing practice barrier, CME has referred to the developmental background on energy efficiency measures in Singapore, specifically for Chiller plants systems exists and getting implemented.

Host country has ratified the Kyoto Protocol in Year 2006 and since then there is a movement observed towards achieving energy efficiency in Singapore. As per the historical data made available by the countries regulatory body National Environmental Agency, it was observed that there were only 6 projects implemented prior to this PoA, with an intention to achieve specific energy efficiency coefficient in the range of 0.60 - 0.65 KW/TR for chiller plant system.

Out of all these implemented projects only SingPost is known to match with the technology and integrated design approach implemented in the proposed PoA project i.e. replacement of old energy in efficient chillers and anciliary equipment with energy efficient water cooled chiller and equipment's, pipelines and installation of 1 minute interval monitoring system. Validation team has verified list of projects provided in the PoA DD by CME and found that 4 Projects have achieved energy efficiency by means of either optimization of chillers or ancillary equipment's or by reducing the operational hours (i.e. Shutting down Chiller plants in night) and there is no consistency in achieving energy efficiency of 0.65 KW/TR.

Sector	Company	Measures implemented
Industry	Systems on Silicon Manufacturing Co. Pte Ltd (SSMC)	Optimization of chillers: The optimal level of refrigerant charging was determined for best chiller efficiency and controller was implemented to maintain optimal performance under all operating/loading conditions. ***Validation Conclusion: The Company received EASe Grant for reducing energy bill, however there is no evidence to suggest that Chiller plant system is able to achieve specific Energy efficiency Coefficient of 0.65 and better.***
	Singapore Oxygen Air Liquide Pte Ltd (SOXAL)	Shutting down of chiller plant at night: Before the implementation of this measure, the chiller plant was operated 24 hours daily although the facility only operates from 8am to 7pm on a 5.5-day week. The main reason for this was to prevent condensation from taking place. The shutdown sequence was modified such that the AHUs are switched off only after a period of time where the supply, exhaust and scrubber fans have stopped operation. This minimized condensation problems. Retrofit of chiller plant: The existing chillers and associated pumps were replaced with more efficient ones. System efficiency improved by 38%. Optimization of chilled water pumps: Variable speed drives were installed on the new chilled water pumps, allowing them to run relative to the cooling load demand. Optimization of chilled water primary pumps: The pumps were optimized by converting direct-on-line to variable speed drive that supplies power to the pumps at reduced speed depending on pressure. ***Validation Conclusion: The Company received EASe Grant for reducing energy bill, however there is no evidence to suggest that Chiller plant system is able to achieve specific Energy efficiency Coefficient of 0.65 and better.***
Building	Singapore Post Center	The chiller plant system efficiency is improved from 1.1 kW/RT to 0.6kW/RT via the following measures Chiller replacement: Three (3) numbers of the existing chillers were replaced with more efficient ones. Optimization of pumps and cooling towers. Variable speed drives were installed to the pumps and cooling towers including 1 Minute interval monitoring system. ***Validation Conclusion: It is observed that the Building is able to demonstrate that specific energy efficiency of 0.65 kW/TR is achieved consistently by the Chiller plant system.***
	Singapore Airline House	Optimization of pumps and cooling towers: A 20% improvement in chiller plant system efficiency was achieved by installing new condenser pumps and installing variable speed drives to chilled water pumps and cooling towers. ***Validation Conclusion: The Company received EASe Grant for reducing energy bill, however there is no evidence to suggest that Chiller plant system is able to achieve specific Energy efficiency Coefficient of 0.65 and better.***

In case of SingPost project, a complete retrofit of Chiller Plant System took place and hence it was considered as similar type of energy efficiency project. However it was observed that there is a clear distinction between the SingPost project and the proposed PoA project i.e. SingPost project was conceived before Singapore acceded Kyoto Protocol as well it is availing EASe grant.

Also it was further observed that after the implementation of SingPost project in year 2007, there is no known precedence of implementing same technology and integrated design approach for achieving the Energy efficiency coefficient of 0.65 KW/TR in Singapore by any other building till the CME came up with

the PoA project. Initially CME developed Galen project as 1st CPA to be included in the PoA project, however due to the start date problem i.e. CPA start date was earlier than PoA GSC date, Galen Project was not qualified to be the 1st CPA. Capricorn also belongs to the same CPA owner and it was implemented later with start date of 16/11/2010. This change in the 1st real case CPA was approved by UNFCCC through mail communication Dtd. 27/06/2011& 22/07/2011, which is explained in the PoA Validation Report adequately.

From the known sources and publically available information it is validated that the general trend of energy efficiency in chillier plant system in Singapore is 1.36 KW/TR on an average. This was also confirmed by the Singapore DNA, National Environmental Agency, through a letter Reference NEA/EP/RCD/10-00068-1 dated on 13 July 2010 From this it was observed that installation of Chiller plant Systems using an integrated Design approach to achieve better Energy Efficiency coefficient in the range of 0.60 – 0.65 KW/TR is not a prevailing practice in host country Singapore.

Further it is validated that there is no regulatory requirement in Singapore that the building owners have to use energy efficient Chiller Plant Systems with Energy Efficiency coefficient of 0.65 kW/TR or better. Although there are certain initiatives by the Singapore government to promote energy efficiency by means of publishing code of practice and energy efficiency standards such as SS530, there is no specific requirement/mandates for actually achieving an energy efficiency coefficient of 0.65 kW/TR. From the statistical data provided by National Environmental Agency of Singapore, it can be concluded that most of the energy efficient chiller plant systems operating in existing commercial and industrial buildings have a specific energy efficiency coefficient of about 1.36 kW/TR, which is shown in the above graph:

It was also evident that the implementation of energy efficient chiller plant in Singapore is encouraged by the Singapore government through various schemes e.g.

- Energy Efficiency Improvement Assistance Scheme (EASe) – Started in 2005 and provides 50% of consultancy fees, there is no specific energy efficiency norm established.

- GREET (Grant For Energy Efficient Technology) – Launched on 24th May 2011, there is no specific energy efficiency norm established and requires that project should not commence operation before approval of grant. In this specific PoA the decision on implementation was taken much before the launch of the GREET Scheme, and hence it is confirmed that the project is not implemented due to the implementation of GREET scheme.

- Green Mark Scheme – Awards 7 point for 0.9 KW/TR energy efficiency and 13points (Max) if 0.60 KW/TR energy Efficiency for Chiller plant systems.

- Code of Practice – General Guidelines only.

However the response to such schemes is found very poor, i.e. hardly 10 buildings are found registered under GREET scheme, which is insignificant in highly urbanized Singapore, also there is no credible data/ information available to show that energy efficiency achieved by these projects is consistently monitored and reported. Whereas the proposed PoA is designed to monitor and report chiller plant efficiency in consistent manner.

From the description of technology provided in the PoA & CPA DD's, Validation team observed that the technology adopted to achieve the energy efficiency coefficient of 0.65 KW/TR involves an integrated Design approach of retrofitting the chiller plant with energy efficient equipment's (i.e. Chillers, pumps, Cooling towers etc.) and monitoring at a 1 minute interval using EMS (Electronic Monitoring System) in accordance with ASHRAE 14 Guideline, is not a baseline trend and PoA ensures that only such technology implementation through retrofits of existing chiller plants are eligible to include as CPA in the future.

Based on the arguments presented in the PoA DD and supporting evidences, Validation team confirms that the proposed Programme of Activities faces barrier due to prevailing practice, and it is proven that

achieving energy efficiency coefficient in the rage of 0.60 – 0.65 KW/TR becomes a real and prohibitive barrier that can hardly be overcome by additional financial means of grant, subsidies etc. made available by the Singapore Government to promote energy efficiency.

2. The DOE shall explain how it has validated the additionality of CPA. In doing so, please specify which eligibility criteria are related to the additionality demonstration of CPA and explain the appropriateness of those eligibility criteria in demonstrating the additionality of CPA. Please refer to EB 60, annex 26, paragraph.

Response:
As per the clarification provided by EB through Para 4 of EB 60 annex 26, it is understood that a full additionality assessment is not required in the context of component project activities (CPA), rather the confirmation of additionality for CPAs should be conducted by means of the eligibility criteria.

In accordance with this clarification DOE has assessed the additionality of CPA by checking the eligibility criteria established by CME in PoA-DD, and validation details are provided in CPA Validation Report section 3.5. From the assessment of all established eligibility criteria it was concluded that Capricorn CPA is fulfilling all Eligibility criteria established, hence is additional and eligible to include as 1st CPA in the PoA.

On the basis of Completeness point No. 6 below, CME has revised PoA-DD, Real Case CPA-DD and Typical CPA-DD to include revised eligibility criteria in accordance with EB 65 Annex 3 and Validation team has subsequently validated these changes in the revised PoA and CPA Validation Reports.

3. The DOE shall explain how it has validated that the project emission from the project refrigerants has been considered as per paragraph 3 of AMS II.C version 13. In particular, explain in a quantitative manner how it has validated that the replacement of refrigerants does not result in project emissions.

Response:
During initial submission of project documents, CME has proposed to account emissions in baseline as well as in project scenario only on account of Electricity Consumption. CME did not account emissions due to refrigerant leakages in baseline as well as in project scenario, irrespective of the Gas used. Hence emissions due to refrigerant use were considered as Zero. Initially Validation Team has considered this approach conservative.

However due to the Completeness point, CME has revised the PoA-DD and CPA-DD to incorporate emissions on account of refrigerant usage in baseline as well as project scenario. Baseline emission and emission reduction values are now revised to 1,995 tCO_2/ Annum and 1,021 tCO_2/Annum respectively. The calculation of Baseline emission and emission reduction found correct and in accordance with the Approved methodology AMS II.C, Version 13.

Revised Emission Reduction Calculation Spread sheet is enclosed herewith for review.

4. The DOE shall explain how it has validated the eligibility criteria in the PoA-DD as per EB63, Annex 3, paragraph 13, given that the eligibility criteria have not included the conditions related to: (i) the demonstration of additionality; (ii) avoidance of double counting of emission reductions; (iii) geographical boundary of the CPA; (iv) check of the start date of the CPA; and (v) affirmation on the funding from Annex I parties. In addition, the 9th eligibility criteria (Complete optimization of chiller plants only and without retrofits that do not include procedures within this PoA or inclusion of measurement and monitoring requirements are not allowed) has not been expressed clearly.

Response:
POA Validation Report Section 3.3.1 is now revised to bring more clarity on validation of eligibility criteria mentioned in the completeness Point No.4 above i.e.

i) The demonstration of additionality;
ii) Avoidance of double counting of emission reductions;
iii) Geographical boundary of the CPA;
iv) Check of the start date of the CPA; and
v) Affirmation on the funding from Annex I parties. In addition, the 9th eligibility criteria (Complete optimization of chiller plants only and without retrofits that do not include procedures within this PoA or inclusion of measurement and monitoring requirements are not allowed) has not been expressed clearly

5. With regard to the calculation of emission reductions, the DOE shall explain how it has validated the baseline efficiency of new chillers (e.g. chillers in new buildings).

Response:
Please note that there is no new building in the Project scenario. The Project activity involves retrofit of the old Chiller Plant System at Capricorn building by replacing entire Chiller Plant System with new Chiller Plant System.

As entire baseline Chiller Plant System is retrofitted, the PoA considers efficiency of the entire Chiller Plant System for calculating the Emission reductions. DOE has validated Baseline Chiller Plant System efficiency through the records of Baseline monitoring campaign performed for one month period which is adequately reported in the CPA Validation Report Section 3.6.3.

6. Please note that the lasted standard (EB 65, Annex 3) is effective for new submission since 25/07/2012.

Response:
CME has revised POA-DD, Real Case CPA-DD and Typical CPA-DD documents to make them aligned with the changed Standard (EB 65 Annex 3).

Validation Team has taken a note of these changes and validated them in the revised PoA and CPA Validation reports and enclosed herewith for review.

We hope you will find above responses in accordance with completeness points raised.

Yours faithfully

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