**Validation report form for renewal of crediting period for CDM project activities**

**(Version 03.0)**

*Complete this form in accordance with the instructions attached at the end of this form.*

| BASIC INFORMATION | |
|---|---|
| **Title and UNFCCC reference number of the project activity** | Dapein (1) Hydropower Project in Union of Myanmar (UNFCCC Registration No.:7731) |
| **Number and duration of the next crediting period** | The 2nd crediting period<br>From 04/02/2020 to 03/02/2027 |
| **Version number of the validation report** | 01 |
| **Completion date of the validation report** | 15/12/2020 |
| **Version number of PDD to which this report applies** | 06.1 |
| **Project participants** | Dapein (1) Hydropower Company Limited (Myanmar)<br>Cleantec Development PCC (Netherland)<br>Dapein (1) Hydropower Company Limited (China) |
| **Host Party** | Myanmar |
| **Applied methodologies and standardized baselines** | ACM0002 (Version 20.0), "Grid-connected electricity generation from renewable sources" |
| **Mandatory sectoral scopes** | Sectoral scope(s): 01 Energy industries (renewable/non-renewable sources) |
| **Conditional sectoral scopes, if applicable** | - |
| **Estimated amount of annual average GHG emission reductions or GHG removals by sinks in the next crediting period** | 403,153 $tCO_2e$ |
| **Name and UNFCCC reference number of the DOE** | Shenzhen CTI International Certification Co., Ltd (CTI)（UNFCCC Registration No.:E-0061） |
| **Name, position and signature of the approver of the validation report** | Zhou Lu, General Manage |

## SECTION A. Executive summary

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Dapein (1) Hydropower Company Limited has commissioned Shenzhen CTI International Certification Co., Ltd (CTI) to validate the renewal of crediting period of the proposed CDM project activity “Dapein (1) Hydropower Project in Union of Myanmar” in Myanmar (UNFCCC Registration No.: 7731).This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

The project is a newly built hydropower project located on Dapein River in Bhamo city, Kachin state, Myanmar. The project is operated by Dapein (1) Hydropower Company Limited which is the Joint Venture (hereafter referred to as “JV”) company found by Datang (Yunnan) United Hydropower Developing Company Limited (hereafter referred to as “DUHD”) in China and the Department of Hydropower Planning Ministry of Electric Power No.(1)(hereafter referred to as “DHPP”) in Myanmar. The total installed capacity of the proposed project is 240 MW, consisting of 4 sets of water turbine (Model: HLA883-LJ-345) and generator (SF60-32/690) unit, each of which has a rated capacity of 60 MW manufactured by Multipower Hydroelectric Development Corporation and lifetime of 40 years. The electricity generated by the proposed project will be delivered to Myanmar National Power Grid (MNPG) and South China Power Grid (SCPG). As per Development Operation Transfer (hereafter referred to as “DOT”) signed between DUHD and DHPP and the Feasibility Study Report (FSR), the estimated annual electricity generation is 1,070,000 MWh with the annual operational hours are 4,458h and the Plant Load Factor (PLF) of 0.5089. The 8% of the annual total production of electricity is supposed to be supplied to Myanmar as free power for the first 25 years and 10% for remaining 15 years. During the first 25 operational years which covers the whole crediting period, the annual on-grid electricity is 1,029,926 MWh of which 950,290 MWh is supplied to SCPG and 79,636 MWh is supplied to MNPG. The first set of hydro turbine and generator unit was commissioned on 26/08/2010, the second on 24/09/2010, the third on 22/12/2010 and the fourth on 28/12/2010. The objective of the project is to produce electricity with clean and renewable water resources and to displace part of the electricity from fossil fuel-fired plants connected to MNPG and SCPG. The project activity will generate greenhouse gas (GHG) emission reductions by avoiding $CO_2$ emissions from electricity generation by connected fossil fuel power plants.

The purpose of the validation of renewal of crediting period is to have an independent third party assess the validity of the project baseline that has opted for a renewal of crediting period. In particular, the project's baseline, monitoring plan, and the project’s compliance with relevant UNFCCC criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. The validation of baseline is a requirement for all CDM projects seeking renewal of crediting period and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

The validation scope is defined as an independent and objective review of the project design document (PDD), baseline update, monitoring plan and other relevant documents. The report is based on the assessment of the project design document under taken through stakeholder consultations, application of standard auditing techniques including but not limited to document reviews, follow-up interviews with project stakeholders, review of the applicable methodology and its underlying formulae and calculations.

In summary, it is CTI’s opinion that the project activity “Dapein (1) Hydropower Project in Union of Myanmar” in Myanmar, as described in the PDD, version 06.1 of 03/12/2020, meets all relevant UNFCCC requirements for the renewal of crediting period. Hence, CTI requests the renewal of the crediting period of the project.

## SECTION B. Validation team, technical reviewer and approver

### B.1. Validation team member

| No. | Role | Type of resource | Last name | First name | Affiliation (e.g. name of central or other office of DOE or outsourced entity) | Involvement in | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Desk/document review | inspection | Interview(s) | Validation findings |
| 1. | Team Leader | IR | Wang | Guolian | Shenzhen | √ | × | √ | √ |

### B.2. Technical reviewer and approver of the validation report for RCP

| No. | Role | Type of resource | Last name | First name | Affiliation (e.g. name of central or other office of DOE or outsourced entity) |
|---|---|---|---|---|---|
| 1. | Technical reviewer | IR | Lin | Shunrong | Shenzhen |
| 2 | Approver | IR | Zhou | Lu | Shenzhen |

## SECTION C. Means of validation

### C.1. Desk/document review

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The PDD and additional background documents related to the project design and baseline were submitted to the validation team for review. The document review in particular includes applicability of selected methodology, baseline determination, monitoring plan, emission reductions calculation. All documentations that were reviewed during the validation can be found in Appendix 3 of this validation report.

### C.2. On-site inspection

| **Duration of on-site inspection**: NA | | | | |
|---|---|---|---|---|
| **No.** | **Activity performed on-site** | **Site location** | **Date** | **Team member** |
| 1. | NA | NA | NA | NA |

Due to the COVID-19 pandemic from the beginning of 2020 until now, CTI cannot easily to arrange the on-site inspection especially going abroad as the travel restrictions from both Myanmar and China. Take the current situation into account, CDM EB agrees to relax mandatory site visits by DOEs for a period of three months (23 March to 23 June 2020) because of COVID-19 in the 106th EB meeting report and further extend the period in which DOEs may apply alternative measures of validation/verification to mandatory on-site inspections until 30 June 2021 at its 108th meeting, CTI adopted an interview in form of teleconference instead of the on-site inspection.

In accordance with the requirement by EB, the reasons that the site visit cannot be postponed are justified as follow:

- As the requested by PP, the site visit cannot be postponed. The first crediting period of the project activity was ended up by 03/02/2020. Considering the procedure and time schedule of the requests for renewal of crediting period as per the PCP and the uncertainty of the COVID-19 pandemic, to avoid the risk on the CERs delivery delay, PP commissioned CTI to complete the validation before the end of the year 2020.
- The project is located in Myanmar, while CTI is the DOE from China. As the result of the COVID-19 pandemic, the authority of Myanmar has taken preventive measures for foreigners

i.e. suspension of visa exemption policy and visa on arrival, a health certificate and insurance requested for visa application, self-isolate regulation and reduction of flights, etc. Thus, CTI cannot ensure site visit to be on schedule.

Therefore, CTI applied the standard auditing techniques for validation as referred to in sections 7.1.3 of the VVS-PA. An interview with PP was taken on 27/11/2020 through a teleconference instead in order to understand the project status, implementation and monitoring plan as well as the grid system and baseline. Moreover, CTI requests PP to provided supportive materials regarding to the official documents of baseline updates and grid emission factors, technique data and documents of equipments, main structure of the project, monitoring meters, connection diagram and operation records, sales receipts, PPA etc.. CTI obtained adequate information to validate the implementation of the project activity and the consistency between the registered PDD and the presented situation. CTI confirms it is sufficient for the purpose of validation by these alternative means.

### C.3. Interviews

| No. | Interviewee | | | Date | Subject | Team member |
|---|---|---|---|---|---|---|
| | Last name | First name | Affiliation | | | |
| 1. | Cheng | Lihua | Dapein (1) Hydropower Company Limited | 27/11/2020 | 1. Status of the project activity<br>2. Applicability of selected methodology<br>3. Baseline of the project<br>4. Emission reductions<br>5. Monitoring plan | Guolian Wang |
| 2 | Chen | Qingwei | | | | |
| 3 | Yan | Lei | | | | |

### C.4. Sampling approach

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NA

### C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

| Area of validation findings | No. of CL | No. of CAR | No. of FAR |
|---|---|---|---|
| Compliance with PDD form | 1 | 0 | 0 |
| Application and selection of methodologies and standardized baselines | 0 | 0 | 0 |
| Validity of original baseline or its update | 0 | 0 | 0 |
| Estimated emission reductions or net anthropogenic removals | 1 | 1 | 0 |
| Validity of monitoring plan | 0 | 0 | 0 |
| Crediting period | 0 | 0 | 0 |
| Project participants | 0 | 0 | 0 |
| Post-registration changes | 0 | 0 | 0 |
| Others (please specify) | 0 | 0 | 0 |
| **Total** | 2 | 1 | 0 |

## SECTION D. Validation findings

### D.1. Compliance with PDD form

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| **Means of validation** | Document review the PDD against the PDD form. |
| **Findings** | By checking the PDD, CTI confirmed that the CDM-PDD-FORM version 11.0 has been applied correctly. |

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| | As per the “Instructions for completing CDM-PDD-FORM”, the following information is missed in the provided PDD:<br>1. The title of the applied methodology needs also to be proivded on the cover page of the PDD;<br>2. The project boundary of the project activity needs to be described in the Section A.1 of the PDD;<br>3. The information of monitoring equipment and their location in the systems also needs to be provided in Section A.3;<br>4. In Section B.3, the project boundary of the project activity, including the physical delineation of the project activity, and which sources and GHGs are included in the project boundary, needs to be defined in accordance with the applied methodologies and the applied standardized baselines.<br>Therefore CL 01 was raised. |
| Conclusion | The relevant information as required in CL 01 has been correctly described in the updated PDD, hence CL 01 is closed.<br>The project is a 240 MW hydropower project located on Dapein River in Bhamo city, Kachin state, Myanmar. The project installs 4 sets of water turbine (Model: HLA883-LJ-345) and generator (SF60-32/690) unit, each of which has a rated capacity of 60 MW. The details of installed turbine and generator units with respect to installation and capacity have been verified by CTI through interview and checking the photos of water turbine and generator nameplates and equipment purchase contract to be consistent with description indicated in the registered PDD (version 05) and the updated PDD (version 06.1).<br>CTI has verified the project implementation through interview and by checking the daily operation and maintenance records, sales receipts, and the power purchase agreements (PPA) signed during the period from 2010 to 2020, as well the connection diagram and photos of the meters. It was confirmed that the first set of hydro turbine and generator unit was commissioned on 26/08/2010, the second on 24/09/2010, the third on 22/12/2010 and the fourth on 28/12/2010. As of the interveiw and checking the FSR, the connection diagram, Development Operation Transfer (DOT) and PPA, it is confirmed that the electricity generated by the project activity is supplied to the MNPG and SCPG, two meters (main meter and back-up meter) are installed at the SCPG interface point and two meters (main meter and back-up meter) are installed at the MNPG interface point to measure the electricity exports to and imports form the grid.<br>CTI can confirm through interview and documents review that the project activity was implemented according to the registered PDD. The monitoring system in operation period is consistent with the description in the monitoring plan. No serious malfunction happened and the plant was under a normal operation as expected during the operation.<br>The implementation status has been described in the updated PDD (version 06.1), and the project description of the project activity contained in the PDD to be |

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| | complete and accurate, information transferred to the PDD is materially the same as that in the registered PDD ( version 05). |

## D.2. Application and selection of methodologies and standardized baselines

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| **Means of validation** | The assessment of the project's compliance with the applicability criteria of ACM0002 (Version 20.0) |
| **Findings** | (1) The project is the installation of Greenfield power plant, i.e. the project is a grid-connected Greenfield hydropower plant.<br>(2) The project is a hydropower project resulting in new single reservoir, with the power density of 585 W/$m^2$, greater than 4 W/$m^2$.<br>(3) The project activity does not involve switching from fossil fuels to renewable energy at the project site or biomass fired power plants/units.<br>(4) The project does not involve capacity additions, retrofits, rehabilitations or replacements and it is not a integrated hydro power project.<br>(5) The project is connected to the MNPG and SCPG, and the geographical and system boundaries are clearly identified and information on the characteristics of the grid is available. |
| **Conclusion** | The validation team concluded that the project meet all applicability criteria of the methodology ACM0002 (Version 20.0). |

## D.3. Validity of original baseline or its update

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| **Means of validation** | According to the CDM project standard for project activities (CDM PS), the demonstration of the validity of the original baseline or its update does not require a reassessment of the baseline scenario, but rather an assessment of the GHG emission reductions that would have resulted from that scenario. With reference to the methodology tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period". |
| **Findings** | **Step 1: Assess the validity of the current baseline for the next crediting period**<br>The CDM PS requires assessing the impact of new relevant national and/or sectoral policies and circumstance on the baseline. The validity of the current baseline is assessed using the following sub-steps.<br><br>**Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies**<br>The current baseline remains the same as it was in the updated PDD. There has been not significant change in the relevant national and/or sectoral policies in China and Myanmar since the date of PDD registered till now. Hence, it can be concluded that the current baseline still complies with all relevant policies.<br><br>**Step 1.2: Assess the impact of circumstances**<br>There are not new national/sectoral policies or circumstances that could affect the |

baseline scenario during the renewal of the crediting period. The validation team confirmed that the current baseline identified in the registered PDD is still valid for the second crediting period.

**Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested**

In absence of the project activity, similar amount of electricity would have been generated by the grid and the continuation of the use of current baseline equipment is considered technically possible. Not any investment needs to be undertaken by the project participants or the third party. Hence, this is not applicable to the project activity.

**Step 1.4: Assessment of the validity of the data and parameters**

According to the requirement of the "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period", if any of the data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period and not valid anymore, the current baseline needs to be updated for the subsequent crediting period.

The Designated National Authority (DNA) of China issued the notice "2017 Baseline Emission Factors for Regional Power Grid in China" on 20/12/2018, which is the latest grid data available at the time of request for renewal of the crediting period. The emission factors $EF_{SCPG,OM,y}$ and $EF_{SCPG,BM,y}$ of the SCPG the project connected have been updated according to the latest data available on 20/12/2018.

The Oil and Gas Planning Department, Ministry of Electricity and Energy of the Union of Myanmar issued Myanmar Energe Statistics 2019 which is the latest data officially released for the MNPG. The emission factors $EF_{MNPG,OM,y}$ and $EF_{MNPG,CM,y}$ of MNPG have been updated based on the calculation according to above data sources.

For the hydropower project, the values of $W_{OM}$ and $W_{BM}$ for SCPG also need to be updated in the second crediting period as per the "Tool to calculate the emission factor for an electricity system" version 07.0.

The parameters mentioned above were determined at the start of the first crediting period are not valid any more. In addition, the parameters such as $W_{OM}$ and $W_{BM}$ for MNPG are still valid according to the "Tool to calculate the emission factor for an electricity system" version 07.0. Thus the baseline emissions need to be updated for the second crediting period with the application of the new data available.

**Step 2: Update the current baseline and the data and parameters**

**Step 2.1: Update the current baseline**

The baseline emissions have been updated for the second crediting period, without

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| | re-assessing the baseline scenario, based on the latest approved version (Version 20.0) of the methodology ACM0002 applicable to the project activity taking into account the sectoral policies and circumstances that are applicable at the time of request for renewal of the crediting period.<br><br>**Step 2.2: Update the data and parameters**<br>**For $EF_{SCPG,CM,y}$:** The "2017 Baseline Emission Factors for Regional Power Grid in China" was issued by DNA of China, which was calculated according to the "Tool to calculate the emission factor for an electricity system". The values of $W_{OM}$ (0.25) and $W_{BM}$ (0.75) for SCPG are as per the "Tool to calculate the emission factor for an electricity system", version 07.0. The verification team confirms that the $EF_{SCPG,CM,y}$ is calculated as per the udapted values.<br>**For $EF_{MNPG,CM,y}$:** Due to Myanmar located in a Least Developed Country (LDC), the simplified CM method is selected to calculate the $EF_{MNPG,CM,y}$ which is in accordance with the "Tool to calculate the emission factor for an electricity system", version 07.0. The data available in the most recent three historical years (2014-2016) issued in Myanmar Energe Statistics 2019 has been used for the calculation of the combined emission factor of MNPG ($EF_{MNPG,CM,y}$). The values of $W_{OM}$ (1) and $W_{BM}$ (0) for MNPG keep unchanged as per the "Tool to calculate the emission factor for an electricity system", version 07.0. The verification team confirms that the $EF_{MNPG,CM,y}$ is calculated as per the udapted values.<br>The validation team confirmed that the applied data and parameters are latest available at the time of the project participant requesting renewal of the crediting period and valid for calculation of baseline grid emission factor of the second crediting period. |
| **Conclusion** | CTI confirmed that the baseline scenario for the project is continuation for the current practice, namely provision of equivalent amount of annual power output by the grid where the project is connected to. |

## D.4. Estimated emission reductions or net anthropogenic removals

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| **Means of validation** | The GHG emission reduction calculations were checked in accordance with the formulae given in the baseline and monitoring methodology ACM0002 (Version 20.0). |
| **Findings** | 1. Baseline emissions<br>The baseline is that, in the absence of the project activity, equivalent amount of electricity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources within the grid. Therefore, following ACM0002 (Version 20.0), the baseline emissions ($BE_y$, in $tCO_2e$) are the product of the baseline emissions factor ($EF_{grid,CM,y}$ in $tCO_2/MWh$) times the net power delivered to the grid ($EG_{PJ,y}$ in MWh):<br>$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$<br>For the project, the electricity is expected to be supplied to both SCPG and MNPG. |

The baseline emission is calculated as below:

$$BE_y = BE_{SCPG,y} + BE_{MNPG,y}$$

**1) Calculation of $BE_{SCPG,y}$**

The baseline emissions to SCPG were calculated as the product of the net electricity exported to SCPG and the baseline emission factor of SCPG.

$$BE_{SCPG,y} = EG_{PJ\ net\ to\ SCPG,y} \times EF_{SCPG,CM,y}$$

**Determination of $EG_{PJ\ net\ to\ SCPG,y}$**

$EG_{PJ\ net\ to\ SCPG,y}$ is equal to the electricity exported to the SCPG ($EG_{PJ\ to\ SCPG,y}$) minus the electricity imports from the SCPG ($EG_{SCPG\ to\ PJ,y}$) by the project as below:

$$EG_{PJ\ net\ to\ SCPG,y} = EG_{PJ\ to\ SCPG,y} - EG_{SCPG\ to\ PJ,y}$$

Where:

**$EG_{PJ\ net\ to\ SCPG,y}$** is the quantity of net electricity generation that is produced and fed into SCPG as a result of the implementation of the project activity in year *y*.

**$EG_{PJ\ to\ SCPG,y}$** is the electricity exported to SCPG by the project in year y.

**$EG_{SCPG\ to\ PJ,y}$** is the electricity imported from SCPG to the project in year y.

As stated above, the annual electricity supplied to SCPG during the first 25 operational years of the project is 950,290 MWh.

**Determination of $EF_{SCPG,CM,y}$**

The grid emission factor of SCPG ($EF_{SCPG,CM,y}$) is determined *ex-ante* as a combined margin of the operating margin (OM) and build margin (BM) (the weighted average $w_{OM} = 0.25$, $w_{BM} = 0.75$ for the hydropower projects in the second crediting period) according to the "Tool to calculate the emission factor for an electricity system". The $EF_{SCPG,CM,y}$ is calculated to be 0.3948 $tCO_2$/MWh.

$BE_{SCPG,y} = EG_{PJ\ net\ to\ SCPG,y} \times EF_{SCPG,CM,y} = 950{,}290 \times 0.3948 = 375{,}174\ tCO_2e$

**2) Calculation of $BE_{MNPG,y}$**

The baseline emissions to MNPG were calculated as the product of the net electricity exported to MNPG and the baseline emission factor of MNPG.

$$BE_{MNPG,y} = EG_{PJ\ net\ to\ MNPG,y} \times EF_{MNPG,CM,y}$$

**Determination of $EG_{PJ\ net\ to\ MNPG,y}$**

$EG_{PJ\ net\ to\ MNPG,y}$ is equal to the electricity exported to the MNPG ($EG_{PJ\ to\ MNPG,y}$) minus the electricity imports from the MNPG ($EG_{MNPG\ to\ PJ,y}$) by the project as below:

$$EG_{PJ\ net\ to\ MNPG,y} = EG_{PJ\ to\ MNPG,y} - EG_{MNPG\ to\ PJ,y}$$

Where:

**$EG_{PJ\ net\ to\ MNPG,y}$** is the quantity of net exported electricity from the project to MNPG in year *y*.

**$EG_{PJ\ to\ MNPG,y}$** is the quantity of electricity exported to MNPG by the project in year y.

**$EG_{MNPG\ to\ PJ,y}$** is the electricity imported from MNPG to the project in year y. As

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| | indicated in the registered PDD and updated PDD, the proposed project is likely to import the electricity from the SCPG in case of equipment shutdown or overhaul. The proposed project is not import the electricity from the MNPG. So, $EG_{MNPG\ to\ PJ}$=0.<br><br>As described above, the annual electricity supplied to MNPG during the first 25 operational years of the project is 79,636 MWh.<br><br>**Determination of $EF_{SCPG,CM,y}$**<br><br>The grid emission factor ($EF_{MNPG,CM,y}$) is determined *ex-ante* as a combined margin of the operating margin (OM) and build margin (BM) (the weighted average $w_{OM}$ = 1, $w_{BM}$ = 0 for the project activity located in a LDC country) according to the "Tool to calculate the emission factor for an electricity system". The $EF_{MNPG,CM,y}$ is calculated to be 0.3513 $tCO_2$/MWh.<br><br>$BE_{MNPG,\ y}$＝$EG_{PJ\ net\ to\ MNPG,y}$ ×$EF_{MNPG,CM,y}$ = 79,636×0.3513 = 27,979 $tCO_2e$<br><br>Thus, the baseline emissions ($BE_y$) is calculated as below:<br>$BE_y$ = $BE_{SCPG,y}$ +$BE_{MNPG,\ y}$=375,174+27,979=403,153 $tCO_2e$<br><br>2. Project emissions<br>The project is a new hydropower plant, with a new single reservoir, so the $CAP_{BL}$ and $A_{BL}$ is zero. The Power Density (PD) is 585 W/$m^2$ greater than 10 W/$m^2$, as per the methodology, project emission is zero. Based on document review, the validation team regards this consideration is correct, and in line with methodology ACM0002 (Version 20.0).<br><br>3. Leakage emissions<br>No leakage is considered under the methodology ACM0002 (Version 20.0).<br><br>Finally, emission recuctions are calculated as:<br>$ER_y$ =$BE_y$ – $PE_y$ – $LE_y$ = $BE_y$ – 0 – 0= $BE_y$=403,153 $tCO_2e$<br><br>The information of parameters used for calculating $EF_{MNPG,OM,y}$ needs to be clarified in the PDD with supporting data sources according to the "Tool to calculate the emission factor for an electricity system" (Version 07.0), and also the calculation process of $EF_{MNPG,OM,y}$ needs to be described in Appendix 4 of the PDD. Therefore, the CL 02 was raised.<br>In addition, the values of $EF_{MNPG,OM,y}$ and $EF_{MNPG,CM,y}$ are identified inconsistent, such as 0.5595 $tCO_2$/MWh in B.6.1 and B.6.2, 0.3513 $tCO_2$/MWh in B.6.3. Therefore, the CAR 01 was raised. |
| **Conclusion** | By checking the updated PDD, CTI confirms that the information of parameters |

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| | used for calculating $EF_{MNPG,OM,y}$ has been described in the PDD and the calculation process of $EF_{MNPG,OM,y}$ has been added in Appendix 4 of the PDD. The data in most recent three historical years (2014-2016) issued in Myanmar Energe Statistics 2019 and $CO_2$ emission factor for the specific fuel type sourced from IPCC 2006 has been used for the calculation of which is in accordance with the "Tool to calculate the emission factor for an electricity system" (Version 07.0). Therefore, the CL 02 is closed.<br>In the updated PDD, CTI confirms that the typo error for inconsistent values of $EF_{MNPG,OM,y}$ and $EF_{MNPG,CM,y}$ has been corrected. Therefore, CAR 01 has been closed.<br>All assumptions and data used by the project participants are listed in the updated PDD and/or supporting documents, including their references and sources. All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the updated PDD. All values used in the updated PDD are considered reasonable in the context of the proposed CDM project activity. The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakages and emission reductions. All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in the updated PDD. |

## D.5. Validity of monitoring plan

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| **Means of validation** | Based on review of the documented procedures, interviews with relevant personnel, CTI evaluated the revised monitoring plan for the proposed project to ensure that it is based on the approved monitoring methodology that has been applied, and assessed:<br>(1) Whether the monitoring plan contains all necessary parameters;<br>(2) Whether the parameters are clearly described;<br>(3) Whether the means of monitoring described in the plan complies with the requirements of the methodology;<br>(4) Whether the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, are sufficient to ensure that the emission reductions can be reported ex post and verified. |
| **Findings** | The project applies the approved monitoring methodology ACM0002 (Version 20.0).<br><br>Based on the interview and checking the FSR, the connection diagram, PPA and meters, it is confirmed that the main meter and back-up meter are bidirectional installed at SCPG interface point to measure the electricity exports to the grid by the project ($EG_{PJ\ to\ SCPG,y}$) and the electricity imports from the grid by the project ($EG_{SCPG\ to\ PJ,y}$) and two meters (main and back-up) are installed at the MNPG interface point to measure the electricity exported to the MNPG ($EG_{PJ\ to\ MNPG,\ y}$). The |

accurancy of all meters is 0.2s which is in accordance with the monitoring plan. In case of the main meter out of order, readings from the back-up meter will be used. Each meter will be annually calibrated according to industry standards.

The electricity monitored for $EG_{PJ\ to\ SCPG,\ y}$, $EG_{SCPG\ to\ PJ,\ y}$ will be crosschecked with the electricity sales receipts settled between the project owner and the grid company. For the $EG_{PJ\ to\ MNPG,\ y}$, because the electricity supplied to the Myanmar by the project are all free, these part of electric volume doesn't involve the settlement between the MNPG and the project owner, so the meter records will be together signed and stamped by MNPG and the project owner and used for ERs calculation, which is confirmed by CTI to be in line with the registered monitoring plan.

The installed capacity of the hydro power plant ($CAP_{PJ}$) will be verified by checking the nameplate of installed water turbine generators and the area of the reservoir after the implementation of the project ($A_{PJ}$) will be measured by the qualified design institute once at the beginning of the second crediting period.

CTI confirmed that the monitoring plan in the updated PDD (version 06.1) is in line with the registered PDD (version 05), complies with the requirements of the methodology and reflects the real situation.

**(1) Parameters determined ex-ante**

The following parameters are determined *ex-ante* and will be kept fixed during the second crediting period, which have been verified by CTI.

| Data and parameter | Unit | Ex-ante value | Data source |
|---|---|---|---|
| Operating margin emission factor of SCPG ($EF_{SCPG,OM,y}$) | $tCO_2/MWh$ | 0.8367 | The emission factors of operating margin and build margin are calculated ex-ante based on the most recent information available at the time of requesting for crediting period renewal . |
| Build margin emission factor of SCPG ($EF_{SCPG,BM,y}$) | $tCO_2/MWh$ | 0.2476 | |
| Combined margin emission factor of SCPG ($EF_{SCPG,CM,y}$) | $tCO_2/MWh$ | 0.3948 | |
| Operating margin emission factor of MNPG ($EF_{MNPG,OM,y}$) | $tCO_2/MWh$ | 0.3513 | |
| Combined margin emission factor of MNPG ($EF_{MNPG,CM,y}$) | $tCO_2/MWh$ | 0.3513 | |
| Weighting of operating margin emissions factor ($w_{OM}$) | % | 25 for SCPG<br>100 for MNPG | |
| Weighting of build margin emissions factor ($w_{BM}$) | % | 75 for SCPG<br>0 for MNPG | |
| Installed capacity of the hydro | W | 0 | Confirmed with |

| | | | |
|---|---|---|---|
| power plant before the implementation of the project activity ($CAP_{BL}$) | | | FSR |
| Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full ($A_{BL}$) | $m^2$ | 0 | Confirmed with FSR |

Data and parameters have been indicated in B.6.2 of the PDD and used to calculate the combined margin emission factors of two grids.

**(2) Parameters monitored ex-post**

According to ACM0002 (Version 20.0), data and parameters monitored for the project are:

| | |
|---|---|
| $EG_{PJ\ to\ SCPG,y}$ | Electricity exported to SCPG by the project in year y |
| $EG_{SCPG\ to\ PJ,y}$ | Electricity imported from SCPG to the project in year y |
| $EG_{PJ\ to\ MNPG,\ y}$ | Electricity exported to MNPG by the project in year y |
| $CAP_{PJ}$ | Installed capacity of the hydro power plant after the implementation of the project activity |
| $A_{PJ}$ | Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full ($m^2$) |

**(3) Management system and quality assurance**

Detailed procedures have been elaborated in the updated PDD, including;

- Monitoring team
- Monitoring system
- Data collection procedures
- Emergency procedures
- Staff training
- Internal audit

These will be maintained and implemented to enable subsequent verification of emission reductions.

| | |
|---|---|
| **Conclusion** | CTI confirmed that the project correctly applies the approved monitoring methodology ACM0002 (Version 20.0). The monitoring plan will give opportunity for real measurements of achieved emission reductions. CTI considers the project participants are capable to implement the monitoring plan. |

## D.6. Crediting period

| | |
|---|---|
| **Means of validation** | CTI reviewed the PDD, and registration information in the UNFCCC website to confirm the validity of the second crediting period. |
| **Findings** | The project was registered on 04/02/2013 as CDM project and the first crediting period was from 04/02/2013 to 03/02/2020.The renewed second crediting period is from 04/02/2020 to 03/02/2027.<br><br>As per the Para 272 of the PCP (version 02.0), the renewal request shall be submitted "no earlier than 270 days prior to, but no later than one year after, the expiry of the crediting period". With regard to this registered project activity, its renewal request is no later than one year after the expiry of the crediting period. The validation team confirmed that the request for renewal of crediting period of the project meets the requirements of CDM PCP. |
| **Conclusion** | The validation team confirmed that the request for renewal of crediting period of the project meets the requirements of CDM PCP, and the 2nd crediting period is valid. |

## D.7. Project participants

| | |
|---|---|
| **Means of validation** | CTI reviewed the PDD, and registration information in the UNFCCC website to confirm the validity of project participants. |
| **Findings** | It is confirmed that the project participants including "Dapein (1) Hydropower Company Limited" from the host Party Myanmar, "Cleantec Development PCC" from Annex I country Netherlands and "Dapein (1) Hydropower Company Limited" from China, which are verified by CTI by checking the MoC and LoAs. The DNAs from Myanmar and China confirmed that the project assists in achieving sustainable development. |
| **Conclusion** | The validation team confirmed that the project participant indicted in the updated PDD are consistent with name in the UNFCCC website for the project. |

## D.8. Post-registration changes

| **Type of post-registration changes (PRCs)** | **Confirmation** (Y/N) | **Validation report for PRCs** | |
|---|---|---|---|
| | | **Version** | **Completion date** |
| Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents[1] | NA | NA | NA |
| Corrections | NA | NA | NA |
| Change to the start date of the crediting period | NA | NA | NA |
| Inclusion of a monitoring plan | NA | NA | NA |
| Permanent changes to the registered monitoring plan, or | NA | NA | NA |

[1] Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

| | | | |
|---|---|---|---|
| permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents | | | |
| Changes to the project design | NA | NA | NA |
| Changes specific to afforestation and reforestation project activities | NA | NA | NA |

## SECTION E. Internal quality control

>>

The validation report underwent a technical review performed by a technical reviewer qualified in accordance with CTI's qualification scheme for CDM validation and verification.

## SECTION F. Validation opinion

>>

Shenzhen CTI International Certification Co., Ltd (CTI) has performed a validation of renewal of crediting period of the project activity "Dapein (1) Hydropower Project in Union of Myanmar" (UNFCCC Registration No.:7731). The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism as well as criteria given to provide for consistent project operations, monitoring and reporting.

The report is based on the assessment of the project design document undertaken through stakeholder consultations, application of standard auditing techniques including but not limited to document reviews, follow-up interviews with project stakeholders, review of the applicable methodology and its underlying formulae and calculations.

The project participants are "Dapein (1) Hydropower Company Limited" from the host Party Myanmar, "Cleantec Development PCC" from Annex I country Netherlands and "Dapein (1) Hydropower Company Limited" from China.

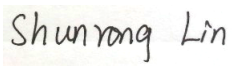
The project correctly applies the baseline and monitoring methodology ACM0002, Version 20.0, "Grid-connected electricity generation from renewable sources".

The project results in reductions on-term benefits to the mitigation of climate change. The total emission reductions from the project are estimated to be on the average 403,153 $tCO_2e$ per year over the second renewable crediting period. The emission reductions forecast have been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is CTI's opinion that the project participants are able to implement the monitoring plan.

In summary, it is CTI's opinion that the project activity "Dapein (1) Hydropower Project in Union of Myanmar", as described in the PDD (version 06.1 dated 03/12/2020), meets all relevant UNFCCC requirements for the renewal of crediting period. Hence, CTI requests the renewal of the crediting period of the project.

Ms. Guolian Wang
Team Leader
15/12/2020



Ms. Shunrong Lin
Technical Reviewer
15/12/2020

# Appendix 1. Abbreviations

| Abbreviations | Full texts |
|---|---|
| BM | Build Margin |
| CAR | Corrective Action Request |
| CDM | Clean Development Mechanism |
| CDM PCP | CDM project cycle procedure for project activities |
| CDM PS | CDM project standard for project activities |
| CDM VVS | CDM Validation and Verification Standard |
| CER | Certified Emission Reduction(s) |
| CL | Clarification request |
| CM | Combined Margin |
| $CO_2$ | Carbon dioxide |
| $CO_2e$ | Carbon dioxide equivalent |
| CTI | Shenzhen CTI International Certification Co., Ltd |
| DNA | Designated National Authority |
| DOT | Development Operation Transfer |
| EF | Emission Factor |
| FAR | Forward Action Request |
| FSR | Feasibility Study Report |
| GHG | Greenhouse gas(es) |
| IPCC | Intergovernmental Panel on Climate Change |
| LoA | Letter of approval |
| MEE | Ministry of Ecology and Environment of the People's Republic of China |
| MNPG | Myanmar National Power Grid |
| OM | Operating Margin |
| PDD | Project Design Document |
| PPA | Power Purchase Agreement |
| SCPG | South China Power Grid |
| $tCO_2e$ | Tonnes of $CO_2$ equivalents |
| UNFCCC | United Nations Framework Convention on Climate Change |

# Appendix 2. Competence of team members and technical reviewers

## Ms. Guolian WANG

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

| Qualification | | | | | |
|---|---|---|---|---|---|
| GHG Auditor | Validator | Verifier | Team Leader | Technical Reviewer | Technical Expert |
| √ | √ | √ | √ | √ | √ |

| Scope | Technical Area |
|---|---|
| SS 1: Energy industries (renewable/non-renewable sources) | TA 1.2: Energy generation from renewable energy sources |
| SS 5: Chemical industry | TA 5.1: Chemical industry |
| | TA 5.2: Caprolactam, nitric and adipic acid |
| SS 11: Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride | TA 11.1: Emissions of fluorinated gases |
| | TA 11.2: Refrigerant gas production |
| SS 12: Solvents use | TA 12.1: Chemical industry |

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by:

Wu LIN Wu Lin

Technical Competent Manager

Shenzhen, 01/01/2018

# Ms. Shunrong Lin

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

| **Qualification** | | | | | |
|---|---|---|---|---|---|
| GHG Auditor | Validator | Verifier | Team Leader | Technical Reviewer | Technical Expert |
| √ | √ | √ | √ | √ | √ |

| **Scope** | **Technical Area** |
|---|---|
| SS 1: Energy industries (renewable/non-renewable sources) | TA 1.2: Energy generation from renewable energy sources |
| SS 14: Afforestation and reforestation | TA 14.1: Afforestation and reforestation |
| SS 15: Agriculture | TA 15.1: Agriculture |

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by:

Wu LIN Wu Lin

Technical Competent Manager

Shenzhen, 01/01/2018

# Appendix 3. Documents reviewed or referenced

| No. | Author | Title | References to the document | Provider |
|---|---|---|---|---|
| 1 | PP | Registered CDM-PDD for project activity "Dapein (1) Hydropower Project in Union of Myanmar", version 05 | 08/10/2012 | PP |
| 2 | PP | CDM PDD for renewal of crediting period of project activity "Dapein (1) Hydropower Project in Union of Myanmar", version 06.0 | 27/10/2020 | PP |
| 3 | PP | CDM PDD for renewal of crediting period of project activity "Dapein (1) Hydropower Project in Union of Myanmar", version 06.1 | 03/12/2020 | PP |
| 4 | PP | Emission reduction spreadsheet for renewal of crediting period of project activity | - | PP |
| 5 | PP | CDM Monitoring Manual | - | PP |
| 6 | Grid company | Power Purchase Agreement (PPA) signed between the SCPG and the project owner | 2010-2020 | PP |
| 7 | PP | Diagram of power connection system of the Project | - | PP |
| 8 | PP | Photos of the meters | - | PP |
| 9 | PP | Water turbine units commission reports | 2010 | |
| 10 | PP | Daily operational and maintenance records | 2010-2020 | PP |
| 11 | PP | Electricity sales receiptes | 2010-2020 | PP |
| 12 | PP | Nameplate of installed equipment of the project | - | PP |
| 13 | Dapein (1) Hydropower Company Limited | Water turbine and generator units purchase contract | 2008 | PP |
| 14 | PP | Internal Training Mannual and Records | - | PP |
| 15 | RINA | Validation report, Version 1.3 | 12/10/2012 | PP |
| 16 | Datang (Yunnan) United Hydropower Developing Co. Ltd | Feasibility study report (FSR) | 11/2007 | PP |
| 17 | Ministry of Electric Power NO.(1), Union of Myanmar | FSR Approval | 15/01/2008 | PP |
| 18 | Myanmar DNA | LoA for Dapein (1) Hydropower Company Limited | 22/12/2010 | |
| 19 | China DNA | LoA for Dapein (1) Hydropower Company Limited | 04/11/2011 | PP |
| 20 | Netherlands DNA | LoA for Dapein (1) Hydropower Company Limited | 10/09/2012 | PP |
| 21 | PP | MoC for Dapein (1) Hydropower Company Limited | 27/08/2013 | PP |
| 22 | MEE | 2017 Baseline Emission Factors for Regional Power Grid in China | 20/12/2018 | Others |
| 23 | The Oil and Gas Planning Department, Ministry of Electricity and Energy of the Union of Myanmar | Myanmar Energe Statistics 2019 | 2019 | Others |
| 24 | IPCC | IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy. | 2006 | Others |
| 25 | CDM Website | Registered information of project activity in the UNFCCC website: | - | Others |

| | | | | |
|---|---|---|---|---|
| | | https://cdm.unfccc.int/Projects/DB/JCI1350363892.83/view | | |
| 26 | National People's Congress | China Renewable Energy Law | 01/01/2016 | Others |
| 27 | Industry standard | DL/T 448-2016 Technical administrative code of electric energy metering | - | Others |
| 28 | Industry standard | JJG 596-2012 Electronic energy meter testing procedures | - | Others |
| 29 | EB | CDM project cycle procedure for project activities, version 02.0 | 29/11/2018 | Others |
| 30 | EB | CDM validation and verification standard for project activities, version 02.0 | 29/11/2018 | Others |
| 31 | EB | CDM project standard for project activities, version 02.0. | 29/11/2018 | Others |
| 32 | EB | Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period, version 03.0.1. | 02/03/2012 | Others |
| 33 | EB | Baseline and monitoring methodology, ACM0002, Grid-connected electricity generation from renewable sources, Version 20.0 | 28/11/2019 | Others |
| 34 | EB | Tool to calculate the emission factor for an electricity system, version 07.0. | 31/08/2018 | Others |

# Appendix 4. Clarification requests, corrective action requests and forward action requests

**Table 1. CL from this validation**

| **CL ID** | 01 | **Section no.** | D.1 | **Date:** 27/11/2020 |
|---|---|---|---|---|
| **Description of CL** | | | | |
| As per the "Instructions for completing CDM-PDD-FORM", the following information needs to be provided in the PDD:<br>1. The title of the applied methodology needs also to be proivded on the cover page of the PDD;<br>2. The project boundary of the project activity needs to be described in the Section A.1;<br>3. The information of monitoring equipment and their location in the systems also needs to be provided in Section A.3;<br>4. In Section B.3, the project boundary of the project activity, including the physical delineation of the project activity, and which sources and GHGs are included in the project boundary, needs to be defined in accordance with the applied methodologies and the applied standardized baselines. | | | | |
| **Project participant response** | | | | **Date:** 03/12/2020 |
| Response:<br>1. the methodology name has been added;<br>2. the project boundary has been described;<br>3. the information of monitoring equipment and the location in the system has been provided;<br>4. the project boundary has been difined. | | | | |
| **Documentation provided by project participant** | | | | |
| Updated PDD (version 06.1 dated 03/12/2020) | | | | |
| **DOE assessment** | | | | Date: 13/12/2020 |
| By checking the updated PDD (version 06.1), CTI confirms that the relevant information has been correctly described as required. Therefore, the CL 01 is closed. | | | | |

| **CL ID** | 02 | **Section no.** | D.4 | **Date:** 27/11/2020 |
|---|---|---|---|---|
| **Description of CL** | | | | |
| The information of parameters used for calculating $EF_{MNPG,OM,y}$ needs to be clarified in the PDD with supporting data sources according to the "Tool to calculate the emission factor for an electricity system" (Version 07.0), and also the calculation process of $EF_{MNPG,OM,y}$ needs to be described in Appendix 4 of the PDD. | | | | |

| **Project participant response** | **Date:** 03/12/2020 |
|---|---|
| The parameters and the calculation procedure for $EF_{MNPG,OM,y}$ have been added. | |
| **Documentation provided by project participant** | |
| Updated PDD (version 06.1 dated 03/12/2020) | |
| **DOE assessment** | Date: 13/12/2020 |
| By checking the updated PDD (version 06.1), CTI confirms that the information of parameters used for calculating $EF_{MNPG,OM,y}$ has been described in the PDD and the calculation process of $EF_{MNPG,OM,y}$ has been added in Appendix 4 of the PDD. The data in most recent three historical years (2014-2016) issued in Myanmar Energe Statistics 2019 and $CO_2$ emission factor for the specific fuel type sourced from IPCC 2006 has been used for the calculation of which is in accordance with the "Tool to calculate the emission factor for an electricity system" (Version 07.0). Therefore, the CL 02 is closed. | |

**Table 2. CAR from this validation**

| **CAR ID** | 01 | **Section no.** | D.4 | Date: 27/11/2020 |
|---|---|---|---|---|
| **Description of CAR** | | | | |
| The values of $EF_{MNPG,OM,y}$ and $EFMNPG,CM,y$ are identified inconsistent, such as 0.5595 $tCO_2$/MWh in B.6.1 and B.6.2, 0.3513 $tCO_2$/MWh in B.6.3. | | | | |
| **Project participant response** | | | | **Date:** 03/12/2020 |
| This typo has been revised. | | | | |
| **Documentation provided by project participant** | | | | |
| Updated PDD (version 06.1 dated 03/12/2020) | | | | |
| **DOE assessment** | | | | Date: 13/12/2020 |
| CTI confirms that the typo error has been corrected in the updated PDD. Therefore, CAR 01 has been closed. | | | | |

**Table 3. FAR from this validation**

| **FAR ID** | NA | **Section no.** | NA | Date: NA |
|---|---|---|---|---|
| **Description of FAR** | | | | |
| NA | | | | |
| **Project participant response** | | | | Date: NA |
| NA | | | | |
| **Documentation provided by project participant** | | | | |
| NA | | | | |
| **DOE assessment** | | | | Date: NA |
| NA | | | | |

- - - - -

## Document information

| *Version* | *Date* | *Description* |
|---|---|---|
| 03.0 | 31 May 2019 | Revision to:<br>• Ensure consistency with version 02.0 of the "CDM validation and verification standard for project activities" (CDM-EB93-A05-STAN) and version 02.0 of the "CDM project cycle procedure for project activities" (CDM-EB93-A06-PROC);<br>• Make editorial improvements. |
| 02.0 | 31 October 2017 | Revision to align with the requirements of the "CDM validation and verification standard for project activities" (version 01.0). |
| 01.0 | 23 March 2015 | Initial publication. |

Decision Class: Regulatory
Document Type: Form
Business Function: Renewal of crediting period
Keywords: crediting period, project activities, validation report