

# Environmental and Social Compliance Audit Report

Project Number: 52292-001  
December 2018

## THA: Thailand Green Bond Project

Prepared by DNV GL Business Assurance Australia Pty Limited for the B.Grimm Power Company Limited and the Asian Development Bank.

# **B.GRIMM Power Company Limited ESMS Assessment & E&S Due Diligence Assessment**

**November 2018**

**Asian Development Bank**

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**Customer Details**

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Customer Name: Asian Development Bank  
Project Name: Enhancing Readiness of ADB Developing Member Countries for Scaled Up Climate Finance  
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**DNV GL Details**

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Title: B.GRIMM Power Company Limited  
ESMS Assessment &  
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**Project Team**

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15 October 2018

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## INTRODUCTION

This document has been created to detail the Audit executed for the Asian Development Bank's (ADB's) Safeguards ESMS and Due Diligence assessment of the entity B.GRIMM Power Company Limited (B.GRIMM). This report has been produced to present the context, procedures, findings and Corrective Action Plan of the Environment and Social Management System (ESMS) Assessment and Due Diligence assessment. This assessment has been based on the requirements of the ADB Safeguards Policy Statement 2009 (SPS 2009) and where available and applicable, local regulations and requirements. The purpose of this report is to provide a narrative context, findings summary and discussion of the outcomes, lessons and process completed as a part of this process. This report is to be followed by works to conduct a Climate Bonds Standard Verification of the proposed.

### 1. ASSESSMENT SCOPE

The scope of the project is to provide an external audit of the environmental, social, health and safety performance of the client (B.GRIMM) in accordance with the ADB Safeguard Policy Statement<sup>1</sup> General Corporate Finance modality requirements; and assist and advise the client (B.GRIMM) to ensure projects' compliance with ADB's safeguard policy requirements. The work has been conducted on

- a) corporate audit of the Company's current Environmental and Social Management System (ESMS) or equivalent, and;
- b) compliance audit of the Company's current performance of its existing and proposed Solar Photo Voltaic (Solar PV) projects in Thailand against the objectives, principles, and requirements of ADB's SPS (2009)<sup>1</sup>, Social Protection Strategy (2001), Policy on Gender and Development (1998), and the Public Communication Policy (2011). Compliance with applicable local laws and regulations.

Specifically, this assessment is to:

- i) Assess the capacity of the Company to manage and address all relevant environmental and social impacts and risks of its business operations (construction and operation of Solar PV operations) and the proposed subprojects or activities, particularly the issues identified in the SPS Safeguard Requirements 1-3;
- ii) Assess the Company's compliance with the applicable national and local laws and regulations of the jurisdiction in which the subprojects/facilities operate that pertain to environmental and social matters, including those laws implementing host country obligations under international law;
- iii) Assess the Company's human resource policy and practices and its gender responsiveness and its compliance with national labor laws and the international core labor standards, and;

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<sup>1</sup>ADB's Safeguard Policy Statement, 2009(<http://www.adb.org/dites/default/files/institutional-document/32056/safeguard-policy-statement-june2009.pdf>)

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- iv) Identify the Company's main stakeholder groups and current stakeholder engagement activities.

## 2. METHODOLOGY

### Desk Based Reviews

ADB shared an information request list based on which relevant documents on the projects were provided by B.GRIMM via electronic transmission. The documents provided were reviewed and further relevant information as required was requested by ADB and provided by B.GRIMM.

Documents provided for the Desk Review include:

- BGSK1\_Yearly production and performance report 2017
- BGYSP\_O&M Yearly report 2017
- Credit Facilities Agreement\_BGYSP
- Credit\_Facilities\_Agreement\_BGPSK
- Energy Yield Forecast\_VET-Coop
- Environmental and Safety Assessment (ESA) report, Code of Practice (CoP) report, and Environmental and Social Screening Checklist for Solar Ban Na Doem, Surat Thani - Agri Coop
- Environmental and Safety Assessment (ESA) report, Code of Practice (CoP) report Solar Bang Bo, Samut Prakan – Vet
- Environmental and Safety Assessment (ESA) report, Code of Practice (CoP) report Solar Chachoengsao – Vet
- Environmental and Safety Assessment (ESA) report, Code of Practice (CoP) report Solar Chon Daen Phetchabun - Agri Coop
- Environmental and Safety Assessment (ESA) report, Code of Practice (CoP) report Solar Lat krabang, Bangkok – Vet
- Environmental and Safety Assessment (ESA) report, Code of Practice (CoP) report Solar Nong Chok, Bangkok - Vet –
- Environmental and Safety Assessment (ESA) report, Code of Practice (CoP) report Solar Sai Noi, Nonthaburi – Vet
- Green bond use of proceed diagram
- LTA Report 521130 B Grimm Yanhee Power 9 PV Power Projects Draft Due Diligence report rev 4
- LTA Report 521134 B Grimm Power Sra Kaeo 8MW PV Power Project Final Due Diligence report rev 2
- Project Information\_VET-Coop
- Projected financial statements (VET Coop)\_to ADB
- Credit Facilities Agreement\_BGYSP
- Credit\_Facilities\_Agreement\_BGPSK
- Summary of Solar Projects\_2018.09.06 (003)

## Kick off and Introduction

A meeting was held at the B.GRIMM corporate office to introduce the ADB team and discuss the project. B.GRIMM presented a brief overview of the Projects and discussions were held for the entire assessment and selection of sites for the visits.

## Corporate Audit Findings

B.GRIMM is a multinational conglomerate, based in Bangkok, Thailand and founded in 1878. The organisation is active in healthcare, energy, building & industrial systems, real estate, e-commerce, and transport.

B.GRIMM Energy Company Ltd, a subsidiary of B.GRIMM, builds and operates power plants in Thailand, Laos and Vietnam, providing electricity and steam for national power grids as well as private customers. It owns and operates more than 20 power plants in Thailand, four in Laos and one in Vietnam.

B.GRIMM is significantly expanding into renewable energy generation, particularly in Solar PV generation in Thailand. This assessment has been undertaken in the context of the B.GRIMM Solar Photo-Voltaic (PV) assets under operation and construction in Thailand. These Solar PV assets are proposed to be subject to re-financing via a Green Bond which ADB intends to subscribe to in full.

ADB's assistance will be deployed for refinancing the seven solar plants under construction and 16 existing solar plants in Thailand.

Subproject	Location	Capacity (MW)
<b>Operational Assets</b>		
1. Sai Luang 2	Pathumthani Province	8
2. Sai Luang 3	Pathumthani Province	8.0
3. Sai Luang 9	Pathumthani Province	7.2
4. Sai Luang 10	Pathumthani Province	7.5
5. Sai Yai Nha	Pathumthani Province	8.0
6. Sai Manow	Pathumthani Province	8.0
7. Sai Putsa	Pathumthani Province	8.0
8. Sai Sena 2	Ayutthaya Province	5.0
9. Sakeo 1	Sakeo Province	8.0
<b>Under Construction Assets</b>		
1. Chachoengsao	Chachoengsao Province	3.6
2. Chon Daen	Phetchabun Province	2.3
3. Ban Na Doem	Surat Thani Province	5.0
4. Lat Krabang	Bangkok	5.0

5. Sai Noi	Nonthaburi Province	5.0
6. Bang Bo	Samut Prakan Province	5.0
7. Nong Chok	Bangkok	5.0

The B.GRIMM ESMS and Environmental and Social (E&S) Due Diligence Audit identified a range of E&S related issues at both the management system and site level. Detail of the findings and related corrective action are located in Section 6 of this report. It is acknowledged that the findings of this E&S Due Diligence Audit are not to be considered non-compliances with ADB SPS 2009 requirements or B.GRIMM ESMS commitments as the projects were not previously ADB funded. These findings however are required to be addressed as a part of the proposed ADB funding. Findings are discussed in at a high level in this section, with site specific findings detailed in Section 3 of this report.

## B.GRIMM Organisation Structure

B.GRIMM Power Company Limited is a corporate entity within the B.GRIMM Group of companies that builds, owns and operates energy generation facilities including gas, diesel and renewable energy assets.

The Solar projects are supported by the Special Projects division and the Project Development and Commercial Team who sit below the Management Committee.

The Special Projects Team handle the Business Development, Operational Monitoring and Government/Community Affairs and Relations. The Special Projects Team also prepare the E&S Reports related to the Solar Projects. The E&S Team includes the SHE Working Team, ESMS Working Team and OHS Working Team and sits under the Project Development and Commercial division.

ADB Funding is to be directed to the Special Projects division for investment in the Solar PV projects.

*Figure 1. B.GRIMM Organizational Structure relevant to Solar projects.*



## Organization Chart • Solar Project & E&S Team



## Environmental and Social Management System

B.GRIMM has in place an ESMS approved by ADB in July 2017 and updated in conjunction with the ADB in April 2018 to include renewable energy projects. The ESMS was developed for the projects which ADB intended to finance in a previous loan. Projects audited for this financing proposal were not necessarily covered by that ESMS. The ESMS document includes sections covering key areas:

- I. Scope and Applicability of ESMS
- II. Introduction
- III. ESMS Policy and Applicable Requirements (includes E&S Screening and Categorisation)
- IV. Operationalization and Implementation of the ESMS
- V. Compliance Monitoring and Reporting
- VI. Organisational Responsibilities, Resources and Capacity
- VII. E&S Management Plan Budget

Focus of the review of ESMS operation was targeted at:

- Applicable ADB Policy and local regulations
- Screening and Categorisation functions and how these had been executed for the reviewed sub-projects, and
- Adequacy of categorisation process conducted



## **A. Applicable Local Laws and Regulations**

The ESMS details National and Local Laws detailed in the following legislation:

- Environment and Conservation of the National Environment Quality Act, 1992
  - o Water quality standards for river, canal, swamp, marsh, lake, reservoir and other public inland water sources
  - o Water quality standards for coastal and estuarine water areas
  - o Groundwater quality standards
  - o Atmospheric ambient air standards
  - o Ambient standards for noise and vibration
  - o Environmental quality standards for other matters
- Department of Labour Regulation (2006)
- Department of Industrial Work Regulation (2003)
- Department of Industrial Estate Authority of Thailand

The list of relevant local legislation and regulations is considered to be reasonable and appropriate for the nature of the B.GRIMM business and the project investments undertaken. The development and operation of power generation projects involves the acquisition and retention of a number of permits related to project development. These may be required by B.GRIMM or their EPC contractors.

## **B. Applicable ADB Policy**

The ESMS specifically references the Safeguard Policy Statement (SPS), 2009 and;

- Safeguards Requirement 1 (SR1) on Environment
- Safeguards Requirement 2 (SR2) on Involuntary Resettlement
- Safeguards Requirement 3 (SR3) on Indigenous Peoples

In addition to:


- ADB Policy on Gender and Development (GAD), 1998
- ADB Social Protection Strategy, 2001, and
- ADB Public Communications Policy, 2011

The reflection of relevant ADB Policy and Strategy is up to date and in line with ADB requirements.

## **C. Screening**

The B.GRIMM ESMS sets out the process for screening of potential projects and the resources responsible for screening, including the stages and outputs of the screening process. This procedure includes:

- Allocation of project screening responsibility to the E&S Manager
- Identify Subproject Concept and Candidate Sites
- Screen the proposed project against ADB's PIAL
- Conduct Visits to Candidate Sites, and

- 
- Consult with Local Community Authorities and Leaders

The defined screening measures set out in the ESMS provide sufficient information exploration and consideration of project particulars to identify relevant project aspects. This is covered under “Identify Subproject Concept and Candidate Sites” which further requires the E&S Manager to identify:

- the type of subproject
- size of site required
- operating capacity and components of the subproject
- minimal site parameters to satisfy subproject development
- potential site locations
- preferred timeframe for achieving the commercial operation date

Screening, desktop review and site visits including contact community representatives and leader are then required, resulting in the documentation of the screening exercise in the checklist set out in Annex 6 of the ESMS. The information required to be recorded in the Screening Checklist is considered appropriate and reasonable for the purposes of SPS 2009 requirements. Completed screening checklists were provided and reviewed during the site visit. The ADB Safeguards team provided guidance to the B.GRIMM E&S Team to provide well elaborated and relevant information in the screening checklist during the visit.

#### **D. Categorisation**

Using the information collected through the screening process, categorisation is required to be conducted on the projects as set out in Table 1 of the ESMS. This covers Environmental, Involuntary Resettlement (IR), Indigenous Peoples (IP) as defined in SPS 2009 Safeguard Requirements 1-3, categorised as A, B or C in accordance with SPS 2009 Categorisation requirements.

The ESMS excludes the conduct of Category A projects using ADB funding, however does not exclude the conduct of those projects funded from non ADB sources. The ESMS is applied to Category B and C projects using ADB funding after confirmation of screening and categorisation procedures and outcomes with ADB.

The ESMS required projects to be conducted with necessary disclosures as set out in Table 2 of the ESMS.

The ESMS also requires projects to undergo potential site ranking for selection purposes Site selection based on management decision making is then to be conducted and recorded. If site selection differs from the recommended site, ADB is to be informed.

The categorisation process detailed and set out in the ESMS reasonably and correctly reflects the templates for the execution of the categorisation for sub projects and complies with SPS 2009.

Basis of categorization on impacts in environmental, Involuntary Resettlement (IR) and Indigenous Peoples (IP) for subprojects visited are presented in **Table 2**.

### **E. Due Diligence and ESIA**

After categorisation, the ESMS requires B.GRIMM to engage an external consultant to conduct an E&S review of the proposed project based on a terms of reference defined by B.GRIMM. As required the external consultant will be required to prepare the necessary safeguards documentation such as IEE, IR Plan or IP Plan. B.GRIMM must also prepare, with the assistance of the consultant, an Environmental and Social Management Plan (ESMP) as outlined in Appendix 12 of the ESMS.

### **F. Monitoring and Reporting**

The ESMS requires six monthly monitoring of projects during construction, and annual monitoring for projects under operation, when utilising ADB funding. Monitoring is to include:

- site supervision
- assessment of compliance with national environmental regulations and verification of permits
- assessment of implementation of the construction ESMP
- assessment of implementation of the operations ESMP
- review of grievance logs

The frequency of monitoring and suite of parameters and requirements is considered to be adequate for the purposes of risk identification and management in line with the SPS 2009.

Monitoring of the project is to include any actual or potential breach of local laws and regulation, which are to be reported to ADB as soon as they are known the B.GRIMM E&S manager.

Reporting is required to be prepared by the B.GRIMM E&S Manager using the template provided in Appendix 13 of the ESMS.

The provisions for Monitoring and Reporting described in the ESMS are reasonable and appropriate in the context of compliance with the SPS 2009.

**Table 1. E&S Capacity and Resources**

<b>Resource</b>	<b>B.GRIMM</b>
<b>ESMS</b>	Completed and up to date ESMS developed in conjunction with the ADB. Updated April 2018.
<b>E&amp;S Resources</b>	Dedicated E&S Manager with defined responsibilities captured in the ESMS.
<b>E&amp;S Reporting System</b>	E&S related reporting captured in specific ESMS requirements detailing responsible resources, frequency, type and scope for compliance with SPS 2009.
<b>Internal Data systems</b>	Physical and soft data storage managed and maintained at a corporate level. Additional construction related data ad records maintained by EPC contractor.

<b>Human Resources</b>	HR Lead and Department HR and Admin Managers
<b>Training</b>	Managed and conducted by the B.GRIMM through B.GRIMM corporate training program. Reported to include E&S/ESMS materials.

## Training and Competence

The management of E&S related training and competence at the corporate level was managed by the E&S Manager in conjunction with internal Training and HR functions. Records of training delivery and staff competence were reported to be held at the B.GRIMM head office. Training materials related to the ESMS were not provided. ADB provided a half day SPS training to the E&S team and few management representatives on 28 April 2018 as part of capacity building, and plans additional SPS training to include project site managers/staff of B.Grimm. Records of safety inductions and training were held and available at the site offices. Training and competence are not mentioned within the ESMS document in detail.

## Site Visits

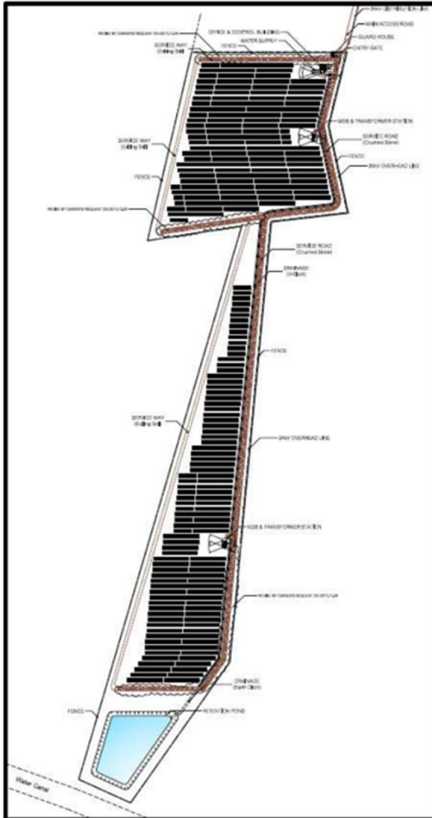
The ADB team including Safeguards and Investment Specialists visited the two project sites in Bangkok, Thailand on the 3<sup>rd</sup> October 2018. The key activities carried out during the visits include the following:

- Kick-off meeting with site management and EPC Contractor for understanding the projects, stage of work and organisational capacity
- Walk through the sites
- Inspection of surrounding areas
- Visit and interactions with nearby villagers, and
- Onsite interactions and stakeholder consultations with land owners, contractors, supervisors and workers

### A. Site Visit: Solar Lat Krabang, Bangkok

Lat Krabang Solar Project is a 5 MW solar PV project located in the greater Bangkok area. The project is under construction with expected completion by the end of 2018. The project has a design capacity of 5 MW and will supply generated electricity to the Bangkok power grid.

The Lat Krabang Solar Project is a War Veterans group owned project which has engaged B.GRIMM as their development and operation partner.



**Figure 2. Lat Krabang Project**



**Figure 3. Lat Krabang Project Setting.**

### Site Visit Findings – Lat Krabang Solar Project



***Photo 1: Unrestrained gas cylinders for gas cutting.***



***Photo 2: Welding and gas cutting without face masks or shielding for***



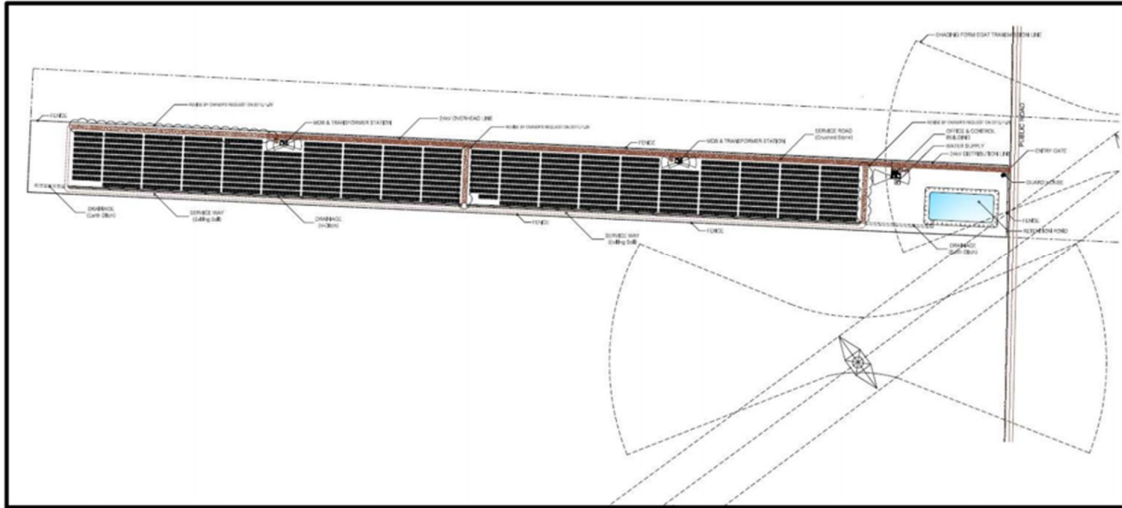
***Photo 3: Electrical cables, sockets and tools on open ground.***

**B. Site Visit: Solar Nong Chok, Bangkok**

Nong Chok Solar Project is a 5 MW solar PV project located in the greater Bangkok area. The project is under construction with expected completion by the end of 2018. The project will connect to the nearest transmission line aligned with existing roads, approximately 50 meters from the project boundary.

The project has a design capacity of 5 MW and will supply generated electricity to the Bangkok power grid.

The Nong Chok Solar Project is a War Veterans group owned project which has engaged B.GRIMM as their development and operation partner.



**Figure 4. Nong Chok Project Layout Layout.**



**Figure 5. Nong Chok Project Setting.**



**Site Visit Findings – Nong Chok Solar Project**



***Photo 4: Waste pile trip and fall hazard. Power tools on open ground.***



***Photo 5: Waste chemical containers on open ground.***



***Photo 6: Electrical cable running over open ground.***

### 3. SITE SPECIFIC FINDINGS

#### Environmental and Social Gap Assessment – ADS Safeguards Policy Statement 2009

**It is acknowledged that the assessed projects all conducted social and environmental screening and assessment procedures prior to ADB involvement and prior to implementation of the B.GRIMM ESMS.**

##### **A. SUBPROJECTS UNDER CONSTRUCTION**

##### **1. ADB Safeguard Requirement 1 - Environment**

**Criteria: 1.1 Environmental Assessment**

Conduct an environmental assessment for each proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential trans-boundary and global impacts, including climate change. Use strategic environmental assessment where appropriate.

**Finding: All Projects**

Environmental Site Assessments for the projects were conducted by external consultants for the projects. These assessments include analysis under the sections and subsections detailed below. Review of the ESA report during the visit to B.GRIMM offices revealed that consideration of physical surrounds relevant to the construction and operation of the project itself were adequate. These were however focused on the project as opposed to the surrounding environment. Risk assessment conducted in section 4 of the report was superficial and failed to identify that the Lat Krabang, Nong Chok and Sai Noi sites are located within an Important Bird Area.

The stakeholder engagement including community outreach, information dissemination and feedback was conducted to a high standard and recorded in sufficient detail within the reports.

The identified gaps between the conducted COP and ESA reports and the level of environmental assessment required in accordance with the ADB SPS 2009 were covered in the B.Grimm's ESMS, but were not met since initially funding was from non ADB sources, and at a minimum only required to comply with national and local environmental regulations.

**Criteria: 1.2 EMP Implementation**

Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.

**Finding: All Projects**

The ESA report contains relevant highlevel management plans including Constructions Plan, Safety Plan, Risk Mitigation Plan and Operations Plan. These documents include provision and monitoring requirements related to environmental compliance.

At the time of inspection the projects were still under construction. Site inspections confirmed that the EPC contractor had been provided with the construction and safety plans with site safety signage erected and displayed at the site and construction management materials located at the site.

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The environmental compliance monitoring related to air, water and noise emissions had been subcontracted to a supplier Pacific Labs

**Observation Leading to Corrective Action**

It was noted during the site visit that there was a reporting disconnect between the EPC contractor and the B.GRIMM E&S Team. Discussions with the EPC contractor confirmed they had dialogue with the third party monitoring consultant who submitted the monitoring results to the regulatory body and copied in the EPC management. The E&S Team did not however receive results or copies of the monitoring reports, instead relying on the EPC contractor to report any non-compliance to B.GRIMM.

**Criteria: 1.3 Information Disclosure**

Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.

**Finding: All Projects**

The CoP findings were presented as a part of the community consultation process. At the time of consultation, there was no requirement for B.GRIMM to make such a disclosure.

**Criteria: 1.4 Consultation and Participation**

The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.

**Finding: All Projects**

The CoP findings were presented as a part of the community consultation process. It is unclear if all affected people and stakeholders were engaged as a part of the consultation, however the notification of local people via notes appears to have been reasonable in this case.

**Criteria: 1.5 Grievance Mechanism**

There should be a mechanism within projects for the resolution of complaints of discrimination, harassment, or other working condition concerns.

**Finding: All Projects**

External project stakeholder and local community members are presented with the contact details of the project EPC contractor and B.GRIMM representatives for the delivery of feedback, questions and grievances. The B.GRIMM E&S Team has in place a method for the recording and management of feedback received.

As per the ESMS, employees, workers and contractors are to be provided with a red letterbox at the project site to provide anonymous feedback to the EPC contractor and B.GRIMM.

**Observation Leading to Corrective Action**

It was noted that the feedback letterbox could not be located during the visit to the project site. It was also noted that the B.GRIMM E&S Team were unaware of the complaints raised by local residents at the La Krabang and Nong Chok sites, which had been reported to the EPC contractor. B.GRIMM E&S team work with the EPC contractor to confirm the presence and function of the grievance mailboxes at all sites during construction and with the project operator post commissioning.

**Criteria: 1.6 Pollution Prevention**

Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the

World Bank Group’s Environmental, Health and Safety Guidelines.

During the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group’s Environment, Health and Safety Guidelines.

**Finding: All Projects**

Waste is managed on sites according to the waste management plan detailed in the ESA for each project. The EPC contractor was confirmed to have engaged contractors for waste management on site and collection by local government for disposal for general and construction wastes.

Broken panels, if any, are to be secured by the EPC contractor during construction then collected by the retained insurance company for claim purposes. After commissioning the operator will secure all faulty and broken panels for recycling via the Solar PV module provider.

Planned recycling of panels at end-of-life after approximately 17-25 years has been pre-arranged with the supplier. Contingency has been arranged in the event that the supplier is no longer in a position to recycle the modules. In those cases the modules would be recycled using a licensed contractor.

The key pollution sources/ impacts associated with operational phase of the project is:

- Small quantities of solid waste and wastewater generation from regular activities at transformer and projects site office
- The main environmental issues associated with Solar Photovoltaic project is handling of broken panels; if not properly disposed of can cause leaching of metals to the environment.<sup>2</sup>
- WREL has an existing arrangement with the suppliers of the solar panel whereby they return the wastes (like broken panels). At the site (till the time the panels are picked up by the supplier) the broken solar panels are stored in a locked container

The pollution prevention and management adopted at Site and planned are:

- Septic Tanks and soak pits are attached to the toilets to treat the wastewater generated from the toilets
- Domestic solid waste generated is stored and collected on regular basis by an accredited third party contractor

Construction materials were observed to be stored outside the facility in the open ground awaiting collection and sorting by contractors and local government waste management services.


**Criteria: 1.7 GHG Emissions**

The borrower/client will promote the reduction of project-related anthropogenic greenhouse gas emissions in a manner appropriate to the nature and scale of project operations and impacts.

**Finding: All Projects**

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<sup>2</sup> Ramos-Ruiz, Adriana et al. "Leaching of cadmium and tellurium from cadmium telluride (CdTe) thin-film solar panels under simulated landfill conditions" Journal of hazardous materials vol. 336 (2017): 57-64.



Solar PV electricity generation is a key technology for reducing the GHG emissions in grid scale electricity generation.

**Criteria: 1.8 Resource Efficiency**

Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage.

**Finding: All Projects**

Solar energy operations provide clean and green renewable energy. The pollution sources and impacts of solar projects are generally low and for short duration, generally limited to construction phases.

The sites have incorporated water storage tanks to service and clean the PV modules during operations.

**Criteria: 1.9 Waste Management**

The borrower/client will avoid, or where avoidance is not possible, will minimize or control the generation of hazardous and nonhazardous wastes and the release of hazardous materials resulting from project activities.

**Finding: All Projects**

Sites are expected to generate minor quantities of hazardous waste in the form of construction materials, paint containers etc; which too should be handled appropriately in accordance with local regulations.

B.GRIMM and the EPC contractor confirmed they are aware of the regulatory requirements related to hazardous waste handling and management and disposes it to authorized vendors in case of hazardous waste during and after the construction process. A waste management contractor has been engaged and government waste management services are being used.

Hazardous broken solar panels are to be stored separately and will be submitted to the insurance company during construction. Disposal during operation will be conducted via licensed contractor or the manufacturer.

End of life disposal has been considered and procedures for equipment and material disposal / recycling set out in the decommissioning plan.

**Criteria: 1.10 Hazardous Materials**

The borrower/client will avoid the manufacture, trade, and use of hazardous substances and materials subject to international bans or phaseouts because of their high toxicity to living organisms, environmental persistence, potential for bioaccumulation, or potential for depletion of the ozone layer and will consider the use of less hazardous substitutes for such chemicals and materials.

**Finding: All Projects**

Sites were not observed to be storing any hazardous materials except for small quantities of paint and fuel for construction vehicles. No significant quantities of hazardous materials are expected to be stored on site during construction or operation. Transformer oil was not observed at the sited. Transformer oil type was not listed at the sites.

**Criteria: 1.11 Pesticide Use**

The environmental assessment will ascertain that any pest and/or vector management activities related to the project are based on integrated pest

management approaches and aim to reduce reliance on synthetic chemical pesticides in agricultural and public health projects.

**Finding: All Projects**

Reportedly, site is not utilizing any herbicides for maintenance of the site areas. Vegetation management is proposed for all sites to be conducted via regular mechanical cutting and trimming of vegetation around buildings, modules and fences. Green areas will as well be maintained within the project footprint to support the biodiversity action plan for the project.

**Criteria: 1.12 Community Safety**

The borrower/client will identify and assess the risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the project, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts. These measures will favor the prevention or avoidance of risks and impacts over their minimization and reduction. Consideration will be given to potential exposure to both accidental and natural hazards, especially where the structural elements of the project are accessible to members of the affected community or where their failure could result in injury to the community. The borrower/client will avoid or minimize the exacerbation of impacts caused by natural hazards, such as landslides or floods that could result from land use changes due to project activities.

**Finding: All Projects**

Community safety has been managed for the projects through the construction, OHS and operations plans developed by B.GRIMM and delegated to contractors where required.

Specific risks to the local communities include:

- Flooding risks associated with waters trapped on the sites. This has been mitigated with water disposal infrastructure including pumps, storm water storage infrastructure and drainage. Electrical risks associated with flooding have been engineered into the projects through the use of circuit breakers for all sites
- Risks to road users and damage to local roads during the construction phase by heavy vehicles. This has been addressed in the construction plan and is being managed by the EPC contractor on an ad hoc basis as damage to roads is reported to them or observed by contractors on and around the sites

Other risks to the community such as noise, dust and material use are considered to be limited and minor.

**Criteria: Resources 1.14 Biodiversity Conservation and Sustainable Management of Natural**

The borrower/client will assess the significance of project impacts and risks on biodiversity and natural resources as an integral part of the environmental assessment process.

**Finding: All Projects**

Review of the local environmental reports showed there was not sufficient biodiversity assessment undertaken as part of the assessment. Three of the subprojects are located at the lower portion of the Central Basin Important Bird Area (IBA), which is a wintering area for the Manchurian Reed-warbler (VU). That IBA is listed as globally important for White-browed/Manchurian Reed-warbler (VU) and Greater Spotted Eagle (VU). Both species are tolerant of quite heavy degradation, though the eagle is sensitive to hunting/persecution. The IBA also supports regionally important species (e.g., Grey-headed Lapwing, Painted Stork).

The sites have an average affected area of 7.8 ha, which may not significantly impact the species given that the IBA has an area of 190,000ha. The land use for the three subprojects used to be farmlands (Lat Krabang used to be a fish farm, Nong Chok and Sai Noi as agricultural lands).

**Criteria: 1.15 Cultural Heritage**

The borrower/client is responsible for siting and designing the project to avoid significant damage to physical cultural resources.

**Finding: All Projects**

Not applicable. The previous land use as rental farmlands did not present a unique activity to the area and was unlikely to have involved physical cultural artifacts.

**2. ADB Safeguard Requirement 2 – Involuntary Resettlement**

**Criteria: 2 Involuntary Resettlement**

Screen the project early on to identify past, present, and future involuntary resettlement impacts and risks. Determine the scope of resettlement planning through a survey and/or census of displaced persons, including a gender analysis, specifically related to resettlement impacts and risks.

**Finding: All Projects**

The land for the solar project was purchased by B.GRIMM on through private negotiated settlement based a willing buyer- seller arrangement utilising the services of a buyer’s agent. The negotiation and sale were completed prior to ADB’s investment (was not done in anticipation of ADB funding). As a result, SPS Requirement 2 has not been triggered.

**3. ADB Safeguard Requirement 3 – Indigenous Peoples**

**Criteria: 3 Indigenous Peoples**

Screen early on to determine (i) whether Indigenous Peoples are present in, or have collective attachment to, the project area; and (ii) whether project impacts on Indigenous Peoples are likely.

**Finding: All Projects**

The project site is in an established agricultural area on lands previously cleared and utilised for private agricultural enterprise. Project studies did not identify the presence or Indigenous land interests. The land acquisition and project studies were completed prior to ADB investment and the establishment of the B.GRIMM ESMS. As a result, SPS Requirement 3 has not been triggered

**ADB Social Protection Strategy 2001**

**Criteria: 1.3 Passive Labour Market Policies**

Right to Organize and Collective Bargaining

**Finding: All Projects**

Projects reviewed were in the construction phase at the time of inspection and review. The employment undertaken at that stage was wholly related to construction and installation contracting. The primary EPC contractor was responsible for employment of subcontractors and staff from the local area. B.GRIMM had made no provision in the EPC contract specifically related to unionising or organised labour. It was noted during the inspection that B.GRIMM had made no enquiries as to whether the subcontractors were receiving their regulation wage or conditions.

It is recommended that the communication between the E&S Team and sub contractors is formalised for all relevant E&S data including grievances, monitoring and reporting of data collected by contractors and subcontractors.

**Criteria: 1.3 Passive Labour Market Policies, Discrimination**

Elimination of discrimination in employment and occupation. The key four (4) steps identified by ADB as part of the CLS are:

- Complaints committee
- Challenging stereotypes of minorities
- Occupational health and safety
- Health insurance and social security

Encouraging minority groups/organizations Protecting migrant workers

**Finding: All Projects**

B.GRIMM has in place a procedure for the handling of grievances and complaints received. There was however noted to be a failure of communication between the EPC contractor and the E&S Team for the Lat Krabang and Nong Chok projects. This has been discussed above with recommendations made accordingly.

B.GRIMM has a policy of equal opportunity in the workplace stating: "every employee has equal opportunities, regardless of nationality, religion, gender, colour, age, sexual orientation, or disability". In practice there was no observed or unexpected bias in either the corporate office, which was equally represented in the B.GRIMM team at the meeting. At the sites for the Solar Projects staff had been hired by the EPC contractor who reportedly hired based on merit, skill and experience. At the Lat Krabang site only 2% of the current roster was female, however the same EPC contractor had hired 20% female staff at the Nong Chok project site. The EPC contractor explained the male dominated site being a result of the physically arduous construction work limiting the number of female employee candidates amongst contractors.

B.GRIMM has put in place provisions within the Construction and OHS plans for the 7 projects. These were confirmed to have been communicated to the EPC contractor.

**Observation Leading to Corrective Action**


On site there were a number of behavioural OHS issues identified. These include:

- The operation and function of electrical power tools on open ground without water protection
- Welding being conducted without operator PPE (face masks or shielding for other nearby persons)
- Wastes being stored uncovered on open ground
- A range of slip and fall risks observed around platforms and walkways
- Steel grinding equipment being operated without hearing protection, and
- A lack of proper foot protection being used on site

These risks were not in compliance with the safety signage posted around the site and not in compliance with the OHS plan presented by B.GRIMM.

**Corrective Action:** Improve the Occupational, Health and Safety protocols in each of the seven subprojects by providing specific OHS training to workers activities for





working at heights, hot works, PPE use and electrical safety for site workers. B.Grimm will also prepare an OHS training plan for the operations phase of the project and link it with the operational environmental management plan.

B.GRIMM has HR policy in place to ensure their employees are provided with the wages/salary and benefits their staff are entitled to under Thai legislation and regulation. Compliance with Thai employment law by the EPC contractor and their subcontractors was left to the relevant contracted body to ensure and enforce.

#### **Observation Leading to Recommendation**

It was noted there was little understanding of how the EPC contractor was ensuring construction workers were being provided with compliance remuneration and benefits under local laws.

**Recommendation:** It is recommended that the B.GRIMM E&S team work with the EPC contractor to confirm and document that GRM is implemented on all sites during construction and with the project operator post commissioning.

### **ADB Prohibited Investment Activities List**

#### **Criteria: Child Labour**

The ILO Minimum Age Convention, 1973 (No.138) and its accompanying Recommendation (No.146) set the goal of elimination of child labour, and the basic minimum age for employment or work (in developing countries at 14 years of age or the end of compulsory schooling, whichever is higher; and 15 or the end of compulsory schooling for developed countries).

#### **Finding: All Projects**

The EPC contractor confirmed the policy of checking the identity of subcontractors and workers to confirm eligibility to work according to citizenship, visa and age.

The need for unskilled labour on the sites is relatively limited due to the small volume of materials used and moved in the construction exercise and the highly technical nature of the installation. The risk of child labour during both the construction phase and during operation is considered to be limited.

#### **Criteria: Forced Labour**


According to the Forced Labour Convention, 1930 (No. 29), the ILO defines forced labour for the purposes of international law as "all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily".

The other fundamental ILO instrument, the Abolition of Forced Labour Convention, 1957 (No. 105), specifies that forced labour can never be used for the purpose of economic development or as a means of political education, discrimination, labour discipline, or punishment for having participated in strikes.

#### **Finding: All Projects**

The need for unskilled labour on the sites is relatively limited due to the small volume of materials used and moved in the construction exercise and the highly technical nature of the installation. The risk of forced labour during both the construction phase and during operation is considered to be limited.

### **B. OPERATIONAL SUBPROJECTS**



The environmental and social audit for the operating solar PV subprojects were conducted as part of the corporate audit undertaken for B.Grimm at the time of ADB's equity investment in 2017. There were no material gaps identified at the time of audit, and corrective actions were incorporated as part of the ESMS preparation. The current operations of the subprojects remain to have limited impacts, and have not recorded any safety incidents or grievances from workers and communities, as reported by B.Grimm's E&S team. Regular reporting out to government regulators is done in accordance with the permit and license requirements.

**Table 2. Basis of Categorization on Environmental, IR and IP Impacts**

Criteria	Lat Krabang Project	Nong Chok Project	Sai Noi Project	Chon Daen Project	Chachoengsao Project	Bang Bo Project	Ban Na Derm Project
<b>Project Siting</b>	Lat Krabang Solar PV Project is located in the outskirts of Bangkok in a predominantly agricultural area. Surrounding receptors include fish farms to the North, West and South and un managed vegetation to the east.	Nong Chok Solar PV Project is located in the outskirts of Bangkok in a predominantly agricultural area. Surrounding receptors include farms to the North, West and South and un managed vegetation to the east including a creek/canal.	Sai Noi Solar PV Project is located in Nonthaburi Province, Thailand in a predominantly agricultural setting. Surrounding receptors include farmlands to the North, South, East and West.	Chon Daem Solar PV Project is located in Phetchabun Province, Thailand. Surrounding receptors include farmland to the East, West and South and rural residences to the North.	Chachoengsao Solar PV Project is located in Chachoengsao Province, Thailand in a predominantly agricultural area. Surrounding receptors include farmlands to the North, South, East and West.	Bang Bo Solar PV Project is located in Samutprakan Province, Thailand in a predominantly agricultural area. Surrounding receptors include farmlands to the North, South and East. Industrial land use appears to the west and forested areas are located to the South West and South East.	Ba Na Derm Solar PV Project is located in Surat Thani Province, Thailand in a predominantly agricultural area. Surrounding receptors include farmlands to the North, South, East and West.
<b>Scale and Nature of Impacts</b>	<p>The project site is approximately 83,600m<sup>2</sup>. The site land use has changed from farmland to host the Solar PV facility and associated infrastructure.</p> <p>The number of people impacted is expected to have been limited due to the density of the area and previous agricultural land use.</p> <p>The purchase of land was reported to have been completed by negotiated settlement with the previous owner in with provision for tenant farmers to harvest the crops planted on the land in compliance with Thai Regulations.</p>	<p>The project site is approximately 70,434m<sup>2</sup>. The site land use has changed from farmland to host the Solar PV facility and associated infrastructure.</p> <p>The number of people impacted is expected to have been limited due to the density of the area and previous agricultural land use.</p> <p>The purchase of land was reported to have been completed by negotiated settlement with the previous owner in with provision for tenant farmers to harvest the crops planted on the land in compliance with Thai Regulations.</p>	<p>The project site is approximately 80,000m<sup>2</sup>. The site land use has changed from farmland to host the Solar PV facility and associated infrastructure.</p> <p>The number of people impacted is expected to have been limited due to the density of the area and previous agricultural land use.</p> <p>The purchase of land was reported to have been completed by negotiated settlement with the previous owner in with provision for tenant farmers to harvest the crops planted on the land in compliance with Thai Regulations.</p>	<p>The project site is approximately 50,190m<sup>2</sup>. The site land use has changed from farmland to host the Solar PV facility and associated infrastructure.</p> <p>The number of people impacted is expected to have been limited due to the density of the area and previous agricultural land use.</p> <p>The purchase of land was reported to have been completed by negotiated settlement with the previous owner in with provision for tenant farmers to harvest the crops planted on the land in compliance with Thai Regulations.</p>	<p>The project site is approximately 66,000m<sup>2</sup>. The site land use has changed from farmland to host the Solar PV facility and associated infrastructure.</p> <p>The number of people impacted is expected to have been limited due to the density of the area and previous agricultural land use.</p> <p>The purchase of land was reported to have been completed by negotiated settlement with the previous owner in with provision for tenant farmers to harvest the crops planted on the land in compliance with Thai Regulations.</p>	<p>The project site is approximately 84,800m<sup>2</sup>. The site land use has changed from farmland to host the Solar PV facility and associated infrastructure.</p> <p>The number of people impacted is expected to have been limited due to the density of the area and previous agricultural land use.</p> <p>The purchase of land was reported to have been completed by negotiated settlement with the previous owner in with provision for tenant farmers to harvest the crops planted on the land in compliance with Thai Regulations.</p>	<p>The project site is approximately 82,000m<sup>2</sup>. The site land use has changed from farmland to host the Solar PV facility and associated infrastructure.</p> <p>The number of people impacted is expected to have been limited due to the density of the area and previous agricultural land use.</p> <p>The purchase of land was reported to have been completed by negotiated settlement with the previous owner in with provision for tenant farmers to harvest the crops planted on the land in compliance with Thai Regulations.</p>
<b>Potential Environmental and Social Impacts</b>	<p>(For all sites)</p> <p>Solar PV energy facilities provide renewable energy. The pollution sources and impacts are generally low and for short duration, generally limited to construction phase.</p> <p>Environmental risks include explicit risks to the environment such as habitat destruction, as well as deferred risks (such as the disposal after the system's lifecycle or after irreparable failure). The associated Environmental and Social impacts are generally experienced during the construction phase, such as land clearing, dust pollution, waste production and noise pollution. Minimal impacts would be expected to result during the operational phase of the project. The main environmental issues associated with Solar Photovoltaic projects is handling of broken panels; if not properly disposed of, it can cause leaching of heavy metals that may include Cadmium telluride under extreme conditions where CdTe thin film panels are used. B.GRIMM reportedly has an existing arrangement with the suppliers of the solar panel whereby they return the hardware waste.</p>						



<b>Involuntary Resettlement</b>	The land for the solar project was purchased by B.GRIMM on through private negotiated settlement based a willing buyer- seller arrangement utilising the services of a buyer's agent. The negotiation and sale were completed prior to ADB's investment (was not dne in anticipation of ADB funding) in B.GRIMM and the development of the ESMS.						
<b>Indigenous People</b>	The project site is located in an established agricultural area on lands previously cleared and utilised for private agricultural enterprise. Project studies did not identify the presence or Indigenous land interests. The land acquisition and project studies were completed prior to ADB investment and the establishment of the B.GRIMM ESMS.						
<b>Climate Change and Disaster Risk</b>	<p>Climate Risks and natural disaster risk associated with the projects do not appear to have been directly assessed for the project in the Environmental Site Assessment.</p> <p>The project falls within the lowest range of Degree I-V Modified Mercalli Scale for earthquake risk and lowest Tropical Storm risk zone One (118-153 km/h wind) as per the OHCA Natural Hazard Map for Thailand.</p> <p>The Bangkok provincial region is subject to flooding, coastal erosion and urban subsidence. These factors combined with risks presented by sea level rise present the project with an increased likelihood of flooding and inundation.</p> <p>The location of the project in former fish farm and rice paddy land presents some risks of flooding to the electricity generating assets. This appears to have been considered and somewhat mitigated by the installation of the solar PV arrays on elevated posts in addition to the use of plastic conduit to shield the wiring from water. The Solar PV modules were elevated 0.8m above sea level.</p>	<p>Climate Risks and natural disaster risk associated with the projects do not appear to have been directly assessed for the project in the Environmental Site Assessment.</p> <p>The project falls within the lowest range of Degree I-V Modified Mercalli Scale for earthquake risk and lowest Tropical Storm risk zone One (118-153 km/h wind) as per the OHCA Natural Hazard Map for Thailand.</p> <p>The Bangkok provincial region is subject to flooding, coastal erosion and urban subsidence. These factors combined with risks presented by sea level rise present the project with an increased likelihood of flooding and inundation.</p> <p>The location of the project in former fish farm and rice paddy land presents some risks of flooding to the electricity generating assets. This appears to have been considered and somewhat mitigated by the installation of the solar PV arrays on elevated posts in addition to the use of plastic conduit to shield the wiring from water.</p>	<p>Climate Risks and natural disaster risk associated with the projects do not appear to have been directly assessed for the project in the Environmental Site Assessment.</p> <p>The project falls within the lowest range of Degree I-V Modified Mercalli Scale for earthquake risk and lowest Tropical Storm risk zone One (118-153 km/h wind) as per the OHCA Natural Hazard Map for Thailand.</p>	<p>Climate Risks and natural disaster risk associated with the projects do not appear to have been directly assessed for the project in the Environmental Site Assessment.</p> <p>The project falls within the lowest range of Degree I-V Modified Mercalli Scale for earthquake risk and lowest Tropical Storm risk zone One (118-153 km/h wind) as per the OHCA Natural Hazard Map for Thailand.</p>	<p>Climate Risks and natural disaster risk associated with the projects do not appear to have been directly assessed for the project in the Environmental Site Assessment.</p> <p>The project falls within the lowest range of Degree I-V Modified Mercalli Scale for earthquake risk and lowest Tropical Storm risk zone One (118-153 km/h wind) as per the OHCA Natural Hazard Map for Thailand.</p>	<p>Climate Risks and natural disaster risk associated with the projects do not appear to have been directly assessed for the project in the Environmental Site Assessment.</p> <p>The project falls within the lowest range of Degree I-V Modified Mercalli Scale for earthquake risk and lowest Tropical Storm risk zone One (118-153 km/h wind) as per the OHCA Natural Hazard Map for Thailand.</p>	<p>Climate Risks and natural disaster risk associated with the projects do not appear to have been directly assessed for the project in the Environmental Site Assessment.</p> <p>The project falls within the lowest range of Degree I-V Modified Mercalli Scale for earthquake risk and lowest Tropical Storm risk zone One (118-153 km/h wind) as per the OHCA Natural Hazard Map for Thailand.</p>



<b>Ecologically and cultural sensitivity</b>	<p>The sites have an average affected area of 7.8ha, which may not significantly impact the species given that the IBA has an area of 190,000ha. The land use for the three subprojects used to be farmlands (Lat Krabang used to be a fish farm, Nong Chok and Sai Noi as agricultural lands) and considered to be a modified habitat.</p> <p>Review of the local environmental reports showed there was not sufficient biodiversity assessment undertaken as part of the assessment. Three of the subprojects are located at the lower portion of the Central Basin Important Bird Area (IBA), based on the results of the Integrated Biodiversity Assessment Tool (IBAT). The IBA is a wintering area for the Manchurian Reed-warbler (VU). That IBA is listed as globally important species such as White-browed/Manchurian Reed-warbler (VU) and Greater Spotted Eagle (VU). Both species are tolerant of quite heavy degradation</p> <p>The IBA is also listed as regionally important for some other species (e.g., Grey-headed Lapwing, Painted Stork), and for waterbird aggregations broadly. However, with the lack of information at this stage, the actual impact of the subprojects on biodiversity cannot be fully determined; corrective actions to address the biodiversity concerns are made accordingly in the CAP attached to this report.</p>	<p>Review of the local environmental reports showed there was not sufficient biodiversity assessment undertaken as part of the assessment.</p> <p>IBAT results showed that the areas for these subprojects are not located within or near any ecologically sensitive areas.</p>
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## 5. CONCLUSION AND FINDINGS

B.GRIMM currently operate an ADB approved ESMS to facilitate ADB investment. The solar PV subprojects subject to this Environmental and Social Audit were initiated prior to ADB green bond investment and where not subject to other ADB existing facilities (equity or loan) with B.Grimm. The operational PV subprojects included in the Green Bond investment were audited separately during project processing for ADB Equity Investment to BGrimm.

The resulting gaps identified and discussed in this report are considered to be low risk and can be addressed through implementation of the Corrective action plan (CAP). These issues are discussed in more detail below and in the CAP attached in Appendix 1.

### **ESMS Content and Operation**

The ESMS B.GRIMM has implemented is ADB approved and is sufficient for application on ADB funded projects. It is noted that the sites under construction are not covered by the ESMS.

Implementation of the ESMS procedures is required for the Solar PV projects in relation to events yet to take place and ongoing responsibilities such as monitoring and reporting.

Contractor Communication and Information Collection: Communication of grievance and monitoring information was identified as not being effectively communicated from the EPC contractor and the E&S Team. This included grievances received by the EPC contractor related to road damage from the construction at Lat Krabang and Nong Chok and the results of environmental monitoring activities conducted at the sites not being obtained by the E&S Team. (Refer to CAP entry 6-7)

Worker and Subcontractor Working Conditions: B.GRIMM had no record and had not specifically checked that subcontractors on the projects sites were being provided with remuneration and working conditions required under local labour laws and were of a legal working age. (Refer to CAP entry 4-5)

Land Acquisition and Records of Resettlement: There were no records of the settlements or conditions provided for tenant farmers who occupied the lands upon which the projects are being implemented on. These activities were reported to have been conducted in compliance with local laws allowing the tenant farmers to harvest their current seasons crops and stock before being required to vacate the property.

### **Site Specific Issues**

Occupational Health and Safety (Lat Krabang and Nong Chok): A number of minor OHS non-compliance issues were identified including the operation or electrical cables and plugs on open, uncovered ground and the failure of workers on the Lat Krabang site to utilise appropriate Personal Protective Equipment. (Refer to CAP entry 4-5)

Biodiversity Impact Assessments (Lat Krabang, Nong Chok and Sai Noi Projects): The subprojects are located at the lower portion of the Central Basin Important Bird Area (IBA). No Biodiversity Impact Assessments were conducted to identify the potential impacts resulting from project implementation on these sites. (Refer to CAP entry 1-3)

## 6. CORRECTIVE ACTION PLAN

The following Corrective Action Plan (CAP) has been prepared through the compilation of new CAP items as identified and selected during the course of this assessment.

Corrective Action	Proposed Timeline (to be confirmed by B.Grimm)	Estimated Budget
<b>BIODIVERSITY</b>		
1. Conduct detailed biodiversity assessment with focus on ornithological surveys for the three sites (i.e. Lat Krabang, Nong Chok and Sai Noi). This will be undertaken by a local ornithologist, who will be engaged by B.Grimm.	Survey activity to start by first week of December 2018; report from expert to be submitted a month after the survey.	\$5,000 to \$10,0000 (USD)
2. Restoration of some unused areas within the three subprojects sites suitable for planting tall grass tall grass/scrub mix or reeds around.  a. B.Grimm to identify the area within the subproject sites in where restoration will be planned or possibly the restoration of some other unused areas, like ponds previously used as fish farms that can possibly be converted in suitable habitats for the migrating/wintering birds.  b. B.Grimm to prepare the detailed restoration plan for each of the three subprojects.	First week of November 2018  January 2019	(Cost to be estimated by B.Grimm)
3. Monitoring and reporting of the restoration within the three sites	This will be included in the 2019 Annual Environmental and Social Performance Report to be submitted to ADB as part of ESMS compliance.	This is expected to be minimal and can be included as part of the project administrative cost.
<b>EHS MANAGEMENT SYSTEM</b>		
4. Improve the Occupational, Health and Safety protocols in each of the seven subprojects by providing specific OHS training to workers activities for working at heights, hot works, PPE use and electrical safety for site workers. B.Grimm will also prepare an OHS training plan for the operations phase of the project and link it with the operational environmental management plan	November 2018	This can be included as part of the administrative cost
5. Strengthen the EHS reporting mechanism and record keeping, to ensure that safety performance, grievance logs, and environmental monitoring results, are submitted by the project team to the corporate EHS team. Roles and responsibilities of the environmental management plans need to be update to reflect this.	November 2018	This can be included as part of the administrative cost



<b>GRIEVANCE MECHANISM</b>		
6. Review access points for employees and stakeholders to submit grievances to B.GRIMM and their contractors at all sites. Review project signage to ensure clear contact details are displayed at sites.	November 2018	This can be included as part of the administrative cost
7. Conduct a contractor briefing for all sites to ensure all responsible parties within EPC contractor are aware of their responsibility to communicate all grievances received from stakeholders and employees.	November 2018	This can be included as part of the administrative cost