Environmental and Social Compliance Audit

July 2020

THA: Green Loan for Renewable Energy and Electric Vehicle Charging Network Project

Asian Development Bank

ABBREVIATIONS

ADB – Asian Development Bank

NOTE

(i) In this report, "$" refers to United States dollars.

Energy Absolute Public Company Limited

Nakhonsawan 90MW Solar & EV Charging

Network Projects

Environmental and Social Management System Audit

June 2020
Asian Development Bank

Customer Details	
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DNV GL Details	
DNV GL Organisation Unit:	DNV GL Business Assurance Australia Pty Ltd
DNV GL Address:	Level 7, 124 Walker Street, North Sydney NSW 2060
DNV GL Telephone:	+61 02 9922 1966
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Project Team	
Project Leader:	Mark Robinson

for DNV GL Business Assurance Australia

10 July 2020

Mark Robinson
Manager, Sustainability Services
DNV GL – Business Assurance

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A. INTRODUCTION

This document has been created to detail the Audit executed for the Asian Development Bank's (ADB's) Safeguards Environmental and Social Management System Audit of the entity Energy Absolute Public Company Limited (EA). This report has been produced to present the context, procedures, findings and Corrective Action Plan of the Environment and Social 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 purposed 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. BACKGROUND

1.1 Corporate Background

EA was established in 2006 and has grown to become one of Thailand's largest energy companies. EA's main businesses are currently solar PV and wind renewable energy generation and biodiesel production (largest producer in Thailand) and distribution. EA has acquired a Taiwanese lithium battery manufacturer and is looking to expand that capacity into Thai based battery manufacturing to expand into electric vehicle manufacture, sales and service/charging. The EA capitalization was reported to currently be approximately USD 6 billion.
EA has controlling interest in four solar PV projects with a total capacity of 278 MW and two wind projects with a capacity of 386 MW.

1.2 Project Background

ADB is considering a THB [1.5] billion (approximately $46.2 million equivalent) ADB OCR debt facility to be used for liquidity support for EA's renewable projects which are facing financing uncertainties due to the market conditions caused by the onset of COVID-19.

To date, ADB has signed funding for one corporate finance project with Energy Absolute: Energy Absolute Green Bond for Wind Power Project (B3,000 million or $97 million, approved in 2019). In addition, ADB has been mandated to provide a project financing loan of up to $8 million for EA's electric ferry transaction; however, due to COVID-19 adversely impacting mass transportation demand and difficulties in concluding JV partnerships, this transaction is likely to be delayed.

The green bond's proceeds will be used to refinance the existing debt for the 90 MW Nakhonsawan Solar Project in Nakhonsawan Province in North Western Thailand, 260MW Hanuman Wind Power Project in Chiyaphum Province, in North Eastern Thailand that was supported by ADB in 2019, and the EV Charging Project across Thailand. These projects are part of the long-term

corporate growth strategy of EA, which seeks to make investments into renewable energy generation, energy storage and electric vehicles/transport in the region.

EA's strategy aligns with Thailand's Alternative Energy Development Plan, 2018 - 2037, which sets a target to increase the share of renewable energy and alternative energy used for power generation more than 30% by 2037.

The audit focused on the Nakornsawan solar project and the electric vehicle charging stations as a separate audit was already undertaken for the Hanuman wind project in 2019 for ADB's purposes.

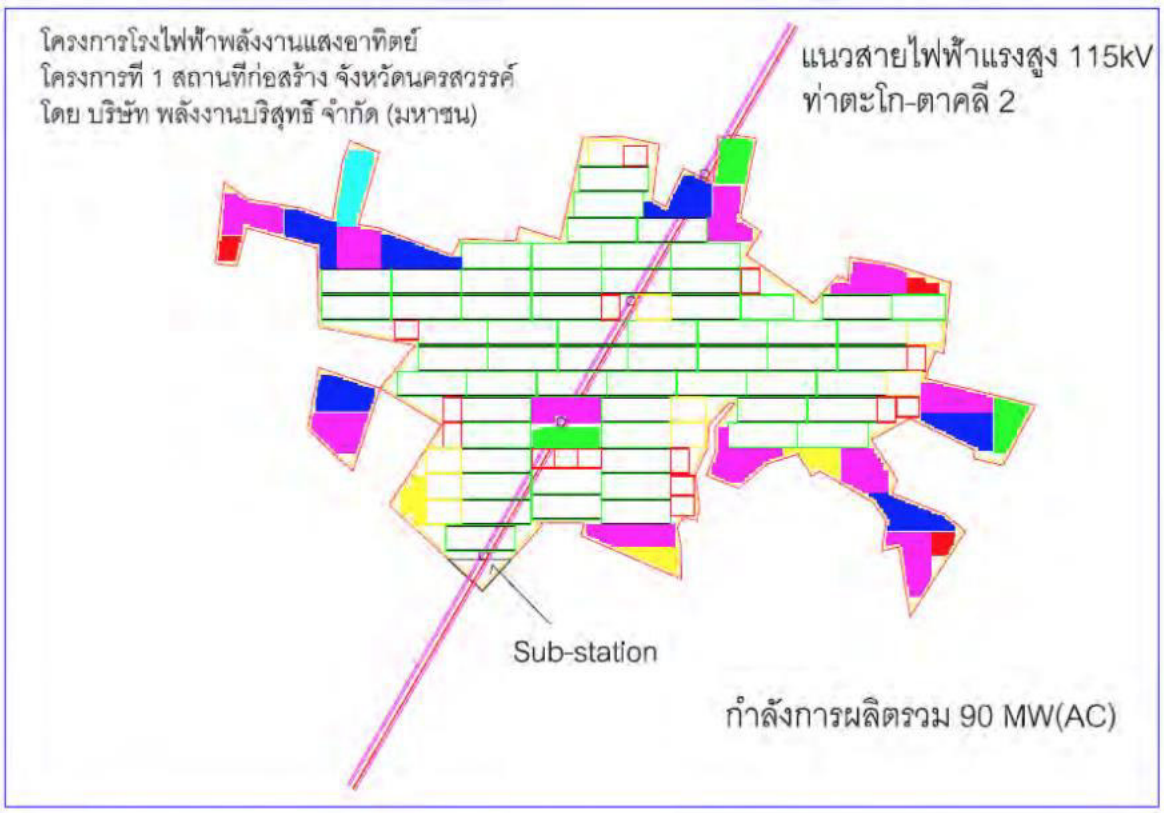
1.3 Nakhonsawan Solar Project

The Nakhonsawan Solar Project is a solar PV project located in Nakhon Sawan Province in North Western Thailand, approximately 240km north of Bangkok and east of Wat Nong Pho as illustrated by the location map below.

Figure 1. Location of Nakhonsawan Solar Project.

The Nakhonsawan Solar Project utilizes 508,794 solar PV modules with 180 sets of inverters and 101 sets of transformers to generate electricity for sale into the Electricity Generating Authority of Thailand (EGAT) power grid. The project has a design capacity of 126.126 MWp and 90 MW AC. The project is located on 1,850 Rai of land, equivalent to approximately 296 Ha. This land was purchased through negotiated settlement on 19 July 2011. There are 180 inverters on the site with 90 1250kVA transformers, 350 kVA transformers, 6 100 kVA transformers, and one of each 160 kVA and 250 kVA transformers. The site system feeds to an EGAT substation on the site with an internal transmission line. The EGAT substation then connects to the electricity grid.

Figure 2. Nakhonsawan transmission layout.



1.4 EA Anywhere EV Charging Project

EA has initiated an EV charging project in the greater Bangkok area. The project involved the installation of EV fast chargers near existing gas station locations. The installation plan is for a charger to be installed every 3-5 square km in the greater Bangkok area and every 50km along motorways. The Chargers are to be installed by EA subsidiary ESM. The charger units are to be designed and constructed to the IEC Standard.

Chargers are proposed to include AC 22/44kW, DC 40kW and AC/DC 22/150kW units depending on the power source connection type.

2. APPROACH, METHOD AND SCOPE OF WORKS

The scope of the project is to provide an external audit of the environmental, social, health and safety performance of the client's (EA's) Projects in accordance with the ADB Safeguard Policy Statement[1] General Corporate Finance modality requirements; and assist and advise the client (EA) 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 Nakhonsawan Solar Project and EA Anywhere EV Charging Project in Thailand against the objectives, principles, and requirements of ADB's SPS (2009)[1], 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 the Projects 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 Projects 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;
iv) Identify the Company's main stakeholder groups and current stakeholder engagement activities.

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

2.1 Methodology

2.1.1 Desk Based Reviews

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

EA Corporate Reporting and Policies

- 1.1 EA_Annual Report 2018 2019.pdf
- 1.2 EA_Quality, Environmental, Energy Conservation, OHS policy.pdf
- 1.3 EA_Sustainability Policy.pdf
- 1.4 EA Corporate Environmental Policy _ Certifications.pdf
- 1.5 MANAGEMENT SYSTEM PROCEDURE.pdf
- 1.6 ENVIRONMENTAL RELATED PROCEDURE.pdf
- 1.7 SITE ENVIRONMENTAL OPERATION PROCEDURE.pdf
- 1.8 Health and Safety Manual.pdf

ISO and OHSAS Certifications

- EA Biodiesel ISO 9001 2015.pdf
- EA Biodiesel OHSAS 18001 2007.pdf
- EA Biodiesel RSPO.pdf
- EA Headquarter ISO 9001 2015.pdf
- EA SOLAR ISO 9001 2015.pdf
- EA SOLAR ISO 14001 2015.pdf
- EA SOLAR LAMPANG ISO 9001 2015.pdf
- EA SOLAR LAMPANG ISO 14001 2015.pdf
- EA SOLAR NAKORNSAWAN ISO 9001 2015.pdf
- EA SOLAR NAKORNSAWAN ISO 14001 2015.pdf
- EA SOLAR PHITSANULOK ISO 9001 2015.pdf
- EA SOLAR PHITSANULOK ISO 14001 2015.pdf
- EA WIND HADKANGHAN 3_ISO 9001 2015.pdf
- EA WIND HADKANGHAN 3_ISO 14001 2015.pdf
- Planning of Certification to ENERGY ABSOLUTS_PUBLIC-Rev.01.pdf

Organization Structure

- EA_HSE Organization Chart (English version).pdf
- EA_HSE Organization Chart (Thai version).pdf
- ESM Organization Chart.pdf
- ESM_Nakhonsawan Organization
- EMN_EA Anywhere EV Charging Organisation
- Chart.pdf EA E&S Training Calendars
- 4.1 EA training calendar 2018.pdf
- 4.2 EA training calendar 2019.pdf EA’s grievance redress system
- 6.1. GRIEVANCE PROCEDURE_EngNote.pdf

- 6.2 Form Complaints record.pdf

Environmental, health, safety and social monitoring and reporting system

- Nakhonsawan Initial Environmental Examination Reports 2012 and 2015

EA Contractor and subcontractor requirements and procedures

- 9.1 HSE-WI-003_WI Contractor Control.pdf

EA Internal and external EHS training records

- 10.1 Action Plan ISO 9001 ISO 14001.pdf
- 10.2 Confined Space training attendance.pdf
- 10.3 EA training record 2018.pdf

B2. Environmental Compliance Permits

B3. Annual Environmental compliance monitoring reports

B4. Other E&S related permit (e.g. water discharge permit, water extraction permit)

B5. Supporting documents in relation to the provisions of the permit

B7. Organizational structure, roles of on-site management and staff, E&S team

B8. Record of health and safety statistics

B9. Labor related reports submitted to Ministry of Labor and Employment for the last 3 years

B10. Land Documentation

B11. Internal and external EHS training records of relevant staff

B13_14. Technical summary reports, Design Spec

Green Loan Documentation

- B19. EA_Green Bond Framework.pdf
- B20. EA_Financial Summary.pdf

2.2.2 Project Meetings

A meeting was held online due to travel restrictions on 28 May 2020 and subsequently via video call at the sites 10 June 2020 for Nakhonsawan Solar Project and 11 June 2020 EA Anywhere EV Charging Project to introduce the ADB team and discuss the Nakhonsawan project and EA Everywhere EV Charging Project. EA presented a brief overview of the Projects and discussions were held for the entire assessment. Meeting participants included:

EA

Chatrapon Sripratum, Assistant Vice President Sarawut
Wongruean, Production Manager
Punika Phungsung, QHSE Team
Sirin Srijongsirikul, QHSE Team
Vivat Khositsakul, AEP Team
Sarun Sritammaratch, AEP Team
Benjawan Sura, AEP Team

ADB

Melissa M. Manguiat, Senior Safeguards Officer ADB
Abhishek Singh, Senior Social Safeguard Specialist ADB
Mark Robinson, ADB Consultant

3. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

3.1 Applicable EHS Laws

Ministry of Natural Resources and Environment.

The Environmental Impact Evaluation Bureau (EIEB) Office of Natural Resources and Environmental Policy and Planning (ONEP) is responsible for the administration of the environmental impact assessment (EIA) process in Thailand. Based on "The Announcement of Ministry of Natural Resources and Environment for the type and size of projects or activities required to submit an EIA report; and criteria, procedure, regulation and guideline to prepare an EIA report, June 2002 or B.E. 2545, solar power project are not required to prepare an EIA report.

Energy Regulatory Commission (ERC).

The Energy industry Act (2007) legislated the ERC body to oversee and regulate the energy industry within Thailand. The ERC Code of Practice (CoP) decrees requires projects exempted from the IEE process to submit a CoP report as part of the requirements in the application of the electricity industry operation and generation license/permit. The IEE report contains information on the following: (i) project description; (ii) current environmental conditions; (iii) environmental and safety assessment; and (iv) environmental and safety mitigation measures. While an COP was not required for the project under regulation, EA prepared an IEE document in 2012 and 2015 for the purposes of a Clean Development Mechanism project related to the plant. The Environmental

Assessment/Examination documentation and compliance section discussed the environmental management, monitoring measures, and stakeholder engagement plan throughout the project cycle, from pre-construction to decommissioning phases of the project.

Permits associated with the EA energy generation operations as a whole include:

- Electricity Industry Operations license, 15 February 2016-2026
- Factory Permit (Factory License 1-3), 2013-2025

Permits associated with the operation of the Nakhonsawan Project include the:

- Ground Water Extraction Permit issued in 2018;
- Hazardous Waste Manifests issued in 2018-2020;
- Letter of Permit for Construction, issued May 2012
- Letter of Approval for Construction, issued October 2012
- EGAT Generation Meter Reading, from 2013

Permits associated with the operation of the EA Anywhere EV Charging Project include the:

- ERC/Ministry of Energy Operations Permit, as at June 2020.

Other relevant National and Local Laws detailed in the following legislation are noted to be relevant to the projects:

Environmental

  - Environment and Conservation of the National Environment Quality Act, 1992Water quality standards for river, canal, swamp, marsh, lake, reservoir and other public inland water sources
  - Water quality standards for coastal and estuarine water areas
  - Groundwater quality standards
  - Atmospheric ambient air standards
  - Ambient standards for noise and vibration
  - Environmental quality standards for other matters
- Sections 44(3) and 46 of the Enhancement and Conservation of National Environmental quality Act of B.E. 2535 (1992)
- Enhancement and Conservation of National Environmental Quality Act, B.E. 2535, Chapter 4 Pollution Control, Part 4, Section 68
- Natural Resources Management Enhancement and Conservation of National Environmental Quality Act, B.E. 2535, Chapter 3
- Enhancement and Conservation of National Environmental Quality Act, B.E. 2535, Chapter 4 Pollution Control, Part 5

Workplace and Human Rights

- Labour Protection Act B.E. 2541 (1998), Chapter 4 Section 44 – 52 (Child Labour)
- Labour Protection Act B.E. 2541 (1998), Chapter 4 Section 53 – 77 (Wages and Benefits)
- Labour Protection Act B.E. 2541 (1998), Chapter 2 Section 23 (Working Hours)
- The Anti-Trafficking in Persons Act (No.3) B.E. 2560 (2017), section 52 (Forced Labour)
- Labor Relations Act, B.E. 2518 (1975), Chapter 9 (Freedom of Association)
- Occupational Safety, Health and Environment Act B.E. 2554 (2011), Chapter 1 Section 6 (OHS)
- Dormitory Act, B.E. 2558 (2015) (OHS)
- Announcement of Department of Labor Protection and Welfare Personal Protection Equipment (OHS)
- Labour Protection Act B.E. 2541 (1998), Chapter 1 Section 16 (Harassment)
- Labour Protection Act B.E. 2541 (1998), Chapter 1 Section 15 (Discrimination)
- Department of Labour Regulation (2006)
- Department of Industrial Work Regulation (2003)
- Department of Industrial Estate Authority of Thailand

Compliance Status

ADB Policy

Applicable ADB policy includes:

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

4. AUDIT FINDINGS

4.1. Corporate E&S Review

Energy Absolute PLC is a Thai business with the vision and purpose of becoming a leader in alternative energy business Using modern technology that is environmentally friendly within the Thailand and internationally.

History and Broad Timeline

Energy Absolute was founded as Pure Energy PLC in 2008 with 50 million baht and construction of a biodiesel plant at Kabinburi Industrial Estate, Prachinburi Thailand. By 2011 increased capital to THB 305 million and began operational and investment expansion into renewable energy generation with the EA Solar Company Limited and the 8 MW solar PV farm at Lopburi. In 2011 EA also signed a PPA agreement with EGAT for a 90 MW solar PV plant in Muang District, Lampang Province. By 2014 EA had expanded further, setting up numerous entities to handle multiple operations in Solar PV and Wind power generation. In 2016 EA had continued its growth in the Biodiesel, Solar and Wind power sectors and invested in Taiwanese Lithium Battery manufacturer Amita Technologies Ltd. In May 2017 EA invested in the construction of 5 wind power plants in Chaiyaphum province, with a total capacity of 260 megawatts, collectively called the "Hanuman Project", with a total investment value of approximately 20,000 million baht and ultimate capacity of 260 MW. In 2018 EA acquired the remainder of the Amita Technologies entity, effectively making it a subsidiary of EA. In 2018 EA also established the Mine Mobility Corporation with the intention of developing an electric transportation business and launching the development of electric vehicle charging stations within Thailand.

4.1.1 Organizational Structure

The corporate structure illustrates the position of the corporate entities within EA (Figure 5). The renewable energies power plant business of EA is comprised of a series of indirect subsidiaries responsible for the ownership and operation of the renewable energy projects including Nakhonsawan Solar Project. The Energy Solutions Management entity (ESM) plays the role of operator for the projects held under subsidiary.
As depicted in Figure 5, below, EA's operations in Renewables (Solar and Wind) and EV Charging are highlighted with red lines. These entities are a combination of direct and indirect subsidiaries.

Figure 5: Organizational Structure of EA as of 31 March 2019.

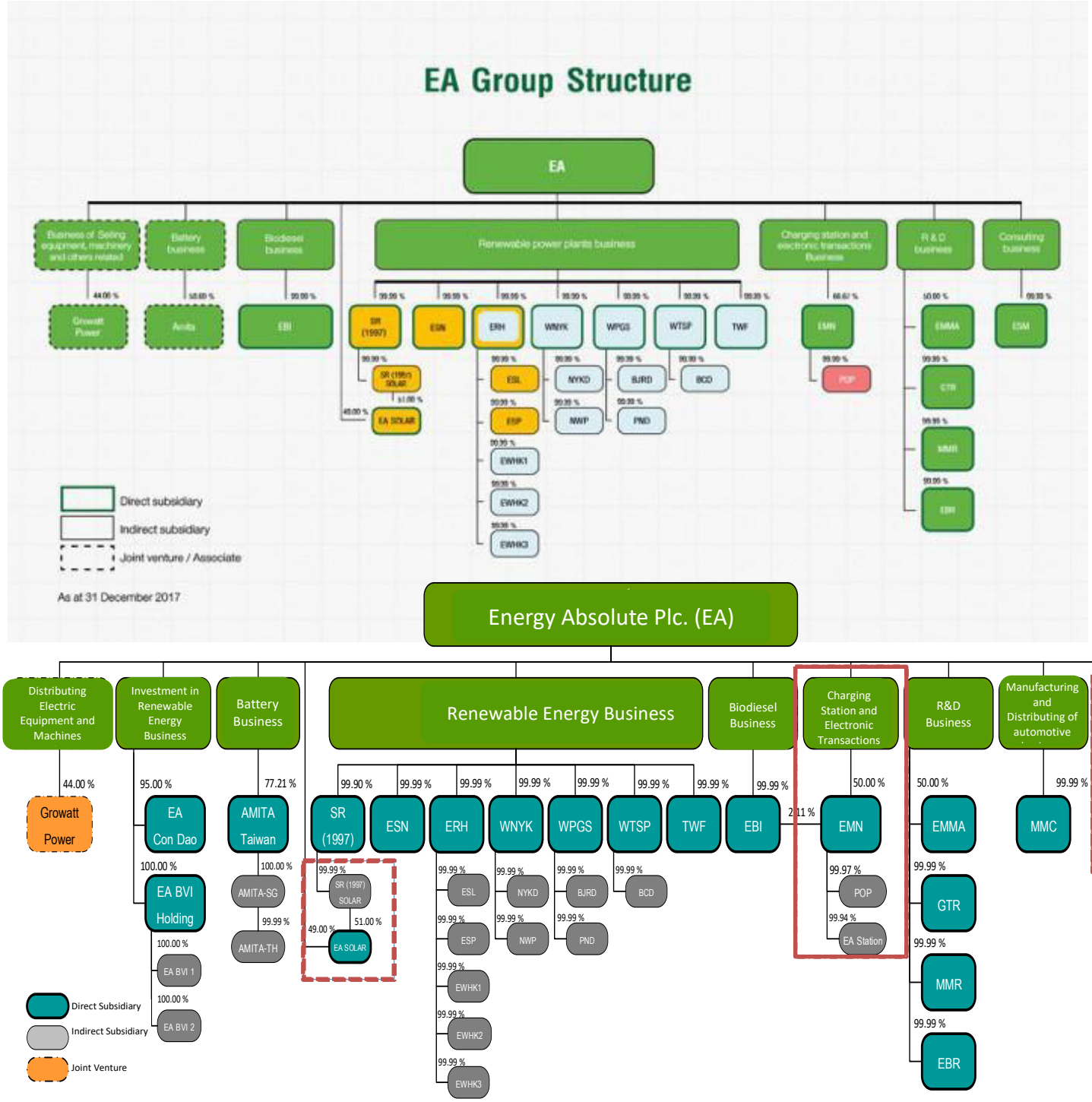
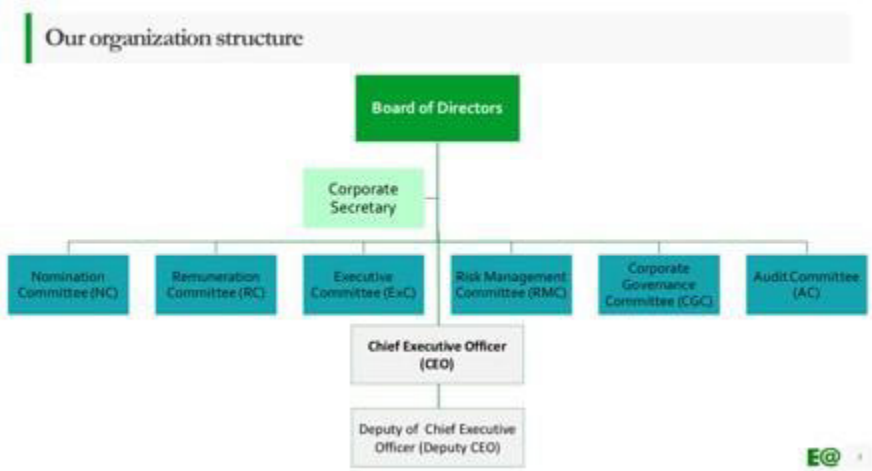
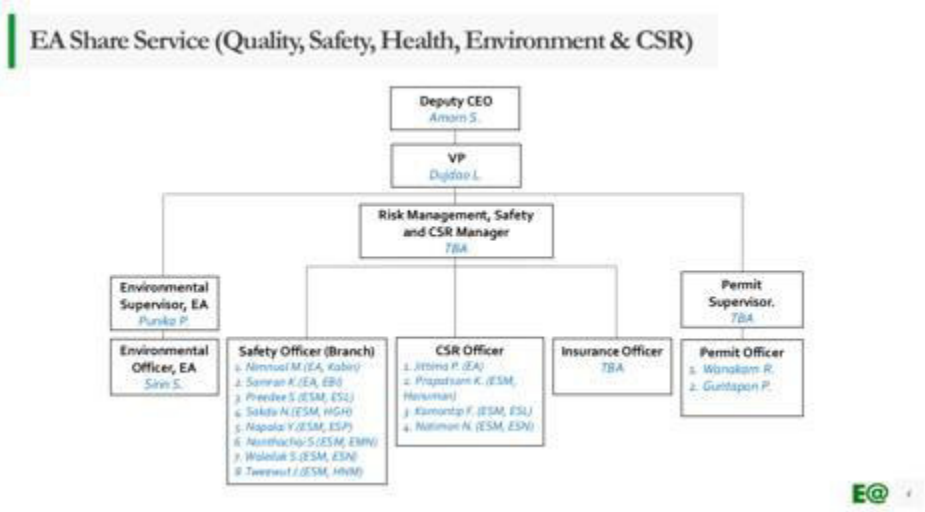


Figure 6: Executive Structure of EA



As per Figure 6 above, the Risk Management Committee (RMC), The Corporate Governance Committee (CGC) and Internal Audit Committee (AC) sit at the executive committee level between the Board of Directors and the office of the CEO.

Figure 7: EA Quality, Safety, Health, Environment & CSR Corporate Structure



As per Figure 7 above, the office of the CEO (Deputy CEO) and Vice President oversee the Environmental, Safety, Insurance and Compliance functions within the organization. These functions were confirmed to be shared services which operate across all EA subsidiaries (and projects). These functions then cascade procedures, training, instruction, resources and other services to the project level human resources.

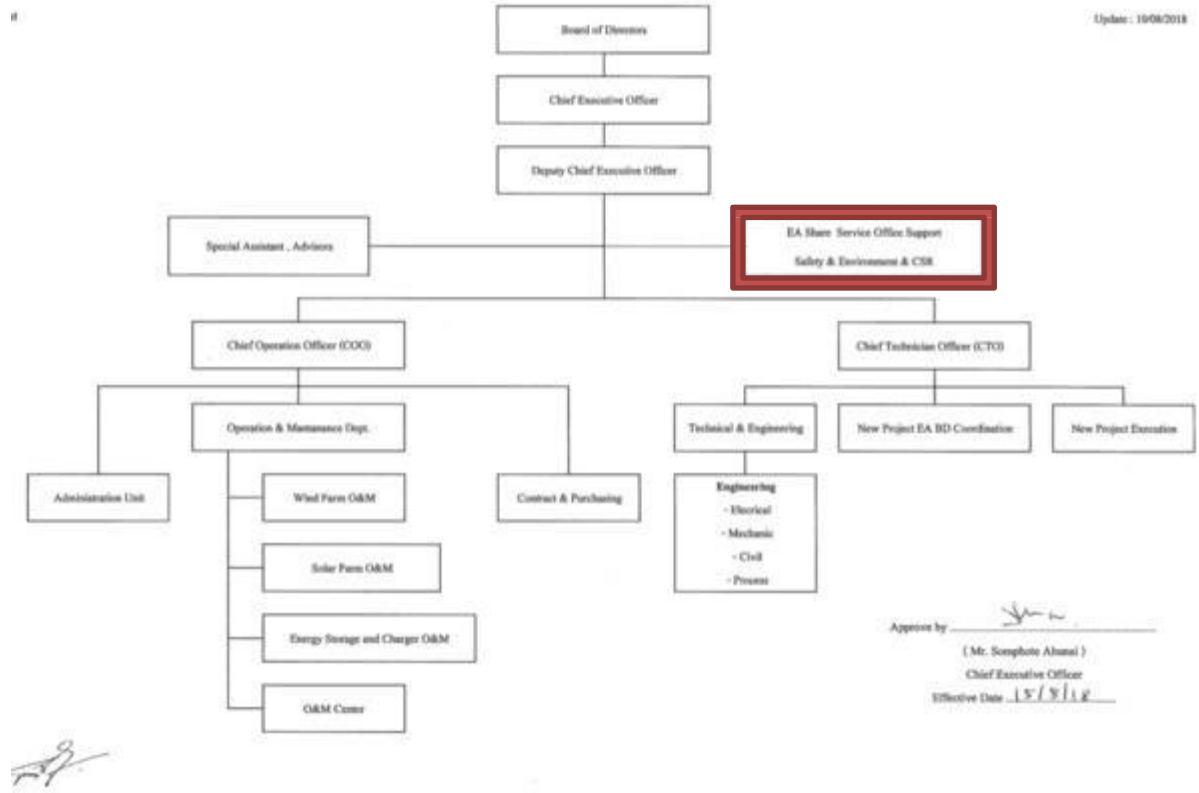


Figure 8: Energy Solutions Management Structure.

Figure 8 above sets out the corporate structure for ESM, who operate the renewable energy generation projects including Hanuman. The red box in Figure 8 shows how the Shared Quality, Safety, Health, Environment & CSR services from the EA corporate level fit into the ESM structure.

Figure 9: Nakornsawan Solar Project Organization Chart.

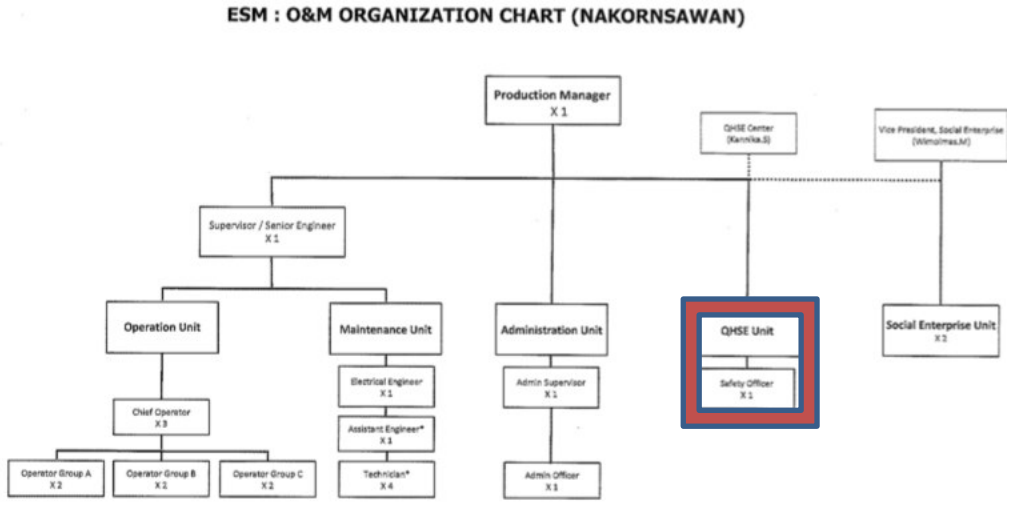


Figure 9 details the organizational structure at the site level. The red box in Figure 9 shows how the Shared Quality, Safety, Health, Environment & CSR services from the EA corporate level fit into the structure.

Figure 10. EA Anywhere EV Charging Project Organization Chart

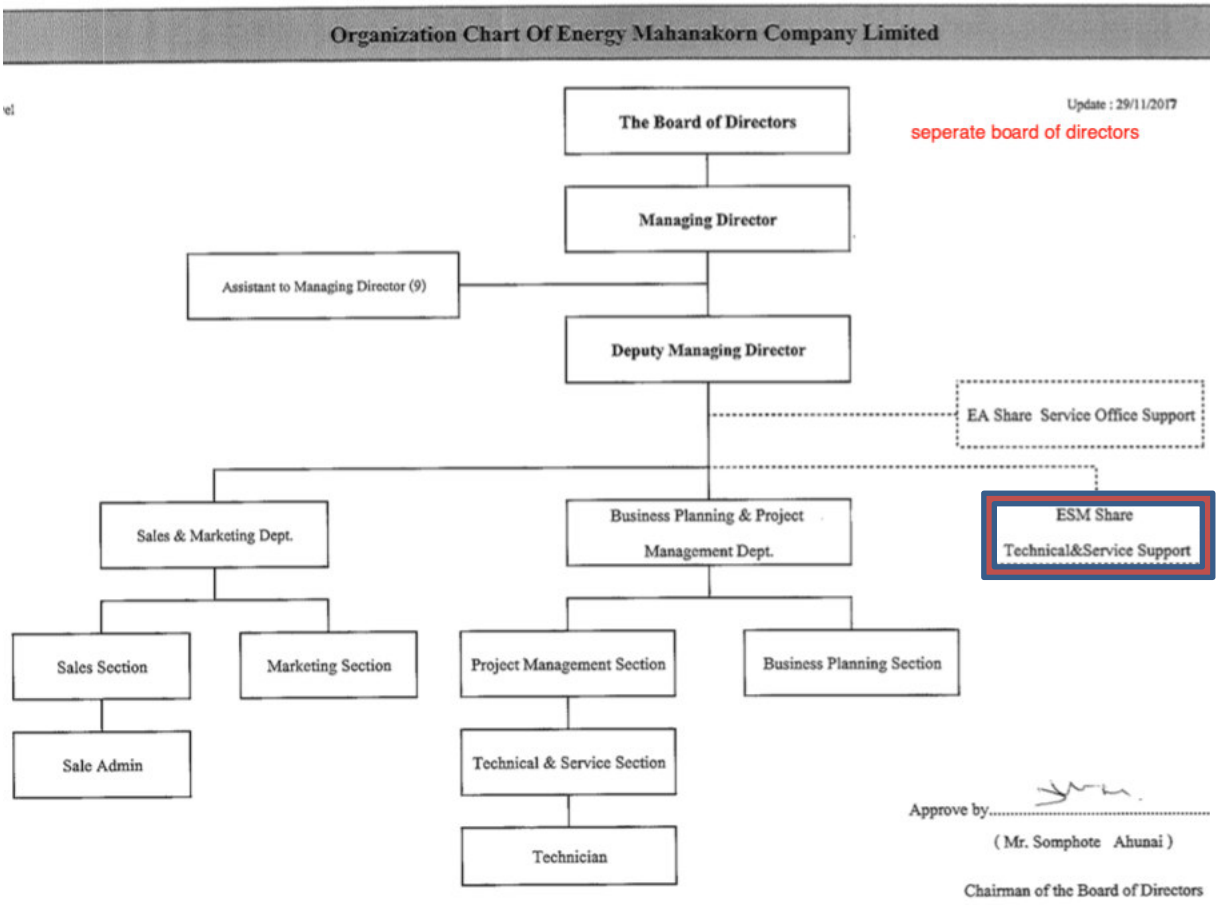


Figure 10 details the organizational structure at the project level. The red box in Figure 9 shows how the

Shared Quality, Safety, Health, Environment & CSR services from the EA corporate level fit into the structure.

4.1.2 Environmental and Social Management System

EA has in place a range of Environmental, Safety and CSR policies and procedures for the management and mitigation of E&S related risks. This assessment has instead considered the scope and effectiveness of existing EA E&S policy and procedures for compliance with the SPS and sough to identify any gaps.

Quality, Environmental, Energy Conservation, OHS Policy

EA has in place a Quality, Environmental, Energy Conservation, OHS policy that applies to all investments and operations under the operational control of EA. The policy has been developed in alignment with ISO standards 9001 for Quality, 14001 for Environment and 18001 for Safety. EA has in place all these ISO certifications for its operational entities where possible. Where these certifications are not yet in place, EA has developed a schedule for their attainment. The Nakhonsawan project has achieve ISO 9001 and 14001 certifications. The policy sets out EA goals and commitments including environmental stewardship and compliance, delivery of quality products and services and commitments to workplace safety and safety for customers.

Sustainability Policy

EA has in pace a Sustainability Policy targeting economic, social and environmental sustainability dimensions. The policy has been structured to facilitate the development and deployment of procedures across a range of dimensions and categories including:

Economic Sustainability

- Corporate Governance
- Business Ethics and Anti-corruption
- Risk Management and Crisis Management
- Supply Chain Management
- Innovation in Business and Society

Environmental Sustainability

- Determination of Environmental Policy within the EA group
- Determination of Environmental Programme and support requirements

Social Sustainability

- Adherence in fairness and respect for human rights to all workers
- Employee conduct at all levels
- Provide a social evaluation system
- Corporate Social Responsibility projects

The goals and commitments within the Sustainability Policy are broadly in line with best practice. Even if it does not explicitly mention commitments to or policies on the avoidance of child labour, forced labour, environmental risk assessment and involuntary resettlement, these are aligned with law and regulation required.

Integrated Management System Procedure (Environmental, Quality and Safety)

EA as a part of its work to achieve ISO system certification has developed a Management System Procedure to facilitate the necessary functions for the management and mitigation of environmental, quality and safety risks. This document includes scope and set procedures EMS and QMS operation including:

- Context of the Organization
- Needs & Expectation of Interested Parties
- Determination of Risk and Opportunities
- Establishment of Objectives and Planning to achieve them
- Control of Documented Information
- Management of Change
- Internal Audit
- Management Review
- Nonconformity and Corrective Action
- Continual Improvement

The document appears to be well elaborated for the purposes of operation within the scope of ISO 9001, 14001 and 18001 certification and in line with law and regulation requirement. The Procedure does not specifically address social risks and their mitigation and management.

Environment Management System Related Procedure

The EA Environment Management System Related Procedure follows on from the previous Integrated Management System Procedure to specifically deal with Environmental aspects. The Procedure has been developed for deployment at the EA group level and is relevant to the function of the Quality, Safety, Health, Environment & CSR Shared Service Team. The procedure covers topics including:

- Identification of Environmental Aspect and Impacts
- Legislative compliance
- The information of environmental safety monitoring
- Emergency Preparedness and Response
- Grievance Mechanism
- Internal and external communication

The Procedure sets out the procedures and process for environmental risk identification, reporting and checklist formats, responsible persons and resources and communication conduits. The procedure is considered reasonable in context and should be capable of facilitating the identification, mitigation and management of environmental risks associated with the Nakhonsawan Project. It is noted that an equivalent and dedicated Social Management System Related Procedure did not exist. It is noted that the grievance mechanism outlined in the Environment Management System Related Procedure section 5.5 should be able to facilitate this function for both social and environmental aspects.

An ESMS developed in accordance with the ADB SPS 2009 was drafted in 2017 for prospective ADB investment at that time. The ESMS was not rolled-out for implementation as ADB's initial investment did not push through. EA is keen in implementing the ESMS for future ADB supported projects.

EA has developed an ADB compliance Environmental and Social Management System (ESMS) that was prepared previously but not fully implemented. The ESMS is an addendum to their existing environmental and social policies and procedures. The ESMS must be updated to facilitate the inclusion of the EA Anywhere EV Charging Project.

Site Environmental Operation Procedure

EA has created and implemented a generic site based Environmental Procedure covering:

- Waste Management
- Wastewater Management
- Chemical Control

EA Health and Safety Manual

EA has in place a Health and Safety Manual that appears to be generic for all operational purposes. The manual is relatively detailed and covers a wide range of safety requirements, risks and details on safe work and personal protective equipment. The Manual covers:

- Cleaning and storage of materials in the workplace Fire Protection
- Personal Protective Equipment
- Safety in Welding
- Safety in Gas Cut
- Safety in Grinding
- Safety in Working at a Height
- The safe use of Electrical Equipment
- The safety of moving heavy objects by hand
- Safety for using forklifts for moving objects
- The safe use of machinery
- Safety for The Contractor
- Safety in Office
- First Aid
- Signs of Danger and Flammable Substances

4.1.3 E&S Training, Competence and Capacity

Table 4 below sets out a summary of E&S resources and capacity related to the Nakhonsawan Solar Project.

It is noted that while the CSR team has group level competence and capacity, team was dedicated site officer level responsible for Environmental issues under supervision of Site Manager and VP QHSE at corporate level.

Table 4. E&S Capacity and Resources

Resource	EA
ESMS	Completed and developed in conjunction with the ADB but yet to be deployed. The ESMS was confirmed to be the joint responsibility of the EA VP and new role of Corporate CSR Manager.
E&S Resources	EA corporate level E&S shared services team with Environmental Supervisor and Environmental Officer.
E&S Reporting System	E&S related reporting captured in ISO 14001 Management System. Environmental compliance reporting handled through Permit Officer and Permit Supervisor.
Internal Data systems	Physical and soft data storage managed and maintained at a corporate level. Additional construction related data ad records maintained by EPC contractor.
Training	Managed and conducted by the EA through EA corporate training program. Reported to include E&S/ESMS materials. Training for E&S matters subject to defined training plan.

The management of E&S related training and competence at the corporate level was managed by the CSR Manager (yet to be appointed) in conjunction with internal Training and HR functions. Records of training delivery and staff competence were provided for the previous 2 years. Records of safety inductions and training were reported to be held and available at the site offices. Training and competence are mentioned within the EA Integrated Management System.

4.2. Nakhonsawan Solar Project E&S Review

4.2.1. Compliance with national and local laws and regulations

The Nakhonsawan project is not required to undertake regulatory Initial Environmental Examination (IEE) under Environment and Conservation of the National Environment Quality Act, 1992 or Enhancement and Conservation of National Environmental Quality Act, B.E. 2535. Thailand's Energy regulatory Commission (ERC), required the project the prepare a Code of Practice (CoP) report, equivalent to an IEE. The proponent EA, also undertook an IEE for the project related to CDM application, submitted to TGO in 2015.

Electricity Operations License and Power Generation Licenses were confirmed to have been obtained as required and were valid at the time of the audit. Other relevant permissions, related to the above local legislations and regulations in section 3.1, including the ground water extraction permits and health and safety certificates relevant to Fire Safety were noted to be valid. No evidence of non-compliance with the other relevant National and Local EHS regulations was observed during the audit.

4.2.2. Initial Environmental Examination

The Project IEE sets out the record of how risks were identified and in consideration of these, sets out the Environmental and Social Management Plan to mitigate and manage these risks.

The primary E&S impacts and risks associated with the project have been identified as being associated with Land Use, Construction impacts, Biodiversity Impacts and Water use. The effectiveness of the IEEs assessment of these factors is considered in this section.

4.2.3. Environmental management plan during construction activities

The environmental management plan and mitigation measures during the construction activities as indicated in the CoP and IEE reports are summarized in the following table.

Table 5. E&S Requirements and Measures during construction.

Impacts	Mitigation measures	Monitoring Indicator	Remarks/Status of Compliance
Pre-Construction Phase **Responsibility of Advanced Energy Plus Company Limited**			
Compliance to permitting requirements of the ERC and MOI.	The final technical design, site selection and zoning requirement and should be in accordance with the applicable national regulation's standards of ERC and MOI	Submission of CoP annual monitoring report. License Permit from the MOI and ERC	Compliant
Change in land use	Ensure that the project is consistent with any zoning/land use plan.	Approval from the local/provincial department on any change in land use.	Compliant Based on the annual CoP report. Project was granted a factory permit indicating that the project is consistent with any zoning/land use plan in the project area.
Construction Phase **Responsibility of the Construction Subcontractor.**			
Air pollution			
Generation of dust or particulate matter from site preparation-grading and leveling	Provision of enclosure or temporary fence around the project area and damp down exposed soil on site by spraying with water when necessary during dry weather.	Total suspended particulate matter (TSP) and particulate matter (PM-10) concentrations at the project area and surrounding communities.	Compliant with Announcement of the National Environment Board No. 24 (2004) Subject: Setting general air quality standards in the atmosphere based on the annual CoP report.
Emission from movement of heavy equipment and construction vehicles	• Truck loads should be covered with canvas/tarpaulin. • A speed limit of 30km/h in the project area and 60km/h in street roads will be implemented to prevent and/or minimize dust emission. • Vehicles and equipment used during construction must be properly maintained and in good condition to ensure optimal performance.		
Water pollution			
Domestic sewage/wastewater from workers.	Impact insignificant as few workers working on-site and no construction camp was required.	Visual inspection of the site supervisor.	Compliant With regulations including

Impacts	Mitigation measures	Monitoring Indicator	Remarks/Status of Compliance
	All concrete works are prepared and done outside the project area. The structures will just be assembled at the construction site. Domestic sewage will be treated in a septic tank.		Announcement of the MSTE, 4th edition (1996), MSTE, 3rd edition (1996) and Announcements of the Pollution Control Department based on the annual CoP report.
Noise and Vibration			
Disruption of activities in nearby communities during land leveling and grading.	Construction hours limited (7:00 am to 7:00 pm) Equipment producing high level sound will not be used simultaneously so as to minimize the noise produced. Regular inspection and maintenance of engine/machinery to ensure that they are in good working condition.	Project area and annoyance level at the surrounding communities	Compliant with Announcement of the National Environment Board No. 15 (1997) Subject: Setting general noise level standards based on the CoP report.
Generation of construction/solid waste			
Improper solid waste management could block waterways and could cause odor or vermin problem.	Domestic solid wastes should be properly segregated for collection and disposal by an accredited waste hauler. For hazardous waste, such as broken solar panels, the company should have a contract agreement with an accredited hazardous waste hauler.	Regular inspection of the site supervisor. Contract agreement with an accredited waste hauler.	Compliant with Notification of the Ministry of Industry Subject: Rules and procedures for reporting details regarding sewage or materials That is not used from the factory By Electronic Media (Internet) B.E. 2547 as discussed in the annual CoP report. The project has a manual on waste management. Agreement/contract with DEMCO to be in-charge of the transport and final disposal of broken/end-of-life of solar panel.
Traffic/Transportation Plan			
Aside from the generation of noise and dust on hauling routes, the movement of construction vehicles will disrupt normal traffic patterns and expose the local	• Truck loading will be according to the standards (no overloading) to ensure that the transport of materials will not cause damage to existing roads.	Visual inspection of the site supervisor.	CoP report and based on the field visit, there were no recorded incidents/accidents related to traffic management.

Impacts	Mitigation measures	Monitoring Indicator	Remarks/Status of Compliance
communities to risk of injury or accidents. Transport of construction materials may cause damage to existing roads.	• There will be a speed limit of 30km/h in the construction area and 60km/h in street roads. • Regular maintenance and/or inspection of vehicles. • Avoid the transport of materials during rush hours.		
Fire safety			
Installation and assembly of the solar panel modules may result to fire and/or explosion.	• Provision of security guards 24/7 • Provision of security fence • Warning signs of "fire hazard" and "no smoking" in the perimeter of the project area • Training of employee on fire safety • Provision of fire extinguishers • Provision of an isolated and contained storage room for flammable materials. There will be no welding operations near the storage room.	Fire safety plan	Fire safety manual and evacuation plan during construction activities.
Construction activities may cause harm and danger to the lives and welfare of workers.	• The contractor should prepare occupational safety and health (OSH) manual/plan which will be part of the contractor's contract documents. The occupational safety plan should have provisions on (i) providing personnel protective equipment (PPE) like hard hats, safety gloves, ear mufflers to all workers; (ii) providing occupational health and safety training to all workers (i.e. first aid measures, prevention of malaria, diarrhea, HIV/AIDS); (iii) documenting safety procedures to be followed for all construction site activities; (iv) maintaining records of accident and the corrective actions implemented; and (v) emergency response plan during fire, earthquake and other incidents • Provision of first-aid facilities for the workers and at least one safety and health officer should be assigned in the construction area • Provide adequate portable or permanent sanitation facilities serving all workers	OSH manual/plan	EA has an OSH manual which is included in the subcontractor agreement.

Impacts	Mitigation measures	Monitoring Indicator	Remarks/Status of Compliance
	• Providing sufficient, safe, and easily accessible drinking water stations in the project area		

EA provided evidences of its regulatory compliance during the construction phase of the project. The audit confirmed that there are no pending environmental, health and safety issues from the construction activities.

4.2.4. Public Consultation

Public participation and consultation prior to construction activities is a requirement of the CoP. Based on the CoP Report and CDM IEE Report, the project has organized consultation meetings prior to construction activities. The meeting was on 8 February 2012 at the Hua Wai Sermon Pavilion, Hua Wai Subdistrict, Takli District. Local stakeholder participants were invited and there were 133 participants including villagers living near the solar power plant site. The photo documentation and the attendance sheet of the public consultations are included in the IEE report.

Topics discussed during the public consultation included: project description; project construction; project operation; environmental impacts from the project. After the company's presentation, all stakeholders were encouraged to ask questions and give feedback about the project. The general comments from the consultation are: (i) light impacts associated with the project; (ii) road access for the project; and (iii) community development plan during the construction and operation phases of the project. A survey was conducted on the acceptability of the project at the end of the meeting and 92% approved of the project.

4.2.5. Grievance redress mechanism (GRM)

One of the requirements of the CoP is to establish a GRM for the project. The GRM of the project is documented in the Communication Manual of the project. Employees and members of the community can submit grievances to the to the management representative/plant manager. The mechanism includes evaluation and screening of complaints, implementing and monitoring of corrective and preventive action and record keeping. The EA website also provides a channel for getting in contact and submitting grievances and is accessible to all stakeholders. There were no records of grievances during the construction activities of the project.

4.2.6. Land acquisition

EA acquired the land for Nakhonsawan solar power plant in 2011 on a willing buyer-willing seller basis. The area of land purchased for the site was 1,850 Rai or 296 Ha. The EGAT substation and the evacuation transmission line from the solar power substation, are all located within the project boundary and hence do not have any additional project linked land footprint. The plant site is surrounded by agricultural lands and there were no residential houses in the site thus no physical relocation was taken place. No relocation of dwellings, residents (formal or informal) or business activities was required for the development of the site. The plant area is fenced with electrified wires along the top of the fencing. There were no reported or identified encroachments or disputes on the site are. There are no legal claims pending over the site area as reported by EA management.

The company is using a small area of land in the central area of the plant to establish demonstration site of organic farm for the benefit of site workers and visitors.

4.2.1. Indigenous People

Based on the location, existing agricultural land use prior to the project implementation and process for land acquisition, no impacts to indigenous peoples are envisaged for the project.

4.2.2. E&S Impacts during Operation and Maintenance of the Project

As discussed in the IEE, there are no anticipated significant environmental and social impacts during the O&M of the project. On environment, it is anticipated that it will lessen air pollution since it is not dependent on fossil fuel and the source is considered as a renewable energy.

Positive social impacts from the project include: (i) increased tax revenue for the local municipality; (ii) project related CSR activities directed towards the community; and (iii) increase in local employment or job opportunities.

Positive environmental impact from the project is the decrease in air pollution and the avoided greenhouse gas (GHG) emissions from the use of fossil fuel.

4.2.3. Environmental management plan for Project O&M

The mitigation measures implemented during O&M phase of the project are in general satisfactory. Table 6 shows the status of compliance of the environmental mitigation measures during the O&M activities of the project. Details on the environmental quality monitoring such as sampling location, number of samples, and methodology used in the analyses are discussed in the 6 monthly COP Reports.

Table 6: Environmental and social measures during operation and maintenance phase

Impacts	Mitigation measures/Management Plan	Monitoring Indicator	Remarks/findings at the site inspection
Water use management plan			
Regular cleaning of solar panels may deplete the existing local source. Water demand and utilization efficiency	The solar plant has set-up a water management plan. Based on the IEE, the water that will be used for the solar panel cleaning will be from 4 licensed well connected to ponds with an extraction rate of 56m^3, 19m^3, 72m^3 and 30m^3 Solar panel cleaning is done manually and through the use of automatic solar panel cleaning machinery. Schedule of solar panel cleaning: (i) 22-day cycle during dry/summer season (November to May); and (ii) as required during rainy season.	Monthly water use report	Based on the CoP report, the project has 4 licensed well connected to ponds with an extraction rate of 56m^3, 19m^3, 72m^3 and 30m^3. These licenses were provided to ADB and were confirmed to be valid at the time of inspection.
Water quality			

Impacts	Mitigation measures/Management Plan	Monitoring Indicator	Remarks/findings at the site inspection
Water from the retention pond undergoes treatment in the wastewater treatment plant using ion-exchange process before using it to clean the solar panel or domestic water use.	Water from the retention pond undergoes treatment in the wastewater treatment plant using ion-exchange process before using it to clean solar panel or domestic water use. Water from the site ponds is also used for site buildings and site use.	Water quality monitoring for: (i) pH, total hardness, TDS, total iron, manganese, copper, zinc, sulfate, chloride, fluoride, nitrate, nitrogen, coliform bacteria, E. coli. Sampling points: Wastewater treatment plant	Based on the monitoring report, all water quality parameters are within the acceptable level of the national standard including Announcement of the MSTE, 4th edition (1996), MSTE, 3rd edition (1996) and Announcements of the Pollution Control Department based on the annual CoP report
Unsafe and unclean drinking water which may cause disease or sickness	Provision of clean drinking water to employees. Drinking water is supplied from water refilling station.	Water quality monitoring for pH total hardness, turbidity, TDS, coliform bacteria, fecal coliform bacteria Sampling points: House water Drinking water provided in separate commercial tanks.	Based on the monitoring report, the water quality concentrations are within the national standards including Announcement of the MSTE, 4th edition (1996), MSTE, 3rd edition (1996) and Announcements of the Pollution Control Department based on the annual CoP report.
Air pollution			
Fugitive dust emission in the project area from open/cut soil	Provision of greenbelt area. Planting of trees/bushes and grass to reduce dust, increase soil moisture and enhance the landscape.	Greenbelt area Monitoring of ambient air quality monitoring for TSP and PM-10 Sampling points: Fence line nearest to local dwellings.	Site is completed and in operation. No areas of concern were identified during the remote inspection.
Solid waste management			
Improper solid waste management could cause odor and vermin problems, pollution and flow obstruction of nearby water courses and negatively impact the landscape.	Domestic solid wastes will be properly segregated and will be collected for final disposal by an accredited waste hauler.	Waste segregation bins in the project site.	Compliant Field visit observed that there are color-coded waste bins. Waste are segregated as: hazardous (red) for busted lamps, containers of chemicals and batteries; compostable (green) for food leftovers; recyclable (yellow) for PET bottles, can, glass, papers; and general waste (blue) for plastic bags, food packing, tissue paper. The bins are located at

Impacts	Mitigation measures/Management Plan	Monitoring Indicator	Remarks/findings at the site inspection
			the warehouse area and are in a covered protected area. Food waste is used in the composting for the fertilizer used in the organic farming. Hazardous wastes are collected by an accredited waste hauler (DEMCO).
Noise			
It is not anticipated that noise will be significant during operation activities	The project regularly monitors the noise level at the project area.	Noise level (Leq ave) at building level D04	Based on the monitoring report, the noise level is within the standards
Workplace environment			
Unsafe or unhealthful working conditions.	Ensure a healthy working environment by providing ergonomic office chairs, proper lighting, clean and dust-free furniture, etc.	Regular monitoring of noise, dust, heat stress and light intensity at the workplace.	Based on the monitoring report, all parameters are within the standards.

4.2.4. Occupational safety and health (OSH).

EA has developed a stand-alone OSH manual which is implemented in all its subprojects and as part of its contractor management system. The OSH manual contains sections on: (i) "ten commandments" of safety; (ii) cleaning and storage of materials; (iii) fire protection; (iv) personnel protective equipment (PPE); (v) safety in welding; (vi) safety in gas cutting; (vii) safety in grinding; (viii) working at high elevation; (ix) safe use of electrical equipment; (x) moving objects by hand; (xi) safety for using forklifts in moving objects; (xii) use of machinery; (xiii) requirements for the contractor; (xiv) safety in the office; (xv) first aid; and (xvi) signs of danger and flammable substance. During the remote virtual site inspection, all staff at the project site were observed to be wearing PPE and safety/caution signages were placed in appropriate locations in the solar plant.

Site safety documentation available at the site included the Site Safety Policy, Emergency Services contact details, EA contact details, Site evacuation plan and interior safety and emergency plans.

Annual health, safety, and environmental plan is also prepared which includes information on training plan, safety inspection, safety meeting and report, safety activity promotion, sanitation and environment promotion, and new safety regulation monitoring (compliance register spreadsheet). Records for the execution of annual fire drills were provided for the last two years. Training records were also provided for a chemical spill drill in 2019. Personnel receiving the training were confirmed to include site staff and management who were recorded as participating. The staff were represented in areas including O&M, KCONNECT contractors and administration. Training materials associated with the 2018 and 2019 were also provided for reference.

The company also maintains a record of incidents and accidents during construction and operation phases of the project. Based on the field visit, there were no accidents/incidents recorded to date during the

construction and operation phases of the project. Incidents reported are accidents resulting only to property damage (i.e. wire, cable, cross arm). The status of OSH is posted in their main gate.

No OHS incidents including lost time incidents, hospitalizations or loss of life were reported to have occurred on the site during construction or operation.

During the remote site inspection, it was noted that the eye wash station at the water treatment plant was not functioning at full pressure. This safety equipment must be repaired to operate at designed pressure.

Fire extinguishers on site were noted in some cases to have missed inspection since March 2020. The firefighting equipment on site must be inspected for safe operation and condition.

The Fire extinguisher at the fuel storage location was noted to be attached to the front of the enclosure, which would be too close to the flammable liquids to safely operate in the event of a fire in that area. This fire extinguisher must be relocated to be accessible when a fire is burning in the fuel storage area.

4.2.5. Community health and safety.

The solar power plant is surrounded by agricultural land and the plant has fencing along the boundary of the plant. The site setting is agricultural and there may be buffalo or cow grazing near the plant site as. The surrounding agricultural fields such as rice paddies may be cultivated two or three rice crops a year depending to the rain. To ensure that no individuals and/or animals will accidentally come close near the power plant, a 24-hr security is provided and closed-circuit televisions (CCTV) is installed around the perimeter fence of the power plant.

4.2.6. Fire safety and emergency response procedures.

Electrical faults related to the operation and failure of photovoltaic systems are a possibility and may present risks of sparks and fire. Preventive measures for fire safety are in place such as the provision of fire extinguishers in various locations in the power plant. Inspection of fire extinguishers is on a monthly basis and fire safety drills and trainings are done at least annually. Fire drills also include the rescue emergency response training. In addition, monthly preventive maintenance on the inverter station and annual electrical safety inspection by a third-party are also completed. The nearest fire station is located approximately 3km from the site.

There is no medical facility in the solar power plant as it is reported that the plant is close to sub-district medical center. In case of emergency, site vehicles of ambulances may take patients to the sub-district medical center (4km away) or nearest major hospital (15km). Also, emergency numbers of hospital, police station, fire station, and supervisor office are posted at the main entrance and office of the solar power plant. The access road to the plant is sealed road and is accessible year-round. All the employees and subcontractors working in the plant were reported to have been trained in the EA safety and first aid program and all personnel on site are required to complete a safety induction.

4.2.7. Manpower and work force.

The total number of employees in the plant is 21 full time staff and a roster of 54 listed contractors. The labor works include the maintenance of the storage and workshop, panel cleaning, security, grass cutting,

etc. The labor works is subcontracted to K-Connect who employed 30 staff for cleaning and grass cutting, subsequently reverting to 23 staff after the panel cleaning robot was introduced on the site. Some of the benefits received by the plant staff are regular health check-up and housing accommodation in the project area.

The plant provides modern accommodations for the employees who opt to stay inside the plant. There are total of 24 rooms (20 for staff and 4 for managers) equipped with television, air-conditioning unit, microwave, shower, and a centralized laundry area. The employees who use the accommodation do not pay any fees. Currently, there are 12 staff staying in the plant accommodation. These personnel come to work in the plant from other areas. The rest are from local communities and chose to come home to their family after work every day.

4.2.8. Environment, Health and Safety Officer.

At the project level, the Energy Solutions Management, Co. Ltd. (ESM) Inc., a direct subsidiary of the Company, is in-charge of the engineering design, construction, management, and operation and maintenance activities including the implementation of EHS management plans at site level. The project is served by a QHSE officer who also serves other sites. The QHSE unit reports to the VP at the corporate level. There is a dedicated safety officer located on the site. The EHS officer supervises and monitors the implementation of OSH measures and reports the status of compliance in the EA main office periodically-OSH monitoring reports on a monthly basis and evaluation and training plans on an annual basis. Environmental assessments, monitoring and preparation of environment-related documents is mainly contracted to external parties.

Remote site inspection indicated that the EHS Officer and staff were familiar with the health and safety measures.

4.2.9. Contractor Management System.

As mentioned, ESM is in-charge of the operation and maintenance of the project. In connection with environmental and social measures, ESM is required to strictly implement the OSH plan of EA.

4.2.10. Public participation and consultation.

As a requirement Electricity Licensee, public participation and consultation should be done throughout the project cycle. During the operation phase, the project is required to conduct an annual consultation. The consultation may be in the form of survey and/or consultation meetings. The output minutes of the consultation are required to be submitted to the Ministry of Energy each year for compliance purposes.

4.2.11. Grievance redress mechanism (GRM).

The project continued to implement the mechanism established during the construction activities (discussed in the previous section). It was noted that there has been a grievance submitted regarding minor damage by stormwater flows to a neighboring farm in the first half of 2020. EA provided records of the grievance and its handling resulting in repair works being conducted for the neighboring farmland. No further grievance issues were identified.

4.2.12. Corporate social responsibility (CSR).

The CSR of the company is documented in its Company Handbook. The company has implemented CSR

activities for the schools and local communities to visit the demonstration of organic farm in the solar plant.

Specific local CSR initiatives include:

1) Participated and given the presents on the National Children's Day in schools nearby the project site.
2) Participated and supported on lunch expense and given drinking water in the community activity.
3) Given surgical mask to communities nearby the project site.
4) Participated and given winning cash, beverage and snack on the sport day in the schools nearby the project site.
5) Supported on the Red Cross activity in the Nakhonsawan province.
6) etc.

CSR activities are summarized in monthly basis, the CSR for year 2019 and 2020 have been provided.

4.2.13. Compliance with ADB's Safeguard Policy Statement (2009)

The table below provides the compliance status of the environmental performance of Nakhonsawan Solar Power Plant based on ADB's SPS requirement for Environment (SR 1). Complete details on the compliance rating, summary of findings/observations, and reference documents are in Annex 10.

Table 7: Compliance with ADB's SPS (2009) Safeguard Requirement 1-Environment

No.	ADB SPS		Status/Issues	Recommendations
	Requirements	Compliance		
1	Environmental Assessment Requirements: Conduct environmental assessment to identify potential direct, indirect, cumulative, transboundary, and induced impacts and risks.	The project is classified as category B based on ADB's SPS which implies that the environmental impacts are temporary, short-term, site-specific, reversible and not significant. Impacts can be avoided and/or minimized with the implementation of mitigation measures. **National Law.** The project is not required to prepare an environmental impact assessment (EIA) report. However, an IEE and CoP reports were required for the project in compliance with CDM and ERC requirements, respectively.	Compliant Based on the review of the IEE and CoP reports, cumulative impact was not discussed because the project area is a greenfield. There are no other renewable energy plants at the project site prior to implementation of the project.	For any future project or expansions, cumulative impacts and an increase in radius influence is recommended for environmental assessment.
2	Environmental Planning and Management	Strict implementation of the EMP from pre-	The EMP of the Project is in the form of environmental	

No.	ADB SPS		Status/Issues	Recommendations
	Requirements	Compliance		
	Avoid, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an environmental management plan (EMP)	construction to decommissioning phases of the project. The EMP should indicate the related institutional or organizational arrangements, monitoring indicator and schedule of implementation. Compliance should not only be through the documentation and submission of reports but also on the actual implementation of the EMP at the project site.	checklist in the CoP report which requires the status of implementation on the following: Code of practice during construction phase - air quality management -noise management -water resource management -transportation plan -waste management -occupational health and safety -public relation and stakeholder engagement plans Code of practice during operation phase -water resource management - transportation plan -waste management -occupational health and safety plan -performance measurements of the project. Reports are submitted annually during construction phase and semiannually during operation phase. EHS officer at the project and corporate level was aware of the EMP implementation.	
3	Information disclosure	Disclosure of the environmental assessment report including the EMP. The IEE should be disclosed in a timely manner, in an accessible place and in a form and languages understandable to affected people and other stakeholders.	Since the IEE was prepared as part of the Project's registration to the CDM, there were no disclosure of the report at the company's website. It was noted that the IEE is available at the project site.	IEE is available on-site computer system
4	Consultation and Participation	The Company should carry out meaningful consultation with affected stakeholders, including civil society, and facilitate	Compliant One of the requirements of ERC in the CoP report is the conduct of public consultation prior to	

No.	ADB SPS		Status/Issues	Recommendations
	Requirements	Compliance		
		informed participation throughout the project cycle. The consultation should begin as early as the design or planning stage of the project.	construction activities and throughout the project cycle (annually during construction phase and semiannually during operation phase). The meeting was on 8 February 2012 at the Hua Wai Sermon Pavilion, Hua Wai Subdistrict, Takli District. Local stakeholder participants were invited and there were 133 participants including villagers living near the solar power plant site.	
5	Grievance Redress Mechanism	The Project should establish a mechanism to receive and facilitate resolution of affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate and readily accessible.	There is an existing grievance mechanism at the project both for the employees and other stakeholders. The grievance can be sent directly through the grievance form or a letter to the plant manager and it will be evaluated for the corresponding corrective/preventive action. The mechanism includes the monitoring of the implemented action/s and is time bound for the addressing and resolution of complaints.	
6	Monitoring and Reporting	The project should monitor and measure the progress of implementation of the EMP.	Compliant The Company submits CoP report to ERC semiannually during the operation phase of the Project.	It is recommended that the monitoring reports should also be included in the environmental and social performance report submitted by EA to ADB (part of corporate audit recommendations). Further, reports on training and employment should indicate sex-disaggregated data.
7	Unanticipated Environmental Impacts	Update the IEE and prepare a new EMP to address unanticipated environmental impacts that	Compliant It is stated in the CoP that the Company is willing to address any unanticipated impacts if ever identified during	

No.	ADB SPS		Status/Issues	Recommendations
	Requirements	Compliance		
		becomes apparent during project implementation.	the field inspection of ERC.	
8	Biodiversity Conservation and Sustainable Natural Resources Management	The Project should ensure specific requirement and mitigation measures in the development of critical area.	An IBAT search using the project location was conducted on 7 May 2020. The search conducted detailed 1 protected area within 50km, 4 key biodiversity areas within 50km, 30 species on the IUCN red list and critical habitat likely to be found within 50km of the site. The project is not located in modified, natural and critical habitats (the site was previously operating as agricultural lands), and legally protected areas. It is concluded based on the IBAT search, the history of the site and the function of the site currently as a Solar PV facility that the project is unlikely to cause significant negative impacts to biodiversity, conservation and natural resource management.	
9	Pollution Prevention and Abatement	The project should apply pollution control technologies and practices consistent international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. The guidelines provide specific measures on the following: (i) pollution prevention, resource conservation, and energy efficiency; (ii) wastes; (iii) hazardous materials; (iv) pesticide use	**Resource conservation and energy efficiency**. The company is committed on saving energy in its operation by using energy efficient light and all air-conditioning units operate during daytime hours with the exception of the control room (SCADA system). **Pesticide management** The company practices organic farming and minimal pesticides. **Solid waste**	**Chemical Storage Room** Provide an appropriate chemical storage room. The specifications should include applicable international and national guidelines such as secondary containment, proper labelling, temperature control, etc. Material Safety Data Sheets should be located with each material stored. **Transformer Units** Install drip trays under each transformer to catch minor spills to reduce clean-up effort and cost associated with remediating gravel and sand gutter

No.	ADB SPS		Status/Issues	Recommendations
	Requirements	Compliance		
		and management; (v) greenhouse gas emissions; (vi) occupational and community health and safety; and (vii) physical and cultural resources.	**management** The implement waste segregation-hazardous, compostable, recycle and general wastes. **Hazardous wastes management**. The fuel storage area is located in a ventilated space outdoors. Chemicals related to water treatment were located in the warehouse. Solid bags of chemical buffer were stored on pallets and liquid chlorine was stored in a leak proof container. The chemicals were not stored in a dedicated room or cage. The transformers have in place a filled gutter style secondary containment.	around transformers.
10	Greenhouse Gas Emissions	The borrower/client will promote the reduction of project-related anthropogenic GHS emissions in a manner appropriate to the nature and scale of project operations and impacts.	The project is a renewable energy and aims to reduce the greenhouse gas emissions.	
11	Physical Cultural Resources	The borrower/client is responsible for siting and designing the project to avoid significant damage to physical cultural resources.	Not applicable. The project is not located in an area with physical cultural resources	

4.3. EA Anywhere EV Charging Project E&S Review

4.2.14. Compliance with national and local laws and regulations

The EA Anywhere EV Charging Project, run through EA subsidiary Energy Mahanakorn Company Limited (EMN), is not required to undertake regulatory Initial Environmental Examination (IEE) under Environment and Conservation of the National Environment Quality Act, 1992 or Enhancement and Conservation of National Environmental Quality Act, B.E. 2535. A single permit was identified as being required and held, from the ERC Regulator. This was provided by EA/EMN.

4.2.15. Initial Environmental Examination

No IEE is required for the EV Charging project. EMN reported to be following the existing EA suite of policies and procedures related to Environment, Health and Safety.

4.2.16. Environmental management plan during construction activities

No Environmental Management Plan is required or in place. Minimal environmental impacts were identified during the construction phase.

The operations associated with the EV Charging project include two warehouse locations, one smaller facility of one 50 sqm room and a larger warehouse facility of approximately 200sqm. Both facilities facilitate component and equipment storage with minor office / workshop facilities to prepare the charging equipment for installation.

The installation activities associated with the EV Charging project involve the transportation of equipment in commercial vans to charging sites and installation of these in carpark and similar locations. Restrictions on installation location include the distancing of the charging units from fuel pumps by a minimum of 15m.

O&M activities associated with the EV Charging project include repair, maintenance, site inspections and safety inspections.

Sites for the EV Charging project are existing or new commercial premises with vehicle access such as service stations, shopping malls, commercial office buildings and other businesses with vehicle access.

4.2.17. Public Consultation

No CoP or IEE was required to be undertaken for the project. No formal public consultation was required to be undertaken as a result.

4.2.18. Grievance redress mechanism (GRM)

The GRM of the project is part of the EA internal systems for employees and contractors. Employees, contractors, customers or members of the community can submit grievances to the to the management through the website or through the contact telephone details listed at each charger station. The mechanism includes evaluation and screening of complaints, implementing and monitoring of corrective and preventive action and record keeping. The EA website also provides a channel for getting in contact

and submitting grievances and is accessible to all stakeholders. There were no records of grievances during the construction activities of the project.

4.2.19. Land acquisition

No land was required to be acquired for the EV Charging project. The warehouse facilities are rented by ESM and the charging station units are placed on existing commercial sites through negotiated commercial agreement.

4.2.20. E&S Impacts during Operation and Maintenance of the Project

There are no anticipated significant environmental and social impacts during the O&M of the project. On environment, it is anticipated that it will assist in the reduction of air pollution through facilitation of EV uptake in the area of greater Bangkok.

Positive social impacts from the project include: (i) job creation for the O&M team; (ii) project related CSR activities directed towards the community.

Positive environmental impact from the project is the decrease in air pollution and the avoided greenhouse gas (GHG) emissions from the uptake of EVs.

4.2.21. Environmental management plan for Project O&M

The mitigation measures implemented during O&M phase of the project are in general satisfactory and reflect the minimal impact of the EV Charging project on the environment.

4.2.22. Occupational safety and health (OSH).

EA has developed a stand-alone OSH manual which is implemented in all its subprojects and as part of its contractor management system. During the field visit, all staff at the project site are wearing proper PPE and safety/caution signages are placed in strategic locations in the warehouses and around the charging units.

Annual health, safety, and environmental plan is also prepared which includes information on training plan, safety inspection, safety meeting and report, safety activity promotion, sanitation and environment promotion, and new safety regulation monitoring (compliance register spreadsheet). The company also maintains a record of incidents and accidents during construction and operation phases of the project. Based on the field visit, there were no accidents/incidents recorded to date during the installation and operation phases of the project. Incidents reported are accidents resulting only to small cuts during wiring preparation.

It was noted during the remote site inspection and interviews that there is not currently a formalized checklist or form to assist and keep record of subcontractor activities with regards to OHS requirements and compliance. It is recommended that a procedure for safe work and a form for recording of safe work practices for both internal staff and contractors be put in place.

4.2.23. Community health and safety.

The primary interaction of the EV Charging project with community health and safety is related to the Charging units in publicly accessible locations. These units transmit high voltage electricity and present

risks of electrocution and sparks/arcs upon damage or faults. It is however acknowledged that the risks presented by high voltage have been mitigated and managed through the use of equipment designed and constructed to standards including IEC 61851 and are Type B Residual Current Devices to prevent current leakage and ensure unit isolation in the case of short circuit, power surge or fault. This reduces the risk of electrician and fire.

It was noted that there were not procedures or provisions in place for the interaction with emergency services such as the fire department who may be required to attend accidents involving EMN EV Charging sites. It was also noted that while the EV Charging units were located greater than 15m from fuel pumps at service stations, there did not appear to be consideration or provisions in place for ensuring the EV Charging units were not located within 15m of fuel delivery tankers who attend service stations to transfer liquid fuels. It is recommended that a dedicated emergency management plan be prepared to ensure that all critical EV Charger unit information and specification can be provided to emergency services quickly in the event of an incident. It is noted that this is currently managed through the listing of emergency contact information at every site, however it is not immediately clear how EA would handle these emergencies after contact is made. It is also recommended that the EV Charger site plans and commercial agreements with sites includes a consideration of fuel tanker movements to ensure the minimum required distance is maintained.

4.2.24. Fire safety and emergency response procedures.

Electrical faults related to the operation and failure of EV Charging systems are a possibility and may present risks of sparks and fire. Preventive measures for fire safety are in place such as the provision of fire extinguishers in various locations at the sites. Inspection of fire extinguishers is on a monthly basis. Metropolitan fire stations and hospitals are located throughout the greater Bangkok area and are capable of serving the EV Charging sites.

All the employees and subcontractors working in the EV Charging business were reported to have been trained in the EA safety and first aid program and all personnel on site are required to complete a safety induction.

4.2.25. Manpower and work force.

The employees in the EMN operation include the executive and management structure with 13 ESM staff including 12 technicians/engineers and one OHS specialist shared with ESM. The labor works include the maintenance of the storage and charger units and cleaning.

The ESM staff, which includes contractors are subject to EA (ESM) HR policies and employment conditions.

4.2.26. Environment, Health and Safety Officer.

At the project level, the Energy Solutions Management, Co. Ltd. (ESM) Inc., a direct subsidiary of the Company, is in-charge of the engineering, installation, management, and operation and maintenance activities. The project has one OHS officer who is a shared resource with ESM. The OHS officer supervises and monitors the implementation of OSH measures and reports the status of compliance. The OHS Officer reports on a monthly basis.

4.2.27. Contractor Management System.

As mentioned, ESM is in-charge of the operation and maintenance of the project. In connection with environmental and social measures, ESM is required to strictly implement the OSH plan of EA. A small core team of ESM employees and contractors also manage external electrical specialists to be engaged and on an as required basis. These contractors are engaged using the ESM/EA subcontracting procedure and contracts.

It was noted that there was no formalized form for subcontractors to complete related to works on EMN projects related to operations and safety. It is recommended that a standard form/checklist be prepared for this purpose.

4.2.28. Public participation and consultation.

CSR and public participation activities are not mandated for the project, however EA's culture and practice of CSR activities at the local level has been implemented with the EMN business participating in the community on a seasonal and basis, including participation in and support for special cultural events through the year.

4.2.29. Grievance redress mechanism (GRM).

The project continued to implement the mechanism established during the installation and operational activities (discussed in the previous section). No recorded grievances had been recorded.
During installation, the EMN/ESM engineer is the contact point for grievances or complaints. During operations there are EA website and contact number details available for the submission of grievances, complaints or feedback.

4.2.30. Corporate social responsibility (CSR).

The CSR of the company is documented in the EA Company Handbook. The community development programs of the project for the EMN business include participating in the community on a seasonal and basis, including participation in and support for special cultural events through the year. EMN and EA management reported that the EMN business had recently supported local COVID-19 responses in the community.

4.2.31. Compliance with ADB's Safeguard Policy Statement (2009)

The table below provides the compliance status of the environmental performance of EA Anywhere EV Charging Project based on ADB's SPS requirement for Environment (SR 1). Complete details on the compliance rating, summary of findings/observations.

Table 7: Compliance with ADB's SPS (2009) Safeguards Requirements - Environment

No.	ADB SPS		Status/Issues	Recommendations
	Requirements	Compliance		
1	Environmental Assessment Requirements: Conduct environmental assessment to identify potential	The project is classified as category C based on ADB's SPS which implies that minimal or no adverse environmental	Compliant No IEA or IEE has been prepared. The EMN company holds a permit from the Ministry of Energy for	

No.	ADB SPS		Status/Issues	Recommendations
	Requirements	Compliance		
	direct, indirect, cumulative, transboundary, and induced impacts and risks.	impacts. An EIA or IEE is not required. **National Law.** The project is not required to prepare an environmental impact assessment (EIA) or IEE report.	execution of its activities.	
2	Environmental Planning and Management Avoid, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an environmental management plan (EMP)	The project is required to comply with national Environmental and OHS laws in addition to all conditions relevant under the Ministry of Energy permit to operate in the retail sale of electricity.	The EMN operations hold a Ministry for Energy permit to operate. It was noted that the largest negative environmental impact associated with the project is the disposal of the EV Charging units at the end of their life. No end-of-life procedures or plan has yet been formalized. It is noted that planning and management associated with construction and operation wastes is yet to be developed.	It is recommended to develop a formal waste management and decommissioning plan for all charging infrastructure to ensure responsible recycling and disposal of electronic waste products.
3	Information disclosure	The project is not required to provide disclosure associated with EIAs, IEEs or EMPs.	NA	NA
4	Consultation and Participation	The project must engage with any stakeholders who's lives, or livelihoods are affected by the project implementation or operation.	The Company carries out consultation and negotiation with property holders whose land will host the EV Charging setups. No other stakeholders were identified as being affected.	
5	Grievance Redress Mechanism	The Project should establish a mechanism to receive and facilitate resolution of affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate and readily accessible.	There is an existing grievance mechanism for the project both for the employees and other stakeholders. The grievance can be sent directly through the grievance form or a letter to the project manager and it will be evaluated for the corresponding corrective/preventive action. The mechanism includes the	

No.	ADB SPS		Status/Issues	Recommendations
	Requirements	Compliance		
			monitoring of the implemented action/s and is time bound for the addressing and resolution of complaints.	
6	Monitoring and Reporting	The project should monitor and report OHS and any environmental related incidents for reporting internally and for compliance purposes.	Compliant The Company conducts internal OHS reporting and reporting to the Ministry of Energy under its permit.	OHS and environmental reporting should be included in annual reports to ADB.
7	Unanticipated Environmental Impacts	No EIA or IEE is required to be in place.	Compliant The Company conducts internal OHS reporting and reporting to the Ministry of Energy under its permit.	
8	Biodiversity Conservation and Sustainable Natural Resources Management	The Project should ensure specific requirement and mitigation measures in the development of critical area.	Not applicable. The project is not located in modified, natural and critical habitats, and legally protected areas.	
9	Pollution Prevention and Abatement	The project should apply pollution control technologies and practices consistent international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. The guidelines provide specific measures on the following: (i) pollution prevention, resource conservation, and energy efficiency; (ii) wastes; (iii) hazardous materials; (iv) pesticide use and management; (v) greenhouse gas emissions; (vi) occupational and community health and safety; and (vii) physical and cultural resources.	**Resource conservation and energy efficiency**. The company is committed on saving energy in its operation by using energy efficient light and all air-conditioning units operate during daytime hours. **Solid waste management** End-of-life / decommissioning plan for the charging units is not yet in place. A formalized waste management plan is to be prepared to manage disposal of all collected debris from concrete drilling and wire cuttings from the EV charging stations	**Disposal of Charging Units** It is recommended to develop a formal waste management and decommissioning plan for all charging infrastructure to ensure responsible recycling and disposal of electronic waste products.
10	Greenhouse Gas Emissions	The borrower/client will promote the reduction of project-	The project promotes the uptake of electric vehicles, which reduce	

No.	ADB SPS		Status/Issues	Recommendations
	Requirements	Compliance		
		related anthropogenic GHS emissions in a manner appropriate to the nature and scale of project operations and impacts.	atmospheric emissions of greenhouse gasses and particulate/exhaust emissions.	
11	Physical Cultural Resources	The borrower/client is responsible for siting and designing the project to avoid significant damage to physical cultural resources.	Not applicable. The project is not located in an area with physical cultural resources	

5. CONCLUSION

EA does not yet operate the ADB approved ESMS created in 2017 to facilitate ADB investment as this is ADB's first proposed corporate finance investment in the organisation. During the audit discussions with EA management confirmed their willingness and intention to operate the formalised ESMS aligned with the ADB SPS 2009. The existing solar PV project and EV Charging project subject to this Environmental and Social Audit were initiated prior to ADB investment and were not subject to other ADB existing facilities (equity or loan) with EA.

The E&S related 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 Section 6 of this report.

ESMS Content and Operation

EA has accepted and adopted the ESMS designed in 2017, however it does not yet operate the ESMS aligned with the ADB SPS 2009. The Existing Environmental, Social and Occupational Health and Safety Policies and Procedures that EA has in place were considered to be well elaborated and suited to the purpose of developing and operating Solar PV and EV charging projects.

The ESMS is to incorporate screening checklists to avoid partnerships with projects in sensitive areas and with legal issues.

The ESMS will also include a standardised EMP for the construction and operation of EV charging stations.

The E&S monitoring procedure for all ADB funded projects will be streamlined and included in the updated ESMS.

Site Specific Issues

A number of minor project specific issues were identified relating to OHS, Fire and Emergency, Waste Management and Materials storage. These issues are considered to be minor operational issues that can be resolved with minimal investment and some management time to put in place some additional procedure and plan documentation. These issues are set out for each project in the CAP located in Section 6 of this report.

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.

Table 9: Corrective Action Plan.

Corrective Action	Proposed Timeline (to be confirmed by		Responsible Party
E&S Management System			
1. ESMS EA has developed an ADB compliance Environmental and Social Management System (ESMS) that was prepared previously but not fully implemented. As a requirement for the proposed ADB Corporate Finance, EA must update the ESMS based on the below items and implement for the projects that are covered in the Green Loan. A. Screening Process to incorporate screening checklists to avoid partnerships with any new facilities that are planned to be built in sensitive areas (e.g. ecological sensitive area, land with legal issues) B. Annex a standardized EMP fit for the construction and operations of EV charging stations.	Initiated in 2017 Completed before disbursement	This is expected to be minimal and can be included as part of the project administrative cost.	Responsible Party: EA Corporate Level
2. Reporting It is recommended that the site monitoring report findings should also be included in the environmental and social performance report submitted by EA to ADB (part of corporate audit recommendations). Further, reports on training and employment should indicate sex-disaggregated data.	Annual	This is expected to be minimal and can be included as part of the project administrative cost.	Responsible Party: EA Corporate Level
Nakhonsawan Solar Project			
3. OHS During the remote site inspection, it was noted that the eye wash station at the water treatment plant was not functioning at full pressure. This safety equipment must be repaired to operate at designed pressure.	Complete by September 30, 2020	<USD 1,000	Responsible Party: Site Level EHS Team.

4. <u>Fire Safety</u> Fire extinguishers on site were noted in some cases to have missed inspection since March 2020. The firefighting equipment on site must be inspected for safe operation and condition. The Fire extinguisher at the fuel storage location was noted to be attached to the front of the enclosure, which would be too close to the flammable liquids to safely operate in the event of a fire in that area. This fire extinguisher must be relocated to be accessible when a fire is burning in the fuel storage area.	Complete by September 30, 2020	< USD 2,500	Responsible Party: Site Level EHS Team
5. <u>Chemical Storage</u> A. <u>Warehouse</u> Provide an appropriate chemical storage area. The specifications should include applicable international and national guidelines such as secondary containment, proper labelling, temperature control, etc. relevant to the materials held. This is primarily relevant to the water treatment buffer materials which include chemical reagents. Material Safety Data Sheets should be located with each material stored. B. <u>Transformers</u> Install drip trays under each transformer to catch minor spills to reduce clean-up effort and cost associated with remediating gravel and sand gutter around transformers.	Complete by September 30, 2020	USD 5,000 – 10,000	Responsible Party: Site Level EHS Team
EA Anywhere EV Charging Project			
6. <u>OHS</u> <u>Work Safety Procedures and Forms</u> There is not currently a formalized checklist or form to assist and keep record of internal and subcontractor activities with regards to OHS requirements and compliance. It is recommended that a procedure for safe work and a form for recording of safe work practices be put in place.	Complete by September 30, 2020	This is expected to be minimal and can be included as part of the project administrative cost.	Responsible Party: ESM/EMN Management Team and EHS Officer

7. <u>Community Health and Safety</u> It is also recommended that the EV Charger site plans and commercial agreements with sites include a consideration of and plan for fuel tanker movements to ensure the minimum required distance (15m) is maintained not only from fuel bowsers but from fuel tankers under discharge.	Complete by September 2020	This is expected to be minimal and can be included as part of the project administrative cost.	Responsible Party: ESM/EMN Management Team and EHS Officer
8. <u>Waste Management Plan</u> A formalized waste management plan is to be prepared to facilitate all collected debris from concrete drilling and wire cuttings from the EV charging stations and the recycling / disposal of the EV charging units upon failure or obsolescence. This must include storage and disposal plan and details of how disposal is to be made using appropriate licensed waste contractors for recycling / disposal to minimize negative environmental impacts.	Complete by September 2020	This is expected to be minimal and can be included as part of the project administrative cost.	Responsible Party: ESM/EMN Management Team and EHS Officer