ENVIRONMENTAL MANAGEMENT PLAN (EMP) REPORT for

MYANMAR SATOKETAYAR SOLAR POWER PLANT PROJECT

connected to Satoketayar Substation

Proposed by;

MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED

Myanmar Satoketayar Solar Power Co., Ltd.

Prepared by;

eguard ENVIRONMENTAL SERVICES

E Guard Environmental Services Co., Ltd.

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Summary: EMP Report This document represents Environmental Management Plan (EMP) report as required for construction and operation of 30 MW ground mounted solar power plant project.	**Approved by: U Soe Min** 

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Disclaimer

This report is prepared by a third-party environmental service provider, E Guard Environmental Services Co., Ltd., for 30 MW Ground Mounted Solar Power Plant Project connected to Satoketayar Substation, proposed by Myanmar Satoketayar Solar Power Co., Ltd. The project is located at Myaynigone Village Tract, Satoketayar Township, Minbu District, Magway Region, Myanmar. The report preparation was done inside the framework of Myanmar EIA Procedure (2015).

The study works is based on the provided data of the proposed plan of project from the project proponent and onsite observation of environmental parameters guided by Myanmar Government Environmental Authority, Environmental Conservation Department, hereinafter ECD.

Impact assessment and mitigation measures are prepared based on the facts and figures of detail plan/ process of the project obtained from the project proponent. Environmental Management Plans are prepared in line with the prevailing active Laws, Rules, Procedure, Guidelines, and Standards etc. of the Myanmar's legal system.

Drawings, sketches, maps and other illustrative figures in this report are for the demonstrative/ descriptive purposes only and not to be considered as approved boundary nor accepted territory nor recognized properties extend of any kind.

In case of dual or multiple meanings of the wordings, those wordings should be interpreted as relevant meaning to the concerned area of interest discussed in this report.

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List of Abbreviations

%	: Percentage
µg/m^3	: Micro Gram per Cubic meter
BOD	: Biochemical Oxygen Demand
CO	: Carbon Monoxide
CO_2	: Carbon Dioxide
COD	: Chemical Oxygen Demand
CSR	: Corporate Social Responsibility
dB (A)	: Decibel unit
ECD	: Environmental Conservation Department
EMoP	: Environmental Monitoring Plan
EMP	: Environmental Management Plan
EPGE	: Electric Power Generation Enterprise
HSE	: Health, Safety and Environment
km	: Kilometer
kV	: Kilovolt
kWh	: Kilo Watt Hour
mg/l	: Milligram per Liter
MOEE	: Ministry of Electricity and Energy
MONREC	: Ministry of Natural Resources and Environmental Conservation
MWh	: Mega Watt Hour
NO_2	: Nitrogen Dioxide
ºC	: Degrees Celsius
pH	: Pond us Hydrogenium
PM	: Particulate Matter
ppm	: Part Per Million
PV	: Photovoltaic
SO_2	: Sulfur Dioxide
TSP	: Total Suspended Particulates
WHO	: World Health Organization

အကျဉ်းချုပ်အစီရင်ခံစာ

ဤပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်သည် Myanmar Satoketayar Solar Power Co., Ltd. အမည်ဖြင့် အကောင်အထည်ဖော် ဆောင်ရွက်နေသည့် စေတုတ္တရာ ဓာတ်အားခွဲရုံနှင့်ချိတ်ဆက်၍ လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးမည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းစီမံကိန်းအတွက် E Guard Environmental Services Co., Ltd. မှတာဝန်ယူ ပြင်ဆင်ရေးဆွဲထားခြင်းဖြစ်သည်။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သဘောထား မှတ်ချက်များအရ အဆိုပြုစီမံကိန်းသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်တင်ပြရန် လိုအပ်ပြီး E Guard Environmental Services Co., Ltd. သည် အဆိုပြုစီမံကိန်းအတွက် အစီရင်ခံစာ ပြင်ဆင်ရေးဆွဲကာ ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာမှုများပြုလုပ်ခဲ့သည်။ ဤအစီရင်ခံစာတွင် လေ့လာမှုများသည် နေရောင်ခြည်စွမ်းအင်သုံးလျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းစီမံကိန်း တည်ဆောက်ခြင်းနှင့် ဓာတ်အားဖြန့်ဖြူးရန် ကောင်းကင်ဓာတ်အားလိုင်းသွယ်တန်းခြင်း၊ စီမံကိန်းမှ နေရောင်ခြည်စွမ်းအင် အသုံးပြု၍ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းနှင့် စေတုတ္တရာ ဓာတ်အားခွဲရုံသို့ ၆၆ ကေဗွီ ကောင်းကင်ဓာတ်အားလိုင်းဖြင့် လျှပ်စစ်ဓာတ်အားဖြန့်ဖြူးခြင်း လုပ်ငန်းများအတွက် ပြုလုပ်ခဲ့ခြင်း ဖြစ်သည်။ လေ့လာမှုနယ်ပယ်အား စီမံကိန်းဗဟိုမှ ၁ ကီလိုမီတာ အချင်းဝက်ရှိသောဧရိယာ အတွင်းအဖြစ် သတ်မှတ်လေ့လာခဲ့ခြင်းဖြစ်ပြီး ထိုဧရိယာသည် စီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားဆိုင်ရာသက်ရောက်မှုများအတွက် လုံလောက်မှုရှိသည်။

အဆိုပြုစီမံကိန်းသည် မြေနီကုန်းကျေးရွာအုပ်စု၊ စေတုတ္တရာ မြို့နယ်၊ မင်းဘူးခရိုင်၊ မကွေးတိုင်းဒေသကြီး၊ မြန်မာနိုင်ငံတွင်တည်ရှိသည်။ စီမံကိန်း၏ တည်နေရာမှာ မြောက်လတ္တီကျူ ၂၀ ဒီဂရီ ၂၄ မိနစ် ၂၇ စက္ကန့်နှင့် မြောက်လတ္တီကျူ ၂၀ ဒီဂရီ ၂၅ မိနစ် ၁၃ စက္ကန့်ကြား၊ အရှေ့လောင်ဂျီကျူ ၉၄ ဒီဂရီ ၁၄ မိနစ် ၅၅ စက္ကန့် နှင့် အရှေ့လောင်ဂျီကျူ ၉၄ ဒီဂရီ ၁၅ မိနစ် ၃၇ စက္ကန့် အတွင်း ဖြစ်ကာ ပင်လယ်ရေမျက်နှာပြင်အမြင့် ၁၃၈ မီတာနှင့် ၁၉၀ မီတာကြားတွင်တည်ရှိသည်။ အဆိုပြုစီမံကိန်း၏ တည်ဆောက်ခြင်း လုပ်ငန်းများတွင် box transformer များ၊ string inverter များ၊ ဆိုလာပြားများ တပ်ဆင်ရန် ဒေါက်တိုင်များ တပ်ဆင်ခြင်း၊ solar power station တည်ဆောက်ခြင်း၊ ဘက်စုံသုံးအဆောက်အဦ၊ ဝန်ထမ်းအဆောင်များ၊ အစည်းအဝေးခန်းမ၊

မီးဖိုဆောင်၊ ထမင်းစားဆောင်များတည်ဆောက်ခြင်း၊ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ရန်နှင့် ဖြန့်ဖြူးရန် စက်ကိရိယာများ တပ်ဆင်ခြင်းနှင့် လျှပ်စစ်ဓာတ်အားဖြန့်ဖြူးရန် ၆၆ ကေဗွီ ကောင်းကင်ဓာတ်အား လိုင်းသွယ်တန်းခြင်း လုပ်ငန်းများ ပါဝင်သည်။ အဆိုပြုစီမံကိန်း၏ ပြန်လှန်လျှပ်စီး စွမ်းရည်မှာ ၃၀ မဂ္ဂါဝပ်ဖြစ်ပြီး တိုက်ရိုက်လျှပ်စီး စွမ်းရည်မှာ ၃၆.၂၈၈ မဂ္ဂါဝပ် ဖြစ်သည်။ စီမံကိန်းအဆိုပြုသူသည် စီမံကိန်းအတွက် စုစုပေါင်းမြေရိယာ ဧက ၁၄၈.၈ လိုအပ်သည်။ မြေနေရာနှင့်ပတ်သက်၍ Super One Holdings Co., Ltd. မှ တရားဝင် ငှားရမ်းထားပြီးဖြစ်သည်။ စီမံကိန်းအဆိုပြုသူသည် စီမံကိန်းတွင် ဆိုလာပြား ၆၇၂၀၀ ခု၊ ၂၅၀ kW inverter ၂၀ လုံး၊ ၅၀၀၀ kVA box-type transformer ၁ လုံးအား နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ရန် တပ်ဆင်သွားမည်ဖြစ်သည်။ တည်ဆောက်ခြင်း လုပ်ငန်းများအား မတ်လ ၁၅ ရက်၊ ၂၀၂၂ ခုနှစ်တွင် စတင်ခဲ့ပြီး နိုဝင်ဘာလ ၁၅ ရက်၊ ၂၀၂၂ တွင် ပြီးဆုံးမည်ဖြစ်ကာ ဆောင်ရွက်ရန် ၈ လ ကြာမြင့်မည်ဖြစ်သည်။ ***(အသေးစိတ်အား အခန်း ၂ တွင် ဖတ်ရှုပါရန်)***

အဆိုပြုစီမံကိန်းအား Myanmar Satoketayar Solar Power Co., Ltd. မှ အကောင်အထည်ဖော်ဆောင်ရွက်မည်ဖြစ်သည်။ တည်ဆောက်ခြင်း လုပ်ငန်းများပြီးစီးပါက အဆိုပြုစီမံကိန်းသည် နေရောင်ခြည်စွမ်းအင်ကိုအသုံးပြု၍ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်မည်ဖြစ်ပြီး စေတုတ္တရာ ဓာတ်အားခွဲရုံသို့ ၆၆ ကေဗွီ ကောင်းကင်ဓာတ်အားလိုင်းဖြင့် လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးသွားမည်ဖြစ်ကာ လုပ်ငန်းလည်ပတ်ရန် ကာလမှာ နှစ် ၂၀ ဖြစ်သည်။ စီမံကိန်း အကောင်အထည်ဖော်သူ၏ ဒါရိုက်တာအဖွဲ့ဝင်များနှင့် ဖွဲ့စည်းပုံများ၊ အဆိုပြုစီမံကိန်း၏ ဖွဲ့စည်းပုံနှင့် ရင်းနှီးမြှုပ်နှံမှုအစီအစဉ်များအား ဖော်ပြထားသည်။ ***(အသေးစိတ်အား အခန်း ၃ တွင် ဖတ်ရှုပါရန်)***

ဤပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီရင်ခံစာ ပြင်ဆင်ရာတွင် ပါဝင်သော ကျွမ်းကျင်ပညာရှင်များနှင့် ၎င်းတို့၏ တာဝန်များနှင့်ကျွမ်းကျင်မှုများအား ***အခန်း ၄*** တွင် ဖော်ပြထားသည်။

အဆိုပြုစီမံကိန်း တည်ဆောက်ခြင်းနှင့် လုပ်ငန်းလည်ပတ်ခြင်းတို့တွင် ပတ်ဝန်းကျင်အား ထိခိုက်မှု ကာကွယ်ရန် လိုက်နာရမည့် နိုင်ငံတော်၏တည်ဆဲဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများအား ဖော်ပြထားသည်။ ***(အသေးစိတ်အား အခန်း ၅ တွင် ဖတ်ရှုပါရန်)***

လက်ရှိစီမံကိန်းအခြေအနေကို ကွင်းဆင်းလေ့လာခြင်းနှင့် ယခင်လေ့လာပြီးသော အချက်အလက်များအား မှီငြမ်းလေ့လာခြင်းသည် ပတ်ဝန်းကျင်ထိခိုက်မှုများ ဆန်းစစ်ခြင်းအတွက် အလွန်အရေးပါသည်။ ထို့ကြောင့် လက်ရှိစီမံကိန်း၏ ပတ်ဝန်းကျင်ဆိုင်ရာအခြေအနေများအား ကွင်းဆင်းလေ့လာခြင်းသည် ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာမှုများပြုလုပ်ရာတွင် အရေးပါသော နေရာတွင်ပါဝင်သည်။ ထို့ကြောင့် E Guard Environmental Services Co., Ltd. သည် စီမံကိန်း၏ လေအရည်အသွေး၊ ရေအရည်အသွေးနှင့် ဆူညံသံပမာဏတို့အား ၂၀၂၂ ခုနှစ်၊ မေလ ၂၅ ရက်နှင့် ၂၆ ရက်တို့တွင် ၂၄ နာရီဆက်တိုက် စောင့်ကြပ်ကြည့်ရှုသည့်နည်းဖြင့် တိုင်းတာခဲ့သည်။ တိုင်းတာရရှိသော ရလဒ်များအား အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များနှင့် အခြားသက်ဆိုင်ရာလမ်းညွှန်ချက်များဖြင့် နှိုင်းယှဉ်လေ့လာခဲ့သည်။ လေထုအတွင်း ဓာတ်ငွေ့ပါဝင်မှုရလဒ်များအား နှိုင်းယှဉ်လေ့လာခြင်းအရ ဆာလဖာဒိုင်အောက်ဆိုဒ် (၀.၀၄ $\mu g/m^3$)၊ နိုက်ထရိုဂျင်ဒိုင်အောက်ဆိုဒ် (၂၄.၈၃ $\mu g/m^3$)၊ ကာဗွန်မိုနောက်ဆိုဒ် (၀.၀၀၉ ppm)နှင့် ကာဗွန်ဒိုင်အောက်ဆိုဒ် (၃၆၁.၈၀ ppm) တို့သည် သက်ဆိုင်ရာ လမ်းညွှန်ချက်တန်ဖိုးများအတွင်း ရှိကြောင်းလေ့လာတွေ့ရှိရသည်။ လေထုအတွင်း အမှုန်ပါဝင်မှု လေ့လာခြင်း ရလဒ်များအရ PM_{10} (၂၂.၉၁ $\mu g/m^3$) နှင့် $PM_{2.5}$ (၁၀.၈၀ $\mu g/m^3$) တို့သည် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်တန်ဖိုးများအတွင်းရှိကြောင်း လေ့လာတွေ့ရှိရသည်။ မြေပေါ်ရေအရည်အသွေးတို့အား တိုင်းတာရန် ကိရိယာဖြင့်တိုင်းတာခြင်းနှင့် ရေနမူနာကောက်ယူခြင်း တို့ဖြင့်ဆောင်ရွက်ခဲ့သည်။ ရေအရည်အသွေး တိုင်းတာမှုရလဒ်များအရ တိုင်းတာသော မြေပေါ်ရေတို့၏ Parameters အားလုံးသည် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်တန်ဖိုးများ အတွင်းရှိပါသည်။ ဆူညံသံပမာဏတိုင်းတာမှုအား နေရာ (၁) နှင့် နေရာ (၂) တို့တွင်တိုင်းတာခဲ့ပြီး နေရာ (၁)တွင် နေ့အချိန်တိုင်းတာရရှိမှု ရလဒ်များ (၆၀.၄၈ dBA) နှင့် ညအချိန်တိုင်းတာရရှိမှု ရလဒ်များ (၅၂.၇၅ dBA) သည် လမ်းညွှန်ချက်တန်ဖိုးများကို ကျော်လွန်ကြောင်း လေ့လာတွေ့ရှိရသည်။ နေရာ (၂) တွင် နေ့အချိန်တိုင်းတာရရှိမှု ရလဒ်များ (၅၂.၅၇ dBA) နှင့် ညအချိန်တိုင်းတာရရှိမှု ရလဒ်များ (၄၄.၁၉ dBA) သည်လည်း လမ်းညွှန်ချက်တန်ဖိုးများအတွင်း ရှိကြောင်း လေ့လာတွေ့ရှိရသည်။ ထို့ကြောင့် စီမံကိန်းဝန်းကျင်ပတ်ဝန်းကျင်အရည်အသွေး (လေအရည်အသွေးနှင့် ရေအရည်အသွေး) များသည် စီမံကိန်းတည်ဆောက်ခြင်း ကာလတွင် သက်ဆိုင်ရာ လမ်းညွှန်ချက်တန်ဖိုးများအတွင်းရှိပြီး

ဆူညံသံပမာဏမှာ အနည်းငယ်ကျော်လွန်ကြောင်း လေ့လာတွေ့ရှိရသည်။ စီမံကိန်းအကောင်အထည်ဖော်သူသည် စီမံကိန်းဝန်းကျင် လက်ရှိပတ်ဝန်းကျင် အရည်အသွေးများအား ရေရှည်ကောင်းမွန်စေရန် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များနှင့် လျှော့ချရန်နည်းလမ်းများကို မဖြစ်မနေ လိုက်နာဆောင်ရွက်ရမည်။ ထို့ပြင် ယခင်လေ့လာပြီးသော အချက်အလက်များဖြစ်သည့် ရာသီဥတုဆိုင်ရာ အချက်အလက်များ၊ စီမံအုပ်ချုပ်မှုဆိုင်ရာ အချက်အလက်များ၊ လူမှုစီးပွားဆိုင်ရာအချက်အလက်များ၊ မြေအသုံးချမှုနှင့် အခြားလေ့လာပြီးသော အချက်အလက်များအား ဤအစီရင်ခံစာတွင် ဖော်ပြထားသည်။ ***(အသေးစိတ်အား အခန်း ၆ တွင် ဖတ်ရှုပါရန်)***

စီမံကိန်းတည်ဆောက်ခြင်းနှင့် လုပ်ငန်းလည်ပတ်ခြင်းတို့ကြောင့် ပတ်ဝန်းကျင်ဆိုင်ရာ အရင်းအမြစ်များ၊ ဂေဟစနစ်များ၊ လူသားများနှင့် စွန့်ပစ်ပစ္စည်းစွန့်ပစ်မှုတို့အပေါ် ထိခိုက်နိုင်သော ဖြစ်နိုင်ခြေရှိသည့် သက်ရောက်မှုများအား ခွဲခြားလေ့လာခဲ့ပြီး ထိုသက်ရောက်မှုများအား International Association for Impact Assessment (IAIA) ၏ သက်ရောက်မှုဆန်းစစ်ခြင်းနည်းလမ်းကို အသုံးပြု၍ဆန်းစစ်ခဲ့သည်။ သက်ရောက်မှုများဆန်းစစ်လေ့လာရာတွင် အဆိုပြု စီမံကိန်းအတွက် တည်ဆောက်ခြင်းကာလနှင့် လုပ်ငန်းလည်ပတ်သည့်ကာလဟူ၍ ကာလနှစ်ခု ခွဲခြားလေ့လာခဲ့သည်။

တည်ဆောက်ခြင်းကာလတွင် လျှပ်စစ်ဓာတ်အား စတင်ဖြန့်ဖြူးရန်နေရာနှင့် ဘက်စုံသုံး အဆောက်အဦ၊ ဝန်ထမ်းအဆောင်များ၊ အစည်းအဝေးခန်းမ၊ မီးဖိုဆောင်၊ ထမင်းစားဆောင်များ တည်ဆောက်ခြင်း၊ ဆိုလာပြားများ၊ ဆိုလာပြားများတပ်ဆင်ရန် ဒေါက်တိုင်များ၊ string inverter များ၊ transformer များတပ်ဆင်ခြင်း၊ တောင်တော်ကွင်းဓာတ်အားခွဲရုံသို့ လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးရန် ကောင်းကင်ဓာတ်အားလိုင်း၏ ဓာတ်တိုင်များစိုက်ထူခြင်းနှင့် ဓာတ်အားလိုင်းသွယ်တန်းခြင်းတို့ ပါဝင်သည်။ တည်ဆောက်ခြင်းလုပ်ငန်းများအား မတ်လ ၂၀၂၂ ခုနှစ်တွင် စတင်ခဲ့ပြီး နိုဝင်ဘာလ ၂၀၂၂ တွင် ပြီးဆုံးမည်ဖြစ်ကာ တည်ဆောက်ခြင်းကာလကြာမြင့်ချိန်မှာ ၈လ ဖြစ်သည်။

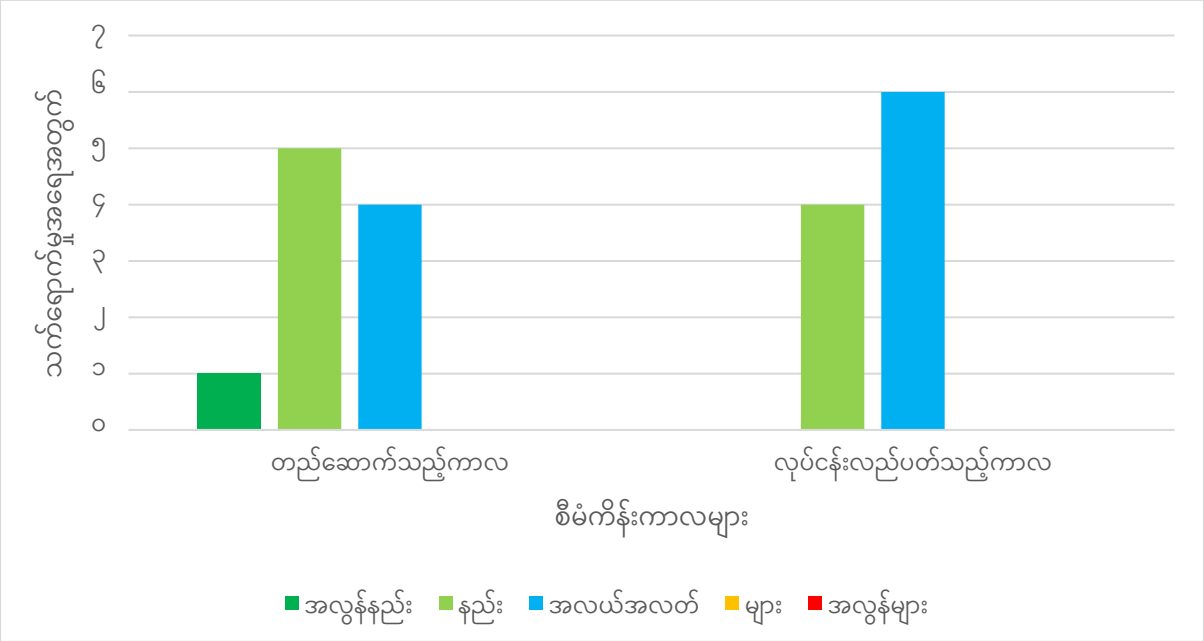
လုပ်ငန်းလည်ပတ်သည့်ကာလတွင် နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ပြီး စေတုတ္တရာဓာတ်အားခွဲရုံသို့ ၆ ကီလိုမီတာ (၃.၇ မိုင်) အရှည်ရှိသော ၆၆ ကေဗွီ

ကောင်းကင်ဓာတ်အားလိုင်းဖြင့် လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးခြင်းတို့ ပါဝင်ပြီး လုပ်ငန်းလည်ပတ်သည့် ကာလမှာ နှစ် ၂၀ ဖြစ်သည်။

လုပ်ငန်းဖျက်သိမ်းသည့်ကာလတွင် လုပ်ငန်းလည်ပတ်သည့်ကာလပြီးဆုံးပါက အဆိုပြုစီမံကိန်းသည် Build, Own and Operate (BOO) စနစ်ကိုအခြေခံဆောင်ရွက်သောကြောင့် စီမံကိန်း အကောင်အထည်ဖော်သူအနေဖြင့် လုပ်ငန်းလည်ပတ်ရန်ကာလအား သက်ဆိုင်ရာ၏ခွင့်ပြုချက်ဖြင့် သက်တမ်းတိုးမြှင့်ပြီး နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းလုပ်ငန်းများ ဆက်လက်ဆောင်ရွက်သွားမည်ဖြစ်သည်။ သို့သော် စီမံကိန်းအား အပြီးသတ်ဖျက်သိမ်းမည်ဆိုပါက စီမံကိန်းအကောင်အထည်ဖော်သူသည် လုပ်ငန်းဖျက်သိမ်းမည့်ကာလအတွက် အစီအစဉ်များကို တင်ပြသွားရမည်ဖြစ်သည်။ ထို့ကြောင့် အဆိုပြုစီမံကိန်း၏ လုပ်ငန်းဖျက်သိမ်းသည့်ကာလနှင့် သက်ဆိုင်သော သက်ရောက်မှုများအား ခွဲခြမ်းလေ့လာခြင်း၊ ဆန်းစစ်လေ့လာခြင်းနှင့် မကောင်းသော သက်ရောက်မှုများအား လျှော့ချရန်နည်းလမ်းများ ရေးဆွဲခြင်းတို့အား ဤအစီရင်ခံစာတွင် ထည့်သွင်းထားခြင်းမရှိပါ။

တည်ဆောက်ခြင်းကာလတွင် လေအရည်အသွေးအပေါ်သက်ရောက်မှု၊ မြေအရည်အသွေးအပေါ် သက်ရောက်မှု၊ ဆူညံသံနှင့် တုန်ခါမှုသက်ရောက်မှု နှင့် အစိုင်အခဲစွန့်ပစ်ပစ္စည်းကြောင့် သက်ရောက်မှုများသည် **အလယ်အလတ်အဆင့် သက်ရောက်မှုများ**အဖြစ် ဆန်းစစ်လေ့လာတွေ့ရှိရသည်။ အခြားသက်ရောက်မှုများဖြစ်သည့် ရေအရည်အသွေးအပေါ်သက်ရောက်မှု၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှု၊ လူထုကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှု၊ မီးဘေးအန္တရာယ်သက်ရောက်မှုနှင့် အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းကြောင့် သက်ရောက်မှုများသည် **နည်းသည့်အဆင့်သက်ရောက်မှုများ** အဖြစ်တွေ့ရှိရပြီး စွန့်ပစ်ရေကြောင့် သက်ရောက်မှုသည် **အလွန်နည်းသည့်အဆင့် သက်ရောက်မှု**အဖြစ် ဆန်းစစ်တွေ့ရှိရသည်။ **လုပ်ငန်း လည်ပတ်သည့် ကာလ**တွင် ရေအရည်အသွေးအပေါ် သက်ရောက်မှု၊ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှု၊ လူထုကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှု၊ မီးဘေးအန္တရာယ်သက်ရောက်မှု၊ စွန့်ပစ်ရေနှင့် အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းကြောင့် သက်ရောက်မှုများသည် **အလယ်အလတ်အဆင့် သက်ရောက်မှုများ**အဖြစ် ဆန်းစစ်တွေ့ရှိရသည်။ အခြားသက်ရောက်မှုများ ဖြစ်သည့်

လေအရည်အသွေးအပေါ်သက်ရောက်မှု၊ မြေအရည်အသွေးအပေါ် သက်ရောက်မှု၊ ဆူညံသံသက်ရောက်မှုနှင့် အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းကြောင့်သက်ရောက်မှုများသည် **နည်းသည့်အဆင့်** **သက်ရောက်မှုများ**အဖြစ် ဆန်းစစ်လေ့လာခြင်းရလဒ်များအရ ဆန်းစစ်တွေ့ရှိရသည်။ အောက်ဖော်ပြပါပုံတွင် စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော မကောင်းသောသက်ရောက်မှုများ၏ အသေးစိတ်အဆင့်များအား ဖော်ပြထားသည်။



မကောင်းသောသက်ရောက်မှုများအား သက်ရောက်မှုလျော့ချရန်အတွက် လျော့ချရန်နည်းလမ်းများသည် အရေးကြီးသည်။ ထိုလျော့ချရန်နည်းလမ်းများအား ဆောင်ရွက်ရန်လိုအပ်သော ဆောင်ရွက်ချက်များနှင့် နည်းပညာများအား သက်ရောက်မှုအမျိုးအစားပေါ် မူတည်ပြီး ဖော်ပြထားသည်။ အဆိုပြုစီမံကိန်းသည် အလုပ်အကိုင်အခွင့်အလမ်းများ ဖန်တီးပေးနိုင်ခြင်း၊ စီးပွားရေးအခွင့်အလမ်းများ ဖန်တီးပေးနိုင်ခြင်း၊ ကာဗွန်ထုတ်လုပ်မှု လျော့ချခြင်း၊ သယံဇာတများ ထိန်းသိမ်းခြင်းနှင့် ပတ်ဝန်းကျင်နှင့်လိုက်လျောညီထွေသော စီးပွားရေးများ အစပြုနိုင်ခြင်း၊ အခွန်ငွေ ရရှိနိုင်ခြင်း၊ လူမှုစီးပွားတာဝန်ယူမှု အစီအစဉ်များကြောင့် ဒေသတွင်း ဖွံ့ဖြိုးတိုးတက်ခြင်းစသည့် ကောင်းသောသက်ရောက်မှုများကိုလည်း ဖြစ်ပေါ်စေနိုင်သည်။ ***(အသေးစိတ်အား အခန်း ၇ တွင် ဖတ်ရှုပါရန်)***

လျော့ချရန်နည်းလမ်းများနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များအား အကောင်အထည်ဖော် ဆောင်ရွက်ရာတွင် လိုအပ်သော အခြေခံလိုအပ်ချက်များနှင့် တာဝန်ရှိသူများအား

ဤအစီရင်ခံစာတွင် ဖော်ပြထားသည်။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အား သက်ရောက်မှုများ လေ့လာ ဆန်းစစ်ချက်များနှင့် သက်ရောက်မှုအဆင့်များကို အခြေခံ၍ စီမံကိန်း၏ တည်ဆောက်ခြင်းကာလနှင့် လုပ်ငန်းလည်ပတ်သည့်ကာလတို့အတွက် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး မူဘောင်များ နှင့် ရေးဆွဲထားခြင်းဖြစ်သည်။ စီမံကိန်းအကောင်အထည်ဖော်သူသည် အဆိုပြုစီမံကိန်းအား အောက်ဖော်ပြပါအစီအစဉ်များ ပါဝင်သော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့်အညီ အကောင်အထည်ဖော် ဆောင်ရွက်ရမည်။

- ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်
- ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်
- လူမှုစီးပွားတာဝန်ယူမှုအစီအစဉ်
- မီးဘေးအန္တရာယ်ကင်းရှင်းရေးအစီအစဉ်
- အရေးပေါ်ကိစ္စများအတွက်တုံ့ပြန်ရေးနှင့် ကြိုတင်ပြင်ဆင်ရေးအစီအစဉ်
- မကျေလည်မှုများကိုဖြေရှင်းပေးမည့်အစီအစဉ်

ထို့အပြင် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်များ ဆောင်ရွက်ရန် ခန့်မှန်းကုန်ကျစရိတ်ကိုလည်း ထည့်သွင်းဖော်ပြထားသည်။ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်သည် စီမံကိန်း၏မကောင်းသောသက်ရောက်မှုများ၊ သက်ရောက်မှုရင်းမြစ်များ၊ လျှော့ချရန်နည်းလမ်းများ၊ ကျန်ရှိသောသက်ရောက်မှုများနှင့် တာဝန်ယူဆောင်ရွက်မည့်ပုဂ္ဂိုလ်တို့ အား တည်ဆောက်ခြင်းကာလနှင့် လုပ်ငန်းလည်ပတ်သည့်ကာလတို့အတွက် ဖော်ပြထားခြင်း ဖြစ်သည်။ ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်သည် လေနှင့်ရေအရည်အသွေး၊ ဆူညံသံပမာဏနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာစစ်ဆေးခြင်းများအား စောင့်ကြပ်ကြည့်ရှုရန်အမျိုးအစား၊ အကြိမ်အရေအတွက်နှင့် တာဝန်ယူဆောင်ရွက်မည့်ပုဂ္ဂိုလ်တို့အား ဖော်ပြထားခြင်းဖြစ်သည်။ လူမှုစီးပွားတာဝန်ယူမှုအစီအစဉ်သည် ဒေသခံပြည်သူများတွက် ဖွံ့ဖြိုးမှုလုပ်ငန်းများ ဆောင်ရွက်ပေးရန်နှင့် အဆိုပြုစီမံကိန်းသည် စီမံကိန်းအကောင်အထည်ဖော်သူကိုသာမက ဒေသခံပြည်သူများအတွက်လည်း အကျိုးရှိကြောင်း ဖော်ပြရန်ဖြစ်သည်။ မီးဘေးအန္တရာယ် ကင်းရှင်းရေးအစီအစဉ်သည် အဆိုပြုစီမံကိန်း၏ မီးဘေးအန္တရာယ်များ လျှော့ချရန်အတွက် ဖော်ပြထားခြင်းဖြစ်သည်။ အရေးပေါ်ကိစ္စများအတွက်တုံ့ပြန်ရေးနှင့် ကြိုတင်ပြင်ဆင်ရေးအစီအစဉ် သည် အရေးပေါ်ကိစ္စရပ်များဖြစ်ပေါ်ပါက မည်သို့ဆောင်ရွက်ရမည်ကို ဖော်ပြထားခြင်းဖြစ်သည်။

မကျေလည်မှုများကိုဖြေရှင်းပေးမည့် အစီအစဉ်သည် အဆိုပြုစီမံကိန်းနှင့်ပတ်သက်သော မကျေလည်မှုများကို မည်သို့ဖြေရှင်းပေးမည်ဖြစ်ကြောင်း ဖော်ပြထားခြင်းဖြစ်သည်။ ***(အသေးစိတ်အား အခန်း ၈ တွင် ဖတ်ရှုပါရန်)***

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် ပြင်ဆင်ရေးဆွဲရာတွင် စီမံကိန်းအကြောင်းအရာများကို ရှင်းလင်းတင်ပြခြင်းသည် အရေးကြီးပြီး သက်ဆိုင်သူများ၏ အကြံဉာဏ်နှင့်အမြင်များကို အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားရေးဆွဲရမည်ဖြစ်သည်။ ထို့ကြောင့် အဆိုပြုစီမံကိန်းအတွက် အများပြည်သူသဘောထား ရယူခြင်းအခမ်းအနားကို ၂၀၂၂ ခုနှစ်၊ မေလ (၂၆) ရက်နေ့တွင် စီမံကိန်းဧရိယာ ရှင်းလင်းဆောင်၊ မြေနီကုန်းကျေးရွာအုပ်စု၊ စေတုတ္တရာမြို့နယ် တွင် ကျင်းပခဲ့သည်။ အခမ်းအနားကို နံနက် ၉ နာရီတွင် စတင်ခဲ့ပြီး နံနက် ၁၀ နာရီ ၃၀ မိနစ်တွင် ပြီးဆုံးခဲ့သည်။ အများပြည်သူသဘောထား ရယူခြင်းအခမ်းအနား၏ ရည်ရွယ်ချက်မှာ စီမံကိန်းအကြောင်းအရာများ၊ စီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများ၊ လျှော့ချရန် နည်းလမ်းများဖော်ပြရန်နှင့် ဒေသခံပြည်သူများ၏ အကြံဉာဏ်နှင့်သုံးသပ်ချက်များ ရယူရန်ဖြစ်သည်။ စီမံကိန်း အကောင်အထည်ဖော်သူသည် အခမ်းအနားသို့တက်ရောက်ရန် ဒေသခံပြည်သူများအား ကျေးရွာအုပ်ချုပ်ရေးမှူးများမှ တင်ဆင့်ဖိတ်ကြားခဲ့သည်။ မြေနီကုန်းကျေးရွာအုပ်စု၊ မြေနီကုန်း ကျေးရွာမှ ဒေသခံပြည်သူများ၊ စီမံကိန်းအကောင်အထည်ဖော်သူ၏ ကိုယ်စားလှယ်များနှင့် E Guard Environmental Services Co., Ltd. မှ ကိုယ်စားလှယ်များ ပါဝင်သည့် တက်ရောက်သူ စုစုပေါင်း ၁၉ ယောက် ရှိခဲ့ပြီး အချို့တက်ရောက်သူများသည် သိရှိလိုသည်များကို မေးမြန်းဆွေးနွေး အကြံပြုခဲ့ကြသည်။ စီမံကိန်းဆိုင်ရာ အချက်အလက်များနှင့် ဤပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီရင်ခံစာကို အဆိုပြုစီမံကိန်း၊ စီမံကိန်းအကောင်အထည်ဖော်သူ၏ရုံး၊ https://www.mediafire.com/folder/xevdo2neqtbgb/Myanmar+Satoketayar+Solar+EMP+Report နှင့် E Guard Environmental Services Co., Ltd. ၏ ရုံးတွင် အများပြည်သူများနှင့် စီမံကိန်းနှင့် သက်ဆိုင်သူများ ဖတ်ရှုလေ့လာနိုင်ရန် ဖော်ပြထားပါသည်။ ***(အသေးစိတ်အား အခန်း ၉ တွင် ဖတ်ရှုပါရန်)***

နိဂုံးချုပ်အားဖြင့် အဆိုပြုစီမံကိန်းသည် အလုပ်အကိုင်အခွင့်အလမ်းများ ဖန်တီးပေးနိုင်ခြင်း၊ စီးပွားရေးအခွင့်အလမ်းများ ဖန်တီးပေးနိုင်ခြင်း၊ အခွန်ငွေရရှိနိုင်ခြင်း၊ လူမှုစီးပွားတာဝန်ယူမှု

အစီအစဉ်များကြောင့် ဒေသတွင်းဖွံ့ဖြိုးတိုးတက်ခြင်း၊ ကာဗွန်ထုတ်လုပ်မှု လျှော့ချခြင်း၊ သယံဇာတများထိန်းသိမ်းခြင်းနှင့် ပတ်ဝန်းကျင်နှင့်လိုက်လျောညီထွေသော စီးပွားရေးများ အစပြုနိုင်ခြင်း စသည့် ကောင်းသောသက်ရောက်မှုများကို ဖြစ်ပေါ်စေသည်။ တည်ဆောက်ခြင်းကာလနှင့် လုပ်ငန်းလည်ပတ်သည့်ကာလ တို့တွင် ဖြစ်ပေါ်နိုင်သော မကောင်းသောသက်ရောက်မှုများကိုလည်း လျှော့ချရန်နည်းလမ်းများနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်များကို အသုံးပြု၍ လျှော့ချနိုင်သည်။ ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်အား စီမံကိန်းပတ်ဝန်းကျင်အရည်အသွေးများအား စောင့်ကြပ်ကြည့်ရှုရန် အကောင်အထည်ဖော်ဆောင်ရွက်ရမည်။ စီမံကိန်းအကောင်အထည်ဖော်သူသည် ဤအစီရင်ခံစာအား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ စိစစ်သုံးသပ်ပြီးပါက ပေးပို့လာမည့် သဘောထားမှတ်ချက်များ နှင့် အကြံပြုချက်များကို လိုက်နာရမည်။ ဤအစီရင်ခံစာကို သက်ဆိုင်ရာမှ အတည်ပြုပြီးပါက စီမံကိန်းအကောင်အထည်ဖော်သူမှ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်များအား အကောင်အထည်ဖော် ဆောင်ရွက်ခြင်းသည် စီမံကိန်းအား ပတ်ဝန်းကျင်အပေါ်ထိခိုက်မှု အနည်းဆုံးဖြစ်အောင် လည်ပတ်ခြင်းအတွက် အလွန်အရေးပါသည်။ စီမံကိန်းအကောင်အထည် ဖော်သူများသည် ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်၏ ပတ်ဝန်းကျင်ဆိုင်ရာတည်ဆဲ ဥပဒေ၊ နည်းဥပဒေ၊ မူဝါဒများနှင့် လမ်းညွှန်ချက်များကို စီမံကိန်းလည်ပတ်စဉ်ကာလတစ်လျှောက်လုံး လိုက်နာဆောင်ရွက်ရမည်ဖြစ်သည်။

(အသေးစိတ်အား အခန်း ၁၀ တွင် ဖတ်ရှုပါရန်)

1. EXECUTIVE SUMMARY

This Environmental Management Plan (EMP) report is for the 30 MW Ground Mounted Solar Power Plant Project Connected to Satoketayar Substation, which is proposed by Myanmar Satoketayar Solar Power Co., Ltd. The project proponent, Myanmar Satoketayar Solar Power Co., Ltd., was incorporated under the Myanmar Company Law 2017 on 28 March 2022 as a Private Company limited by shares with Company Registration no. 132890811. According to the instructions from Environmental Conservation Department (ECD), this proposed project requires to submit Environmental Management Plan (EMP) report and E Guard Environmental Services Co., Ltd. prepared EMP report and carried out environmental studies for the proposed project. In this EMP, a study was made to cover construction of solar power plant and overhead transmission line as well as operation of solar power plant to generate electricity from solar energy and distribute to the Satoketayar Substation with 66 kV overhead transmission line. The scope of the study area for the proposed project is roughly defined to be the area within 1 km radius from the center of the project and this area would be large enough to cover for most environmental and socio-economic impacts of the project.

The proposed project is located in Myay Ni Kone Village, Satoketayar Township, Minbu District, Magway Region, Myanmar. It is about 76km away from Magway capital, and covers an area of about 0.58km^2. Its coordinates are between 20°24' 27"N ~ 20°25' 13"N, between 94°14' 55"E ~ 94°15' 37"E and the elevation of the site is between 138m- 190m. The construction of the proposed project includes box transformers, string inverters, supporting brackets, construction of solar power station, multiple-use building, staff quarters, briefing hall, kitchen, dining hall and outdoor equipment foundation construction as well as construction and stringing of 66 kV overhead transmission line. The total installed capacity of AC side of the proposed project is 30 MW and that of DC side is 36.288 MWp. The project proponent has been acquired the land slot to build the Solar Power Plant and total land requirement for the project is 148.8 acres. The land is lessee by Myanmar Satoketayar Solar Power Co., Ltd., from lessor Super One Holdings Co., Ltd. The proposed project will install 67,200 mono-crystalline silicon double-sided PV modules, A 5000kVA box transformer and 20 sets of 250kW series inverters to generate electricity from solar energy and construction phase of the project will take six months, which started construction and installation on March 15th, 2022 and finished on November 15th, 2022 with a total construction and installation period of 8 months. ***(See details in Chapter 2).***

The proposed project is developed by MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED, under the consortium of ITS Holding (China) International Co., Ltd. After construction period, proposed project will generate electricity from solar energy and distribute to the Satoketayar Substation with 66kV overhead transmission line and proposed operation period is 20 years. List of directors and organizational structure of respective project proponent, organizational structure and detail investment plan of the proposed project are also described. ***(See details in Chapter 3).***

The responsible persons of study team for this EMP report preparation are described in ***Chapter 4.***

National laws and regulations for environmental protection applicable for construction and operation of proposed project are compiled and presented. ***(See details in Chapter 5).***

Primary data and secondary data collections are very important to assess environmental impacts. Primary data collection for environmental quality monitoring plays an important role for environmental studies. Therefore, E Guard Environmental Services conducted air quality, water quality and noise level measurements at project site on 25th to 26th May 2022 (24 hours continuous monitoring system). The observed values are compared with National Emissions Quality (Emission) Guidelines and other guideline values. According to the comparison results of gaseous emissions, the observed value of SO_2 (0.04 µg/m3), NO_2 (24.83 µg/m3), CO (0.009 ppm) and CO_2 (361.80 ppm) are lower than the respective guideline values. For dust emissions, the observed values of PM $_{10}$ (22.91 µg/m3) and PM $_{2.5}$ (10.80 µg/m3) are also within the guideline values of NEQEG. The existing surface water quality from that temporary water tank was tested by two methods: onsite measurement and sampling water in order to compare the difference between quality of the surface water before and after implementation of the project. All of the parameters are within the reference values of NEQEG for not only groundwater but also surface water. For noise level, monitoring was done at two points: Point 1 and Point 2, results of Point 1 are lower than standard value not only at day time (60.48 dBA) but also at night time (52.75 dBA). For Point 2, the results are also lower than standard value not only at day time (52.57dBA) but also at night time (44.19 dBA). Therefore, it can be considered that the baseline environmental quality (air quality, and water quality) at the proposed project are within the respective guideline values during construction phase of the project except noise level because of construction activities implementation. The project proponent must follow EMPs and mitigation measures in order to sustain baseline environmental quality of the project. In addition, secondary data like climate data, administrative structure, socio-economic data, land use and other secondary data are described in this report. ***(See details in Chapter 6).***

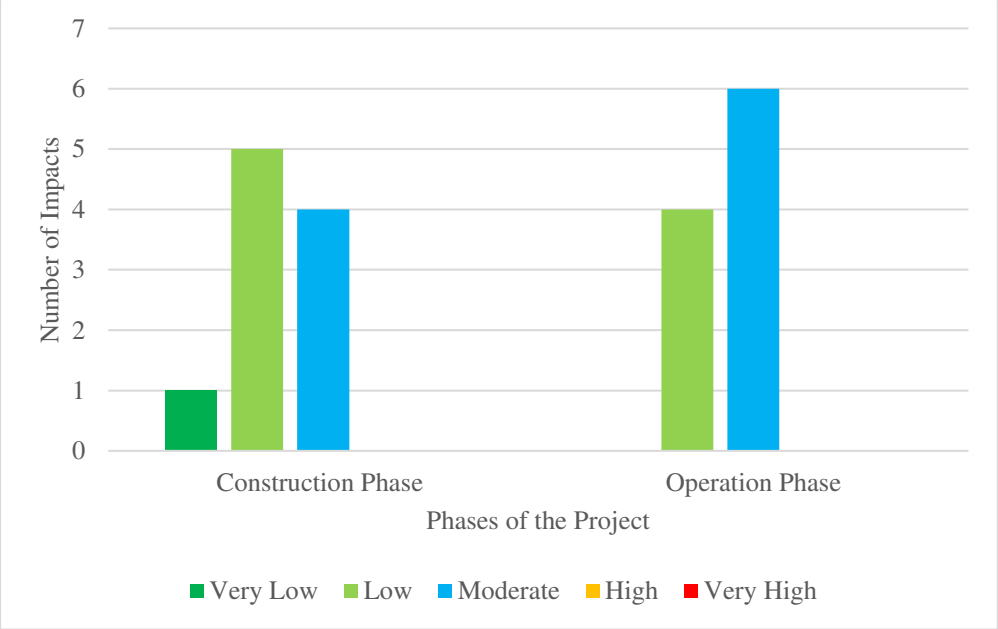
Potential impacts, such as impacts on environmental resources, ecological resources, human and waste disposal due to construction and operation processes were identified, and their significance was assessed by using International Association for Impact Assessment (IAIA)'s impact assessment methodology. Potential impacts for the proposed projects are differentiated into two main phases namely; Construction phase and Operation phase.

Construction Phase: includes construction of switchyard and multiple-use building, staff quarter, briefing room, dining room and kitchen, installation of PV modules, tracking brackets, inverters, transformers, poles of overhead transmission line and stringing cables of overhead transmission line, which will connect to the existing Satoketayar Substation. The construction period of the proposed project is 8 months, which was started on March 15th, 2022 and finished on November 15th, 2022.

Operation Phase: includes electric power generation from solar energy and distributing to the Satoketayar Substation through 66 kV overhead transmission line, which length is almost 6 km (3.7 miles). The operation period of the proposed project is 20 years.

Decommissioning Phase: after operation period, the project proponent will extend the operation periods with the approval of relevant departments to generate electricity from solar energy as per Build, Own, Operate (BOO) basis. The project proponent will have prior to submission of the decommissioning plan if they have a plan to close their project permanently. Therefore, impacts identification, impacts assessment and mitigation measures formulating for decommissioning phase of the project is excluded in this Environmental Management Plan Report.

During the ***construction phase***, impacts on air, soil, noise and vibration impacts and solid waste generation impacts are assessed as **Moderate Impacts** and other impacts such as impacts on water, occupational health and safety, community health and safety, fire hazards impacts and hazardous waste generation impacts are categorized as **Low Impacts** as well as liquid waste generation impact is considered as **Very Low Impact** as per the results of assessments. During the ***operation phase***, impacts on water, occupational health and safety, community health and safety, fire hazard impacts, liquid waste generation and hazardous waste generation impacts are assessed as **Moderate Impacts** and other impacts like impacts on air, soil, noise impacts and solid waste generation impacts are categorized as **Low Impacts** according to the results of assessments. The following figure illustrates detail impact significances of potential adverse impacts of the proposed project.



Mitigation measures are important to minimize and reduce these potential negative impacts. They are also described requirements of impacts mitigation tasks and technologies according to the types of impacts scales. However, the proposed project can ensure some positive impacts such as providing job opportunities, business opportunities, carbon emission reduction,

resources conservation and green economy, revenue to government and CSR development. ***(See details in Chapter 7).***

Institutional requirements and responsible persons for implementing mitigation measures and EMP are also described in this report. The Environmental Management Plan (EMP) was prepared based on findings of impacts and its significance and designed with the framework of health and safety for all two phases; construction phase and operation phase of the proposed project. The project proponent must manage the development of the proposed project by implementing the EMP, which is composed of five parts as follows:

- Environmental Management Plan
- Environmental Monitoring Plan
- Corporate Social Responsibility (CSR) Plan
- Firefighting Plan
- Emergency Response and Preparedness Plan and
- Grievance Redress Mechanism

Moreover, cost estimation for EMP and EMoP were also described in this report. The **Environmental Management Plan (EMP)** identifies potential negative environmental impacts, source of impacts, how to mitigate these impacts and residual impacts after mitigation and responsible persons for construction and operation phases. The **Environmental Monitoring Plan (EMoP)** identifies parameters, frequency and responsible persons to monitor for air quality, water quality, noise level and environmental auditing. The **Corporate Social Responsibility (CSR) Plan** aims to create social welfare for local community and to prove that the implementation of the proposed project is beneficial for not only the project proponent but also for the local community. The **Firefighting Plan** aims to protect fire hazards of the proposed project. The **Emergency Preparedness and Response Plan** identify how to overcome emergency cases effectively. The **Grievance Redress Mechanism (GRM)** identifies the steps to solve complaints related with the proposed project. ***(See details in Chapter 8).***

It is important to disclose the information about the project during the preparation of EMP report and the opinions of all stakeholders should be considered in the finalization of the EMP report. So, public consultation meeting for the proposed project was held on 26th May, 2022 at Satoktayar Solar Project Site Meeting Hall, Myaynigone Village, Myaynigone Village Tract, Satoketayar Township. The staring time was 9:00 am and finished at 10:30 am. The objective of the meeting is to disclose information of the project, potential impacts of project activities and mitigation measures and to receive public recommendations and feedbacks for the proposed project. The project proponent invited local people by negotiating with village administrators. As the public consultation meeting was held during COVID-19 Pandemic Period, there were some limitations related to number of attendees, venue and social distancing. Totally, 19 persons including local people from Myaynigone Village, representatives of project proponent and E Guard Environmental Services attended public consultation meeting and some attendees discussed with regards to the project. The project information and this Environmental Management Plan (EMP) report can be accessible at the

project site and E Guard Environmental Service Co., Ltd.'s Office for disclosure to public and stakeholders. ***(See details in Chapter 9).***

In conclusion, the proposed project can ensure some positive impacts such as providing job opportunities, business opportunities, revenue to government, CSR development, carbon emission reduction, resources conservation and green economy. All of the negative impacts during construction and operation phases can be minimized by using mitigation measures and implementing Environmental Management Plan (EMP). Environmental Monitoring Plan (EMoP) must need to implement for monitoring the environmental quality of the proposed project. Finally, the project proponent must follow the comments and suggestions that will be given by ECD after reviewing this EMP report. Once EMP report is approved by concerned authorities, effective implementation of EMP by the project proponent is essential to implement the project environmental soundly. The project proponent shall abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar throughout the lifespan of project. ***(See details in Chapter 10).***

2. PROJECT DESCRIPTION

This Environmental Management Plan (EMP) report is for the 30 MW Ground Mounted Solar Power Plant Project Connected to Satoketayar Substation, which is proposed by Myanmar Satoketayar Solar Power Co., Ltd. The project proponent, Myanmar Satoketayar Solar Power Co., Ltd., was incorporated under the Myanmar Company Law 2017 on 28 March 2022 as a Private Company limited by shares with Company Registration no. 132890811. The project proponent won tender from the Ministry of Electricity and Energy and obtained permit for construction and electricity generation of the proposed project. The proposed project will contribute to fulfill a goal for achieving universal access to electricity by 2030 as per Myanmar National Electrification Plan (NEP). Myanmar has one of the lowest rates of electrification in Southeast Asia; almost 61.8 % of households in Myanmar have access to electricity and electricity consumption per capita is among the lowest in the world, therefore, development of electricity generation projects, especially for electricity generation from renewable energy projects are urgently required in Myanmar.

According to the Environmental Conservation Law (2012), it is the requirement of every development project in the country, to submit an Environmental Management Plan (EMP) or Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) report to Ministry of Natural Resources and Environmental Conservation (MONREC) depending on the criteria for specific kind of economic activity, which was enacted in the Environmental Impact Assessment Procedure (2015). According to the instructions from Environmental Conservation Department (ECD), this proposed project requires to submit Environmental Management Plan (EMP) report to meet the environmental assessment requirements of the Environmental Policy, Environmental Conservation Law and other environmental related rules and procedures. Therefore, Myanmar Satoketayar Solar Power Co., Ltd., was made consultations with E Guard Environmental Services Co., Ltd. for conducting the environmental studies for the proposed project.

The specific objectives of this study are:

(1) Identify the major impacts that may arise from the activities of the proposed project on natural environment and socio-economic environment of the project area,
(2) Describe the mitigation measures to minimize these impacts,
(3) Prepare and implement Environmental Management Plan and Environmental Monitoring Plan for the proposed project,
(4) Make sure that EMP is developed sufficiently and soundly for the proposed project and
(5) Implement the Corporate Social Responsibility Plan (CSR Plan), which plays an essential part for the improvement of the social welfare of community as well as development of the region.

2.1 Scope of the Project

The scope of the study for EMP will vary on the scale and type of the development project. In this EMP, a study was made to cover construction of solar power plant and overhead transmission line as well as operation of solar power plant to generate electricity from solar energy and distribute to the Satoketayar Substation with 66 kV overhead transmission line. This EMP is based on consideration of terrestrial and aquatic resources conservation, pollutant abatement on air quality, water quality and soil quality, noise level reduction, safe working environment ensuring for the workers. The site survey and baseline environmental quality measurement were carried out by a study team from E Guard Environmental Services, which has experiences in conducting assessments on environmental concerns for various kinds of development projects in Myanmar.

A study team from E Guard Environmental Services conducted site survey on 25th May, 2022 for all site-related issues and baseline environmental data were also collected from possible sources of pollution by using appropriate environmental measuring devices. Data interpretation and analysis were made based on those collected data for the current and future conditions. In this EMP report, recommended mitigation and monitoring measures were also include to mitigate environmental impacts due to the activities of the proposed project. It is estimated that there will be not much significant impacts on the environmental and socio-economic factors due to implementation of the proposed project during construction phase, operation phase and decommissioning phase because the proposed project will utilize renewable energy to generate electricity and distribute to Satoketayar Substation. Therefore, the scope of the study area for the proposed project is roughly defined to be the area within 1 km radius from the center of the project and this area would be large enough to cover for most environmental and socio-economic impacts of the project and 200 m buffer area for transmission line. Within this defined area, available secondary information and primary information collected from site survey were used for the consideration of cumulative impacts. The following figure illustrates the scope of the study area for the proposed project.

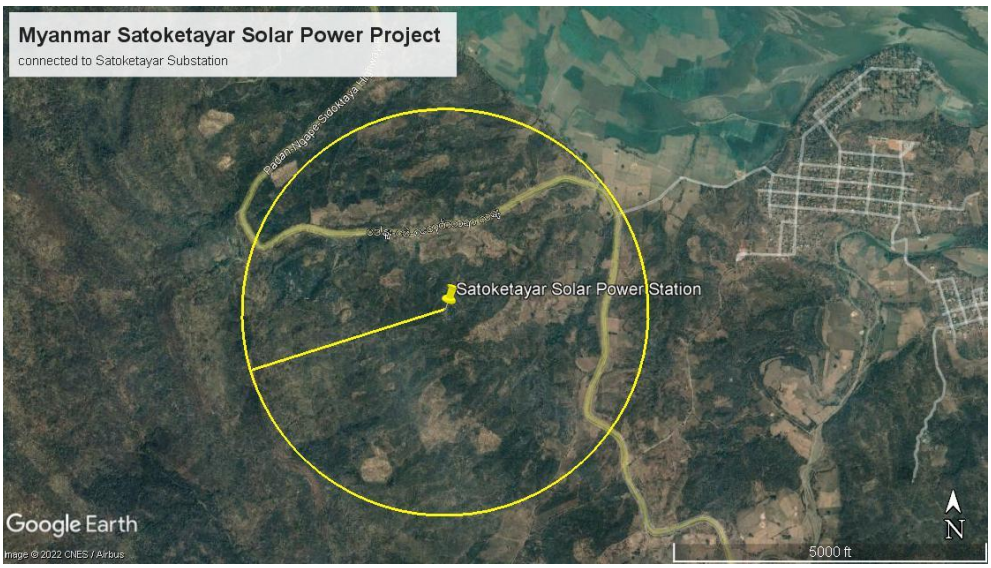


Figure 2. 1 Scope of the study area

2.2 Project Size and Location of the Project

The proposed project is located in Myay Ni Kone Village, Satoketayar Township, Minbu District, Magway Region, Myanmar. It is about 76km away from Magway capital, and covers an area of about 0.58km^2. Its coordinates are between 20°24' 27"N ~ 20°25' 13"N, between 94°14' 55"E ~ 94°15' 37"E and the elevation of the site is between 138m- 190m. The proposed project includes construction of box transformers foundation, supporting brackets and foundation of solar power station, multiple-use building, on-site road construction, PV array foundation and support construction, PV module installation, installation of box inverter equipment and related power distribution devices, cable laying, commissioning and finishing work, outdoor equipment foundation as well as construction of newly built single circuit 66 kV overhead line connecting to Satoktayar Substation power distribution device and total length of overhead line is 6 km. The following figures show the details location map of the project.

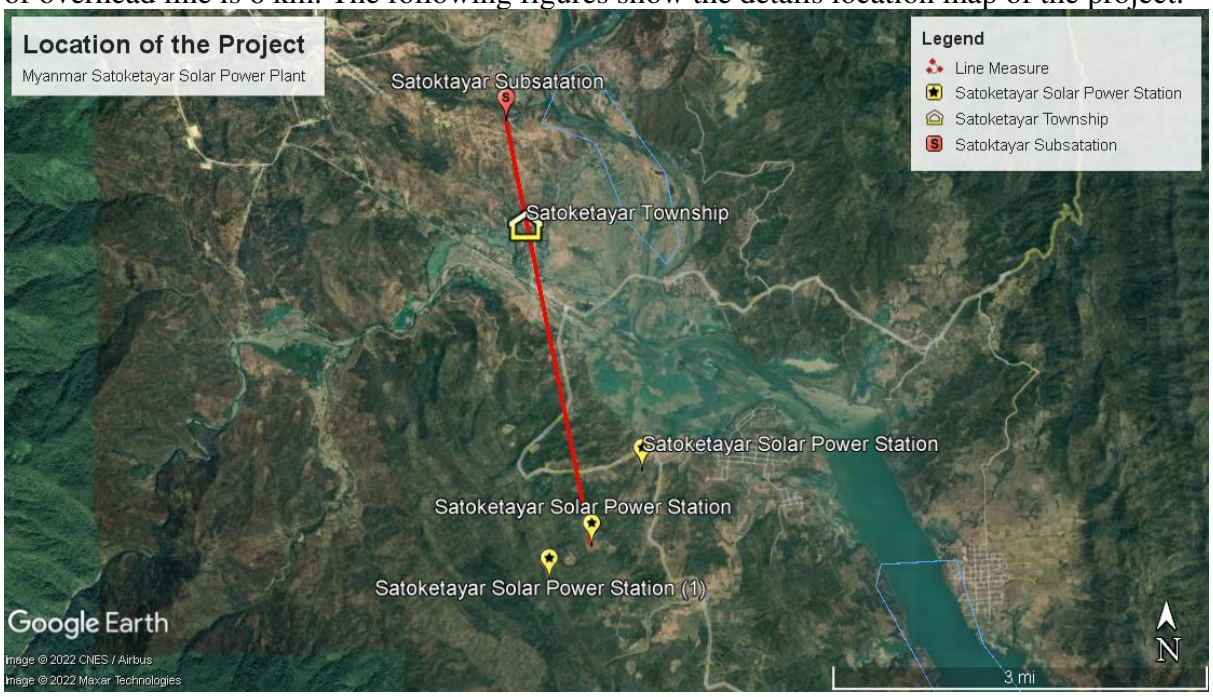
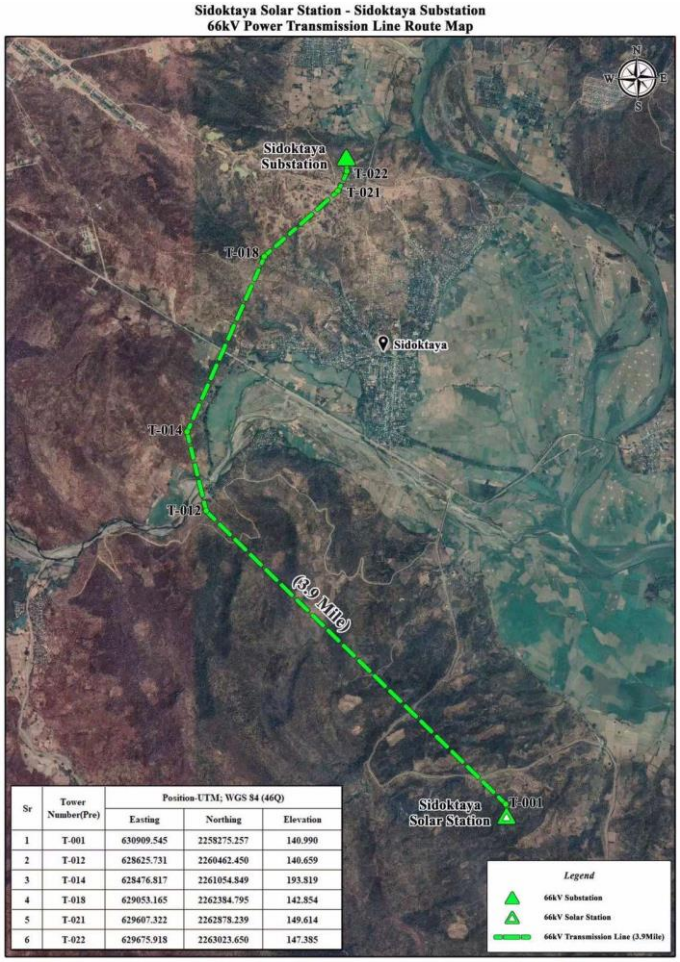


Figure 2. 2 Location of the Project Site

Figure 2. 3 Schematic diagram of the geographical location of the project



Sr	Tower Number(Pre)	Position-UTM; WGS 84 (46Q)		
		Easting	Northing	Elevation
1	T-001	630909.545	2258275.257	140.990
2	T-012	628625.731	2260462.450	140.659
3	T-014	628476.817	2261054.849	193.819
4	T-018	629053.165	2262384.795	142.854
5	T-021	629607.322	2262878.239	149.614
6	T-022	629675.918	2263023.650	147.385

Figure 2. 4 66kV Transmission Line Route Map

2.3 Land Acquisition

The project proponent has been acquired the land slot to build the Solar Power Plant and total land requirement for the project is 148.8 acres. The land is leased by Myanmar Satoketayar Solar Power Co., Ltd., from the land owner, Super One Holdings Company Limited with long-term land lease agreement (LLA).

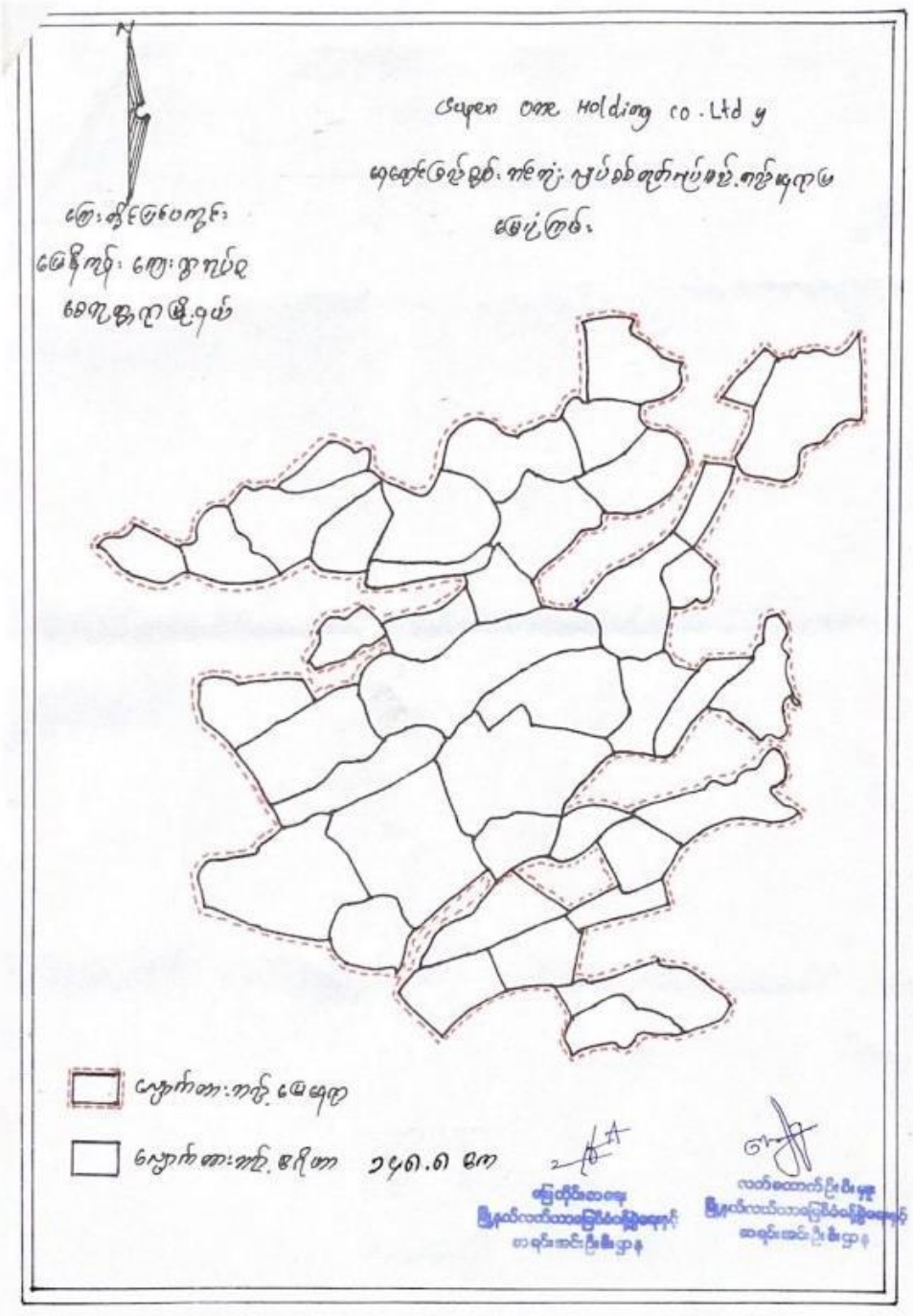


Figure 2. 5 Plot of Land

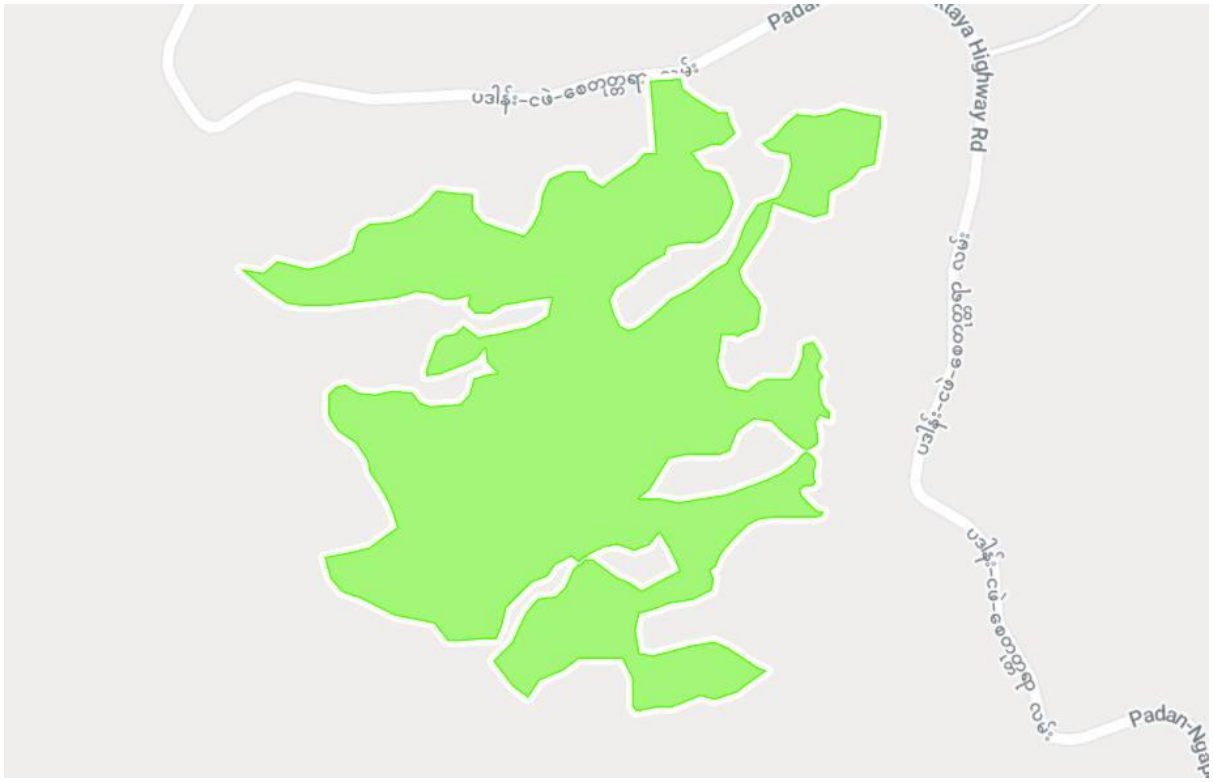


Figure 2. 6 Google Map

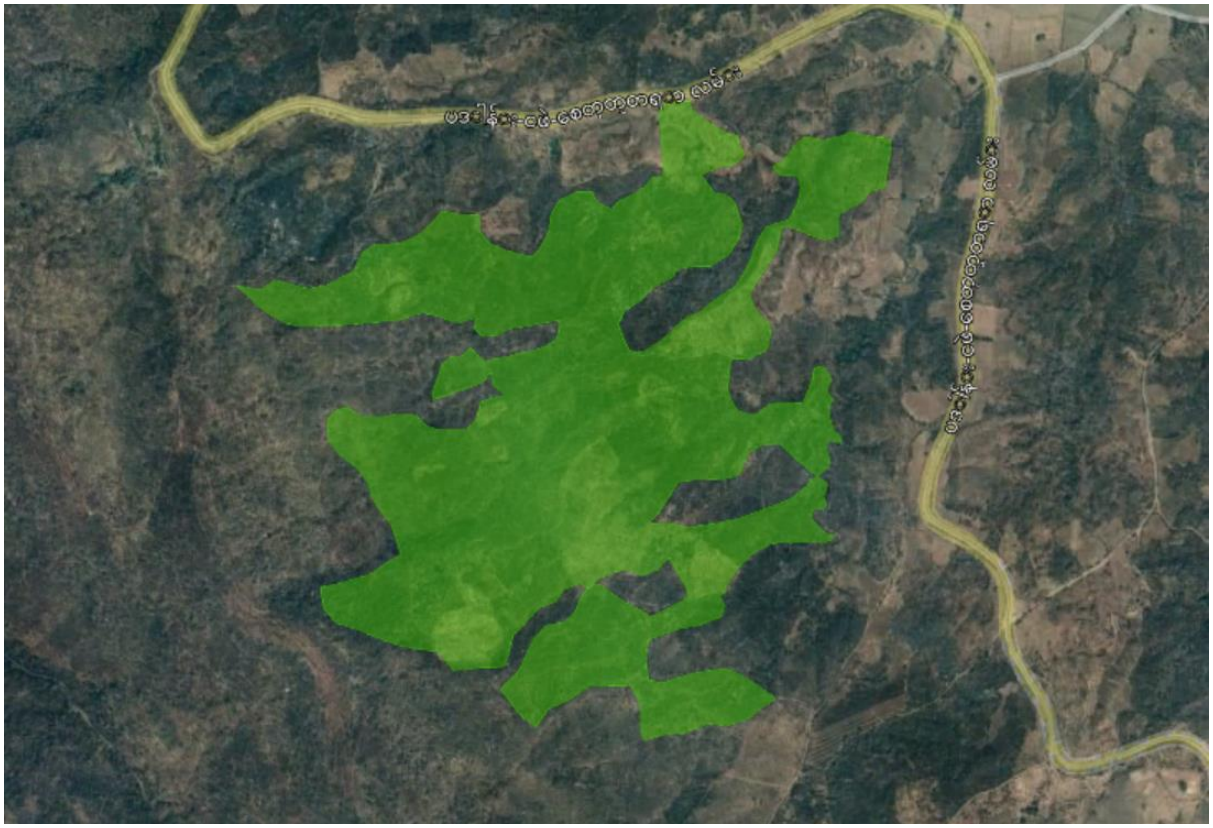


Figure 2. 7 Satellite Map

2.4 Solar Resource Conditions on Site

Myanmar is a country with great potential to develop solar energy by virtue of its superior geographical position and abundant light resources. Myanmar is located in the sub-equatorial region, with abundant solar energy resources, and its spatial distribution is mainly large in the middle and low in the periphery. The annual average total solar radiation in Magway Region is 6400MJ/m^2 ~ 6900MJ/ m^2, and the annual average sunshine hours are over 2300h. The distribution of solar energy resources in Magway Region and its surrounding areas is shown in following.

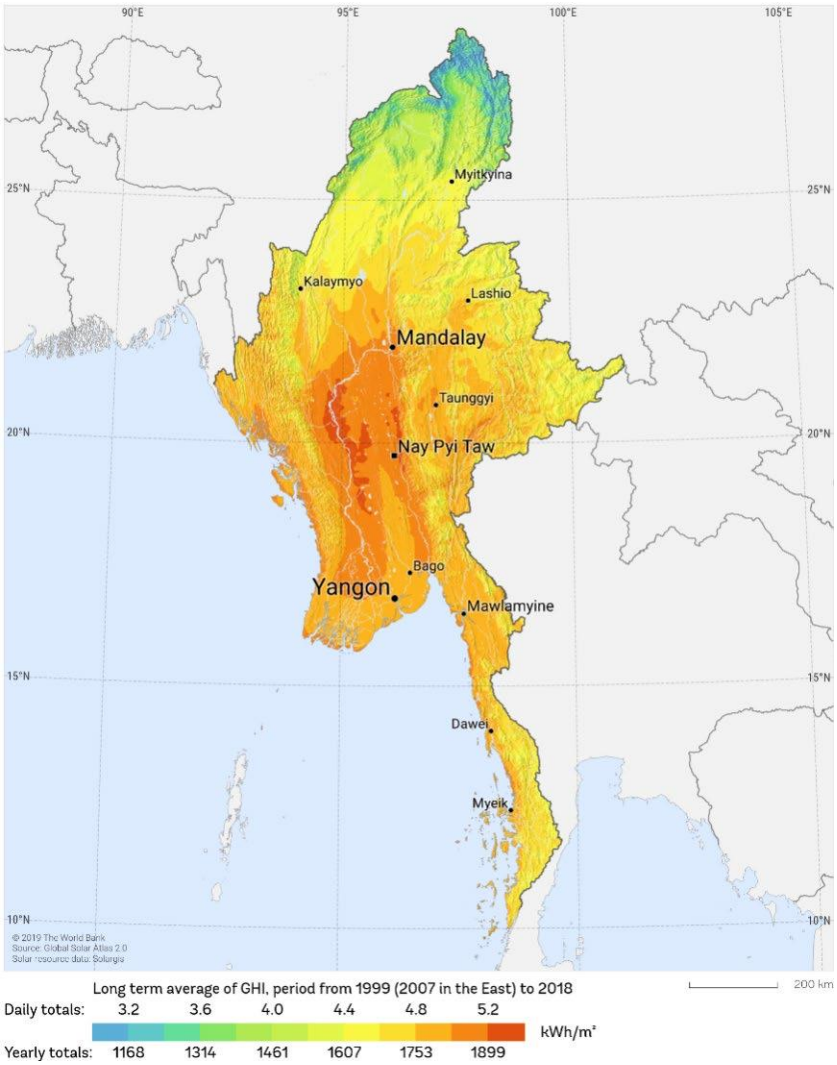


Figure 2. 8 Distribution of solar energy resources in Myanmar

2.5 Project Description

2.5.1 PV Power Generation System

The total installed capacity of AC side of the proposed project is 30 MW and that of DC side is 36.288 MWp. A 5000kVA box transformer and 20 sets of 250kW series inverters are adopted, each inverter is connected with 20 PV series, and each PV series is connected with 28 PV modules. The output electric energy is boosted to 33kV by the box transformer and then sent to the booster station. The box transformer is arranged in the middle of the array near the

road. A total of 6 PV sub-arrays of 6.048MWp are arranged, and a total of 67,200 mono-crystalline silicon double-sided PV modules with a capacity of 540Wp are adopted. The system efficiency of this PV power generation project is considered as 81.5%. The power generation gain of the back of the double-sided module is 4.5%, and the double-sided module attenuates by 2% in the first year and then by 0.45% every year. The annual total solar radiation of the project site is 6637.4MJ/ m^2. After calculation, the average on-grid power of this project in the 20-year operation period is 57562MW·h, and the average annual equivalent utilization hours are 1586.

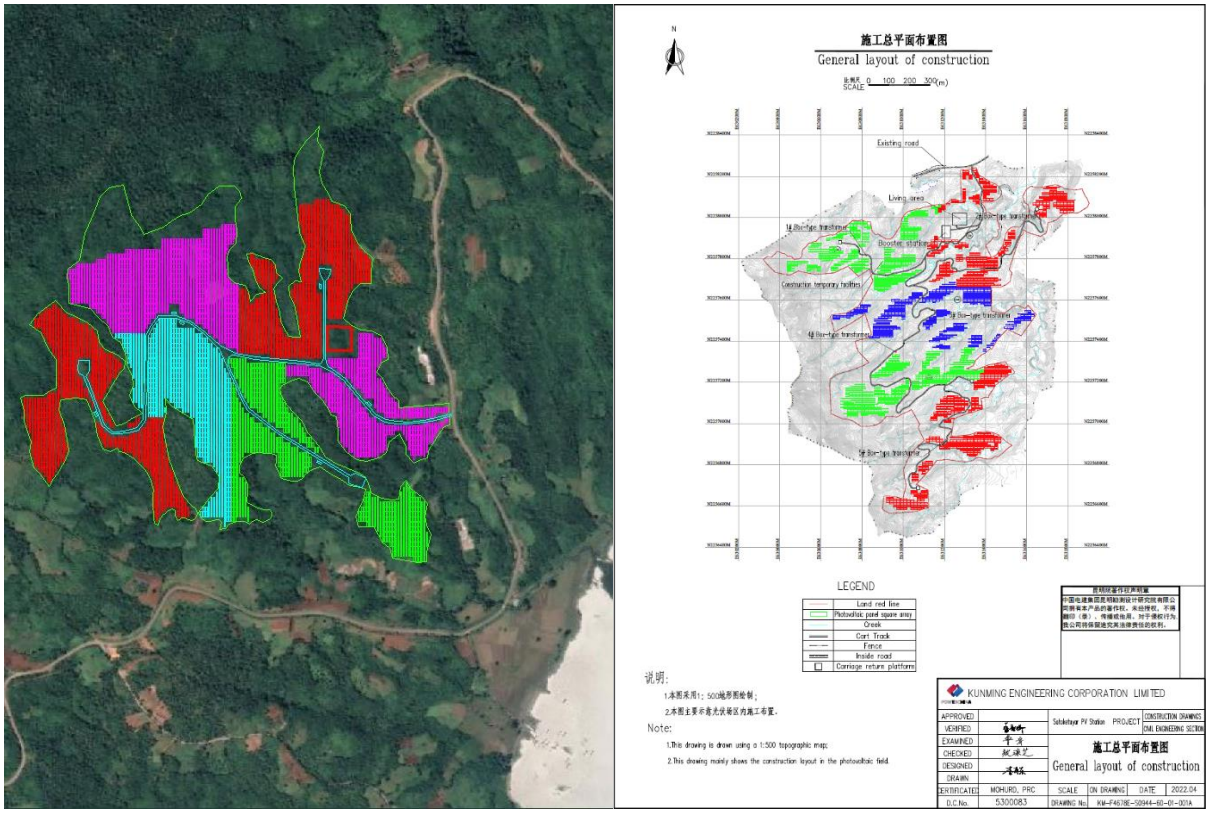


Figure 2. 9 General Layout of Satoketayar PV Power Station

Table 2. 1 Summary of Equipment Quantity in PV Field

No.	Name	Quantity
1.	5MWac PV module array	6 (pieces)
2.	PV strings	2400 (pieces)
3.	5000kW box-type step-up transformer	6 (sets)
4.	Collector line	2 (circuits)

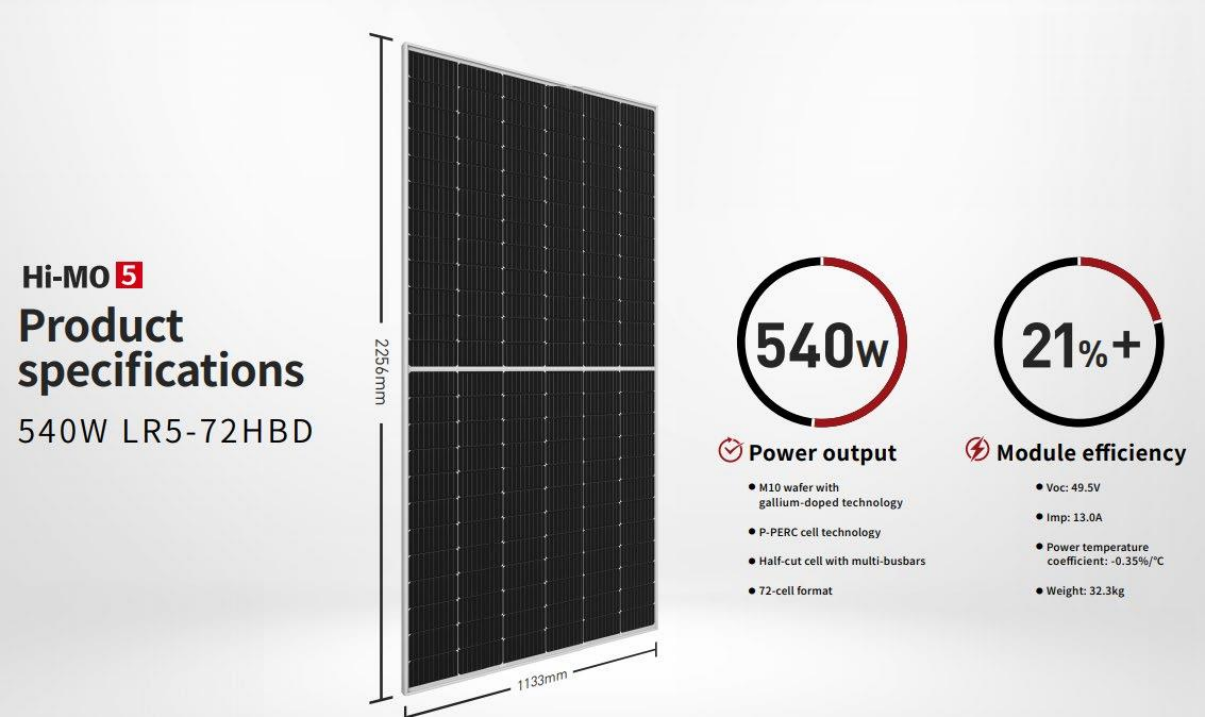


Figure 2. 10 Specifications of 540 WP PV module

2.5.2 Access System Scheme of Electrical Design

The scale of this project is 30MWac, and a 66kV booster station is built in the middle of the PV field. After the booster station collects the power of PV power generation project, the booster station is connected to the 66kV side of Satoketayar Substation about 6km (3.7 miles) away from the site with a conductor cross section of 240mm^2.

2.5.3 Electrical Equipment Layout

The series inverter is arranged in the PV array, fixed on the PV bracket locally and installed outdoors. The 33kV box-type substation and the 33kV cable tap box are centrally arranged locally, and the cables are directly buried. The booster station is arranged in a rectangular shape with a length of about 50m and a width of about 50m. The booster station is equipped with a production complex building, which is arranged in the middle of the booster station, and the 33kV distribution room is arranged in the north of the booster station. The booster station is arranged in a rectangular shape with a length of about 50m and a width of about 50m. The booster station is equipped with a production complex building, which is arranged in the middle of the booster station, and the 33kV distribution room is arranged in the north of the booster station.

2.5.4 Channel Design

All power cables with flame retardant crosslinked polyethylene insulation sheath are used in PV plant area, and cables in PV plant area are laid in trough box or directly buried way, while cables passing through roads are laid in buried pipes.
There are two laying modes of DC output cables of PV array. The cables in the east-west direction directly enter the series inverter along the mounting bracket of PV module, and the cables in the north-south direction are laid into the series inverter by means of cable box. The AC output cable of group series inverter is laid in cable trough box mode and enters the low

voltage side of box transformer. Cable tray box can be supported by the bracket and ground foundation of PV array string nearby.

2.5.5 Power Quality Monitoring Equipment

The booster station is equipped with a set of power quality monitoring device, which is used for real-time monitoring of voltage deviation, frequency deviation, three-phase unbalanced current, negative sequence current, harmonics, flicker, voltage fluctuation and continuous recording of other power quality indicators, so as to accurately evaluate the impact of grid-connected PV power station project on power quality of the power grid. The proposed project will also be equipped with Microcomputer Five-Prevention System, GPS time synchronization system, Fire alarm system, Image monitoring and public alarm system and Optical power prediction system, SCADA system for real-time data collection, security monitoring and control, screen display and operation, operation records, tabulation printing and screen copying, local and remote operation control of the substation.

2.5.6 Design of Booster Station

A 66kV booster station is built in the west of the site, with a length of 69m, a width of 62m and an area of 4278m^2. The entrance of booster station is arranged on the south side of the station area, and a living area is arranged near the entrance. A comprehensive building, a warehouse, a pump house and a pool are arranged in the living area. The northeast side of booster station is a production area, and the comprehensive control building, main transformer, outdoor GIS and reactive power compensation are arranged in the production area in turn. There is cable trench connection between each electrical equipment and the comprehensive control building. The entrance road of booster station is connected by the on- site construction road. The minimum width of the roads in the station is 4m, all of which are concrete pavements with a turning radius of 9m. The roads form a circular lane around the comprehensive control building, and the clear height of the roads is not less than 4m, meeting the fire protection requirements. Greening is appropriate around the complex building, and 2.2m high brick walls are set around the booster station.

2.5.7 Design of bracket foundation

Based on the site geology and bracket layout, each bracket is provided with 10 bored steel pipe cast-in-place pile foundations (arranged in front and back double rows). According to calculation, the steel pipe cast-in-place pile is proposed to have a pile length of 1.75m, a pile top with a height of 0.25m above the ground, a pile foundation drilling diameter of 200mm and a drilling depth of 1.5m. The steel pipe pile is formed by welding three 1.2m long f 14 ribbed steel bars with f F76×4mm specifications. After drilling pile foundation, insert steel pipe pile, straighten steel pipe pile and pour C25 fine stone concrete into drilling gap.

2.5.8 Total efficiency of power generation system

The energy conversion of grid-connected PV power generation system mainly includes: energy source link, energy conversion link, energy output link and so on. There are different energy losses in all the above links.The main losses in the energy source link are the unavailable solar radiation loss (including the loss caused by shading in the morning and evening, and the reflection and refraction loss of light passing through glass), dust shading loss and so on. The main losses in energy conversion are the losses caused by the quality defects or mismatches of battery components, and the losses caused by temperature influence, etc.The main losses in the energy output link are ohmic losses (DC and AC lines, protection diodes, cable joints, etc.),

inverter efficiency losses, transformer efficiency losses, field power losses (including box inverter power consumption, main transformer, booster station lighting, etc.), system failures and maintenance losses, etc.

Table 2. 2 Value Table of System Efficiency Evaluation

No	Loss Factor	Generation Loss
1	Unavailable light loss	2.00%
2	Component mismatch loss	1.50%
3	Temperature influence loss	9.50%
4	Dust shielding loss	2.00%
5	Low voltage cable confluence loss	0.45%
6	Inversion loss	0.75%
7	Loss of collecting line	0.98%
8	Field power loss	1.20%
9	System failure and maintenance loss	1.00%
10	Power grid dispatching loss	0.50%
11	**Comprehensive efficiency of system**	**81.5%**

2.5.9 Calculation of annual on-grid power generation

The power generation capacity of double-sided monocrystalline silicon PV cell module will be attenuated to some extent due to the aging of the cell module after working for a period of time. The operation period of this project is calculated as 20 years. The power generation gain of double-sided module is 4.5%, and the power attenuation of PV module in the first year is 2%, and then the power attenuation of PV module is 0.45% every year. According to the above calculation principle, the annual average power generation of Satoketayar PV power station is 57562MW·h, and the annual power generation is shown in Table 2.3.

Table 2. 3Annual Power Generation of Satoketayar PV Power Station

Running period	Attenuation coefficient	Annual attenuation rate	Annual power generation (MW·h)
Year 1	0.98	2.00%	60188
Year 2	0.9755	0.45%	59912
Year 3	0.971	0.45%	59635
Year 4	0.9665	0.45%	59359
Year 5	0.962	0.45%	59082
Year 6	0.9575	0.45%	58806
Year 7	0.953	0.45%	58530
Year 8	0.9485	0.45%	58253
Year 9	0.944	0.45%	57977
Year 10	0.9395	0.45%	57701
Year 11	0.935	0.45%	57424
Year 12	0.9305	0.45%	57148
Year 13	0.926	0.45%	56871
Year 14	0.9215	0.45%	56595
Year 15	0.917	0.45%	56319
Year 16	0.9125	0.45%	56042
Year 17	0.908	0.45%	55766
Year 18	0.9035	0.45%	55490

Year 19	0.899	0.45%	55213
Year 20	0.8945	0.45%	54937
Annual Average			57562

2.5.10 Transmission line design

(1) line name: 66kV transmission line to Satoketayar Substation.
(2) Line origin and destination: starting from this PV power station and ending at Satoketayar Substation. The total length of the line is about 6km. Single circuit erection.
(3) Design meteorological conditions: design according to the basic wind speed of 30m/s and the ice thickness of 0mm.
(4) Type of conductor and ground wire: the conductor adopts JL/G1A-240/30 steel-cored aluminum stranded wire; OPGW-50 communication cable is used as ground wire.
(5) Insulation level: 2*4 pieces of suspension strings, 2*5 pieces of tension strings and 2*4 pieces of jumper strings.
(6) Insulator and hardware string type: 70kN U70B double insulator string is used for suspension insulator string, 70kN U70B double insulator string for tension string and 70kN U70B double insulator string for jumper string.
(7) Arrangement mode of iron tower conductors: triangular arrangement is adopted.
(8) Iron towers: all are self-supporting iron towers.
(9) Foundation type: Cast-in-place vertical reinforced concrete foundation is adopted for the entire iron tower.

Table 2. 4Main Economic Indicators of Lines

No.	Projects	Indicators
1.	Line length (km)	6
2.	Number of towers (base)	28
3.	Average span (m)	217
4.	Tensile ratio (%)	45.6%
5.	Wire (kg/km)	1132
6.	Insulator (piece /km)	245

2.6 Implementing Construction and Implementation Schedule

According to the requirements of MOEE, it is initially planned to start construction and installation on March 15th, 2022 and finished on November 15th, 2022 with a total construction and installation period of 8 months. The scale of this project is 30MWac, and the preparatory work for construction has to begin in March. However, the current status of the project area is starting some preliminary activities such as to ensure that such preliminary activities do not cause Environmental Impacts.
The following figure illustrates the details implementing schedules of the project.

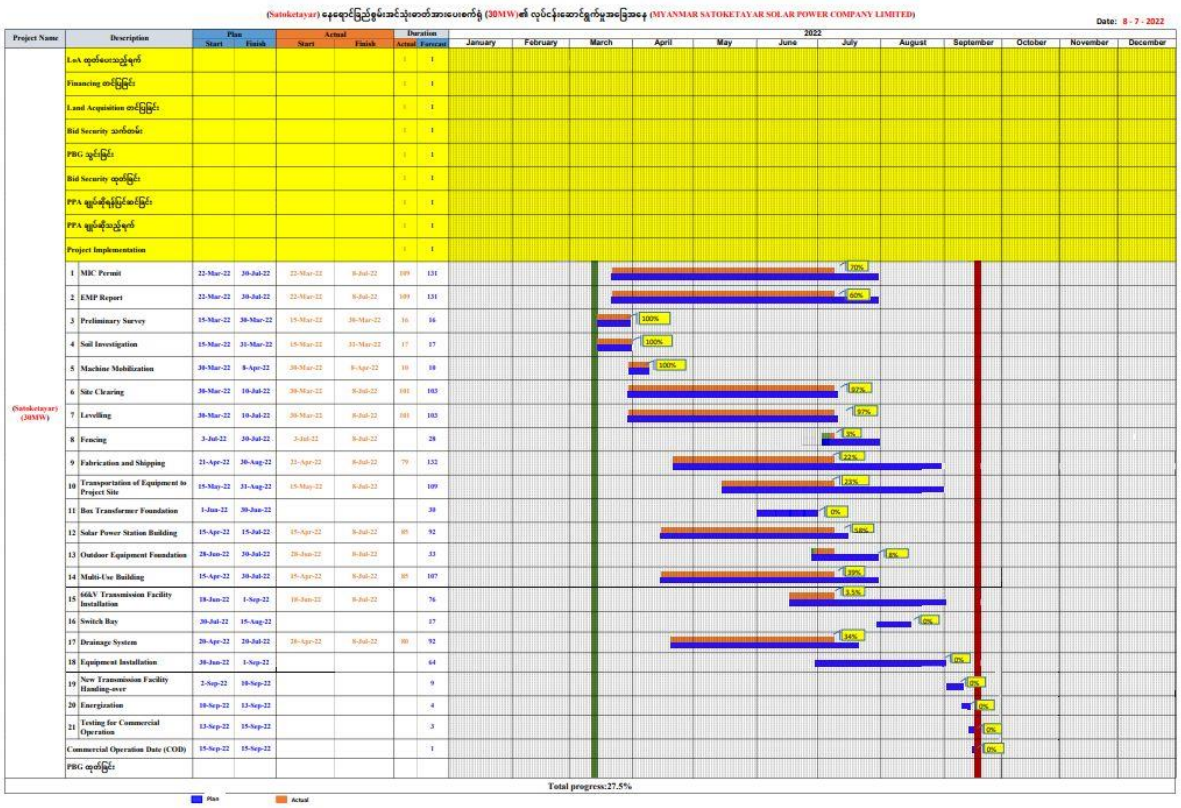


Figure 2. 11 General Construction and Installation Schedule

2.7 Utilities

2.7.1 Construction Materials and Machines Requirement

With regards to construction materials, cement, gravel, steel, wood and chain link are purchased from local providers for the proposed project. Estimated construction materials requirement are described as below tables.

Table 2. 5 Satoketayar Substation Equipment and Material Supply (Onshore Supply) Portion

Satoketayar Substation Equipment and Material Supply (Onshore Supply) Portion					
ITEM M/L	NAME & SPECIFICATION	Qty	Unit	Estimated Price USD	Origin of Country
1	Steel material of pile foundation (600*76/4 steel pipe)	1	Unit	466,011	Myanmar
2	Borehole pump	1	Unit	15,854	
3	Electric shrinkage gate	1	Unit	20,178	
4	Crawl	1	Unit	341,581	
5	Sand & stone & brick & concrete, etc.	1	Unit	1,096,492	
6	Pile foundation reinforcement	1	Unit	289,119	
7	Concrete iron	1	Unit	68,460	
8	Hot galvanized steel pipe	1	Unit	121,067	
9	Ground flat steel	1	Unit	224,118	

10	Light distribution box	1	Unit	57,651	
11	Diesel generator	1	Unit	194,572	
12	Wire	1	Unit	43,238	
13	Supply and drainage equipment	1	Unit	165,746	
14	PVC PIPE	1	Unit	28,869	
15	Portable dwellings	1	Unit	144,127	
16	Temporary facilities	1	Unit	186,164	
17	Epidemic prevention materials	1	Unit	110,948	
18	Other sporadic materials	1	Unit	211,055	
				3,785,250	

Table 2. 6 Satoketayar Substation Equipment and Material Supply (Offshore Supply) Portion

ITEM M/L	HS CODE	NAME & SPECIFICATION	Unit	Qty	Estimated Price USD	Origin of Country	Preliminary Shipping Plan
1	8541.4022.00	PV module	U	96186	13369267	China	
2	7308.9099.00	PV support bracket	Kg	1032000	2101063	China	
3	8504.4040.00	String inverters	U	190	774082	China	
4	8504.3429.00	Packaged Transformer	U	17	872625	China	
5	8537.1092.00	Communications cabinets (Including switch, anti PID control device, data management device, etc.)	Kg	3600	52886	China	
6	8544.4929.00	PV cable (including accessories)	Kg	30000	822486	China	
7	8544.6012.00	Power cable (including accessories)	Kg	162600	375097	China	
8	8544.6012.00	Control cable (including accessories)	Kg	4800	352837	China	
9	8504.2329.00	Main transformer (including accessories)	U	1	280650	China	
10	8535.9010.00	Neutral point equipment (including neutral isolating 18491772000switch, current transf14400ormer, lightning arrester, etc.)	Kg	2400	135213	China	

11	8535.9010.00	66kV line – transformer group interval	Kg	72000	184917	China	
12	8535.9010.00	66kV outdoor equipment (66kV lightning arrester, attached discharge recorder, outdoor voltage transformer)	Kg	14400	55185	China	
13	8537.1099.00	Distribution Equipment	Kg	12000	272622	China	
14	8543.7090.00	Reactive power compensation device	U	3	297270	China	
15	8504.2192.00	Station service electricity equipment	U	10	140459	China	
16	9015.8090.00	Environmental monitoring instrument	U	3	31095	China	
17	8507.2099.00	Value-controlled sealed lead-acid battery	U	3	27303	China	
18	9030.3390.00	Fault recording cabinet	U	3	17877	China	
19	8543.7090.00	Supervisory system	U	6	348336	China	
20	8535.9090.00	Protection system	kg	4800	254282	China	
21	8517.6230.00	DC and uninterruptible power supply system	U	6	79844	China	
22	8504.4011.00	Communication system	U	6	227743	China	
23	9015.8090.00	Optical power prediction system equipment	U	2	32646	China	
24	8415.1010.00	Heating and ventilation system equipment	U	3	40139	China	
25	8424.1090.00	Fire fighting equipment	U	3	73710	China	
26	8531.1020.00	Fire alarm system	U	3	128567	China	
27	8421.2122.00	Sewage treatment equipment	U	2	68911	China	
28	8517.6230.00	Meeting system	U	24	264432	China	
29	8517.6230.00	Internet equipment	U	24	264432	China	
30	8537.2090.00	step-up substation equipment	Kg	50000	189088	China	
31	3917.3999.00	Carbon threaded pipe	Kg	7200	6411	China	

32		Hot-dip Galvanized steel pipe				China	
32.1	7306.3099.00	Hot-dip Galvanized steel pipe	Kg	24000	19628	China	
32.2	7308.9099.00	Hot-dip Galvanized steel pipe	Kg	96000	176653	China	
33	3816.0090.00	Cable Fire Retardant Coating	Kg	2400	7543	China	
34	8544.4299.00	Panel ground wire	Kg	840	5274	China	
35	3918.9019.00	Anti-static computer roon floor	Kg	7200	31108	China	
36	7228.7090.00	Galvanized Angle Steel	Kg	22200	37948	China	
37	3816.0090.00	Fire blocking material	Kg	3600	9315	China	
38	3208.9090.00	Antirust paint	Kg	36	301	China	
39	8535.4000.00	Farming lightning rod	Kg	12000	101039	China	
40	8413.8119.00	Water supply and drainage equipment	u	2	24866	China	
41	8537.1099.00	Lighting distribution box	Kg	960	7452	China	
42	8544.1900.00	Electric wire	Kg	540	4969	China	
43	8502.2010.00	Diesel generator	U	2	53799	China	
44		66kV transmission line	Kg			China	
44.1	7318.1590.00	Anchor bolt	Kg	7800	6925	China	
44.2	7308.2019.00	Transmission line tower	Kg	192000	126956	China	
44.3	7614.1090.00	Steel core aluminium stranded wire	Kg	12000	57708	China	
44.4	8538.9019.00	Connector clamp for transmission lines	Kg	2400	16158		
44.5	8546.1000.00	Line insulator	Kg	10200	23083		
Total					**22,852,200**		

Different types of construction machines and vehicles are used for construction processes of the project. These include concrete batching plants, augers, excavators, compactors, wheel loaders, generators. The following table describes detail construction machines and vehicles used for proposed project.

Table 2. 7List of Construction Machines and Vehicles

No.	Type of Machines and Vehicles	Number of Machines and Vehicles
1.	Concrete Batching Plant	4
2.	Auger	4
3.	Generator	8

Total	**16**

The following figure shows construction machines and vehicles used for proposed project.

Concrete Batching Plant

Auger

Compactor

Excavator

Wheel Loader

Generator

2.7.2 Water Requirement

Two 200 ft. depth groundwater well in the site area for construction and domestic uses is still digging and can't get pure water. Water requirement for construction work is approximately 160,000 gallons per day and get from the nearest stream named Mone stream by pumping system. and stored in the temporary tanks and transported by car.

 Tube well	 Temporary storage tank
 Transporter	 Temporary bath area

2.7.3 Electricity and Fuel Rrequirement

Generators are used for construction as power supply. Among eight generators, three are 75 kV, next three are 50kV and the left one is 25 kV.

Electricity for operation phase will be obtained from national grid line.

Diesel is used for operation processes and will be purchased from nearby fuel station and stored with portable fuel tanks in the project site.

Figure 2. 12 Diesel Storage area

2.7.4 Human Resources Requirement

There are 9 Chinese citizen workers and others are Myanmar. The current workers size for construction phase is over 280 people. There are 7 worker camps, hold 40 people for each camp and have 2 toilets and 1 temporary water tank for each camp. In this project working hours is 10 hours per day and work 30 days a month. Construction phase works start at 7:00 AM to 5:00 PM and one shift per day. In this project, worker camp is providing in project site for migrate workers.

<table>
<tr><td> 
Workers camp</td><td> 
Workers Toilet</td></tr>
<tr><td> 
Construction Site Meeting Hall</td><td> 
Starting foundation of living area</td></tr>
<tr><td> 
Drainage</td><td> 
Solar Points</td></tr>
</table>

2.8 Waste Generation

2.8.1 Solid Wastes Generation

During the construction phase, rejected components and packaging materials of electrical equipment and building materials, surplus materials, papers, containers, broken bricks, solvent containers are main sources of solid wastes generation from the proposed project. These solid wastes can be injurious to the environment through blockage of drainage systems because these wastes may contain hazardous substances such as residue of cement, adhesive and cleaning solvents bottles. Construction soil wastes will be also excavated mainly from site preparation, access road construction and leveling activities as well as vegetation debris will be generated at the time of land clearance for PV modules, switchyard, multiple-use building and right of way for overhead transmission line. Domestic solid wastes such as garbage and organic waste from construction workers camp are other sources of solid waste generation.

During the operation phase, there is no operation solid waste which are disposed of from the proposed project's operation processes. However, domestic solid waste such as garbage, rejected office materials and organic waste from multiple-use building are common solid wastes generation.

2.8.2 Liquid Waste Generation

During the construction phase, cleaning construction machines and construction vehicles within the project site will generate liquid waste. Domestic liquid waste such as black water from toilets used by construction workers and grey water from basins and bathrooms in construction workers camp will be also discharged from the proposed project.

During the operation phase, main source of operation liquid waste is cleaning activities for PV modules to promote their efficiency for electricity generation. Domestic liquid waste such as black water from toilets and grey water from basins and bathrooms within the project site will be discharged.

2.8.3 Hazardous Waste Generation

During the construction phase, damaged PV modules due to improper installation are common hazardous waste generation of the proposed project because PV modules contain toxic chemicals. Used oil disposed of from repair and maintenance of construction machines and construction vehicles, oil spills and leakage from refueling, fuel storage area and machineries maintenance area within the project site are also common hazardous waste.

During the operation phase, damaged PV modules due to improper handling during cleaning activities and maintenance activities are common hazardous wastes generation. Uninstalled lifespan-expired PV modules due to exchanging new PV modules at the time of extending operation period of the project are also common hazardous wastes. Other hazardous wastes are used oil from transformers, oil spills and leakage from maintenance activities, vehicles, refueling and fuel storage area. For batteries waste, this project does not used batteries to

store electricity from PV modules and will distribute directly to Satoketayar Substation via overhead transmission line.

3. IDENTIFICATION OF THE PROJECT PROPONENT

The proposed 30 MW ground mounted solar power plant project is proposed by MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED, formed by China ITS (Holdings) Co., Ltd., which is a China-based company and a successful bidder for EPGE solar Tender PV (Bid No. EPGE PV 02/2021-2022). The project is located at Myaynigone Village Tract, Satoketayar Township, Minbu District, Magway Region. The construction processes of the proposed project will take about 8 months and then operation processes to generate electricity from solar energy and distribute to the Satoketayar Substation for 20 years. During the construction period, MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED is responsible for the proposed project.

3.1 Information of the Project Proponent

Myanmar Satoketayar Solar Power Co., Ltd. is in order to implement the proposed project. The following table describes the management responsible persons and the following tables show the list of directors, list of shareholders and employment list of Myanmar Satoketayar Solar Power Co., Ltd.

Table 3. 1 List of Director

	No.	Citizen	NRC/ Passport No	Position	Address
1.	Mr. JIANG XINGCHENG	CHINESE	PE2174891	DIRECTOR	CORNER OF MALIKHA STREET AND PATHONEMAR 5TH STREET, A-031 SHWE KYAR PIN QUARTER, ZUBUTHIRI TOWNSHIP, NAYPYITAW, MYANMAR

Table 3. 2 List of Shareholders

No.	Name	Country	Registration Number	Percentage	Address
1	HYTRUST ENERGY (SINGAPORE) INVESTMENT PTE. LTD.	Singapore	202209792C	100%	250, North Bridge Road,#36-01 A, Raffles City Tower, Singapore(179101)

Table 3. 3 Mangement Employments list of MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED

No.	Rank	Number		Total
		Local	Foreign	
1.	Senior Management (Manager/Senior Official)	1	1	2

2.	Professionals	2	1	3
3.	Technicians	2	1	3
4	Skilled Labors	1	1	2
5	Workers	7	2	9
Total		**13**	**6**	**19**

The following

3.2 Bidder Information

China Intelligent Transportation System (Holdings) Co., Ltd. is a company based in China and is doing railway business, civil aviation business, sustainable business, and overseas business and investor relations. The following table describes the shareholders and the following figure shows the organizational chart of China ITS (Holdings) Co., Ltd.

Table 3. 4 Bidder of Proposed Project

Name of Bidder	China ITS (Holdings) Co., Ltd.	
Head office address	Building 204, Jia 10 Courtyard, Jiuxianqiao North Road, Chaoyang District, Beijing, China.	
Telephone/Contact	+959770437886	Zhang Zhitao
E-mail/Alternative E-mail	Zhitao1024@hotmail.com	Phyu.kiec@gmail.com
Place and Year of incorporation/registration	Cayman Islands	2008

The following figure shows the organization chart of China (ITS) Holding Co., Ltd.

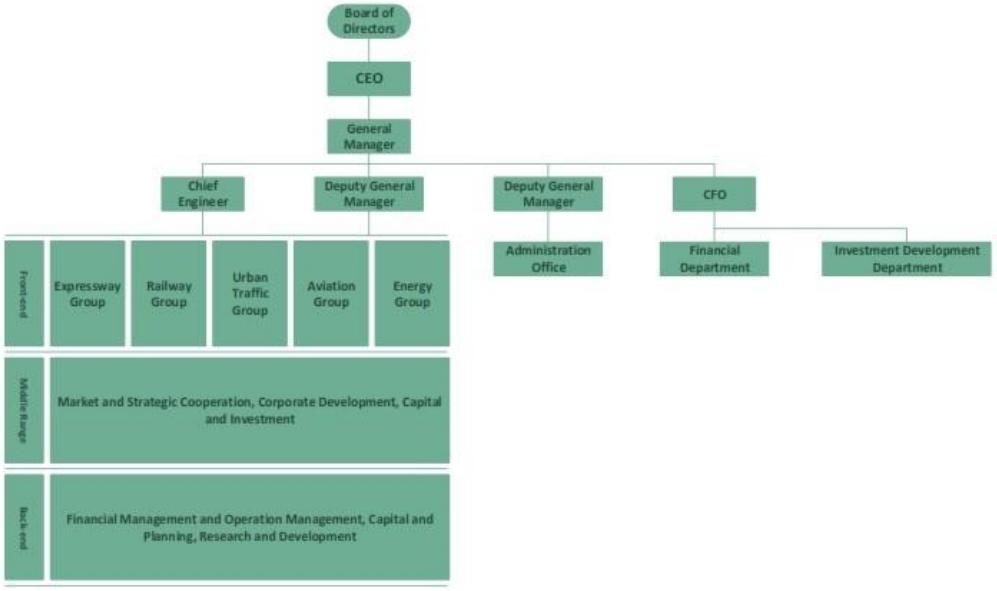


Figure 3. 1 Organizational Chart of China (ITS) Holding Co., Ltd.

3.3 Organizational Structure of 30 MW Ground Mounted Solar Power Plant

The following figure shows the organization chart of MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED.

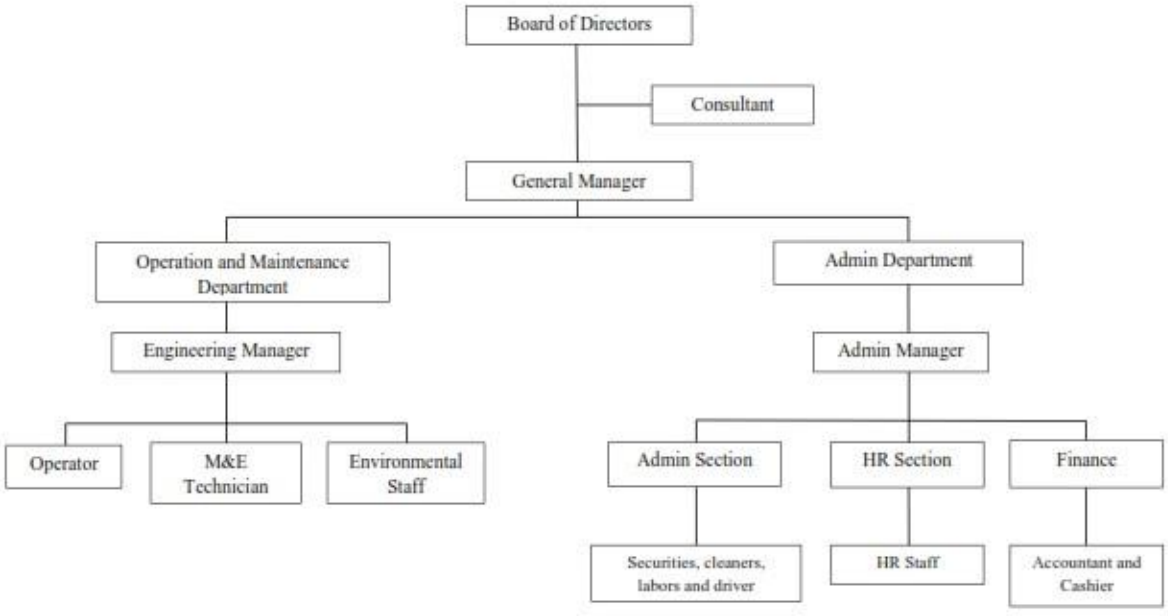


FIgure 3. 2 Organizational Chart of MYANMAR SHWEKYIN SOLAR POWER COMPANY LIMITED

3.4 Investment Plan

The total investment amount for the proposed project is 27.8 Million USD and it includes investment for financing, EPC and non- EPC cost (consulting service and development cost). The following table describes detailed investment plan for the proposed project.

Table 3. 5 Investment Plan of the Project

No.	Category	Investment Amount (Million USD)
1.	Investment for financing	0.69
2.	Investment for EPC	26.64
3.	Investment for non-EPC	0.47
Total		**27.8**

4. IDENTIFICATION OF THE EMP EXPERTS

The Environmental Management Plan (EMP) for the proposed 30 MW ground mounted solar power plant project connected to Satoketayar Substation is prepared by E Guard Environmental Services Co., Ltd. The Environmental study was carried out by the study team and the following is a summary of team member's responsibilities.

U Soe Min (Director)

U Soe Min had worked as a civil, water resources and environmental engineer in public and private organizations. He had involved in water resources development projects from investigation and feasibility studies to planning, design and construction, and environmental impact assessments. He has experiences of local and international practices on construction management, contractual documentations, environmental equipment sales and environmental consulting services. Taking the role of a local environmental consultant, he is leading the local team and collaborating with international consultant firms in implementing EIA projects in Myanmar. He had provided and shared local knowledge to international consultants and supporting capacity building projects to strengthen environmental safeguard systems in Myanmar.

U Myint Oo (Advisor)

Dr. Myint Oo, Rector (Retired) of University of Forestry and Environmental Science, Yezin, Ministry of Natural Resources and Environmental Conservation, worked for the Ministry for 35 years from 1984 to 2019. He obtained M. Sc. and Ph. D. Degrees from Göttingen University, Germany with special reference to tropical forest resources assessment using remotely sensed data and geographic information system. As a government employee he was involved in forest management planning and implementation, organizing and conducting forestry research studies, training, international relation, administration and teaching of forestry and environment-related subjects at the University. After retirement in 2019 he joined E Guard Environmental Services Co. Ltd. as an advisor, attended the training course on 'Principles of Environmental Impact Assessment Review' organized by AIT Center in Vietnam, and has been involved in internal review process of EIA studies implemented by project teams of the company, as well as providing advice to project team members regarding project implementation and report preparation. He is also responsible for review and revision of existing technical documents relevant to his expertise, supporting ongoing implementation of company's governance policies and procedures and providing advice for improvement when required.

Daw Thein Mwe Khin (Associate Consultant)

Daw Thein Mwe Khin is an Associate Consultant, who received her Master Degree in Regional and Rural Development Planning from Asian Institute of Technology in 2019 and Bachelor Degree in Forestry from the University of Forestry in 2013. She is currently working as a social expert in Yangon Outer Ring Road Construction Project, Hanthawaddy New international Airport Development Project and Wataya bridge Construction project. She had experience in working as a survey team leader for YCRL Updating Project and Dryzone Water Supply

Project in 2014, 2015 and 2016 respectively. She had her expereinces in working as a core team member of the social team who did the prearation of RAP for Construction of Kyarkalay Bypass and 2 Bridges and RAP for Construction of Thaton Bypass and 2 Bridges in 2014. In addition, she has a project leader role in the preparation of four IEE reports for various types of projects, tender preparation, many social surveys, FGDS for various EIA/IEE/EMP projects during around five years of working life in EIA field. She also studied the socioeconomic impact of rural electrification on the well-being of rural households in central dry zone, Myanmar as her master thesis in 2018.

U Aung Si Thu Thein (Assistant Consultant)

U Aung Si Thu Thein is an Assistant Consultant, who received his Bachelor Degree in Forestry from the University of Forestry in September, 2015. He also received Post Graduate Diploma in Geographic Information Systems from the Dagon University in February, 2018. Moreover, he pursued his Master of Science Degree in Natural Resources Management from the Asian Institute of Technology, Thailand in May, 2020. He has almost four years-experience in preparation of Environmental Management Plan and Initial Environmental Examination Reports for various development projects as a Lead Consultant and in participation many Environmental Impact Assessment and Resettlement Action Plan projects for development projects in Myanmar. On the other hand, he has two years-experience in research conducting with regards to impacts assessment of natural resources management systems on livelihood of local people. Moreover, he has many experiences in communication with clients, government authorities and local people, stakeholder engagements and public consultation meetings conduction and socio-economic survey.

Daw Shwe Ya Min Bo (Environmental Specialist)

Daw Shwe Ya Min Bo is an Environmental Specialist, who received her Bachelor Degree in Forestry from the University of Forestry and Environmental Sciences in November, 2016. She also received Post Graduate Diploma in Geographic Information System and Remote Sensing and Post Graduate Diploma in Environmental Studies from University of Yangon in December, 2019. She has almost five years-experiences in preparation of Environmental Management Plan and Initial Environmental Examination reports for various development projects and in participation many Environmental Impact Assessment and Resettlement Action Plan projects including Japan's ODA loan projects. She also participates in the activities of socio-economic survey, biodiversity survey, and reviewing the reports. She was responsible for Planning and Identifying, Coordinating, Data Analysis and Impact Assessment, Stakeholder engagement and Public consultation meeting and Technical Report Writing of this EMP report.

Daw Htet Shwe Sin Aung (Environmental Specialist)

Daw Htet Shwe Sin Aung is an environmental specialist at E Guard Environmental Services Co., Ltd. She graduated since 2017 with the Master of Science specialized in Zoology from Yangon University. She has three years experiences in surveying the fauna, writing report and good experience in lab works. Now she is responsible for surveying fauna data and report

writing, gathering information for the environmental reports, conducting socioeconomic surveys, cooperating with clients including NGOs, Local and Governmental agencies for the projects, assisting and cooperating in writing of environmental reports. Her responsibilities are surveying fauna data analyzing and writing report.

U Kyaw Soe Moe (Environmental Specialist)

U Kyaw Soe Moe is an Environmental Specialist who received Bachelor of Civil Engineering from Taunggyi Technological University in 2016 and Post Graduate in GIS from Dagon University, Yangon in 2019. He has more than five years of experiences in conduction stakeholder engagement, public consultation, social survey and site visit. Now he is responsible for site visiting, primary and secondary data supervision, environmental quality data analysis and assisting on environmental and social impacts assessment consideration and writing environmental management plans and mitigation measures.

U Htet Aung (Project Associate)

U Htet Aung is a Project Associate, received Master Degree with Petroleum Geology from Yangon University in 2015. He has three years experiences in data collections and report writing. He is currently preparing environmental reports, conducting public consultation and information gathering processes. He was participated in the preparation of Environmental Impacts Assessment (EIA) Report of Yangon Outer Ring Road (YORR) Construction Project and Nyaungdon Bank Protection and Rehabilitation Project. He was responsible for Data Analysis and Impact Assessment, Stakeholder engagement and Public Consultation Meeting and Technical Report Writing of EMP report.

Daw Nang Aye Thida (Project Associate)

Daw Nang Aye Thida is working as a project assistant in E-Guard Environmental Services Co., Ltd. She obtained her Bachelor degree in Civil Engineering from Technological University (Taunggyi). She has over three years experiences working in Environmental and Social Fields. She has her experience in preparing Environmental Management Plan (EMP) report for New Donthami Bridge Construction Project and experience in working as one of the core team member of social team who did the preparation of RAP for Yangon Outer Ring Road (Eastern Section) Construction Project, Hanthawaddy New International Airport Development Project. Additionally, she has experience in collecting information, conducting socioeconomic surveys, data entry and analyzing, involved in engagement with stakeholders as well as the project owners, governmental organizations and public consultation meeting, site visit, impact assessment and reporting for the other relevant projects.

U Nyein Chan Aung (Project Associate)

U Nyein Chan Aung is currently working as a Project Associate at E Guard Environmental Services Co., Ltd. He has received Bachelor Degree in Forestry from University of Forestry and Environmental Sciences (Yezin, Naypyitaw) in November, 2016. Now, he is trying to achieve a Diploma in Environmental Studies at University of Yangon (YU). He has about four

years experiences in reporting, conduction stakeholder engagement, biodiversity survey, social survey, RAP survey and site visiting. He has completed various trainings regard with environmental management and GIS. Now he is responsible for report preparation, planning and identifying, coordinating, data analysis and impact assessment, stakeholder engagement and public consultation meeting and information gathering process.

Daw Thet Shwe Yee Aung (Project Associate)

Daw Thet Shwe Yee Aung is working as Project Associate in E Guard Environmental Services. She completed her Bachelor Degree in Geology from University of Yangon in 2018. She has more than three years-experience in conduction stakeholder engagement and public consultation, social survey and site visit. She is currently assisting in preparing environmental reports, drawing maps, public consultation and information gathering processes. Contact: 09-797005173; thetshweyeeaung@eguardservices.com

U Zaw Ye Naung (Project Assistant)

U Zaw Ye Naung, a project assistant, received Bachelor Degree in Civil Engineering from Technological University (Thanlyin) in 2020. Bachelor degree research papers, "Solid Waste Management System for Technological University (Thanlyin)" and "Drainage Design for Downtown Yangon Region", were accomplished. He also has foreign training of "Mini Hydro power Design" at Anan Institute of Technology, Tokushima, Japan in 2016. He has experiences in environmental impact assessment, stakeholder engagements and public negotiations, social and resettlement survey. He has also participated in the activities of the assist to the EIA process and Resettlement Action Plan.

U Aung Zayar Wint (Project Assistant)

U Aung Zayar Wint is a Project Assistant in Environmental Quality Team at E Guard Environmental Services. He got Bachelor Degree of Forestry from University of Forestry and Environmental Science (UFES) in 2017. He also got Post Graduate Diploma in Environmental Impact Assessment and Environmental Management System from Yangon Technological University (YTU) in 2019. He has experiences of monitoring environmental quality, writing the environmental quality reports and project monitoring reports including Japan's ODA Loan Project. He also takes part in ISO document controlling of Environmental Quality Team.

Daw May Thu Win (Project Assistant)

Daw May Thu Win is working as a Project Assistant in E Guard Environmental Services Co., Ltd. She obtained her Bachelor Degree in Law from East Yangon University (Tarwa) in 2018. In this project, her responsibilities are legal aspect conformity analysis laws, rules, regulations, policies, agreements, international conventions, protocols, derivatives, announcements and notifications used for environmental reports, cooperating in public consultations and information gathering process.

Daw Shar Thae Hoy (Project Assistant Internship)

Daw Shar Thae Hoy, graduated with a qualified bachelor's degree in Plant Biology from the University of Yangon. She put a strong emphasis on environmental science in her final year research studies term paper, analyzing the quality of the water from the MyitNge River and how it affects local public health issues. In these research studies, she has seen the critical situation of water pollution and the uttermost importance of water sanitation. Academically, she also has a keen enthusiasm for plants, ecosystems, and community ecology and possesses 4 years of lab and fieldwork experience, working hand in hand on projects in the field of ecological sciences, monitoring and identifying plant species. Furthermore, excellent written communication, technical and report writing, field assessment, and data analysis are other particular skills of her working attributes. She is devoted to environmental protection because she has participated in numerous trainings such as the "World Green Organization Youth Leadership Training Program", the "Air Quality Measurement and Monitoring Training Program" organized by the University of Toronto as well as being an "Ambassador of Sustainability International Training Program". She is applying all of her academic knowledge by working as a project assistant internship role at E-Guard Environmental Service, in which responsibilities include assisting senior project associates in researching and gathering information, especially for the physical and biological environmental impacts and mitigation for environmental reports.

U Khin Zaw Min (Surveyor)

U Khin Zaw Min specializes in instrumentation and field data collection of environmental condition of the site and measuring of environmental baseline data. He has experiences at onsite data collection of many projects, since 2014 to present.

The full address of the company conducting this EMP report is as followed.

E Guard Environmental Services Co., Ltd.
No. (145, A2-3), Thiri Mingalar Street, Ward No. (4),
Mayangone Township, 11062, Yangon.
Tel: +95 1 9667757,
Fax: (+95)1 9667757
E-mail: info@eguardservices.com
URL: www.eguardservices.com

5. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

We, Myanmar Satoketayar Solar Power Co., Ltd. had made commitment that this report is strongly prepared by following the related existing Laws and Rules including EIA Procedure and mitigation measures already stated in this Environmental Management Plan (EMP) report for the proposed 30 MW Ground Mounted Solar Power Plant Project Connected to Satoketayar Substation. Moreover, we also committed to operate the proposed project by following the plans and mitigation measures stated in this EMP report.

We, E Guard Environmental Services Co., Ltd. had also made commitment to follow and compliance with the related existing Laws, Environmental Conservation Law, Rules, Environmental Impact Assessment Procedure, National Environmental (Quality) Emission Guidelines, Standards and Mitigation Measures stated in this Environmental Management Plan (EMP) report for the proposed 30 MW Ground Mounted Solar Power Plant Project Connected to Satoketayar Substation operated by Myanmar Satoketayar Solar Power Co., Ltd.

The National Laws and Regulations for the Environmental Protection applicable to the proposed project are described as followings.

1. The Environmental Conservation Law (2012)
2. The Environmental Conservation Rule (2014)
3. Environmental Impact Assessment Procedure (2015)
4. National Environmental Quality (Emission) Guidelines (2015)
5. Myanmar National Environmental Policy (2019)
6. Myanmar Climate Change Policy (2019)
7. National Land Use Policy (2016)
8. Myanmar Investment Law (2016)
9. Foreign Investment Rules (2013)
10. The Law Amending The Prevention and Control of Communicable Disease Law (2011)
11. Prevention of Hazards from Chemical and Related Substances Law (2013)
12. The Control of Smoking and Consumption of Tobacco Product Law (2006)
13. Myanmar Fire Brigade Law (2015)
14. Motor Vehicles Safety and Management Law (2020)
15. The Myanmar Insurance Law (1993)
16. The Public Health Law (1972)
17. Labour Organization Law (2011)
18. Settlement of Labour Dispute Law (2012)
19. The Development of Employment and Skill Law (2013)
20. The Minimum Wages Law (2013)
21. The Payment of Wages Law (2016)
22. Workmen's Compensation Act (1923)
23. The Leaves and Holiday Act (1951)
24. Social Security Law (2012)
25. Occupational Safety and Health Law (2019)

26. The Rights of National Races Law (2015)
27. The Petrol and Petroleum Product Law (2017)
28. Forest Law (2018)
29. Freshwater Fisheries Law (1991)
30. The Underground Water Act (1930)
31. The Electricity Law (2014)
32. The Farm Land Law (2012)
33. Natural Disaster Management Law (2013)

(1) The Environmental Conservation Law (2012)

Purpose: To construct a healthy and clean environment and to conserve natural and cultural heritage for the benefit of present and future generations; to maintain the sustainable development through effective management of natural resources and to enable to promote international, regional and bilateral cooperation in the matters of environmental conservation.

- The project proponent has to pay the compensation for damages if the project will cause injuries to environment, under the sub-section (o) of section 7 of said law.
- The project proponent has to purify, emit, dispose and keep the polluted materials in line with the stipulated standards, under section 14 of said law
- The project proponent has to install or use the apparatus, which can control or help to reduce, manage, control or monitor the impacts on the environment, under section 15 of said law.
- The project proponent has to allow relevant governmental organization or department to inspect whether performing is conformity with the terms and condition included in prior permission, issued by the ministry, or not, under section 24 of said law.
- The project proponent has to comply with the terms and conditions included in prior permission, under section25 of said law.
- The project proponent has to abide by the stipulations included in the rules, regulation, by-law, order, notification and procedure issued by said law, under section 29.

(2) The Environmental Conservation Rule (2014)

- The project proponent has to avoid emit, discharge, or dispose, direct to discharge or dispose the materials which can pollute to environment, or hazardous waste or hazardous material prescribed by notification in the place where directly or indirectly injure to public, under sub- rule (a) of rule 69.
- The project proponent has to avoid performing to damage to ecosystem and the environment generated by said ecosystem, under sub-rule (b) of rule 69.

(3) Environmental Impact Assessment Procedure (2015)

- The project proponent has to be liable for all adverse impacts caused by doing or omitting of project owner or contractor, sub-contractor, officer, employee, representative or consultant who is appointed or hired to perform on behalf of project owner, under sub-paragraph (a) of paragraph 102.
- The project proponent has to support, after consultation with effected persons by project, relevant governmental organization, governmental department and other related persons to resettlement and rehabilitation for livelihood until the effected persons by the project receiving the stable socio-economy, which is not lower than the status in pre-project, under sub-paragraph (b) of paragraph 102.
- The project proponent has to implement fully all commitments of project and conditions included in EMP. Moreover, the project proponent has to be liable for contractor and sub-contractor who perform on behalf of him/her have to fully abide by the relevant laws, rules, this procedure, EMP and all conditions, under paragraph 103.
- The project proponent has to be liable and fully & effectively implement all requirements included in ECC, relevant laws and rules, this procedure and standards under rule 104.
- The project proponent has to inform the completed information, after specifying the adverse impacts caused by the project, from time to time, under paragraph 105.
- The project proponent has to continuously monitor all adverse impacts in the pre-construction phrase, construction phrase, operation phrase, suspension phrase, closure phrase and post-closure phrase, moreover has to implement the EMP with abiding the all conditions included in ECC, relevant laws & rules and this procedure, under paragraph 106.
- The project proponent has to submit, as soon as possible, the failures of his or her responsibility, other implementation, ECC or EMP. If dangerous impact caused by this failure or failure should be known by the Ministry the project proponent has to submit within 24 hours and other than this situation has to submit within 7 days from knowing it, under paragraph 107.
- The project proponent has to submit the monitoring report semiannually prescribed time by Ministry in line with the schedule of EMP, under paragraph 108.
- The project proponent has to prepare the monitoring report in accord with the rule 109.
- The project proponent has to show this monitoring report in public place such as library, hall and website and office of project for the purpose to know this report by public within 10 days from the date, which the report is submitted to the Ministry. Moreover, has to give the copy of this report, by email or other way which way agreed with the asked person, to any asked person or organization, under paragraph 110.

- The project proponent has to allow inspector to enter and inspect in working time and if it is needed by Ministry has to allow inspector to enter and inspect in the office and work place of project and other work place related to this project in any time, under paragraph 113.
- The project proponent has to allow inspector to immediately enter and inspect in any time if it is emergency or failure to implement the requirements related to social or environment or caused to it, under paragraph 115.
- The project proponent has to allow inspector to inspect the contractor and sub-contractor who implements on behalf of project, under paragraph 117.

(4) Nation Environmental Quality (Emission) Guidelines (2015)

- The project proponent has to emit, discharge (or) dispose anything in line with the standards stipulated in said guideline.

(5) Myanmar National Environmental Policy (2019)

Mission: To achieve a clean environment, with healthy and functioning ecosystems, that ensures inclusive development and wellbeing for all people in Myanmar.

Vision: To establish national environmental policy principles for guiding environmental protection and sustainable development and for mainstreaming environmental considerations into all policies, laws, regulations, plans, strategies, programs and projects in Myanmar.

(6) Myanmar Climate Change Policy (2019)

Vision: To be a climate-resilient, low carbon society that is sustainable, prosperous and inclusive, for the wellbeing of present and future generations.

Purpose: To create and maximize opportunities for sustainable, low carbon, climate resilient development, ensuring benefits for all.

(7) National Land Use Policy (2016)

Objectives:

- To promote sustainable land use management and protection of cultural heritage areas, environment, and natural resources in the interest of all people in the country;
- To strengthen land tenure security for the livelihood's improvement and food security of all people in both urban and rural areas of the country;
- To recognize and protect customary land tenure rights and procedures of the ethnic nationalities;
- To develop transparent, fair, affordable and independent dispute resolution mechanisms in accordance with the rule of law;

- To promote people centered development in land resources and accountable land use administration in order to support the equitable economic development of the country;
- To develop a National Land Law in order to implement the above objectives of the National Land Use Policy.

(8) Myanmar Investment Law (2016)

Purpose: To ensure the appointing of employees, fulfilling the rights of employees, avoiding any injury to environment, social and cultural heritage, insure the prescribed insurance in line with the above law. This law focuses as follows,

- The project proponent has to register the land lease contract at the specific registration office, under sub-section (d) of section 51 of said law. (if the land lease contract is needed)
- The project proponent has to appoint the nationalities in the various levels of administrative, technical and expert work by the arrangement to develop their expertise, in line with the sub-section (b) of section51of said law.
- The project proponent has to appoint the nationalities only in normal work without expertise, in line with the sub-section (c) of section51of said law.
- The project proponent has to appoint either foreigner or nationality with the appointment agreement in accord with the law, in line with the sub-section (d) of section51of said law.
- The project proponent has to comply with the international best practices, existing laws, rules and procedures to not damage, pollute, and injure to environment, cultural heritage and social, in line with the sub-section (g) of section65of said law.
- The project proponent has to close the project after paying the compensation to the employees in accord with the existing laws if violates the appointment agreement or terminate, transfer or suspend the investment or reduce the number of employees, in line with the sub-section (i) of section65of said law.
- The project proponent has to pay the wages or salary to the employees in accord with the laws, rules, order and procedures in the suspension period, in line with the sub-section (j) of section65of said law.
- The project proponent has to pay the compensation or injured fees to the respected employees or their inheritors if injury in or loss of part of body or death caused by work, in line with the sub-section (k) of section 65of said law.
- The project proponent has to stipulate the foreign employees to respect the culture and custom and abide by the existing laws, rules, orders, directives, in line with the sub-section (l) of section65of said law.
- The project proponent has to abide by labor laws, in line with the sub-section (m) of section65of said law.

- The project proponent has to pay the compensation to the injured person for damages if damages of environment or socio-economy are occurred by misuse of project, in line with the sub-section (o) of section 65of said law.
- The project proponent has to allow to inspect in anywhere of project if Myanmar Investment Commission inform to inspect the project, in line with the sub-section (p) of section 65 of said law.
- The project proponent has to obtain the permission of MIC before EIA process and report this process to MIC, in line with the sub-section (q) of section 65 of said law.
- The project proponent has to insure the prescribed insurance by rules, under section 73 of said law.

(8) Foreign Investment Rules (2013)

The promoter or investor shall:

- comply with Environmental Protection Law in dealing with environmental protection matters related to the business;
- shall carry out socially responsible investment in the interest of the Union and its people;
- shall co-operate with authorities for occasional or mandatory inspection;
- shall exercise due diligence to be in conformity and harmony with norms and standards prescribed by relevant Union Ministry in conducting construction of factories, workshops, buildings, and other activities;
- shall enforce Safety and Health under rule 54 of said rule.

(9) The Law Amending the Prevention and Control of Communicable Diseases Law (2011)

Purpose: To ensure the healthy work environment and prevention the communicable diseases by the cooperation with the relevant health department.

- The project proponent has to build the housing in line with the health standards, distribute the healthful drinking water & using water and arrange to systematically discharge the garbage and sewage, under clause (9) of sub-section (a) of section 3 of said law.
- The project proponent has to abide by any instruction or stipulation by Department of health and Ministry of Health, under section 4 of said law.
- The project proponent has to inform promptly to the nearest health department or hospital if the following are occurred; (under section 9)
- Mass death of animals included in birds or chicken;
- Mass death of mouse;
- Suspense of occurring of communicable disease or occurring of communicable disease;
- Occurring of communicable disease, this must be informed.
- The project proponent has to allow any inspection, anytime, anywhere if it is need to inspect by health officer, under section 11 of said law.

(10) Prevention of Hazards from Chemical and Related Substances Law (2013)

Purpose: To ensure to use the hazardous chemical and related substances safely and safety for the employees. Moreover, safety in carrying the hazardous chemical and related substances and storage place of it. If it is needed to train how to use the safety dresses, which provided to the employees with free of charges. Insure to compensate for injury to person or damage to environment. The project has to be inspected for safety use of hazardous chemical and related substances before starting the project.

- The project owner will be inspected for the safety and resistance of the machinery and equipment by the respective Supervisory Board and Board of Inspection before starting the business under sub-section (a) of section 15 of said law.
- The project owner will assign the employees, who will serve with the hazardous chemical and substances, to attend the trainings on prevention of hazardous chemical and substances in local or abroad under sub-section (b) of section 15 of said law.
- The project owner will abide by the conditions included in the license under sub-section (a) of section 16 of said law.
- The project owner will abide by and assign to the employees who serve in this work to abide by the instructions for safety in using the hazardous chemical and related substances under sub-section (b) of section 16 of said law.
- The project owner will arrange the enough safety equipment in the work place and provide the safety dresses to the employees who serve in this work with free of charge under sub-section (c) of section 16 of said law.
- The project owner will train, in work place my arrangement, the know how to use the occupational safety equipment, personal protection equipment and safety dresses systemically in the work place under sub-section (d) of section 16 of said law.
- The project owner will allow the receptive Supervisory Board and Board of Inspection to inspect whether the hazard may be injured to health of human, animal, or damaged to environment under sub-section (e) of section 16 of said law.
- The project owner will assign the healthy employees who have obtained the recommendation that is fit for this work after taken medical check- up and keep systematically the medical records of employees under sub-section (f) of section 16 of said law.
- The project owner will inform the copy of storage permission for hazardous chemical and related substances to the relevant township administrative office under sub-section (g) of section 16 of said law.
- The project owner will obtain the approval with instructions of relevant fire force before starting the work if the project will use the fire hazard substances or explosive substances under sub-section (h) of section 16 of said law.
- The project owner will transport only the limited amount of the chemical and related substance in accord with the prescribed stipulations in local transportation under sub-section (i) of section 16 of said law.

- The project owner will insure, in accord with the stipulations, to pay the compensation if the project cause injury to person or animals or damage to environment under section 17 of said law.
- The project owner will abide by the conditions included in the registration certificate. Moreover will abide by the orders and directives issued by the Central Supervisory Board from time to time under section 22 of said law.
- The project owner will classify the level of hazard to protect it in advance according to the properties of chemical and related substances under sub-section (a) of section 27 of said law.
- The project owner will provide the safety equipment, personal protection equipment to protect and reduce the accident and assign to attend the training to use the equipment systematically under sub-section (c) of section 27 of said law.
- The project proponent has to abide any regulation contained in license and any regulation contained in license and any regulation contained in certificate under section 30 of said law.

(11) The Control of Smoking and Consumption of Tobacco Product Law (2006)

Purpose: To ensure the creation of smoking area and non-smoking area in the power plant area for health and control of smoking.

- The project proponent has to keep the caption and mark referring that is non- smoking area in the project area under sub-section (a) of section 9 of said law.
- The project proponent has to arrange the specific place for smoking in the project area, keep the caption and mark in accordance with the stipulations under sub-section (b) of section 9 of said law.
- The project proponent has to supervise and carry out the measures so that no one shall smoke at the non-smoking area under sub-section (c) of section 9 of said law.
- The project proponent has to allow the inspection of supervisory body in the power plant area, under sub-section (d) of section 9 of said law.

(12) Myanmar Fire Brigade Law (2015)

Purpose: To ensure to prevent the fire, to provide the precautionary material and apparatuses, if the fire caused in the project area to be defeated because the project is business in which electricity and any inflammable materials such as petroleum are used. Therefore, the project owner has to institute the specific fire service in line with the above law. This law focuses the following

- The project proponent has to institute the specific fire services if it is needed, under sub-section (a) of section 25.
- The project owner has to provide materials and apparatuses for fire precaution and prevention, Sub-section (b) of section 25.

(13) Motor Vehicles Safety and Management Law (2020)

Purpose: When the construction period and if it is needed in operation and production period for the all vehicles.

- The project proponent has to comply with the restrictions and restrictions on the use of domestic vehicles by the Ministry of Transport and Communications with the approval of the Union Government under sub-section (a) of section 9 of said law.
- The project proponent has to comply with safety, environmental regulation, standards and regulations regarding the initial registration of vehicles issued by the Ministry under sub-section (c) of section 12 of said law.
- The project proponent has to drive at the speed limit set by the Road Transport Directorate to ensure the safe movement of vehicles on public roads under sub-section under sub-section (r) of section 14 of said law.
- The project proponent has to maintain the vehicles in accordance with the standards set by the Department so that it can be driven safely under sub-section (a) of section 18 of said law.
- The project proponent has not to carry or transport hazardous materials in public places in accordance with the regulations under sub-section (g) of section 81 of said law.

(14) The Myanmar Insurance Law (1993)

Purpose: The project can cause the damages to the environment and injuries to public so to ensure the needed insurances are insured at Myanma Insurance. This law focuses the following matters;

- If the project proponent uses the owned vehicles, the project owner has to insure the insurance for injured person under section 15 of said law.
- The project proponent has to insure the insurance to compensate for general damages because the project may cause the damages to the environment and injury to public under section 16 of said law.

(15) The Public Health Law (1972)

Purpose: To ensure the public health include not only employees but also resident people and cooperation with the authorized person or organization of health department. The project owner will cooperate with the authorized person or organization in line with the section 3 and 5 of said law.

Section 3 - The project proponent has to abide by any instruction or stipulation for public health.

Section 5 - The project proponent has to allow any inspection, anytime, anywhere if it is needed.

(16) Labour Organization Law (2011)

Purpose: To ensure protection the rights of the employees, having the good relationships between the employees and employer and enabling to form and carry out the labour organizations systematically and independently.

- The project owner promises to allow the labour organization, to negotiate and to settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labour laws and to summit demands to the employer and claim in accord with the relevant law if the agreement cannot be reached under section 17 of said law.
- The project proponent promises to demand the re-appointment of worker who is dismissed by the employer, without the conformity with the labour laws under section 18 of said law.
- The project proponent promises to send the representatives to the Conciliation Body in settling a dispute between the employer and the worker under section 19 of said law.
- The project proponent promises the labour organization to participate and discuss in discussing with the government, the employer and the complaining employees in respect of employee's rights or interest contained in the labour laws under section 20 of said law.
- The project proponent promises the labour organization to participate in solving the collective bargains of the employees in accord with the labour laws under section 21 of said law.
- The project proponent promises the labour organization to carry out the holding the meetings, going on strike and other collective activities in line with the procedure, regulation, by-law and directive of relevant Chief Labour Organization under section 22 of said law.

(17) Settlement of Labour Dispute Law (2012)

Purpose: To ensure negotiation and discussion between employees and project proponent, abiding the decision of Tribunal. This law focuses as follows;

- The project proponent has to not absent to negotiation within the stipulated time for complaint, under section 38 of said law.
- The project proponent has not to change the existing stipulations for employees within conducting period before Tribunal, under section 39 of said law.
- The project proponent has not to close the work without negotiation, discussion on dispute in accord with this law, decision by Tribunal, under section 40 of said law.
- The project proponent has to pay the compensation decided by Tribunal if violates any act or any omission to damage the interest of labour by reducing of product without efficient cause, under section 51 of said Law.

(18) The Development of Employment and Skill Law (2013)

Purpose: To ensure the job security and to develop the employee's skill with the fund of project owner:

- The project proponent has to appoint employees with the contract in line with the provision of section 5 of said law.
- The project proponent has to carry out the training programs with the policy of Skill Development Body to develop the employment skill of employees who is appointed or will be appointed, under section 14 of said law.
- The project proponent has to monthly pay to the fund, which is fund for development of skill of employees, not less below 0.5 percentage of the total payment to the level of worker supervisor and the workers below such level, under sub-section (a) of section 30 of said law.
- The project proponent has to promise not to deduct from the payment of employees for above-mentioned fund, under sub-section (b) of section 30 of said law.

(19) The Minimum Wages Law (2013)

Purpose: To ensure the project owner pay the wages not less than prescribed wages and notify obviously this wage in work place, moreover to be inspected.

- The project proponent has to pay the wages in line with section 12 of said law.
- The project proponent has to notify the prescribed wages obviously in work place under sub-section (a) of section 13 of said law.
- The project proponent has to record correctly the lists, schedules, documents, and wages, report these to the relevant department, and give if these are asked while inspecting, in accord with the stipulations under sub-section (b) (c) (d) of section13 of said law.
- The project proponent has to allow to be inspected by the inspector, under sub-section (d) and (e) of section 13 and section 18 of said law.
- The project proponent has to allow holiday for medical treatment if the employee' health is not fit to work, under sub-section (f) of section 13 of said law.
- The project proponent has to allow holidays without deducting from the wages if one of parents or one of family dies, under sub-section (g) of section 13 of said law.

(20) The Payment of Wages Law (2016)

Purpose; To ensure the way of payment and avoiding delay payment to the employees. This law focuses as follows;

- The project proponent has to pay the wages in accord with the section 3 and 4 of said law under section 3 and 4 of said law.

- The project proponent has to submit with the agreements of employees & reasonable ground to department if it is difficult to pay because of force majeure included in natural disaster, under section 5 of said law.
- The project proponent has to abide by the provisions of section 7 to 13 in chapter (3) in respect of deduction from wages.
- The project proponent has to pay the overtime fees, prescribed by law, to the employees who work over working hours, under section 14 of said law.

(21) Workmen's Compensation Act (1923)

Purpose: To ensure the compensations to injured employee while implementing in line with the above law and pay the prescribed compensations in various kinds of injury. This law focuses as follow;

Section 13 -The project proponent has to pay the compensation in line with the provisions of said law base on kind of injury and case-by-case.

(22) The Leaves and Holiday Act (1951)

Purpose: The employees can take the leaves and get the holidays legally and to ensure the right to get the holidays and leaves. This law focuses the following matters;

- The project proponent has to allow the leaves and holidays in line with the law.

(23) Social Security Law (2012)

Purpose: The project proponent has to create the social security for the employees because the project is the business under the Myanmar Citizen Investment Law. To ensure the social security for employees of the project, the project owner has to register to the social security offices and to pay the prescribed fund.

- The project proponent has to register to the respected social security office, under sub-section (a) of section 11 of said law
- The project proponent has to pay the social security fund for at least four types of social security included in sub-section (a) of section 15, under section 15 of said law.
- The project proponent has to pay the fund, which has to be paid myself, and together with the fund which has to be paid from their salary by the employees. Moreover, the project owner will pay the cost for paying the above-mentioned fund only myself under sub-section (b) of section 18 of said law.
- The project proponent has to pay the fund for accidence, under sub-section (b) of section 48 of said law. (but this fund is not related to workmen compensation so if it is needed compensation must be separately paid by the Workmen compensation Act)

- The project proponent has to make correctly and submit the list and record provided in section 75 to respected social security office, under section 75 of said law.

(24) Occupational Safety and Health Law (2019)

Purpose: To effectively implement measures related to safety and health in every industry and to set occupational safety and health standards.

- The project proponent has to provide adequate and relevant personal protective equipment to workers free of charge and make them wear it during work so as not to expose workers to any serious occupational diseases or hazards under sub-section (e) of section 26 of said law.
- The project proponent has to arrange and display occupational safety and health instructions, warning signs, notices, posters, and signboards under sub-section (l) of section 26 of said law.
- The worker shall wear or use at all times any protective clothes, equipment and tools provided by the employer for the purpose of safety and health under sub-section (a) of section 30 of said law.
- The worker shall proper and systematic use any equipment and tools, machines, any parts of the machines, vehicles, electricity and other substances being used at the workplace under sub-section (d) of section 30 of said law.
- The worker shall take reasonable care for the safety and health of himself/ herself and of other persons who may be affected by his/ her acts or omissions at work under sub-section (e) of section 30 of said law.

(25) The Rights of National Races Law (2015)

Purpose: To ensure that project proponent has to disclose to residents' ethnic nationalities about the project fully, moreover to ensure to cooperate with them. This law focuses the following matters;

Section 5 - The project proponent has to disclose all about the project fully to the residents who are national races.

- The project proponent has to cooperate with the residents who are national races.

(26) The Petroleum and Product of Petroleum Law (2017)

Purpose: The project will transport and store the fuel in any phrase. To ensure to take the license for importation and storage and abide by the stipulations in the license

- The project proponent has to transport the fuel by the vehicle or vessel, which is licensed by the Ministry of Transportation and Communication under sub-section (a) of section 9 of said law.

- The project proponent has to abide by the procedures and conditions specified by the Ministry of Transportation and Communication under sub-section (e) of section 9 of said law.
- The project proponent has to transport after obtaining the transportation license issued by the Ministry of Natural Resource and Environmental Conservation under sub-section (b) of section 10 of said law.
- The project proponent has to allow inspection by the Ministry of Natural Resource and Environmental Conservation under sub-section (d) of section 10 of said law.
- The project proponent has to store the fuel in the tank, which is licensed by the Ministry of Natural Resource and Environmental Conservation under sub-section (a) of section 10 of said law.
- The project proponent has to show the notice of danger on the tank or container of fuel under section 11 of said law.

(27) Forest Law (2018)

Purpose: To ensure in carrying out the project with the permission of Ministry of Natural Resources and Environmental Conservation if the project land is forestland or forest covered land. This law focuses as follow;

- The project proponent has to obtain the permission of Ministry of Natural Resources and Environmental Conservation before starting the work if the project land is forest land or forest covered under sub- section (a) of section 12

(28) Freshwater Fisheries Law (1991)

Purpose: According to the sub-section (e) of section 2 of said law, the freshwater area includes any river, creek, pond and water area so the project will be near by the river or creek which is freshwater area the safety of freshwater and aquatics. This law focuses as follow;

- The project proponent has to avoid any water pollution and disturbing to fish and other aquatic lives in any fresh-water such as river, creek under section 40 of said law.

(29) The Underground Water Act (1930)

Purpose: to ensure to obtain the licence before sinking the underground water and to abide by the conditions in licence. This law focuses as follow;

- The project owner will obtain the licence granted by the water officer for sinking the underground water before sinking water, under section 3 of said law.
- The project proponent has to abide by the conditions prescribed by rules, under sub-section (a) of section 6 of said law.

(30) The Electricity Law (2014)

- The purpose; of this law is to ensure the compliance with the conditions of permission for productions of electricity, abiding by any stipulation, implementing with the best practices and paying compensation in line with above law. It stipulated the following obligations of the project proponent:

- To implement the project with the best practices to reduce the damages on the environment, health and socio-economy, also will pay compensation for the damages and will pay the fund for environmental conservation, under sub-section (b) of section 10;
- To take the certificate of electric safety, issued by the chief-inspector, before the commencement of power generation, under section 18;
- To be liable for damages to any person or enterprise by failure to abide by the quality standards or rules, regulation, by-law, order and directive issued under said law according to sub-section (a) of section 21;
- To be liable for damages to any person or enterprise by negligence of project owner according to sub-section (a) of section 22;
- To comply with the permission for electric searching and generation, under sub-section (a) and (b) of section 26;
- To inform promptly to chief-inspector and head officer of related office while occurring of accident in electricity generation, under section 27;
- To comply with the standards, rules and procedure. Moreover, will allow the inspection by respected governmental department and organization if it is necessary, under section 40; and
- To pay the compensation to anyone who is injured or caused to death in electric shock or fire caused by the negligence or omitting of the project owner or representative of project owner, under section 68..

(31) The Farm Land Law (2012)

Purpose: To ensure the right to use the farm land and sufficient compensation for acquisition of the farm land. This law focuses the following matters;

- The project owner has to abide by the decision of relevant Ministry with the coordination with the Central Administrative Body of the Farmland for paying the compensation if it is needed acquisition farm land under section 26 of said law.
- The project proponent has to obtain the permission of the Central Administrative Body of Farmland for the land use change from paddy field land to other land use under sub section (a) of section 30 of said law.
- The project proponent has to obtain the permission of the Yangon Region Government with the recommendation of Yangon Region Administrative Body of Farmland for the land use change from farm land other than paddy field land to other land use under sub section (b) of section 30 of said law.

(32) Natural Disaster Management Law (2013)

Purpose: to implement natural disaster management programs and to coordinate with national and international organizations in carrying out natural disaster management activities; to conserve and restore the environment affected by natural disaster and to provide health, education, social and livelihood programmes in order to bring about better living conditions for victims.

- The project proponent has to perform preparatory and preventive measures for natural disaster risks reduction before the natural disaster strikes under sub section (a)(i) of section 13 of said law.
- The project proponent has to undertake rehabilitation and reconstruction activities for improving better living standard after the natural disaster strikes and conservation of the environment that has been affected by natural disaster under sub section (a)(iii) of section 13 of said law.
- The project proponent has to carry out better improvement on early warning system of natural disaster under sub section (b) of section 14 of said law.
- The project proponent has to carry out together with the measures of natural disaster risk reduction in development plans of the State under sub section (d) of section 14 of said law.
- Whoever if the natural disaster causes or is likely to be caused by any negligent act without examination or by willful action which is known that a disaster is likely to strike, shall be punished with imprisonment for a term not exceeding three years and may also be liable to fine under section 25 of said law.
- Whoever interferes, prevents, prohibits, assaults or coerces the department, organization or person assigned by this law to perform any natural disaster management shall, on conviction, be punished with imprisonment for a term not exceeding two years or with fine or with both under section 26 of said law.
- Whoever violates any prohibition contained in rules, notifications and orders issued under this law shall, on conviction, be punished with imprisonment for a term not exceeding one year or with fine or with both under section 29 of said law.
- Whoever willful failure to comply with any of the directives of the department, organization or person assigned by this law to perform any natural disaster management shall, on conviction, be punished with imprisonment for a term not exceeding one year or with fine or with both under sub section (a) of section 30 of said law.

6. DESCRIPTION OF THE SURROUNDING ENVIRONMENT

The followings are the methodologies used for analyzing surrounding condition of the proposed project.

i. **Onsite Measurements and Analysis** – Baseline environmental parameters such as wind speed, wind direction, air quality, water quality and noise level of the project were measured by using the appropriate environmental quality measuring equipment.

ii. **Secondary Data Collection and Analysis** – Some data such as socio-economic condition, physical/biological environment and weather data were collected from official township data from the General Administration Department and analyzed by the study team.

Onsite measurements are conducted by using the following environmental quality measuring equipment.

Table 6. 1 Environmental Quality Measuring Equipment

No.	Name and Model of Instrument	Purpose	Measuring Instrument
1.	Haz-Scanner EPAS	PM_{10}, PM $_{2.5}$, NO_2, CO, CO_2, SO_2, Temperature, and Relative Humidity	
2.	Digital Sound Level Meter	Noise level	
3.	Onsite Water Quality Monitor	Water Quality	

6.1 Physical Environment

6.1.1 Climate

The climate of Myanmar can be described as tropical monsoon climate. It is characterized by strong monsoon influences, has a considerable amount of sun, a high rate of rainfall, and high humidity. The annual average temperature ranges from 22°C to 27°C year-round. The climate of Satoketayar can be described as tropical climate.

Temperature and Rainfall - The proposed project site is located at Satoketayar Township, Minbu District, Magway Region. The highest temperature of Satoketayar Township is 42 °C and the lowest temperature is 13 °C. Rainfall and temperature of Satoketayar Township from 2017 to 2020 is described as followed.

No.	Year	Rainfall		Temperature	
		Rain Days	Total Rainfall (inches)	Summer (°C)	Winter (°C)
				Highest	Lowest
1	2017	75	48.03	38 °C	13 °C
2	2018	73	72.32	42 °C	18 °C
3	2019	70	44.09	42 °C	17 °C
4	2020	38	21.87	42 °C	15 °C

Source: Satoketayar Township Data (GAD, 2020)

6.1.2 Wind Speed and Wind Direction

The following figures describe the wind speed, wind direction and wind class frequency distribution of the proposed project site on 25th to 26th May 2022. According to the observed data, the wind blow from East with the highest speed of 3 m/s in the project site.

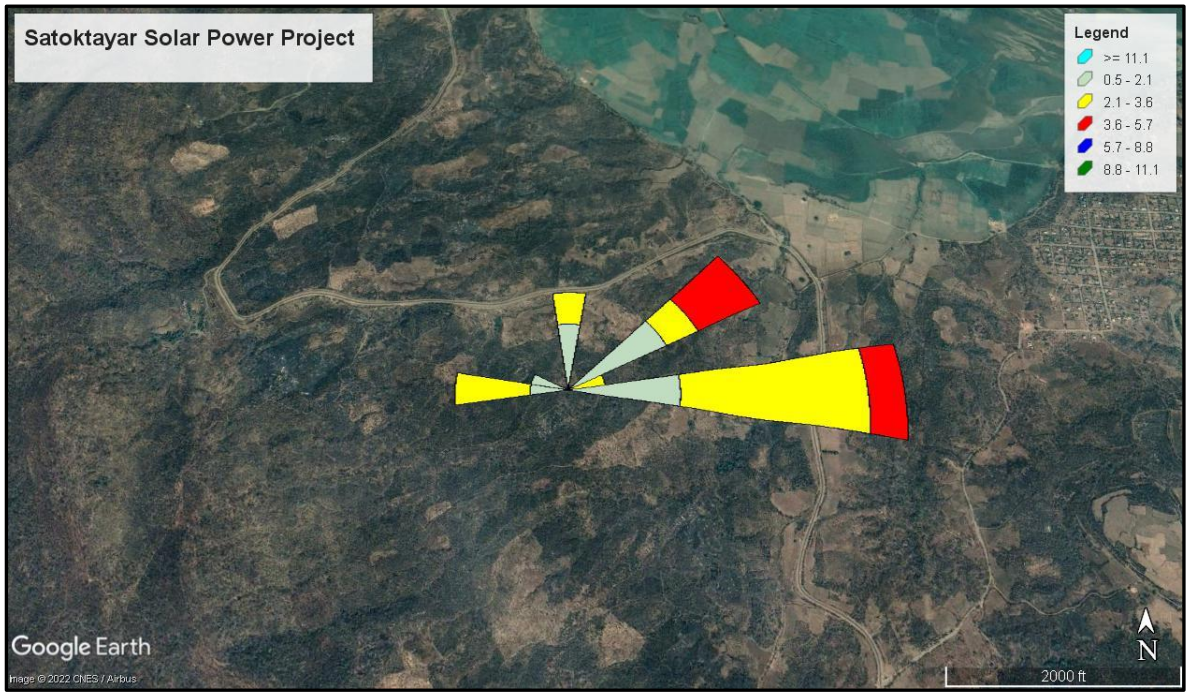


Figure 6. 1 Wind Speed and Wind Direction at Air Monitoring Point in the project site

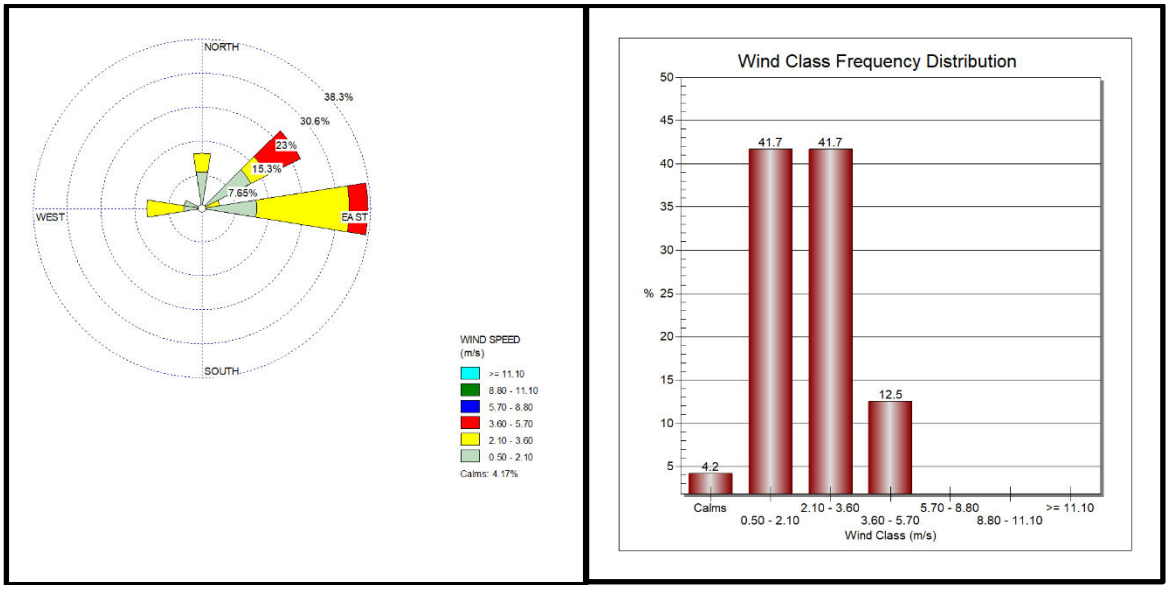


Figure 6. 2 Wind Speed Data and Wind Class Frequency Distribution at Air Monitoring Point in the project site

6.1.3 Topography

The topography of Satoketayar Township is plenty of hilly regions and plains with forest covered region and bordered with Rakhine Yoma. Nwarma hill is situated from North to South. Highly hills are situated in the Western part of the township. It is bordered with Salin and Pwint Phyu Townships at the east, NgaPe Township at the south, Ann Township from Rakhine State and KanPatLat Township from Chin State are at the west, and Saw Township at the north.

6.1.4 Hydrology

Satoketayar Township is plenty of streams and all are flow from west to east. The most famous stream, Mone Stream flows start from Chin State and flows through the township to the southeast and then flows through the Pwint Phyu Township and flowing into Ayeyarwaddy River. All of streams are fresh water and can be used drinking water and agricultural uses.

6.1.5 Earthquake Intensity

Myanmar is exposed to multiple natural hazards including cyclones, earthquakes, floods and fire and it has been periodically exposed by natural disasters. The Satoketayar Township is located close to the Sagaing Fault, which is a major tectonic structure that cuts through the center of Myanmar. The Sagaing Fault broadly divides the country into a western half moving north with the Indian Plate and an eastern half attached to the Eurasian Plate. Earthquake intensity of the area in Myanmar can be seen in the following figure.

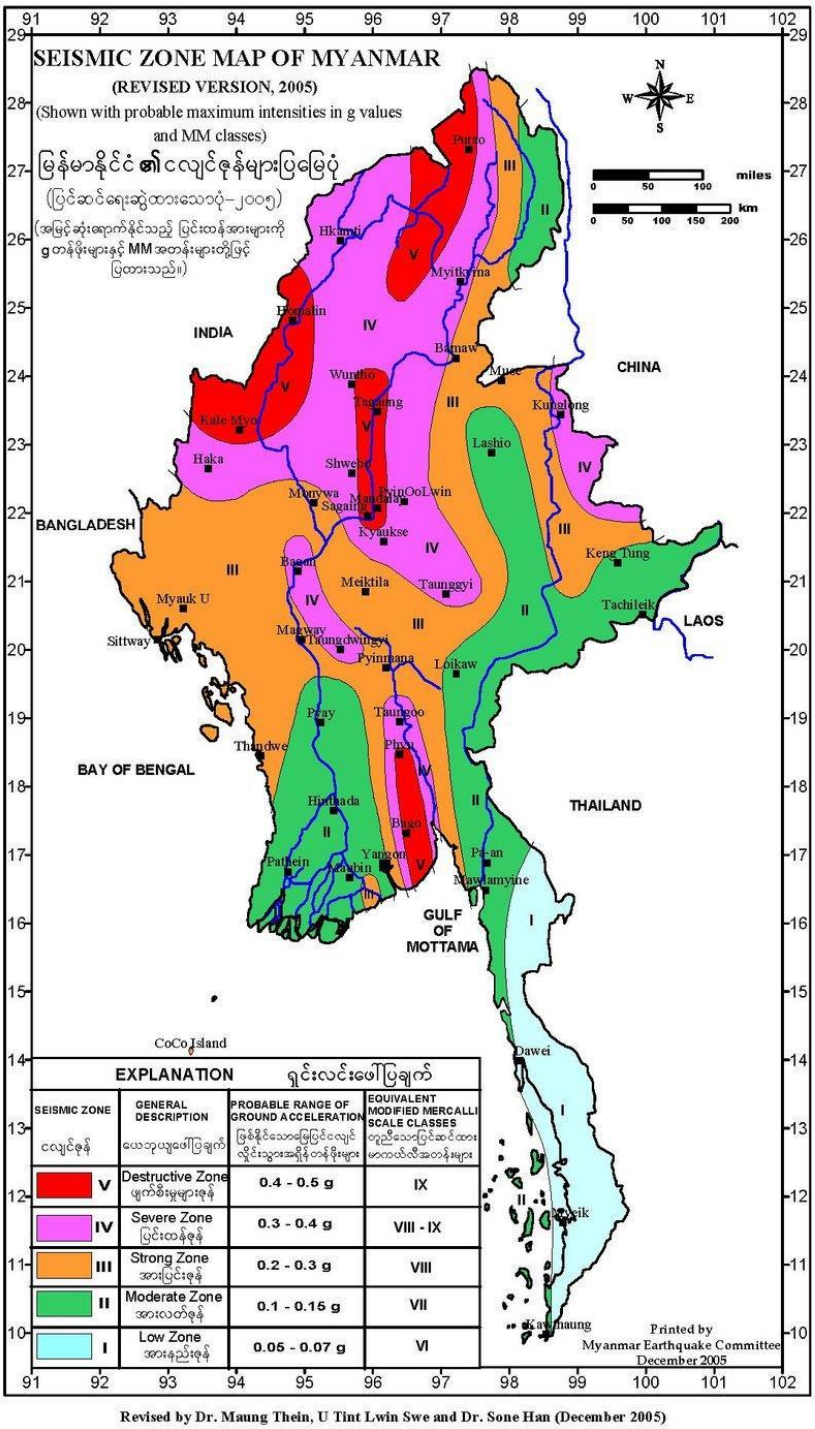


Figure 6. 3 Seismic Zone Map of Myanmar

The approach is mainly empirical and historical in the sense that it makes use of past seismic events and history to make educated predictions about region wide intensities in the future. It is hoped that a probabilistic seismic risk (or earthquake hazard map) on horizontal ground acceleration should be considered in the design. As shown in the map, five seismic zones are demarcated and named (from low to high) Zone I (Low Zone), Zone II (Moderate Zone), Zone III (Strong Zone), Zone IV (Severe Zone), and Zone V (Destructive Zone), mainly following the nomenclature of the European Macro Seismic Scale 1992.

According to this Seismic Zone Map of Myanmar, the proposed project is located within the Zone III (Strong Zone). Therefore, the project proponent shall consider all structural designs of the building and electrical equipment installation such as PV modules, inverters, box-type transformers and overhead transmission line in order to prevent earthquake risks.

6.1.6 Air Quality

The emissions of dust particles and gases were measured for 24hrs continuously at the selected sites using the Portable Haz Scanner Environmental Parameter Air Station (EPAS). The EPAS provides direct readings in real time with data logging capabilities. The following table and figure describe detail location of air quality monitoring point for the proposed project.

Table 6. 2 Location and Parameters of Air Quality Point

Date	Item	GPS Coordinates	Locations	Parameters
25.05.2022 – 26.05.2022	**Air Monitoring Point**	Lat: 20° 25' 03.46" N Long: 94° 15' 18.44" E	In the project site	**Gas Emission:** CO, CO_2, SO2, NO_2 **Dust Emission:** PM_{10}, $PM_{2.5}$

Figure 6. 4 Location of Air Quality Monitoring Point

The following figures illustrate air quality monitoring for the proposed project.

Figure 6. 5 Air Quality Monitoring in the project site

Air quality monitoring was done in the project site on 25th to 26th May 2022. The observed values of parameters are compared with National Environmental Quality (Emission) Guideline, National Ambient Air Quality Standards and American Conference of Govermental Industrial Hygienists. According to the comparison results, the observed values of the parameters are under the guideline value.

Table 6. 3Observed Values of Air Monitoring in the project site

Parameter	Observed Value	Guideline Value	Guideline	Unit	Averaging Period
SO_2	0.04	20	NEQG	µg/m^3	24 hours
NO_2	24.83	200	NEQG	µg/m^3	1 hour
CO	0.009	9	NAAQS	ppm	8 hours
CO_2	361.80	5000	ACGIH	ppm	8 hours
PM_{10}	22.91	50	NEQG	µg/m^3	24 hours
$PM_{2.5}$	10.80	25	NEQG	µg/m^3	24 hours

According to the comparison results of gaseous emissions, the observed values of SO2 (0.04 µg/m3), NO2 (24.83 µg/m3), CO (0.009 ppm) and CO2 (361.80 ppm) are lower than the respective guideline values. For dust emissions, the observed values of PM 10 (22.91 µg/m3) and PM 2.5 (10.80 µg/m3) are also within the guideline values of NEQEG. Therefore, it can be considered that the ambient air quality of the proposed project is quite good during the construction of the project. It is anticipated that ambient air quality will be decreased during the operation phase of the proposed project because of no construction activities. The following figures describe detail air quality monitoring results for 24 hours continuously at the proposed project.

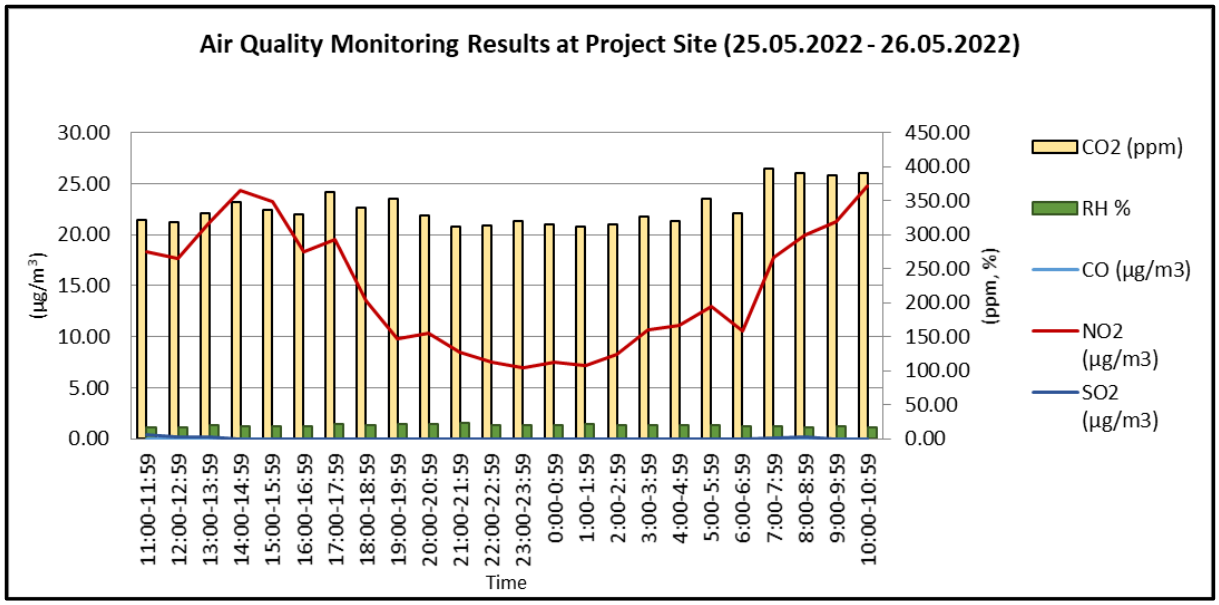


Figure 6. 6 Air Quality (NO2, SO2, CO2, CO and RH) Monitoring Result in the project site

According to the results of gaseous emissions, the emission level of NO_2 increased significantly between 10:00 and 14:00. However, steady emission level SO_2, CO and CO_2 are found during 24 hours continuously.

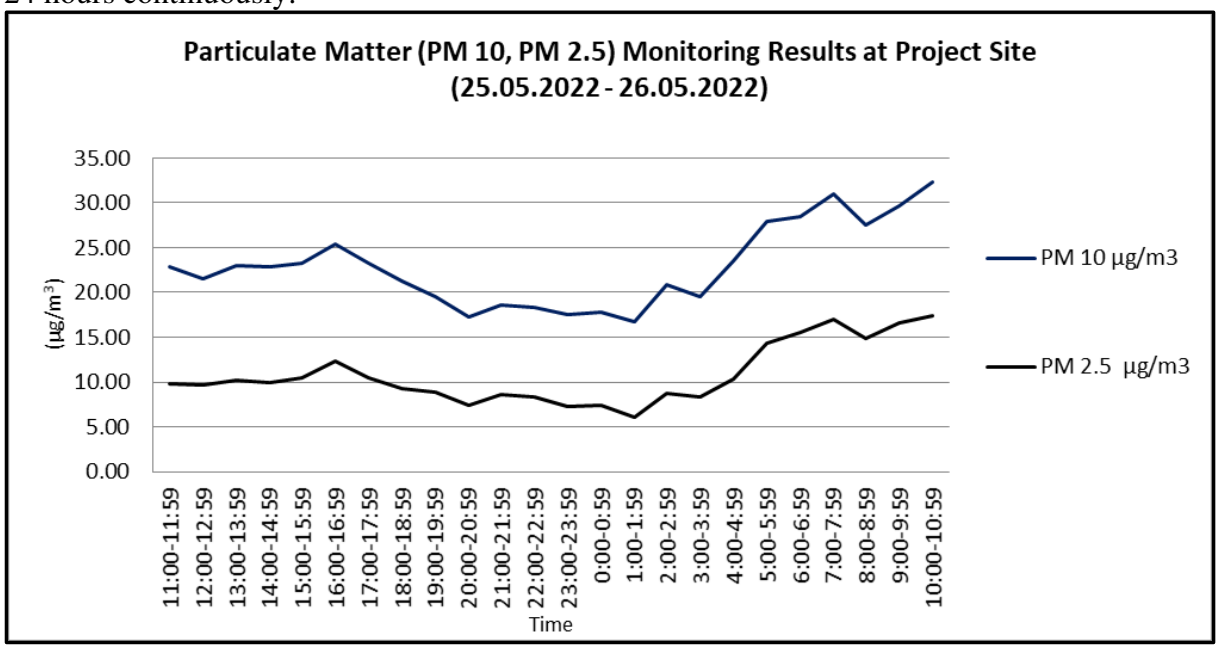


Figure 6. 7 Detailed Dust Emissions Monitoring Results

According to the results of dust emissions, dust generation of both PM_{10} and $PM_{2.5}$ decreased significantly at 1:00 and increased significantly at 7:00.

6.1.7 Noise Level

Noise level LAeq (dBA) was measured at the selected locations on 25th to 26th May 2022. Duration and frequency were measured for 24 hrs continuously at the selected sites using the

digital sound level meters. Noise and vibration levels were measured at the same time with air quality measurement. Measurement range of noise level measuring meter is 20-130 dBA. The environmental noise quality was recorded at every 1 minute for 24 hours.

Table 6. 4Locations and Parameters of Noise and Vibration Points

Item	GPS Coordinates	Locations	Parameters
Noise Point 1	Lat: 20° 25' 03.48" N Long: 94° 15' 18.45" E	In the project site (Source)	Noise: (LAeq (dB (A)) 1hr interval for 24 hours) Vibration: (Lveq (dB) 1hr interval for *24 hours)*
Noise Point 2	Lat: 20° 25' 18.57" N Long: 94° 16' 30.49" E	At Myay Ni Gone Village (Receptor)	

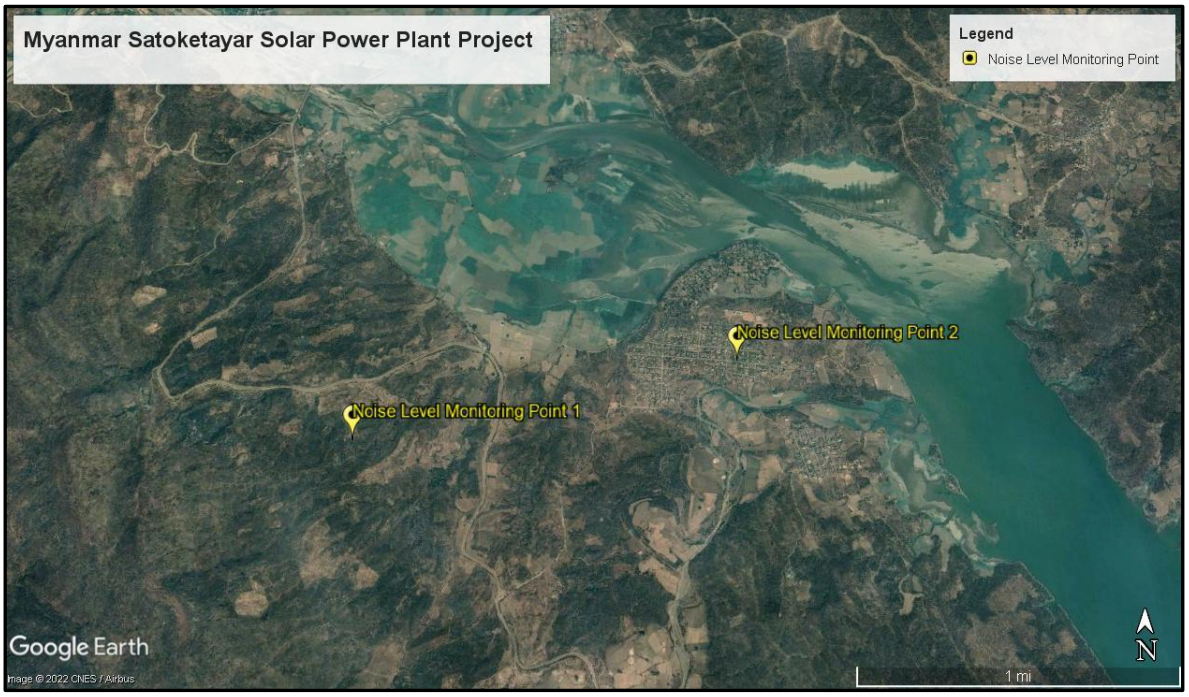


Figure 6. 8 Locations of Noise Level Monitoring

Figure 6. 9 Noise Level Monitoring at Source and Receptor of the Proposed Project

Hourly averaged noise levels in energy weighted values of day and night time average are shown in Table below. The level results are compared with Environmental Quality Emission Guidelines (NEQG) Myanmar.

Table 6. 5Comparison of the noise results and the standard guidelines

Location	Measured Values (dB (A))	
	Day Time (07:00-22:00)	Night Time (22:00-7:00)
Point 1	60.48	52.75
Point 2	52.57	44.19
Noise Level Standards from National Environmental Quality (Emission) Guideline		
Standard Value (NEQG) for industrial, commercial	70	70
Standard Value (NEQG) for residential	55	45

As the proposed project is located at residential area, standard values for noise level at day time is considered as 55 dBA and at night time is 45 dBA. With regards to noise level at source, the results are higher than standard value not only at day time (60.48 dBA) but also at night time (52.75 dBA). With regards to noise level at receptor, the results are lower than standard value not only at day time (52.57dBA) but also at night time (44.19 dBA). Therefore, it can be considered that the noise level (source) at the proposed project is not within the guideline value of NEQEG it is increased during the construction phase of the proposed project because of construction activities implementation. The following figures illustrate detail noise level at source and receptor of the proposed project.

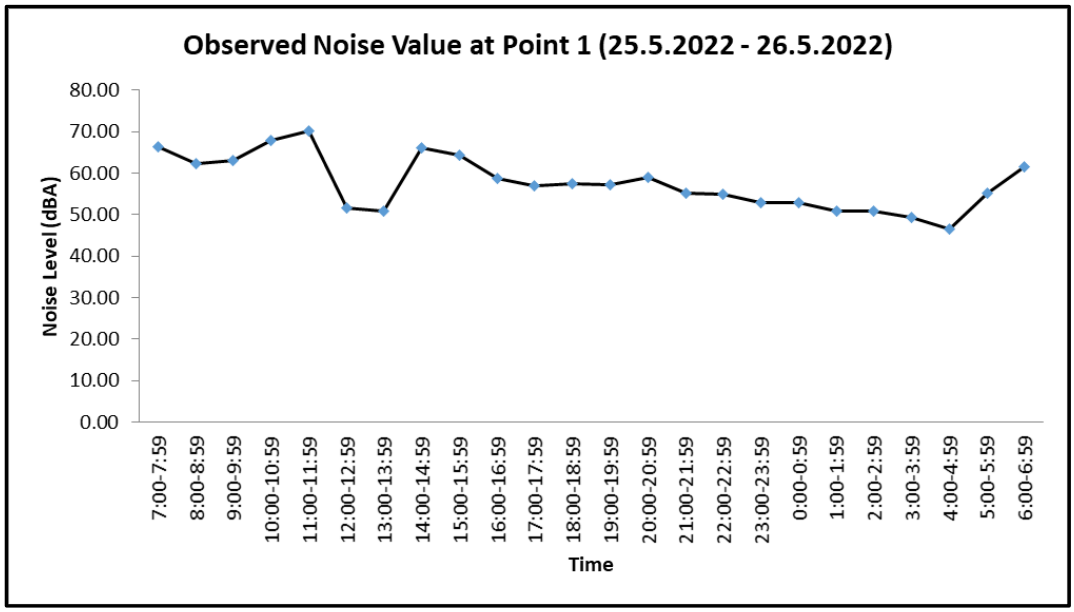


Figure 6. 10 Day Time and Night Time Noise Data at Point 1 (25.5.2022 - 26.5.2022)

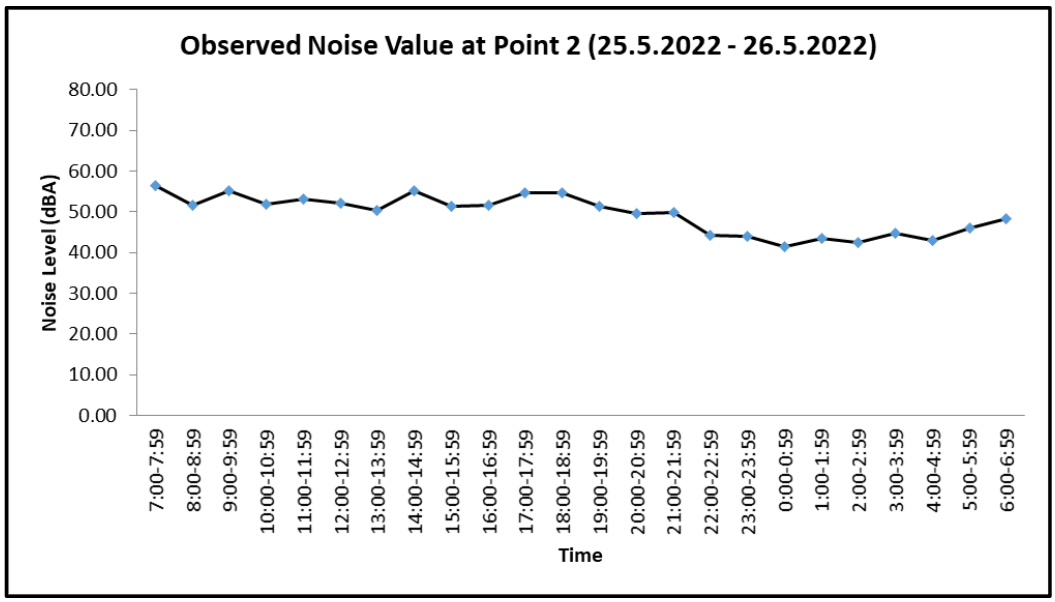


Figure 6. 11 Day Time and Night Time Noise Data at Point 2 (25.5.2022 - 26.5.2022)

According to the results of noise level at source, peak level of noise generation was found between 11:00, 14:00 and 6:00. There was no peak level of noise generation at receptor.

6.1.8 Water Quality

The water supply for the proposed project will be taken from tube wells within the project site but it still digging and can't get pure water. Therefore, water is taken from the Mone stream for construction uses by pumping system. Hence, E Guard Survey Team chose one temporary water tank in the in the project for surface water quality measurement. The existing surface water quality from that temporary water tank was tested by two methods: onsite measurement and sampling water in order to compare the difference between quality of the surface water before and after implementation of the project. Moreover, there is no effluent water discharge from the project, therefore, water quality measurement for surface water and effluent water were not carried out. The survey team from E Guard sampled surface water on 26th May, 2022 and sent to respective laboratories for measuring the required parameters. National Environmental Quality (Emissions) Guideline is used to compare for data interpretation. The baseline data of surface water quality comparing with NEQG are described in the following table. Water quality results from laboratories test and on-site measurement are attached in **Appendix 7**.

On-site water quality measurements were conducted using HORIBA U-50, Multipara meter Water Quality Meter. Water samples were collected using appropriate sampling equipment and procedures. The sampling team has pre-arranged with the labs in Yangon for analysis and logistic arrangement made to reach the preserved samples with unique IDs to the designated labs within 48hrs.

The following laboratories were used for analysis of sampled water.

1. ISO Lab, No-18, Lanthit Road, Insein Township, Yangon. Tel; 01 540 955, 732251575
2. SGS (Myanmar) Limited, Mineral Services, 79/D, Bo Chein Street, 6 ½ Mile, Hlaing Township, Yangon, Myanmar. Tel; +95(1) 654 795

Table 6. 6 Locations of Surface Water Quality Sampling Points

Item	GPS Coordinates	Location	Parameters
Surface Water Quality Sampling Point	Lat: 20° 25' 06.22"N Long: 94° 15' 17.03"E	In the project site	Biochemical Oxygen Demand, Chemical Oxygen Demand, pH, EC, Total Dissolved Solid, Salinity, Dissolved Oxygen, Turbidity, Total Suspended Solid, Total Phosphorus, Total Nitrogen, Total Coliform Count, Oil & Grease, Potassium

Figure 6. 12 Location of Surface Water Quality Onsite Measuring and Sample Taking Point


Figure 6. 13 On Site Surface Water Quality Measurement and Surface Water Sample Taking

The results of the observed parameters are compared with National Environmental Quality (Emission) Guideline. The results of both onsite water and surface water are under the guideline limit.

Table 6. 7 Results of On Site Water Quality Measurement

Location	pH	Electrical Conductivity			DO (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (ORP)	Depth (ft)
		EC (ms/cm)	TDS (g/l)	Salinity (ppt)				
Surface Water	7.1	0.02	0.15	0.1	5.48	25.3	412	-

Table 6. 8 Comparison of Lab Results and National Emission Quality (Emission) Guideline

Item	Unit	Surface Water	National Environmental Quality (Emission) Guideline
Biological Oxygen Demand (BOD)	mg/l	8	30
Chemical Oxygen Demand (COD)	mg/l	32	125
Chromium	mg/l	<0.1	-
Total Nitrogen	mg/l	<1	10
Total Phosphorus	mg/l	0.014	2
Potassium	mg/l	0.99	-
Oil and Grease	mg/l	<5	10
Total suspended solid (TSS)	mg/l	32	50
Total coliform bacteria	CFU/100ml	22	400

6.1.9 Soil Quality

Top Soil and Bottom Soil from the project site are collected to know the quality and condition of the soil in the site. Soil samples were collected using appropriate sampling equipment and procedures.

The location where the soil sample was collected has already been cleared for project site. The site used to have bamboos. Collected soils sample are visually verified with soil classification map of Magway Division which is shown in the figure below. The color of top soil sample is dark red brown and sub soil is light brown color. The texture of the soils is medium to heavy loamy and the top soil contain moderate to high amount of plant available nutrients.

Soil types mostly found in Setoketaya Township are red brown forest and yellow brown forest soils. The project site has yellow brown soil and closely connected with the Red Brown Forest soils in their distribution and usually replacing them down the slope. They mainly occur in the region of gentle slopes of low hills and foot hills at the elevation of 300 to 1500 feet above sea level.

These are typical for the monsoon or tropical mixed deciduous forests and contain more percentage of clay and humus than the Red Brown Forest soils. The soil is slightly acid with the pH value ranging from 5.0 to 6.0 and has moderate porosity and the water holding capacity is 20 to 30 %. The majority of these soils are classified as good garden lands and suitable for are rubber, oil palm and orchards.

Figure 6. 14 Getting Soil Sampling within site area

Table 6. 9 Locations of Top Soil and Bottom Soil Sample Taking Points

Item	GPS Coordinates	Locations
Top Soil Sample Taking Point	Lat: 20° 25' 03.76" N Long: 94° 15' 19.76" E	In the project site
Bottom Soil Sample Taking Point	Lat: 20° 25' 03.70" N Long: 94° 15' 19.64" E	In the project site

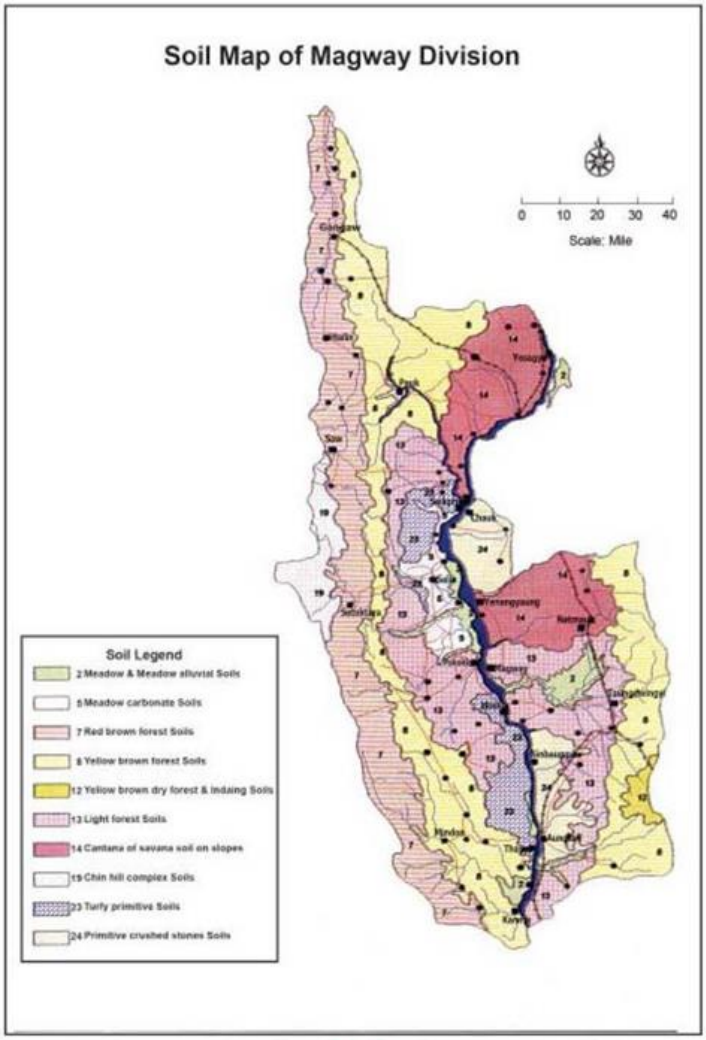


Figure 6. 15 Soil Map of Magway Division

6.2 Biological Environment

Flora and Fauna

As the proposed project site is located in vacant land and the existing of biological resources; not only terrestrial but also aquatic are rare conditions and only bushes and small trees are found. In addition, there are no forests, protected areas and coastal resources within the proposed project area as well as the route of overhead transmission line, similarly. However, Satoketayar has 76.64% of forest cover and among them, Reserved Forest cover is 64.53% and Protected Public Forest cover is 12.11%.

Table 6. 10 Biological Environment of the Proposed Project

Biological Resources	Existing Conditions
Fisheries and aquatic biology	No fisheries and aquatic biology existing within the scope of the study
Wildlife	No wildlife existing within the scope of the study

Biological Resources	Existing Conditions
Natural Vegetation	Only bushes and small trees are found within the scope of the study
Rare or endangered species	No rare or endangered species existing within the scope of the study
Protected areas	No protected areas existing within the scope of the study
Coastal resources	No coastal resources existing within the scope of the study

Source: Satoketayar Township Data (GAD, 2020)

6.3 Socio-Economic Environment

6.3.1 Demographic Profile

The following table describes the number of houses, households, quarter, village tracts and villages in Satoketayar Township.

Table 6. 11 Administrative Structure of Satoketayar Township

No.	Subject	Houses	Households	Quarters	Village Tracts	Villages
1.	Urban	1,663	1,613	2	-	-
2.	Rural	9,414	9,394	-	46	113
Total		**11,077**	**11,007**	**2**	**46**	**113**

Source: Satoketayar Township Data (GAD, 2020)

The detail population status of Satoketayar Township is described in the following table.

Table 6. 12 Population Status of Satoketayar Township

No.	Subject	Male	Female	Total
1.	Urban	2,599	3,263	5,862
2.	Rural	19,571	20,756	40,327
Total		**22,170**	**24,019**	**46,189**

Source: Satoketayar Township Data (GAD, 2020)

The detail number of ethnic people who live in Satoketayar Township is described in the following table.

Table 6. 13 Ethnic Status of Satoketayar Township

No.	Ethnic	Number of Ethnic People	Total Population in Township	Percentage of Total Population
1.	Kachin	-	-	-
2.	Kayah	-	-	-
3.	Kayin	3	46,189	0.01%
4.	Chin	24,484	46,189	53.01%
5.	Mon	4	46,189	0.01%
6.	Bamar	21,661	46,189	46.90%
7.	Rakhine	17	46,189	0.03%

8.	Shan	17	46,189	0.03%
9.	Other	3	46,189	0.01%
Total		**46,189**	**46,189**	**100%**

Source: Satoketayar Township Data (GAD, 2020)

The detail religious status of Satoketayar Township is described in the following table.

Table 6. 14 Religious Status of Satoketayar Township

No.	Religion	Number of People
1.	Buddhist	46,166
2.	Christian	10
3.	Islam	5
4.	Worship of deities	8
Total		**46,189**

Source: Satoketayar Township Data (GAD, 2020)

6.3.2 Socio-economic profile

Socio-economic profile of Satoketayar Township is summarized as the following table.

Table 6. 15 Socio-economic profile of Satoketayar Township

Socio-economic Environment	
Project site location	Satoketayar Township, Magway Region
Type of local administration	Municipality
Population	46,189
No. of housings	11,077
No. of households	11,007
Economy	Permanent Job, employee (24,896) Jobless, employee (1,905) Jobless percentage (7.11)
University	No
No. of schools	9 Pre-primary schools 1 Primary schools and 1 Post-primary school 13 Middle schools and 10 Middle school branches 8 High schools and 16 High school branches
Literacy Percentage	100% Over 15 years old (37,743)
Public health facilities	Private health care centers = 25 Public General hospital = 16
Transportation	The main transportation is occupied by roads. By bus, by cars, by bicycle, by taxi and on foot.

Source: Satoketayar Township Data (GAD, 2020)

6.3.3 Land use status

The following table describes the land use status of Satoketayar Township.

Table 6. 16 Land Use Status of Satoketayar Township

No.	Types of Land	Area (acre)
1	Net acre for plantation	19,562
	(i) Paddy land	5,619
	(ii) Farmland for crop	12,764
	(iii) Cultivated land	-
	(iv) Orchard	35
	(v) Taungya Land	1,144
2	Vacant Land Area	-
3	Pasture Land	-
4	Land for industrial zone	22,280
5	Urban	175
6	Village	1,355
7	Other lands	7,235
8	Reserved forest and protected forest area	397,099
9	Wild forest	160,941
10	Wild land	9,669
11	Non-cultivated area	74,967
Total		**693,283**

Source: Satoketayar Township Data (GAD, 2020)

6.4 Cultural and Historical Status

There are no distinct cultural features and historical site in Satoketayar Township.

7. IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES OF POTENTIAL IMPACTS

7.1 Objectives of the Study

The objectives of this study are to identify the potential impacts due to the project activities on the natural environment and human beings, to highlight the significance of impacts with assessment parameters and its scales and to formulate mitigation measures, which are to eliminate or reduce adverse potential impacts on the surrounding environment.

7.2 Phases of the Project

Potential impacts are normally differentiated into three main categories, viz., Construction phase, Operation phase and Decommissioning phase:

Construction Phase: includes construction of switchyard and multiple-use building, installation of PV modules, tracking brackets, inverters, transformers, poles of overhead transmission line and stringing cables of overhead transmission line, which will connect to the Satoketayar Substation. The construction period of the proposed project is 8 months.

Operation Phase: includes generating electricity from solar energy and distributing to the Satoketayar Substation through 66 kV overhead transmission line. The operation period of the proposed project is 20 years.

Decommissioning Phase: after operation period, the project proponent will extend the operation periods with the approval of relevant departments to generate electricity from solar energy as per Build, Own, Operate (BOO) basis. The project proponent will have prior to submission of the decommissioning plan if they have a plan to close their project permanently. Therefore, impacts identification, impacts assessment and mitigation measures formulating for decommissioning phase of the project is excluded in this Environmental Management Plan Report.

7.3 Methodology for the Assessment

The assessment of each impact is based on consideration of the magnitude, duration, extent and frequency of activities, which are going to be carried out during three phases and characteristics of the project site. The significance of potential environmental impacts identified during the basic assessment by using a ranking scale. The significance of each impact is classified into five categories.

The following methodology was applied to assess the environmental impacts of the project mainly on air, water, soil, biodiversity including human beings and wastes generation. Each source of impact was assessed by four parameters, magnitude, duration, extent and probability and each assess have five scales as mentioned below:

Table 7. 1 Impact Assessment Parameters and Its Scale

Assessment	Scale				
	1	2	3	4	5
Magnitude (M)	Insignificant	Small and will have no effect on working environment	Moderate and will result in minor changes on working environment	High and will result in significant changes on working environment	Very high and will result in permanent changes on working environment
Duration (D)	0-1 year	2-5 years	6-15 years	Life of operation	Post closure
Extent (E)	Limited to the site	Limited to the local area	Limited to the region	National	International
Probability	Very improbable	Improbable	Probable	Highly probably	Definite

Then, the Significant Point (SP) is calculated by following formula.

Significant Point (SP) = (Magnitude+ Duration+ Extent) * Probability

Impact Significance: Based on calculated significant point, impact significance can be categorized as follows:

Table 7. 2 Impact Significance

Significant Point (SP)	Impact Significance
<15	Very Low
15-29	Low
30-44	Moderate
45-59	High
>59	Very High

7.4 Identification of Impacts

There may be some positive and negative impacts on surrounding environment of the proposed site due to the implementation of proposed project. The possible environmental impacts are identified based on the analysis of environmental baseline information and project activities. Most of the identified impacts were quantified to the extent based on the professional judgment. Each of the environmental issues was examined in terms of their current conditions, likely impacts during construction and operation phase, however, consideration for decommissioning phase of the project is excluded in this study.

7.5 Positive Impacts

7.5.1 Construction Phase

Job Opportunities

Several job opportunities such as civil engineers, electrical engineers, surveyors, electricians, machine operators, drivers, bricklayers, carpenters and general labors will be created. Security services, cleaning, cooking and waste collection are some of the services that will benefit indirectly. Especially, the proposed project will create job opportunities for causal labors from local community. The advanced technology, skill, knowledge and experience of local community will be improved by cooperating with experienced engineers and workers from the project. The net effect of job opportunities creation is livelihood and living standard improvement of local community and poverty reduction.

Business Opportunities

The construction processes of the project require a huge quantity of building and road materials such as sand, gravel, stones, woods, cement and other construction materials. This will provide business opportunities for local markets and will increase their income. The construction of the project will also provide several business opportunities for small-scale traders and vendors such as food stalls and cold drink stalls near the project site.

7.5.2 Operation Phase

Job Opportunities

The operation processes of the project will create job opportunities for several workers such as electrical engineers, electricians, managers, cleaners, securities and drivers. Especially, local workers and local graduates will have the chance to obtain job opportunities.

Revenue to National and Local Government

National and local government will earn payment of relevant taxes such as properties tax, income tax and other fees from the proposed project throughout operation lifespan of the project.

CSR Developments

The project proponent shall contribute CSR activities to surrounding local community by providing to schools, clinics, roads and bridges throughout operation lifespan of the project. This will lead to improvement of local community due to implementation of the proposed project.

Carbon Emission Reduction and Resources Conservation

Electricity generation from solar energy emit insignificant carbon into the atmosphere. This leads carbon emission reduction that compared to other electricity generations such as coal, oil and gas power plant. With fewer carbon emissions, solar power plant has a much lower effect on climate change than fossil fuel alternatives do. Besides, the proposed project does not require any solid fuel such as coal, oil or gas mining activities for generating electricity, which has huge benefits for resources conservation.

Green Economy

Although solar power continues to account for a small share of overall energy supply, the residential and commercial sectors are slowly embracing renewable energy, especially solar energy. As solar power plant implementation prices continue to decline, it is expected that solar energy systems become more prevalent and lead to green economy.

7.6 Negative Impacts

The following figure briefly describes the potential negative impacts of the proposed project. There are four main types of impacts; impact on environmental resources, impact on ecological resources, impact on human and impact of waste generation.

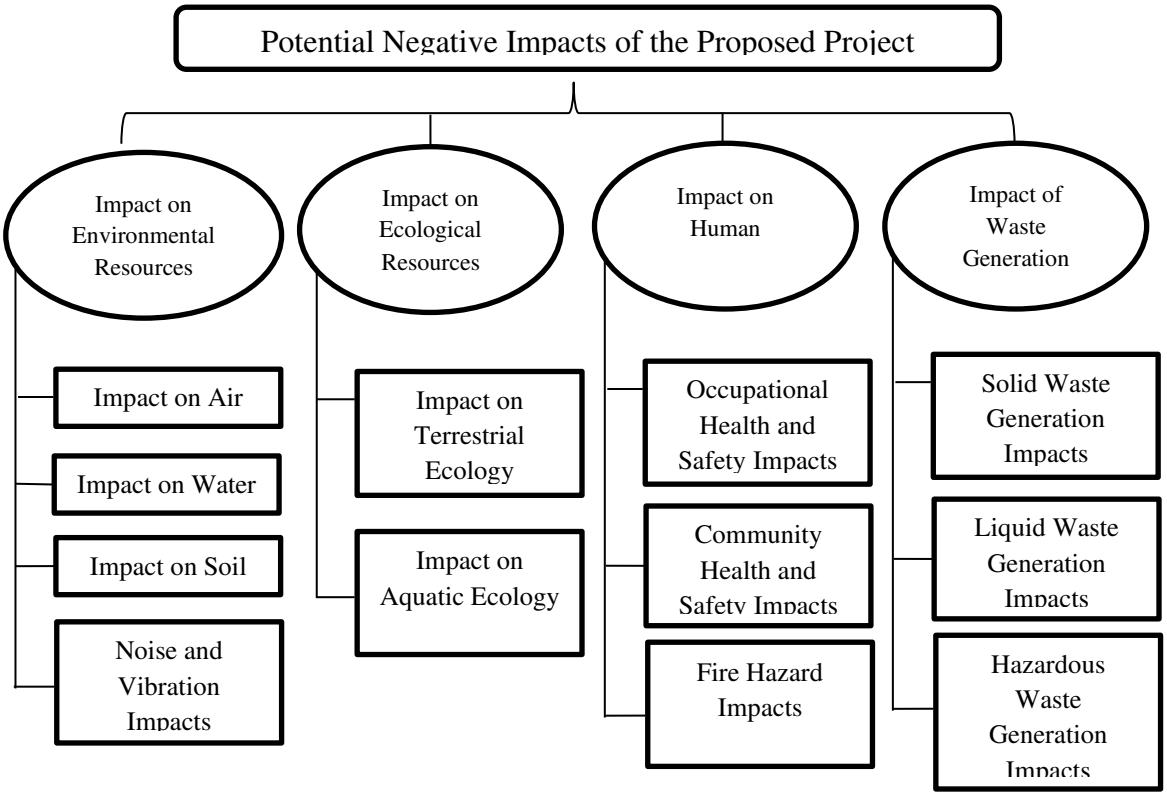


Figure 7. 1 Potential Negative Impacts of the Proposed Project

7.6.1 Impacts on Environmental Resources

Impact on Air

***Solar Power Plant*:** During the construction phase, site clearing and earth moving activities, which will get worse during dry season, will be the main reason of dust emission. Operating construction machines and vehicles such as loaders, excavators, dumpers, bulldozers, backhoes, road rollers, water bowsers, cranes, trucks and concrete mixers as well as operating generators will cause gaseous emission and dust emission into the air. It is also anticipated that vehicles which used for delivering electrical equipment such as PV modules, tracking brackets, inverters, transformers and construction materials to the project site will also emit dust and gases. Odor from painting of multiple-use building will also affect indoor air quality.

During the operation phase, dust emission from the operation activities of the project is insignificant. However, gaseous emission is anticipated from office vehicles, maintenance vehicles, generators, refrigerators and air conditioning system of the project. Odor and smoke can also be emitted multiple-use building's kitchen.

***Overhead Transmission Line*:** During the construction phase, route clearing and earth moving activities, which will get worse during dry season, will be the main reason of dust emission. Operating construction machines and vehicles used for overhead transmission line construction is one of the main reasons of dust and gaseous emission.

Impact on Water

***Solar Power Plant*:** During the construction phase, groundwater may be contaminated by earth working activities during rainy days. Oil spillage and leakage from construction machines, construction vehicles, transportation vehicles and generators will contaminate groundwater. Water discharged from construction activities of ground mounted solar power plant and overhead transmission line will contaminate groundwater. Especially, concrete foundation of tracking brackets, poles of overhead transmission line, switchyard, multiple-use building will excavate surface layer of earth and deeply excavated foundation processes need to use cement and hardener chemicals, which will impact negatively on groundwater quality. Sewage disposed of from toilets used by construction workers can also lead to groundwater pollution. Improper temporary PV modules storage damaged PV modules released from improper installing, improper waste storage, fuel storage, refueling and machineries maintenance area can also cause groundwater pollution by penetrating into groundwater layer. Water usage demand will also increase for site clearing, site preparation, water spraying activities and other water required construction activities and construction workers.

During the operation phase, groundwater can be contaminated by oil and waste spillage and leakage from transformers, improper waste storage, fuel storage and refueling. Poor waste management may also lead to blocking of drains, which will lead to flooding and unsanitary conditions within the project site. Improper handling of damaged PV modules due to improper cleaning and maintenance activities and uninstalled lifespan-expired PV modules can cause groundwater pollution because these PV modules contain toxic chemicals. Water consumption will also increase for cleaning PV modules in order to enhance their efficiency for generating electricity.

***Overhead Transmission Line*:** During the construction phase, water discharged from construction activities of overhead transmission line will contaminate groundwater. Especially, concrete foundation of poles of overhead transmission line will excavate surface layer of earth and deeply excavated foundation processes need to use cement and hardener chemicals, which will impact negatively on groundwater quality.

Noise and Vibration Impacts

Solar Power Plant: During the construction phase, operating construction vehicles such as loaders, excavators, dumpers, bulldozers, backhoes, road rollers, water bowsers, cranes, trucks

and concrete mixers as well as transportation vehicles and generators will generate noise and vibration. Improper unloading electrical equipment for ground mounted solar power plant and overhead transmission line, construction materials and other equipment will also cause noise pollution. Stringing cables for overhead transmission line can also cause noise pollution.

During the operation phase, the main reason for noise impacts is operating generators, management vehicles and maintenance vehicles. Other sources include transformers and inverters; however, this impact is insignificant.

***Overhead Transmission Line*:** During the construction phase, operating construction machines and vehicles for erecting poles and stringing cables of overhead transmission line will generate noise and vibration. Improper unloading electrical equipment will also cause noise pollution.

Impacts on Soil

***Solar Power Plant*:** During the construction phase, site preparation and leveling activities will be carried out for the construction of ground mounted solar power plant and overhead transmission line. Especially, soil excavation for the foundation of tracking brackets, switchyard, multiple-use building and poles of overhead transmission line can result in disturbance of soil structure, which may cause increasing soil erosion at the project site and release of sediments into the natural drainage system. Top soil nutrient layers will be removed, lower soil will be covered and in somewhere soil layer will be mixed. Stringing cables for overhead transmission line will also disturb soil structure. Soil contamination can also be occurred due to oil spills and leakage from construction machines, construction vehicles, generators and transportation vehicles. Improper temporary PV modules storage damaged PV modules due to improper installing, improper waste storage, and fuel storage, refueling and machineries maintenance area will also cause soil pollution.

During the operation phase, the possible reasons of soil pollution are improper handling of damaged PV modules due to improper cleaning and maintenance activities and uninstalled lifespan-expired PV modules because these PV modules contain toxic chemicals. Soil can also be contaminated by leakage from improper waste storage, oil spillage and leakage from transformers, fuel storage and refueling.

***Overhead Transmission Line*:** During the construction phase, soil excavation for the foundation of poles of overhead transmission line can result in disturbance of soil structure, which may cause an increasing soil erosion at the project site and release of sediments into the natural drainage system. Stringing cables for overhead lewill also disturb soil structure.

7.6.2 Impacts on Ecological Resources

Impacts on Terrestrial Ecology

The impact on terrestrial ecology is insignificant in construction and operation phases because the project is located at vacant land as well as overhead transmission line will also pass-through similarly. Only bushes and small trees are found not only within the project site area but also route of overhead transmission line, there is no huge natural vegetation. There is no national

park, reserved forest, protected public forest, protected area and wildlife within the scope of study area for the proposed project.

Impacts on Aquatic Ecology

The impact on aquatic ecology is insignificant in construction and operation phases because there is no Marine Park, coastal resource, and mangrove area as well as water body such as river, creek, stream, lake and reservoir within the scope of study area for the proposed project.

7.6.3 Impacts on Human Resources

Occupational Health and Safety

Solar Power Plant: During construction phase, it is expected that construction workers are likely to have accidental injuries and hazards due to human and workplace interactions. Because of the intensive engineering and construction activities including erection and installation of PV solar racks, metal grinding and cutting, concrete work, tower erection, piling and welding among others, construction workers will be exposed to risks of accidents and injuries. Such injuries can result from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others. Moreover, accidents and injuries to workers and local communities can be caused from heavy vehicles movement for the transport of construction materials and equipment. Small injuries due to slips, headache and sickness cause of the noise, air pollution and odor can also be affected to the workers and local people. Occupational exposure to dust and fine particle is associated with all phases of construction activities. Any kind of nuisance dust has potential hazards to health for workers. A certain number of migrant construction workers will come into the project site for construction, which can lead the issues related to infectious diseases including insect borne disease, water borne disease, and sexually transmitted infections (STIs), including HIV/AIDS. The construction workers can also be infected COVID-19 virus during Pandemic period, if they do not follow strictly the instructions of Ministry of Health and Sports.

During the operation phase, noise from the generating of the machine and generator may also affect the health of people working in the project area. Fire and explosion hazards are mainly cause poor management of waste disposal and diesel storage. The usage of fuel must carefully handle because spillage and leakage of oil and grease can cause ignition of fire. Domestic wastewater or grey water produced from dormitory, kitchen and toilets will cause enormous breeding of mosquitos, which can lead to diseases like malaria and dengue fever, if not carefully managed. Moreover, occupational health and safety impacts can be occurred due to improper maintenance of vehicles and equipment used in operation process. . Improper housekeeping is also an important factor in causing injuries, illness and property damage that may results from hazards such as trips, slips and falls, fires and pest infestation. The operation workers can also be infected COVID-19 virus during Pandemic period, if they do not follow strictly the instructions of Ministry of Health and Sports.

***Overhead Transmission Line*:** During the construction phase, the common possible accidental injuries include falling from height related to poles of overhead transmission line for cable stringing which can cause fatal or permanent disabling injury. Use of lifting equipment for overhead transmission line stringing is main source of occupational health and safety impacts.

During the operation phase, the common occupational health and safety impacts are falling from height related to poles of overhead transmission line for maintenance activities which can cause fatal or permanent disabling injury. Workers' safety could be affected by lack of adequate Personal Protective Equipment (PPEs) and lack of using lockout-tagout system while repair and maintenance overhead transmission line.

Community Health and Safety

***Solar Power Plant*:** During the construction phase, the accidents due to operating construction vehicles and transportation vehicles at public roads are common community health and safety impacts. Activities such as earth working, switchyard, multiple-use building and access road construction can generate dust, gases, noise and vibration, which can impact directly and indirectly on community health and safety in terms of nuisance and health effects. However, these impacts are insignificant because of short construction period and certain distance from nearby villages to project site.

During the operation phase, electromagnetic field can be occurred due to the operations of PV modules and switchyard, which can impact on community health of nearby villagers. However, this impact is insignificant because voltage level of the project is low and the project will use qualified products and modern technology for electricity generation. Although, there is a certain distance from project site to local communities, glint and glare from PV modules can affect on nearby local communities under particular conditions. Electric shock can also be anticipated due to entering into the project site without permission by nearby local people. Operating management vehicles and maintenance vehicles at public roads can also impact on community health and safety.

***Overhead Transmission Line*:** During the construction phase, overhead transmission line's poles erection and cable stringing activities are main sources of community health and safety impacts.

During the operation phase, electric shock can be occurred due to climbing poles of overhead transmission line by nearby local people.

Fire Hazard

***Solar Power Plant*:** During the construction phase, poor installation of electrical equipment and overloads, heating from bunched cables and damaged cables at construction workers camp are common high risks of fire hazards. Improper storage of raw materials for electrical equipment and construction materials can cause fire hazards. Fuel storage area, improper fuel handling and improper maintenance of construction machines and construction vehicles are also main reasons for fire hazards.

During the operation phase, improper and irregular maintenance of electrical equipment of ground mounted solar power plant are common high risks of fire hazards. Fuel storage area, improper fuel handling, overloads, heating from bunched cables and damaged cables at multiple-use building are other factors of fire hazards.

***Overhead Transmission Line*:** During the operation phase, improper and irregular maintenance of electrical equipment of overhead transmission line are common high risks of fire hazards.

7.6.4 Impact of Waste Generation

Solid Wastes Generation Impacts

***Solar Power Plant*:** During the construction phase, rejected components and packaging materials of electrical equipment and building materials, surplus materials, papers, containers, broken bricks, solvent containers are main sources of solid wastes generation from the proposed project. These solid wastes can be injurious to the environment through blockage of drainage systems because these wastes may contain hazardous substances such as residue of cement, adhesive and cleaning solvents bottles. Construction soil wastes will be also excavated mainly from site preparation, access road construction and leveling activities as well as vegetation debris will be generated at the time of land clearance for PV modules, switchyard and multiple-use building. Domestic solid wastes such as garbage and organic waste from construction workers camp are other sources of solid waste generation.

During the operation phase, there is no operation solid waste which are disposed of from the proposed project's operation processes. However, domestic solid waste such as garbage, rejected office materials and organic waste from multiple-use building are common solid wastes generation.

***Overhead Transmission Line*:** During the construction phase, construction soil wastes will be also excavated mainly from excavation activities for poles erection as well as vegetation debris will be generated at the time of land clearance for right of way for overhead transmission line.

Liquid Waste Generation Impacts

Solar Power Plant: During the construction phase, cleaning construction machines and construction vehicles within the project site will generate liquid waste. Domestic liquid waste such as black water from toilets used by construction workers and grey water from basins and bathrooms in construction workers camp will be also discharged from the proposed project.

During the operation phase, main source of operation liquid waste is cleaning activities for PV modules to promote their efficiency for electricity generation. Domestic liquid waste such as black water from toilets and grey water from basins and bathrooms within the project site will be discharged.

***Overhead Transmission Line*:** There is no significant impact in this phase.

Hazardous Waste Generation Impacts

Solar Power Plant: During the construction phase, damaged PV modules due to improper installation are common hazardous waste generation of the proposed project because PV modules contain toxic chemicals. Used oil disposed of from repair and maintenance of construction machines and construction vehicles, oil spills and leakage from refueling, fuel storage area and machineries maintenance area within the project site are also common hazardous waste.

During the operation phase, damaged PV modules due to improper handling during cleaning activities and maintenance activities are common hazardous wastes generation. Uninstalled lifespan-expired PV modules due to exchanging new PV modules at the time of extending operation period of the project are also common hazardous wastes. Other hazardous wastes are used oil from transformers, oil spills and leakage from maintenance activities, vehicles, refueling and fuel storage area. For batteries waste, this project does not used batteries to store electricity from PV modules and will distribute directly to Satoketayar Substation via overhead transmission line.

***Overhead Transmission Line*:** There is no significant impact in this phase.

7.7 Impact Significance

The above-mentioned potential adverse impacts of the proposed project should be assessed in order to formulate for reducing these impacts. Therefore, the following table shows the details impact significance of potential adverse impacts of the project.

Table 7. 3 Details Impact Significance of Potential Adverse Impacts of the Project

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
A.	**Construction Phase**							
1.	Impacts on Air	***Solar Power Plant:*** • Dust and gaseous emission can occur due to site clearing, leveling and earth working activities, which will get worse during dry season • Operating and movement of construction machines and vehicles • Operating generators • Vehicles which used for delivering electrical equipment • Odor from painting of multiple-use building, staff quarters,	4	1	2	5	35	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		briefing hall, kitchen and dining hall ***Overhead Transmission Line:*** • Dust and gaseous emission can occur due to operating and movement of construction vehicles and transportation vehicles • Site clearing, leveling and earth moving activities						
2.	Impacts on Water	***Solar Power Plant:*** • Earth working activities during rainy days • Oil spillage and leakage from construction machines, construction vehicles, transportation vehicles and generators • Water discharged from construction activities	3	1	2	3	18	Low

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Deeply excavated concrete foundation processes of tracking brackets, switchyard and multiple-use building • Sewage disposed of from toilets used by construction workers • Improper temporary PV modules storage, damaged PV modules due to improper installing, improper waste storage, fuel storage, refueling and machineries maintenance area • Water usage demand increasing due to site clearing, site preparation, water spraying activities and other water required construction activities and construction workers ***Overhead Transmission Line:*** • Water discharged from construction activities of overhead transmission line will contaminate groundwater						

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Especially, concrete foundation of poles of overhead transmission line will excavate surface layer of earth and deeply excavated foundation processes need to use cement and hardener chemicals, which will impact negatively on groundwater quality						
3.	Noise Impacts	***Solar Power Plant:*** • Operating and movement of construction vehicles and machines generate noise and vibration • Operating generators • Improper mobilization of construction machines and vehicles, unloading electrical equipment, construction materials and other equipment ***Overhead Transmission Line:*** • Improper unloading electrical equipment and cables for overhead	4	1	1	5	30	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		transmission line will generate noise and vibration • Operating and movement of construction machines and vehicles for erecting poles and stringing cables						
4.	Impacts on Soil	***Solar Power Plant:*** • Soil structure and formation will be disturbed due to site preparation and leveling activities • Soil excavation for the foundation of tracking brackets, switchyard, multiple-use building and other buildings can cause soil structure disturbance, soil erosion and release of sediments into the natural drainage system and surface water • Top soil nutrient layers will be removed, lower soil will be covered and in somewhere soil layer will be mixed	5	1	1	5	35	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Oil spills and leakage from construction machines, construction vehicles, generators and transportation vehicles can cause soil pollution • Improper temporary PV modules storage, damaged PV modules due to improper installing, improper waste storage, fuel storage, refueling, machineries maintenance and parking area ***Overhead Transmission Line:*** • Soil structure and formation will be disturbed due to soil excavation for the foundation of poles of overhead transmission line • Stringing cables for overhead transmission line will also disturb soil structure and upper soil layer						
5.	Impacts on Occupational Health and Safety	***Solar Power Plant:***	5	1	1	4	28	Low

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Common possible accidental injuries include falling from height related to ladder • Small injuries due to slips and falls, accidents and electric shock can also occur due to mismanagement • Improper management of construction activities in erection and installation of electrical equipment, metal grinding, welding and cutting, concrete work, piling, access roads construction, high-speed vehicles driving, absence of proper traffic sign and warning sign board • Poor working conditions will damage health and put workers at risk as well as operating machinery and using materials in the construction site can pose temporary hazard • Lack of adequate Personal Protective Equipment (PPEs)						

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Domestic wastewater such as grey water and black water discharged by construction workers can impact on worker's health if not managed properly because of its adverse smell • A certain number of migrant construction workers will enter into the project site for construction, which can lead the issues related to infectious diseases • The construction workers can also be infected COVID-19 virus during Pandemic period ***Overhead Transmission Line:*** • Falling from height related to poles of overhead transmission line for poles erection and cable stringing which can cause fatal or permanent disabling injury • Use of lifting equipment						

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Poor working conditions will damage health and put workers at risk as well as operating machinery and using materials in the overhead transmission line construction • Lack of adequate Personal Protective Equipment (PPEs) and warning signs						
6.	Impacts on Community Health and Safety	***Solar Power Plant:*** • Accidents due to operating and movement of construction machines, vehicles and transportation vehicles at public roads • Construction activities, earth working and site leveling can generate dust, gases, noise and vibration, which can impact directly and indirectly on community health and safety in terms of nuisance and health effects	4	1	2	4	28	Low

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		Overhead Transmission Line: • Overhead transmission line's cable stringing and poles erection along the route • Movement of construction machines and vehicles						
7.	Fire Hazard Impacts	• Poor installation of electrical equipment and overloads • Heating from bunched cables and damaged cables at construction workers camp • Improper storage of raw materials for electrical equipment and construction materials • Fuel storage area, improper fuel handling and improper maintenance of construction machines and construction vehicles	5	1	1	4	28	Low
8.	Solid Waste Generation Impacts	***Solar Power Plant:*** • Rejected components and packaging materials of electrical	4	1	1	5	30	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		equipment and building materials, surplus materials, papers, containers, broken bricks, solvent containers • These solid wastes can be injurious to the environment through blockage of drainage systems because these wastes may contain hazardous substances • Construction soil wastes will be also excavated mainly from site preparation, access road construction and leveling activities • Vegetation debris will be generated during site clearance activities • Domestic solid wastes such as garbage and organic waste from construction workers camp and staff quarters, briefing hall, kitchen and dining hall ***Overhead Transmission Line:***						

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• During the construction phase, vegetation debris will be generated during site clearance along right of way for overhead transmission line						
9.	Liquid Waste Generation Impacts	• Cleaning construction machines and vehicles • Domestic liquid waste such as black water from toilets used by construction workers and grey water from basins and bathrooms in construction workers camp, staff quarters, briefing hall, kitchen and dining hall	2	1	1	3	12	Very Low
10.	Hazardous Waste Generation Impacts	• Damaged PV modules due to improper installation • Used oil disposed of from repair and maintenance of construction machines and construction vehicles • Oil spills and leakage from refueling, fuel storage area and machineries maintenance area	4	1	1	4	24	Low

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
B.	**Operation Phase**							
1.	Impacts on Air	***Solar Power Plant:*** • Gaseous emission from office vehicles, maintenance vehicles, generators, refrigerators and air conditioning system • Odor and smoke from kitchen ***Overhead Transmission Line:*** • Operating and movement of maintenance vehicles	3	4	2	3	27	Low
2.	Impacts on Water	***Solar Power Plant:*** • Oil and waste spillage and leakage from transformers, improper waste storage, fuel storage and refueling • Poor waste management • Improper handling of damaged PV modules due to improper cleaning and maintenance activities and uninstalled lifespan-expired PV modules	4	4	2	4	40	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Water consumption increasing due to cleaning PV modules						
3.	Noise Impacts	***Solar Power Plant:*** • Operating generators, management vehicles and maintenance vehicles • Operating transformers and inverters	3	4	1	3	24	Low
4.	Impacts on Soil	***Solar Power Plant:*** • Improper handling of damaged PV modules due to improper cleaning and maintenance activities and uninstalled lifespan-expired PV modules • Leakage from improper waste storage • Oil spillage and leakage from transformers, fuel storage and refueling	3	4	1	3	24	Low
5.	Impacts on Occupational Health and Safety	***Solar Power Plant:*** • Falling from height related to ladder for maintenance activities	5	4	1	4	40	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Small injuries due to slips and falls, accidents and electric shock • Electromagnetic field can be occurred due to the operations of PV modules and switchyard • Lack of adequate Personal Protective Equipment (PPEs) and lockout-tagout system while repair and maintenance • Domestic wastewater such as grey water and black water from the project if not managed properly because of its adverse smell • Poor waste management at multiple-use building, staff quarters, briefing hall, kitchen and dining hall can also lead to the blocking of drains, which in turn can lead to flooding and unsanitary conditions						

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Operation workers and staffs can also be infected COVID-19 virus during Pandemic period ***Overhead Transmission Line:*** • Falling from height related to poles of overhead transmission line for maintenance activities • Lack of adequate Personal Protective Equipment (PPEs) and lockout-tagout system while repair and maintenance for overhead transmission line						
6.	Impacts on Community Health and Safety	***Solar Power Plant:*** • Electromagnetic field occurrence • Glint and glare from PV modules • Electric shock due to entering into the project site without permission by nearby local people	4	4	2	4	40	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Operating management vehicles and maintenance vehicles at public roads ***Overhead Transmission Line:*** • Electric shock due to climbing poles of overhead transmission line by nearby local people						
7.	Fire Hazard Impacts	***Solar Power Plant:*** • Improper and irregular maintenance of electrical equipment of ground mounted solar power plant • Fuel storage area and improper fuel handling • Overloads and heating from bunched cables and damaged cables at multiple-use building ***Overhead Transmission Line:***	5	4	1	4	40	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		• Improper and irregular maintenance of electrical equipment of overhead transmission line						
8.	Solid Waste Generation Impacts	• Domestic solid waste such as garbage, rejected office materials and organic waste from multiple-use building	2	4	1	3	21	Low
9.	Liquid Waste Generation Impacts	• Operation liquid waste from cleaning activities of PV modules • Domestic liquid waste such as black water from toilets and grey water from basins and bathrooms within the project site	3	4	1	5	40	Moderate
10.	Hazardous Waste Generation Impacts	• Damaged PV modules due to improper handling during cleaning activities and maintenance activities • Uninstalled lifespan-expired PV modules due to exchanging new PV	4	4	1	4	36	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		modules at the time of extending operation period of the project • Used oil from transformers • Oil spills and leakage from maintenance activities, vehicles, refueling and fuel storage area						

During the ***construction phase***, impacts on air, soil, noise and vibration impacts and solid waste generation impacts are assessed as **Moderate Impacts** and other impacts such as impacts on water, occupational health and safety, community health and safety, fire hazards impacts and hazardous waste generation impacts are categorized as **Low Impacts** as well as liquid waste generation impact is considered as **Very Low Impact** as per the results of assessments. During the ***operation phase***, impacts on water, occupational health and safety, community health and safety, fire hazard impacts, liquid waste generation and hazardous waste generation impacts are assessed as **Moderate Impacts** and other impacts like impacts on air, soil, noise impacts and solid waste generation impacts are categorized as **Low Impacts** according to the results of assessments. The following figure illustrates detail impact significances of potential adverse impacts of the proposed project.

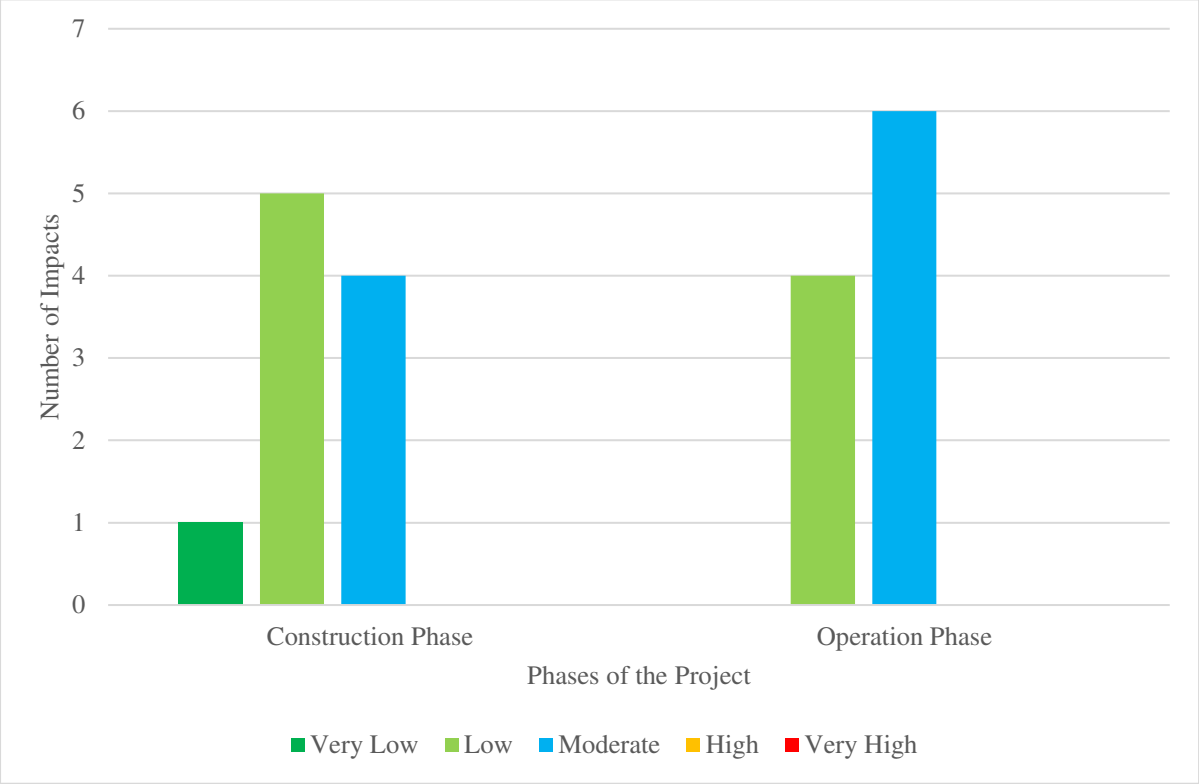


Figure 7. 2 Impact Significance of Potential Adverse Impacts of the Proposed Project

7.8 Mitigation Measures

7.8.1 Mitigation Measures for Impacts on Environmental Resources

Mitigation Measures for Impacts on Air

***Solar Power Plant*:** During the construction phase, speed of construction vehicles and transportation vehicles must be controlled within the project site to control the dust emission. Regular water spraying on access roads and working places must be carried out in order to control dust emission by increasing humidity of working area. If possible, access roads of the project should pave to control dust emission. Transportation vehicles must need to install proper covers when carrying soil, sand and cement to avoid falling down along route of

transportation and dust emission. Construction activities and earth working activities which generate excessive dust must be avoided on extremely windy days. Temporary building enclosures (green shade net fencing) must be installed at excessive dust generated working area in order to control dust emission from the project to nearby local community. Personal Protective Equipment (PPEs) such as masks and dust respirators must be provided for construction workers who work in intensive dust generation area. Regular inspection and proper maintenance for the construction machines, generators, construction vehicles and transportation vehicles must be implemented to control gaseous emission from the proposed project.

During the operation phase, all roads within the project shall be paved in order to prevent dust emissions. Regular maintenance and inspection for management vehicles, maintenance vehicles, generators, refrigerators and air conditioning system must be implemented to control gaseous emission. Good ventilation system must be ensured and project proponent will install 5 ventilators and 10 air conditioners at multiple-use building to reduce adverse impacts of indoor air quality. Some shady trees must be planted to reduce impacts on air of the project.

***Overhead Transmission Line*:** During the construction phase, regular water spraying on working places of poles erection and cables stringing must be carried out in order to control dust emission by increasing humidity of working area. Earth working activities for poles erection which generate excessive dust must be avoided on extremely windy days. Regular inspection and proper maintenance for the construction machines, construction vehicles and transportation vehicles must be implemented to control gaseous emission.

Mitigation Measures for Impacts on Water

***Solar Power Plant*:** During the construction phase, site levelling should be done with minimum alteration in contour level to prevent natural drainage system of the project. Regular inspection for construction machines, generators, construction vehicles and transportation vehicles must be done to prevent oil leak and spillage. Toilets, washing basins and septic tanks must be provided adequately for the construction workers to reduce impacts on water. Moreover, the project proponent must manage groundwater usage systematically in construction activities to prevent depletion of groundwater.

During the operation phase, project proponent must install proper drainage system within the project site to reduce impacts on water. PV modules cleaning and maintenance must be carried out properly in order to prevent damaging PV modules. Damaged PV modules and uninstalled lifespan-expired PV modules must be disposed with adequate packaging at waste management authorities or service providers, according to the instructions of the government and direct burry and open burning must be strictly prohibited. HSE Coordinator must monitor handling, stockpiling and disposal of PV modules as per monitoring plan. Transformers, management vehicles, maintenance vehicles and generators must be inspected and maintained regularly to reduce oil spillage. Refueling must be done properly and drainage system must be checked and cleaned properly. Direct disposing domestic waste from multiple-use building into the drains must be prohibited to prevent drainage block.

***Overhead Transmission Line*:** During the construction phase, regular inspection for construction machines, construction vehicles and transportation vehicles must be done to prevent oil leak and spillage. Proper management must be implemented for poles erection and cables stringing activities to reduce impacts on water.

Mitigation Measures for Noise and Vibration Impacts

***Solar Power Plant*:** During the construction phase, excessive noise and vibration generated construction activities must be notified to nearby local communities, firstly. Construction machines, construction vehicles and transportation vehicles used in construction activities must be inspected and maintained regularly for reducing noise and vibration. Personal Protective Equipment (PPEs) such as earplugs and earmuffs must be provided for construction workers who work in excessive noise generated area. Transportation vehicles' drivers should be instructed to avoid gunning of vehicle engines or hooting when passing through sensitive areas such as schools and hospitals across transportation routes. Highly noise and vibration generated construction machines and generators must be placed in enclosures to minimize noise generation. Noise and vibration generated construction activities must not be carried out at night, if possible.

During the operation phase, generators, inverters, transformers, management vehicles and maintenance vehicles must be inspected and maintained regularly to reduce noise pollution. Silence-type generators is recommended to use and some shady trees must be planted to reduce noise impacts. On the other hand, no specific mitigation measures are required to reduce vibration impacts because all of the electricity generation processes from ground mounted solar power plant and electricity distributing processes to the Satoketayar Substation via overhead transmission line do not generate vibration significantly.

***Overhead Transmission Line*:** During the construction phase, construction machines, construction vehicles and transportation vehicles used in construction activities must be inspected and maintained regularly for reducing noise and vibration. Proper management must be implemented for poles erection, cables stringing activities and unloading electrical equipment to reduce noise and vibration impacts.

Mitigation Measures for Impacts on Soil

***Solar Power Plant*:** During the construction phase, earth working activities and concrete mixing processes for foundation of PV modules' brackets, switchyard and multiple-use building must be carried out systematically and properly. Soil contamination can be reduced through using leak-proof fuel containers with secondary containments in fuel storage area. Refueling must be done carefully for preventing oil spills and leakage. Modernized construction machines, construction vehicles and transportation vehicles shall be used for the construction activities of the project. These machines and vehicles must be maintained regularly and isolated machineries maintenance area must be identified with paved ground in the project. PV modules installing must be carried out properly in order to prevent damaging PV modules. Damaged PV modules must be disposed with adequate packaging at waste

management authorities or service providers, according to the instructions of the government and direct burry and open burning must be strictly prohibited. HSE Coordinator must monitor handling, stockpiling and disposal of PV modules as per monitoring plan. Some shady trees must be planted to reduce soil erosion and restore top soil. Raw materials storage area for electrical equipment and construction materials must be defined with impervious surface to prevent seepage into the soil layer. Toilets, washing basins and septic tanks must be provided adequately for the construction workers to reduce impacts on soil.

During the operation phase, project proponent must install proper drainage system within the project site to reduce impacts on soil. PV modules cleaning and maintenance must be carried out carefully in order to prevent damaging PV modules. Damaged PV modules and uninstalled lifespan-expired PV modules must be disposed with adequate packaging at waste management authorities or service providers, according to the instructions of the government and direct burry and open burning must be strictly prohibited. HSE Coordinator must monitor handling, stockpiling and disposal of PV modules as per monitoring plan. Fuel storage area and generators area must be designed with impervious surface in order to prevent seepage into soil layer. Electrical equipment maintenance especially for transformers must be carried out systematically by technicians and experts. Temporary domestic waste storage area, fuel storage area and switchyard must be inspected regularly to reduce impacts on soil.

***Overhead Transmission Line*:** During the construction phase, earth working activities and concrete mixing processes for foundation of poles of overhead transmission line must be carried out systematically and properly. Proper management must be needed for cable stringing and vegetation clearance for right of way of overhead transmission line.

7.8.2 Mitigation Measures for Impacts on Ecological Resources

Mitigation Measures for Impacts on Terrestrial Ecology

Vegetation clearance within right of way of overhead transmission line must be minimized as much as possible and vegetation clearance beyond designated area of ground mounted solar power plant must be prohibited strongly. Introduction of exotic species by workers shall not be allowed during the construction and operation phase of the project.

Mitigation Measures for Impacts on Aquatic Ecology

There is no marine park, coastal resource, mangrove area as well as water body such as river, creek, stream, lake and reservoir within the scope of study area for the proposed project. Therefore, no specific mitigation measures for impacts on aquatic ecology are required for the proposed project.

7.8.3 Mitigation Measures for Impacts on Human

Mitigation Measures for Occupational Health and Safety Impacts

***Solar Power Plant*:** During the construction phase, personal fall restraint system must be provided for installation workers who are working at height. Lockout-tagout system must be used for installation of electrical equipment. The project proponent must provide Personal Protective Equipment (PPEs) such as safety helmets, splash goggles, dust respirators, ear muffs, safety gloves, reflected safety suits and safety boots for all construction workers to reduce occupational health and safety impacts. The project proponent must monitor regularly whether construction workers use PPEs adequately or not for ensuring safe working site. Besides, safety notices and emergency contact numbers of the Fire Services Department, Hospitals and Police Stations and contact persons for emergency cases must be tagged at noticeable places of the project site. First aid training, safety training, firefighting training, electrical equipment installation training and other essential trainings for construction activities must be arranged for all construction workers and first aid kits must be provided in the project site. Construction machines and construction vehicles must be operated by trained and licensed industrial machine operators. The project proponent must prepare health and safety management plan for construction workers based on the EMP in Myanmar language and any other language that construction workers can read and display prominently at the project site. The project proponent must provide purified drinking water to prevent health risk of workers. Especially, all construction workers must follow the instructions issued by the Ministry of Health and Sports to prevent COVID-19 virus infection during pandemic period.

During the operation phase, personal fall restraint system must be provided for maintenance workers who are working at height. Lockout-tagout system must be used for maintenance of electrical equipment. The project proponent must provide Personal Protective Equipment (PPEs) such as safety helmets, safety gloves, reflected safety suits and safety boots for all maintenance workers to reduce occupational health and safety impacts. The project proponent must monitor regularly whether maintenance workers use PPEs adequately or not for ensuring safe working site. Besides, safety notices and emergency contact numbers of the Fire Services Department, Hospitals and Police Stations and contact persons for emergency cases must be tagged at noticeable places of the project site. First aid training, safety training, firefighting training, electrical equipment repairs and maintenance training and other essential trainings for operation processes of electricity generation and distributing must be arranged for all workers and first aid kits must be provided in the project site. All energized electrical equipment of the project must be marked with warning signs. Proper management for electricity generation and distributing such as checking all electrical cords, cables and do not use overload voltage must be carried out. The voltage level of the project is low and the project will use qualified products and modern technology for electricity generation, therefore, the power frequency electromagnetic field generated has little impacts on occupational health and safety. Moreover, housekeeping staffs must be trained and assigned to do regular cleaning and housekeeping for prevention of accidents due to poor housekeeping in the project. The project proponent must manage the drainage systems of the project properly and provide purified drinking water to prevent health risk of workers. Especially, all construction workers must follow the instructions issued by the Ministry of Health and Sports to prevent COVID-19 virus infection during pandemic period.

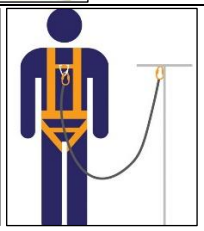
***Overhead Transmission Line*:** During the construction phase, personal fall restraint system must be provided for poles erection and cables stringing workers who are working at height. The project proponent must provide Personal Protective Equipment (PPEs) such as safety helmets, splash goggles, dust respirators, ear muffs, safety gloves, reflected safety suits and safety boots for all construction workers to reduce occupational health and safety impacts. The project proponent must monitor regularly whether construction workers use PPEs adequately or not for ensuring safe working site. Construction machines and construction vehicles must be operated by trained and licensed industrial machine operators.

During the operation phase, personal fall restraint system must be provided for overhead transmission line maintenance workers who are working at height. Lockout-tagout system must be used for maintenance of overhead transmission line. The project proponent must provide Personal Protective Equipment (PPEs) such as safety helmets, safety gloves, reflected safety suits and safety boots for all maintenance workers to reduce occupational health and safety impacts. The project proponent must monitor regularly whether maintenance workers use PPEs adequately or not for ensuring safe working site.

Figure 7. 3 Safety Signages

Table 7. 4 Types of PPEs and Their Functions

Function of PPEs	Feature and Characteristics
Protective Goggles (Suitable for protection from dust, particle, chips, chemical splattering)	
Goggles with direct vents are suitable for protection from chemical splattering or smoke.	
Hearing Protection	
Cotton earplugs: disposable earplugs for short- term use – not suitable for high noise levels	
Earmuffs: They offer a high level of sound reduction and are suitable for high noise levels. They can be used in combination with a safety helmet.	 
Respiratory Protection	

Function of PPEs	Feature and Characteristics
Dust mask: lightweight mask that is fitted over the nose and mouth and secured behind the head with elastic.	
Head Protection	
Use head gear which conforms to recognized safety standards	
Hand and Arm Protection	
Gloves for common tasks (cotton/ leather)	
Foot Protection	
Select footwear that fits the purpose and conforms to recognized safety standards.	
Body Protection	
Reflective clothing: For working in busy traffic: brightly-colored reflective clothing can increase the visibility of employees and reduce their chances of being struck by vehicles or machinery	
High fall protective equipment (personal fall restraint system): to prevent construction workers from falling off of overhead platforms, elevated work stations or into holes in the floor and walls.	 

Mitigation Measures for Community Health and Safety Impacts

***Solar Power Plant*:** During the construction phase, construction vehicle drivers and transportation vehicle drivers must drive carefully with low speed at public road while mobilizing, transporting electrical equipment and construction materials.

During the operation phase, voltage level of the project is low and the project will use qualified products and modern technology for electricity generation, therefore, the power frequency electromagnetic field generated has little impacts on community health and safety. The project proponent must follow international standards to generate electricity and distribute to Satoketayar Substation. Before PV modules installation, project proponent must assess glint and glare on nearby local communities and consult with experts to reduce glint and glare

impacts. Safety notices and warning signs must be tagged at the fence of the project site in order to prohibit local people entering the project area without permission.

***Overhead Transmission Line*:** During the construction phase, cable stringing and poles erection for overhead transmission line must be implemented properly and informed to nearby local community to reduce community health and safety impacts.

During the operation phase, safety notices and warning signs must be tagged at the poles of overhead transmission line in order to prohibit local people climbing poles of overhead transmission line.

Mitigation Measures for Fire Hazard Impacts

***Solar Power Plant*:** During the construction phase, construction machines, construction vehicles, transportation vehicles and electrical system of construction worker camp must be inspected and maintained regularly. Fire extinguishers must be installed near temporary raw materials storage area, fuel storage area, generators and construction worker camp and these fire extinguishers must be inspected regularly. Water for firefighting must be stored adequately and properly with storage tanks. Firefighting training and fire drills must be provided for all construction workers in order to extinguish fire cases. Besides, safety notices and emergency contact numbers of the Fire Services Department, Hospitals and Police Stations and contact persons for emergency cases must be tagged at noticeable places of the project site. An assembly point must be assigned for emergency cases to gather construction workers and smoking must be strongly prohibited in the project site.

During the operation phase, maintenance activities must be implemented regularly and properly for ground mounted solar power plant. Fire extinguishers must be installed near fuel storage area, generators, switchyard, multiple-use building and these fire extinguishers must be inspected regularly. Especially, dry powder type fire extinguishers must be used to extinguish electrical fire and water shall not be used. Water must be stored adequately and properly with storage tanks for other type of fire cases. Fire hose reels and fire hydrants must be installed to extinguish fire by using water. Firefighting training and fire drills must be provided for all workers in order to extinguish fire cases. Fire protection lane must be implemented around the project site to prevent fire in dry season. Besides, safety notices and emergency contact numbers of the Fire Services Department, Hospitals and Police Stations and contact persons for emergency cases must be tagged at noticeable places of the project site. An assembly point must be assigned for emergency cases to gather workers and smoking must be strongly prohibited in the project site. Visible and audible fire alarm system must be installed and emergency routes and exists must be assigned at multiple-use building, these emergency routes and exists must not be blocked.

Overhead Transmission Line: During the operation phase, maintenance activities must be implemented regularly and properly for overhead transmission line.

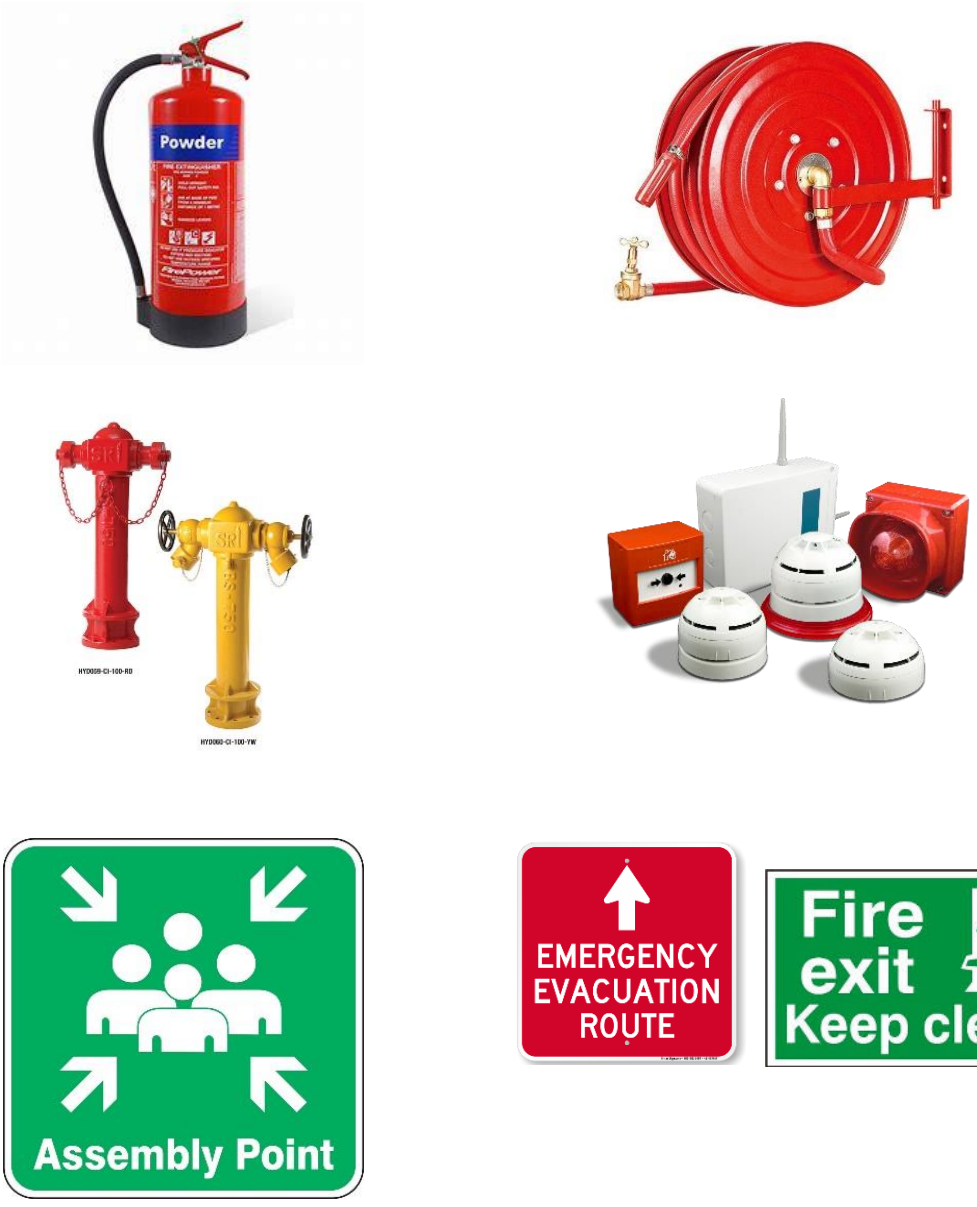


Figure 7. 4 Firefighting Equipment and Singage

7.8.4 Mitigation Measures for Waste Generation Impacts

Mitigation Measures for Solid Waste Generation Impacts

***Solar Power Plant*:** During the construction phase, vegetation debris generated from land clearance activities must be collected at separate place and excavated soil must be reused at other places of the project as soil filing and leveling activities. The project proponent must calculate detail requirement of raw materials for purchasing electrical equipment and construction materials to reduce solid waste generation. Recycling, reuse and refurbishment of solid waste will reduce the amount of construction waste other than disposal. The project proponent must define temporary disposal site within the project, before final disposal and these wastes must be segregated by using different appropriate waste bins. Burning and

landfilling solid waste at the project site must be strongly prohibited and final disposal must be transferred to the Township Municipal.

During the operation phase, there is no operation solid waste generation from electricity generation and distributing processes of the proposed project. However, the project proponent must define temporary disposal site within the project for domestic waste, before final disposal and domestic solid wastes from multiple-use building must be segregated by using different appropriate waste bins. Burning and landfilling solid waste at the project site must be strongly prohibited and final disposal must be transferred to the Township Municipal.

***Overhead Transmission Line*:** During the construction phase, vegetation debris generated from land clearance activities within right of way of overhead transmission line must be collected at separate place and excavated soil must be reused at other places of the project as soil filing and leveling activities.

Figure 7. 5 Waste Bins for Solid Waste Disposal

Mitigation Measures for Liquid Waste Generation Impacts

During the construction phase, adequate sanitation facilities such as toilets, washing basins and septic tanks must be provided. Therefore, adequate quantity of toilets and washing basins will be provided for construction workers in order to control domestic wastewater.

During the operation phase, project proponent must install proper drainage system within the project site to reduce liquid waste generation impacts. Adequate sanitation facilities such as toilets, washing basins and septic tanks must be provided. Therefore, adequate quantity of toilets, washing basins and septic tanks will be provided for workers in order to control domestic wastewater.

Mitigation Measures for Hazardous Waste Generation Impacts

During the construction phase, fuel and lubricants for construction machines and vehicles must be kept and handled systematically. Used oil must be disposed of by collecting with leak proof containers and machineries maintenance area must be identified with paved ground in the project. Damaged PV modules must be disposed with adequate packaging at waste management authorities or service providers, according to the instructions of the government and direct burry and open burning must be strictly prohibited. HSE Coordinator must monitor handling, stockpiling and disposal of PV modules as per monitoring plan. Residual cement, solvent-based paints and other lubricants must be collected separately at designated area and final disposal of hazardous waste must be transferred to the Township Municipal.

During the operation phase, fuel and lubricants for maintenance vehicles must be kept and handled systematically. Damaged PV modules and uninstalled lifespan-expired PV modules must be disposed with adequate packaging at waste management authorities or service providers, according to the instructions of the government and direct burry and open burning must be strictly prohibited. HSE Coordinator must monitor handling, stockpiling and disposal of PV modules as per monitoring plan. Used oil must be disposed of by collecting with leak proof containers and final disposal of hazardous waste must be transferred to the Township Municipal.

8. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

8.1 Institutional Requirement

This Environmental Management Plan (EMP) report is prepared as an environmental management framework for 30 MW Ground Mounted Solar Power Plant Project Connected to Satoketayar Substation. The environmental management practices, procedures and responsibilities are defined herein to get full compliance with the existing environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar. The project proponent should appoint one Health, Safety and Environment (HSE) Coordinator or Environmental Staff throughout the life span of the project. The environmental coordinator/ staff will review and update this plan at least one time annually to cover all potential impacts, mitigations and modifications as necessary. Revisions will be made as need throughout the year. Myanmar Satoketayar Solar Power Co., Ltd. is responsible party for this Environmental Management Plan of 30 MW Ground Mounted Solar Power Plant Project. Moreover, if the cost estimation for the implementation of Environmental Management Plan and Environmental Monitoring Plan does not fully cover the practical solutions stated in this report at the time of implementation, we, Myanmar Satoketayar Solar Power Co., Ltd. will add additional funds to get the target of these plans through the project lifespan. Any suggestions, comments and questions must be directed to 30 MW Ground Mounted Solar Power Plant Project. We, Myanmar Satoketayar Solar Power Co., Ltd. had made commitment that we will construct and operate our project according to our commitments and implement Environmental Management Plans (EMP) and mitigation measures that are mentioned in this EMP report, prepared by E Guard Environmental Services Co., Ltd. for our project. We also commit to work out our best not to cause any impacts on social and environment during the construction, operation and decommissioning phases of the project by implementing the appropriate mitigation measures described in this EMP report and if any impacts that are not anticipated in the report occur, appropriate mitigation measures must be implemented accordingly.

8.2 Environmental Management Plan

The Environmental Management Plan (EMP) prepared for the proposed project covers the anticipated impacts of the project, mitigation measures, management and monitoring plans during each of the phases:

- Construction Phase and
- Operation Phase

The objectives of EMP areas are as follows:

- Identify the possible environmental impacts due to implementation the activities of the project;
- Develop measures to minimize, mitigate and manage these impacts and
- Estimate the budget of EMP for each phase.

Clean Power Energy Co., Ltd. must manage the development of the proposed project by implementing this EMP, which is comprised the following parts:

- Environmental Management Plan
- Environmental Monitoring Plan
- Corporate Social Responsibility Plan
- Firefighting Plan
- Emergency Preparedness and Response Plan and
- Grievance Redress Mechanism

Responsible Persons for EMP and Mitigation Measures

Implementation of the EMP, management practices and mitigation measures are the responsibility of all site personnel: however, key personnel (Site Director, Site Manager, HSE Coordinator, HSE Assistant, Ministry of Natural Resources and Environmental Conservation (MONREC)) are main responsible persons for communicating environmental matters and ensuring management practices and procedures are being implemented. The list of responsible persons for implementing EMP and mitigation measures are described in the following tables in terms of their name, position, department, phone number and responsibilities.

Table 8. 1 Responsible Persons for EMP and Mitigation Measures

No.	Name	Position	Department	Responsibilities and Duties
1.		Director	Myanmar Satoketayar Solar Power Co., Ltd.	• Implementation of the EMP • Supervision and management of the implementation of EMP
2.		Project Manager		• Implementation of the EMP • Supervision and monitoring of the implementation of EMP
3.		HSE Officer		• Implementation of the EMP • Oversight of overall implementation of the project environmental activities • Supervision and monitoring of the implementation of EMP • Supervision, monitoring and performing of Health and safety for workers
4.	Members of MONREC	Department	MONREC	• Monitoring and inspection of projects to determine compliance with all environmental and social requirements • The Ministry may impose penalties and/ or require the project

No.	Name	Position	Department	Responsibilities and Duties
				proponent to undertake corrective action • Where, the Ministry views that the project is not in compliance, it shall o Promptly inform the project proponent o Indicate specific non-compliances of the project environmental and social requirements; and o Specify a time period for the project proponent to bring the project into compliance • In the event of noncompliance o Inform the project proponent indicating the specific non-compliances with environmental and social requirements; • Where a project is not in compliance or not likely to comply with its environmental and social requirements, take enforcement action including: o Suspension of project operation; and o Employing third parties to correct non-compliance **Source: Environmental Impact Assessment Procedure (2015).**

The detail Environmental Management Plans for the proposed project is described in the following tables.

Table 8. 2 Environmental Management Plan for Construction Phase

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
1.	Impacts on air	Solar Power Plant	Dust and gaseous emission	• Control speed of construction vehicles and transportation vehicles within the project site • Spray water regularly on access roads and working places • If possible, pave all access roads of the project • Install proper covers for transportation vehicles when carrying soil, sand and cement • Avoid construction activities and earth working activities which generate excessive dust on	Already included in cost estimation for EMP	Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				extremely windy days • Install Temporary Building Enclosures at excessive dust generated working area • Provide Personal Protective Equipment (PPEs) such as masks and dust respirators for construction workers who work in intensive dust generation area • Implement regular inspection and proper maintenance for the construction machines, generators, construction vehicles and transportation vehicles			
		Overhead Transmission		• Overhead transmission line construction activities and earth			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Line		working and excavation activities which generate excessive dust must be avoided on extremely windy days • Temporary building enclosures (green shade net fencing) must be installed at excessive dust generated working area			
2.	Impacts on water	Solar Power Plant	Groundwater pollution and groundwater depletion	• Carry out site levelling with minimum alteration in contour level • Implement regular inspection for construction machines, generators, construction vehicles and transportation vehicles	Already included in cost estimation for EMP	Very Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				• Provide toilets, washing basins and septic tanks adequately • Manage groundwater usage systematically in construction activities			
		Overhead Transmission Line		• Regular inspection for construction machines, construction vehicles and transportation vehicles must be done • Proper management must be implemented for poles erection and cables stringing activities			
3.	Noise and vibration impacts	Solar Power Plant	Nuisance due to noise and vibration generation	• Notify excessive noise and vibration generated construction activities to nearby local communities	Already included in cost estimation for	Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				• Inspect and maintain construction machines, construction vehicles and transportation vehicles regularly • Provide Personal Protective Equipment (PPEs) such as earplugs and earmuffs for construction workers who work in excessive noise generated area • Instruct transportation vehicles' drivers to avoid gunning of vehicle engines or hooting when passing through sensitive areas across transportation routes • Place highly noise and vibration generated construction machines	EMP		

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				and generators in enclosures • Avoid working noise and vibration generated construction activities at night, if possible			
		Overhead Transmission Line		• Excessive noise and vibration generated construction activities must be notified to nearby local communities, firstly • Transportation vehicles' drivers should be instructed to avoid gunning of vehicle engines or hooting when passing through sensitive areas • Noise and vibration generated construction activities must not be carried out at night, if			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				possible			
4.	Impact on soil	Solar Power Plant	Soil contamination	• Carry out earth working activities and concrete mixing processes for foundation systematically and properly • Use leak-proof fuel containers with secondary containments in fuel storage area • Carry out refueling carefully • Use modernized construction machines, construction vehicles and transportation vehicles • Maintain these machines and vehicles regularly • Identify isolated	Already included in cost estimation for EMP	Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				machineries maintenance area with paved ground • Carry out PV modules installing properly • If PV modules are damaged, direct buried must be strongly prohibited and disposing with adequate packaging at authorized waste dealer must be implemented • Plant some shady trees • Define raw materials storage area with impervious surface • Manage cable stringing and vegetation clearance activities for right of way of overhead transmission line properly			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				• Provide toilets, washing basins and septic tanks adequately			
		Overhead Transmission Line		• Earth working activities and concrete mixing processes for foundation of poles of overhead transmission line must be carried out systematically and properly. • Proper management must be needed for cable stringing and vegetation clearance for right of way of overhead transmission line			
5.	Impacts on terrestrial ecology	Solar Power Plant	Disturbance terrestrial ecology and habitats	• Vegetation clearance beyond designated area of ground mounted solar power plant must be prohibited strongly	Already included in cost estimation for	Very Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Overhead Transmission Line		• Introduction of exotic species by workers shall not be allowed • Vegetation clearance within right of way of overhead transmission line must be minimized as much as possible	EMP		
6.	Occupational health and safety impacts	Solar Power Plant	Health and safety problems for construction workers	• Personal fall restraint system must be provided for installation workers who are working at height • Lockout-tagout system must be used • The project proponent must provide Personal Protective Equipment (PPEs) for all construction workers	Already included in cost estimation for EMP	Very Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				• The project proponent must monitor regularly whether construction workers use PPEs adequately or not • Safety notices and emergency contact numbers must be tagged at noticeable places • First aid training, safety training, firefighting training, electrical equipment installation training and other essential trainings for construction activities must be arranged • First aid kits must be provided • HSE Officer carries out toolbox meeting every morning before			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				working hours and safety meeting every week • Safety induction meetings are also provided for every fresh worker • Construction machines and construction vehicles must be operated by trained and licensed industrial machine operators • The project proponent must prepare health and safety management plan for construction workers based on the EMP in Myanmar language and any other language that construction workers can read and display			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				prominently • The project proponent provides purified drinking water • All construction workers must follow the instructions to prevent COVID-19 virus infection during pandemic period			
		Overhead Transmission Line		• Personal fall restraint system must be provided for overhead transmission line installation workers who are working at height • The project proponent provides Personal Protective Equipment (PPEs) for all construction workers • The project proponent			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				must monitor regularly whether construction workers use PPEs adequately or not • Cable stringing processes must be carried out properly • Construction machines and construction vehicles must be operated by trained and licensed industrial machine operators			
7.	Community health and safety impacts	Solar Power Plant	Health and safety problems for nearby local communities	• Construction vehicle drivers and transportation vehicle drivers must drive carefully with low speed at public road • Public road, nearby project site, must be cleaned and repaired, if damaged after the	Already included in cost estimation for EMP	Very Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				construction period			
		Overhead Transmission Line		• Cable stringing and poles construction for overhead transmission line must be informed to nearby local community and done properly			
8.	Fire hazard impacts	All construction area	Loss of properties and life	• Construction machines and vehicles and electrical system of construction worker camps and staff quarters must be inspected and maintained regularly • Fire extinguishers must be installed at storage yard, fuel storage area, generators, construction worker camps and staff quarters	Already included in cost estimation for EMP	Very Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				• A total of 16 fire extinguishers (3 kg and 5 kg) and 16 fire extinguisher balls are installed and 2 water bowsers are standby • Firefighting equipment must be inspected regularly • Water for firefighting must be stored adequately and properly with storage tanks • Firefighting training and fire drills must be provided • Safety notices and emergency contact numbers must be tagged at noticeable places • An assembly point is			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				assigned for emergency cases • Smoking must be strongly prohibited			
9.	Wastes generation impacts	Solar Power Plant	Water and soil pollution and impacts on health	• Collect vegetation debris generated from land clearance activities at separate places • Reuse excavated soil at other places of the project as soil filing and leveling activities • Calculate detail requirement of raw materials for purchasing electrical equipment and construction materials • Implement recycling, reuse and refurbishment of solid waste	Already included in cost estimation for EMP	Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				• Define temporary disposal site within the project, before final disposal • Segregate solid wastes by using different appropriate waste bins • Prohibit burning and landfilling solid waste at the project site strictly • Provide adequate sanitation facilities such as toilets, washing basins and septic tanks for construction workers • Keep and handle fuel and lubricants for construction machines and vehicles systematically • Dispose of used oil by			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				collecting with leak proof containers with secondary containments • Identify isolated machineries maintenance area with paved ground • If PV modules are damaged during installing, direct buried must be strongly prohibited and disposing with adequate packaging at authorized waste dealer must be implemented • Collect residual cement, solvent-based paints and other lubricants separately at designated area • Transfer final disposal			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				of solid wastes and hazardous wastes to the Township Municipal			
		Overhead Transmission Line		• Vegetation debris generated from land clearance activities along right of way of overhead transmission line must be collected at separate place • Excavated soil must be reused as soil filing and leveling activities			

Table 8. 3 Environmental Management Plan for Operation Phase

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
1.	Impacts on air	All operation	Dust and gaseous	• Pave all roads within the project	Already included in	Very	Myanmar Satoketayar

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		area	emission	• Implement regular maintenance and inspection for management vehicles, maintenance vehicles, generators, refrigerators and air conditioning system • Ensure good ventilation system at multiple-use building • Plant some shady trees	cost estimation for EMP	Low	Solar Power Co., Ltd.
2.	Impacts on water	All operation area	Groundwater pollution and groundwater depletion	• Install proper drainage system within the project site • Carry out PV modules cleaning and maintenance properly • Damaged PV modules and uninstalled lifespan-expired PV modules must be disposed with adequate	Already included in cost estimation for EMP	Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				packaging at authorized waste management services providers and direct buried must be strongly prohibited • Inspect and maintain transformers, management vehicles, maintenance vehicles and generators regularly • Carry out refueling properly • Check and clean drainage system properly • Prohibit direct disposing domestic waste from multiple-use building into the drains			
3.	Noise and vibration	All operation	Nuisance due to noise and	• Inspect and maintain generators, inverters,	Already included in	Very	Myanmar Satoketayar

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
	impacts	area	vibration generation	transformers, management vehicles and maintenance vehicles regularly • Install silence-type generators • Plant some shady trees	cost estimation for EMP	Low	Solar Power Co., Ltd.
4.	Impact on soil	All operation area	Soil contamination	• Install proper drainage system within the project site • Carry out PV modules cleaning and maintenance properly • Damaged PV modules and uninstalled lifespan-expired PV modules must be disposed with adequate packaging at authorized waste management services providers and direct buried must be strongly prohibited.	Already included in cost estimation for EMP	Very Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				• Design fuel storage area and generators area with impervious surface • Carry out electrical equipment maintenance, especially for transformers, by technicians and experts properly • Inspect temporary domestic waste storage area, fuel storage area and switchyard regularly			
5.	Impacts on terrestrial ecology	All Operation Area	Disturbance terrestrial ecology and habitats	• Prohibit introduction of exotic species by workers	Already included in cost estimation for EMP	Very Low	Myanmar Satoketayar Solar Power Co., Ltd.
	Occupational	Solar Power	Health and	• Personal fall restraint	Already		Myanmar

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
6.	health and safety impacts	Plant	safety problems for construction workers	system must be provided for maintenance workers who are working at height • Lockout-tagout system must be used for maintenance of electrical equipment • The project proponent must provide Personal Protective Equipment (PPEs) for all maintenance workers • The project proponent must monitor regularly whether maintenance workers use PPEs adequately or not • Safety notices and emergency contact numbers must be tagged at noticeable	included in cost estimation for EMP	Low	Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				places • First aid training, safety training, firefighting training, electrical equipment repairs and maintenance training and other essential trainings for operation processes of electricity generation and distributing must be arranged • First aid kits must be provided • All energized electrical equipment of the project must be marked with warning signs • Proper management for electricity generation and distributing such as checking all electrical cords, cables and do not			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				use overload voltage must be carried out • The voltage level of the project is low and the project will use qualified products and modern technology for electricity generation • Housekeeping staffs must be trained and assigned • The project proponent must manage the drainage systems properly and provide purified drinking water • All operation workers and staff must follow the instructions to prevent COVID-19 virus infection during pandemic period			
		Overhead		• Personal fall restraint			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Transmission Line		system must be provided for overhead transmission line maintenance workers who are working at height • The project proponent must provide Personal Protective Equipment (PPEs) The project proponent must provide Personal Protective Equipment (PPEs) for all maintenance workers • The project proponent must monitor regularly whether maintenance workers use PPEs adequately or not			
7.	Community health and	Solar Power Plant	Health and safety problems for	• Voltage level of the project is low and the project will use	Already included in cost	Low	Myanmar Satoketayar Solar Power

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
	safety impacts		nearby local communities	qualified products and modern technology for electricity generation • The project proponent must follow international standards to generate electricity and distribute to Satoketayar Substation • Before PV modules installation, project proponent must assess glint and glare on nearby local communities and consult with experts • Safety notices and warning signs must be tagged at the fence of the project site	estimation for EMP		Co., Ltd.
		Overhead Transmission		• Safety notices and warning signs must be tagged at poles of			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Line		overhead transmission line			
8.	Fire hazard impacts	Solar Power Plant	Loss of properties and life	• Maintenance activities must be implemented regularly and properly for electrical equipment • Fire extinguishers must be installed at fuel storage area, generators, switchyard, multiple-use building and other buildings • These fire extinguishers must be inspected regularly • Especially, dry powder type fire extinguishers must be used to extinguish electrical fire and water shall not be used • Firefighting training	Already included in cost estimation for EMP	Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				and fire drills must be provided for all workers • Fire protection lane must be defined around the project site to prevent fire in dry season • Water must be stored adequately and properly with storage tanks for other type of fire cases • Fire hose reels and fire hydrants must be installed to extinguish fire by using water for other types of fire • An assembly point must be assigned for emergency cases • Smoking must be strongly prohibited			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				• Visible and audible fire alarm system must be installed • Emergency routes and exists must be assigned at multiple-use building and other buildings • These emergency routes and exists must not be blocked • Safety notices and emergency contact numbers must be tagged at noticeable places			
		Overhead Transmission Line		• Maintenance activities must be implemented regularly and properly			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
9.	Wastes generation impacts	All operation area	Water and soil pollution and impacts on health	• Define temporary disposal site within the project for domestic waste, before final disposal • Segregate domestic waste by using different appropriate waste bins • Prohibit burning and landfilling solid waste at the project site strongly • Install proper drainage system within the project site • Provide adequate sanitation facilities such as toilets, washing basins and septic tanks • Keep and handle fuel and lubricants for maintenance vehicles	Already included in cost estimation for EMP	Low	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				• Damaged PV modules and uninstalled lifespan-expired PV modules must be disposed with adequate packaging at waste management authorities or service providers, according to the instructions of the government and direct burry and open burning must be strictly prohibited • HSE Coordinator must monitor handling, stockpiling and disposal of PV modules as per monitoring plan • Dispose of used oil by collecting with leak proof containers • Transfer final disposal			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				of solid wastes and hazardous wastes to the Township Municipal			

8.3 Environmental Monitoring Plan

The following table describes the detail Environmental Monitoring Plan for construction phase and operation phase of the proposed project.

Table 8. 4 Environmental Monitoring Plan for construction phase and operation phase

No.	Environmental Concerns	Parameters	Frequency	Location	Estimated Cost	Responsible Party
A.	**Construction Phase (Solar Power Plant)**					
1.	Air quality	PM_{10}, $PM_{2.5}$, CO, CO_2, SO_2, NO_2	Once/ Year	A suitable point within the project site	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.
2.	Surface water quality	pH, Color (true), Turbidity, Conductivity, Total Alkalinity, Iron, Chloride, Manganese, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oil and	Once/ Year	At temporary water tank within the project site	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Environmental Concerns	Parameters	Frequency	Location	Estimated Cost	Responsible Party
		Grease, Total Coliform Bacteria, Total Nitrogen, Total Phosphorus, Total Suspended Solids				
3.	Noise level	Equivalent Noise Level dB (A)	Once/ Year	A suitable point within the project site and a suitable point at village near the project site	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.
4.	Waste Quantity	Amount of construction solid waste, domestic solid waste and hazardous waste disposal	Monthly	All construction area	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.
B.	**Construction Phase (Overhead Transmission Line)**					
1.	Air quality	PM_{10}, $PM_{2.5}$, CO, CO_2, SO_2, NO_2	Once/ Year	In the middle of transmission line's route	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.
2.	Noise level	Equivalent Noise Level dB (A)	Once/ Year	In the middle of transmission line's route	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.
C.	**Operation Phase**					
1.	Air quality	PM_{10}, $PM_{2.5}$, CO, CO_2, SO_2, NO_2	Once/ Year	A suitable point within the project site	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Environmental Concerns	Parameters	Frequency	Location	Estimated Cost	Responsible Party
2.	Groundwater quality	pH, Color (true), Turbidity, Conductivity, Total Alkalinity, Iron, Chloride, Manganese, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oil and Grease, Total Coliform Bacteria, Total Nitrogen, Total Phosphorus, Total Suspended Solids	Once/ Year	An outlet from tube well within the project site	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.
3.	Discharged water quality	pH, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oil and Grease, Total Coliform Bacteria, Total Nitrogen, Total Phosphorus, Total Suspended Solids	Once/ Year	At final outlet of drainage system	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.
4.	Noise level	Equivalent Noise Level dB (A)	Once/ Year	A suitable point within the project site and a suitable point at village near the project site	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.
5.	Waste Quantity	Amount of domestic solid waste and hazardous waste disposal	Quarterly	All operation area	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.

No.	Environmental Concerns	Parameters	Frequency	Location	Estimated Cost	Responsible Party
6.	Environmental auditing	Assess the compliances with this EMP as well as laws, rules, policies and regulations	Once/ Year	At the project office	Already included in cost estimation for EMP	Myanmar Satoketayar Solar Power Co., Ltd.

8.4 Cost Estimation for EMP and EMoP

The following table shows the expenditures for the implementation of Environmental Management Plan and mitigation measures. Estimated prices may be varied according to the implementation time and service providers. We, Myanmar Satoketayar Solar Power Co., Ltd. strongly commit that we will add required funds for the implementation of Environmental Management Plan and mitigation measures including monitoring plan if the following cost estimation for EMP is not enough at the time of real practices throughout the project lifespan.

Table 8. 5 Cost Estimation for EMP and Mitigation Measures

No.	Item	Unit	Frequency	Unit Cost (MMK)	Cost (MMK)
A.	**Mitigation Measures for Construction Phase**				
1.	Dust control			Lump Sum	2,500,000
2.	Provide Personal Protective Equipment (PPEs) to workers			Lump Sum	1,000,000
3.	Provide adequate toiles and septic tanks facilities			Lump Sum	900,000
4.	Use leak-proof fuel containers with secondary containments			Lump Sum	500,000
5.	Provide first aid kits and training for workers			Lump Sum	800,000
6.	Provide purified drinking water for workers			Lump Sum	700,000
7.	Install fire extinguishers			Lump Sum	800,000
8.	Wastes disposal			Lump Sum	1,000,000
Subtotal					**8,200,000**
B.	**Mitigation Measures for Operation Phase**				
1.	Install good ventilation system			Lump Sum	2,500,000
2.	Plant some shady trees			Lump Sum	1,000,000
3.	Install proper drainage system			Lump Sum	1,500,000
4.	Provide Personal			Lump Sum	1,000,000

No.	Item	Unit	Frequency	Unit Cost (MMK)	Cost (MMK)
	Protective Equipment (PPEs) for workers				
5.	Provide first aid kits for workers			Lump Sum	800,000
6.	Provide purified drinking water for workers			Lump Sum	700,000
7.	Install dry powder type fire extinguishers, fire hose reels and fire hydrants			Lump Sum	800,000
8.	Install visible and audible fire alarm system			Lump Sum	500,000
9.	Waste disposal	Month	12	100,000	1,200,000
	Subtotal				**10,000,000**
Contingency					**2,000,000**
Total					**20,200,000**

The following table describes the cost estimation for Environmental Monitoring Plan, Supervision and Capacity Building Programs and these will cost annually. Prices may be varied according to the implementation time and services providers.

Table 8. 6 Cost Estimation for Monitoring, Supervision and Capacity Building

No.	Item	Unit	Quantity	Unit Cost (MMK)	Annual Cost (MMK)
A.	**Environmental Monitoring Plan**				
1.	Air quality	Frequency per year	1	800,000	800,000
2.	Water quality	Frequency per year	1	900,000	900,000
3.	Noise level	Frequency per year	1	400,000	400,000
4.	Waste quantity	Frequency per year	4	150,000	600,000
5.	Monitoring and Reporting	Frequency per year	1	800,000	800,000
Subtotal					**3,500,000**

No.	Item	Unit	Quantity	Unit Cost (MMK)	Annual Cost (MMK)
B.	**Supervision**				
1.	Environmental Officer	Months	12	500,000	6,500,000
Subtotal					**9,500,000**
C.	**Capacity Building (Training Programs for workers)**				**1500,000**
Total					**11,000,000**

8.5 Corporate Social Responsibility (CSR) Plan

Myanmar Satoketayar Solar Power Co., Ltd. will implement Corporate Social Responsibility (CSR) Plan together with Environmental Management Plan (EMP) through the project lifespan. The objective of this plan is to create social welfare for local community and to prove that implement of the proposed project is beneficial for not only the project proponent but also for local community. The project proponent has a plan to use **2% of Annual Net Profit** for the corporate social responsibility fund for the following subjects. Detail CSR Plan of the proposed project is attached in **Appendix**.

Table 8. 7 Corporate Social Responsibility Plan of the Project

No.	Subjects	Percentage of the Fund
1.	Education	25%
2.	Health Care	25%
3.	Social Aid	25%
4.	Environmental Conservation	25%

8.6 Grievance Redress Mechanism

People who live near the project site or stakeholders concerned with the problems and impacts that they suffer from the proposed project; they can complain though Grievance Committee, which includes the responsible persons of the project proponent, representatives from Myaynigone Village and representative from General Administration Department (Satoketayar Township). Small issues will be solved at the Grievance Committee stage and other unsolved problems will be submitted to higher responsible authorities and finally the court will decide in legal terms. The following diagram shows detail steps of Grievance Redress Mechanism of the proposed project.

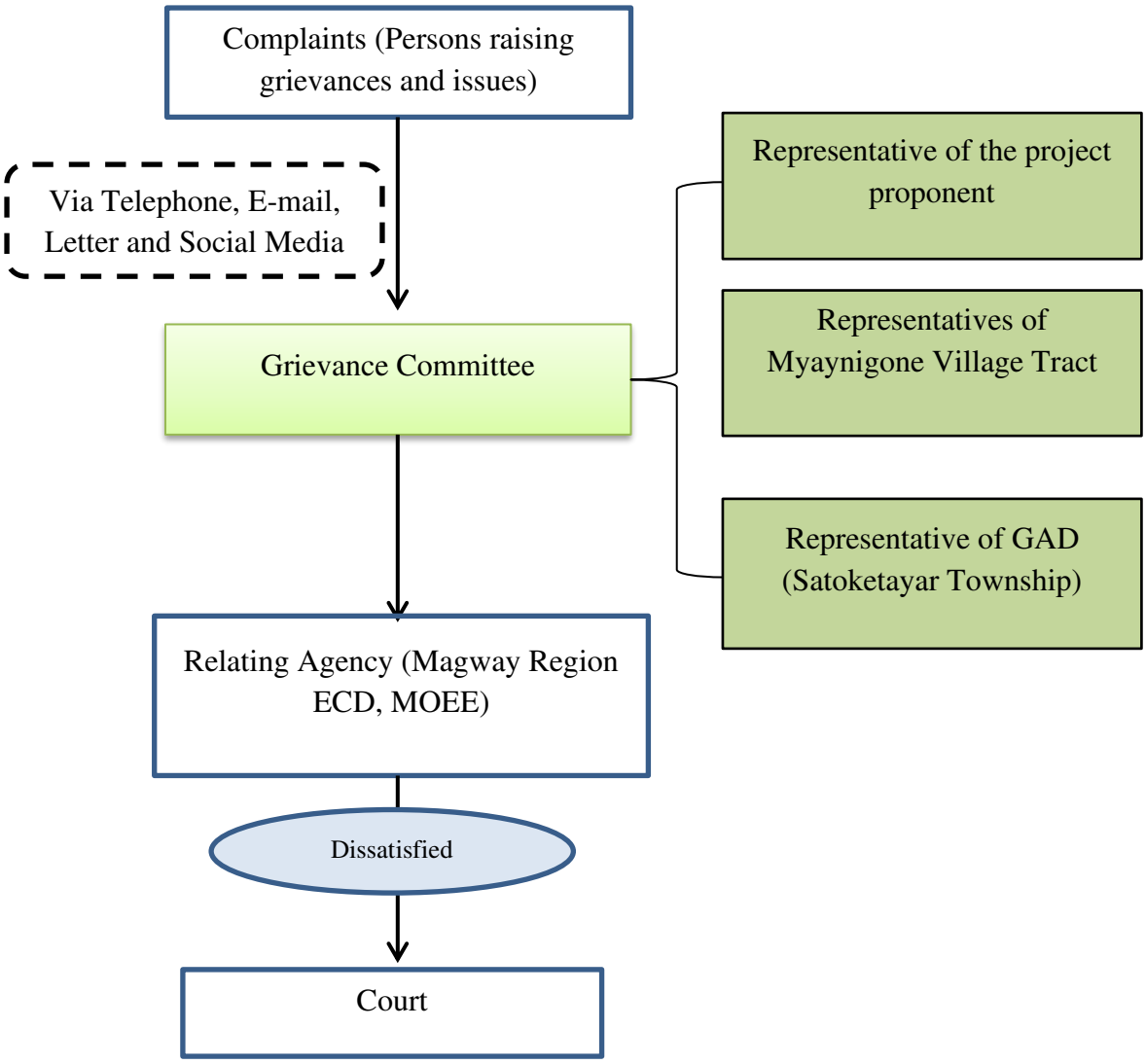


Figure 8. 1 Grievance Redress Mechanism for the Proposed Project

8.7 Firefighting Plan

A set of fire alarm system is set up in the booster station area, including detection device (point or cable detector, manual alarm), centralized alarm device, power supply device and linkage signal device, etc. The centralized alarm device is arranged in the main control room of the booster station, and the detection points are directly connected to the centralized alarm device. In case of fire in equipment and rooms in booster station area, sound and light signals shall be sent out immediately on the centralized alarm device, and the address and time of fire alarm shall be recorded. After confirmation, the corresponding fire-fighting facilities can be manually started to organize fire-fighting. The linkage control mode is adopted to control the ventilator and air conditioner in the main control room and distribution room in the area, and monitor the feedback signals. Deep well pumps are used to pump water to the 150m^3 fire-fighting pool in the booster station as the water source for fire-fighting.

8.8 Emergency Response and Preparedness Plan

The project proponent has already prepared an emergency preparedness plan in order to prevent consequences of natural disasters such as fire, floods and earthquakes and man-made errors. Care should be given to manufacturing processes in order to prevent man-made errors (e.g.

electricity shock, fire hazards) etc. The emergency contact numbers of Township and District Fire Services Department must be printed and tagged at easily visible places for fire emergency cases. The main entrances and emergency routes of the factory must not be blocked with materials or machines for fire emergency cases. Moreover, the project proponent has installed fire extinguishers and fire hose reels. Audible and visible fire alarm systems have been installed at the project site.

In case of fire, all the workers including guests should be evacuated systematically as soon as possible. Firefighting group must be assigned which will cooperate with Satoketayar Township's Fire Services Department. The proponent has committed to abide guidelines provided by Myanmar Fire Services Department. Emergency escape plan must be tagged at multiple-use building.

For all emergency cases, emergency response plan must be developed by the project proponent and train to all workers in order to evacuate systematically during emergency cases. Recovery plan must be developed because recovery plan should be followed after severe damages due to emergency cases.

If an earthquake occurs minimize your movements to a few steps to a nearby safe place and if you are indoors stay there until the shaking has stopped and you are sure exiting is safe.

The following actions should be followed for personnel indoors:

- Drop to the ground and take cover by getting under a sturdy desk or other piece of furniture and hold on until the shaking stops. If there isn't a desk or sturdy piece of furniture near you, cover your face and head with your arms and crouch in an inside corner of the building.

- Stay away from glass, windows, outside doors and walls, and anything that could fall such as lighting fixtures or furniture.

- Use a doorway for shelter only if it is in close proximity to you and if you know it is a strongly supported load bearing doorway.

- Stay inside until the shaking stops and it is safe to go outside.

The following actions should be followed for personnel outdoors:

- If you are already outdoors, stay there.

- Move away from buildings, structures, light poles, and utility wires.


[FIRE]
A fire is both frightening and destructive. Fires are a danger to buildings and residents in equal measure. Keep your cool in the event of a fire by following these SAFE STEPS:
BE PREPARED...
PREPARE YOUR GO-BAGS
KNOW AND PRACTICE YOUR ESCAPE ROUTE
FIRE ALARM
GET IT
INSTALL IT
CHECK IT
CARRY OUT ANNUAL CHECKS, ENSURE FIRE ALARMS WORK
DO NOT LEAVE BURNING CIGARETTES OR CANDLES UNATTENDED
SAND
PREPARE FIRE FIGHTING EQUIPMENT...
AND KNOW HOW TO EXTINGUISH A FIRE
PULL
AIM
SQUEEZE
SWEEP
IF USING EXTINGUISHER, PULL PIN, AIM AND SQUEEZE HANDLE, SWEEP BASE OF FIRE
NEVER USE WATER OR FOAM EXTINGUISHER ON AN OIL OR ELETRICAL FIRE
IN CASE OF FIRE...
IF YOUR CLOTHES CATCH FIRE...
STOP
STOP WHERE YOU ARE
DROP
DROP TO THE GROUND
ROLL
ROLL ON THE FLOOR TO PUT OUT THE FLAMES
IF THERE IS SMOKE...
GET DOWN LOW - COVER YOUR MOUTH WITH A DAMP CLOTH AND GET OUT!
EXIT
GET OUT THROUGH A SAFE EXIT
FIRE ALARM
SOUND ALARM AND CALL FOR HELP
BEWARE OF GAS LEAKS AND EXPOSED WIRE
DO NOT GO HOME UNLESS LOCAL AUTHORITIES DEEM IT SAFE
NATIONAL GEOGRAPHIC CHANNEL
SAFESTEPS.COM
SAFE STEPS TIPS APPROVED BY:
International Federation of Red Cross and Red Crescent Societies
PRUDENCE FOUNDATION

Figure 8. 2 Safety Cards for Awareness of Emergency Cases

In case of Fire, the following emergency response plan should be done immediately.

- Alert other workers to gather at assembly point
- For electrical fire, turn off electricity distributing devices before fighting

- For electrical fire, oil and lubricant fire DO NOT USE WATER, rather use dry powder type fire extinguishers
- If small, control using an extinguisher or fire hose reel
- Contact Fire Services Department if not under immediate control
- Attend to human life in immediate danger
- Once out of the building, stay out. Do not allow people to go back into the burning building to collect valuables. While existing the building, close doors (but do not lock) to slow down the spread of fire
- Obey all instructions issued by the project proponent
- Proceed to emergency evacuation area
- First aid measures should be followed to all injured persons and transfer to clinic or hospital if necessary.

9. RESULT OF THE STAKEHOLDER MEETING

9.1 Purpose of the Stakeholder Meeting

It is important to disclose the information of the project during the EMP report preparation and the opinions of attendees must be considered in implementation of the project. Stakeholder meeting should be held with local people to be affected by the project, administrative bodies and community-based organizations. Especially, results of consultation with Project Affected Persons (PAP) should be considered in identification of impacts, impact assessment, mitigation measures formulating and environmental monitoring plans.

9.2 Methodology and Approach

As methodology, information disclosure should be carried out by announcing the stakeholder meeting for the proposed project to local people within an adequate time needed for invitation. All feedbacks from stakeholder meeting should be well-addressed and considered in the formulation of EMP, environmental monitoring plan and CSR plan. For the proposed project, the project proponent informed and invited local people to attend the stakeholder meeting. The EMP report will be finalized and submitted to ECD for environmental approval. After submission, the submitted EMP report will be ensured for available to interested parties and public at Satoketayar Township General Administration Department, Magway Region Environmental Conservation Department, proposed ground mounted solar power plant's project office and office of E Guard Environmental Services, where any interested persons can review for further comments and suggestions.

Stakeholder Meeting and information disclosure concerning with the Environmental Management Plan (EMP) for the construction and operation of 30 MW ground mounted solar power plant project connected to Satoketayar Substation, proposed by Myanmar Satoketayar Solar Power Co., Ltd. was held on 26th May, 2022 at Satoktayar Solar Project Site Meeting Hall, Myaynigone Village, Myaynigone Village Tract, Satoketayar Township. The staring time was 9:00 am and finished at 10:30 am. The objective of the meeting is to disclose information of the project, potential impacts of project activities and mitigation measures and to receive public recommendations and feedbacks for the proposed project. The project proponent invited local people by negotiating with village administrators. The attendance list, presentation file and photos are described in **Appendix 3, 4 and 5.** The number of attendees in the meeting is briefly shown in the following table**.**

Table 9. 1 Attendance List of Stakeholder Meeting

No.	Category	Number of Participants
1.	Local People from Myaynigone Village	10
3.	Representatives of project proponent	5
4.	Representatives of E Guard Environmental Services	4
Total		**19**

9.3 Agenda of Stakeholder Meeting

The meeting was held in accordance with the following agenda;

1) Opening Ceremony
2) Presentation of Project Information by U Thuta Soe (Assistant Project Manager, Asia Oracle Construction) on behalf of Mr. AN GUOHUA (Project Manager, Sinohydro Myanmar Co., Ltd.)
3) Presentation of Environmental Management Plan (EMP) for construction and operation of 30 MW ground mounted solar power plant project connected to Satoktayar Substation by Daw Shwe Ya Min Bo (Environmental Specialist, E Guard Environmental Services Co., Ltd.)
4) Questions, Comments and Suggestions from the attendees.
5) Closing Ceremony.

The detail of each agenda is described in the following:

1. Opening Ceremony

2. Presentation of Project Information by U Thuta Soe on behalf of Mr. AN GUOHUA (Project Manager, Sinohydro Myanmar Co., Ltd.)

U Thuta Soe (Assistant Project Manager, Asia Oracle Construction) briefly explained about the project information such as type of business, construction and operation processes of the project, project proponent information and project description.

3. Presentation of Environmental Management Plan (EMP) for construction and operation of 30 MW ground mounted solar power plant project connected to Satoktayar Substation by Daw Shwe Ya Min Bo (Environmental Specialist, E Guard Environmental Services Co., Ltd.)

Daw Shwe Ya Min Bo explained the processes of environmental management plan preparation, potential positive impacts of the project, potential negative impacts of the project, proposed mitigation measures to reduce these negative impacts, proposed monitoring plan, grievance redress mechanism and environmental quality measurements processes of the proposed project.

4. Questions, Comments and Suggestions from the Attendees

Question: **U Aung (Myaynigone Village)**

(a) He would like to know about the project boundary. Will the fence be inside or outside of boundary line?
(b) Will you inform before forest burning to us?
(c) The amount of toilets in the construction site camps enough or not. He worried about the health problems to his village.
(d) He also would like to know about the impact on weather condition and agriculture.

Answer: **U Thuta Soe (Assistant Project Manager, Asia Oracle)**

(a) He answered that the fence will be in the center of the project boundary but there will be a little bit impact from the vehicle using of land clearance and please kindly understand that point.

(b) Yes, we will inform to village tract leader before forest burning.

(c) Yes, we can do more toilets immediately.
Daw Shwe Ya Min Bo (Environmental Specialist, E Guard Environmental Services)

(d) Solar energy plant can reduce greenhouse gas emissions particularly CO_2, thus mitigate climate change and can't impact on weather condition and agriculture.

Question: **U Thura (Myaynigone Village)**

(a) He asked that will you use herbicides or chemicals for the ground clearance around solar panels such as shrubs and grasses. He worried about the impact on soil contamination, groundwater contamination and animals drinking and agriculture.

(b) He would like to know that he understand solar panels absorb the sunlight, thus is there any reflection from them.

(c) The project is not temporary and he worried about the fire hazards in the upcoming years.

Answer: **Mr. LONG YUN GUO (Sinohydro Myanmar), U Kyaw Soe (Director, Asia Oracle)**

(a) U Kyaw Soe translated to Mr. LONG YUN GUO about the question and he answered that there is no chemical or herbicides usage for ground clearance.
U Thuta Soe (Assistant Project Manager, Asia Oracle)

(b) They will use mono crystalline silicon solar panels that absorb light and reflect only a small amount of the sunlight and not sun's heat.
Daw Shwe Ya Min Bo (Environmental Specialist, E Guard Environmental Services)

(c) Fire Fighting Plan and other emergency response plan are also set up in EMP and the project proponent will implement this plan to reduce the negative impacts.

Question: **U Arr Marn (Myaynigone Village)**

He worried about the weather condition because of the project.

Suggestion By: **U Win Thaung (Myaynigone Village Tract Leader)**

He hopes there are no negative impacts from the project.

Answer: **Daw Shwe Ya Min Bo (Environmental Specialist, E Guard Environmental Services)**

We will note each of villagers' suggestion and mention in our EMP report.

5. Closing the Ceremony

10.CONCLUSION

10.1 Conclusion

This Environmental Management Plan (EMP) is formulated for the proposed project in accordance with Environmental Impact Assessment Procedure as per instructions of Environmental Conservation Department (ECD). The project proponent will implement the EMP during construction and operation in compliance with the National laws and regulations for environmental protection.

The effective implementation of the mitigation measures proposed will ensure towards good environmental management within the proposed project area. Implementation of appropriate mitigation measures are needed to be implemented by establishing an EMS (Environmental Management System) based on the description from this EMP. Employment of Environmental Staff, training to the engineers and workers, budget allocation, etc., is vital for the success of an EMS.

A GRM will be implemented from the earlier stage of the commencement of the project and engage the problem arise from the public or encounter due to the activities by the project proponent or contractors.

Though, the main objective of the study is to identify the major environmental impacts due to the implementation of the project activities in two phases; construction phase and operation phase but descriptions of decommissioning phase is excluded as the project proponent will extend the operation periods with the approval of relevant departments to generate electricity from solar energy as per Build, Own, Operate (BOO) basis at the end of contracted operation period. The project proponent is committed to submit decommissioning plan when the project is to be closed permanently due to any reasons; operational, technical, financial, social or political.

This EMP report will be used as guidance for implementing the environmental management tasks practically and cost effectively with continuous improvement.

The findings of the EMP study indicated that the proposed project would generate positive impacts such as local employment and business opportunities, and enhancement of capabilities and working skills of the employees. Consequently, local socio-economic in the region is expected to be improved. Successful implementation of the proposed project will raise confidence for investors and aid agencies to develop further solar and other renewable projects in Myanmar. Major benefits of this project is that it will increase the supply of electrical energy in Myanmar from a renewable source, which is in line with the aim of the Myanmar Government to increase energy supply and reduce the overall CO_2 emission of Myanmar by substituting energy from the predominating coal-fired Power Plants.

REFERENCES

- General Administration Department (Satoketayar Township), 2020, *"Satoketayar Township Data"*.
- Ministry of Environmental Conservation and Forestry (MOECAF), 2015, *"Environmental Impact Assessment Procedure"*.
- Ministry of Environmental Conservation and Forestry (MOECAF), 2015, *"National Environmental Quality (Emission) Guidelines"*.
- E Guard Environmental Services Co., Ltd., 2021, *"Environmental Management Plan for 30 MW Ground Mounted Solar Power Plant Project, Connected to Thapyaywa Substation"*.

APPENDIX

Appendix 1 Commitment Letter from Project Proponent

MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED

To follow Commitments and Mitigation Measures stated in the Environmental Management Plans (EMP) of Environmental Management Plan (EMP) Report

With regards to the above matter, we, MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED, strongly commit that this EMP report, prepared by E Guard Environmental Services Co., Ltd. is strong and complete. We also commit that we will operate our proposed project according to our commitments and implement Environmental Management Plan (EMP) and mitigation measures that are mentioned in this EMP report. Moreover, we commit to work out our best not to cause any impacts on social and environment during the construction and operation phases of the project by implementing the appropriate mitigation measures described in this EMP report and if any impacts that are not anticipated in the report occur, appropriate mitigation measures must be implemented accordingly.

Your Sincerely,

Mr. Jiang Xingcheng
Director
Myanmar Satoketayar Solar Power Company Limited

Appendix 2 Commitment Letter from Third Party

E GUARD ENVIRONMENTAL SERVICES
No. 145 (A2-3), Thiri Mingalar Street (သိရိမင်္ဂလာ လမ်းဆွယ်),
Ward No. (4), 8 Mile-Pyay Road, Mayangone Township, 11062, Yangon,
the Republic of the Union of Myanmar
Ph: (+95) 1 9667757, (+95) 9 797005151
www.eguardservices.com; info@eguardservices.com

Commitment to follow and compliance with Environmental Conservation Law, Rules, Environmental Impact Assessment Procedure, National Environmental Quality (Emission) Guidelines, Relevant Environmental Standards and Mitigation Measures stated in the Environmental Management Plan (EMP) of EMP Report

With regards to the above matter, we, E Guard Environmental Services Co., Ltd. Has prepared the Environmental Management Plans (EMP) Report for 30 MW Ground Mounted Solar Power Plant Project connected to Satoketayar Substation, proposed by Myanmar Satoketayar Solar Power Co., Ltd., Our company strongly commits that this EMP report has been prepared by following Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental Impact Assessment Procedure (2015), National Environmental Quality (Emission) Guidelines (2015) and relevant environmental standards through successful implementation of mitigation measures and environmental monitoring plans stated in the Environmental Management Plan (EMP) of EMP Report.

Aye Thiha
Managing Director
E guard Environmental Services

www.facebook.com/EGuardmm/

Appendix 3 Instructions to prepare EMP report

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
ညွှန်ကြားရေးမှူးချုပ်ရုံး

စာအမှတ်၊ EIA - ၂/၉/ သဘောထား (PP-N)(ဒေသ/ ၂၀၂၂)
ရက်စွဲ ၊ ၂၀၂၂ ခုနှစ် ဩဂုတ် လ ၃ ရက်

သို့

အုပ်ချုပ်မှုဒါရိုက်တာ
Myanmar Satoketayar Solar Power Co.,Ltd
အမှတ် (၆၈၀) စိန်ပန်းလမ်းနှင့် သရဖီလမ်းထောင့်၊ သပြေကုန်းရပ်ကွက်၊ ဇမ္ဗူသီရိမြို့နယ်၊
နေပြည်တော်၊ ဖုန်း - ၀၉- ၂၂၂၀၉၈၂

အကြောင်းအရာ။ **Myanmar Satoketayar Solar Power Co.,Ltd ၏ ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်သုံးလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းလုပ်ငန်းနှင့်ပတ်သက်၍ ပေးပို့လာသော စီမံကိန်းအဆိုပြုလွှာအပေါ် သဘောထားမှတ်ချက်ပြန်ကြားခြင်း**

ရည်ညွှန်းချက်။ (၁) Myanmar Satoketayar Solar Power Co.,Ltd ၏ ၂၁-၇-၂၀၂၂ ရက်နေ့ ရက်စွဲပါ စာအမှတ်၊ Satoketayar/ECD/2022-01

(၂) ဤဝန်ကြီးဌာန၊ ပြည်ထောင်စုဝန်ကြီးရုံး၏ ၂၂-၄-၂၀၂၁ ရက်စွဲပါ စာအမှတ်၊ (သစ်တော) ၃(၂) /၀၃ (EC) / (၁၀၉၄ /၂၀၂၁)

၁။ အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ Myanmar Satoketayar Solar Power Co.,Ltd က မကွေးတိုင်းဒေသကြီး၊ မင်းဘူးခရိုင်၊ စေတုတ္တရာမြို့နယ်တွင် အကောင်အထည်ဖော်ဆောင်ရွက် မည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်သုံးလျှပ်စစ်ဓာတ်အား ထုတ်လုပ်မည့် စီမံကိန်းအတွက် စီမံကိန်း အဆိုပြုလွှာအား စိစစ်သုံးသပ်ပေးနိုင်ပါရန် ရည်ညွှန်း (၁) ပါစာဖြင့် ပေးပို့တင်ပြလာပါသည်။

၂။ Myanmar Satoketayar Solar Power Co.,Ltd က အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လုပ်မည့် စီမံကိန်းအတွက် စီမံကိန်း အဆိုပြုလွှာအား စိစစ်သုံးသပ်ရာတွင် အောက်ဖော်ပြပါအတိုင်း တွေ့ရှိရပါသည်-

(က) နေရောင်ခြည်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လုပ်မည့် စီမံကိန်းအကျယ်အဝန်းမှာ ၁၄၈.၈ ကေ ကျယ်ဝန်းပြီး အဆိုပါ မြေနေရာအား Super One Holding Co.,Ltd မှ China ITS (Holdings) Col.,Ltd ထံသို့ ငှားရမ်းထားခြင်းဖြစ်ကြောင်း၊

ဓာတ်အားလိုင်းသွယ်တန်းခြင်း၊လမ်းဖောက်ခြင်း၊ ဝန်ထမ်းများနေထိုင်ရာနေရာများ တည်ဆောက်ခြင်း စသည့် လုပ်ငန်းများအားလုံးကိုခြုံငုံသောပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်ကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း အပိုဒ် (၆၃)၊ အပိုဒ်ခွဲ (၈) နှင့် အပိုဒ် (၇၇) တို့နှင့်အညီ ရေးဆွဲ၍ သယံဇာတနှင့်သဘာဝ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသို့ တင်ပြအတည်ပြုချက်ရယူရန်၊

(ခ) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲရာတွင် နေရောင်ခြည်သုံးလျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းလုပ်ငန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ သက်ရောက်မှုများဖြစ်သော ဂေဟစနစ်နှင့် ဇီဝမျိုးစုံမျိုးကွဲ၊ မြေအသုံးချမှု၊ စွန့်ပစ်ပစ္စည်း (အစိုင်အခဲ/ အရည်) စီမံခန့်ခွဲခြင်း၊ လူမှုစီးပွားရေး၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးစသည့် နယ်ပယ်များဆိုင်ရာ ကျွမ်းကျင်ပညာရှင်များဖြင့် ပြည့်စုံစွာရေးဆွဲတင်ပြရန်၊

(ဂ) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို ဦးစီးဌာနသို့ တင်သွင်းပြီးနောက် ၁၅ ရက်ထက် နောက်မကျစေဘဲ လူမှုအဖွဲ့အစည်း၊ စီမံကိန်းကြောင့် ထိခိုက်ခံစားရသူများ၊ ဒေသ ဆိုင်ရာအဖွဲ့အစည်းနှင့် အခြားအကျိုးသက်ဆိုင်သူများသိရှိနိုင်စေရန် စီမံကိန်း သို့မဟုတ် စီမံကိန်းအဆိုပြုသူ၏ ဝက်ဘ်ဆိုဒ်များနှင့် သတင်းစာစသည့် ပြည်တွင်း မီဒီယာများမှ လည်းကောင်း၊ စာကြည့်တိုက်၊ လူထုစုဝေးခန်းမစသည့် အများပြည်သူ စုဝေးရာနေရာများတွင်လည်းကောင်း၊ စီမံကိန်းအဆိုပြုသူ၏ ရုံးများတွင်လည်းကောင်း ထုတ်ပြန်ကြေညာ၍ထုတ်ပြန်ကြေညာကြောင်းအထောက်အထားသို့မဟုတ် ဝက်ဘ်ဆိုဒ် လိပ်စာတို့အား အစီရင်ခံစာတင်သွင်းပြီး ၁၅ ရက်အတွင်း reporting.eia@gmail.com သို့ တင်ပြရန်။

ညွှန်ကြားရေးမှူးချုပ် (ကိုယ်စား)

(ဒေါက်တာဆန်းဦး၊ ဒုတိယညွှန်ကြားရေးမှူးချုပ်)

မိတ္တူကို

ပြည်ထောင်စုဝန်ကြီးရုံး၊ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန၊ ရုံးအမှတ် (၂၈)
ဦးဆောင်ညွှန်ကြားရေးမှူး၊ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ရေးလုပ်ငန်း
ညွှန်ကြားရေးမှူးရုံး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ မကွေးတိုင်းဒေသကြီး
ရုံးလက်ခံ၊ မျှောစာတွဲ

Appendix 4 Third-party's certificate for transitional consultant registration

REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ်)

No. 10028 Date 15 JUN 2017

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို အဖွဲ့အစည်းအား ထုတ်ပေးလိုက်သည်။)

(a)	Name of Organization (အဖွဲ့အစည်းအမည်)	E Guard Environmental Services Co., Ltd.
(b)	Name of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏အမည်)	U Aye Thiha
(c)	Citizenship of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏နိုင်ငံသား)	Myanmar
(d)	Identity Card /Passport Number of the representative person in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)	12/ MRK (Naing) 069784
(e)	Address of organization (ဆက်သွယ်ရန်လိပ်စာ)	No. 99, Mya Kan Thar Lane, Nyein Chan Yay Street, 10 Miles, Pyay Road, Saw Bwar Gyi Gone, Insein Township, Yahgon. info@eguardservices.com, 09448001676
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Organization
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	31 March 2018

EXTENSION

သက်တမ်းတိုးမြှင့်ခြင်း

The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)

ဤလက်မှတ်သက်တမ်းကာလ (၀၁-၀၄-၂၀၁၈) မှစ၍တစ်နှစ် (၃၁-၀၃-၂၀၁၉) အထိ သက်တမ်းတိုးမြှင့်ပေးသည်။

For Director General
(Soe Naing, Director)
Environmental Conservation Department

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Air Pollution Control
2. Ecology and Biodiversity
3. Facilitation of Meeting
4. Geology and Soil
5. Ground Water and Hydrology
6. Land Use
7. Legal Analysis
8. Modeling for Water Quality
9. Noise and Vibration
10. Risk Assessment and Hazard Management
11. Socio-Economy
12. Water Pollution Control
13. Waste Management
14. Agriculture, RAP
15. Food Technology
16. Health Impact Assessment
17. Marine and Microbiology, Water Quality
18. RS & GIS
19. Water Quality

EXTENSION (သက်တမ်းတိုးခြင်းခြင်း)
The VALIDITY of this certificate is extended for six months from (1.1.2023) to (30.6.2023)
ဤလက်မှတ်အား(၁-၁-၂၀၂၃)ရက်နေ့မှ(၃၀-၆-၂၀၂၃)
ရက်နေ့အထိ (၆)လသက်တမ်းတိုးပြင်ပေးသည်။
For Director General
(Sa Aung Thu, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးခြင်းခြင်း)
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား(၁-၁-၂၀၂၂)ရက်နေ့မှ(၃၁-၁၂-၂၀၂၂)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးပြင်ပေးသည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးခြင်းခြင်း
The VALIDITY of this certificate is extended for six months from (1.7.2021) to (31.12.2021)
ဤလက်မှတ်အား(၁-၇-၂၀၂၁)ရက်နေ့မှ(၃၁-၁၂-၂၀၂၁)
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးပြင်ပေးသည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးခြင်းခြင်း
The VALIDITY of this certificate is extended for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား(၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁-၁၂-၂၀၁၉)
ရက်နေ့အထိ (၉)လသက်တမ်းတိုးပြင်ပေးသည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးခြင်းခြင်း
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား(၁-၁-၂၀၂၀)ရက်နေ့မှ(၃၁-၁၂-၂၀၂၀)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးပြင်ပေးသည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
The VALIDITY of this certificate is extended for six months from (1.1.2019) to (30.6.2019)
ဤလက်မှတ်အား(၁-၁-၂၀၁၉)ရက်နေ့မှ(၃၀-၆-၂၀၁၉)
ရက်နေ့အထိ (၆)လသက်တမ်းတိုးပြင်ပေးသည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

Appendix 5 Third-party's expert certificate for transitional consultant registration

REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 10067 Date

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

(a)	Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)	U Soe Min
(b)	Citizenship (နိုင်ငံသား)	Myanmar
(c)	Identity Card / Passport Number (မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ် အမှတ်)	7/ Pa Ma Na (N) 006103
(d)	Address (ဆက်သွယ်ရန်လိပ်စာ)	No.42(A), Bawdiyeiktha, Shwetaunggyar (2), Bahan Township, Yangon. usoemin@gmail.com usoemin@eguardservices.com , 09 448001676
(e)	Organization (အဖွဲ့အစည်း)	E Guard Environmental Services Co.,Ltd.
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Person
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	31 March 2018

EXTENSION

The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)

For Director General

(Soe Naing, Director)

Director General

Environmental Conservation Department

Ministry of Natural Resources and Environmental Conservation

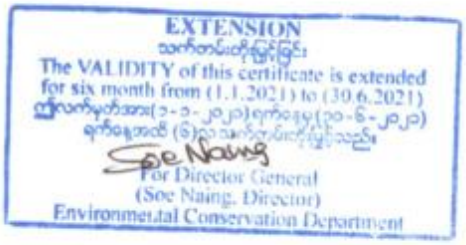
Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

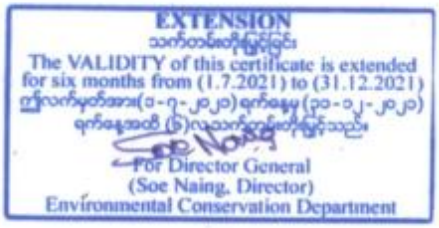
1. Air Pollution Control

2. Modeling for Water Quality

3. Water Pollution Control

4. Water Resources Engineering





REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 10104 Date

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

(a)	Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)	Daw Thein Mwe Khin
(b)	Citizenship (နိုင်ငံသား)	Myanmar
(c)	Identity Card / Passport Number (မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)	8/ Aa La Na (Naing) 140211
(d)	Address (ဆက်သွယ်ရန်လိပ်စာ)	99, Mya Kan Thar Lane, Nyein Chan Yay Street, 10 Mile, Pyay Road, Saw Bwar Gyi Kone Ward, Insein Township, Yangon Northern District, Yangon. theinmwe@eguardservices.com , 09 797005174
(e)	Organization (အဖွဲ့အစည်း)	E Guard Environmental Services Co., Ltd.
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Person
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	31 March 2018

သက်တမ်းတိုးမြှင့်ခြင်း

The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)

ဤလက်မှတ်အား (၁-၄-၂၀၁၈) ရက်နေ့မှ (၃၁.၃.၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်တောက်တန်း တိုးမြှင့်ထားသည်။

For Director General
(Soe Naing, Director)
Environmental Conservation Department

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Forestry

EXTENSION
သက်တမ်းတိုးခြင်းပြုပြင်
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား(၁-၁-၂၀၂၀) ရက်စွဲမှ (၃၁-၁၂-၂၀၂၀)
ရက်စွဲအထိ တစ်နှစ်သက်တမ်းတိုးပြင်သည်။
Soe Naing 2.1.2020
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးခြင်းပြုပြင်
The VALIDITY of this certificate is extended for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား(၁-၄-၂၀၁၉) ရက်စွဲမှ (၃၁-၁၂-၂၀၁၉)
ရက်စွဲအထိ (၉)လသက်တမ်း တိုးပြင်သည်။
Soe Naing 7.6.2019
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးခြင်းပြုပြင်း
The VALIDITY of this certificate is extended for six month from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား(၁-၁-၂၀၂၁) ရက်စွဲမှ (၃၀-၆-၂၀၂၁)
ရက်စွဲအထိ (၆)လသက်တမ်းတိုးပြင်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးခြင်းပြုပြင်း)
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား(၁-၁-၂၀၂၂) ရက်စွဲမှ (၃၁-၁၂-၂၀၂၂)
ရက်စွဲအထိ တစ်နှစ်သက်တမ်းတိုးပြင်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးမြှင့်ပြင်း)
The VALIDITY of this certificate is extended for six months from (1.1.2023) to (30.6.2023)
ဤလက်မှတ်အား(၁-၁-၂၀၂၃) ရက်စွဲမှ (၃၀-၆-၂၀၂၃)
ရက်စွဲအထိ (၆)လသက်တမ်းတိုးပြင်သည်။
Sa Aung Thu
For Director General
(Sa Aung Thu, Director)
Environmental Conservation Department

THE REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00281 Date 13 FEB 2023

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.
(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယ်ဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

(a)	Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)	Mr. Aung Si Thu Thein
(b)	Citizenship (နိုင်ငံသား)	Myanmar
(c)	Identity Card / Passport Number (မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)	12/AhSaNa (N) 199101
(d)	Address (ဆက်သွယ်ရန်လိပ်စာ)	Room No. (1), Building No. (30), Gyogone Avenue, Western Gyogone Ward, Insein Tsp, Yangon. Mobile phone: 095504419, 09797005164 Telephone: +95 1 3644743 E mail: agsithuforestry@gmail.com, aungsithu@eguardservices.com
(e)	Organization (အဖွဲ့အစည်း)	E guard Environmental Services Co., Ltd
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Person
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	30th June, 2023.

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

ဤအထောက်အထားလက်မှတ်သည် ဇနီဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း ထုတ်ပြန်သည့်ရက်မှစ၍ (၆) လ ပြည့်မြောက်သည့်နေ့တွင် ပျက်ပြယ်မည် ဖြစ်သည်။

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Ecology and Biodiversity;	2. O (GIS);
3. Land use.	4.
5.	6.
7.	8.
9.	10.
11.	12.
13.	14.

စည်းကမ်းချက်များ

၁။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-

(က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုစေခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်စေခြင်းမပြုရ၊

(ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

(ဂ) ဤအထောက်အထားလက်မှတ်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူ လေ့လာဆန်းစစ်ရေးဆွဲခွင့်ရှိသည်၊

(ဃ) မိမိအဖွဲ့အစည်းတွင် ပါဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်စုံတစ်ရာရှိပါက ကြားကာလ အကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသူဖြင့်သာ အစားထိုး ပြောင်းလဲရမည်၊

(c) အဖွဲ့အစည်းဖြစ်ပါက အဖွဲ့အစည်းတွင် ဒါရိုက်တာဘုတ်အဖွဲ့ (Board of Director)၊ အကြံပေးပုဂ္ဂိုလ် (Consultant) များ ပြောင်းလဲလိုလျှင် တည်ဆဲဥပဒေများနှင့်အညီ ဆောင်ရွက်ပြီး ရက်ပေါင်း ၃၀ အတွင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ မဖျက်မကွက် အကြောင်းကြားရမည်၊

(စ) ဝန်ကြီးဌာနက အခါအားလျော်စွာ သတ်မှတ်သည့် စည်းကမ်းချက်များကိုလိုက်နာရမည်၊

(ဆ) ဖော်ပြပါ စည်းကမ်းချက်တစ်ရပ်ရပ်ကို ဖောက်ဖျက်ခြင်း၊ လိုက်နာရန်ပျက်ကွက်ခြင်း တစ်စုံတစ်ရာ ပေါ်ပေါက်ပါက အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၂။ အထောက်အထားလက်မှတ်ရရှိသူသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနက ခွင့်ပြုထားသော ပတ်ဝန်းကျင် ဆန်းစစ်ခြင်းအမျိုးအစားကိုသာ ဆောင်ရွက်ရမည်၊

၃။ အထောက်အထားလက်မှတ်ရရှိသူသည် မြန်မာနိုင်ငံ၏ တည်ဆဲဥပဒေတစ်ရပ်ရပ်ကို ဖောက်ဖျက်ကြောင်း သို့မဟုတ် ဆန်းစစ်ခြင်းလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် သိသာထင်ရှားသော မှားယွင်းမှုများ ပါရှိနေပြီး သတ်မှတ် စံချိန်စံညွှန်း သို့မဟုတ် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်၊

၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။

THE REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00279 Date 13 FEB 2023

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.
(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

(a)	Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)	Ms. Shwe Ya Min Bo
(b)	Citizenship (နိုင်ငံသား)	Myanmar
(c)	Identity Card / Passport Number (မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)	8/MaKaNa (N) 218158
(d)	Address (ဆက်သွယ်ရန်လိပ်စာ)	No. A 870, 6th road, AungMyitter Quarter, Magway Region, Magway. Mobile phone: 09441545461 E mail: shweyaminbo712016@gmail.com shweyaminbo@eguardservices.com
(e)	Organization (အဖွဲ့အစည်း)	E guard Environmental Services Co., Ltd
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Person
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	30th June, 2023.

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

ဤအထောက်အထားလက်မှတ်သည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း ထုတ်ပြန်သည့်ရက်မှစ၍ (၆) လ ပြည့်မြောက်သည့်နေ့တွင် ပျက်ပြယ်မည် ဖြစ်သည်။

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. O (Forestry);	2. O (GIS);
3. Ecology and Biodiversity.	4.
5.	6.
7.	8.
9.	10.
11.	12.
13.	14.

စည်းကမ်းချက်များ

၁။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-

(က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုစေခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်စေခြင်းမပြုရ၊

(ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

(ဂ) ဤအထောက်အထားလက်မှတ်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူ လေ့လာဆန်းစစ်ရေးဆွဲခွင့်ရှိသည်၊

(ဃ) မိမိအဖွဲ့အစည်းတွင် ပါဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်စုံတစ်ရာရှိပါက ကြားကာလ အကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသူဖြင့်သာ အစားထိုး ပြောင်းလဲရမည်၊

(င) အဖွဲ့အစည်းဖြစ်ပါက အဖွဲ့အစည်းတွင် ဒါရိုက်တာဘုတ်အဖွဲ့ (Board of Director)၊ အကြံပေးပုဂ္ဂိုလ် (Consultant) များ ပြောင်းလဲလိုလျှင် တည်ဆဲဥပဒေများနှင့်အညီ ဆောင်ရွက်ပြီး ရက်ပေါင်း ၃၀ အတွင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ မဖျက်မကွက် အကြောင်းကြားရမည်၊

(စ) ဝန်ကြီးဌာနက အခါအားလျော်စွာ သတ်မှတ်သည့် စည်းကမ်းချက်များကိုလိုက်နာရမည်၊

(ဆ) ဖော်ပြပါ စည်းကမ်းချက်တစ်ရပ်ရပ်ကို ဖောက်ဖျက်ခြင်း၊ လိုက်နာရန်ပျက်ကွက်ခြင်း တစ်စုံတစ်ရာ ပေါ်ပေါက်ပါက အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၂။ အထောက်အထားလက်မှတ်ရရှိသူသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနက ခွင့်ပြုထားသော ပတ်ဝန်းကျင် ဆန်းစစ်ခြင်းအမျိုးအစားကိုသာ ဆောင်ရွက်ရမည်၊

၃။ အထောက်အထားလက်မှတ်ရရှိသူသည် မြန်မာနိုင်ငံ၏ တည်ဆဲဥပဒေတစ်ရပ်ရပ်ကို ဖောက်ဖျက်ကြောင်း သို့မဟုတ် ဆန်းစစ်ခြင်းလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် သိသာထင်ရှားသော မှားယွင်းမှုများ ပါရှိနေပြီး သတ်မှတ် စံချိန်စံညွှန်း သို့မဟုတ် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်၊

၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။

THE REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00266 Date 13 FEB 2023

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.
(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

(a)	Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)	Ms. Htet Shwe Sin Aung
(b)	Citizenship (နိုင်ငံသား)	Myanmar
(c)	Identity Card / Passport Number (မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)	12/TaMaNa (N) 117189
(d)	Address (ဆက်သွယ်ရန်လိပ်စာ)	No-25, 3rd floor, Thida Street, Kyaukmyaung ward, Tamwe Tsp, Yangon. Mobile phone: 09797005151 Telephone: 951 9667757 E mail: shwesinhtet@eguardservices.com
(e)	Organization (အဖွဲ့အစည်း)	E guard Environmental Services Co., Ltd
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Person
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	30th June, 2023.

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

ဤအထောက်အထားလက်မှတ်သည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း ထုတ်ပြန်သည့်ရက်မှစ၍ (၆) လ ပြည့်မြောက်သည့်နေ့တွင် ပျက်ပြယ်မည် ဖြစ်သည်။

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Ecology and Biodiversity.	2.
3.	4.
5.	6.
7.	8.
9.	10.
11.	12.
13.	14.

စည်းကမ်းချက်များ

၁။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-

(က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုစေခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်စေခြင်းမပြုရ၊

(ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

(ဂ) ဤအထောက်အထားလက်မှတ်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူ လေ့လာဆန်းစစ်ရေးဆွဲခွင့်ရှိသည်၊

(ဃ) မိမိအဖွဲ့အစည်းတွင် ပါဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်စုံတစ်ရာရှိပါက ကြားကာလ အကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသူဖြင့်သာ အစားထိုး ပြောင်းလဲရမည်၊

(င) အဖွဲ့အစည်းဖြစ်ပါက အဖွဲ့အစည်းတွင် ဒါရိုက်တာဘုတ်အဖွဲ့ (Board of Director)၊ အကြံပေးပုဂ္ဂိုလ် (Consultant) များ ပြောင်းလဲလိုလျှင် တည်ဆဲဥပဒေများနှင့်အညီ ဆောင်ရွက်ပြီး ရက်ပေါင်း ၃၀ အတွင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ မဖျက်မကွက် အကြောင်းကြားရမည်၊

(စ) ဝန်ကြီးဌာနက အခါအားလျော်စွာ သတ်မှတ်သည့် စည်းကမ်းချက်များကိုလိုက်နာရမည်၊

(ဆ) ဖော်ပြပါ စည်းကမ်းချက်တစ်ရပ်ရပ်ကို ဖောက်ဖျက်ခြင်း၊ လိုက်နာရန်ပျက်ကွက်ခြင်း တစ်စုံတစ်ရာ ပေါ်ပေါက်ပါက အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၂။ အထောက်အထားလက်မှတ်ရရှိသူသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနက ခွင့်ပြုထားသော ပတ်ဝန်းကျင် ဆန်းစစ်ခြင်းအမျိုးအစားကိုသာ ဆောင်ရွက်ရမည်၊

၃။ အထောက်အထားလက်မှတ်ရရှိသူသည် မြန်မာနိုင်ငံ၏ တည်ဆဲဥပဒေတစ်ရပ်ရပ်ကို ဖောက်ဖျက်ကြောင်း သို့မဟုတ် ဆန်းစစ်ခြင်းလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် သိသာထင်ရှားသော မှားယွင်းမှုများ ပါရှိနေပြီး သတ်မှတ် စံချိန်စံညွှန်း သို့မဟုတ် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စီစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်၊

၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။

THE REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00377 Date 17 FEB 2023

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.
(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

(a)	Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)	Mr. Aung Zayar Wint
(b)	Citizenship (နိုင်ငံသား)	Myanmar
(c)	Identity Card / Passport Number (မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)	12/MaYaKa (N) 154380
(d)	Address (ဆက်သွယ်ရန်လိပ်စာ)	No.(145-A2-3),Thiri Mingalar Street, Ward No.(4), 8th Mile, Mayangone Township, Yangon Mobile phone: 09450539306, 0919667757 Email: aungzayarwint@eguardservices.com
(e)	Organization (အဖွဲ့အစည်း)	E Guard Environmental Services. Co., Ltd.
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Person
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	30th June, 2023.

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

ဤအထောက်အထားလက်မှတ်သည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း ထုတ်ပြန်သည့်ရက်မှစ၍ (၆) လ ပြည့်မြောက်သည့်နေ့တွင် ပျက်ပြယ်မည် ဖြစ်သည်။

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Risk Assessment and Hazard Management.	2.
3.	4.
5.	6.
7.	8.
9.	10.
11.	12.
13.	14.

စည်းကမ်းချက်များ

၁။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-

(က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုစေခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်စေခြင်းမပြုရ၊

(ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

(ဂ) ဤအထောက်အထားလက်မှတ်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူလေ့လာဆန်းစစ်ရေးဆွဲခွင့်ရှိသည်၊

(ဃ) မိမိအဖွဲ့အစည်းတွင် ပါဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်စုံတစ်ရာရှိပါက ကြားကာလ အကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသူဖြင့်သာ အစားထိုး ပြောင်းလဲရမည်၊

(c) အဖွဲ့အစည်းဖြစ်ပါက အဖွဲ့အစည်းတွင် ဒါရိုက်တာဘုတ်အဖွဲ့ (Board of Director)၊ အကြံပေးပုဂ္ဂိုလ် (Consultant) များ ပြောင်းလဲလိုလျှင် တည်ဆဲဥပဒေများနှင့်အညီ ဆောင်ရွက်ပြီး ရက်ပေါင်း ၃၀ အတွင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ မဖျက်မကွက် အကြောင်းကြားရမည်၊

(စ) ဝန်ကြီးဌာနက အခါအားလျော်စွာ သတ်မှတ်သည့် စည်းကမ်းချက်များကိုလိုက်နာရမည်၊

(ဆ) ဖော်ပြပါ စည်းကမ်းချက်တစ်ရပ်ရပ်ကို ဖောက်ဖျက်ခြင်း၊ လိုက်နာရန်ပျက်ကွက်ခြင်း တစ်စုံတစ်ရာ ပေါ်ပေါက်ပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၂။ အထောက်အထားလက်မှတ်ရရှိသူသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနက ခွင့်ပြုထားသော ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းအမျိုးအစားကိုသာ ဆောင်ရွက်ရမည်၊

၃။ အထောက်အထားလက်မှတ်ရရှိသူသည် မြန်မာနိုင်ငံ၏ တည်ဆဲဥပဒေတစ်ရပ်ရပ်ကို ဖောက်ဖျက်ကြောင်း သို့မဟုတ် ဆန်းစစ်ခြင်းလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် သိသာထင်ရှားသော မှားယွင်းမှုများ ပါရှိနေပြီး သတ်မှတ် စံချိန်စံညွှန်း သို့မဟုတ် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်၊

၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။

THE REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00380 Date 17 FEB 2023

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.
(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

(a)	Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)	Ms May Thu Win
(b)	Citizenship (နိုင်ငံသား)	Myanmar
(c)	Identity Card / Passport Number (မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)	12/Thakata(C)186124
(d)	Address (ဆက်သွယ်ရန်လိပ်စာ)	No.E/8, (9) Quarter, EPC (Staff Housing), Thaketa Township, Yangon Mobile phone: 09797005183, 09448033586 Email: maythuwin@eguardservices.com
(e)	Organization (အဖွဲ့အစည်း)	E Guard Environmental Services. Co., Ltd.
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Person
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	30th June, 2023.

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

ဤအထောက်အထားလက်မှတ်သည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း ထုတ်ပြန်သည့်ရက်မှစ၍ (၆) လ ပြည့်မြောက်သည့်နေ့တွင် ပျက်ပြယ်မည် ဖြစ်သည်။

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Legal Analysis	2.
3.	4.
5.	6.
7.	8.
9.	10.
11.	12.
13.	14.

စည်းကမ်းချက်များ

၁။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-

(က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုစေခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်စေခြင်းမပြုရ၊

(ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

(ဂ) ဤအထောက်အထားလက်မှတ်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူလေ့လာဆန်းစစ်ရေးဆွဲခွင့်ရှိသည်၊

(ဃ) မိမိအဖွဲ့အစည်းတွင် ပါဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်နုံတစ်ရာရှိပါက ကြားကာလ အကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသူဖြင့်သာ အစားထိုး ပြောင်းလဲရမည်၊

(c) အဖွဲ့အစည်းဖြစ်ပါက အဖွဲ့အစည်းတွင် ဒါရိုက်တာဘုတ်အဖွဲ့ (Board of Director)၊ အကြံပေးပုဂ္ဂိုလ် (Consultant) များ ပြောင်းလဲလိုလျှင် တည်ဆဲဥပဒေများနှင့်အညီ ဆောင်ရွက်ပြီး ရက်ပေါင်း ၃၀ အတွင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ မဖျက်မကွက် အကြောင်းကြားရမည်၊

(စ) ဝန်ကြီးဌာနက အခါအားလျော်စွာ သတ်မှတ်သည့် စည်းကမ်းချက်များကိုလိုက်နာရမည်၊

(ဆ) ဖော်ပြပါ စည်းကမ်းချက်တစ်ရပ်ရပ်ကို ဖောက်ဖျက်ခြင်း၊ လိုက်နာရန်ပျက်ကွက်ခြင်း တစ်နုံတစ်ရာ ပေါ်ပေါက်ပါက အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၂။ အထောက်အထားလက်မှတ်ရရှိသူသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနက ခွင့်ပြုထားသော ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းအမျိုးအစားကိုသာ ဆောင်ရွက်ရမည်၊

၃။ အထောက်အထားလက်မှတ်ရရှိသူသည် မြန်မာနိုင်ငံ၏ တည်ဆဲဥပဒေတစ်ရပ်ရပ်ကို ဖောက်ဖျက်ကြောင်း သို့မဟုတ် ဆန်းစစ်ခြင်းလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် သိသာထင်ရှားသော မှားယွင်းမှုများ ပါရှိနေပြီး သတ်မှတ် စံချိန်စံညွှန်း သို့မဟုတ် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်၊

၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။

THE REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00379 Date 17 FEB 2023

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.
(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

(a)	Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)	Mr. Htet Aung
(b)	Citizenship (နိုင်ငံသား)	Myanmar
(c)	Identity Card / Passport Number (မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)	12/MaYaKa(N)144621
(d)	Address (ဆက်သွယ်ရန်လိပ်စာ)	(141), Yeikthar (2) Lane, Waizayandar Garden Housing, Mi Gyaung Kan (1) Ward, Thingangyun township, Yangon. Mobile phone: 095074307 Email: htetaung@eguardservices.com hahtetaung22@gmail.com
(e)	Organization (အဖွဲ့အစည်း)	E Guard Environmental Services. Co., Ltd.
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Person
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	30th June, 2023.

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

ဤအထောက်အထားလက်မှတ်သည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း ထုတ်ပြန်သည့်ရက်မှစ၍ (၆) လ ပြည့်မြောက်သည့်နေ့တွင် ပျက်ပြယ်မည် ဖြစ်သည်။

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Geology and Soil.	2.
3.	4.
5.	6.
7.	8.
9.	10.
11.	12.
13.	14.

စည်းကမ်းချက်များ

၁။ ကြေးကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-

(က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုစေခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်စေခြင်းမပြုရ၊

(ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

(ဂ) ဤအထောက်အထားလက်မှတ်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူလေ့လာဆန်းစစ်ရေးဆွဲခွင့်ရှိသည်၊

(ဃ) မိမိအဖွဲ့အစည်းတွင် ပါဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်နှံတစ်ရာရှိပါက ကြေးကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသူဖြင့်သာ အစားထိုးပြောင်းလဲရမည်၊

(c) အဖွဲ့အစည်းဖြစ်ပါက အဖွဲ့အစည်းတွင် ဒါရိုက်တာဘုတ်အဖွဲ့ (Board of Director)၊ အကြံပေးပုဂ္ဂိုလ် (Consultant) များ ပြောင်းလဲလိုလျှင် တည်ဆဲဥပဒေများနှင့်အညီ ဆောင်ရွက်ပြီး ရက်ပေါင်း ၃၀ အတွင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ မဖျက်မကွက် အကြောင်းကြားရမည်၊

(စ) ဝန်ကြီးဌာနက အခါအားလျော်စွာ သတ်မှတ်သည့် စည်းကမ်းချက်များကိုလိုက်နာရမည်၊

(ဆ) ဖော်ပြပါ စည်းကမ်းချက်တစ်ရပ်ရပ်ကို ဖောက်ဖျက်ခြင်း၊ လိုက်နာရန်ပျက်ကွက်ခြင်း တစ်နှံတစ်ရာပေါ်ပေါက်ပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၂။ အထောက်အထားလက်မှတ်ရရှိသူသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနက ခွင့်ပြုထားသော ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းအမျိုးအစားကိုသာ ဆောင်ရွက်ရမည်၊

၃။ အထောက်အထားလက်မှတ်ရရှိသူသည် မြန်မာနိုင်ငံ၏ တည်ဆဲဥပဒေတစ်ရပ်ရပ်ကို ဖောက်ဖျက်ကြောင်း သို့မဟုတ် ဆန်းစစ်ခြင်းလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် သိသာထင်ရှားသော မှားယွင်းမှုများ ပါရှိနေပြီး သတ်မှတ် စံချိန်စံညွှန်း သို့မဟုတ် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေးပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်၊

၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှုနယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြေးကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်းအတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။

THE REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00376 Date 17 FEB 2023

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

(a)	Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)	Mr. Nyein Chan Aung
(b)	Citizenship (နိုင်ငံသား)	Myanmar
(c)	Identity Card / Passport Number (မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)	5/KaLaNa (C) 059799
(d)	Address (ဆက်သွယ်ရန်လိပ်စာ)	No. 39, Bayint Naung 1st, 1 Ward, Mayangone Township, Yangon, Myanmar. Mobile phone: 959798627909, 09893244228, E mail: nyeinchamaung1993@gmail.com, nyeinnca1993@gmail.com
(e)	Organization (အဖွဲ့အစည်း)	E Guard Environmental Services Company Limited.
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Person
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	30th June, 2023.

Director General

Environmental Conservation Department

Ministry of Natural Resources and Environmental Conservation

ဤအထောက်အထားလက်မှတ်သည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း ထုတ်ပြန်သည့်ရက်မှစ၍ (၆) လ ပြည့်မြောက်သည့်နေ့တွင် ပျက်ပြယ်မည် ဖြစ်သည်။

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. (O) Forestry;
2. Ecology and Biodiversity.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.

စည်းကမ်းချက်များ

၁။ ကြေးကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-

(က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုစေခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်စေခြင်းမပြုရ၊

(ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

(ဂ) ဤအထောက်အထားလက်မှတ်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူ လေ့လာဆန်းစစ်ရေးဆွဲခွင့်ရှိသည်၊

(ဃ) မိမိအဖွဲ့အစည်းတွင် ပါဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်စုံတစ်ရာရှိပါက ကြေးကာလ အကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသူဖြင့်သာ အစားထိုး ပြောင်းလဲရမည်၊

(c) အဖွဲ့အစည်းဖြစ်ပါက အဖွဲ့အစည်းတွင် ဒါရိုက်တာဘုတ်အဖွဲ့ (Board of Director)၊ အကြံပေးပုဂ္ဂိုလ် (Consultant) များ ပြောင်းလဲလိုလျှင် တည်ဆဲဥပဒေများနှင့်အညီ ဆောင်ရွက်ပြီး ရက်ပေါင်း ၃၀ အတွင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ မဖျက်မကွက် အကြောင်းကြားရမည်၊

(စ) ဝန်ကြီးဌာနက အခါအားလျော်စွာ သတ်မှတ်သည့် စည်းကမ်းချက်များကိုလိုက်နာရမည်၊

(ဆ) ဖော်ပြပါ စည်းကမ်းချက်တစ်ရပ်ရပ်ကို ဖောက်ဖျက်ခြင်း၊ လိုက်နာရန်ပျက်ကွက်ခြင်း တစ်စုံတစ်ရာ ပေါ်ပေါက်ပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၂။ အထောက်အထားလက်မှတ်ရရှိသူသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနက ခွင့်ပြုထားသော ပတ်ဝန်းကျင် ဆန်းစစ်ခြင်းအမျိုးအစားကိုသာ ဆောင်ရွက်ရမည်၊

၃။ အထောက်အထားလက်မှတ်ရရှိသူသည် မြန်မာနိုင်ငံ၏ တည်ဆဲဥပဒေတစ်ရပ်ရပ်ကို ဖောက်ဖျက်ကြောင်း သို့မဟုတ် ဆန်းစစ်ခြင်းလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် သိသာထင်ရှားသော မှားယွင်းမှုများ ပါရှိနေပြီး သတ်မှတ် စံချိန်စံညွှန်း သို့မဟုတ် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်၊

၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်၊

၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြေးကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။

Appendix 6 DICA Company Registration

ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်

Certificate of Incorporation

MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED

Company Registration No. 132890811

မြန်မာနိုင်ငံကုမ္ပဏီများဥပဒေ၂၀၁၇ အရ

MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED

အား ၂၀၂၂ ခုနှစ် မတ်လ ၂၈ ရက်နေ့တွင်

အစုရှယ်ယာအားဖြင့် တာဝန်ကန့်သတ်ထား သည့် အများနှင့်မသက်ဆိုင်သောကုမ္ပဏီ

အဖြစ် ဖွဲ့စည်းမှတ်ပုံတင်ခွင့်ပြုလိုက်သည်။

This is to certify that

MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED

was incorporated under the Myanmar Companies Law 2017 on 28 March 2022 as a Private Company Limited by Shares.

ကုမ္ပဏီမှတ်ပုံတင်အရာရှိ

Registrar of Companies

ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန

Directorate of Investment and Company Administration

DIRECTORATE OF INVESTMENT AND COMPANY ADMINISTRATION

Myanmar Companies Online Registry - Company Extract

Company Name (English)
MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED

Company Name (Myanmar)
-

Company Information

Registration Number	Registration Date	Status
132890811	28/03/2022	Registered
Company Type	**Foreign Company**	**Small Company**
Private Company Limited by Shares	Yes	-
Principal Activity	**Date of Last Annual Return**	**Previous Registration Number**
-	-	-

Addresses

Registered Office In Union	CORNER OF MALIKHA STREET AND PATHONEMAR 5TH STREET, A-031 SHWE KYAR PIN QUARTER, ZUBUTHIRI TOWNSHIP, NAYPYITAW, MYANMAR

Officers

Name:	JIANG XINGCHENG	Type:	DIRECTOR
Date of Appointment:	28/03/2022	Date of Birth:	02/12/1981
Nationality:	CHINA	N.R.C./Passport:	PE2174891
Gender:	MALE	Business Occupation:	BUSINESSMAN

Ultimate Holding Company

Name of Ultimate Holding Company	Jurisdiction of Incorporation	Registration Number
POWER CONSTRUCTION CORPORATION OF CHINA	China	911100007178306183

Share Capital Structure

Total Shares Issued by Company	Currency of Share Capital
6,950,593	USD

Class	Description	Total Number	Total Amount Paid	Total Amount Unpaid
ORD	Ordinary	6,950,593	200.00	6,950,393.00

Members

Name of Company: HYTRUST ENERGY（SINGAPORE）INVESTMENT PTE. LTD.
Registration Number: 202209792C Jurisdiction of Incorporation: Singapore

Class	Description	Total Number	Total Amount Paid	Total Amount Unpaid
ORD	Ordinary	6,950,593	200.00	6,950,393.00

EXTRACT GENERATED ON 25/04/2022 AT 10:15

DIRECTORATE OF INVESTMENT AND COMPANY ADMINISTRATION

Myanmar Companies Online Registry - Company Extract

Company Name (English)	Company Name (Myanmar)
MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED	-

Mortgages and Charges

Form / Filing Type	Effective Date
No records available	

Details about all mortgages and charges can be accessed from the Company Profile Filing History at no charge.

Filing History

Form / Filing Type	Effective Date
A-1 | Application for incorporation as a private company limited by shares	28/03/2022

EXTRACT GENERATED ON 25/04/2022 AT 10:15

Appendix 7 Investment Plan

MYANMAR SATOKETAYAR SOLAR POWER COMPANY LIMITED
INVESTMENT PLAN

				Start Date	2022-3-1	2022-4-1	2022-5-1	2022-6-1	2022-7-1	2022-8-1
				End Date	2022-3-31	2022-4-30	2022-5-31	2022-6-30	2022-7-31	2022-8-31
				Monthly Label	1	2	3	4	5	6
				Quarterly Label	1	1	1	2	2	2
				Yearly Label	1	1	1	1	1	1
	******Uses of Project Cost									
			Schedule	*6*	25%	25%	20%	15%	10%	5%
				9	20%	20%	15%	10%	10%	5%
				12	20%	20%	10%	5%	5%	5%
A	**EPC**	USD	**26,637,450**		6,659,363	6,659,363	5,327,490	3,995,618	2,663,745	1,331,873
	EPC (Inc. CT)	USD	**26,637,450**		6,659,363	6,659,363	5,327,490	3,995,618	2,663,745	1,331,873
	EPC Offshore Portion	USD	**22,852,200**							
	EPC Onshore Portion (Inc. CT)	USD	**3,785,250**							
B	**Non-EPC**	USD	**472,935**		411,735	-	-	-	-	61,200
	Consulting Service Cost	USD	**231,735**		231,735	-	-	-	-	-
	Due Diligence	USD	**111,735**		111,735	-	-	-	-	-
	Feasibility Study	USD	**120,000**		120,000	-	-	-	-	-
	Development Cost	USD	**241,200**		180,000	-	-	-	-	61,200
	Project Land Cost	USD	**61,200**		-	-	-	-	-	61,200
	Licenses & Permits	USD	**40,000**		40,000	-	-	-	-	-
	Transmission Line Land Cost	USD	**140,000**		140,000	-	-	-	-	-
C	**Financing Cost**	USD	**691,985**		291,183	-	165,299	-	-	235,502
	Upfront Fee	USD	**160,398**		160,398	-	-	-	-	-
	Long-term Loan Interest	USD	**400,801**		55,100	55,100	55,100	78,501	78,501	78,501
	Long-term Loan Interest (Quarterly	USD	**400,801**		-	-	165,299	-	-	235,502
	Loan Compensation	USD	-		-	-	-	-	-	-
	Sinosure Debt Premium	USD	**130,785**		130,785	-	-	-	-	-
D	**Total Capital Cost**	USD	**27,110,385**		7,071,098	6,659,363	5,327,490	3,995,618	2,663,745	1,393,073
E	**Total Construction Cost**	USD	**27,110,385**		7,071,098	6,659,363	5,327,490	3,995,618	2,663,745	1,393,073
F	**Total Project Cost**	USD	**27,802,370**		7,362,281	6,659,363	5,492,789	3,995,618	2,663,745	1,628,575
	******Sources of Project Cost									
	TRUE									
	Total Project Cost	USD	**27,802,370**		7,362,281	6,659,363	5,492,789	3,995,618	2,663,745	1,628,575
	Project Equity	USD	**6,950,592**		4,878,608	-	-	2,071,984	-	-
	Project Debt	USD	**20,851,777**		14,635,824	-	-	6,215,953	-	-
	******End of Sheet									

Appendix 8 Public Consultation Attendance Lists

၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်း နှင့်ပတ်သက်၍ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အခမ်းအနား
([illegible] မြို့နယ်)

ပုဂ္ဂလိက ကုမ္ပဏီများ (Private Company)

ရက်စွဲ ။ ။ ၂၀၂၂ ခုနှစ်၊ မေလ (၂၆) ရက်

စဉ်	အမည်	ရာထူး	ကုမ္ပဏီများ	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	Long Yunguo	项目施工负责人	中国水电十局	097-97973143	Long Yunguo
၂။	[illegible]	Translator	"		[signature]
၃။	U Thuta Soe	A.P.M	Asia Grade Co;Ltd	09.400406928	[signature]
၄။	Daw Dalle Cho Nyein	Purchaser.	"	09.264450239	[signature]
၅။	Kyaw Soe	Director	Asia Grade Co,Ltd	09 780966700	[signature]
၆။					
၇။					
၈။					
၉။					
၁၀။					
၁၁။					
၁၂။					

၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်း နှင့်ပတ်သက်၍ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အခမ်းအနား
([illegible] မြို့နယ်)

မြေနီကုန်း ရပ်ကွက်/ ကျေးရွာ

ရက်စွဲ ။ ။ ၂၀၂၂ ခုနှစ်၊ မေလ (၂၆) ရက်

စဉ်	အမည်	ရပ်ကွက်	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	[illegible]	မြေနီကုန်း	[illegible]	၀၉-[illegible]	[signature]
၂။	[illegible]	"	[illegible]	၀၉-[illegible]	[signature]
၃။	ကိုသင်းဇော်ဦး	"	[illegible]	၀၉-၄၅၀၆၆၆၈၆၇	[signature]
၄။	ဦးဟန်သိန်း	"	"		[signature]
၅။	ကိုသူရ	"	"		[signature]
၆။	ကိုချစ်ဦး	"	"		[signature]
၇။	ကိုဦး	"	"		[signature]
၈။	ကိုကျော်သူအောင်	"	"		[signature]
၉။	ကိုအာကာ	"	"		[signature]
၁၀။	ကိုစည်သူမိုး	"	"		[signature]
၁၁။					
၁၂။					

Appendix 9 Feedbacks from Attendees

ဒေသခံပြည်သူလူထု၏ သဘောထားမှတ်ချက်နှင့် အကြံပြုလွှာ

နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်း

ပြည့်သွင်းသူ၏ အချက်အလက်

ရက်စွဲ	၁၆ . ၅ . ၂၀၂၂
အမည်	ဦး ဝင်း ဆောင်
လိပ်စာ	မြေနီကုန်း
ဖုန်းနံပါတ်	၀၉ - ၂၅၈၀၆၇၅၅၆
ပြည့်သွင်းသူ၏ ကိုယ်စားပြုအဖွဲ့အစည်း	☑ ကျေးရွာအုပ်ချုပ်ရေးမှူး ☐ ရာအိမ်မှူး ☐ ဆယ်အိမ်မှူး ☐ ရပ်မိရပ်ဖ ☐ ရွာသူ/ ရွာသား ☐ အခြား ( )

အကြံပြုချက်/ သုံးသပ်ချက်

(ကျေးဇူးပြု၍ သင်၏ သုံးသပ်ချက်များအား အောက်တွင်ရေးသားဖော်ပြပေးရန်နှင့် ထပ်မံ ရေးသားလိုသည့် အသေးစိတ်အချက်များရှိပါက ဤပုံစံနှင့် အတူ ပူးတွဲပေးပို့နိုင်ပါသည်။)

၁။ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်း စီမံကိန်း မှ မြေနီကုန်း ကျေးရွာတို့ မီးလင်း နိုင်ရန် တောင်းဆိုခြင်း

၂။ မြေနီကုန်း ကျေးရွာတို့ လမ်း [illegible] ကောင်း မွန်စွာဖြင့် ဆောင်ရွက်ပေးခြင်း

၃။ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်သည့် စီမံကိန်း [illegible] ကျေးရွာ [illegible] တောင်းခြင်း

လက်မှတ် ....

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ဒေသခံပြည်သူလူထု၏ သဘောထားမှတ်ချက်နှင့် အကြံပြုလွှာ

နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်း

ဖြည့်သွင်းသူ၏ အချက်အလက်

ရက်စွဲ	ကိုသူရ
အမည်	—
လိပ်စာ	
ဖုန်းနံပါတ်	
ဖြည့်သွင်းသူ၏ ကိုယ်စားပြုအဖွဲ့အစည်း	☐ ကျေးရွာအုပ်ချုပ်ရေးမှူး ☐ ရာအိမ်မှူး ☐ ဆယ်အိမ်မှူး ☐ ရပ်မိရပ်ဖ ☐ ရွာသူ/ ရွာသား ☐ အခြား ( )

အကြံပြုချက်/ သုံးသပ်ချက်

(ကျေးဇူးပြု၍ သင်၏ သုံးသပ်ချက်များအား အောက်တွင်ရေးသားဖော်ပြပေးရန်နှင့် ထပ်မံရေးသားလိုသည့် အသေးစိတ်အချက်များရှိပါက ဤပုံစံနှင့် အတူ ပူးတွဲပေးပို့နိုင်ပါသည်။)

[illegible]
[illegible]
[illegible]
[illegible]

လက်မှတ် ....
Ko Thura

ဒေသခံပြည်သူလူထု၏ သဘောထားမှတ်ချက်နှင့် အကြံပြုလွှာ

နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်း

ဖြည့်သွင်းသူ၏ အချက်အလက်

ရက်စွဲ	26.5-2022.
အမည်	[illegible]
လိပ်စာ	[illegible]
ဖုန်းနံပါတ်	09-264450239.
ဖြည့်သွင်းသူ၏ ကိုယ်စားပြုအဖွဲ့အစည်း	☐ ကျေးရွာအုပ်ချုပ်ရေးမှူး ☐ ရာအိမ်မှူး ☐ ဆယ်အိမ်မှူး ☐ ရပ်မိရပ်ဖ ☐ ရွာသူ/ ရွာသား ☑ အခြား ( )

အကြံပြုချက်/ သုံးသပ်ချက်

(ကျေးဇူးပြု၍ သင်၏ သုံးသပ်ချက်များအား အောက်တွင်ရေးသားဖော်ပြပေးရန်နှင့် ထပ်မံရေးသားလိုသည့် အသေးစိတ်အချက်များရှိပါက ဤပုံစံနှင့် အတူ ပူးတွဲပေးပို့နိုင်ပါသည်။)

လက်မှတ် ....

Appendix 10 Public Consultation Presentation

China ITS Co., Ltd.

၃၀ မဂ္ဂါဝပ် မြန်မာ စေတုတ္တရာ နေရောင်ခြည်စွမ်းအင်သုံး

လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်း

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်းလုပ်ငန်းနှင့်ပတ်သက်၍

ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်းအခမ်းအနား

၂၀၂၂ ခုနှစ်၊ မေလ (၂၆) ရက်

နိဒါန်း

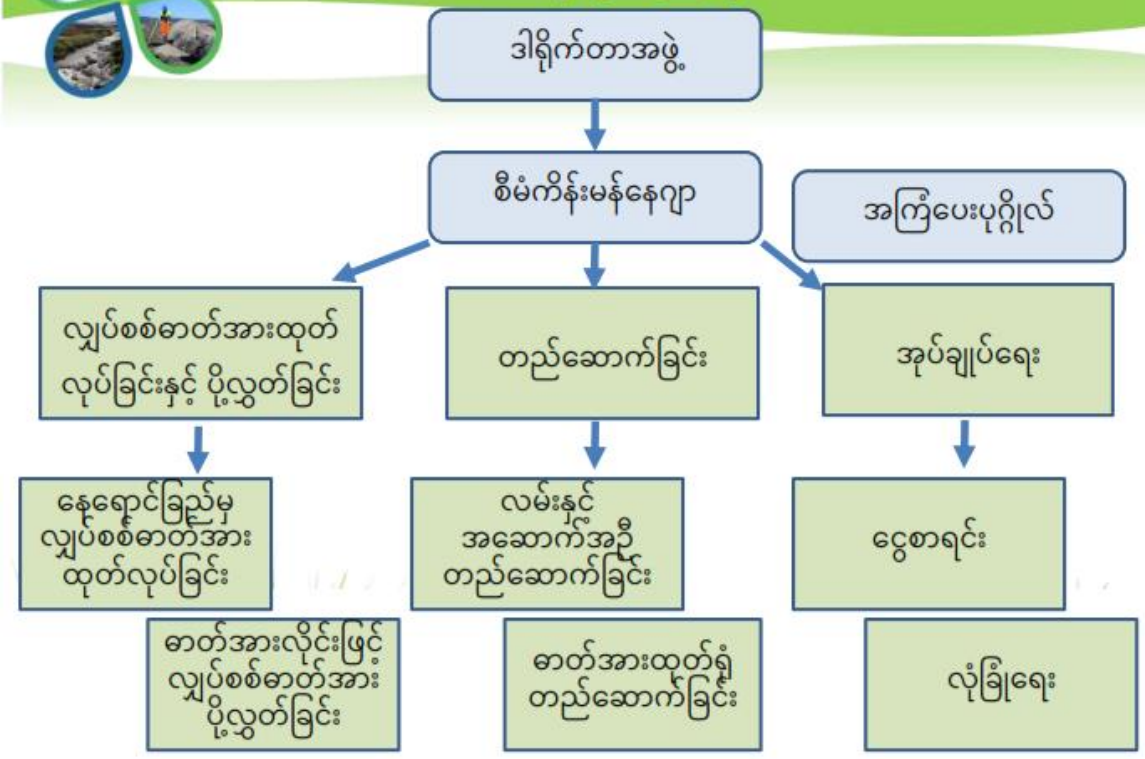
စီမံကိန်းအကောင်အထည်ဖော်သူ	- China ITS Co., Ltd.
ရင်းနှီးမြှုပ်နှံမှုပုံစံ	- နိုင်ငံခြားသားရင်းနှီးမြှုပ်နှံမှု
လုပ်ငန်းအမျိုးအစား	- နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းလုပ်ငန်း
စီမံကိန်း၏အဓိကရည်ရွယ်ချက်	- နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ပြီး စေတုတ္တရာ ဓာတ်အားခွဲရုံသို့ ပို့လွှတ်ရန်
စီမံကိန်းတည်နေရာ	- မကွေးတိုင်းဒေသကြီး၊ မင်းဘူးခရိုင်၊ စေတုတ္တရာမြို့နယ်၊ မြေနီကုန်းကျေးရွာအုပ်စု၊ မြေနီကုန်းကျေးရွာ

စီမံကိန်းအတွက်ရင်းနှီးမြှုပ်နှံမှုပုံစံ

China ITS Co., Ltd. (Main Contractor)
Sino Hydro Co., Ltd. (Sub Contractor)

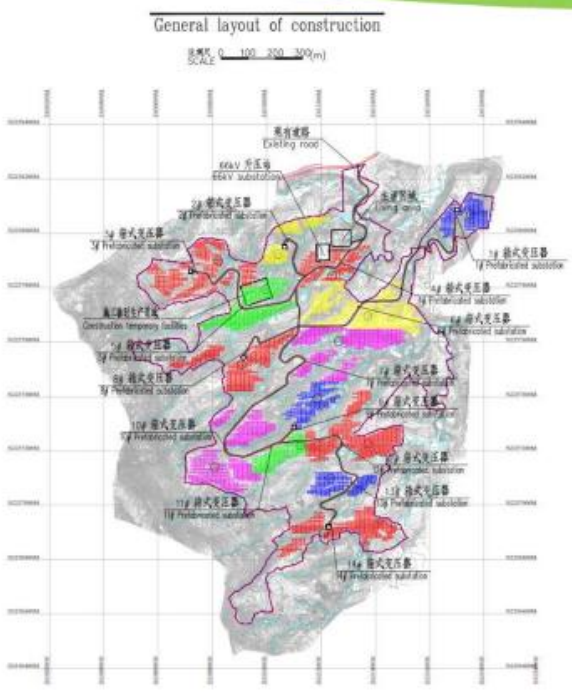
- ကွင်းဆင်းဆောင်ရွက်ခြင်းနှင့် ဒီဇိုင်းရေးဆွဲခြင်း
- တည်ဆောက်ရေးလုပ်ငန်းများ ဆောင်ရွက်ခြင်း
- ဓာတ်အားလိုင်းသွယ်တန်းခြင်း
- ကွန်ပျူတာစနစ်ဖြင့်ဓာတ်အားထုတ်လုပ်မှု၊ ပို့လွှတ်မှုများအား ထိန်းချုပ်ခြင်း

စီမံကိန်းဖွဲ့စည်းပုံ



စီမံကိန်းတည်နေရာ

စီမံကိန်းဆိုင်ရာအချက်အလက်များ



စီမံကိန်းဆိုင်ရာအချက်အလက်များ

စီမံကိန်းတည်ဆောက်မည့်ကာလ	- (၆) လ
စီမံကိန်းအကျယ်အဝန်း	- (၁၄၈.၈) ဧက
ဓာတ်အားလိုင်းမှပို့လွှတ်နိုင်သည့်ပမာဏ	- (၆၆) ကေဗီအေ
ဓာတ်အားလိုင်းအရှည်	- (၆) ကီလိုမီတာခန့်
အဆောက်အဦအမျိုးအစား	- သံကူကွန်ကရစ်အဆောက်အဦ
အဆောက်အဦအရေအတွက်	- (၂) လုံး

စီမံကိန်းဆိုင်ရာအချက်အလက်များ

ဆိုလာပြားအမျိုးအစားနှင့် အရေအတွက်	၅၄၀ Wp ရှိ မျက်နှာပြင်နှစ်ဖက်ပါသော မိုနိုခရစ်စတယ်လိုင်း ဆီလီကွန် ဆိုလာပြား (၆၇၂,၀၀ ခု)
ဆိုလာပြားအောက်ရှိထောက်တိုင်အမျိုးအစားနှင့် အရေအတွက်	ထောက်တိုင် (၂၅,၀၀၀ ခု)
အင်ဗာတာအမျိုးအစားနှင့် အရေအတွက်	၂၅၀ kW series inverter (၂၀ လုံး)
ထရန်စဖော်မာအမျိုးအစားနှင့် အရေအတွက်	၅,၀၀၀ kVA Box type transformer (၁ လုံး)
တည်ဆောက်ရေးကာလ အလုပ်သမား အရေအတွက်	၂၈၀ ဦး (လက်ရှိ)

စီမံကိန်းဆိုင်ရာအချက်အလက်များ

မြေအောက်ပိုက်လိုင်း

Booster Station

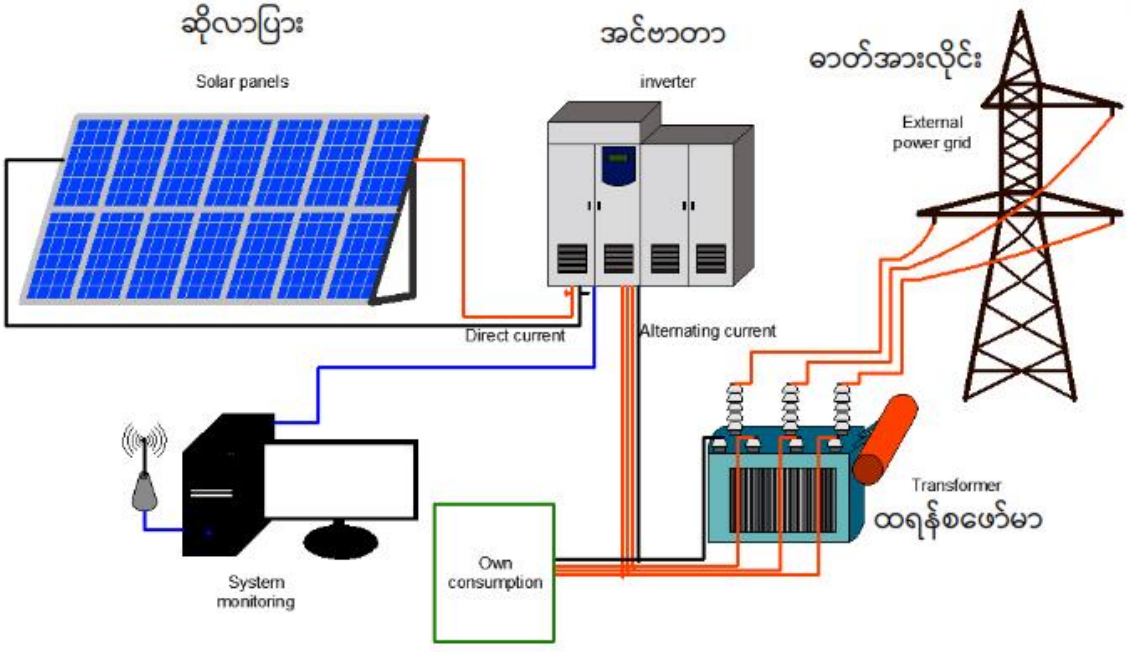
ရေမြောင်းတူးဖော်ခြင်း

အလုပ်သမားတန်းလျား

အိမ်သာ

ရှင်းလင်းဆောင်

စီမံကိန်းဆိုင်ရာအချက်အလက်များ



ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်း

(Environmental Management Plan)

E Guard Environmental Services

11

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်း

စီမံကိန်း၏ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုများ

စစ်ဆေးခြင်း

- ✓ သိသာထင်ရှားမှုရှိ/မရှိ
- ✓ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ဆောင်ရွက်ရန် လိုအပ်ခြင်းရှိ/မရှိ
- ✓ သတ်မှတ်ထားသော အထောက်အထားများ ပြုစုတင်ပြရန်လိုအပ်ခြင်းရှိ/မရှိ

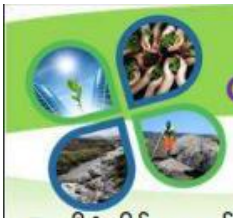
ဆောင်ရွက်သည့်အဖွဲ့အစည်း - E Guard Environmental Services Co., Ltd.

စိစစ်ခွင့်ပြုမည့်အဖွဲ့အစည်း - သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

လိုက်နာရမည့်ဥပဒေ၊ နည်းဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော် ဖွဲ့စည်းပုံအခြေခံဥပဒေ (၂၀၀၈)
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ၊
ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊
အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ

3



ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်း၏ ရည်ရွယ်ချက်များ

- စီမံကိန်းဆောင်ရွက်မှုများကြောင့် ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများကို ဆန်းစစ်လေ့လာခြင်း
- ဆိုးသောသက်ရောက်မှုများကိုလျှော့ချပေးနိုင်မည့်နည်းလမ်းများအား အကြံပြုတင်ပြခြင်း
- ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်များနှင့် အခြားအစီအစဉ်များအား ကြိုတင်ပြင်ဆင်ပြီး အကောင်အထည်ဖော်ဆောင်ရွက်ခြင်း

အများပြည်သူသဘောထားရယူခြင်း၏ရည်ရွယ်ချက်များ

- ဖြစ်ပေါ်လာနိုင်သည့် ကောင်းကျိုး၊ ဆိုးကျိုးများကိုတင်ပြခြင်း
- ပါဝင်ပတ်သက်သူများ၏ အမြင်နှင့်အကြံပြုချက်များ၊ ထိခိုက်သက်ရောက်လာနိုင်မှုများကို လျှော့ချပေးနိုင်မည့်အစီအစဉ်များ၊ စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်များတွင် ထည့်သွင်းစဉ်းစားပေးခြင်း
- စီမံကိန်းတည်ဆောက်ခြင်းနှင့် လုပ်ငန်းလည်ပတ်ခြင်း၏ ပွင့်လင်းမြင်သာမှုနှင့် တာဝန်ယူနိုင်မှု တိုးတက်စေခြင်း
- အငြင်းပွားမှုများလျှော့ချခြင်းနှင့် စီမံကိန်းအကောင်အထည်ဖော်ရာတွင် ချောမွေ့မှုရှိစေရန် ဆောင်ရွက်ခြင်း

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

- အဆောက်အဦနှင့် လမ်းတည်ဆောက်ခြင်း၊ ဆိုလာပြားများ၊ အင်ဗာတာများ၊ ထရန်စဖော်မာများတပ်ဆင်ခြင်း၊ ဓာတ်အားလိုင်းသွယ်တန်းခြင်း **(တည်ဆောက်သည့်ကာလ)**
- နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ပြီး စေတုတ္တရာဓာတ်အားခွဲရုံသို့ ဓာတ်အားပို့လွှတ်ခြင်း **(လုပ်ငန်းလည်ပတ်သည့်ကာလ)**
- စီမံကိန်းပိတ်သိမ်းခြင်း **(စီမံကိန်းဖျက်သိမ်းသည့်ကာလ)**

ဆိုးကျိုးသက်ရောက်ခြင်းမှ
- ကာကွယ်ရန်
- ရှောင်လွဲရန်
- လျှော့နည်းစေရန်

→ နည်းလမ်းနှင့်အစီအစဉ်များ ဖော်ပြသည့်စီမံချက်

ဖြစ်ပေါ်လာနိုင်သည့်သက်ရောက်မှုများ

- ကောင်းသောသက်ရောက်မှုများ
- ဆိုးသောသက်ရောက်မှုများ

ကောင်းသောသက်ရောက်မှုများ

- တည်ဆောက်သည့်ကာလ
  - အလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
  - စီးပွားရေးအခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
- လုပ်ငန်းလည်ပတ်သည့်ကာလ
  - အလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
  - ပြန်လည်ပြည့်ဖြိုးမြဲစွမ်းအင်မှလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်း
  - ဖန်လုံအိမ်ဓာတ်ငွေ့ထုတ်လုပ်မှုလျော့ချနိုင်ခြင်း
  - နိုင်ငံတော်၏စီးပွားရေးဖွံ့ဖြိုးတိုးတက်ခြင်း
- စီမံကိန်းဖျက်သိမ်းသည့်ကာလ
  - အလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
  - စီးပွားရေးအခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
  - ဖျက်သိမ်းပြီးလျှပ်စစ်ပစ္စည်းများအားပြန်လည်အသုံးပြုနိုင်ခြင်း

ဆိုးသောသက်ရောက်မှုများ

- တည်ဆောက်သည့်ကာလ
- လေအရည်အသွေး
- ရေအရည်အသွေး
- မြေအရည်အသွေး
- ဆူညံသံနှင့်တုန်ခါမှု
- ဇီဝမျိုးစုံမျိုးကွဲများအပေါ်သက်ရောက်မှု
- လုပ်ငန်းခွင်ကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေး
- ရပ်ရွာလူထုကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေး
- အစိုင်အခဲစွန့်ပစ်ပစ္စည်းထွက်ရှိမှု
- စွန့်ပစ်ရေထွက်ရှိမှု
- အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းထွက်ရှိမှု

ဆိုးသောသက်ရောက်မှုများ

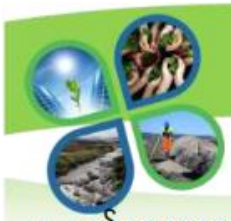
- လုပ်ငန်းလည်ပတ်သည့်ကာလ
- လေအရည်အသွေး
- ရေအရည်အသွေး
- မြေအရည်အသွေး
- ဆူညံသံနှင့်တုန်ခါမှု
- ဇီဝမျိုးစုံမျိုးကွဲများအပေါ်သက်ရောက်မှု
- လုပ်ငန်းခွင်ကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေး
- ရပ်ရွာလူထုကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေး
- အစိုင်အခဲစွန့်ပစ်ပစ္စည်းထွက်ရှိမှု
- စွန့်ပစ်ရေထွက်ရှိမှု
- အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းထွက်ရှိမှု

ဆိုးသောသက်ရောက်မှုများ

- **စီမံကိန်းဖျက်သိမ်းသည့်ကာလ**
- လေအရည်အသွေး
- ရေအရည်အသွေး
- မြေအရည်အသွေး
- ဆူညံသံနှင့်တုန်ခါမှု
- ဇီဝမျိုးစုံမျိုးကွဲများအပေါ်သက်ရောက်မှု
- လုပ်ငန်းခွင်ကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေး
- ရပ်ရွာလူထုကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေး
- အစိုင်အခဲစွန့်ပစ်ပစ္စည်းထွက်ရှိမှု
- စွန့်ပစ်ရေထွက်ရှိမှု
- အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းထွက်ရှိမှု

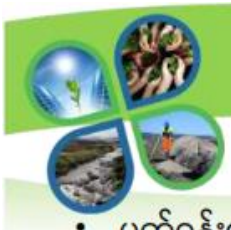
လျော့ချရန်နည်းလမ်းများ

- စီမံကိန်းရှိလမ်းများအား ရေဖြန်းခြင်း၊ လမ်းခင်းခြင်း
- လုပ်ငန်းသုံးယာဉ်များအား စနစ်တကျမောင်းနှင်စေခြင်းနှင့် ပုံမှန်ပြုပြင် ထိန်းသိမ်း ခြင်း
- ညအချိန်တွင် ဆူညံသံနှင့်တုန်ခါမှုများသော စီမံကိန်းလုပ်ငန်းများ ဆောင်ရွက်ခြင်း အားရှောင်ရှားခြင်း
- ဆိုလာပြားများ၊ အင်ဗာတာများ၊ ထရန်စဖော်မာများအား စနစ်တကျတပ်ဆင်၊ ပြုပြင်ထိန်းသိမ်း၊ ဖြုတ်သိမ်းခြင်း
- ဓာတ်အားလိုင်းသွယ်တန်းရာတွင်စနစ်တကျဆောင်ရွက်ခြင်း
- ရေဆိုးသန့်စင်စက်တပ်ဆင်ခြင်းနှင့် ရေမြောင်းများစနစ်တကျဖောက်လုပ်ခြင်း
- လုပ်သားများအား လုပ်ငန်းခွင်ကာကွယ်ရေးပစ္စည်းများအသုံးပြုစေခြင်း၊ အမှန်တကယ် အသုံးပြုမပြုစစ်ဆေးခြင်း။



လျော့ချရန်နည်းလမ်းများ

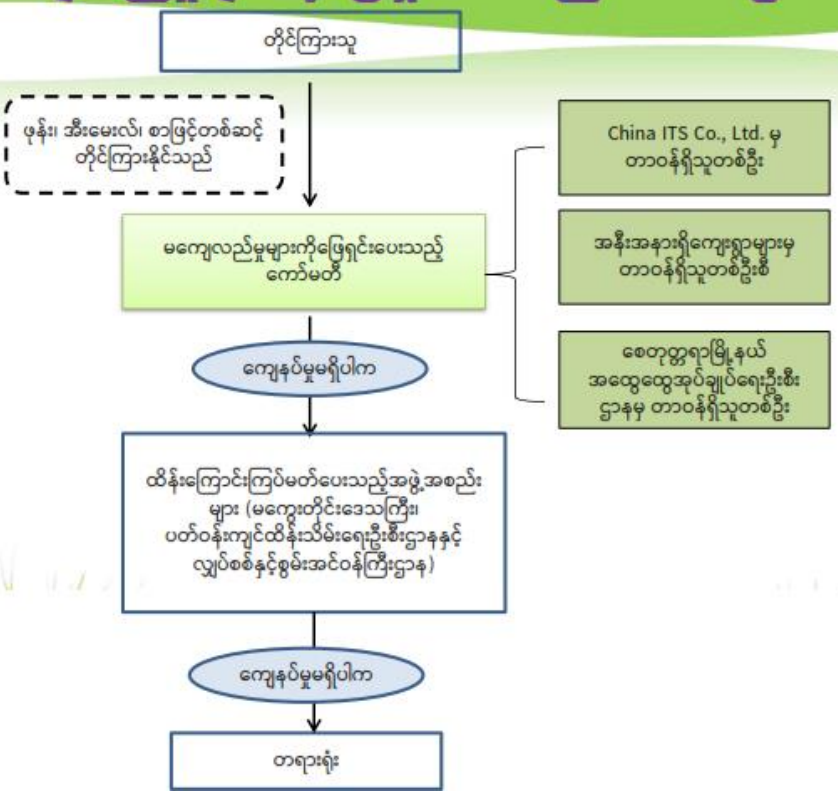
- ရပ်ရွာလူထုအား ဆူညံသံနှင့်တုန်ခါမှုမြင့်မားသော လုပ်ငန်းများဆောင်ရွက်ပါက ကြိုတင်အသိပေးခြင်း
- စီမံကိန်းခြံစည်းရိုးနှင့် ဓာတ်အားလိုင်းများတွင် သတိပေးဆိုင်းဘုတ်များ တပ်ဆင်ခြင်း
- စီမံကိန်းအတွင်းလုံလောက်သောအိမ်သာများ၊ လက်ဆေးကန်များထားပေးခြင်း
- မီးသတ်ဆေးဗူးများ၊ မီးသတ်ပိုက်များ၊ မီးသတ်ရေကန်များတပ်ဆင်ထားရှိခြင်း
- အရေးပေါ်ဆက်သွယ်ရန်ဖုန်းနံပါတ်များအား မြင်သာသည့်နေရာတွင်ထားရှိခြင်း
- အစိုင်အခဲစွန့်ပစ်ပစ္စည်းများနှင့် အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းများအား မြို့နယ်စည်ပင်သာယာရေးကော်မတီရေးနှင့် ချိတ်ဆက်စွန့်ပစ်ခြင်း
- ကိုဗစ်-၁၉ ရောဂါကာကွယ်ရန် သက်ဆိုင်ရာမှ ချမှတ်ထားသော လမ်းညွှန်ချက်များအား လုပ်သားများကို အတိအကျလိုက်နာစေခြင်း



အခြားအစီအစဉ်များ

- ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ် (ဖြလတစ်ကြိမ်)
  - လေအရည်အသွေး
  - ရေအရည်အသွေး
  - ဆူညံသံပမာဏ
- မီးဘေးအန္တရာယ်ကင်းရှင်းရေးအစီအစဉ်
- အရေးပေါ်ကိစ္စရပ်များအတွက်ကြိုတင်ပြင်ဆင်မှုနှင့်တုန့်ပြန်မှုအစီအစဉ်
- လုပ်ငန်းခွင်ကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေးအစီအစဉ်
- လူမှုစီးပွားတာဝန်ယူမှုအစီအစဉ်
- မကျေလည်မှုများကိုဖြေရှင်းပေးမည့်အစီအစဉ်

မကျေလည်မှုများကိုဖြေရှင်းပေးမည့်အစီအစဉ်



ပတ်ဝန်းကျင်အရည်အသွေးတိုင်းတာမှုများ

လေအရည်အသွေးတိုင်းတာခြင်း

ဆူညံသံပမာဏတိုင်းတာခြင်း

Appendix 11 Site Visit Report

	Operation Department	E Guard-OD-RF-08 Version :00	Approved by MD On Date: 08/07/2020 Page 1 of 10
eguard ENVIRONMENTAL SERVICES	Site Visit Report Format		

SITE VISIT REPORT
FOR
SATOKTAYAR SOLAR POWER PROJECT

Date: 31th May 2022

Our Ref: 20220511 SVI_ext. EMP 52-065-3, 4

Summary

A scoping site visit for environmental quality measurement and focus group discussion (FGD) was arranged by the project study team, E Guard Team, with the support from the project proponent, Power China Co., Ltd. and Sinohydro (Myanmar) Co., Ltd. It was two-day trip visit to Myaynigone Village, Myaynigone Village Tract, Satoktayar Township, Magway Region. Arrangement and all the requested support from the client were made via U Yan Kyar Phoo, Translator of Sinohydro (Myanmar) Co., Ltd. during the trip. The team visited the site including environmental expert with project assistant and surveyor. We refer to our site visit itinerary submitted on 12/05/2022 for this site visit report.

Activity Information

Activity Title: Site visit, EQ baseline measurement and stakeholder engagement for 30 MW Ground Mounted Solar Power Plant Project, Satoktayar Substation.
Project Code: 52-065-4-SDTY
Name of Company: Sinohyro (Myanmar) Co., Ltd.
Period: **24/05/2022 and 26/05/2022**
Submitted date: 1/06/2022
Prepared by: Daw Shwe Ya Min Bo, Environmental Specialist
Checked by: U Soe Min, Team Leader

Persons Involved

	Name	Position	Contact No.
E Guard	1) Daw Shwe Ya Min Bo	- Environmental Specialist	- 09 797005201
	2) U Zaw Ye Naung	- Project Assistant	- 09 797005198
	3) U Aung Zayar Wint	- Project Assistant	- 09 797005170
	4) U Khin Zaw Min	- Surveyor	- 09 797005176
Others involved or consulted	(1) Mr. AN GUOHUA	- Project Manager (Sinohydro Myanmar Co., Ltd)	-
	(2) Mr. LONG YUN GUO	- Labor Leader (Sinohydro Myanmar Co., Ltd)	- 09797973143
	(3) U Yan Kyar Phoo	- Translator (Sinohydro Myanmar Co., Ltd)	- 09754203423
	(4) U Aung Kyaw Oo	- Project Manager (Asia Oracle Co., Ltd.)	- 09789888866
	(5) U Thuta Soe	Assistant Project Manager (Asia Oracle Co., Ltd.)	- 09400406928

EFFECTIVE DATE: 08/07/2020

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Travel, meetings and activities diary

Date	Time	Activities	Remark
24th May, 2022, Tuesday	06:00 PM	• Study Team departs from Yangon to Magway.	Transportation by public express vehicle
	07:00 - 08:30 PM	• Traffic Jam at 9 miles because of truck with full of loads crossing the Highway road.	
	05:00 AM	• Arrive at Magway Bus Terminal.	
25th May, 2022, Wednesday	05:00 – 09:30 AM	• Depart Magway and heading to Satoktayar Solar Power Plant Substation site. • It takes about 4 and half hrs to get site area and had to pass every entrance gate of 6 townships, (Minbu, Sagu, LeGaing, PwintPhyu, ShoutTaw and Salin) before getting Satoktayar Tsp.	Transportation was arranged by study team and received approval from client for reimbursement.
	09:30 – 10:30 AM	• Arrived at Satoktayar Solar Power Plant Substation site. • Meet with U Aung Kyaw Oo (Project Manager of Asia Oracle, Sub Contractor for Construction) and Mr. AN GUOHUA (Project Manager, QC of Sinohydro) and Mr. LONG YUN GUO (Labor Leader of Sinohydro) and U Yan Kyar Phoo (Translator of Sinohydro) and request for necessary data regarding project description, explain about EIA process, discuss for Stakeholder Meeting which will be done 26th May, 2022 and arrange for meeting with township GAD and village tract leader.	
	10:30 -11:30 AM	• Installed EQ Measurement Equipment for Air, Noise (Source) and start EQ Measurement (24 hrs).	
	11:30 – 12:30 PM	• Meet with Satoktayar GAD (U Hein Htet Aung, AD) and inform about the project and invite for SHM with U Thuta Soe (Assistant Project Manager of Asia Oracle) • A little security guard at GAD office	
	12:30 - 01:30 PM	• Had lunch at Satoktayar.	
	01:30 – 02:00 PM	• Went to Myaynigone Village to meet Village Tract Leader and meet with his son in law instead of VTL and discuss about time and venue of SHM and invite for SHM. • Installed EQ Measurement Equipment for Noise (Receptor) and start EQ Measurement (24 hrs) at Myaynigone Village.	
	02:00 - 04:00 PM	• Visited Satoktayar Solar Power Plant Construction Site with U Thuta Soe (Assistant Project Manager, Asia Oracle Construction) and took photo records. • It was noted that site clearance has done 100% completely already and at is about to proceed to start construction. Temporary office container rooms and worker camps have been constructed within the site area. • Foundations of two living area and 66 KV substation areas have been starting constructed.	

		• Construction wastes such as cement bags which will sell 40 kyats per one and reuse in the muddy area to prevent slip. • There are 9 Chinese citizen workers and others are Myanmar. The current workers size for construction phase is over 280 people. • There are 7 worker camps, hold 40 people for each camp and have 2 toilets and 1 temporary water tank for each camp. • Two 200 ft. depth groundwater well in the site area for construction and domestic uses is still digging and can't get pure water. • 25,000 piles dragging for solar points and one solar slide conduct each 10 piles.	
	04:00 - 06:00 PM	• Left site and went to Satoktayar and search for hotel.	
	07:00 PM	• Halted at Satoktayar.	
26th May, 2022, Thursday	06:30 – 07:00 AM	• Had Breakfast	Transportation was arranged by study team and received approval from client for reimbursement.
	07:00 – 09:30 AM	• Meet with U Thuta Soe at Construction Site and printed out power point file for Stakeholder Meeting. • Delay about 30 mins because of printer error. • Took surface water sample from temporary water storage area which is transported from Mone Stream for Construction use and soil sample (Top soil and Bottom Soil) at project site.	
	09:30 – 10:30 AM	• Conduct Stakeholder Meeting with villagers at Satoktayar Solar Project Site Meeting Hall, Myaynigone village. • Attendance list and meeting minute is provided below.	
	10:30 – 01:00 PM	• Went to Shwe Pwint Phyu Gate and send water sample to Yangon. • Had Lunch at Satoktayar. • Finished EQ Measurement at Project Site and Village tract leader's home.	
	01:00 PM	• Left Satoktayar site and continue to Kyeeonkyeewa site.	

Site visit notes (observed/findingUs):

- Due to unstable political condition, study team had to prepare forwarding letter for relevant departments before site visit.
- In current condition, Satoktayar site is at the construction phase starts from April 2022 and ends in the middle of June 2022 according to the tentative schedule. There are only two foundation constructions of Living area and control room, 25,000 pile foundation points and two under constructing tube wells.
- Lack of supplies for staff housing in site area for Chinese staff and wait permit from Government. So, they stayed at hostel and rental house at Satoktayar Tsp.

- According to the site location, only surface water sample is taken at the project site. In current condition, the two tube wells can't get pure water and get water from Mone stream with transport vehicle. All of the houses in the Myaynigone village also get from Mone stream by pumping system.
- Soil samples had been taken from project site with two samples according to depth of soil, top soil and bottom soil. Sample taken date is 26th May 2022, 8:00 AM. During samples taken, the weather is dry and sunny.
- Due to usage of heavy machine and vehicle and lump of sand within construction area, air quality and noise level can be affected during construction

Agenda of Stakeholder Meeting

The meeting was held in accordance with the following agenda;

1) Opening Ceremony
2) Presentation of Project Information by U Thuta Soe (Assistant Project Manager, Asia Oracle Construction) on behalf of Mr. AN GUOHUA (Project Manager, Sinohydro Myanmar Co., Ltd.)
3) Presentation of Environmental Management Plan (EMP) for construction and operation of 30 MW ground mounted solar power plant project connected to Satoktayar Substation by Daw Shwe Ya Min Bo (Environmental Specialist, E Guard Environmental Services Co., Ltd.)
4) Questions, Comments and Suggestions from the attendees.
5) Closing Ceremony.

Attendance List of Stakeholder Meeting

No.	Category	Number of Participants
1.	Local People from Myaynigone Village	10
3.	Representatives of project proponent	5
4.	Representatives of E Guard Environmental Services	4

The detail of each agenda is described in the following:

1. Opening Ceremony

2. Presentation of Project Information by U Thuta Soe on behalf of Mr. AN GUOHUA (Project Manager, Sinohydro Myanmar Co., Ltd.)

U Thuta Soe (Assistant Project Manager, Asia Oracle Construction) briefly explained about the project information such as type of business, construction and operation processes of the project, project proponent information and project description.

3. Presentation of Environmental Management Plan (EMP) for construction and operation of 30 MW ground mounted solar power plant project connected to Satoktayar Substation by Daw Shwe Ya Min Bo (Environmental Specialist, E Guard Environmental Services Co., Ltd.)

Daw Shwe Ya Min Bo explained the processes of environmental management plan preparation, potential positive impacts of the project, potential negative impacts of the project, proposed mitigation measures to reduce these negative impacts, proposed monitoring plan, grievance redress mechanism and environmental quality measurements processes of the proposed project.

4. Questions, Comments and Suggestions from the Attendees

***Question*: U Aung (Myaynigone Village)**

(a) He would like to know about the project boundary. Will the fence be inside or outside of boundary line?
(b) Will you inform before forest burning to us?
(c) The amount of toilets in the construction site camps enough or not. He worried about the health problems to his village.
(d) He also would like to know about the impact on weather condition and agriculture.

***Answer:* U Thuta Soe (Assistant Project Manager, Asia Oracle)**

(a) He answered that the fence will be in the center of the project boundary but there will be a little bit impact from the vehicle using of land clearance and please kindly understand that point.
(b) Yes, we will inform to village tract leader before forest burning.
(c) Yes, we can do more toilets immediately.
Daw Shwe Ya Min Bo (Environmental Specialist, E Guard Environmental Services)
(d) Solar energy plant can reduce greenhouse gas emissions particularly CO_2, thus mitigate climate change and can't impact on weather condition and agriculture.

***Question:* U Thura (Myaynigone Village)**

(a) He asked that will you use herbicides or chemicals for the ground clearance around solar panels such as shrubs and grasses. He worried about the impact on soil contamination, groundwater contamination and animals drinking and agriculture.
(b) He would like to know that he understand solar panels absorb the sunlight, thus is there any reflection from them.
(c) The project is not temporary and he worried about the fire hazards in the upcoming years.

***Answer:* Mr. LONG YUN GUO (Sinohydro Myanmar), U Kyaw Soe (Director, Asia Oracle)**

(a) U Kyaw Soe translated to Mr. LONG YUN GUO about the question and he answered that there is no chemical or herbicides usage for ground clearance.
U Thuta Soe (Assistant Project Manager, Asia Oracle)

(b) They will use mono crystalline silicon solar panels that absorb light and reflect only a small amount of the sunlight and not sun's heat.
Daw Shwe Ya Min Bo (Environmental Specialist, E Guard Environmental Services)

(c) Fire Fighting Plan and other emergency response plan are also set up in EMP and the project proponent will implement this plan to reduce the negative impacts.

Question: **U Arr Marn (Myaynigone Village)**

He worried about the weather condition because of the project.

Suggestion By: **U Win Thaung (Myaynigone Village Tract Leader)**

He hopes there is no negative impacts from the project.

Answer: **Daw Shwe Ya Min Bo (Environmental Specialist, E Guard Environmental Services)**

We will note each of villagers' suggestion and mention in our EMP report.

Conclusion

The site visit for environmental quality measurement and Stakeholder Meeting was done as scheduled. Thanks to the support of Sinohydro Myanmar Co., Ltd. and U Aung Kyaw Oo (PM) and U Thuta Soe (APM) from Asia Oracle Construction Co., Ltd. who accompanied with us for site visit and SHM.

Info/doc received and requested

Table 1.0 Info/doc received from Asia Oracle Construction Co., Ltd. during and after the site visit

No.	Received Information	File/ Document Name
1.	Design of Construction Layout Plan (Overall, Living Area, and Substation)	
2.	Map of Transmission Line for Satokttaya Solar Project via Mr. Mu Zheng Jiang during Sedawgyi Site Visit	

Table 2.0 Information and documents to be provided by DOB

No.	Required Information	Remark
1.	Project Checklist	Requested on 25th May, 2022 face to face and follow up via viber
2.	Waste Management Plan (Solid/ Liquid/ Cutting trees)	Same as above
3.	Disposal Method	Same as above
4.	Occupational Health and Safety Plan	Same as above
5.	Emergency Response Plan	Same as above

6.	Investment Plan	Same as above
7.	Man power during construction and operation period	Same as above

Site visit photos

Meeting with Project Proponent regarding project information

Site visit around Project Site

Meeting with Satoktayar Township GAD

Meeting with Myaynigone Village Tract Leader

Air Quality Measurement at Satoktayar Site

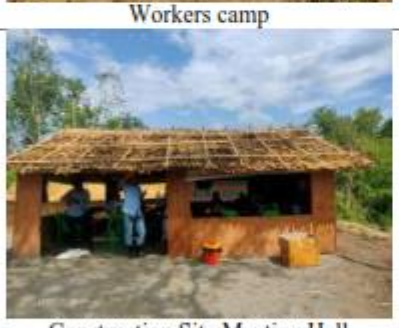
Noise Monitoring at Satoktayar Site (Source)

Getting Soil Sampling within site area

Surface water Sample

Workers camp

Workers Toilet



Construction Site Meeting Hall

Starting foundation of living area

Concrete Batching Plant

Solar Points

Drainage

Gernerator

Attendance

Presented by U Thuta Soe
(on behalf of Sinohydro)

Presented by Daw Shwe Ya Min Bo
(E Guard Environmental Services)

Questions, Comments and Suggestions from the Attendees

Contact Person

Name	Position	- Contact Number
(1) Mr. LONG YUN GUO	- Labor Leader (Sinohydro Myanmar Co., Ltd)	- 09797973143
(2) U Yan Kyar Phoo	- Translator (Sinohydro Myanmar Co., Ltd)	- 09754203423
(3) U Aung Kyaw Oo	- Project Manager (Asia Oracle Co., Ltd.)	- 09789888866
	- Assistant Project Manager	- 09400406928

EFFECTIVE DATE: 08/07/2020

Copy Document

(4) U Thuta Soe (5) U Hein Htet Aung (6) U Thiha	(Asia Oracle Co., Ltd.) - AD (Satoktayar GAD) - Rental Car driver	- 09260490081 - 09401558779

Appendix 12 Water Quality Laboratory Results

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W0522 699

WATER QUALITY TEST RESULTS FORM

Client: Satoktayar Solar Power Plant Project
Nature of Water: Surface Water
Location: Myay Ni Kone Village, Satoktayar Township, Minbu District Magway.
Date and Time of collection: 26.5.2022
Date and Time of arrival at Laboratory: 27.5.2022
Date and Time of commencing examination: 28.5.2022
Date and Time of completing: 2.6.2022

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia Nitrogen (NH_3)		mg/l	
Ammonium Nitrogen (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	8	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (SiO_2)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein
B.Sc (Chemistry)
Sr.Chemist
ISO Tech Laboratory

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)
No.18. Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-880100172, 09-880100173, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

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Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
pH	7.4		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids	32	mg/l	
Total Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein
~~B.Sc (Chemistry)~~
Sr.Chemist
(a division of WEG Co.,Ltd.) ISO Tech Laboratory

Approved by
Signature:
Name: Soe Thit
~~B.E (Civil) 1930,~~
Technical Officer
ISO TECH Laboratory

No.18. Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-880100172, 09-880100173, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

ORIGINAL

SGS

Report No. : **22520-00060**
Job Ref. : 5000130
Date : 02-Jun-22

TEST REPORT

CLIENT NAME : **E GUARD ENVIRONMENTAL SERVICES COMPANY LIMITED**

ADDRESS : **NO.145,(A2-A3), THIRI MINGALAR STREET, 8 MILE, PYAY ROAD, MAYANGONE TOWNSHIP, YANGON**

The following sample was submitted and identified by client and analysed at our lab with the following results.

Sample Description : Satoktayar Solar Power Plant Project (Surface Water)

Sampling Date : 26-May-22

Sample Condition : Glass and Plastic Bottle at Ambient Temperature

Lab Code : W-062

Date Sample(s) Received : 27-May-22

Testing Period : 30-May-22 TO 31-May-22

No.	Test Items	Methods	Results	Units
1	Potassium	APHA 3500-K B (Flame Photometric Method) (23rd Edition)	0.99	mg/L
2	Nitrogen(Kjeldahl)	APHA 4500-NorgB (Macro Kjeldahl Method) (23rd Edition) (In-house Method)	<1	mg/L
3	Phosphorus	APHA 4500-P E (Ascorbic Acid Method) (23rd Edition)	0.014	mg/L

********** End of Report **********

M.C.Z

SGS (MYANMAR) LIMITED Oil, Gas & Chemicals

SGS

Report No. : **22520-00060**
Job Ref. : 5000130
Date : 02-Jun-22

TEST REPORT

CLIENT NAME : **E GUARD ENVIRONMENTAL SERVICES COMPANY LIMITED**

ADDRESS : **NO.145,(A2-A3), THIRI MINGALAR STREET, 8 MILE, PYAY ROAD, MAYANGONE TOWNSHIP, YANGON**

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Sample Condition : Glass and Plastic Bottle at Ambient Temperature

Lab Code : W-062

Date Sample(s) Received : 27-May-22

Testing Period : 30-May-22 TO 31-May-22

No.	Test Items	Methods	Results	Units
4	Oil & Grease	APHA 5520 B (Partition-Gravimetric Method) (23rd Edition)	<5	mg/L
5	Chromium	APHA 3030 &3111B (Direct Air Acetylene Flame Method) (23rd Edition)	<0.1	mg/L

********** End of Report **********

M.C.Z

SGS (Myanmar) Limited
(Thin Thin Maw)
Laboratory Manager