
Environmental Management Plan Report for

30MW MYANMAR SEDAWGYI SOLAR POWER PLANT PROJECT

Proposed by;

Prepared by;

MYANMAR SEDAWGYI SOLAR POWER COMPANY LIMITED



Myanmar Sedawgyi Solar Power Co., Ltd.

E Guard Environmental Services Co.,
Ltd.

July, 2023

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Commitment to Follow and Compliance by E Guard




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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 Sedawgyi Substation, proposed by Myanmar Sedawgyi 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
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ABBREVIATIONS

| | |
|-------------------|--|
| % | : Percentage |
| µg/m ³ | : Micro Gram per Cubic meter |
| AC | : Alternating Current |
| BOD | : Biochemical Oxygen Demand |
| CCTV | : Closed-Circuit Television |
| CO | : Carbon Monoxide |
| CO ₂ | : Carbon Dioxide |
| COD | : Chemical Oxygen Demand |
| CSR | : Corporate Social Responsibility |
| dB (A) | : Decibel unit |
| DC | : Direct Current |
| ECD | : Environmental Conservation Department |
| EMoP | : Environmental Monitoring Plan |
| EMP | : Environmental Management Plan |
| EPGE | : Electric Power Generation Enterprise |
| GPS | : Global Positioning System |
| HSE | : Health, Safety and Environment |
| HVAC | : Heating, Ventilation and Air Conditioning |
| km | : Kilometer |
| kV | : Kilovolt |
| kW | : Kilo Watt |
| kWh | : Kilo Watt Hour |
| L/m ² | : Liter per Square Meter |
| L/s | : Liter per Second |
| m ³ | : Cubic Meter |
| m ³ /h | : Cubic Meter per Hour |
| mg/l | : Milligram per Liter |
| mm ² | : Millimeter Square |
| MOEE | : Ministry of Electricity and Energy |
| MONREC | : Ministry of Natural Resources and Environmental Conservation |
| MJ/m ² | : Mega Joule per Square Meter |
| MWac | : Mega Watt |

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| | |
|-----------------|--|
| MWh | : Mega Watt Hour |
| MWp | : Mega Watt Peak |
| NO ₂ | : Nitrogen Dioxide |
| °C | : Degrees Celsius |
| pH | : Pond us Hydrogenium |
| PM | : Particulate Matter |
| ppm | : Part Per Million |
| PV | : Photovoltaic |
| SCADA | : Supervisory Control and Data Acquisition |
| SO ₂ | : Sulfur Dioxide |
| TSP | : Total Suspended Particulates |
| UPS | : Uninterruptable Power Supply |
| WHO | : World Health Organization |

အစီရင်ခံစာ အကျဉ်းချုပ်

ဤပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်သည် China ITS (Holdings) Co., Ltd. အမည်ဖြင့် လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ရေးလုပ်ငန်းမှ ခေါ်ယူသောတင်ဒါအမှတ် EPGE PV 02/2021-2022 အား ဝင်ရောက်ယှဉ်ပြိုင်အောင်မြင်ခဲ့ပြီး စီမံကိန်းအား အဆင်ပြေချောမွေ့စွာတည်ဆောက်ပြီး လုပ်ငန်းလည်ပတ်နိုင်ရန်အတွက် အသစ်ဖွဲ့စည်းလိုက်သည့် Myanmar Sedawgyi Solar Power Co., Ltd. မှ အကောင်အထည်ဖော် ဆောင်ရွက်နေသည့် ဆည်တော်ကြီး ဓာတ်အားခွဲရုံနှင့်ချိတ်ဆက်၍ လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးမည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းစီမံကိန်းအတွက် E Guard Environmental Services Co., Ltd. မှတာဝန်ယူ ပြင်ဆင်ရေးဆွဲထားခြင်းဖြစ်သည်။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သဘောထား မှတ်ချက် များအရ 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 ဆည်တော်ကြီး ဓာတ်အားခွဲရုံနှင့် အောင်ပင်လယ် ဓာတ်အားခွဲရုံသို့ သွယ်တန်းထားသော ဓာတ်အားလိုင်းသို့ ၁၃၂ ကေဗီ ကောင်းကင်ဓာတ်အားလိုင်းဖြင့် T-Joint ဆက်ပြီးလျှင် ဆည်တော်ကြီး ဓာတ်အားခွဲရုံသို့ လျှပ်စစ်ဓာတ်အားဖြန့်ဖြူးခြင်း လုပ်ငန်းများအတွက် ပြုလုပ်ခဲ့ခြင်း ဖြစ်သည်။ လေ့လာမှုနယ်ပယ်အား စီမံကိန်းဗဟိုမှ ၁ ကီလိုမီတာ အချင်း ဝက်ရှိုသောဧရိယာ အတွင်း နှင့် ၁၃၂ ကေဗီ သွယ်တန်းထားသော ဓာတ်အားလိုင်း၏ တစ်ဘက် တစ်ချပ် ၂၀၀ မီတာအတွင်း အဖြစ် သတ်မှတ်လေ့လာခဲ့ခြင်းဖြစ်ပြီး ထိုဧရိယာသည် စီမံကိန်း ကြောင့်ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားဆိုင်ရာသက်ရောက်မှုများအတွက် လုံလောက်မှုရှိသည်။

အဆိုပြုစီမံကိန်းသည် သန်းကုန်းကျေးရွာ၊ စံကားပင်ကျေးရွာအုပ်စု၊ မတ္တရာမြို့နယ်၊ ပြင်ဦးလွင်ခရိုင်၊ မန္တလေးတိုင်း ဒေသကြီး၊ မြန်မာနိုင်ငံတွင်တည်ရှိသည်။ စီမံကိန်း၏ တည်နေရာမှာ မြောက်လတ္တီကျု ၂၂ ဒီဂရီ ၁၅ မိနစ် ၅၅ စက္ကန့် မှ ၂၂ ဒီဂရီ ၁၆ မိနစ် ၄၁ စက္ကန့် ကြားနှင့် အရှေ့လောင်ဂျီကျု ၉၆ ဒီဂရီ ၁၈ မိနစ် ၁၁ စက္ကန့် မှ ၉၆ ဒီဂရီ ၁၈ မိနစ် ၃၃ စက္ကန့် ကြားတွင် တည်ရှိသည်။ အဆိုပြုစီမံကိန်း၏ တည်ဆောက်ခြင်း လုပ်ငန်းများတွင် box transformer များ၊ string inverter များ၊ ဆိုလာပြားများ တပ်ဆင်ရန် ဒေါက်တိုင်များ တပ်ဆင်ခြင်း၊ solar power station တည်ဆောက်ခြင်း၊

ဘက်စုံသုံးအဆောက်အဦ၊ ဝန်ထမ်းအဆောင်များ၊ ထမင်းစားဆောင်များတည်ဆောက်ခြင်း၊ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ရန်နှင့် ဖြန့်ဖြူးရန် စက်ကိရိယာများ တပ်ဆင်ခြင်းနှင့် လျှပ်စစ်ဓာတ်အားဖြန့်ဖြူးရန် ၁၃၂ ကေဗွီ ကောင်းကင်ဓာတ်အား လိုင်းသွယ်တန်းခြင်း လုပ်ငန်းများ ပါဝင်သည်။ အဆိုပြုစီမံကိန်း၏ ပြန်လှန်လျှပ်စီး စွမ်းရည်မှာ ၃၀ မဂ္ဂါဝပ်ဖြစ်ပြီး တိုက်ရိုက်လျှပ်စီး စွမ်းရည်မှာ ၃၆.၂၈၈ မဂ္ဂါဝပ်ဖြစ်ကာ box-type transformer ၃ လုံးဖြင့် လျှပ်စစ်ဓာတ်အား ထုတ်လုပ် သွားမည်ဖြစ်သည်။ စီမံကိန်းအဆိုပြုသူသည် စီမံကိန်းအတွက် မြေနေရာအား ပိုင်ဆိုင်ထားပြီး စီမံကိန်းအတွက် စုစုပေါင်းမြေဧရိယာ ၈၅၀.၉၄ (၆၁ ဟတ်တာ) လိုအပ်သည်။ မြေနေရာ နှင့်ပတ်သက်၍ Super One Holdings Co., Ltd. မှ China ITS (Holdings) Co., Ltd. သို့ စီမံကိန်းအား အကောင်အထည်ဖော်ဆောင်ရွက်ရန် ငှားရမ်းအသုံးပြုခွင့်ပေးထားပြီး ညီနောင် ကုမ္ပဏီအချင်းချင်း လွှဲပြောင်း အသုံးပြုခြင်းဖြစ်၍ China ITS (Holdings) Co., Ltd. ပိုင်အနေဖြင့် အသုံး ပြုသွားမည်ဖြစ်သည်။ စီမံကိန်းအဆိုပြုသူသည် စီမံကိန်းတွင် ဆိုလာပြား ၆၇၂၀၀ ခု၊ series inverter ၂၀ လုံး၊ ၅၀၀၀၀ kVA box-type transformer ၃ လုံး၊ ဆိုလာပြားများ တပ်ဆင်ရန် ဒေါက်တိုင် ၂၄၀၀ ခုအား နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ရန် တပ်ဆင် သွားမည်ဖြစ်သည်။ တည်ဆောက်ခြင်း လုပ်ငန်းများအား မတ်လ ၂၀၂၂ ခုနှစ်တွင် စတင်ခဲ့ပြီး နိုဝင်ဘာလ ၂၀၂၂ တွင် ပြီးဆုံးမည်ဖြစ်ကာ ဆောင်ရွက်ရန် ၈ လ ကြာမြင့်မည်ဖြစ်သည်။

အဆိုပြုစီမံကိန်းအား China ITS (Holdings) Co., Ltd. ၏ လက်အောက်ခံကုမ္ပဏီဖြစ်သည့် Myanmar Sedawgyi Solar Power Co., Ltd. မှ အကောင်အထည်ဖော်ဆောင်ရွက်မည်ဖြစ်သည်။ တည်ဆောက်ခြင်း လုပ်ငန်းများပြီးစီးပါက အဆိုပြုစီမံကိန်းသည် နေရောင်ခြည်စွမ်းအင်ကို အသုံးပြု၍ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်မည်ဖြစ်ပြီး ဆည်တော်ကြီး ဓာတ်အားခွဲရုံသို့ ၁၃၂ ကေဗွီ ကောင်းကင်ဓာတ်အားလိုင်းဖြင့် လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးသွားမည်ဖြစ်ကာ လုပ်ငန်းလည်ပတ်ရန် ကာလမှာ နှစ် ၂၀ ဖြစ်သည်။ အဆိုပြုစီမံကိန်းသည် နှစ် ၂၀ ပြီးဆုံးပါက စီမံကိန်း အကောင်အထည်ဖော်သူသည် လုပ်ငန်းလည်ပတ်ရန်ကာလအား သက်ဆိုင်ရာထံတွင် သက်တမ်း တိုးမြှင့်ပြီး စီမံကိန်းလုပ်ငန်းများ ဆက်လက်ဆောင်ရွက် သွားမည်ဖြစ်သည်။ စီမံကိန်း အကောင် အထည်ဖော်သူ၏ ဒါရိုက်တာအဖွဲ့ဝင်များနှင့် ဖွဲ့စည်းပုံများ၊ အဆိုပြုစီမံကိန်း၏ ဖွဲ့စည်းပုံနှင့် ရင်းနှီးမြှုပ်နှံမှုအစီအစဉ်များအား ဖော်ပြထားသည်။

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

ခြင်းနှင့် လုပ်ငန်းလည်ပတ်ခြင်းတို့တွင် ပတ်ဝန်းကျင်အား ထိခိုက်မှု ကာကွယ်ရန် လိုက်နာရမည့် နိုင်ငံတော်၏တည်ဆဲဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများအား ဖော်ပြထားသည်။

လက်ရှိစီမံကိန်းအခြေအနေကို ကွင်းဆင်းလေ့လာခြင်းနှင့် ယခင်လေ့လာပြီးသော အချက်အလက် များအား မှီငြမ်းလေ့လာခြင်းသည် ပတ်ဝန်းကျင်ထိခိုက်မှုများ ဆန်းစစ်ခြင်းအတွက် အလွန် အရေးပါသည်။ ထို့ကြောင့် လက်ရှိစီမံကိန်း၏ ပတ်ဝန်းကျင်ဆိုင်ရာအခြေအနေများအား ကွင်းဆင်း လေ့လာခြင်းသည် ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာမှုများပြုလုပ်ရာတွင် အရေးပါသော ကဏ္ဍတွင် ပါဝင်သည်။ ထို့ကြောင့် E Guard Environmental Services Co., Ltd. သည် စီမံကိန်း၏ လေအရည်အသွေး၊ ရေအရည်အသွေးနှင့် ဆူညံသံပမာဏတို့အား ၂၀၂၂ ခုနှစ်၊ မေလ ၁၉ ရက်နှင့် ၂၀ ရက်တို့တွင် ၂၄ နာရီဆက်တိုက် စောင့်ကြပ်ကြည့်ရှုသည့်နည်းဖြင့် တိုင်းတာခဲ့သည်။ တိုင်းတာ ရရှိသော ရလဒ်များအား အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန် ချက်များနှင့် အခြားသက်ဆိုင်ရာလမ်းညွှန်ချက်များဖြင့် နှိုင်းယှဉ်လေ့လာခဲ့သည်။ လေထုအတွင်း ဓာတ်ငွေ့ပါဝင်မှုရလဒ်များအား နှိုင်းယှဉ်လေ့လာခြင်းအရ ဆာလဖာဒိုင်အောက်ဆိုဒ် ($0.2 \mu\text{g}/\text{m}^3$)၊ နိုက်ထရိုဂျင်ဒိုင်အောက်ဆိုဒ် ($0.29 \mu\text{g}/\text{m}^3$)၊ ကာဗွန်မိုနောက်ဆိုဒ် (0.00009 ppm)နှင့် ကာဗွန်ဒိုင်အောက်ဆိုဒ် (95.69 ppm) တို့သည် သက်ဆိုင်ရာလမ်းညွှန်ချက် တန်ဖိုးများအတွင်း ရှိကြောင်းလေ့လာတွေ့ရှိရသည်။ လေထုအတွင်းအမှုန်ပါဝင်မှုလေ့လာခြင်း ရလဒ်များအရ PM_{10} ($9.90 \mu\text{g}/\text{m}^3$) နှင့် $\text{PM}_{2.5}$ ($1.27 \mu\text{g}/\text{m}^3$) တို့သည် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်တန်ဖိုးများ အတွင်း ရှိကြောင်း လေ့လာတွေ့ရှိရသည်။ မြေအောက်ရေ အရည်အသွေး သိရှိနိုင်စေရန် ကိရိယာဖြင့်တိုင်းတာခြင်းနှင့် ရေနမူနာကောက်ယူခြင်း တို့ဖြင့် ဆောင်ရွက်ခဲ့သည်။ မြေအောက်ရေအရည်အသွေး တိုင်းတာမှုရလဒ်များအရ တိုင်းတာသော မြေအောက်ရေ၏ Parameters အားလုံးသည် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် တန်ဖိုးများ အတွင်းရှိပါသည်။ ဆူညံသံပမာဏတိုင်းတာမှုအား နေရာ (၁) နှင့် နေရာ (၂) တို့တွင်တိုင်းတာခဲ့ပြီး နေရာ (၁)တွင် နေ့အချိန်တိုင်းတာရရှိမှု ရလဒ်များ (98.98 dBA) နှင့် ညအချိန်တိုင်းတာရရှိမှု ရလဒ်များ (95.72 dBA) သည် လမ်းညွှန်ချက်တန်ဖိုးများအတွင်း ရှိကြောင်း လေ့လာတွေ့ရှိရသည်။ နေရာ (၂) တွင် နေ့အချိန်တိုင်းတာရရှိမှု ရလဒ်များ (99.92 dBA) နှင့် ညအချိန်တိုင်းတာရရှိမှု ရလဒ်များ (99.98 dBA) သည်လည်း လမ်းညွှန်ချက် တန်ဖိုးများအတွင်း ရှိကြောင်း လေ့လာတွေ့ရှိရသည်။ ထို့ကြောင့် စီမံကိန်းဝန်းကျင် ပတ်ဝန်းကျင်အရည်အသွေး (လေအရည်အသွေး၊ ရေအရည်အသွေးနှင့် ဆူညံသံပမာဏ) များသည် စီမံကိန်းတည်ဆောက်ခြင်း ကာလတွင် သက်ဆိုင်ရာ လမ်းညွှန်ချက်တန်ဖိုးများအတွင်းရှိကြောင်း လေ့လာတွေ့ရှိရသည်။

စီမံကိန်းအကောင်အထည်ဖော်သူသည် စီမံကိန်းဝန်းကျင် လက်ရှိပတ်ဝန်းကျင် အရည်အသွေး များအား ရေရှည်ကောင်းမွန်စေရန် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်များနှင့် လျှော့ချရန်နည်းလမ်း များကို မဖြစ်မနေလိုက်နာဆောင်ရွက်ရမည်။ ထို့ပြင် ယခင်လေ့လာပြီးသော အချက်အလက်များ ဖြစ်သည့် ရာသီဥတုဆိုင်ရာ အချက်အလက်များ၊ စီမံအုပ်ချုပ်မှုဆိုင်ရာ အချက်အလက်များ၊ လူမှုစီးပွားဆိုင်ရာအချက်အလက်များ၊ မြေအသုံးချမှုနှင့် အခြားလေ့လာပြီးသော အချက်အလက် များအား ဤအစီရင်ခံစာတွင် ဖော်ပြထားသည်။

နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းစီမံကိန်း အကောင်အထည်ဖော် တည်ဆောက်ခြင်း နှင့် လုပ်ငန်းလည်ပတ်ခြင်းတို့ကြောင့် အနီးပတ်ဝန်းကျင်နှင့် ဒေသခံပြည်သူတို့ အပေါ် ကောင်းကျိုးသက်ရောက်မှု ရှိနိုင်သလို ဆိုးကျိုးသက်ရောက်မှုများလည်း ရှိနိုင်ပါသည်။

အဆိုပြုစီမံကိန်းကြောင့် ရရှိနိုင်သော ကောင်းကျိုးသက်ရောက်မှုများမှာ -

- ဒေသခံပြည်သူများအတွက် အလုပ်အကိုင်နှင့် စီးပွားရေး အခွင့်အလမ်းများ ဖန်တီးပေးနိုင်ခြင်း
- ကာဗွန်ထုတ်လွှတ်မှု လျှော့ချနိုင်ခြင်း
- သယံဇာတများ ထိန်းသိမ်းခြင်းနှင့် ပတ်ဝန်းကျင်နှင့်လိုက်လျောညီထွေသော စီးပွားရေးများ အစပြုနိုင်ခြင်း၊
- မြန်မာနိုင်ငံ၌ ဆိုလာစွမ်းအင်တွင် ရင်းနှီးမြှုပ်နှံမှုများ တိုးများလာခြင်း
- အခွန်ငွေ ရရှိနိုင်ခြင်း
- လူမှုစီးပွားတာဝန်ယူမှု အစီအစဉ်များကြောင့် ဒေသတွင်း ဖွံ့ဖြိုးတိုးတက်ခြင်း တို့ဖြစ်ပါ သည်။

အဆိုပြုစီမံကိန်းတည်ဆောက်ခြင်းနှင့် လုပ်ငန်းလည်ပတ်ခြင်းတို့ကြောင့် ပတ်ဝန်းကျင်ဆိုင်ရာ အရင်းအမြစ်များ၊ ဂေဟစနစ်များ၊ လူသားများနှင့် စွန့်ပစ်ပစ္စည်းစွန့်ပစ်မှုတို့အပေါ် ထိခိုက်နိုင်သော ဖြစ်နိုင်ခြေရှိသည့် သက်ရောက်မှုများအား ခွဲခြားလေ့လာခဲ့ပြီး ထိုသက်ရောက်မှုများအား International Association for Impact Assessment (IAIA) ၏ သက်ရောက်မှုဆန်းစစ်ခြင်း နည်းလမ်းကို 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၊ ဆည်တော်ကြီး ဓာတ်အားခွဲရုံသို့ လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးနိုင်ရန် ကောင်းကင် ဓာတ်အားလိုင်း၏ ဓာတ်တိုင်များစိုက်ထူခြင်းနှင့် ဓာတ်အားလိုင်း သွယ်တန်းခြင်း တို့ပါဝင်သည်။ တည်ဆောက်ခြင်းလုပ်ငန်းများအား မတ်လ ၂၀၂၂ ခုနှစ်တွင် စတင်ခဲ့ပြီး နိုဝင်ဘာလ ၂၀၂၂ တွင် ပြီးဆုံးမည်ဖြစ်ကာ တည်ဆောက်ခြင်းကာလ ကြာမြင့်ချိန်မှာ ၈ လ ဖြစ်သည်။

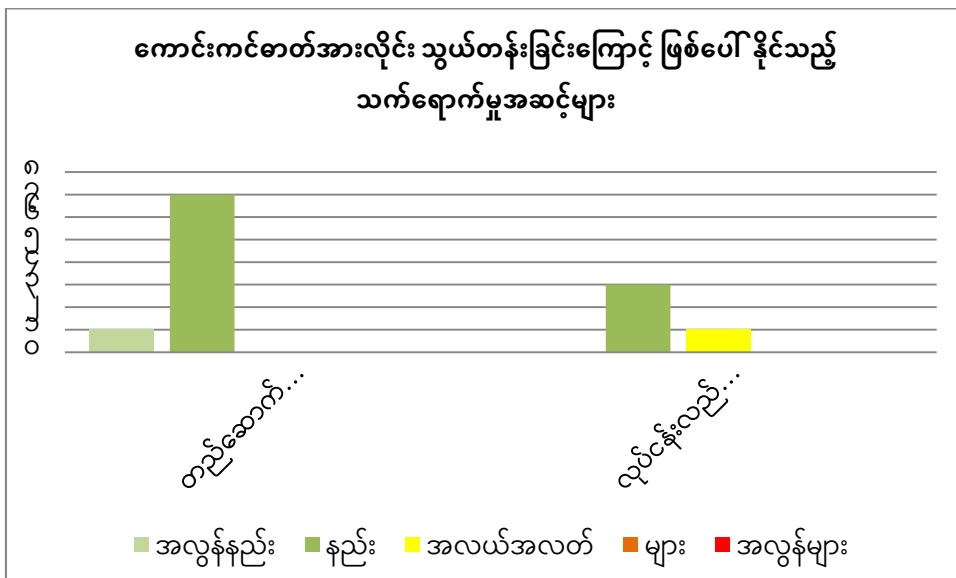
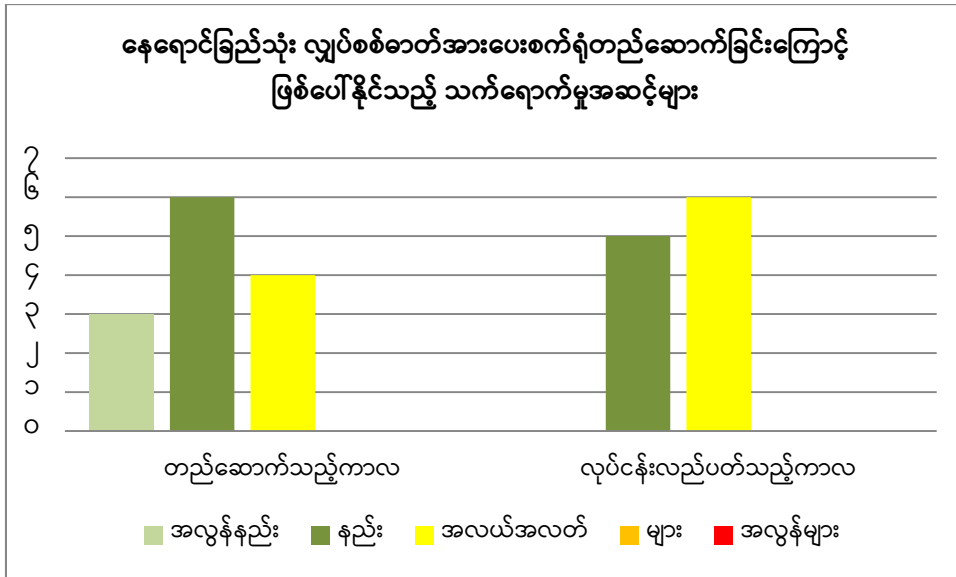
လုပ်ငန်းလည်ပတ်သည့်ကာလတွင် နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ပြီး ဆည်တော်ကြီးဓာတ်အားခွဲရုံနှင့် အောင်ပင်လယ်ဓာတ်အားခွဲရုံသို့ သွယ်တန်းထားသော ဓာတ်အား လိုင်းသို့ ၃.၈ ကီလိုမီတာ (၂.၅ မိုင်) အရှည်ရှိသော ၁၃၂ ကေဗီ ကောင်းကင် ဓာတ်အားလိုင်းဖြင့် T-Joint ဆက်ပြီးလျှင် ဆည်တော်ကြီး ဓာတ်အားခွဲရုံသို့ လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးခြင်း တို့ ပါဝင်ပြီး လုပ်ငန်းလည်ပတ်သည့် ကာလမှာ နှစ် ၂၀ ဖြစ်သည်။

လုပ်ငန်းဖျက်သိမ်းသည့်ကာလတွင် လုပ်ငန်းလည်ပတ်သည့်ကာလပြီးဆုံးပါက စီမံကိန်း အကောင် အထည်ဖော်သူအနေဖြင့် လုပ်ငန်းထပ်မံလည်ပတ်ရန်ကာလအား သက်ဆိုင်ရာ၏ ခွင့်ပြုချက်ဖြင့် သက်တမ်းတိုးမြှင့်ပြီး နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ် ခြင်းလုပ်ငန်းများ ဆက်လက်ဆောင်ရွက်သွားမည်ဖြစ်သည်။ သို့သော် စီမံကိန်းအား အပြီးသတ် ဖျက်သိမ်းမည်ဆိုပါက စီမံကိန်းအကောင်အထည်ဖော်သူသည် လုပ်ငန်းဖျက်သိမ်းမည့် ကာလ အတွက် အစီအစဉ်များကို တင်ပြသွားရမည်ဖြစ်သည်။ ထို့ကြောင့် အဆိုပြုစီမံကိန်း၏ လုပ်ငန်း ဖျက်သိမ်းသည့်ကာလနှင့် သက်ဆိုင်သော သက်ရောက်မှုများအား ခွဲခြမ်းလေ့လာခြင်း၊ ဆန်းစစ်လေ့လာခြင်းနှင့် မကောင်းသော သက်ရောက်မှုများအား လျှော့ချရန်နည်းလမ်းများ ရေးဆွဲခြင်းတို့အား ဤအစီရင်ခံစာတွင် ထည့်သွင်းထားခြင်းမရှိပါ။ သို့သော် စီမံကိန်းပိုင်ရှင်သည် စီမံကိန်းအပြီးပိတ်သိမ်းမည်ဆိုပါက ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာနသို့ Decommissioning Plan ကို တင်ပြ၍ ခွင့်ပြုချက် ရယူရန်လိုအပ်ကြောင်း E Guard Environmental Services Co., Ltd. က အကြံပြုဆွေးနွေးခဲ့ပါသည်။

နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အားပေးစက်ရုံ တည်ဆောက်ခြင်းကာလတွင် လေအရည် အသွေးအပေါ်သက်ရောက်မှု၊ မြေအရည်အသွေးအပေါ် သက်ရောက်မှု၊ ဆူညံသံနှင့် တုန်ခါမှု သက်ရောက်မှုနှင့် အစိုင်အခဲစွန့်ပစ်ပစ္စည်းကြောင့် သက်ရောက်မှုများသည် **အလယ်အလတ် အဆင့်သက်ရောက်မှုများ**အဖြစ် ဆန်းစစ်လေ့လာ တွေ့ရှိရသည်။ အခြားသက်ရောက်မှုများ ဖြစ်သည့် ရေအရည်အသွေးအပေါ်သက်ရောက်မှု၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး ဆိုင်ရာသက်ရောက်မှု၊ လူထုကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှု၊ မီးဘေးအန္တရာယ်သက်ရောက်မှု၊ ယာဉ်အန္တရာယ်နှင့် အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းကြောင့် သက်ရောက်မှု

များသည် နည်းသည့်အဆင့်သက်ရောက်မှုများ အဖြစ်တွေ့ရှိရပြီး ဇီဝပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု၊ အမြင်အာရုံအပေါ်သက်ရောက်မှုနှင့် စွန့်ပစ်ရေကြောင့် သက်ရောက်မှုတို့သည် အလွန်နည်းသည့်အဆင့် သက်ရောက်မှုအဖြစ် ဆန်းစစ်တွေ့ရှိရသည်။ ၃.၈ ကီလိုမီတာ အရှည်ရှိသော ၁၃၂ ကေဗီ ကောင်းကင်ဓာတ်အားလိုင်း သွယ်တန်းခြင်းကြောင့် လေ၊ ရေ၊ မြေ အရည်အသွေးတို့အပေါ် သက်ရောက်မှု၊ ဆူညံသံနှင့် တုန်ခါမှုသက်ရောက်မှု၊ ဇီဝပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး ဆိုင်ရာသက်ရောက်မှု၊ လူထုကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှု နှင့် ယာဉ်အန္တရာယ် သက်ရောက်မှုတို့သည် နည်းသည့်သက်ရောက်မှုများ အဖြစ် တွေ့ရှိရပြီး အစိုင်အခဲစွန့်ပစ်ပစ္စည်းများကြောင့် သက်ရောက်မှုတို့သည် အလွန်နည်းသည့်သက်ရောက်မှုများ အဖြစ်ဆန်းစစ်လေ့လာတွေ့ရှိရသည်။

နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အားပေးစက်ရုံ လည်ပတ်သည့်ကာလတွင် ရေအရည် အသွေးအပေါ် သက်ရောက်မှု၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်း ရေးဆိုင်ရာ သက်ရောက်မှု၊ လူထုကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှု၊ မီးဘေးအန္တရာယ်သက်ရောက်မှု၊ စွန့်ပစ်ရေနှင့် အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းကြောင့် သက်ရောက်မှုများ သည် အလယ်အလတ်အဆင့် သက်ရောက်မှုများအဖြစ် ဆန်းစစ်တွေ့ရှိရသည်။ အခြား သက်ရောက်မှုများ ဖြစ်သည့် လေအရည်အသွေးအပေါ်သက်ရောက်မှု၊ မြေအရည်အသွေး အပေါ်သက်ရောက်မှု၊ ဆူညံသံသက်ရောက်မှု၊ အစိုင်အခဲစွန့်ပစ်ပစ္စည်းကြောင့် သက်ရောက်မှုများနှင့် အမြင်အာရုံအပေါ် သက်ရောက်မှု တို့သည် နည်းသည့်အဆင့် သက်ရောက်မှုများအဖြစ် ဆန်းစစ်လေ့လာတွေ့ရှိရသည်။ ဓာတ်အားလိုင်းထုတ်လုပ်သည့်ကာလတွင်မူ လူထုကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး ဆိုင်ရာ သက်ရောက်မှုသည် အလယ်အလတ်အဆင့်သက်ရောက်မှု အဖြစ် တွေ့ရှိရပြီး လေ အရည်အသွေးအပေါ် သက်ရောက်မှု၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှုနှင့် မီးဘေးအန္တရာယ်သက်ရောက်မှုတို့သည် နည်းသည့်အဆင့်သက်ရောက်မှုများ အဖြစ် ဆန်းစစ်လေ့လာတွေ့ရှိရသည်။ အောက်ဖော်ပြပါပုံ တွင် စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော မကောင်းသောသက်ရောက်မှုများ၏ အသေးစိတ်အဆင့် များအား ဖော်ပြထားသည်။



အဆိုပြုစီမံကိန်းကြောင့် ဖြစ်ပေါ်နိုင်သော ဆိုးကျိုးသက်ရောက်မှုများကို လျှော့ချနိုင်ရန်အတွက် လျှော့ချရေးနည်းလမ်းများသည် အရေးကြီးသည်။ ထိုလျှော့ချရေးနည်းလမ်းများအား ဆောင်ရွက် ရန်လိုအပ်သော ဆောင်ရွက်ချက်များနှင့် နည်းပညာများအား သက်ရောက်မှုအမျိုးအစားပေါ် မူတည်ပြီး ဖော်ပြထားသည်။

လျှော့ချရေးနည်းလမ်းများနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များအား အကောင်အထည်ဖော် ဆောင်ရွက်ရာတွင် လိုအပ်သော အခြေခံလိုအပ်ချက်များနှင့် တာဝန်ရှိသူများအား ဤအစီရင်ခံစာ တွင် ထည့်သွင်းဖော်ပြထားသည်။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အား သက်ရောက်မှုများ လေ့လာဆန်းစစ်ချက် များနှင့် သက်ရောက်မှုအဆင့်များကို အခြေခံ၍ စီမံကိန်း၏ တည်ဆောက် ခြင်းကာလနှင့် လုပ်ငန်းလည်ပတ်သည့်ကာလတို့အတွက် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်

ကင်းရှင်းရေး မူဘောင်များနှင့် ရေးဆွဲထားခြင်း ဖြစ်သည်။ စီမံကိန်း အကောင်အထည်ဖော်သူသည် အဆိုပြုစီမံကိန်းအား အောက်ဖော်ပြပါအစီအစဉ်များ ပါဝင်သော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် နှင့်အညီ အကောင် အထည်ဖော်ဆောင်ရွက်ရမည်။

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

ထို့အပြင် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်များ ဆောင်ရွက်ရန် ခန့်မှန်းကုန်ကျစရိတ်ကိုလည်း ထည့်သွင်းဖော်ပြထားသည်။ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်သည် စီမံကိန်း၏မကောင်းသောသက်ရောက်မှုများ၊ သက်ရောက်မှုရှင်းမြစ်များ၊ လျှော့ချရန် နည်းလမ်းများ၊ ကျန်ရှိသောသက်ရောက်မှုများနှင့် တာဝန်ယူဆောင်ရွက်မည့်ပုဂ္ဂိုလ်တို့ အား တည်ဆောက်ခြင်းကာလနှင့် လုပ်ငန်းလည်ပတ်သည့်ကာလတို့အတွက် ဖော်ပြထားခြင်း ဖြစ်သည်။ ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်သည် လေနှင့်ရေအရည်အသွေး၊ ဆူညံသံပမာဏ၊ စွန့်ပစ်ပစ္စည်းထွက်ရှိမှုနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာစစ်ဆေးခြင်းများအား စောင့်ကြပ်ကြည့်ရှုရန် အမျိုးအစား၊ အကြိမ်အရေအတွက်နှင့် တာဝန်ယူဆောင်ရွက်မည့် ပုဂ္ဂိုလ်တို့အား ဖော်ပြထားခြင်း ဖြစ်သည်။ လူမှုစီးပွားတာဝန်ယူမှုအစီအစဉ်သည် ဒေသခံပြည်သူများတွက် ဖွံ့ဖြိုးမှုလုပ်ငန်းများ ဆောင်ရွက်ပေးရန်နှင့် အဆိုပြုစီမံကိန်းသည် စီမံကိန်း အကောင်အထည် ဖော်သူကိုသာမက ဒေသခံပြည်သူများအတွက်လည်း အကျိုးရှိကြောင်း ဖော်ပြရန်ဖြစ်သည်။ မီးဘေးအန္တရာယ် ကင်းရှင်းရေးအစီအစဉ်သည် အဆိုပြုစီမံကိန်း၏ မီးဘေးအန္တရာယ်များ လျှော့ချရန် အတွက် ဖော်ပြထားခြင်းဖြစ်သည်။ အရေးပေါ်ကိစ္စများအတွက် တုံ့ပြန်ရေးနှင့် ကြိုတင်ပြင်ဆင်ရေး အစီအစဉ်သည် အရေးပေါ်ကိစ္စရပ်များဖြစ်ပေါ်ပါက မည်သို့ဆောင်ရွက်ရမည်ကို ဖော်ပြထား ခြင်းဖြစ်သည်။ မကျေလည်မှုများကိုဖြေရှင်းပေးမည့် အစီအစဉ်သည် အဆိုပြုစီမံကိန်းနှင့် ပတ်သက်သော မကျေလည်မှုများကို မည်သို့ဖြေရှင်း ပေးမည်ဖြစ်ကြောင်း ဖော်ပြထားခြင်းဖြစ်သည်။

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် ပြင်ဆင်ရေးဆွဲရာတွင် စီမံကိန်းအကြောင်းအရာများကို ရှင်းလင်းတင်ပြခြင်းသည် အရေးကြီးပြီး သက်ဆိုင်သူများ၏ အကြံဉာဏ်နှင့်အမြင်များကို

အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားရေးဆွဲရမည်ဖြစ်သည်။ ထို့ကြောင့် အဆိုပြုစီမံကိန်းအတွက် အများပြည်သူသဘောထား ရယူခြင်းအခမ်းအနားကို ၂၀၂၂ ခုနှစ်၊ မေလ (၂၀) ရက်နေ့တွင် မန္တလေးတိုင်း၊ ပြင်ဦးလွင်ခရိုင်၊ မတ္တရာမြို့နယ်၊ စံကားပင်ကျေးရွာအုပ်စု၊ သန်းကျေးကျေးရွာရှိ မဏိမဇ္ဈ ဘုန်းကြီးကျောင်း တွင် ကျင်းပခဲ့သည်။ အခမ်းအနားကို ညနေ ၁ နာရီတွင် စတင်ခဲ့ပြီး ညနေ ၂ နာရီ ၃၀ မိနစ်တွင် ပြီးဆုံးခဲ့သည်။ အများပြည်သူသဘောထား ရယူခြင်းအခမ်းအနား၏ ရည်ရွယ်ချက်မှာ စီမံကိန်းအကြောင်းအရာများ၊ စီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများ၊ လျှော့ချရန်နည်းလမ်းများဖော်ပြရန်နှင့် ဒေသခံပြည်သူများ၏ အကြံဉာဏ် နှင့်သုံးသပ်ချက်များ ရယူရန်ဖြစ်သည်။ စီမံကိန်းအကောင်အထည်ဖော်သူသည် အခမ်းအနားသို့ တက်ရောက်ရန် ဒေသခံပြည်သူများအား ကျေးရွာအုပ်ချုပ်ရေးမှူးများမှ တင်ဆင့်ဖိတ်ကြားခဲ့သည်။ သန်းကုန်းကျေးရွာမှ ဒေသခံပြည်သူများ၊ စီမံကိန်းအကောင်အထည်ဖော်သူ၏ ကိုယ်စားလှယ်များ နှင့် E Guard Environmental Services Co., Ltd. မှ ကိုယ်စားလှယ်များ ပါဝင်သည့် တက်ရောက်သူ စုစုပေါင်း ၂၅ ယောက်ရှိခဲ့ပြီး အချို့တက်ရောက်သူများသည် သိရှိလိုသည်များကို မေးမြန်းဆွေးနွေး အကြံပြုခဲ့ကြသည်။ စီမံကိန်းဆိုင်ရာ အချက်အလက်များနှင့် ဤပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီရင်ခံစာကို အဆိုပြုစီမံကိန်း၊ စီမံကိန်းအကောင်အထည်ဖော်သူ၏ရုံး၊ E Guard Environmental Services Co., Ltd. ၏ရုံးနှင့် ဖော်ပြပါ website link <https://tinyurl.com/solar-sedawgyi> တွင် အများပြည်သူများ နှင့် စီမံကိန်းနှင့် သက်ဆိုင်သူများ ဖတ်ရှုလေ့လာနိုင်ရန် ဖော်ပြထားပါသည်။

နိဂုံးချုပ်အားဖြင့် စီမံကိန်း၏ ဆောက်လုပ်ရေးဆိုင်ရာ လုပ်ဆောင်မှုများကို လေ့လာမှုအရ ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်အပေါ် ဆိုးကျိုးသက်ရောက်မှုတို့သည် စီမံကိန်းဧရိယာအတွင်း အကန့်အသတ်ဖြင့်သာ ဖြစ်ပေါ်နိုင်ပြီး ထိန်းချုပ်နိုင်သော သက်ရောက်မှုများသာဖြစ်သည်။

ဤပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် (EMP) ကို အခြေခံ၍ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုစနစ် (EMS) တစ်ခု တည်ဆောက်၍ သက်ရောက်မှုများကို လျှော့ချခြင်းလုပ်ငန်းများကို အကောင်အထည်ဖော် ဆောင်ရွက်ရန်ဖြစ်ပါသည်။ လုပ်ငန်းခွင်မှ အင်ဂျင်နီယာနှင့် အလုပ်သမားအား ပတ်ဝန်းကျင်ဆိုင်ရာ သင်တန်းများပေးခြင်း၊ ပတ်ဝန်းကျင်ထိခိုက်မှု လျှော့ချရေး လုပ်ငန်းရုံပုံငွေ လျာထားချမှတ် အသုံးပြုစေခြင်း တို့ကို ဆောင်ရွက်ခြင်း လုပ်ငန်းများသည် ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုစနစ် (EMS) တွင် မရှိမဖြစ် ဆောင်ရွက်ရမည့် လုပ်ငန်းရပ်များ ဖြစ်ပါသည်။ ဤအစီရင်ခံစာကို ကုန်ကျစရိတ် သက်သာပြီး အကျိုးရှိသည့် လက်တွေ့ဆန်သော အကောင်းဆုံးသော ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲခြင်း ပြုလုပ်ခြင်းကို မြှင့်တင်ပေးနိုင်ရန် စဉ်ဆက်မပြတ် တိုးတက် ကောင်းမွန်အောင် ပြုလုပ်နိုင်ရန် လမ်းညွှန်အဖြစ် ထိရောက်စွာ အသုံးပြုသွားမည် ဖြစ်ပါသည်။

CHAPTER 1 EXECUTIVES SUMMARY

This Environmental Management Plan (EMP) report is prepared by E Guard Environmental Services Co., Ltd. for 30 MW Ground Mounted Solar Power Plant Project connected to Sedawgyi Substation, proposed by Myanmar Sedawgyi Solar Power Co., Ltd, which is a subsidiary of China ITS (Holdings) Co., Ltd. for good construction and smooth operation of the project. China ITS (Holdings) Co., Ltd. achieved Tender No. RFP EPGE PV 02/2021-2022, invited for bid by the Electric Power Generation Enterprise (EPGE) for the project. According to the instructions from Environmental Conservation Department (ECD), this proposed project requires submitting 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 Sedawgyi Substation with 132kV overhead transmission line via T connection to the 132kV transmission line from Sedawgyi Power Plant substation to Aungpinle Power Plant substation. 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 200 meters on each side of 3.8 km transmission line and this area would be large enough to cover for most environmental and socio-economic impacts of the project.

The proposed project is located at Thangone Village, Sakarpin Village Tract, Madaya Township, Pyin Oo Lwin District, Mandalay Region, Myanmar. Its coordinate points are between 22° 15 ' 55 " N~ 22° 16 ' 41 "N and 96° 18 ' 11 "E ~ 96° 18 ' 33 "E and And the elevation is between 121m ~175m. The construction of the proposed project includes box transformers, string inverters, supporting brackets, construction of solar power station, multiple-use building, staff quarters, dining hall and outdoor equipment foundation construction as well as construction and stringing of 132 kV overhead transmission line. The total capacity of capacity of AC side of the proposed project is 30 MW and DC side is 36.288 MW, including four photovoltaic power generation units. The project proponent possesses the land slot to construct the solar power plant and total land requirement for the project is 150.94 acres (61hectares). The land is owned by Super One Holdings Co., Ltd and transfer to execute the proposed project to China ITS (Holdings) Co., Ltd. The proposed project will install 67200 PV modules, 20 series inverters, 3 box-type transformers and 2400 horizontal single-axis tracking brackets to generate electricity from solar energy and construction phase of the project will take 8 months, which started in March, 2022 and will be finished in November, 2022.

The project is proposed by Myanmar Sedawgyi Solar Power Co., Ltd., which is the subsidiaries of the China ITS (Holdings) Co., Ltd. After construction period, the proposed project will generate electricity from solar energy and distribute to the Sedawgyi Substation via 132 kV overhead transmission line and proposed operation period is 20 years. As the proposed project is of a Build, Own and Operate (BOO) basis, project proponent will submit the application to the relevant authorities to extend the operation period and continue operation activities after 20 years. List of directors and organization chart of the project proponent, organizational structure and detail investment plan of the proposed project are also described.

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.

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 19th and 20th 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 values of SO₂ (0.3 µg/m³), NO₂ (13.35 µg/m³), CO (0.00009 ppm) and CO₂ (416.65 ppm) are lower than the respective guideline values. For dust emissions, the observed values of PM₁₀ (4.40 µg/m³) and PM_{2.5} (2.37 µg/m³) are also within the guideline values of NEQEG. The existing groundwater quality at the project was measured by two methods: on-site measurement and sampling water. All of the result values of groundwater parameters are within the reference values of NEQEG. 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 (58.99 dBA) but also at night time (56.73 dBA). For Point 2, the results are also lower than standard value not only at day time (54.43 dBA) but also at night time (44.99 dBA). Therefore, it can be considered that the baseline environmental quality (air quality, water quality and noise level) at the proposed project site are within the respective guideline values during construction phase of the project. 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.

Due to implementation of Solar Power Plant Project, there may have positive and negative impacts on surrounding environment and socio-economic condition of local communities.

Potential positive impacts by the proposed project are:

- Employment Opportunities
- Business Opportunities
- Carbon Emission Reduction and Resources Conservation
- Green Economy
- Growing Investment in Solar Energy in Myanmar
- Revenue to National and Local Government
- CSR Developments

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 Sedawgyi Substation. The construction period of the proposed project is 6 months, which was started in March, 2022 and will be finished in November, 2022.

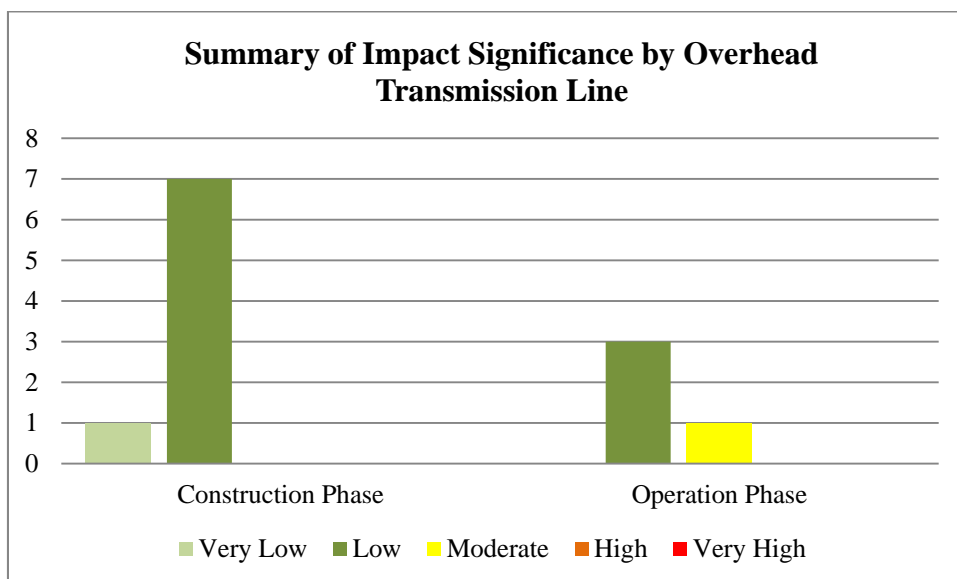
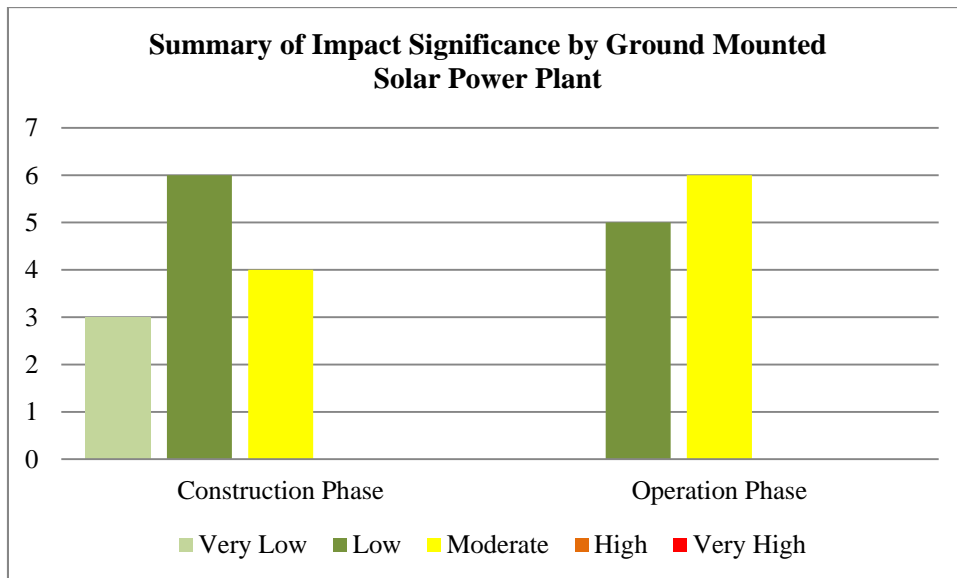
Operation Phase: includes electric power generation from solar energy and distributing to the Sedawgyi Substation via 132kV overhead transmission line (3.8km) which is T connection to the 132kV transmission line from Sedawgyi Power Plant substation to Aungpinle Power Plant substation. The operation period 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, and Operate (BOO) basis. The project proponent will have prior 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. E Guard Environmental Services Co., Ltd has consulted that the project owner must report project decommission plan to Environmental Conservation Department for prior permission.

During the *construction phase of ground mounted solar power plant*, 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, hazardous waste generation impacts and traffic impact are categorized as **Low Impacts** as well as impact on flora and fauna, visual and 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, visual impact are categorized as **Low Impacts** according to the results of assessments.

As for *construction of overhead transmission line*, most of impacts are assessed as **Low Impact** except impact on solid waste generation are **Very Low** as per results of assessments. During **operation phase**, impact on air, occupational health and safety and fire hazards are considered as **Low Impact** and community health and safety will have **Moderate Impact**.

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.

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 Preparedness and Response 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, waste quantity 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.

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 20th May, 2022 at Mani Myitzu Monastery, Thangone Village, Sakar Pin Village Tract, Madaya Township. The starting time was 1:00 pm and finished at 2:30 pm. 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. A total of 25 persons including local people from Thangone 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 EMP report can be accessible via the link of <https://tinyurl.com/solar-sedawgyi> and at the project site, project proponent's office and E Guard Environmental Service Co., Ltd.'s office for disclosure to public and stakeholders.

In conclusion, according to the results of the study of the construction activities, in terms of living environment, most of the induced impacts are controllable, limited and confined to the 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 an Environmental Staff, training to the engineers and works, budget allocation is vital for the success of an EMS. This report will be used as guidance for implementing the environmental management tasks practically and cost effectively with continuous improvement.

CHAPTER 2 PROJECT DESCRIPTION

2.1. Background of the Study

This Environmental Management Plan (EMP) report is prepared for the 30 MW Ground Mounted Solar Power Plant Project Connected to Sedawgyi Substation in Thangone Village, Sakar Pin Village Tract, Madaya Township, Pyin Oo Lwin District, Mandalay Region. The proposed project will be implemented by Myanmar Sedawgyi Solar Power Company Limited. It is registered in the Directorate of Investment and Company Administration (DICA) with the registration number of 132896631. The project proponent was the selected bidder of the tender for the proposed project (EPGE PV 02/2021-2022) from the Ministry of Electricity and Energy and obtained permit for construction and electricity generation from solar energy of the proposed project. The project will contribute to 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 percent 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. This project was prepared to initiate the required processes under Myanmar Environment Impact Assessment Procedure (2015).

According to the Environmental Conservation Law (2012), it is the requirement for every development project in the country to submit an Environmental Management Plan (EMP) or Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) to Ministry of Natural Resources and Environmental Conversation (MONREC) depending on the criteria for specific kind of economic activity, was enacted in the Environmental Impact Assessment Procedure (2015). According to Environmental Conservation Department (ECD) instructions, 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 Sedawgyi Solar Power Co., Ltd. was made consultations with E Guard Environmental Services Co., Ltd. for conducting the environmental studies for the proposed project.

2.2. Environmental Criteria for the Proposed Project

The capacity of the proposed Sedawgyi Solar Power Plant Project is 30 MW with 3.8 km length of 132 KV single circuit transmission line from PV Plant to the T-connection point which is on the transmission line from Sedawgyi Power Plant substation and Aungpinle Power Plant substation. According to Environmental Impact Assessment Procedure (2015), an EMP is required to be prepared for the proposed project because the capacity of the proposed bridge is less than 50MW. The followings table shows the categorizations of Energy Sector Development for Solar Power Plants and Transmission Line in EIA Procedure (2015).

Table 2.1 Categorization of Environmental Assessment Requirement

| Project Types | Criteria | |
|--|---------------------------------|---|
| | IEE | EIA |
| Solar Power Plants | Installed Capacity \geq 50 MW | All activities where the Ministry requires that the Project shall undergo EIA |
| Electrical Power Transmission Lines \geq 115 kV but $<$ 230 kV | \geq 50 km | All activities where the Ministry requires that the Project shall undergo EIA |
| Electrical Power Transmission Lines \geq 230 kV | All sizes | All activities where the Ministry requires that the Project shall undergo EIA |

Source: Environmental Impact Assessment (2015)

2.3. Objective of the Proposed Project

The objective of the proposed project is to provide the country with an efficient and secure energy system by solar PV power energy generation which is a renewable energy source, environmentally sustainable and especially, GHG emission is less intensive. The solar power plant facility is considered a large-scale long-term investment that will contribute to economic benefits to the country through provision of power supply. The production process is mainly converting local natural light energy (solar radiation) into electrical energy, which has little impact on the physical environment, biological environment, acoustic environment, and humans. Moreover, it can create employment opportunities in the construction and operation phases, lead to increasing income level of local people, increasing skills and knowledge development and power generation from a renewable source.

2.4. Objective of Environmental Management Plan

The objectives of the Environmental Management Plan (EMP) are to:

- identify possible impacts from implementation of the proposed project;
- identify a range of mitigation measures that could reduce and mitigate the potential impacts to minimal or insignificant levels;
- establish a method of monitoring and auditing environmental management practices during all phases of development;
- identify detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- ensure that the safety recommendations are complied with; and
- specify time periods within which the measures contemplated in the final environmental management plan must be implemented, where appropriate.

2.5. Methodology of Environmental Management Plan (EMP)

The study on existing environmental resources around the project area is focused on two main resources: physical and socio-economic resources. The physical resources such as air quality, noise level, water quality around the project are called primary data, which are collected from existing information in the field survey. This data collection is done by direct observation, collection by using relevant equipment, interviewing and discussion with the responsible persons from project proponent and sample analyses. Then, the secondary data for the socio-economic resources is obtained from the relevant ministries/bodies and research institutions as reference material for the preparation of EMP report. Moreover, E Guard team made key Informant Interviews to the local people who live in villages nearby the project site. The impacts are evaluated and mitigation measures developed for those impacts are identified as significant. Methodology of Environmental Management Plan is shown in the following figure.

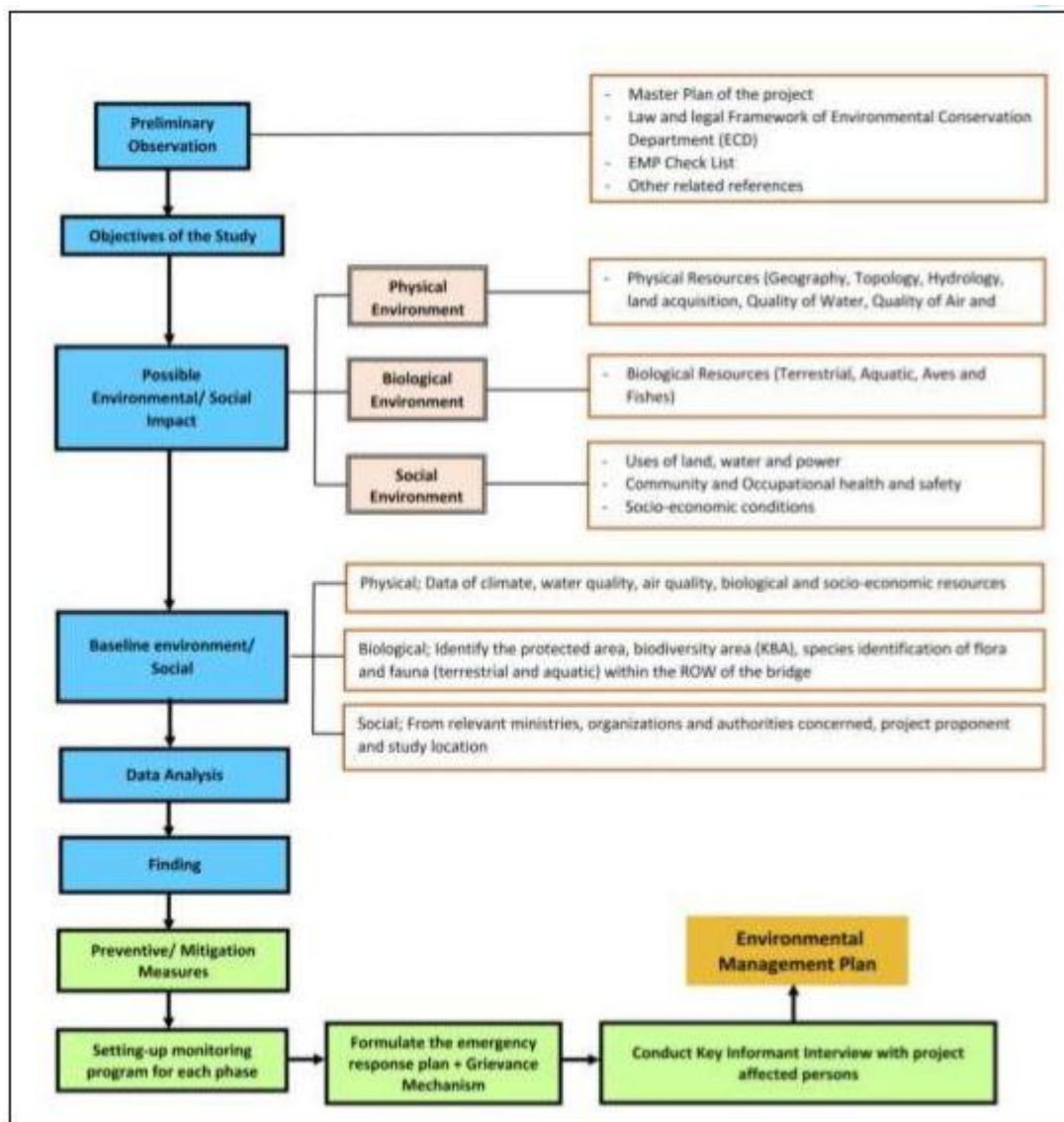


Figure 2.1 Methodology of Environmental Management Plan

2.6. 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 Sedawgyi Substation with 132 kV overhead transmission line. This EMP is based on consideration of terrestrial and aquatic resources preservation, 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 19th and 20th 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 distributing to Sedawgyi Substation. Therefore, the scope of the study area for the solar power plant is roughly defined to be the area within 1 km radius from the center of the project. The transmission line is connected to the nearby the 132kV transmission line from Sedawgyi Power Plant substation to Aungpinle Power Plant substation by a primary 132kV line, with a total length of 3.8 km. The study area for transmission line is roughly defined to be the area within 200 meters on each side of transmission line. This area would be large enough to cover for most environmental and socio-economic impacts of the project. 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.

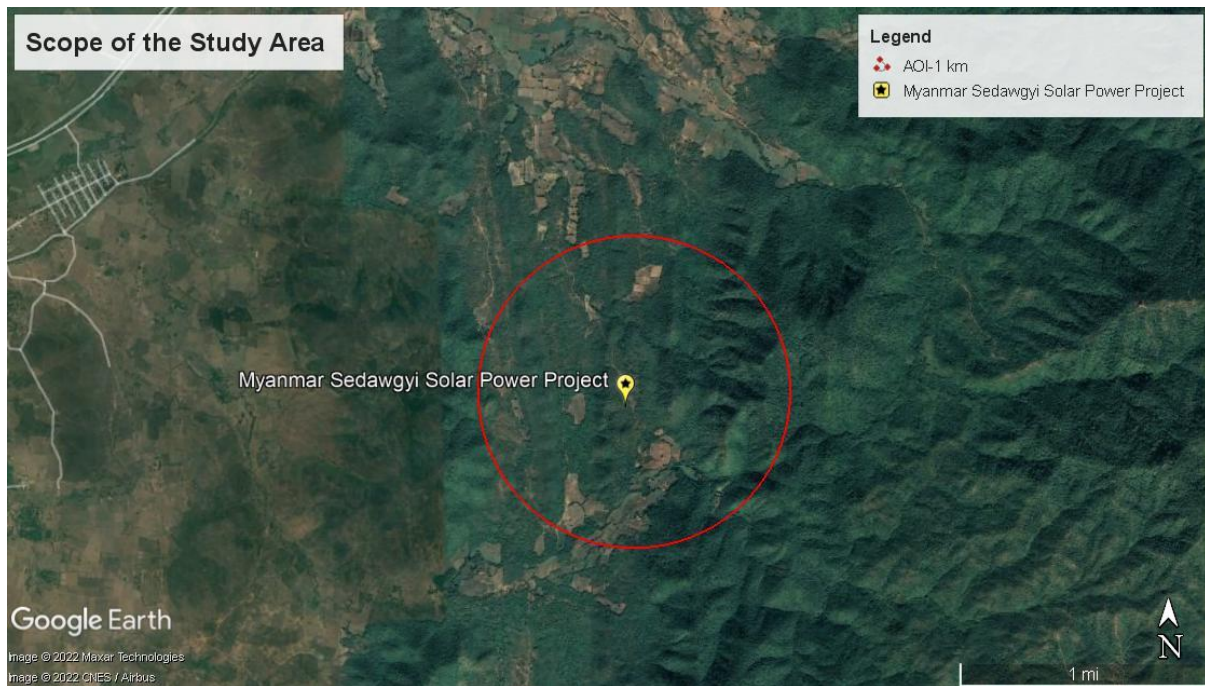


Figure 2.2 Scope of the Study Area

2.7. Project Size and Location of the Proposed Project

Sedawgyi Solar Power Plant is located in Mandalay Region, about 42 km away from Mandalay City, covering an area of about 0.61km². The geographical coordinates of the site are between 22° 15 ' 55 " N~ 22° 16 ' 41 "N and 96° 18 ' 11 "E ~ 96° 18 ' 33 "E. And the elevation is between 121m ~175m. The proposed project includes the leveling of temporary sites, on-site road construction, civil engineering construction of switchyard, other temporary facilities, PV array foundation and support construction, PV module installation, installation of box inverter equipment and related power distribution devices, cable lying, commissioning and finishing work as well as construction and stringing of 132 kV overhead transmission line. The installed capacity of PV power generation project is 36.288MWp, and the installed capacity of AC side is 30MWac.

Location of the Proposed Project

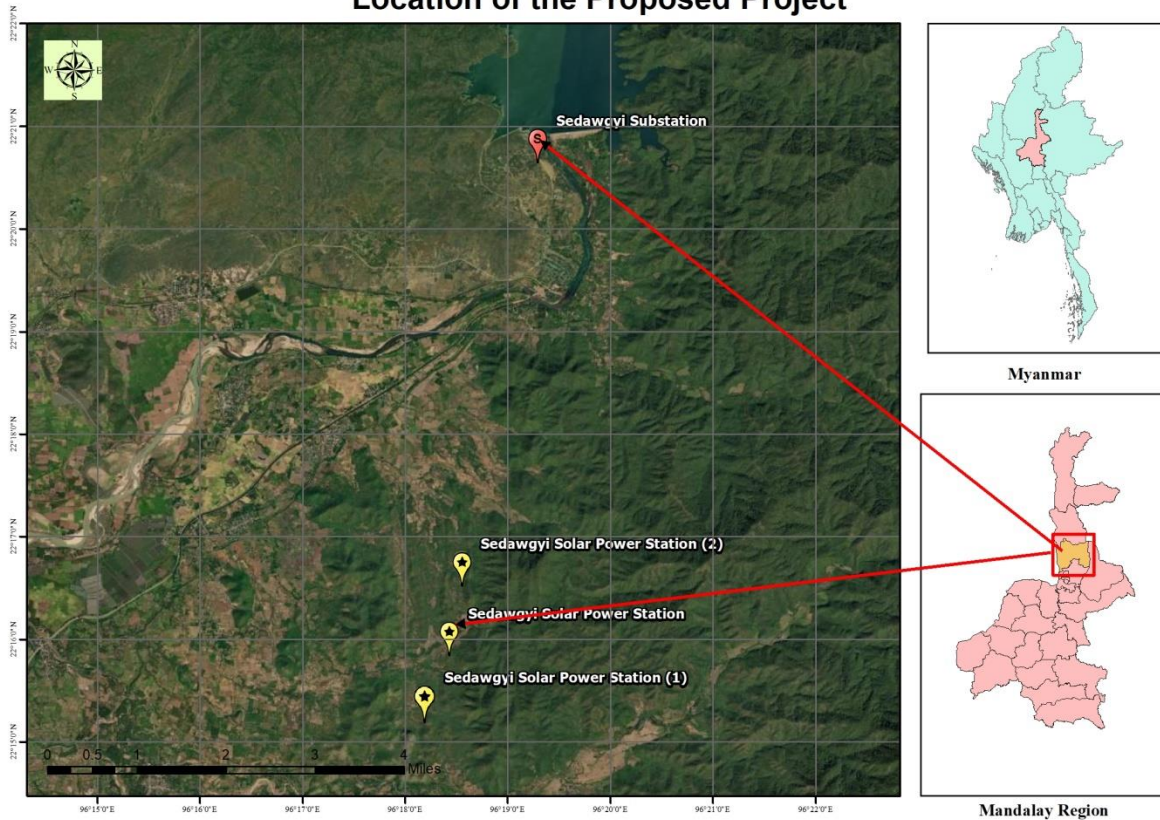


Figure 2.3 Location of the Proposed Project

2.8. History of Land

The project proponent has acquired the land slot to construct the 30 MW ground mounted solar power plant and total land requirement for the project is 150.94 acres (61 hectares). China ITS (Holdings) Co., Ltd. leased the land owned by Super One Holdings Company Limited with long-term land lease agreement (LLA) for the proposed project. The land of the project is covered with small trees and bushes, which is almost flat. However, some hills can also be found in the project site.



Figure 2.4 Satellite Map Showing the Project Area

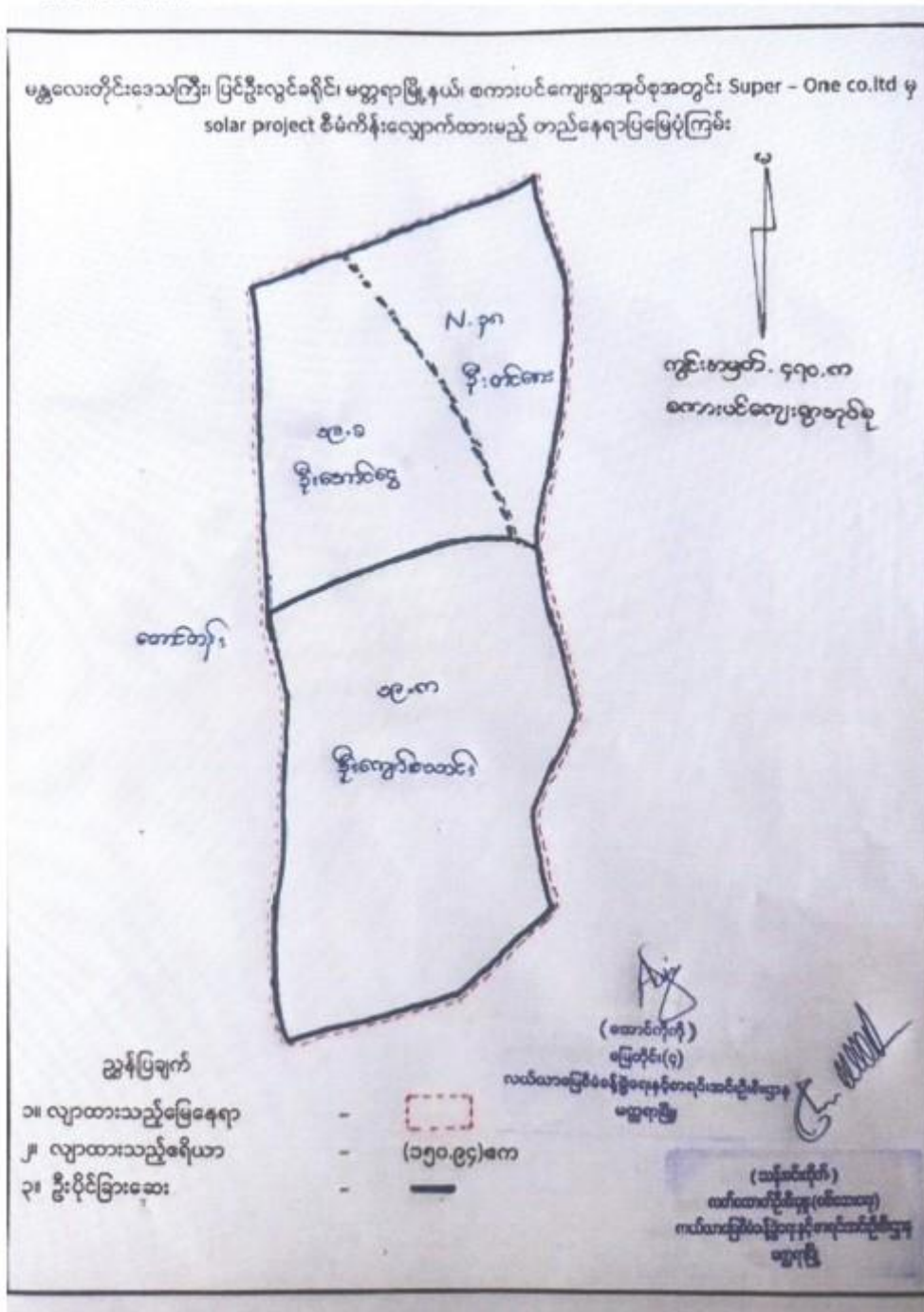


Figure 2.5 Plot of Land

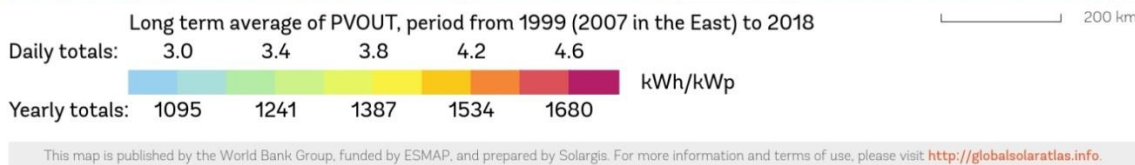
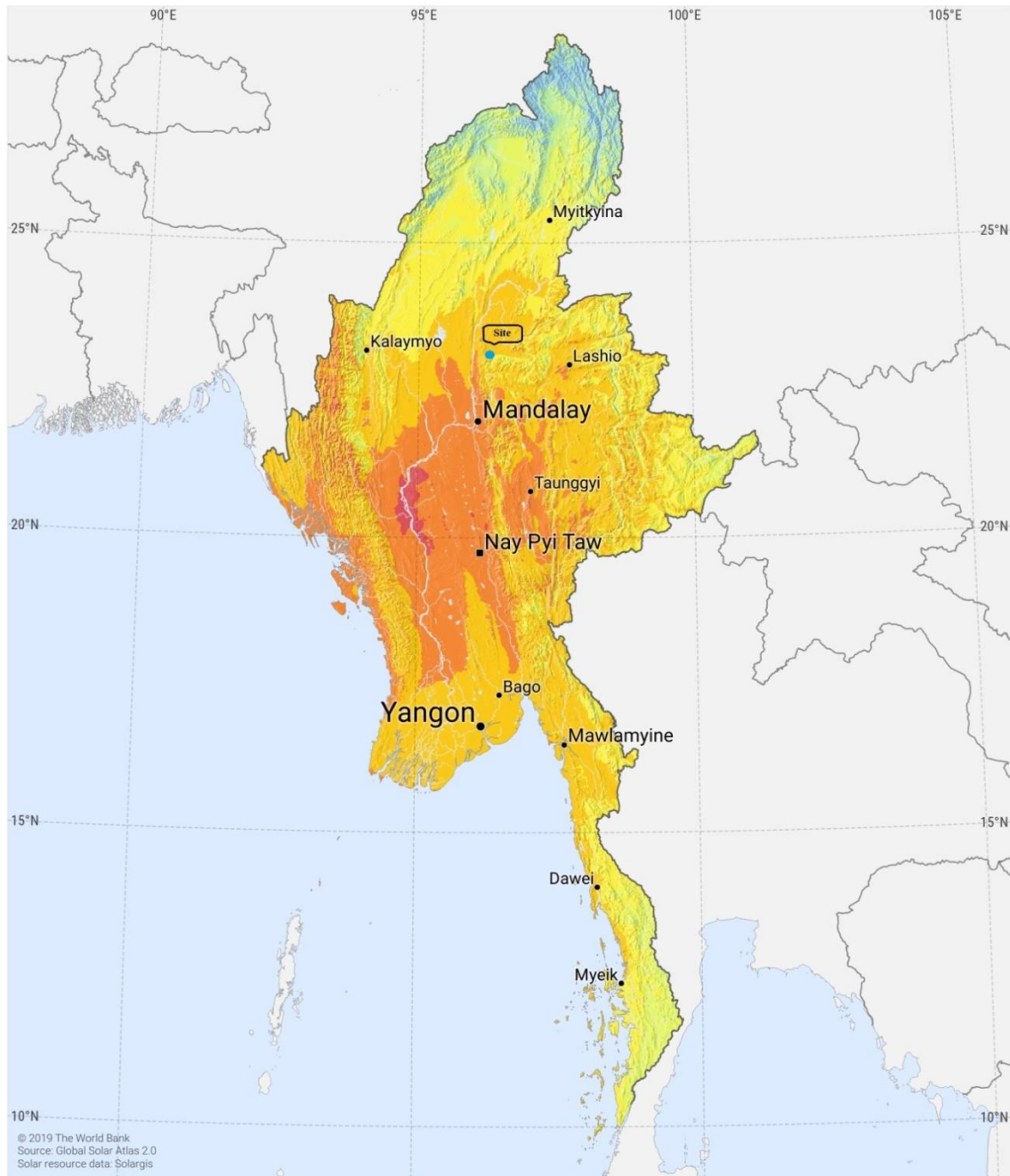
2.9. Solar Resources Condition on Site

Myanmar is located in the sub-equatorial region, and is rich in solar energy resources, and its spatial distribution is mainly large in the middle and low in the periphery. And it is a country with great potential for developing solar energy by virtue of its superior geographical position and abundant light resources. The annual average total solar radiation in Mandalay Region is 6000MJ/m²~7000MJ/m², and the annual average sunshine hours are over 2000h. The distribution of solar energy resources in Mandalay Region and its surrounding areas is shown in the following figure.

SOLAR RESOURCE MAP

PHOTOVOLTAIC POWER POTENTIAL

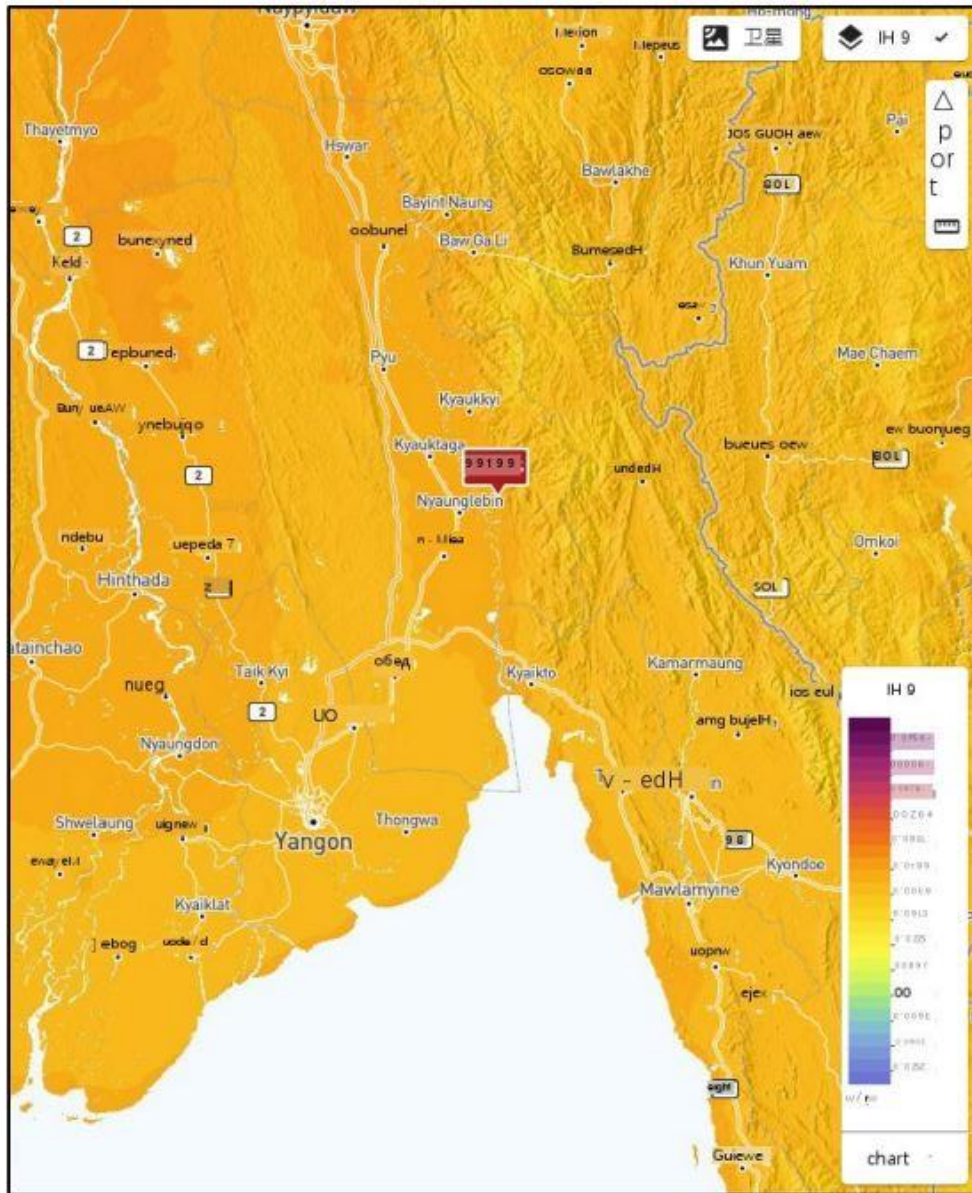
MYANMAR



Source: 2020 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: SolarGIS

Figure 2.6 Distribution Map of Solar Energy Resources in Mandalay Region and its Surrounding Areas

The solar energy resources of Sedawgyi PV power station are simulated and analyzed by SolarGIS. The total solar radiation in the horizontal plane of the site is 6646.6MJ/m², inclination angle of the fixed bracket is 24, and the corresponding total solar radiation in the inclined plane is 7123.3MJ/m². The total horizontal solar radiation is shown in the following figure.



Source: 2020 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: SolarGIS

Figure 2.7 Total Solar Radiation in Horizontal Plane

2.10. PV Power Generation System Solutions

2.10.1. Design Scheme of PV Power Generation System

The PV power generation project adopts monocrystalline silicon PV module, and selects 540Wp monocrystalline silicon double-sided PV module made in China; The PV module is

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Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

installed in a fixed inclination angle mode, and the inclination angle of the PV array is 24. The PV sub-array is designed according to the capacity of 6.048MWp.A, 5000kVA box transformer and 20 sets of 250kW series inverters are adopted, each inverter is connected with 20 PV strings, 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. In this project, six PV sub-arrays of 6.048MWp are arranged, and a total of 67200 monocrystalline silicon double-sided PV modules. The installed capacity of PV power generation project is 36.288MWp, and the installed capacity of AC side is 30MWac.

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 6,646.6 MJ/m². After calculation, the annual average on-grid power of this project in the 20-year operation period is 57.315 million kW·h, and the annual average equivalent utilization hours is 1579.

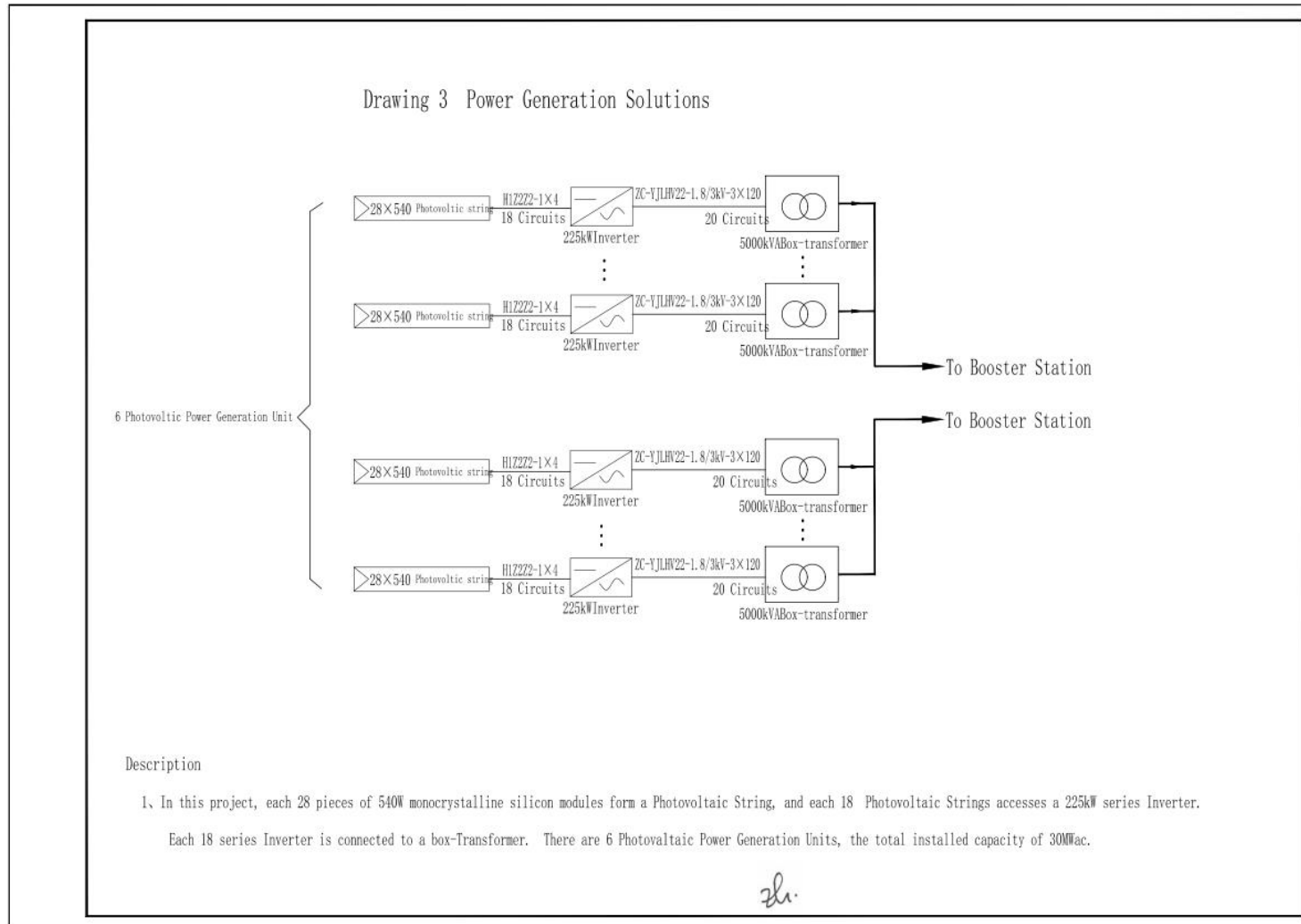


Figure 2.8 Power Generation Solution

2.10.2. Electrical Design

2.10.2.1. Access System Scheme

The scale of this project is 30MWac, and a 132kV booster station will be built in the middle of the PV field. After the booster station collects the power of PV power generation project, it will be connected to the T-connection point on the transmission line from Sedawgyi Power Plant substation and Aungpinle Power Plant substation about 3.8 km away from the site with a conductor cross section of 240mm². The power transmission system design shall prevail on the final design result.

2.10.2.2. Electrical Main Wiring

1. Main Electrical Wiring of PV Field

The scale of this project is 30MWac, and the installed capacity is 36.288MWp. It is planned to adopt 540Wp monocrystalline silicon module and 5000kW box-type substation. There are a total of 6 subarrays with 5MWac per subarray. There are 400 parallel PV strings are connected to 20 sets of 250kW string inverters per 5MWac PV subarray, and each inverter is connected to a maximum of 20 PV strings, and the DC side is connected to 302.4kWp. The inverter is connected to the bus bar on the low voltage side of the box-type transformer, and the voltage drop of this connection mode is small. The average voltage drop of the DC cable between PV strings and inverter and the AC cable between inverter and AC bus box are less than 2%, and the overall efficiency of the system is high. The output voltage of every 5MWac PV subarray of this PV power station is 33kV after being inverted and boosted. In the PV field area, the electric energy collected by the box transformer through the 33kV cable tap box is transmitted to the 132kV booster station through the power collection line. In this project, two circuits of power collection lines are used to collect electric energy and send it to the booster station, and each power collection line collects about 15MWac PV power.

2. Main Wiring of 132 kV Booster Station

132kV outgoing line side: in this project, one 132kV outgoing line will be built to Sedawgyi Power Plant substation.

33kV distribution equipment configuration: single bus collection, with one bus PT interval, two PV incoming intervals, one outgoing interval, one dynamic reactive power compensation interval and one station and grounding transformer interval.

Station-use transformer: 33kV bus is equipped with a 1250kVA Station-use and grounding transformer, and another 11kV transformer with a capacity of 315kVA is connected to the external power supply as the main Station-use transformer.

Reactive power compensation: 1 set of dynamic reactive power compensation device with capacity of ± 7.5 Mvar is configured for 33kV bus, which shall be subject to the requirements approved by the access system.

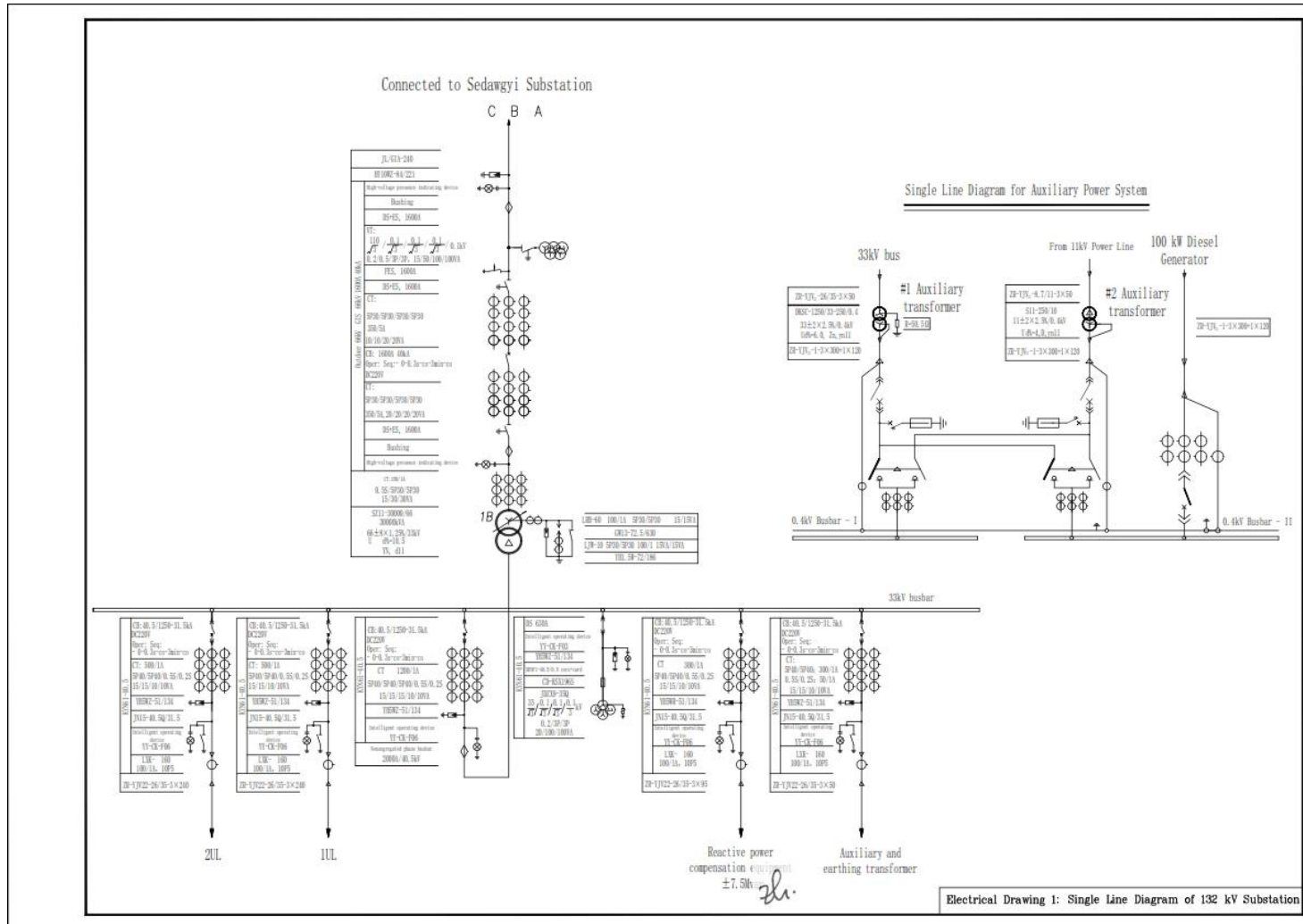


Figure 2.9 Single Line Diagram of 132 kV Substation

2.10.2.3. Selection of Main Electrical Equipment

1. Equipment Selection of PV Power Generation System

Selection of inverter: As PV modules are easily affected by sunlight shading, the optimal operating point of each PV cluster is not matched with the inverter, which will affect the efficiency of the inverter and the power generation of the whole system. In order to solve the above problems, inverters generally adopt the mode of input grouping and parallel connection.

Selection of 33kV box-type step-up substation: Each 5MWac PV power generation unit system adopts a unit connection mode of 5000kW step up transformer (boosted to 33kV).

Selection of 33 kV cable tap box: In order to increase the operation flexibility of each PV array, some PV arrays are equipped with a 33kV cable tap box and then connected in parallel. The outlet of the cable box is designed according to 4 groups of wiring loops at most, and reasonable connections are formed according to different situations. Each generating unit is independent of each other, so it is safer to operate, more convenient to overhaul and smaller-in influence range.

Table 2.2 Summary of Equipment Quantity in PV Field Area

| Serial Number | Name | Quantity |
|---------------|-------------------------------------|---------------|
| 1. | 5MWac PV module phalanx | 6 (pieces) |
| 2. | PV strings | 260 (pieces) |
| 3. | 5000kW box-type step-up substation. | 6 (sets) |
| 4. | Power collector line | 2 (circuits) |

2. Equipment Selection of Booster Station

Configuration of 33kV high voltage switchgear: The 33kV power distribution device is arranged indoors, and KYN-40.5 removable armored metal-enclosed high-voltage switchgear is proposed. the booster station of this project is configured as follows: 1 cable outlet cabinet, 2 PV inlet cabinets, 1 bus voltage transformer cabinet, 1 dynamic reactive power compensation cabinet, and 1 Station-use and grounding transformer cabinet, with a total of 6 switchgear cabinets. Except SF6 circuit breaker used in reactive power compensation cabinet, other cabinets are equipped with vacuum circuit breakers.

Selection of dynamic reactive power compensation device: In order to make the PV power generation project basically not exchange reactive power with the power grid during grid-connected operation, and considering sufficient margin, a set of dynamic reactive power compensation device is installed in the 132kV booster station for local compensation. Outdoor dynamic reactive power compensation device is adopted for reactive power compensation, and the capacity is temporarily selected as ± 7.5 Mvar, and the final configuration is subject to the requirements approved by the power access system.

Selection of Station-use transformer: Considering sufficient margin and optimal load rate of transformer, and considering the size of standby capacity, the capacity of Station-use

transformer is 315kVA. The 400V AC power supply adopts automatic changeover switch to realize automatic switching function. In order to reduce the system overvoltage level, the arc overvoltage of 33kV in this project is reduced by grounding with small resistance via grounding transformer. The substation capacity is 315kVA, and the Station-use transformer on the 33kV bus is considered as the grounding transformer. The model of the station and grounding transformer is DKSC-1250/33315kVA/0.4 three-phase grounding transformer. The booster station uses dual power supply, single-bus configuration. The main power supply is from the bus of 33kV distribution equipment in booster station, and the standby power supply is from the nearby 11kV power grid. S11-315/11 is selected as the model of the transformer for the external power station. The 33kV transformer adopts the form of Station-use and grounding transformer. The booster station is equipped with 6 GCS low-voltage extraction distribution panels as AC power panels of the whole station.

2.10.2.4. Cable and Channel Design

1. Cable Selection

- PV1-F 1800V 1×4mm² cable shall be selected as the cable from PV modules to DC bus box.
- The maximum input DC voltage of inverter is 1500V, which is connected by 3kV flame retardant cross-linked polyethylene insulated jacket power cable. Based on the distance from the series inverter to the box-type step-up transformer, the voltage drop of the farthest PV module is controlled at about 2%, so that the model and specification of AC cable from each inverter to the box-type step-up transformer are determined as Zr-YJLHV22-1.8/3kV-3× 120mm² is preliminarily.
- Based on the connection situation of each group of box transformers, the 33kV power collection line adopts 4 types of cable such as Zr-yjv22-26/35-3× 70mm², Zr-yjv22-26/35-3× 120mm², ZR-YJV22-26/35-3×185mm², ZR-YJV22-26/35-3×240mm².
- The model of 33kV reactive power compensation incoming high voltage power cable is Zryjv22-26/35-3× 95mm². The model of high voltage power cable for 33kV station-use and grounding transformer connection is Zr-yjv22-26/35-3× 70mm². The model of incoming high voltage power cable of 11kV standby transformer is Zr-yjv22.7/11-3× 70mm². The low-voltage power cable of 33kV station-use and grounding transformer and 11kV standby transformer is selected as Zr-yjv22-0.6/1-3× 300+1× 150mm². Selection of control cables in booster station: ZR-KVVP2-22 of various cross-sectional models.

2. Channel Design

- All power cables with flame retardant cross-linked polyethylene insulation sheath are used in PV plant area, and cables in PV plant area are laid by trough box or directly buried, while cables passing through roads are laid by buried pipes.
- There are two laying modes of DC output cables of PV array, in which 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 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 square array nearby.

- The electric energy of each PV array is connected to the power collection line along the cable trench through the cable tap box through the primary 33kV cable, and the secondary power collection lines of this project respectively enter the 33kV distribution room of the booster station along the directly buried trench.
- The 33kV cable trench of the whole station is set along the road in the whole project area. After the main trench penetrates into the fence of the booster station at an appropriate position, it is connected to the cable trench in the station and enters the 33kV distribution cabinet of the booster station.
- Anti-static floor is set in control room, protection room and communication room, and cable bracket is set in the static floor. In addition, cable channels can be laid flexibly according to the layout position and spacing distance of PV square array, and small cable trough boxes, cable bridge branches or main cable bridges can also be set. Cable trough boxes and cable bridges can be supported by brackets and ground foundations assembled by PV square arrays nearby, and cables passing through roads can be laid by buried pipes or overhead bridges.

2.10.2.5. Electrical Equipment Layout

1) Layout of Electrical Equipment in PV Area

- a. The series inverters are arranged in the PV square matrix, fixed on the PV bracket locally and installed outdoors.
- b. The 33kV box-type substation and the 33kV cable tap box are centrally arranged locally, and the cables are directly buried.

2) Layout of 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. The complex building includes a main control room, a protection screen room, a communication room, an office and a living room. A 30m high frame lightning rod is set in the booster station. One set of 33kV reactive power compensation device is set up in the booster station, which is arranged outdoors on the north side of the booster station, and one set of 33kV Station-use and grounding transformer is arranged in the 33kV distribution room of the booster station. The 3kv power distribution equipment adopts KYN-40.5kV armored removable metal enclosed switchgear, which is arranged in a single row in the 33kV power distribution room. The electrical secondary equipment of booster station is arranged in the protection room, and the communication equipment is arranged in the communication room. The booster station is provided with a circular road as a channel for equipment transportation, patrol and firefighting.

3) Layout of cables and cable trenches

The cables and cable trenches in the station shall be arranged according to the principle of connecting electrical equipment nearby, short path and beautiful appearance, and shall be planned as a whole, coordinated with each other in the plane and vertical direction, and combined with each other far and near to reduce bending and crossing. In the open air, cable trenches shall be arranged in parallel along roads and buildings and structures according to the position of electrical equipment. Cable trenches and branch trenches shall be set in areas where cables are concentrated. 33kV high-voltage switchgear and 0.4kV low-voltage panel indoor are connected with outdoor cable trenches. In places where the number of cables is few and the location is relatively close, the scheme of cable burying is adopted.

4) Measurement

The metering gateway of this project is located at the 132kV incoming line interval on the opposite side of the 132kV booster station of the system, and the 132kV outgoing line of the PV power station is configured with the same meter as the gateway, so the 132kV outgoing line current transformer is equipped with a special metering coil with an accuracy of 0.2S, with one master and one standby, and two intelligent multi-function watt-hour meters with 0.2S-level bidirectional measurement and a pressure loss timer. The pressure loss timer reflects the fault condition, recording the time of voltage loss and disconnection in phase separation. 132kV incoming current transformers are equipped with special metering coils with an accuracy of 0.2S, and each is equipped with an intelligent multifunctional watt-hour meter of 0.5S, which can measure in both directions. All electric energy meters are sent to the electric energy collection device through serial ports, and then transmitted to the monitoring system of the step up substation through the device, and simultaneously transmitted to the dispatching end through special channels with a remote meter reader.

5) DC and UPS Power Supply

a. DC System

To supply DC power for breaker opening/closing, microcomputer integrated automation system, communication and emergency lighting in booster station, a set of 220V intelligent microcomputer high-frequency switching power supply DC complete set is set up in booster station, which contains two sets of 200Ah lead-acid maintenance-free batteries and two sets of high-frequency switching power supply charging templates. The battery capacity can meet the discharge capacity of the whole station after 2 hours of power failure.

b. AC Uninterruptible Power Supply

The booster station is equipped with AC uninterruptible power supply to meet the requirements of automation equipment such as monitoring system, automatic fire alarm system and remote viewing system. The AC uninterruptible power supply system is not equipped with a separate battery, and one set is set in the whole station, with redundant configuration and capacity of 2×8kVA. Two UPS modules are adopted, which are mutually connected as standby, and each UPS module is connected with a bus. Two sections of bus run independently. When any UPS module fails, the other UPS module is manually switched to this section of bus. The AC

uninterruptible power supply system uses RS485 interface to communicate with the substation computer monitoring system.

6) 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 and 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. According to the measured results, it is determined whether the filter device needs to be installed.

7) Microcomputer Five Prevention System

The PV booster station of the power station is equipped with a microcomputer five-prevention installation system, which is in communication connection with the booster station monitoring system. The five-prevention system obtains the status information of electrical equipment from the monitoring system through the communication interface and locks the operation of the monitoring system. The microcomputer five-prevention system mainly includes: five-prevention workstation, computer key, electric code lock, line electroscope, grounding pile, intelligent grounding line manager, intelligent unlocking key manager, high-voltage bus live display locking device, etc.

8) GPS Time Synchronization System

The booster station is equipped with a unified time synchronization system to receive the standard timing signals provided by the global positioning system and Beidou II satellite signals. The GPS master clock adopts dual clock redundancy configuration, and the corresponding expansion device is configured according to the scale in the station. The time synchronization system provides the time synchronization function of all secondary equipment such as station control layer equipment, protection equipment, measurement and control equipment, fault recording, automatic devices and other intelligent equipment in the booster station.

9) Fire Alarm System

A set of fire alarm system is set up in the booster station area, including detection devices (point or cable detectors, manual alarms), centralized alarm devices, power supply devices and linkage signal devices, 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 the equipment and rooms in the booster station area, sound and light signals shall be sent out immediately on the centralized alarm device, and the address and time of the fire shall be recorded. After confirmation, the corresponding fire-fighting facilities may be manually started to organize firefighting. Adopt linkage control mode to control the

ventilator and air conditioner in the main control room and distribution room in the area, and monitor their feedback signals.

10) Image Monitoring and Public Alarm System

Closed-circuit television monitoring points shall be set at important parts such as booster station, PV square array, inverter site and fences, fixed-focus or zoom monitoring lenses shall be selected according to the scope or characteristics of different monitoring objects, and an opposite infrared alarm fence security system shall be set at the fence of the station area. The video signal of each CCTV monitoring point passes through the image broadband network; the video signal is processed, distributed and transmitted to the monitor terminal in the main control room, and networked to form a unified closed-circuit television monitoring system covering the scope of this project.

11) Optical Power Prediction System

According to the project management principles and needs of PV power generation project, the booster station is equipped with a set of optical power prediction system.

12) Secondary Equipment Layout

The layout of secondary equipment in booster station is designed according to the centralized layout of relay protection and monitoring, and the background display is placed in the central control room. Equipment such as network switch cabinet, fault recording screen, meter screen, main transformer protection cabinet, and 132kV line protection, power quality monitoring cabinet, DC screen and UPS power supply are all centrally arranged in the protection room. Communication equipment is placed in the communication room.

2.11. Civil Engineering Design

2.11.1. Design of PV Support Bracket

540Wp monocrystalline silicon PV modules are used in this project. 28 monocrystalline silicon PV modules arranged in 2 (rows) × 14 (columns) form a support unit. The inclination angle of the support bracket is 24 and the height of the lowest point of the support from the ground is 0.5m. In this project, there are 2400 support brackets with installed capacity of 36.288MWp.

The PV bracket is supported by Q355 steel diagonal beams and crossbeams. Each bracket unit consists of five frames and four crossbeams, and the front column, the rear column, the diagonal beams and the diagonal braces form one frame. The inclined beam span is 2.8m (vertical projection), and the cross beam span is 3.6m. C80×40×15×2.5mm hot-dip galvanized cold formed thin-walled hemmed channel steel is used for inclined beams and C90×45×15×2.0mm hot-dip galvanized cold-formed thin-walled hemmed channel steel is used for crossbeams. U50×35×2.0mm hot-dip galvanized cold-formed thin-walled hemmed channel steel is used for diagonal braces, and Φ60×2.5mm hot-dip galvanized steel pipe is used for columns. The PV module is connected with the beam by bolts, and each PV modules is fixed on the beam by 4 bolts. The cross beam is connected with the inclined beam through the purlin.

The upper end of the column is connected with the inclined beam through a rotary connector, and the lower end is inserted into the foundation steel pipe for socket fastening.

2.11.2. Design of Support Bracket Foundation

According to the site geology and support arrangement, each support is provided with 10 bored steel pipe cast-in-place pile foundations (arranged in front and back double rows). According to the calculation, it is proposed that the length of the steel pipe cast-in-place pile is 1.75m, the height of the pile top above the ground is 0.25m, the drilling diameter of the pile foundation is 200mm, and the drilling depth is 1.5m. The steel pipe pile is formed by welding three 1.2m long ϕ 14 ribbed steel bars with $\Phi 76 \times 4$ mm specifications. After drilling the pile foundation, insert the steel pipe pile, straighten the steel pipe pile, and pour the drilling gap into C25 fine stone concrete.

2.11.3. Design of Site Structure

One 33kV box transformer is installed at the center of each array near the road, and the foundation is box-type brick-concrete foundation. According to the needs of electrical layout, a cable tap box is installed beside some 33kV box inverter integrated machines, and the foundation is box-type brick foundation. In this project, the box transformer to booster station adopts the form of directly buried cable, and the excavation size is 1.6m in top width, 1m in bottom width and 1m in depth. Place cables after laying sand cushion, Then spread a layer of fine sand and cover it with red bricks, and then backfill it. For the convenience of management, a wire mesh fence with a height of 1.8m is set along the outer side of the PV farm array.

2.11.4. Design of Booster Station

(1) General layout

A 132kV booster station will be built in the site, with a length of 69m and a width of 62m, covering an area of 4278m². 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 production area is sequentially provided with an integrated control building, a main transformer, outdoor GIS and reactive power compensation. There is cable trench connection between each electrical equipment and the comprehensive control building. The entrance road of booster station is connected by the onsite 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, which meets the fire protection requirements. Greening is appropriate around the complex building, and 2.2m high brick walls are set around the booster station.

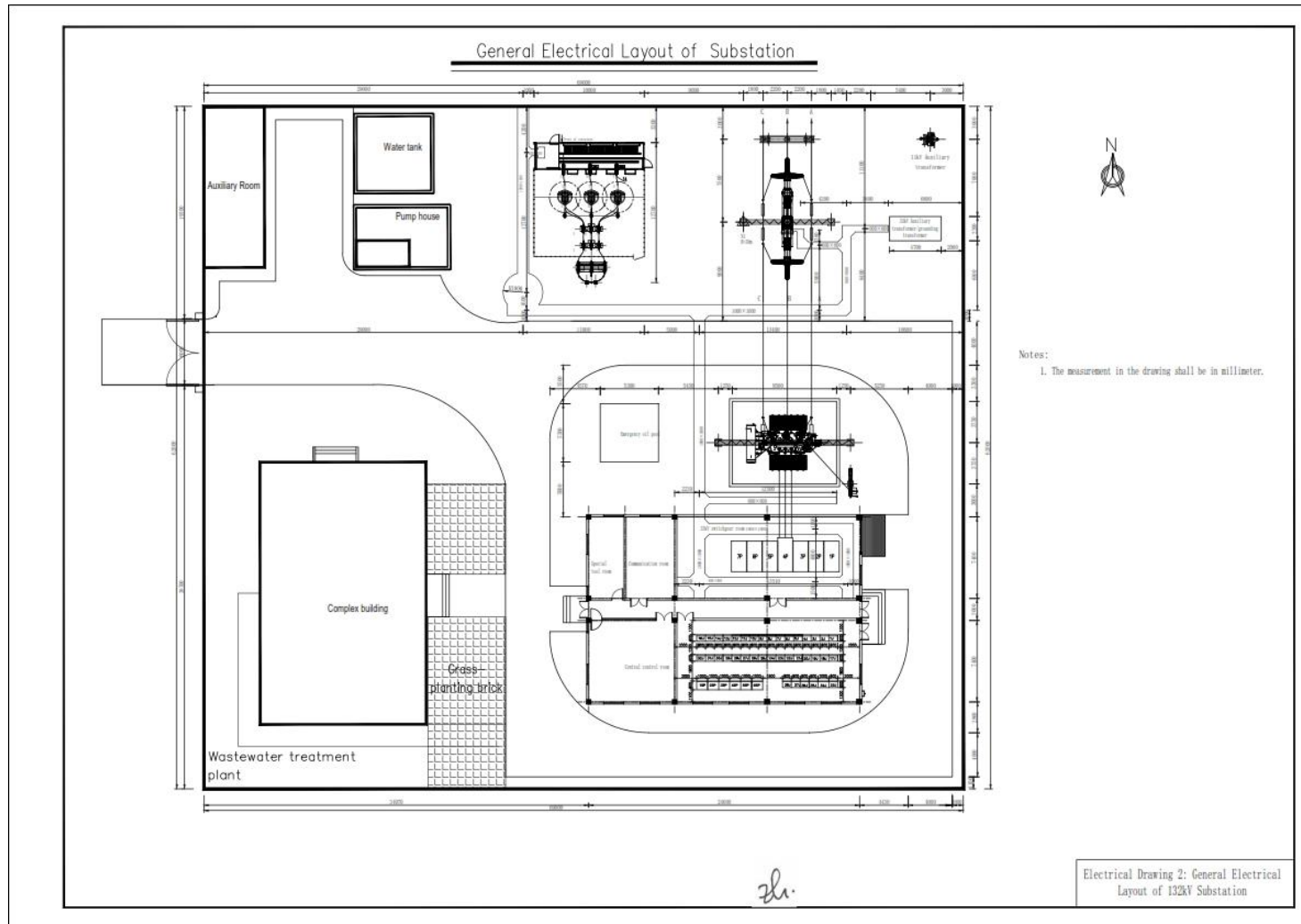


Figure 2.10 General Electrical Layout of 132 kV Substation

(2) Building Design

The comprehensive building is one-story building with a floor height of 3.6m, with a total construction area of 340m². For the convenience of employees lives, each dormitory is provided with a separate bathroom. The comprehensive control building area is of about 180m². It is a single-storey building with high and low spans. The height of the power distribution room is 5.7m, and that of the main control room, protection screen room, communication room and instrument room is 3.6m. The main entrances and exits of the comprehensive control building are set at both ends of the middle corridor.

(3) Structure Design

A water pump room and a fire pool are set up in the station, and a domestic water tank and a fire pump are mainly placed in the pump room. According to the electrical requirements, the frameworks in the booster station are respectively the main transformer framework and the 132kV outdoor GIS framework. The frame is in the form of herringbone cement ring bar and angle steel welded truss, and the buried depth of the foundation is 2.5m, which meets the requirements of anti-overturning checking calculation. The equipment support in the station is mainly used for 132kV outdoor GIS and reactive power compensation devices. According to the height requirements of equipment installation, select 3m or 4.5m cement ring rod, the upper end of which is welded with steel plate for easy connection with equipment, and the lower end is buried in the cup mouth of reinforced concrete independent foundation.

The main transformer foundation is set in the production area of booster station. The foundation of the main transformer is integrally cast with reinforced concrete, with C30 concrete strength and C15 concrete cushion. The foundation of the main transformer has low requirements on the foundation, and the residual gravel soil after field excavation can meet the bearing capacity requirements. Embedded steel plates on the surface of main transformer foundation are convenient for installation of main transformer equipment. The upper layer of the main transformer is provided with steel mesh. Pave with pebbles 250mm thick. One side of the main transformer near the accident oil pool is provided with an oil collecting pit, which is internally connected with a steel pipe with a diameter of 200mm and leads to the accident oil pool, and the oil discharge slope is not less than 2%. The accident oil pool adopts reinforced concrete structure, and its effective volume is not less than 35m³, which can meet the requirement of oil storage after an accident for a single main transformer.

The cable trench in the station is made of brick, and its clear width is generally 0.6m~1m. In order to bear the vehicle load, the local cable trench crossing the road adopts the cast-in-place reinforced concrete type. Precast ditch cover plate shall be laid on the cable trench, and angle steel shall be used around the cover plate.

(4) Heating and Ventilation

Myanmar is a non-heating area with comfortable temperature all year round. There is no central heating equipment in the booster station, and air conditioners and other equipment are arranged

in each room of the comprehensive building to cool down as required. Cabinet air conditioners are set in the power distribution room and protection room to adjust the indoor humidity and temperature according to the working requirements of electrical equipment. Emergency smoke exhaust and mechanical ventilation equipment shall be set in the power distribution room, and the smoke exhaust amount shall be 8050m^3 based on the calculation of air changes not less than 10 times per hour. Two axial fans shall be set near the bottom of the beam, and the flow rate of each fan shall be $Q=5000\text{m}^3/\text{h}$. The public toilet adopts natural air intake and mechanical air exhaust ventilation, and the ventilation frequency is 7 times/hour. The side wall of the toilet is provided with an exhaust fan to exhaust the air outdoors. The dormitory adopts natural air intake and mechanical air exhaust ventilation, and the ventilation frequency is 7 times/hour. The bathroom is equipped with a ventilator and an air duct inside the bathroom to exhaust the air outdoors. Other buildings can be ventilated naturally.

(5) Water Supply and Drainage

A new well is built in this project, which is initially planned to be arranged in the booster station. The water is pumped by a deep well pump to the 150m^3 fire-fighting pool in the booster station as the water source for firefighting, greening and PV module cleaning.

The water consumption of booster station is $200\text{L}/\text{person d}$ per capita, and the daily water consumption is $2.0\text{m}^3/\text{d}$ for d , 10 people. The domestic water quality must meet the drinking water quality standard. A purification treatment system is set for treatment, and the treated water is stored in a 4m^3 water tank. The domestic water is pressurized by a variable frequency pump, and supplied to each water point of booster station through a branched pipe network.

Regular cleaning of PV modules can improve the power generation efficiency of modules to a certain extent. There are few pollution sources in this project, so cleaning once every six months can be considered. The water consumption for PV module cleaning is estimated according to $1.6\text{L}/\text{m}^2$, and the total water consumption for each cleaning is about 523m^3 . The cleaning water is taken from the pool by tanker and transported to each water point area, and pressurized by a small diesel pump to clean the PV modules.

The booster station adopts rain and sewage diversion drainage mode. After collection, the sewage flows into the septic tank, and after clarification and filtration by the septic tank, it is discharged into the sewage treatment equipment. After treatment, it is used for greening irrigation or discharge, and the discharge requirements meet the first-class standard. Setting intercepting ditch along the slope opening line in booster station can prevent foreign exchange water from entering booster station.

Sprinkler and drainage ditch are set around buildings in booster station, which are combined with site drainage ditch. Rainwater is collected by site drainage ditch and then discharged into road drainage ditch outside the station.

(6) Fire Protection Design

The fire protection design of this PV power plant implements the fire protection policy of "Prevention first and combining prevention with elimination". Ensure that the designed firefighting, fire prevention spacing, safety exit, accident smoke exhaust and lighting meet the requirements of relevant specifications. The main electromechanical equipment adopts ammonium phosphate dry powder fire extinguishing method; Ammonium phosphate dry powder fire extinguishers are mainly used for building firefighting.

The volume of the complex building is the largest building in the station. The fire resistance rating is Class II, and the fire risk is classified as Class E. The water consumption of outdoor fire hydrant is 15L/s, the fire duration is 2h, and the maximum fire water consumption for one fire extinguishing is 108m³. 150m³ is set in the booster station, and the fire pool meets the fire water consumption. Outdoor fire hydrant system adopts annular pipe network for water supply. Outdoor fire hydrants are set up in the field, and the distance between fire hydrants is less than 120m.

The fire risk category of the main transformer yard and reactive power compensation device is Class C, and the fire resistance rating is Class II. The capacity of a single main transformer is 30MVA, and two MFT50 trolley dry powder fire extinguishers, one 1m³ fire sand box and three fire shovels are arranged beside the main transformer.

The power supply of fire-fighting electrical equipment shall be supplied according to secondary load. The fire power supply of booster station is taken from the double-circuit 0.4kV station, and the double-circuit power supplies are standby for each other. Separate power supply circuit shall be adopted for fire-fighting electrical equipment; All the power supply circuits of firefighting equipment adopt flame retardant cables, so as to ensure the power consumption for firefighting in case of fire.

Safety exit indicator lights and evacuation indicator lights shall be set at all evacuation passages, stairwells and safety exits, and the distance between them shall be no more than 15m; the minimum illumination of indicator lamp and evacuation lamp is higher than 0.5Lx. The indicator lamp and evacuation lamp are of self-contained battery type, and the continuous power supply time shall not be less than 30min when AC power is lost.

According to the specification requirements, the booster station of the PV power plant should be provided with an automatic fire alarm system, and the fire duty room should be shared with the central control room of the booster station of the PV power plant. The fire alarm system is designed according to the specification requirements. The system includes temperature cable detector, intelligent photoelectric smoke detector and temperature detector, control module, audible and visual alarm, indicator light, manual alarm button, etc. The fire detection and alarm area includes the central control room and communication room in the booster station of PV power station. In case of fire, the fire alarm control box can send out audible and visual alarm signals in time. Display the location of fire alarm and feedback the signal to the linkage control box.

2.11.5. Construction Organization Design

According to the field survey results, the site is located in the hilly area, with uneven ground, little relief and more vegetation on the surface mainly bushes. The site has good geological stability, which meets the topographic and geological conditions of PV power station construction.

The main materials required for this project are masonry materials, sand aggregate, cement, concrete, steel, timber and oil, which are mainly purchased from Mandalay Region. The water for construction is taken from the river near the site, and supplied by water truck with a transportation distance of about 5km. When necessary, water can also be obtained by drilling in the site. Construction electricity can be connected by 11kV line near the site as power supply. Diesel generator is used for construction and emergency standby power supply at a long distance. The newly-built road in this project has a width of 3.5m, a subgrade width of 4.5m and a gravel pavement. The entrance road of booster station is 5m wide, the subgrade is 5.5m wide and the pavement is gravel. The newly built road is about 3km long, and the entrance road is about 3.5km long.

The construction scope of civil engineering and installation of PV array support bracket of this project includes: site leveling, on-site road construction, bored steel pipe cast-in-place pile installation, bracket installation, cable trench excavation and lining, house foundation excavation, treatment, masonry and decoration, booster station equipment foundation excavation and masonry, HVAC and water supply and drainage, environmental protection measures and flood control and drainage facilities construction, etc. The main equipment installation scope includes: installation of PV modules, installation and debugging of inverter boost power transformation and distribution equipment, installation and debugging of power collection lines, installation and debugging of electrical equipment of boost station, etc.

2.12. Install Capacity

Sedawgyi PV power station adopts a total of 67200 pieces of 540Wp monocrystalline silicon PV modules. 28 PV modules are connected in series to form a string unit. Each PV array includes 400 PV string units, and a total of 6 PV arrays are built. The total installed capacity of the project is 36.288MWp.

2.13. Capacity of the Proposed Project

There are a total of 6 PV subarrays, each PV array adopts a 5000kW box-type booster transformer in this PV power station. The rated total capacity is 30MWac.

2.14. Selection of PV Module

According to the mainstream product model, application performance and capacity analysis of PV module market, this project plans to adopt 540Wp monocrystalline silicon double-sided PV module with specific product specifications shown in figure below.



Figure 2.11 Specifications of 540 WP PV Modules

2.14.1. Efficiency and Degradation of PV Module

The efficiency of 540Wp monocrystalline silicon double-sided PV module to be selected in this project is 21%, and the power attenuation of double-sided monocrystalline silicon PV module is less than 2% in the first year and 0.45% in the second year.

2.15. Selection of Inverter

In this project, 250kW series inverters are proposed, and the product specifications of 250kW inverters are shown in figure below.

| | |
|---|---|
| Type designation | SG250HX |
| Input (DC) | |
| Max. PV input voltage | 1500 V |
| Min. PV input voltage / Startup input voltage | 500 V / 500 V |
| Nominal PV input voltage | 1160 V |
| MPP voltage range | 500 V ~ 1500 V |
| MPP voltage range for nominal power | 840 V ~ 1300 V |
| No. of independent MPP inputs | 12 |
| Max. number of input connector per MPPT | 2 |
| Max. PV input current | 30 A * 12 |
| Max. DC short-circuit current | 50 A * 12 |
| Output (AC) | |
| AC output power | 250 kVA @ 30 °C / 225 kVA @40 °C / 200 kVA @ 50 °C |
| Max. AC output current | 180.5 A |
| Nominal AC voltage | 3 / PE, 800 V |
| AC voltage range | 680 ~ 880V |
| Nominal grid frequency / Grid frequency range | 50 Hz / 45 ~ 55 Hz, 60 Hz / 55 ~ 65 Hz |
| THD | < 3% (at nominal power) |
| DC current injection | < 0.5 % In |
| Power factor at nominal power / Adjustable power factor | > 0.99 / 0.8 leading ~ 0.8 lagging |
| Feed-in phases / connection phases | 3 / 3 |
| Efficiency | |
| Max. efficiency | 99.0 % |
| European efficiency | 98.8 % |
| Protection | |
| DC reverse connection protection | Yes |
| AC short circuit protection | Yes |
| Leakage current protection | Yes |
| Grid monitoring | Yes |
| Ground fault monitoring | Yes |
| DC switch | Yes |
| AC switch | No |
| PV String current monitoring | Yes |
| Q at night function | Yes |
| Anti-PID and PID recovery function | Yes |
| Overvoltage protection | DC Type II / AC Type II |
| General Data | |
| Dimensions (W*H*D) | 1092 * 660 * 363 mm |
| Weight | 99kg |
| Isolation method | Transformerless |
| Ingress protection rating | IP66 |
| Night power consumption | < 2 W |
| Operating ambient temperature range | -30 to 60 °C |
| Allowable relative humidity range (non-condensing) | 0 ~ 100% |
| Cooling method | Smart forced air cooling |
| Max. operating altitude | 5000 m (≧ 4000 m derating) |
| Display | LED, Bluetooth+App |
| Communication | RS485 / PLC |
| DC connection type | MC4-Evo2 (Max. 6 mm ² , optional 10mm ²) |
| AC connection type | O1/O1 terminal (Max. 300 mm ²) |
| Compliance | IEC 62109, IEC 61727, IEC 62116, IEC 60068, IEC 61683, VDE-AR-N 410:2018, VDE-AR-N 4120:2018, EN 50549-1/2, UNE 206007-2:2013, P.O.12.3, UTE C15-712-4:2015 |
| Grid Support | Q at night function, LVBT, HVBT, active & reactive power control and power ramp rate control |

Figure 2.12 Specifications of 250kW Inverter

2.16. Technical Specification of Major Equipment

1. Box transformer

The rated capacity: 5000 kVA. The rated voltage is 33kV (8×1.25%/0.8kV).

Number of phases: 3 phases

Frequency: 50Hz.

Voltage regulation mode: the high voltage side is provided with a tap-changer without excitation.

Coil connection group: D,y_n11.

Cooling method: ONAN

Grounding mode of neutral point: the neutral point on 33kV side is not grounded.

2. Cable

(1) PV1-F 1800V 1×4mm² special PV cable shall be selected as the cable from PV modules to DC bus box.

(2) The maximum input DC voltage of the inverter is 1500V, which is connected by 3kV flame retardant cross linked polyethylene insulated jacket power cable. According to the distance from the series inverter to the box-type step-up transformer, the voltage drop of the farthest PV module is controlled at about 2%, so that the model and specification of AC cable from each inverter to the box-type step-up transformer can be determined, and the specification of ZrYJLHV22-1.8/3kV-3× 120mm² is preliminarily adopted. According to the connection situation of each group of box transformers, it adopts four types of Zr-yjv22-26/35-3× 70mm², Zr-yjv22-26/35-3× 120mm², ZR-YJV22-26/35-3×185mm², ZRYJV22-26/35-3×240mm².

(3) The model of 33 kV reactive power compensation incoming high voltage power cable is ZrYJV22-26/35-3× 95 mm².

(4) The model of high voltage power cable for 33kV station-use and grounding transformer connection is Zr-YJV22-26/35-3× 70mm².

(5) The type of high voltage power cable for incoming line of 11kV standby transformer is ZrYJV22-8.7/11-3× 70mm².

(6) The low-voltage power cable for 33kV station and grounding transformer and 11kV standby transformer shall be of Zr-YJV22-0.6/1-3× 300+1× 150mm².

(7) Selection of control cables in booster station: ZR-KVVP2-22 of various cross-sectional models.

2.17. Technical Specification

2.17.1. Relays

This project adopts a microcomputer integrated protection system in which relays are integrated.

2.17.2. Protection

1. Protection of 132kV power transmission line

The 132kV outgoing line is equipped with a set of optical fiber current differential protection as the main protection, with phase-to-phase distance protection, grounding distance protection and three-phase primary reclosing.

2. 33kV Part

The 33kV line adopts microcomputer-based protection device integrating protection, measurement and control, and is equipped with three-stage directional current quick-break and overcurrent protection, which has the functions of automatic reclosing, low-frequency load shedding, wave recording, etc.

The microcomputer-based protection device for 33kV Station-use transformer, which integrates protection and measurement and control of grounding transformer, is provided with time limited current quick-break and overcurrent protection, overvoltage and under voltage protection, overload protection and zero-sequence voltage protection. The measurement and control devices of 33kV line protection and Station-use transformer protection are placed in the distribution room and placed on the corresponding switchgear. It is required to configure operation buttons and signal lights on the screen, and the electric quantity value is directly displayed on the microcomputer-based protection device.

3. 33kV bus protection

The booster station of this project is provided with a set of 33kV bus differential protection device, which can quickly remove the 33kV bus fault.

4. Fault wave record cabinet.

The booster station is provided with a fault recorder cabinet to record the fault process of 33kV bus and 132kV outgoing line and the action of protection.

2.17.3. Communications

1. PV field communication

In this project, each PV array is equipped with a data acquisition and processing device. According to the device, the operating parameters, fault States and power generation parameters of the inverter and the box transformer of the unit and the current quantity signals of each access circuit in each inverter are obtained and stored through the RS485 bus, Meanwhile, the data acquisition and processing device uploads the data to the computer monitoring system of PV power generation project through optical fiber transmission. In addition, mobile phones and walkie-talkies are provided for patrol and maintenance contact and communication of PV power generation project operators.

2. Communication of booster station

The 132kV booster station is designed according to the principle of "nobody on duty, few people on duty", and the communication between the booster station and the dispatching terminal is optical fiber communication. The booster station shall reserve the communication interface with Myanmar centralized control center and be equipped with corresponding equipment.

2.18. Proposed Yearly Generation

The total solar radiation value of Sedawgyi PV power station site is 6646.6 MJ/m² in horizontal plane and 7123.3 MJ/m² in inclined plane at 24°. The calculation of power generation in this project is based on the above solar radiation data.

2.18.1. Total Efficiency of Power Generation System

The energy conversion of grid-connected PV power generation system mainly includes: energy source link, energy conversion link and energy output link, etc. 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, etc. The main losses in the energy conversion are the losses caused by the quality defects or mismatches of battery components, and the losses caused by the influence of temperature. The main losses of 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. For grid-connected PV power generation systems in different regions, different climatic environments and different construction schemes, the above losses are different. The following table shows for the evaluation of the above losses in this project in combination with the local climatic conditions and the proposed construction scheme.

Table 2.3 Value Table of System Efficiency Evaluation

| Serial Number | Loss Factor | Generation Loss |
|---------------|---|-----------------|
| 1 | Loss of unavailable light | 2% |
| 2 | Component mismatch loss | 1.5% |
| 3 | Temperature influence loss | 9.5% |
| 4 | Dust shielding loss | 2% |
| 5 | Low voltage cable confluence loss | 0.45% |
| 6 | Inversion loss | 0.75% |
| 7 | Circuit loss | 0.98% |
| 8 | Field power loss | 1.2% |
| 9 | System failure and maintenance loss | 1% |
| 10 | Power grid dispatching loss | 0.5% |
| 11 | Comprehensive efficiency of system | 81.5% |

2.18.2. 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. In the operation period of this project, the power generation gain of double-sided module is 4.5%, the power attenuation of PV module in the first year is 2%, and then the power attenuation of PV module every year is 0.45%. According to the above calculation principle, the annual average power generation of Sedawgyi PV power station is 57.32 million kW·h, and the annual power generation is shown in table below.

Table 2.4 Annual Power generation of Sedawgyi PV Power Station

| Attenuation Coefficient | Annual Attenuation Rate | Annual Power Generation (MW.h) |
|-------------------------|-------------------------|--------------------------------|
| 0.98 | 2.00% | 59930 |
| 0.9755 | 0.45% | 59654 |
| 0.971 | 0.45% | 59379 |
| 0.9665 | 0.45% | 59104 |
| 0.962 | 0.45% | 58829 |
| 0.9575 | 0.45% | 58554 |
| 0.953 | 0.45% | 58279 |
| 0.9485 | 0.45% | 58003 |
| 0.944 | 0.45% | 57728 |
| 0.9395 | 0.45% | 57453 |
| 0.935 | 0.45% | 57178 |
| 0.9305 | 0.45% | 56903 |
| 0.926 | 0.45% | 56627 |
| 0.9215 | 0.45% | 56352 |
| 0.917 | 0.45% | 56077 |
| 0.9125 | 0.45% | 55802 |
| 0.908 | 0.45% | 55527 |
| 0.9035 | 0.45% | 55251 |
| 0.899 | 0.45% | 54976 |
| 0.8945 | 0.45% | 54701 |
| Average for many years | | 57315 |

2.19. Proposed Layout Plan

Sedawgyi PV power station project has a scale of 30MWac, which was completed and put into operation at one time, with a total area of 0.61 km². According to the land use situation, topography and geomorphology conditions of the site and the preliminary power access system scheme, a 132kV booster station is initially planned to be built in the north of the site, and six subarrays of 5MWac PV power generation are arranged on the gentle slope. There is a road in the west of the site, and the road width is about 4m~4.5m, which meets the transportation requirements of PV power plant equipment. For the reconstruction and expansion of the site where the part of the proposed approach road does not meet the requirements, the roads in the site should avoid hillsides with large gullies as much as possible, so as to reduce digging and filling and avoid destroying natural gullies, and approach or pass more PV arrays along the route as much as possible. The total length of the road is about 4km, the road surface width is 3.5m, and the roadbed width is 4.5m. Clay-bound macadam is adopted, and a shunting platform is set at the end of the road. The PV array should be arranged according to the land use range and terrain conditions, so as to avoid the great difference between the length and width of sub-squares, so as to achieve the best layout scheme with better land use, saving connecting cables and shorter routine inspection lines.

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

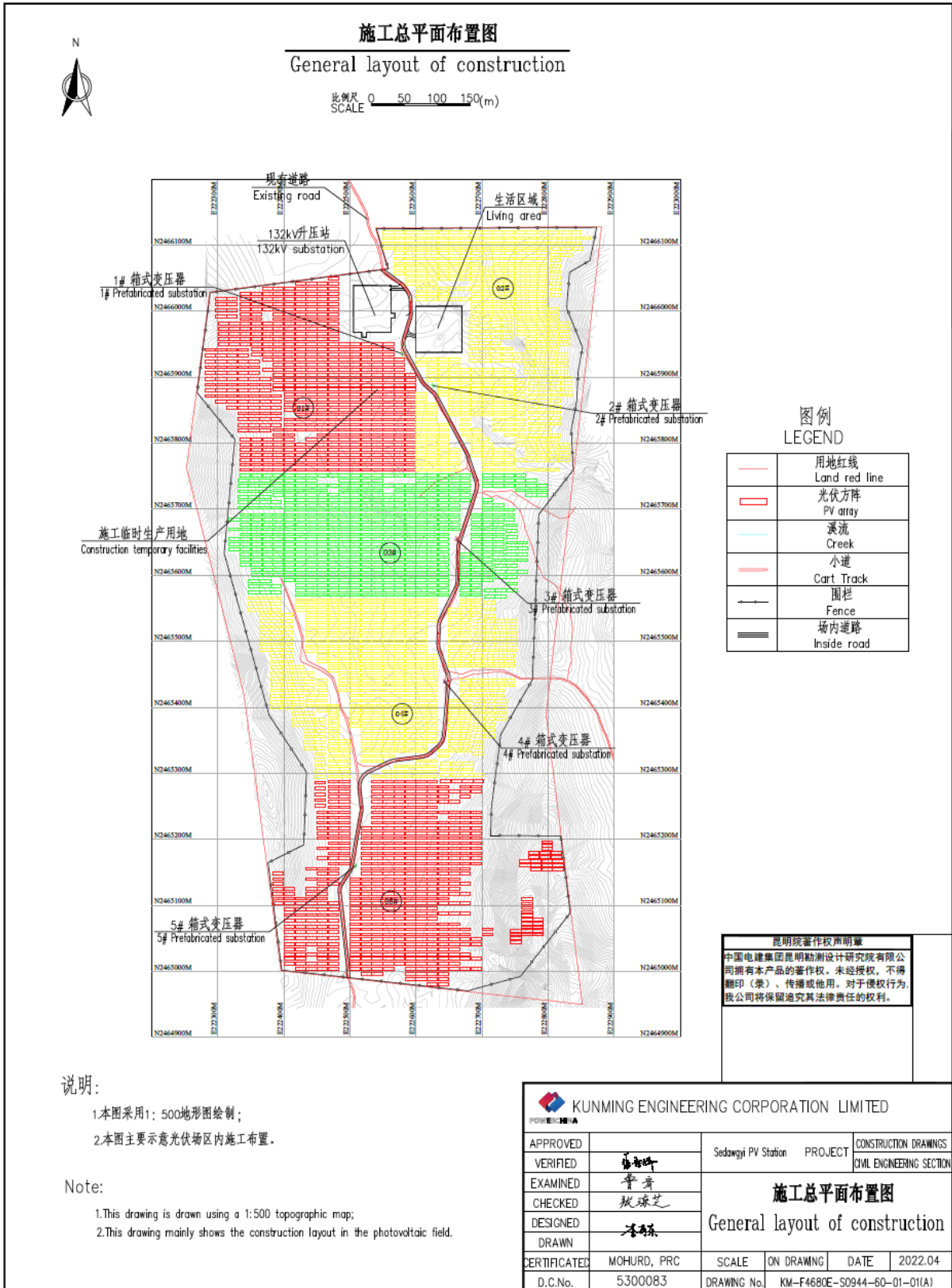


Figure 2.13 General Layout of Sedawgyi Solar Power Station

2.20. Transmission Line Design

2.20.1. Main Technical Characteristic of the Line

- (1) **Line name:** 132kV transmission line T connection to the 132kV transmission line from Sedawgyi Power Plant substation to Aungpinle Power Plant substation.
- (2) **Line origin and destination:** starting from this PV power station and ending the T connection point, this is on the 132kV line from Sedawgyi Power Plant Substation to Aungpinle Power Plant Substation. The whole line is about 3.8 km. Erection of single circuit.
- (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:** JL/G1A-240/30 steel core aluminum stranded wire is used as the conductor; 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 2.5 Main Economic Indicators of the Line

| Serial Number | Project | Index |
|---------------|-------------------------|-------|
| 1. | Line length (km) | 3.8 |
| 2. | Number of towers (base) | 19 |
| 3. | Average span (m) | 200 |
| 4. | Tensile ratio (%) | 45.6% |
| 5. | Wire (kg/km) | 1132 |
| 6. | Insulator (piece /km) | 245 |

2.20.2. System Overview

2.20.2.1. Power Transmission Line Scale

The transmission line is 3.8 km long from to the plant to the T connection point, which will transmit the electricity power from the 30MWac PV.

2.20.2.2. Wire Section

According to system studying, this line project adopts 240mm²cross-section conductor.

2.20.2.3. Power Access Scheme

This project recommends power access system scheme: The 132kV one circuit of outgoing line of this project is connected to the nearby iron tower through T connection mode. The point is on the transmission line from Sedawgyi Power Plant Substation to Aungpinle Power Plant Substation. The cross section of conductor is 240mm², and the maximum load is considered as 30MVA.

FROM SEDAWGYI SOLAR STATION TO AUNGPINLE - SEDAWGYI LINE
Transmission Line Route Map



Figure 2.14 132 kV Transmission Line Route Map

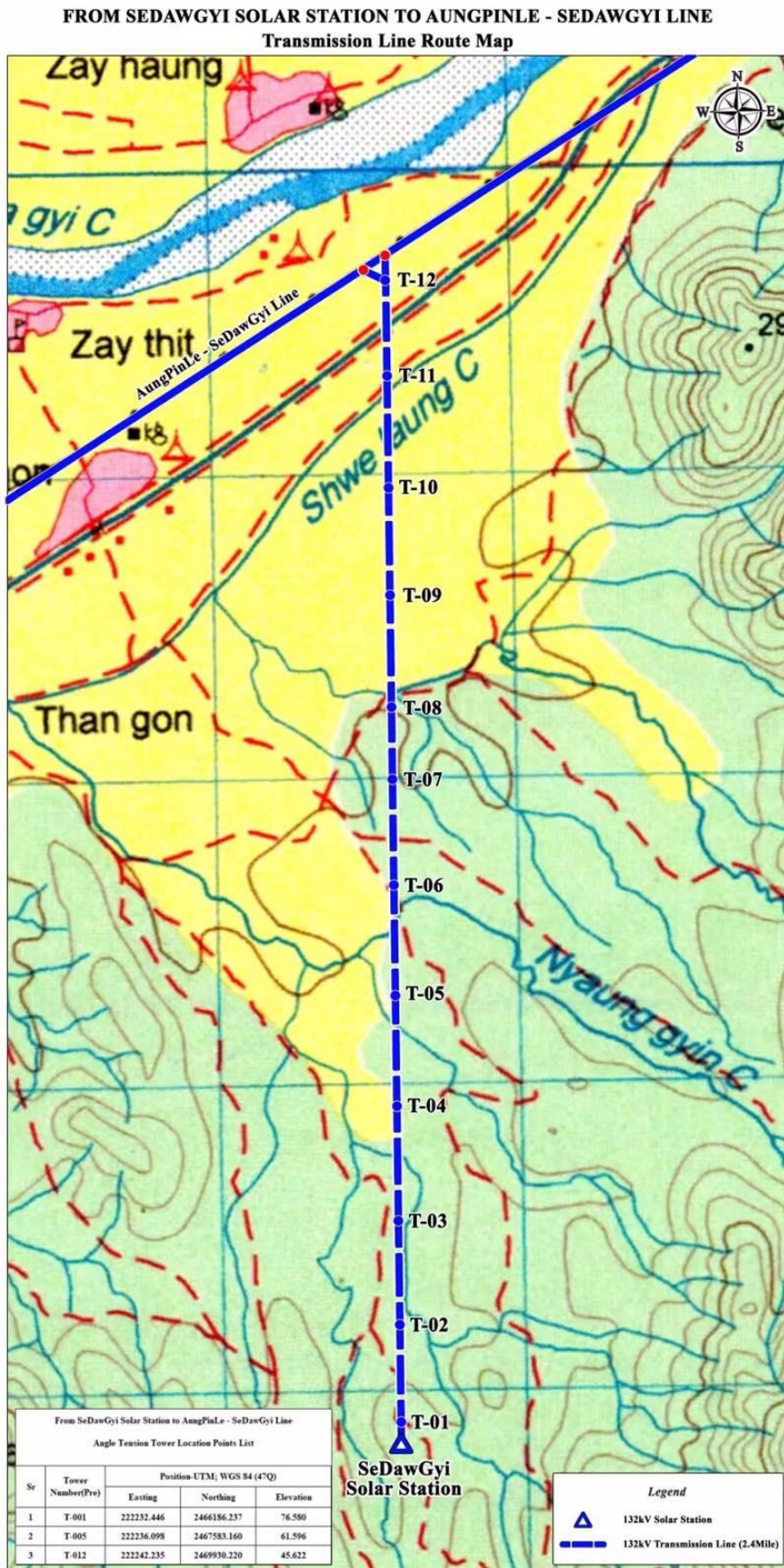


Figure 2.15 132 kV Transmission Line Route Map

2.20.3. Line Part Scheme Selection

2.20.3.1. Description of Outgoing Line

The outgoing line direction of this project is located in the north of the site, with a straight line distance of about 3.8km to the T connection point. The outgoing line is outgoing at the first time, and the outgoing direction is north.

2.20.3.2. Principle of Formulating Route Plan

Path planning will be carried out according to the following principles:

- (1) According to the principle of system planning, considering factors such as construction, operation, traffic conditions and line length, the line will be safe, reliable, economical and reasonable.
- (2) Be as close as possible to existing national roads, county roads and rural roads, and improve the line traffic conditions.
- (3) Try to avoid dangerous terrain, flooded areas and unfavorable geological sections.
- (4) Try to avoid water source forest areas and rare tree species areas, reduce deforestation and protect the natural ecological environment.
- (5) Avoid military facilities, mined minerals and quarries, oil depots and important communication facilities.
- (6) Try to avoid crossing houses.
- (7) Comprehensively coordinate the contradiction between the route of this line and the existing lines (including the planned route) and other facilities along the line.
- (8) The lines shall be as short as possible, and the outgoing channels of other standby lines shall be considered as a whole.

2.20.4. Electromechanical Part

2.20.4.1. Selection of Wire Model

According to the system planning and demonstration, the conductor cross section of this project is $1 \times 240\text{mm}^2$ (the maximum load is considered as 30MVA), considering the requirements of icing and wind load on mechanical strength. At the same time, in combination with the topographic and meteorological conditions of the line and the previous 132kV power transmission operation experience, JL/G1A-240/30 steel-cored aluminum stranded wire is adopted as the conductor of this project.

2.20.4.2. Selection of Ground Wire

This project line is a conventional line, and OPGW is used as the communication line as well as the lightning protection line for the optical cable of the outgoing line.

Table 2.6 OPGW Technical Parameter Values

| Project | | Unit | Guaranteed Value |
|---------------|----------|-----------|------------------|
| Optical fibre | Type | | G.652 |
| | Quantity | rush pith | 24B1 |
| | Weaken | 1310nm | dB/km |

| Project | | Unit | Guaranteed Value |
|--|-------------------------------|--------------------|--------------------------------------|
| | 1550nm | dB/km | 0.21 |
| Section surface | Bearing cross-sectional area: | mm ² | 92.4 |
| | AS area | mm ² | 92.4 |
| | AA area | mm ² | 0 |
| | Stainless steel pipe area: | mm ² | 2.7 |
| | Total cross-sectional area: | mm ² | 95.1 |
| Outer Layer stranding | | | Right direction |
| outside diameter | | mm | 13.05 |
| Unit weight | | kg/km | 605.4 |
| Rated breaking force (RTS) | | kN | 103.6 |
| 20°C DC resistance | | Ω/km | 0.765 |
| Short-circuit current capacity (40°C~200°C, 0.25s) | | kA ² .s | 52.8 |
| Short circuit current | | kA | 14.5 |
| Tensile weight ratio | | km | 17.5 |
| Modulus of elasticity | | kN/mm ² | 148.5 |
| Coefficient of linear expansion | | 1*10-6/°C | 13.2 |
| Maximum allowable working tension (MAT) | | kN | 41.4 |
| Average annual running tension (EDS) | | kN | 25.9 |
| Minimum allowable bending radius | | mm | Construction: 261, Operation: 196 |
| Storage and transportation temperature | | °C | 30 |
| Maximum delivery length | | m | 6000 |

2.20.4.3. Hardware Fitting

According to the regulations, the safety factor of the hardware of this project under the maximum service load is not less than 2.5, and the conditions of disconnection, disconnection and checking calculation are not less than 1.5. The main hardware configuration is shown in table below.

Table 2.7 Model Table of Main Hardware

| Type of Hardware Name | Weir | JL/G1A-240/30 |
|---|------|---------------|
| Suspension clamp | | XGF-5C |
| Tension clamp, Strain clamp, Dead end clamp | | NY-240/30 |
| Connection fittings | | JYD-240/30 |
| Repair fittings | | JX-240/30 |
| Antivibration hammer | | FYH-240/30 |

2.20.5. Insulation Coordination

2.20.5.1. Insulator Type Selection

At present, insulators mainly include porcelain insulators, glass insulators and silicone rubber composite insulators, which have been compared in previous projects. Glass insulators have

the characteristics of large climbing distance, corrosion resistance and zero value self-explosion, so they have better cost performance and are favored by operating units. Therefore, glass insulator design is recommended for the whole line, and its characteristics and insulator string number are shown in tables below.

Table 2.8 Insulator Characteristic

| Model | Height, mm | Climbing distance, mm | Connection type marking | Lighting impulse withstand voltage, kV | Power frequency wet flash, kV | Power frequency breakdown, kV | The rated electromechanical failure load kN | Reference weight kg |
|-------|------------|-----------------------|-------------------------|--|-------------------------------|-------------------------------|---|---------------------|
| U70B | 146 | 320 | 16 | 100 | 40 | 130 | 70 | 4 |

Table 2.9 Insulator String Sheet Table for 132kv Line

| Elevation (m) | Number of jumper strings and hanging | Tensile strand number |
|---------------|--------------------------------------|-----------------------|
| 0-1000 | 8 | 10 |

2.20.5.2. Grounding

Ground wire is grounded base by base by tower, and horizontal radiation grounding body is used for grounding device in general areas, and closed ring grounding device is used for paddy fields and residential areas. The grounding downlead adopts ϕ 12 round steel, and the grounding body is laid with 4~8 ϕ 12 round steel. The buried depth of the grounding body is 0.8m for cultivated land and 0.6m for non-cultivated land. The measures of adding grounding modules are taken in areas with high soil resistivity. According to the regulations, the power frequency grounding resistance value of tower grounding device shall not exceed the values listed in table below when it is dry in the thunder season.

Table 2.10 Grounding Resistance Value

| Soil resistivity (ω .m) | ≤ 100 | 100~500 | 500~1000 | 1000~2000 | ≥ 2000 |
|--|------------|---------|----------|-----------|-------------|
| Grounding resistance requirements (ω) | | | | | |
| Grounding resistance value (ω) | 10 | 15 | 20 | 25 | 30 |

2.20.5.3. Wire to Ground Distance and Cross Requirement

According to the regulations of relevant codes and specifications, the minimum vertical distance between the conductor and the ground and the crossing objects when calculating the maximum sag, or the minimum clearance distance between the conductor and the crossing objects and parallel objects when calculating the maximum wind deviation, shall meet the requirements of the following table.

Table 2.11 Wire to Ground Distance and Crossing Requirements

| Name of object to be crossed | The minimum distance (m) | Remark |
|------------------------------|--------------------------|--------|
| Residential area | 7.0 | |

| Name of object to be crossed | | The minimum distance (m) | Remark |
|--|------------------------------------|--------------------------|-------------------------------------|
| Non-residential area | | 6.0 | |
| Difficult transport area | | 5.0 | |
| A hillside within walking distance | | 5.0 | Wind deflection clearance distance. |
| Hillsides, cliffs and rocks that cannot be reached by foot | | 3.0 | |
| Grade highway to pavement | | 7.0 | |
| Weak current line and power line | | 3.0 | |
| Building | vertical distance | 5.0 | |
| | Wind deflection clearance distance | 4.0 | |
| The natural height of trees | vertical distance | 4.0 | |
| | Wind deflection clearance distance | 3.5 | |
| | Fruit trees and cash crops | 3.0 | |

2.20.6. Iron Tower

2.20.6.1. Type Selection of Iron Tower

The installed capacity of this project is 30MWac. The outgoing line is connected to the nearby Iron Tower by T-connection mode, with a total length of 3.8 km, and the whole line is erected in a single loop. JL/G1A240/30 steel core aluminum stranded wire. The whole line is designed according to the ice thickness of 0mm and the basic wind speed of 30m/s.

This project plans to adopt the 35B19 module in the 35kV tower catalogue module of the typical design of China State Grid Corporations power transmission and transformation project with corresponding voltage level. The module is a single-loop iron tower with an altitude of less than 1000m, a design wind speed of 35m/s, a conductor model of JL/G1A-240/30 and a ground wire of GJ-50, which is designed according to the mountain planning. The straight tower and tension tower in tower form are all "up"-shaped iron towers.

2.21. SCADA System Information

The electrical secondary design of this project strives to be safe, reliable, economical and applicable, and the equipment configuration and function requirements are designed according to the principle of "unattended and few people on duty".

All equipment of this PV power station project is monitored by computer monitoring system. The PV power station project is divided into three levels of monitoring: the inverter boost unit monitors each PV array at the site of each PV array; in the central control room of 132kV booster station, the main equipment of PV array and the electrical equipment of booster station shall be monitored centrally. According to the need, it can be dispatched remotely, monitor the whole PV power plant engineering equipment. The monitoring system of booster station and PV plant area is designed with a unified platform.

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The PV arrays of this project are distributed locally, and the operation parameters of each PV array (including DC input voltage and current, AC output voltage and current, power, grid frequency, fault codes and information, and solar PV battery series current, etc.) are monitored by the inverter control unit and passed through the inverter communication controller. Upload it to the computer monitoring system of 132kV booster station by optical fiber transmission, and realize the monitoring, alarm and historical data storage of the above operation parameters in the central control room of booster station through the operator station of computer monitoring system.

In the operator station of the main control room of the 132kV booster station, the parameters of each inverter can be set separately, and the startup and shutdown sequence of the inverter system can be set according to the actual weather conditions, so that the operation of the whole PV power station project can achieve the optimal performance and maximum power generation capacity.

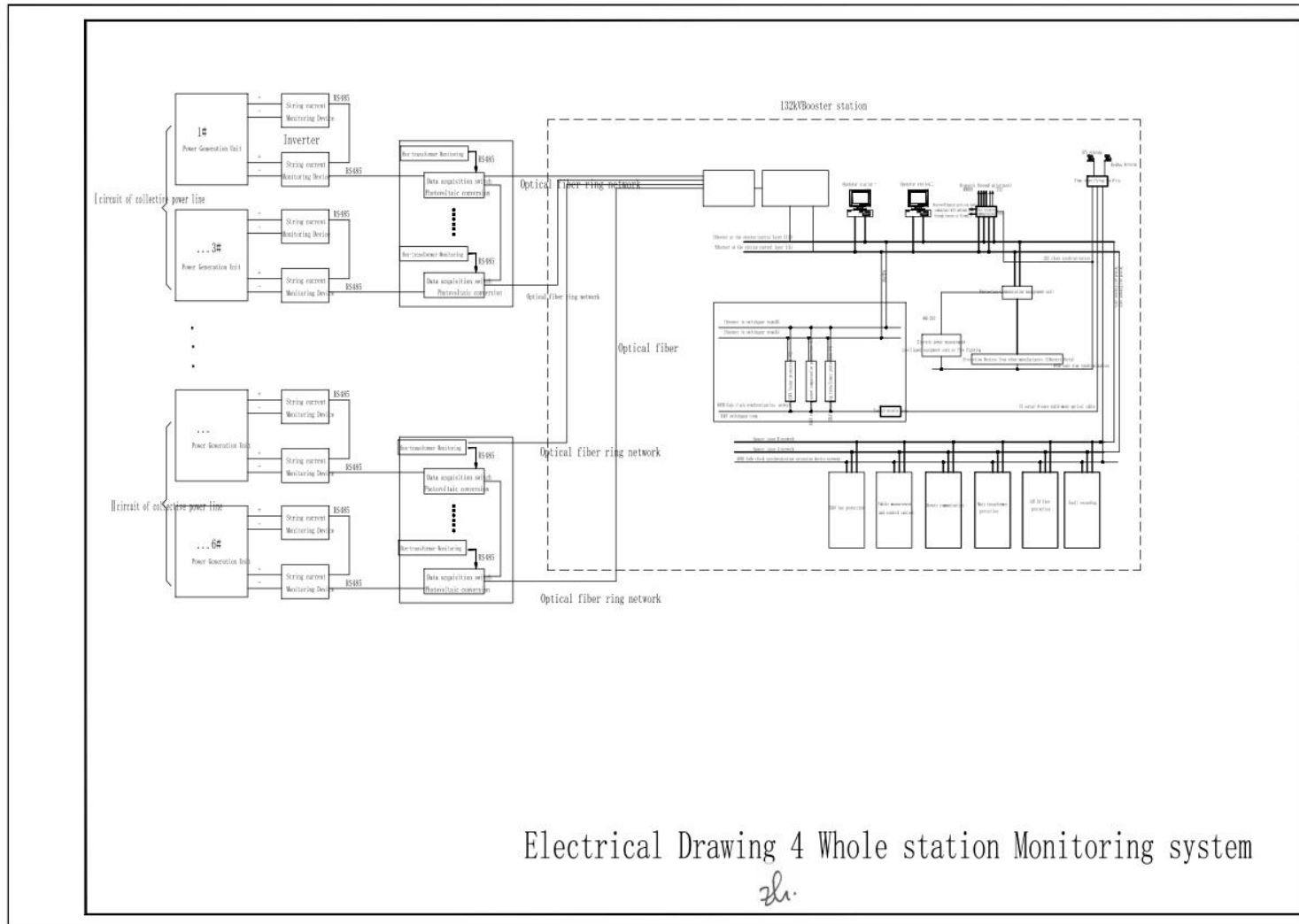


Figure 2.16 Whole Station Monitoring System

2.22. Permissible Lower Limit of Power Generation

The allowable lower limit of annual power generation of Sedawgyi Solar Power Station is considered as 80%, and the annual on-grid power corresponding to the allowable lower limit is shown in table below.

Table 2.12 Annual Power Generation (80% lower allowable limit)

| Running Period | Considering the annual power generation (MW.h) corresponding to 80% of the allowable lower limit |
|------------------------|--|
| Year 1 | 47944 |
| Year 2 | 47724 |
| Year 3 | 47503 |
| Year 4 | 47283 |
| Year 5 | 47063 |
| Year 6 | 46843 |
| Year 7 | 46623 |
| Year 8 | 46403 |
| Year 9 | 46183 |
| Year 10 | 45962 |
| Year 11 | 45742 |
| Year 12 | 45522 |
| Year 13 | 45302 |
| Year 14 | 45082 |
| Year 15 | 44862 |
| Year 16 | 44641 |
| Year 17 | 44421 |
| Year 18 | 44201 |
| Year 19 | 43981 |
| Year 20 | 43761 |
| Average for many years | 45852 |

2.23. Construction Schedule

2.23.1. Progress of Preparatory Period and Preparation Period

The scale of this project is 30 MWac, and the main work during the construction preparation period includes: the construction of temporary production and living houses, the leveling of temporary sites, the construction of some roads in the sites and other temporary facilities, etc.

2.23.2. Total Construction Schedule

The construction of this project can be roughly divided into the following parts: construction preparation, 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, and completion acceptance.

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Constraints on the construction progress of this project mainly include on-site traffic, civil engineering construction of switchyard, and installation and commissioning of electrical equipment of switchyard. According to the requirements of MOEE, it is initially planned to start construction on March 15th, 2022 and finished the project on November 15th, 2022 with a total construction 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 shows the detail implementation schedule of the proposed project.

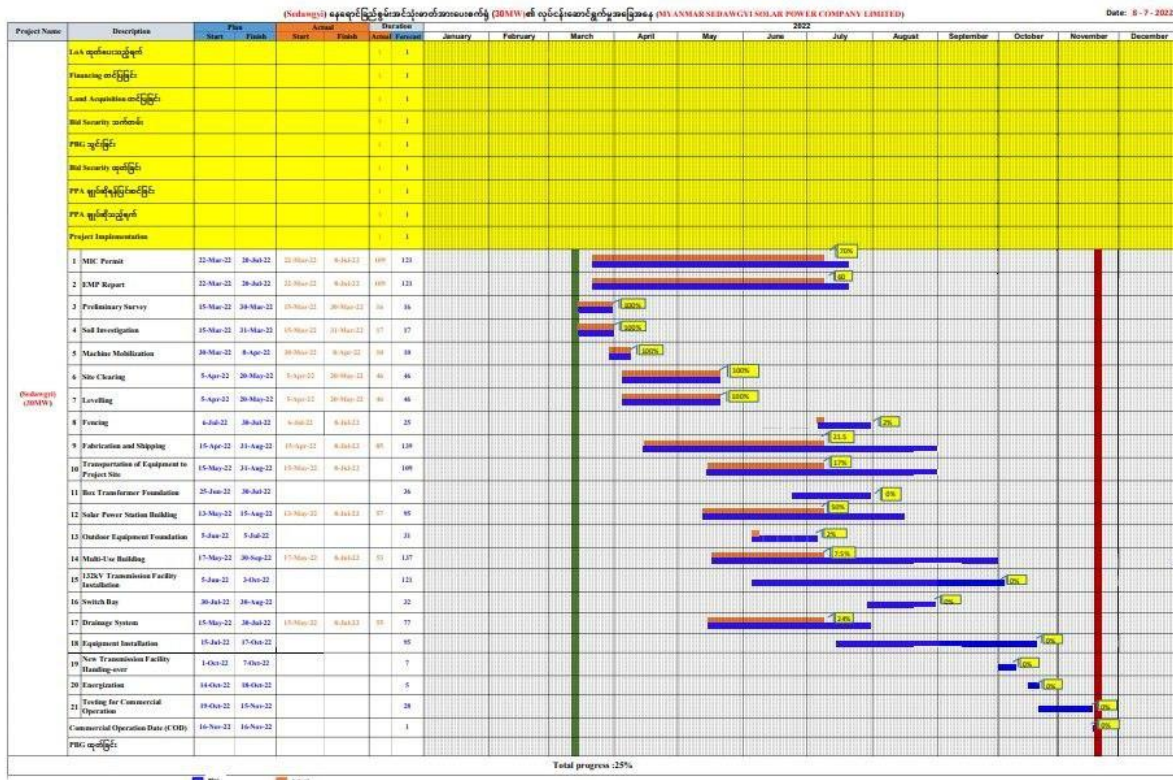


Figure 2.17 General Construction Schedule

The following figures show the current site condition of the proposed project.





Figure 2.18 Current Site Condition

2.24. Utilities

2.24.1. Construction Materials and Machines Requirement

The main materials required for this project are masonry materials, gravel, sand aggregate, cement, concrete, steel, timber and oil, which are mainly purchased from Mandalay Region. Estimated construction materials requirement are 1,200 tons (cement), 2,200 tons (gravel), 1,800 tons (sand), 550 tons (steel), 5 tons (wood) for construction phase.

Different types of construction machines and vehicles will be used for construction processes of the project. These include bulldozers, excavators, wheel loaders, dump trucks, single drum vibrating roller and small truck. The following table describes detail construction machines and vehicles used for proposed project.

Table 2.13 List of Construction Machines and Vehicles

| No. | Type of Machines and Vehicles | Number of Machines and Vehicle |
|-----|-------------------------------|--------------------------------|
| 1 | Bulldozer | 1 |
| 2 | Excavator | 4 |
| 3 | Wheel loader | 2 |
| 4 | Dump truck | 2 |

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| No. | Type of Machines and Vehicles | Number of Machines and Vehicle |
|--------------|-------------------------------|--------------------------------|
| 5 | Single drum vibrating roller | 1 |
| 6 | Small truck | 1 |
| Total | | 11 |

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



Bulldozer



Excavator



Excavator



Excavator



Wheel Loader



Wheel Loader



Dump truck



Dump truck



Single drum vibrating roller



Small truck

Figure 2.19 Construction Machines and Vehicles

2.24.2. Water Requirement

Estimated water requirement for construction processes are 200,000 gallons per month and domestic water requirement is 20,000 gallons per month. Groundwater will be pumped out from tube-wells in the project site and stored with water tanks for construction phase of the project. A purification treatment system is set for treatment, and the treated water is stored in a 4m³ water tank. The domestic water is pressurized by a variable frequency pump, and supplied to each water point of booster station through a branched pipe network.

PV modules are required to clean regularly to improve of the power generation efficiency. Cleaning time slot is once every six months. The estimated water consumption for PV module cleaning is 523 m³ as per 1.6L/m². The cleaning water is taken from the pool by tanker and transported to each water point area, and pressurized by a small diesel pump.

2.24.3. Electrical and Fuel Requirement

Construction electricity can be connected by 11kV line near the site as power supply and estimated electricity requirement is 3.6 MWh per month. Three generators: 100MW, 8.5MW and 5MW will be installed for emergency case.

Diesel will be mainly used for construction processes and estimated requirement is 10,000 gallons per month. Diesel will be purchased from nearby fuel station and stored with fuel tanks in the project site.

Diesel will be also used for operation processes and estimated requirement is 100 gallons per month. Diesel will be purchased from nearby fuel station and stored with portable fuel tanks in the project site.

2.24.4. Human Resource Requirement

A total of 200 workers are required for construction phase of the project, including 3 foreign experts for consultation. Working hours is 8 hours per day and working days are 28 days per month. Working time is from 07:00 am to 5:30 pm and there is only one working shift in construction phase. There are construction staff quarters for migrant workers and staffs in the project site as well as some local workers will also be employed.

2.25. Waste Generation

2.25.1. Solid Waste Generation

Solar Power Plant: During the construction phase, main sources of solid wastes generation from the proposed project are rejected components and packaging materials of electrical 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 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 during site clearance activities for PV modules, booster station, multiple-use building, and staff quarters. Domestic solid wastes such as garbage, plastic bags and organic waste from construction workers camp and staff quarters are other sources of solid waste generation.

During the operation phase, there is no operation solid waste which is 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, staff quarters are common solid wastes generation.

Overhead Transmission Line: During the construction phase, vegetation debris will be generated during site clearance along right of way for overhead transmission line.

2.25.2. Liquid Waste Generation

Solar Power Plant: During the construction phase, cleaning construction machines and vehicles within the project site will generate liquid waste. Wastewater discharge from domestic usage and sewage disposed of from toilets used by construction workers are other source of liquid waste generation.

During the operation phase, main source of operation liquid waste is cleaning activities for PV modules to promote their efficiency for electricity generation. Wastewater discharge from domestic usage and sewage disposed of from toilets used by construction workers are other source of liquid waste generation.

Overhead Transmission Line: There is no liquid waste generated from not only construction but also operation activities of overhead transmission line.

2.25.3. Hazardous Waste Generation

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

During the operation phase, damaged PV modules due to improper 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. As for batteries waste, this project does not used batteries to store electricity from PV modules and will distribute directly to Sedawgyi Substation via overhead

transmission line. If there is electricity outage in Ground Mounted Solar Power Plant, this project will be connected by 11kV line near the site as power supply.

Overhead Transmission Line: There is no hazardous waste generated from not only construction but also operation activities of overhead transmission line.

CHAPTER 3 IDENTIFICATION OF THE PROJECT PROPONENT

The proposed 30 MW solar power plant project is proposed by Myanmar Sedawgyi Solar Power Co., Ltd. formed by China Intelligent Transportation System (Holding) 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 Thangone Village, Sakar Pin Village Tract, Madaya Township, Pyin Oo Lwin District, Mandalay 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 Sedawgyi Substation will take 20 years. After the operation period, the project proponent will extend operation period of the project many times because the proposed project is a BOO basis project.

3.1. Information of the Project Proponent

Myanmar Sedawgyi Solar Power Co., Ltd. is the proponent of the proposed project. The following table describes the management responsible persons and the following figures show the organization chart of project proponent.

Table 3.1 Management List of Myanmar Sedawgyi Solar Power Co., Ltd.

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

Table 3.2 Employment List of Myanmar Sedawgyi Solar Power Co., Ltd.

| 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 |

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

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Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

and investor relations. The following table describes the shareholders of Myanmar Sedawgyi Solar Power Co., Ltd. which is a subsidiary of China ITS (Holdings) Co., Ltd.

Table 3.3 Shareholder of Myanmar Sedawgyi Solar Power Co., Ltd.

| 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 3.4 Bidder of the 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 |

CIC 中国智能交通系统(控股)有限公司
CHINA ITS (HOLDINGS) CO., LTD.

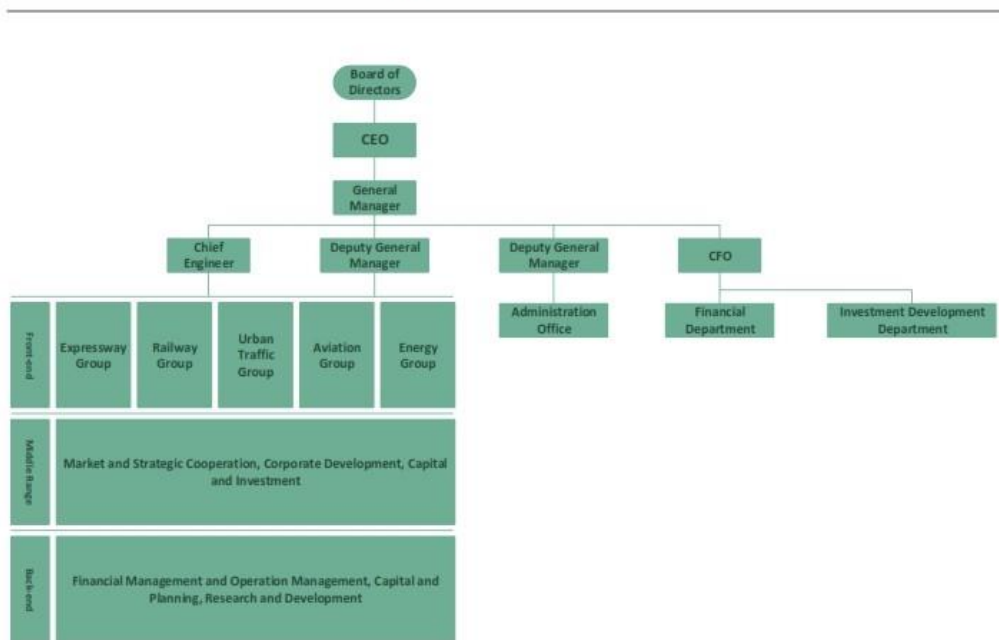


Figure 3.1 Organizations Chart of China ITS (Holdings) Co., Ltd.

3.3. Organizational Structure of 30 MW Ground Mounted Solar Power Plant

The following figure shows the organization chart of Myanmar Sedawgyi Solar Power Co., Ltd.

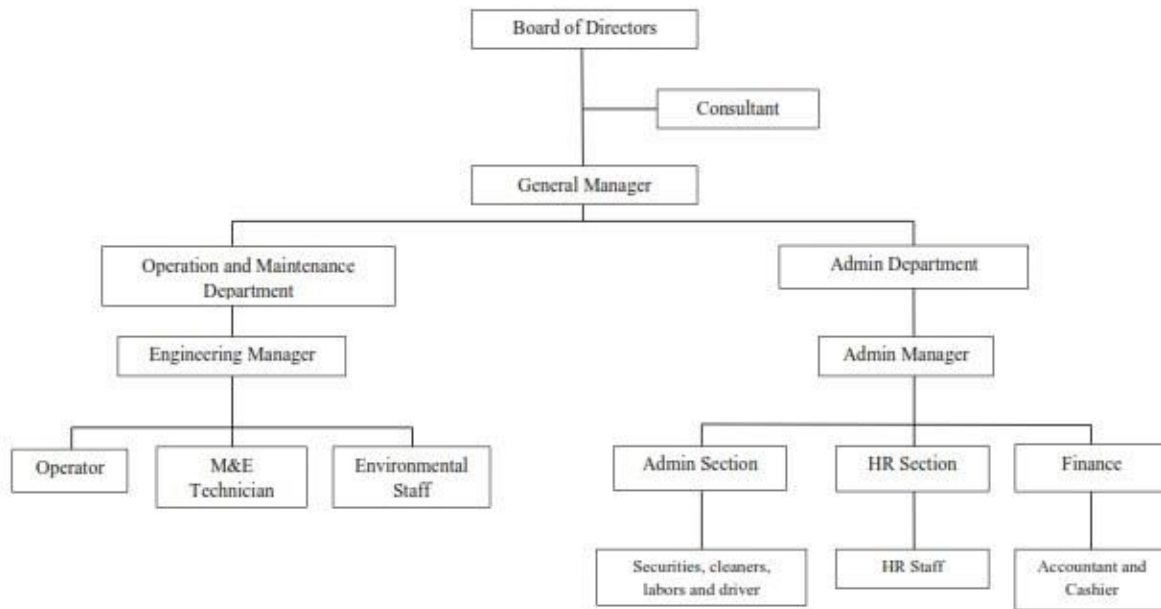


Figure 3.2 Organizational Chart of Myanmar Sedawgyi Solar Power Co., Ltd

3.4. Investment Plan

The total investment amount for the proposed project is 27.672 million USD and it includes investment for financing, materials, equipment, infrastructure and land lease cost. The following table describes investment plan for the proposed project and detailed investment plan is attached in the appendix 4.

Table 3.5 Investment Plan of the Proposed Project

| No. | Category | Investment Amount (Million USD) |
|--------------|------------------------------------|---------------------------------|
| 1. | Material and Equipment | 26.381 |
| 2. | Infrastructure and Land Lease Cost | 0.443 |
| 3. | Investment for Financing | 0.848 |
| Total | | 27.672 |

CHAPTER 4 IDENTIFICATION OF EMP EXPERTS

E Guard Environmental Services is preparing this Environmental Management Plan (EMP) Report in line with related Myanmar Environmental Conservation Laws and Regulations. A summary of team member's responsibilities during the study period is described below. The members of the EMP team are listed in the following Table indicating their ECD Registration number, roles in preparing this report.

Full address of company conducting EMP

E Guard Environmental Services

-
- No.(145- A2- 3), Thiri Mingalar Street, Ward No.(4), 8th Mile, Mayangone Township, Yangon 11062, Myanmar.
 - Tel: +95-1-9667757, +95-1-9653332
 - Fax: +95-1-666512
 - info@eguardservices.com
 - <http://www.eguardservices.com>

Table 4.1 Study Team and Responsibilities

| No. | Name of Team Member | Position | Transitional Consultant Registration Numbers | Responsibilities |
|-----|--|--------------------------------|--|--|
| | E Guard Environmental Services Co., Ltd. | EIA Organization | 00028 | |
| 1. | U Soe Min | Lead Consultant | 10067 | Project supervision Over |
| 2. | Dr. Myint Oo | Advisor | - | Resources Assessment, Internal Review and Consulting |
| 3. | Daw Aye Thida | Project Associate/ Team Leader | - | Report Preparation, data analysis, impact identification and Mitigation Measures, Site Visit, Focus group discussion |
| 4. | U Aung Si Thu Thein | Consultant | 00281 | Overall supervising for report preparation, Negotiation with project proponent and relevant governmental |

| No. | Name of Team Member | Position | Transitional Consultant Registration Numbers | Responsibilities |
|-----|------------------------|----------------------|--|---|
| | | | | organization and Focus Group Discussion |
| 5. | Daw Thein Mwe Khin | Senior Consultant | 10104 | Social survey and focus group discussion, social data analysis and reporting |
| 6. | Daw Shwe Ya Min Bo | Assistant Consultant | 00279 | Data Collection, social survey and focus group discussion, social data analysis and reporting |
| 7. | Daw Htet Shwe Sin Aung | Assistant Consultant | 00266 | Biodiversity assessment, surveys and reporting (especially Fauna) |
| 8. | U Htet Aung | Assistant Consultant | 00379 | Data Collection regarding soil analysis report |
| 9. | Daw Shar Thel Hoy | Project Assistant | - | Biodiversity assessment, surveys and reporting (especially Flora) |
| 10. | U Aung Moe Oo | Assistant Consultant | 00336 | Environmental Quality Measurement and reporting |
| 11. | Daw May Thu Win | Assistant Consultant | 00380 | Preparation and collection of relevant laws and regulations, and report preparation |
| 12. | U Wunna Zaw | Surveyor | - | Environmental Quality Survey and Sampling |

1. U Soe Min (Lead Consultant)

U Soe Min is team leader of the consultant team responsible for successful implementation of the project in all aspects. He is a civil, water resources and environmental engineer. He holds Bachelor of Civil Engineering (Rangoon Institute of Technology, 1984) and Master of Environmental Engineering (Asian Institute of Technology, 2001). He had involved with Water Resources Development Projects in Myanmar and trained in Japan for Irrigation and Drainage Engineering by JICA when he was working for Irrigation Department of Myanmar for 8 Yrs. He had work experiences in Thailand (5 Yrs) and in Singapore (10 Yrs) as civil water resources-environmental engineer at institute and private companies. 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, and establishment of environmental data acquisition systems. Taking the role of a local environmental consultant, he is leading the local consultant team, E Guard Environmental Services Co., Ltd., and collaborating with international consultant firms in doing EIA reporting in Myanmar. He had involved as a local consultant to ADB and World Bank supporting capacity-building projects in strengthening environmental safeguard systems in Myanmar.

2. Dr. 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 advices to project team members.

3. Daw Aye Thida (Project Associate, Team Leader)

Daw Aye Thida is a Project Associate, who obtained her Bachelor degree in Civil Engineering from Technological University (Taunggyi). She has almost four 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 has her experience in preparing Environmental Management Plan (EMP) report for New Donthami Bridge Construction Project, 30 MW Ground Mounted Sedawgyi Solar Power Plant 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.

4. U Aung Si Thu Thein (Consultant)

Aung Si Thu Thein is a 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

has recently pursued his Master of Science Degree in Natural Resources Management from the Asian Institute of Technology, Thailand in May, 2020. He has almost three 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.

5. Daw Thein Mwe Khin (Senior Consultant, Social Expert)

Daw Thein Mwe Khin is a Senior 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 experiences in working as a core team member of the social team who did the preparation 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.

6. Daw Shwe Ya Min Bo (Assistant Consultant)

Daw Shwe Ya Min Bo is an Assistant Consultant, 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.

7. Daw Htet Shwe Sin Aung (Assistant Consultant , Fauna)

Daw Htet Shwe Sin Aung is an Assistant Consultant 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.

8. U Htet Aung (Assistant Consultant)

U Htet Aung is an Assistant Consultant, 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.

9. Daw Shar Thel Hoy (Project Assistant, Floral)

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.

10. U Aung Moe Oo (Assistant Consultant)

Aung Moe Oo is an Assistant Consultant, who received his Bachelor Degree in Chemical Engineering from Technological University in 2016. He has experiences on environmental site survey and socio-economic surveys and Data Collection for (air, noise and vibration, water, soil), Data Computing and Analyzing. Another experience is to cooperate with clients and to conduct stakeholder's engagement and public consultations. In this project he assisted data collection for (air, noise and vibration, water), data computing and analyzing.

11. Daw May Thu Win (Assistant Consultant, Legal Expert)

Daw May Thu Win is working as Project Assistant in E-Guard Environmental Services Co., Ltd. She obtained her Bachelor Degree in Law from East Yangon University (Tarwa) in 2018. She is currently assisting in preparing Laws, Rules, Regulations, Policies, Directions and Notifications use for environmental reports, public consultations and information gathering process.

12. U Wunna Zaw (Surveyor)

U Wunna Zaw 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 2018 to present. He attended and finished 'Occupational Safety and Health Supervisor Course' sponsored by WIN OSHE Co., Ltd.

CHAPTER 5 POLICY LEGAL AND INSTITUTIONAL FRAMEWORK

We, Sedawgyi 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 Sedawgyi Substation. Moreover, we also committed to operate the proposed project by following the plans and mitigation measures stated in this EMP report.

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 Sedawgyi Substation operated by Sedawgyi 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)

5.1. National Laws and Regulations

(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 causes 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 section 25 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.

The environmental quality shall be within the limit of the following reference values of NEQEG.

Table 5.1 Reference Values of NEQEG for the Project

| Parameter | Unit | Guideline Value |
|---|--------------------------|-----------------|
| Air Quality | | |
| Nitrogen dioxide (1 hour) | $\mu\text{g}/\text{m}^3$ | 200 |
| Sulfur dioxide (24 hours) | $\mu\text{g}/\text{m}^3$ | 20 |
| Particulate Matters (PM ₁₀) (24 hours) | $\mu\text{g}/\text{m}^3$ | 50 |
| Particulate Matters (PM _{2.5}) (24 hours) | $\mu\text{g}/\text{m}^3$ | 25 |
| Effluent Water Quality | | |
| Biochemical oxygen demand | mg/l | 30 |
| Chemical oxygen demand | mg/l | 125 |
| Oil and grease | mg/l | 10 |
| pH | S.U | 6-9 |

| Parameter | Unit | Guideline Value |
|--|-----------------------------------|-------------------------------------|
| Total coliform bacteria | 100ml | 400 |
| Total nitrogen | mg/l | 10 |
| Total phosphorus | mg/l | 2 |
| Total Suspended Solid | mg/l | 50 |
| Noise Level | Day Time (07:00-22:00) | Night Time (22:00-07:00) |
| Standard value for industrial, commercial | 70 | 70 |
| Standard value for residential | 55 | 45 |

Source: National Environmental Quality (Emission) Guideline (2015)

(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 livelihoods 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 section 51 of said law.
- The project proponent has to appoint the nationalities only in normal work without expertise, in line with the sub-section (c) of section 51 of 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 section 51 of 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 section 65 of 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 section 65 of 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 section 65 of 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 65 of 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 section 65 of said law.
- The project proponent has to abide by labor laws, in line with the sub-section (m) of section 65 of 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 65 of 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.

(9) 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.

(10) 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.

(11) 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.

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- 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 certificate under section 30 of said law.

(12) 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.

(13) 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.

(14) 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.

(15) 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.

(16) 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.

(17) 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 submit 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.

(18) 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.

(19) 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.

(20) The Minimum Wages Law (2013)

Purpose: To ensure the project owner pay the wages not less than prescribed wages and notify obviously this wages 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 section 13 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's 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.

(21) 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.

(22) 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.

(23) 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.

(24) 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 accident, 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.

(25) 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.

(26) 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.

(27) 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.

(28) 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.

(29) 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.

(30) 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.

(31) 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.

(32) 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.

(33) 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.

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- 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.

5.2. Commitment by the Project Proponent

MYANMAR SEDAWGYI 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 SEDAWGYI 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 Sedawgyi Solar Power Company Limited

CHAPTER 6 DESCRIPTION OF THE SURROUNDING ENVIRONMENT

6.1. Methodology and Objectives of the Data Collection and Analysis

The objective of the EMP data collection is to present the general description of the environment as primary data collection. The methodology had been designed to assess the primary data of the environmental quality factors for the proposed bridge construction project. Primary environmental parameters were defined according to the guideline which applies to projects dedicate to bridge construction. All necessary criteria such as site selections for sampling and analysis of ambient air quality, water quality, and noise quality of the project site were identified by environmental specialists of E Guard. The followings are the methodologies used for analyzing environment condition of the project.

- i) **Onsite Measurements and Analysis** – Baseline environmental parameters such as air quality, water quality, and noise level of the project site are measured onsite and results are mentioned in this Chapter.
- ii) **Secondary Data Collection and Analysis** – Some data such as socio-economic condition, physical/biological environment and weather data are collected from official township data from General Administrative Department and analyzed by the study team.

6.1.1. Ambient Air Quality

The emissions of dust particles and gases were measured for 24hrs continuously at the selected sites using the Environmental Perimeter Air Station (EPAS). The results were compared with National Environmental Quality Guidelines NEQG, American Conference of Governmental Industrial Hygienists (ACGIH) and National Ambient Air Quality Standards (NAAQS). EPAS provides direct readings in real time with data-logging capabilities. Air quality is composed of dust and gas emissions of the ambient air.

Table 6.1 Ambient Air Quality Measurement

| <i>Ambient Air Quality (1 locations)</i> | |
|--|---|
| Gas Emission | CO, SO ₂ , NO ₂ , CO ₂ |
| Dust Emission | PM ₁₀ , PM _{2.5} |

6.1.2. Ambient Noise

Noise level LAeq (dBA) will be measured at the selected locations that can reflect the exposure of the nearest local community and sensitive locations. Duration and frequency were measured for 24hrs continuously at the selected site using the Sound Pressure Level Meter.

The monitoring procedures, data analysis and interpretation were carried out in accordance with the instrument's manufacture and National Environmental Quality (Emission) Guidelines, World Health Organization (WHO) and International Finance Corporation (IFC) guidelines in order to be in line with Environmental Conservation Department, Ministry of Natural

Resources and Environment Conservation (MONREC). "National Environmental Quality (Emission) Guidelines" for Myanmar was also presented the value of noise level as LAeq (dBA).

Table 6.2 Noise level monitoring

| <i>Noise monitoring (1 locations)</i> | |
|---------------------------------------|----------------------------|
| Noise Emission | LAeq (dBA) (1hrs, 24 hrs.) |

Equipment used to measure ambient air and noise measurements are shown as below.

Table 6.3 Equipment used to measure ambient air and noise level measurement

| | |
|--|---|
| <p>Davis Vantage Pro2 Wireless Weather Station</p> <p>Provides detailed current weather conditions and expanded forecasts - all at a glance!</p> <p>The Vantage Pro2 uses a frequency-hopping spread spectrum radio from 902 MHz to 928 MHz to transmit and receive data up to 1,000' (300m) line of sight. In addition, the weather station features a bubble level, improved anemometer base, redesigned wind cups, and factory-calibrated wind direction. The integrated sensor suite combines temperature and humidity sensors, rain collector with an aluminum-plated tipping bucket, and anemometer into one package for easy setup. Measure inside and outside temperature and humidity, heat index, barometric pressure, dew point, rainfall, wind direction and speed, and wind chill.</p> |  |
| <p>Haz-Scanner EPAS</p> <p>PM₁₀, PM_{2.5}, NO₂, SO₂, CO, CO₂, Temperature, and Relative Humidity</p> |  |
| <p>Digital Sound Level Meter</p> <p>Noise</p> |  |

6.1.3. Water Quality

Water samples were collected on site with appropriate sampling equipment and procedures. Physical parameters such as DO, conductivity, salinity, TDS, pH, Temperature turbidity of surface water were measured on site by portable multi parameter water quality meter. 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.

Table 6.4 Environmental Quality Parameters for Water quality

| <i>Water Quality Parameter</i> | |
|--------------------------------|---|
| Chemical Parameter | BOD, COD, pH, TDS, Salinity |
| Physical Parameter | Total Suspended Solid, Temperature, Turbidity, DO, EC |
| Nutrients | Total Nitrogen, Total Phosphorus |
| Compounds | Oils & grease |

On-site water quality measurements, water samplings are conducted using the following equipment as shown below.

Table 6.5 Equipment used for water sampling

| | |
|--|--|
| <p>Water Sampling Bottle</p> |  |
| <p>HORIBA U-50, Multiparameter Water Quality Meter</p> <p>Multiple sensors allow for the measurement of 11 parameters simultaneously. (pH, pH(mv), ORP, DO, Salinity, TDS, Seawater Specific Gravity, Temperature, Turbidity, Water depth)</p> <p>Patented auto-calibration features provide hassle free calibration of pH, dissolved oxygen, conductivity and turbidity.</p> <p>Ultra-sensitive Turbidity Sensors (Models U-50) Precision has been improved over conventional instruments.</p> <p>Improved stability of the dissolved oxygen sensor has been achieved with a new 3 electrode design for fast response and polarographic sensor for ease of maintenance.</p> <p>pH and ORP electrodes can be replaced individually to reduce replacement costs.</p> |  |

6.2. Physical Environment

6.2.1. Result of Air Quality Monitoring

The air quality monitoring was done at selected locations during 19th to 20th May 2022. During this survey, these parameters were measured with adequate devices named Environmental Perimeter Air Station (EPAS) viz; Particulate Matters (PM₁₀ and PM_{2.5}) and gases CO, SO₂, NO₂, CO₂ via 24-hour basis. The detail locations, results and guidelines of all emission pollutants are described in the following tables and figures.

Table 6.6 Air Quality Monitoring Point

| No. | Points | Coordinate | Locations |
|--|--------|---|-------------------------|
| Ambient Air Quality and Noise Monitoring Locations | | | |
| 1. | AQ | Lat- 22°16'41.82"N Long- 96°18'18.61"E | Within the Project Site |



Figure 6.1 Air Quality Monitoring Location of Myanmar Sedawgyi Solar Power Plant Project

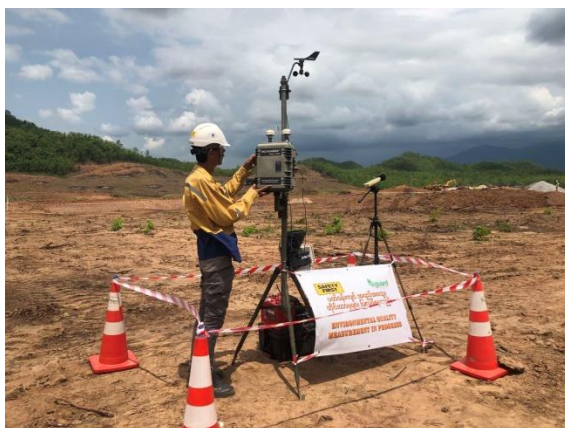


Figure 6.2 Air Quality Monitoring at the Sedawgyi Solar Power Plant Project Site

The following figures describe detail air quality monitoring results for 24 hours continuously at the proposed project.

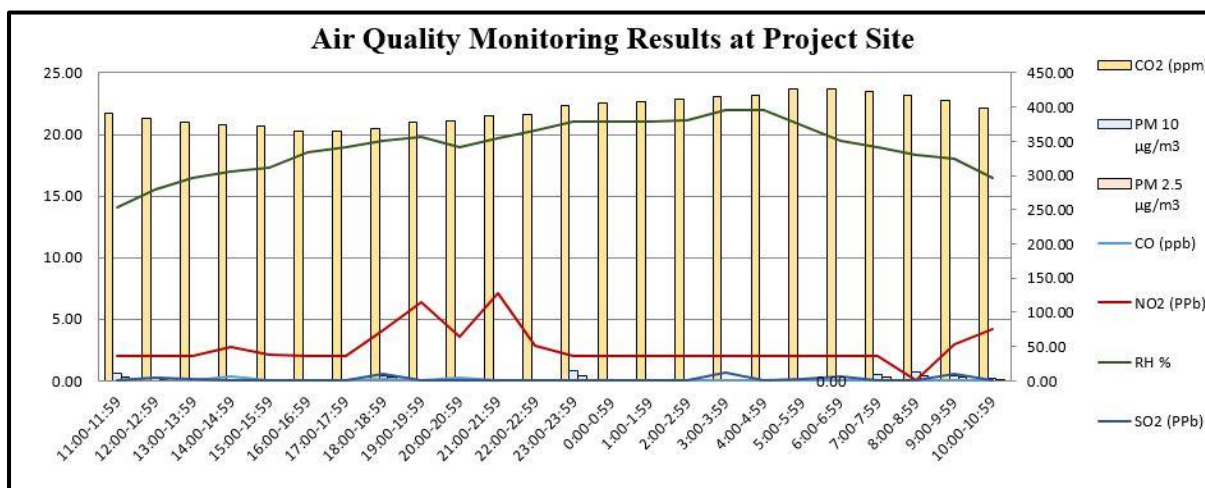


Figure 6.3 Fluctuation of Air Pollutants during dial cycle (Myanmar Sedawgyi Solar Power Plant Project)

According to the results of gaseous emissions, the emission level of NO₂ increased significantly between 19:00 and 22:00, 10:00 and 11:00. The highest CO₂ emission level is found at between 5:00 and 7:00. However, steady emission level of CO and SO₂ are found during 24 hours continuous monitoring.

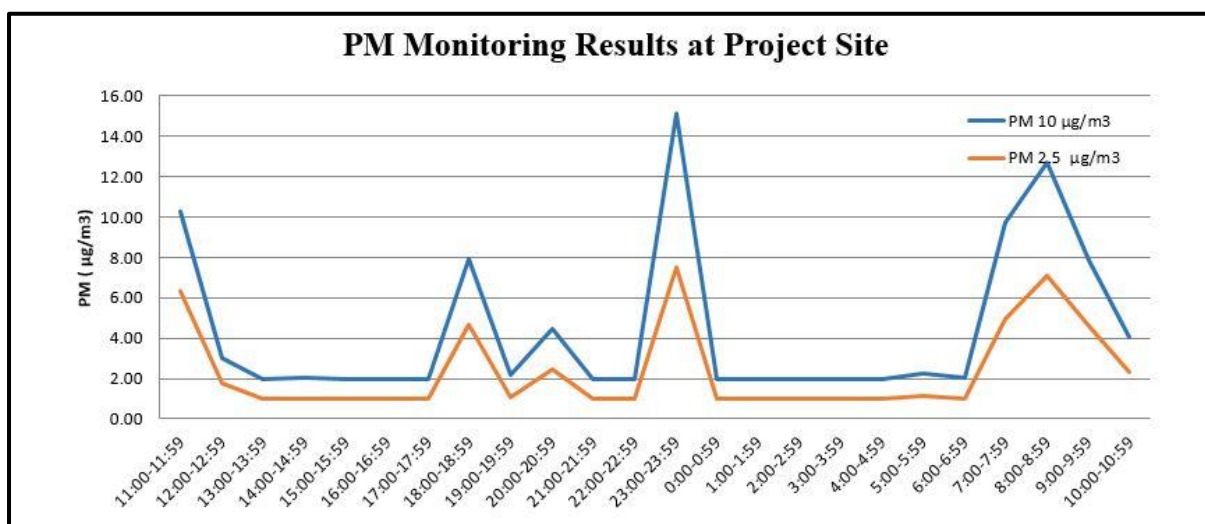


Figure 6.4 Dust Emission Monitoring Results

According to the results of dust emissions, dust generation of both PM₁₀ and PM_{2.5} increased equal at 19:00 and peak level of generation is at 23:00 – 01:00, which is the main construction hour of the project.

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Detail results and diel variation patterns with one-hour interval of pollutants are shown in table below. Results of average, peak and minimum of a day are calculated in the table.

Table 6.7 Air pollutants emission results (Myanmar Sedawgyi Solar Power Plant Project)

| Date | Time | | CO ₂ (ppm) | CO (ppb) | NO ₂ (ppb) | PM ₁₀ µg/m ³ | PM _{2.5} µg/m ³ | RH % | SO ₂ (ppb) |
|-----------------------|-------------|---------|-----------------------|-------------|-----------------------|------------------------------------|-------------------------------------|--------------|-----------------------|
| 19.05.2022 | 11:00-11:59 | Average | 390.85 | 0.00 | 2.00 | 10.28 | 6.32 | 14.12 | 0.00 |
| 19.05.2022 | 12:00-12:59 | Average | 382.78 | 0.23 | 2.00 | 2.98 | 1.73 | 15.52 | 0.30 |
| 19.05.2022 | 13:00-13:59 | Average | 378.30 | 0.00 | 2.00 | 2.00 | 1.00 | 16.43 | 0.18 |
| 19.05.2022 | 14:00-14:59 | Average | 374.38 | 0.35 | 2.72 | 2.02 | 1.02 | 17.00 | 0.00 |
| 19.05.2022 | 15:00-15:59 | Average | 372.68 | 0.00 | 2.12 | 2.00 | 1.00 | 17.33 | 0.00 |
| 19.05.2022 | 16:00-16:59 | Average | 365.47 | 0.00 | 2.00 | 2.00 | 1.00 | 18.53 | 0.00 |
| 19.05.2022 | 17:00-17:59 | Average | 364.80 | 0.00 | 2.07 | 2.00 | 1.00 | 19.00 | 0.08 |
| 19.05.2022 | 18:00-18:59 | Average | 368.73 | 0.13 | 4.10 | 7.90 | 4.68 | 19.47 | 0.60 |
| 19.05.2022 | 19:00-19:59 | Average | 377.90 | 0.00 | 6.43 | 2.20 | 1.10 | 19.78 | 0.00 |
| 19.05.2022 | 20:00-20:59 | Average | 379.90 | 0.28 | 3.60 | 4.45 | 2.43 | 19.00 | 0.00 |
| 19.05.2022 | 21:00-21:59 | Average | 387.88 | 0.00 | 7.10 | 2.00 | 1.00 | 19.73 | 0.00 |
| 19.05.2022 | 22:00-22:59 | Average | 389.07 | 0.00 | 2.87 | 2.00 | 1.00 | 20.27 | 0.00 |
| 19.05.2022 | 23:00-23:59 | Average | 402.47 | 0.00 | 2.00 | 15.13 | 7.48 | 21.00 | 0.00 |
| 20.05.2022 | 0:00-0:59 | Average | 406.77 | 0.00 | 2.00 | 2.00 | 1.00 | 21.00 | 0.00 |
| 20.05.2022 | 1:00-1:59 | Average | 408.15 | 0.00 | 2.00 | 2.00 | 1.00 | 21.00 | 0.00 |
| 20.05.2022 | 2:00-2:59 | Average | 411.03 | 0.00 | 2.00 | 2.00 | 1.00 | 21.20 | 0.00 |
| 20.05.2022 | 3:00-3:59 | Average | 414.60 | 0.00 | 2.00 | 2.00 | 1.00 | 22.00 | 0.63 |
| 20.05.2022 | 4:00-4:59 | Average | 416.65 | 0.00 | 2.00 | 2.00 | 1.00 | 22.00 | 0.00 |
| 20.05.2022 | 5:00-5:59 | Average | 426.62 | 0.00 | 2.00 | 2.25 | 1.13 | 20.78 | 0.13 |
| 20.05.2022 | 6:00-6:59 | Average | 426.40 | 0.00 | 2.00 | 2.02 | 1.00 | 19.52 | 0.32 |
| 20.05.2022 | 7:00-7:59 | Average | 423.45 | 0.00 | 2.00 | 9.75 | 4.97 | 19.00 | 0.00 |
| 20.05.2022 | 8:00-8:59 | Average | 416.58 | 0.00 | 0.00 | 12.70 | 7.07 | 18.30 | 0.00 |
| 20.05.2022 | 9:00-9:59 | Average | 409.85 | 0.00 | 2.95 | 7.88 | 4.63 | 18.00 | 0.52 |
| 20.05.2022 | 10:00-10:59 | Average | 399.05 | 0.00 | 4.23 | 4.05 | 2.32 | 16.52 | 0.00 |
| Average | | | 395.60 | 0.04 | 2.67 | 4.40 | 2.37 | 19.02 | 0.12 |
| 1 hour Minimum | | | 364.80 | 0.00 | 0.00 | 2.00 | 1.00 | 14.12 | 0.00 |

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| Date | Time | CO ₂ (ppm) | CO (ppb) | NO ₂ (ppb) | PM ₁₀ µg/m ³ | PM _{2.5} µg/m ³ | RH % | SO ₂ (ppb) |
|------|-----------------------|-----------------------|----------|-----------------------|------------------------------------|-------------------------------------|-------|-----------------------|
| | 1 hour Maximum | 426.62 | 0.35 | 7.10 | 15.13 | 7.48 | 22.00 | 0.63 |

Table 6.8 Air Quality Monitoring Results

| Parameters | Observed Value | Guidelines Value | Guideline | Unit | Averaging Period |
|-------------------------|----------------|------------------|-----------|-------------------|------------------|
| Gaseous Emission | | | | | |
| CO | 0.00009 | 9 | NAAQS | ppm | 8hrs |
| CO ₂ | 416.65 | 5000 | ACGIH | ppm | 8hrs |
| SO ₂ | 0.3 | 20 | NEQG | µg/m ³ | 24hrs |
| NO ₂ | 13.35 | 200 | NEQG | µg/m ³ | 1hrs |
| Dust Emission | | | | | |
| PM ₁₀ | 4.40 | 50 | NEQG | µg/m ³ | 24hrs |
| PM _{2.5} | 2.37 | 25 | NEQG | µg/m ³ | 24hrs |

According to the comparison results of gaseous emissions, the observed values of CO (0.00009 ppm), CO₂ (416.65 ppm), SO₂ (0.3 µg/m³) and NO₂ (13.35 µg/m³), are lower than the respective guideline values. For dust emissions, the observed values of PM₁₀ (4.40 µg/m³) and PM_{2.5} (2.37 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. Results of average, peak and minimum of a day are calculated in the table.

6.2.2. Wind Speed and Direction

The following figures describe the wind speed and wind directions of the proposed Myanmar Sedawgyi Solar Power Plant Project site on 19th to 20th May 2022. According to the data, the wind direction is as below.

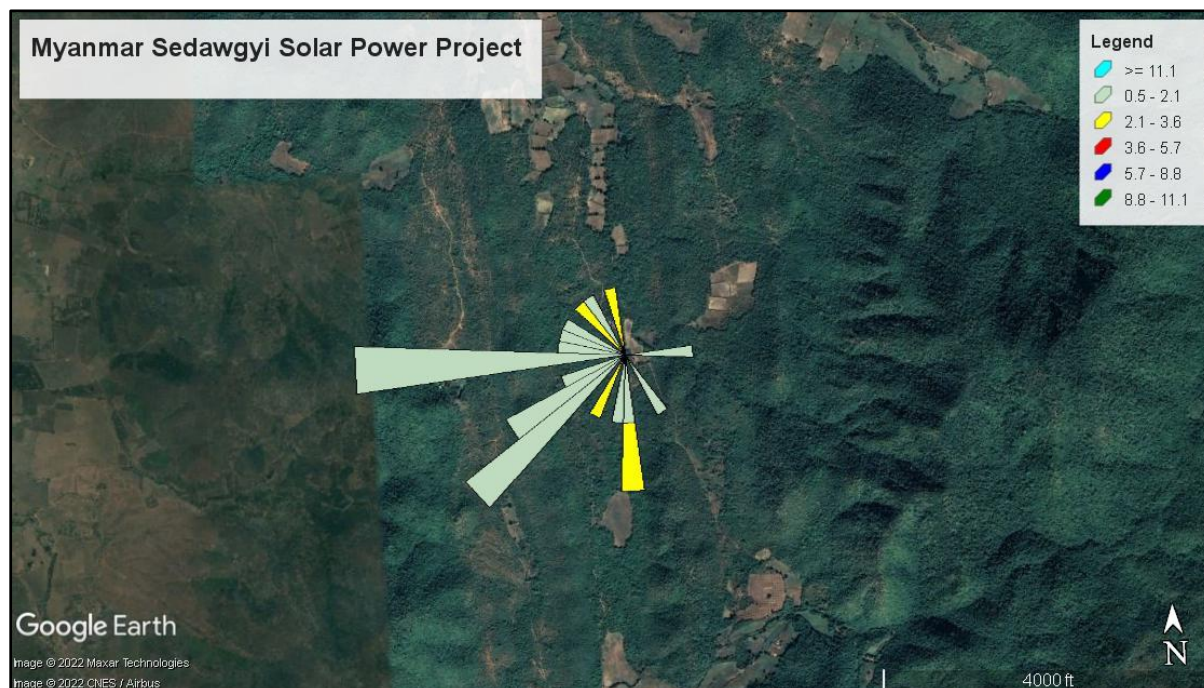


Figure 6.5 Wind Speed and Wind Direction (Blowing From) at Myanmar Sedawgyi Solar Power Plant Project

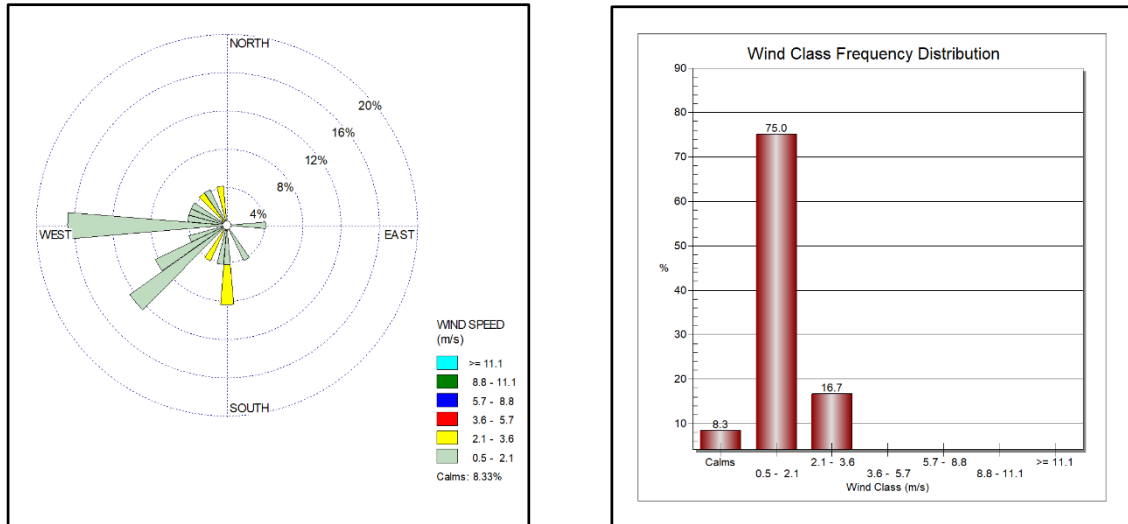


Figure 6.6 Wind Class Frequency Distribution at Myanmar Sedawgyi Solar Power Plant Project

6.2.3. Result of Ambient Noise Level

Noise level LAeq (dBA) was measured with Digital Sound Level Meter at the selected locations regarding as source (near air quality monitoring point) and receptor (Worker Camp). Ambient noise level for the proposed project was measured with at the Project site. The noise level measurement is conducted on 19th to 20th May 2022 and measuring period is 24 hours continuously. The observed values are described in the following tables and figures describe detail locations and results of noise level monitoring at the proposed project site.

Table 6.9 Noise Level Monitoring Points

| Item | GPS Coordinates | Locations | Parameters |
|---------------------------|---|----------------------------------|---|
| Point 1 (Source) | Lat- 22°16'41.82"N Long- 96°18'18.61"E | Within the project site (source) | Noise: (LAeq (dB (A)) 1hr interval for 24 hours) |
| Point 2 (Receptor) | Lat: 22° 16' 40.75" N Long: 96° 18' 20.58" E | Near worker camp (receptor) | |



Figure 6.7 Noise Level Monitoring Location of Myanmar Sedawgyi Solar Power Plant Project

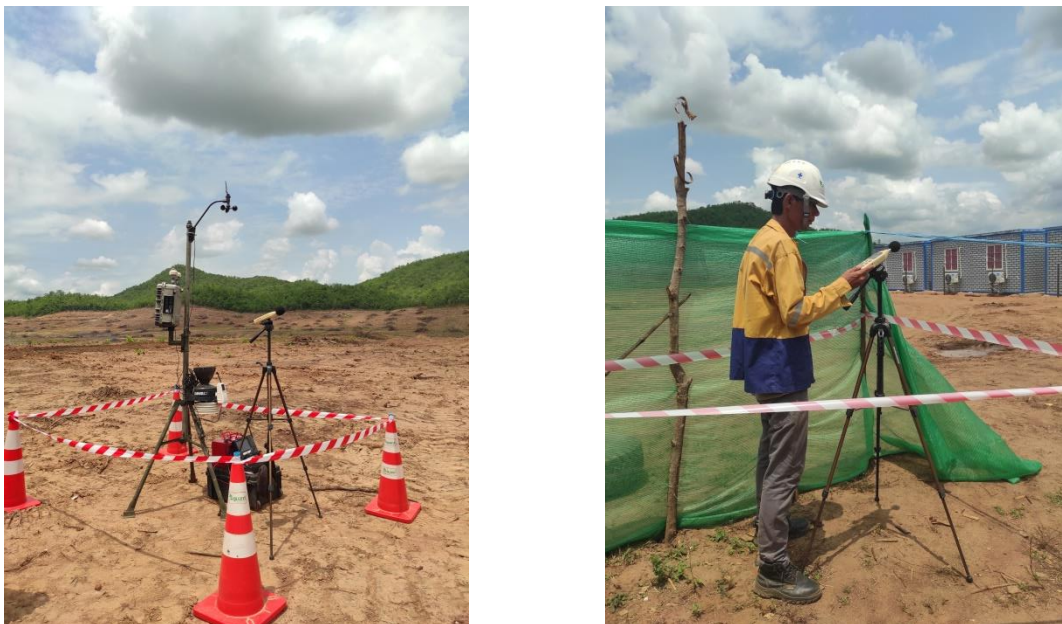


Figure 6.8 Noise Level Monitoring at Source and Receptor of the Proposed Project

Table 6.10 Observed Values of Noise Level Measurement at Project Site (Source)

| No. | Date | Time | Observed Mean Value (Source) | Weight | Day/Night | Average |
|-----|------------|-----------------|------------------------------|--------|-----------|---------|
| 1 | 20.05.2022 | 7:00:13-7:59:13 | 51.87 | A | Day | 58.99 |
| 2 | 20.05.2022 | 8:00:13-8:59:13 | 48.07 | A | Day | |

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Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

| No. | Date | Time | Observed Mean Value (Source) | Weight | Day/Night | Average | |
|----------------|------------|-------------------|------------------------------|--------|-----------|---------|-------|
| 3 | 20.05.2022 | 9:00:13-9:59:13 | 50.91 | A | Day | 56.73 | |
| 4 | 20.05.2022 | 10:00:13-10:59:13 | 51.57 | A | Day | | |
| 5 | 19.05.2022 | 11:00:13-11:59:13 | 61.03 | A | Day | | |
| 6 | 19.05.2022 | 12:00:13-12:59:13 | 54.01 | A | Day | | |
| 7 | 19.05.2022 | 13:00:13-13:59:13 | 60.74 | A | Day | | |
| 8 | 19.05.2022 | 14:00:13-14:59:13 | 61.13 | A | Day | | |
| 9 | 19.05.2022 | 15:00:13-15:59:13 | 62.31 | A | Day | | |
| 10 | 19.05.2022 | 16:00:13-16:59:13 | 54.07 | A | Day | | |
| 11 | 19.05.2022 | 17:00:13-17:59:13 | 60.15 | A | Day | | |
| 12 | 19.05.2022 | 18:00:13-18:59:13 | 70.07 | A | Day | | |
| 13 | 19.05.2022 | 19:00:13-19:59:13 | 66.58 | A | Day | | |
| 14 | 19.05.2022 | 20:00:13-20:59:13 | 66.29 | A | Day | | |
| 15 | 19.05.2022 | 21:00:13-21:59:13 | 66.12 | A | Day | | |
| 16 | 19.05.2022 | 22:00:13-22:59:13 | 66.63 | A | Night | | 56.73 |
| 17 | 19.05.2022 | 23:00:13-23:59:13 | 64.94 | A | Night | | |
| 18 | 20.05.2022 | 0:00:13-0:59:13 | 48.02 | A | Night | | |
| 19 | 20.05.2022 | 1:00:13-1:59:13 | 58.26 | A | Night | | |
| 20 | 20.05.2022 | 2:00:13-2:59:13 | 62.54 | A | Night | | |
| 21 | 20.05.2022 | 3:00:13-3:59:13 | 59.07 | A | Night | | |
| 22 | 20.05.2022 | 4:00:13-4:59:13 | 55.47 | A | Night | | |
| 23 | 20.05.2022 | 5:00:13-5:59:13 | 50.41 | A | Night | | |
| 24 | 20.05.2022 | 6:00:13-6:59:13 | 45.21 | A | Night | | |
| Average | | | 58.15 | | | | |

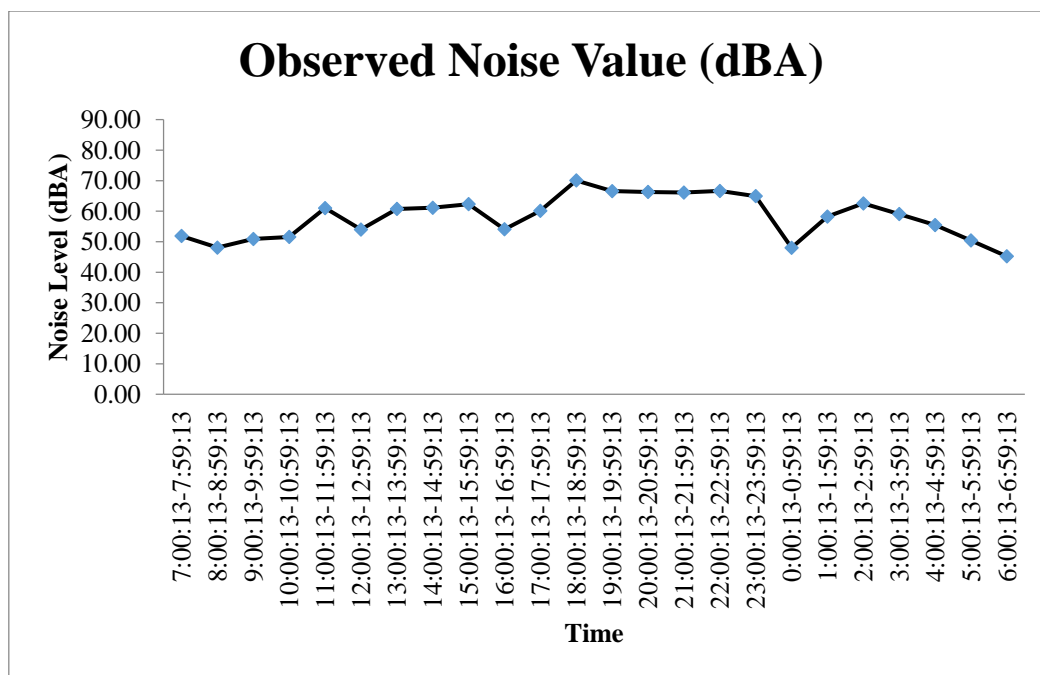


Figure 6.9 Detailed Noise Level Monitoring Result at Project Site (Source)

According to the results of noise level at Point 1 (Source), peak level of noise generation was found at 18:00 due to various construction activities, operation of machineries and movement of transportation vehicles.

Table 6.11 Observed Values of Noise Level Measurement near Worker Camp (Receptor)

| No. | Date | Time | Observed Mean Value (Receptor) | Weight | Day/Night | Average |
|-----|------------|-------------------|--------------------------------|--------|-----------|---------|
| 1 | 20.05.2022 | 7:00:13-7:59:13 | 58.83 | A | Day | 54.43 |
| 2 | 20.05.2022 | 8:00:13-8:59:13 | 49.30 | A | Day | |
| 3 | 20.05.2022 | 9:00:13-9:59:13 | 50.44 | A | Day | |
| 4 | 20.05.2022 | 10:00:13-10:59:13 | 51.03 | A | Day | |
| 5 | 19.05.2022 | 11:00:13-11:59:13 | 53.12 | A | Day | |
| 6 | 19.05.2022 | 12:00:13-12:59:13 | 44.67 | A | Day | |
| 7 | 19.05.2022 | 13:00:13-13:59:13 | 61.06 | A | Day | |
| 8 | 19.05.2022 | 14:00:13-14:59:13 | 62.43 | A | Day | |
| 9 | 19.05.2022 | 15:00:13-15:59:13 | 57.15 | A | Day | |
| 10 | 19.05.2022 | 16:00:13-16:59:13 | 59.93 | A | Day | |

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| No. | Date | Time | Observed Mean Value (Receptor) | Weight | Day/Night | Average |
|----------------|------------|-------------------|--------------------------------|--------|-----------|---------|
| 11 | 19.05.2022 | 17:00:13-17:59:13 | 60.47 | A | Day | |
| 12 | 19.05.2022 | 18:00:13-18:59:13 | 50.60 | A | Day | |
| 13 | 19.05.2022 | 19:00:13-19:59:13 | 48.90 | A | Day | |
| 14 | 19.05.2022 | 20:00:13-20:59:13 | 55.44 | A | Day | |
| 15 | 19.05.2022 | 21:00:13-21:59:13 | 53.01 | A | Day | |
| 16 | 19.05.2022 | 22:00:13-22:59:13 | 46.51 | A | Night | 44.99 |
| 17 | 19.05.2022 | 23:00:13-23:59:13 | 46.07 | A | Night | |
| 18 | 20.05.2022 | 0:00:13-0:59:13 | 44.20 | A | Night | |
| 19 | 20.05.2022 | 1:00:13-1:59:13 | 45.49 | A | Night | |
| 20 | 20.05.2022 | 2:00:13-2:59:13 | 43.69 | A | Night | |
| 21 | 20.05.2022 | 3:00:13-3:59:13 | 41.53 | A | Night | |
| 22 | 20.05.2022 | 4:00:13-4:59:13 | 44.91 | A | Night | |
| 23 | 20.05.2022 | 5:00:13-5:59:13 | 46.48 | A | Night | |
| 24 | 20.05.2022 | 6:00:13-6:59:13 | 45.99 | A | Night | |
| Average | | | 50.89 | | | |

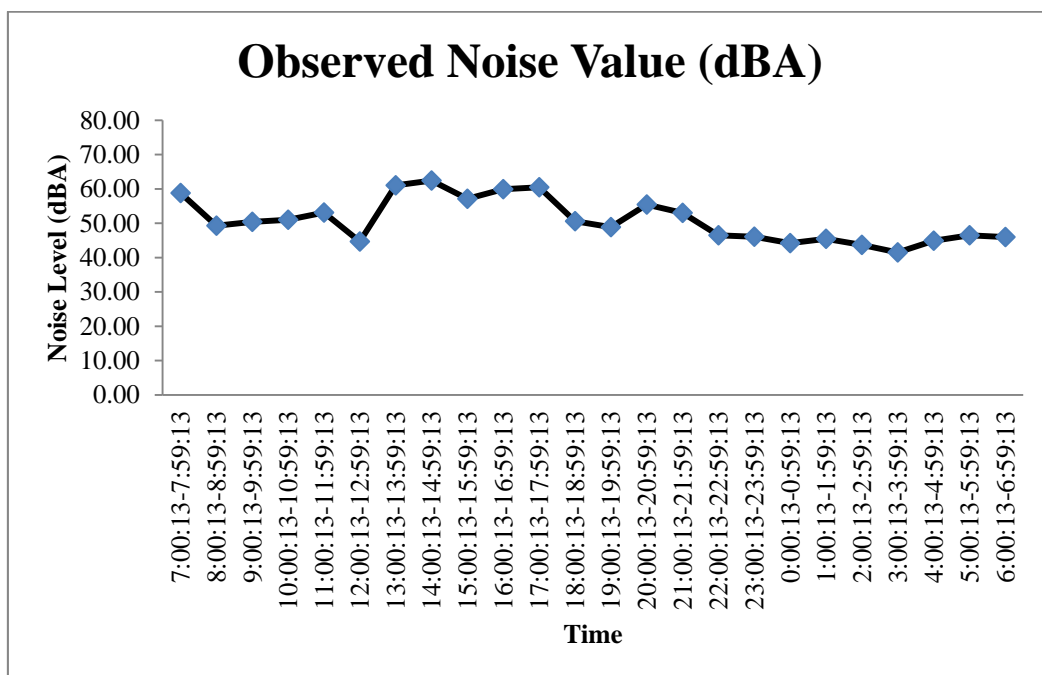


Figure 6.10 Detailed Noise Level Monitoring Result near Worker Camp (Receptor)

According to the results of noise level at Point 2 (Receptor), peak level of noise generation was found between 01:00 and 05:00, which is construction hour of the project and drop steadily.

Table 6.12 Noise Level Monitoring Results

| Location | Measured Values (dB (A)) | |
|--|---------------------------|----------------------------|
| | Day Time (07:00-22:00) | Night Time (22:00-7:00) |
| Point 1 (Source) | 58.99 | 56.73 |
| Point 2 (Receptor) | 54.43 | 44.99 |
| Noise Level Standards from National Environmental Quality (Emission) Guidelines | | |
| Standard value for industrial, commercial | 70 | 70 |
| Standard value for residential | 55 | 45 |

With regards to noise level at source, the results are lower than standard value not only at day time (58.99 dBA) but also at night time (56.73 dBA). With regards to noise level at receptor, the results are lower than standard value not only at day time (54.43 dBA) but also at night time (44.99 dBA). Therefore, it can be considered that the noise level at the proposed project is within the guideline value of NEQEG. It is anticipated that noise level will be increased during the construction phase of the proposed project because of construction activities implementation.

6.2.4. Result of Groundwater Quality

The water supply for the proposed project will be taken from tube wells within the project site. The existing groundwater quality from that well was tested by sampling water and analyzing in the laboratory in order to compare the difference between quality of the groundwater before and after implementation of the project. Moreover, there is no surface water body such as river, creek, stream and lake within the scope of the study (1 km radius from the project) and 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 groundwater on 19th May, 2022 and sent to respective laboratories for measuring the required parameters. World Health Organization (WHO) standards are used to compare for data interpretation. The baseline data of groundwater quality comparing with WHO drinking water quality standards are described in the following table. Water quality results from laboratories test are attached in **Appendix- 10**. The location of water quality measurement for groundwater from tube-well is Latitude 22° 16' 41.4" N and Longitude 96° 18' 20" E. The following figures describe location of groundwater sampling point.

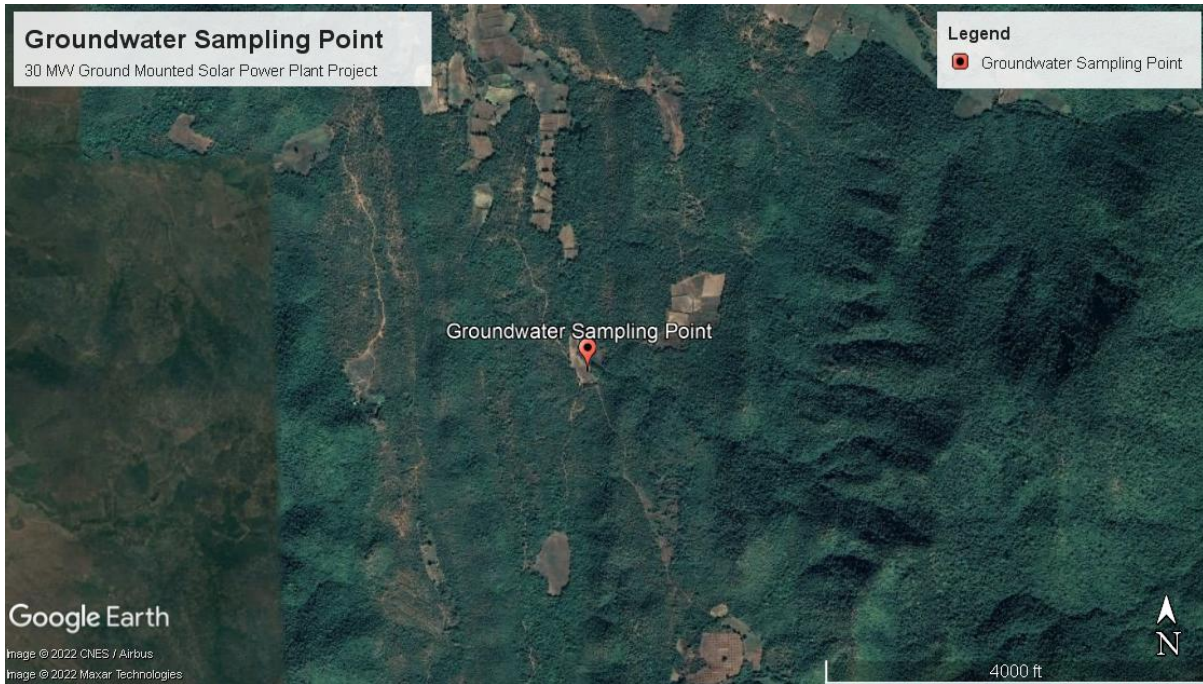


Figure 6.11 Location of Groundwater Sampling



Figure 6.12 Groundwater Sampling at Sedawgyi Solar Power Plant Project

Table 6.13 Groundwater Quality Result

| No. | Parameters | Unit | Water Quality Result | WHO Guidelines for Water |
|-----|------------------------|------------|----------------------|--------------------------|
| 1. | pH | pH | 7.3 | 6.5 ~ 8.5 |
| 2. | Dissolve Oxygen | mg/l | 6 | |
| 3. | Turbidity | NTU | 7 | 5 |
| 4. | Conductivity | micro S/cm | 574 | |
| 5. | Salinity | ppt | 0.2 | |
| 6. | Total Suspended Solids | mg/l | 16 | 50 |
| 7. | Total Dissolved Solids | mg/l | 287 | 1000 |
| 8. | BOD (5 days at 20°) | mg/l | 4 | 50 |
| 9. | COD | mg/l | 32 | 250 |
| 10. | Total Caliform Count | CFU/100ml | 8 | |
| 11. | Potassium | mg/L | 3.88 | <20 |
| 12. | Nitrogen | mg/L | <1 | 10 |
| 13. | Phosphorous | mg/L | <0.01 | 2 |
| 14. | Oil & Grease | mg/L | <5 | 10 |
| 15. | Chromium | mg/L | <0.1 | 0.05 |

According to the observed values, most of the parameters are within the limit of WHO standard except turbidity. Higher Turbidity can indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, and diarrhea and associated headaches. Therefore, the project proponent must need to install purify system, if groundwater will be used as drinking water.

6.2.5. Soil Condition

The location where the soil sample was collected has been cleared for project site. The site was used to have bamboos and shrubs. Collected soil samples are visually verified with soil classification map of Mandalay Division which is shown in the figure below. The color of both of the top and sub soil samples is brownish. The textures of the soils are fine and clayey. Top soil contains low to moderate amount of plant available nutrients. Sub soil has good mechanical properties rather than agricultural utilization. The site is located in Madaya Township and soil types mostly found in this area are classified as compact soils. They are usually found on the lowlands near the rivers and broad depression in the areas of Red Brown Savanna Soils.

The compact soils formation is deep and mostly composed of clayey materials and they are the best soils for irrigated farming. The humus content of the soil is very low, but after rains, they turn into mud and very sticky. The soil is slightly acid with the pH value ranging from 7.5 to 8.5. The soil in natural existence is low in permeability thus infiltration in these soils is also very poor which is very likely to occur salinity and alkalinity problems. The soils contain a considerable amount of calcium and magnesium, and suitable crops are rice, chili, sugarcane, cotton, vegetables, groundnut, sesame and pulses.

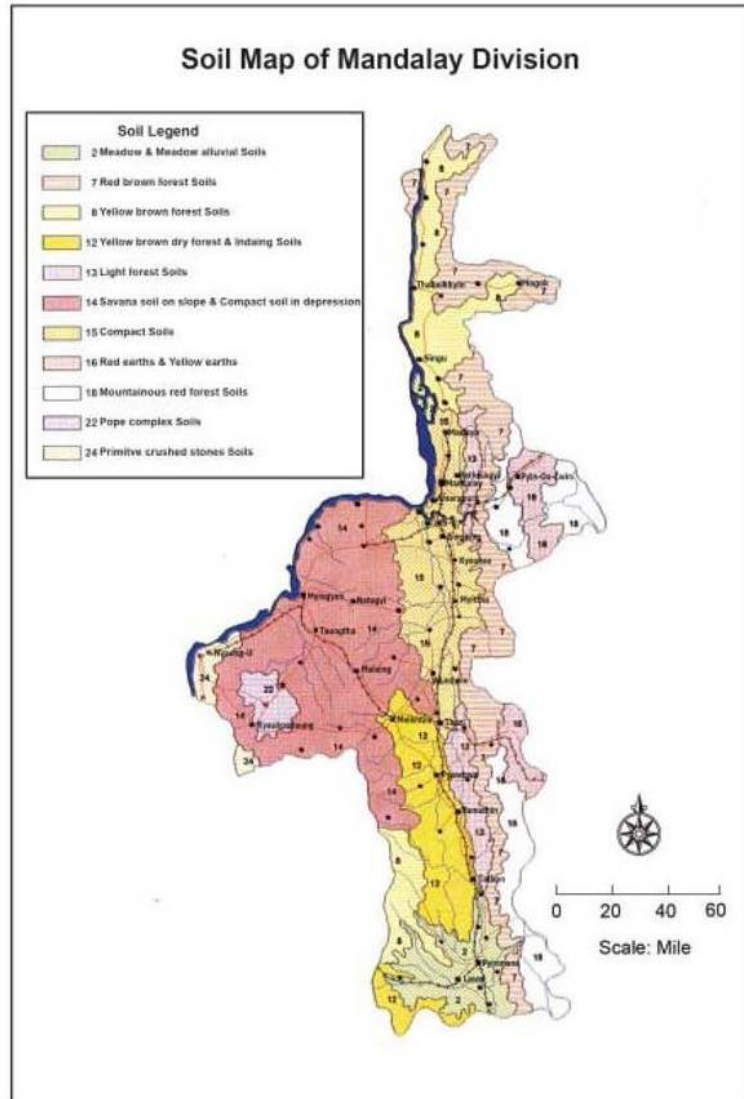


Figure 6.13 Soil Map of Mandalay Division

6.3. Biological Environment

The existing of biological as 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.

Table 6.14 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 area. |
| Wildlife | No wildlife existing within the scope of the study. |

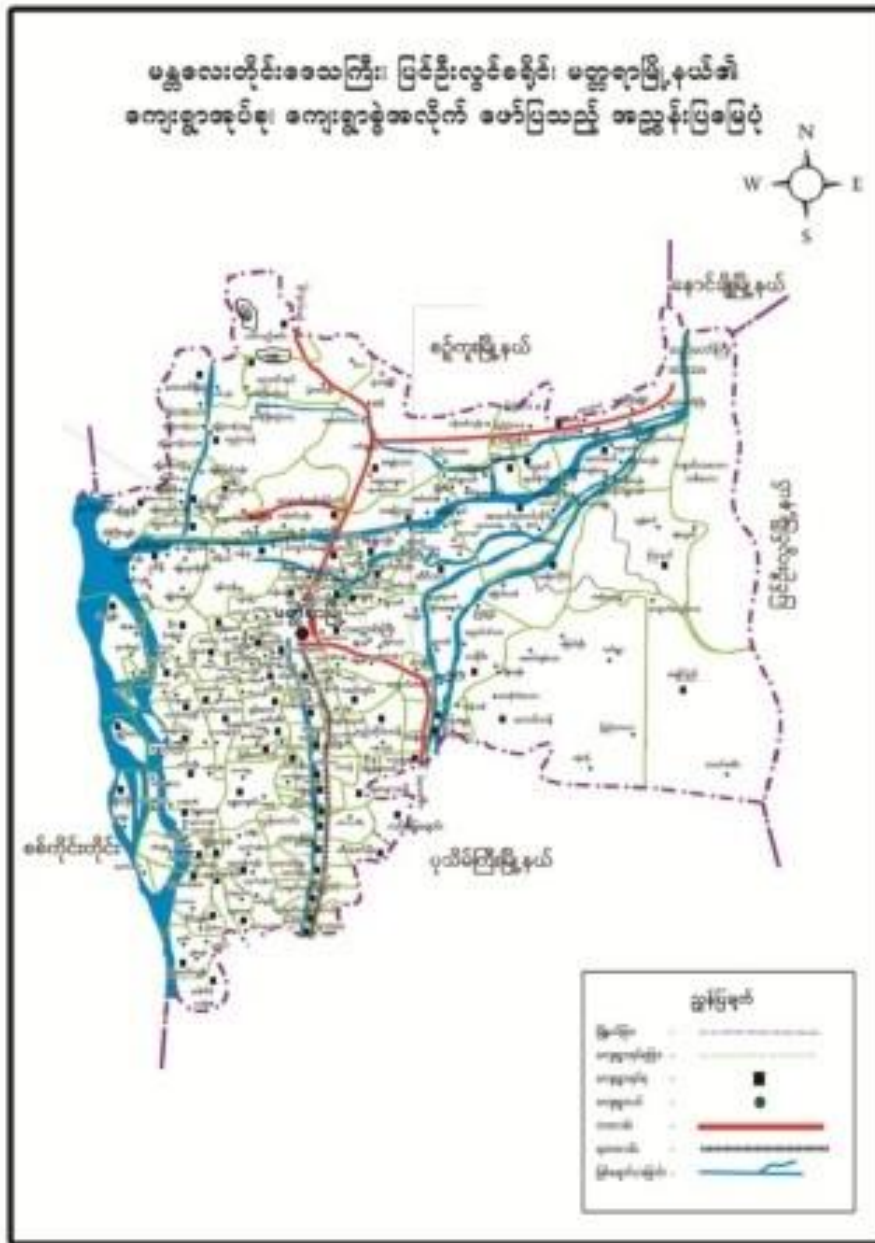
| Biological Resources | Existing Conditions |
|----------------------------|---|
| Natural Vegetation | The vegetation in the project area is dense, and the main vegetation types are low trees, shrubs, shrubs, etc. These vegetation are widely distributed in the surrounding areas and have strong secondary nature. |
| 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 |
| Surrounding Environment | No protected areas existing within the scope of the study |
| Coastal Resources | No coastal resources existing within the scope of the study |

Source: GAD Townships Information (2020) for Madaya Township

6.4. Secondary Township Information Based on General Administration Department

6.4.1. Topography

Madaya Township is situated at the coordinate point of North Latitude between 22° 18' and 22° 28' and East Longitude between 96° 09' and 96° 20'. It locates 21 miles from Mandalay City. It occupies an area of 455 square miles with 25 miles long from East-West direction and 25.75 miles from South-North direction. Madaya Township is bounded by Pyin Oo Lwin Township on the East, Sagaing Township, Wut Lak Township, Sagaing Region on the West and Silt Kuu Township on the North. Moreover, the eastern region of Madaya Township where mountain ranges and forest reserves adjoining Shan State, the northern part of plateau, central and southern region are lowland area where crops can be grown. There are alluvial plain along Ayeyawaddy River and Chaung Ma Gyi Creek.



Source: GAD Townships Information (2020) for Madaya Township

Figure 6.14 Township Map of Madaya Township

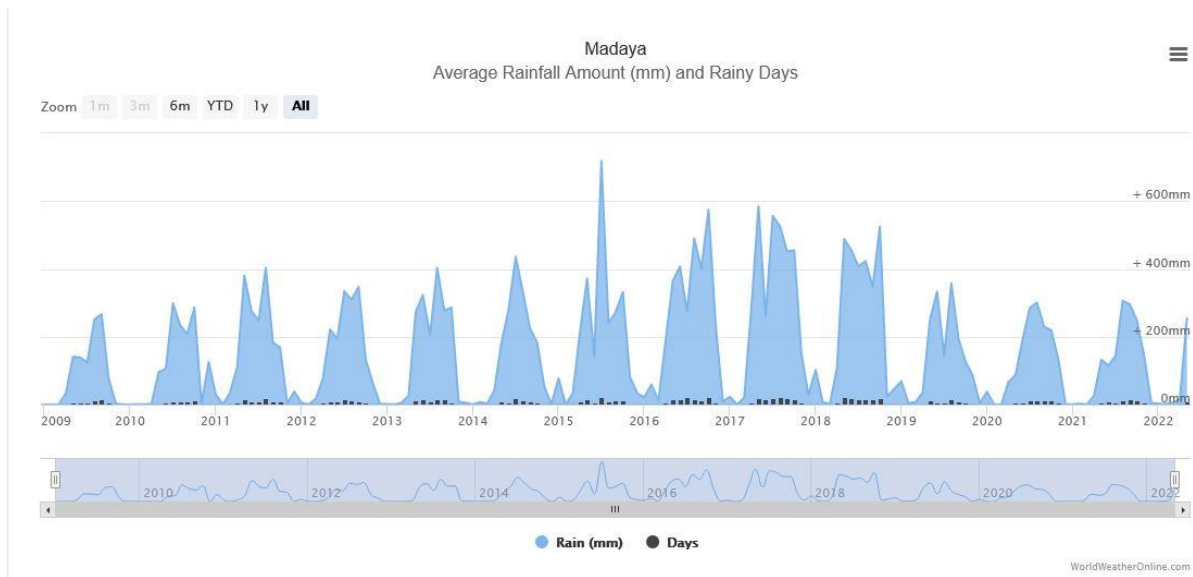
6.4.2. Hydrology

Madaya Township lies 250 ft above sea level. In Madaya Township, Ayeyawaddy River and Myaung River flow from north to south. Chaung Ma Gyi Creek flows from East to West and flows into Ayeyawaddy River. Irrigation water from Sedawgyi Dam flows into township along Mandaly Canal and Yae Nant Thar Canal. There is water transportation along Ayeyawaddy and Myaung River.

6.4.3. Climatology

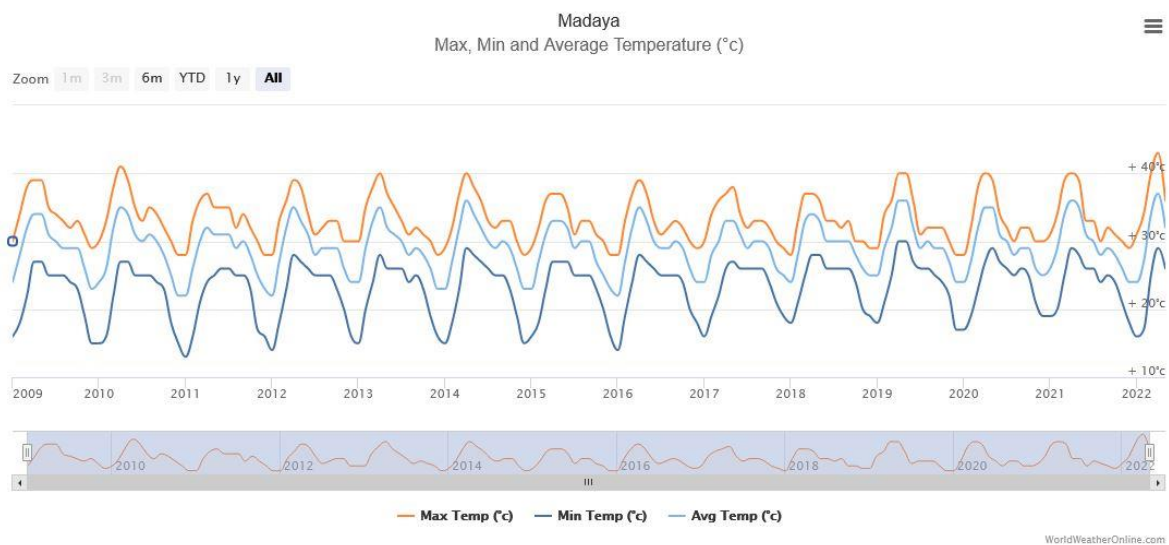
Generally, Myanmar's climate is a tropical monsoon climate. The highest temperature in Central Myanmar during the summer months March and April is above 43.3°C, in Northern Myanmar is about 36.1°C, and on the Shan Plateau is between 29.4°C and 35°C. Temperatures of towns vary according to their locations and elevations.

The climate of Madaya Township is hot and dry. The maximum temperature is 41 °C and minimum temperature of 14.22 °C. The annual rainfall and temperature of Madaya Township is shown in below.



Source: World Weather and Climate Information

Figure 6.15 Average Rainfall and Rainy Days of Madaya Township



Source: World Weather and Climate Information

Figure 6.16 Maximum, Minimum and Average Temperature of Madaya Township

Table 6.15 Annual Rainfall Data and Temperature for Madaya Township

| No. | Year | Rainfall | | Temperature | |
|----------------|------|-------------|---------------------|-------------|-------------|
| | | Rainy Days | Total Rainfall (in) | Summer (°C) | Winter (°C) |
| | | | | Highest | Lowest |
| 1 | 2017 | 64 | 45.25 | 41 | 14.22 |
| 2 | 2018 | 54 | 27.52 | 41 | 13.22 |
| 3 | 2019 | 35 | 23.58 | 41 | - |
| 4 | 2020 | 41 | 27.09 | - | - |
| Average | | 48.5 | 30.86 | - | - |

Source: GAD Townships Information (2020) for Madaya Township

6.4.4. Land Use

Current land use information for Madaya Township is described in the following table according to Government Administrative Department (GAD) information.

Table 6.16 Types of Land Use

| No. | Type of Land Use | Area (Acre) |
|-----|---|----------------|
| 1. | Net Agriculture Land | 138,735 |
| | 1) Paddy Land | 53,403 |
| | 2) Farm Land | 36,583 |
| | 3) Kaing Land | 45,275 |
| | 4) Garden Land | 3,474 |
| | 5) Dahni | - |
| 2. | Fellow | - |
| 3. | Grazing Land | 636 |
| 4. | Indursty Land | 484 |
| 5. | Urban Land | 544 |
| 6. | Rural Land | 6,622 |
| 7. | Other Land | 51,763 |
| 8. | Reserved and Protected Public Forest Land | 38,806 |
| 9. | Wild Forest Land | 11,034 |
| 10. | Wild Land | - |
| 11. | Bare Land | 42,563 |
| | Total | 291,187 |

Source: GAD Townships Information (2020) for Madaya Township

6.4.5. 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 Madaya 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.

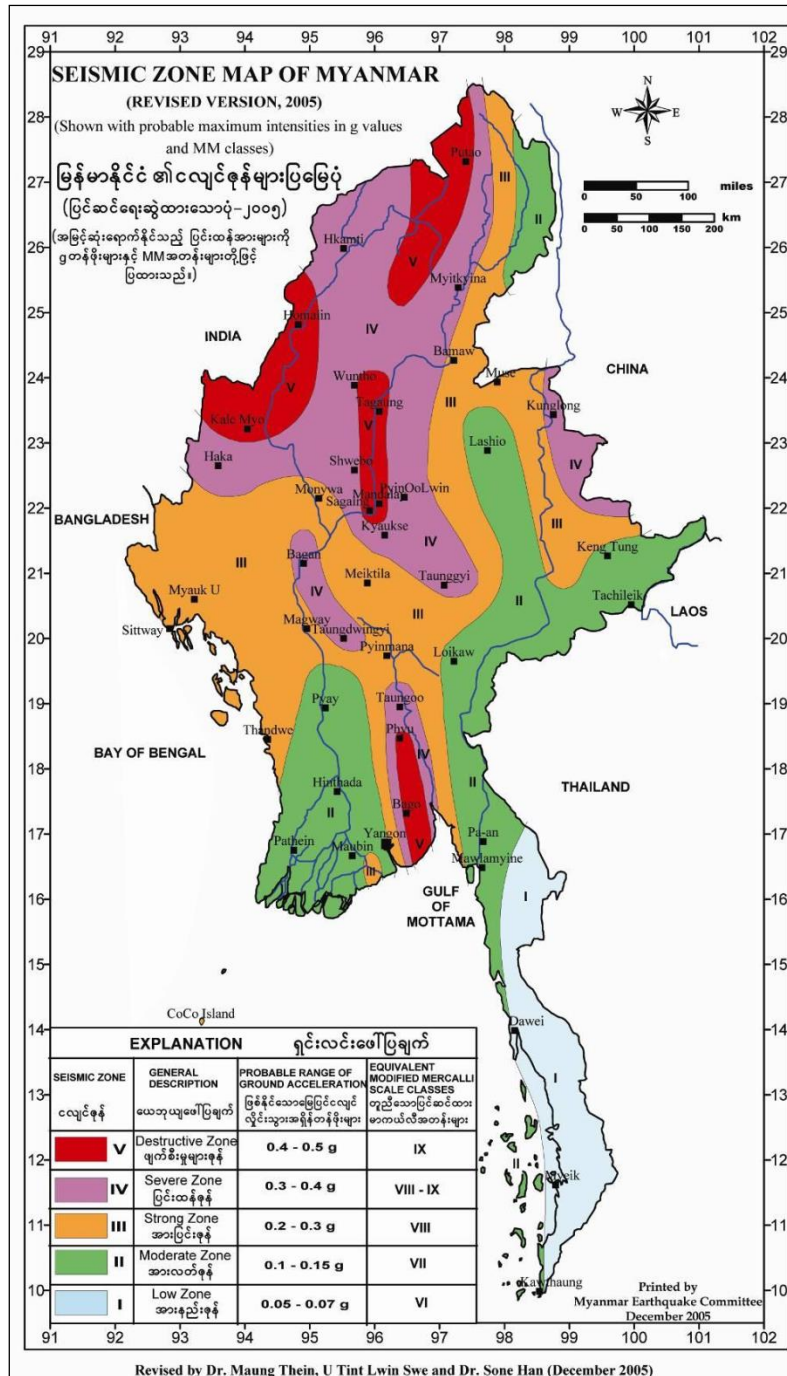


Figure 6.17 Seismic Zone Map of Myanmar

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 1 within 992.

According to this Seismic Zone Map of Myanmar, the proposed project is located within the **Zone IV (Severe 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 reduce earthquake risks.

6.4.6. Natural Disaster

As Madaya Township is a tropical region, fire accident and drought are common natural disaster. In the year of 2019-2020, Madaya Township was faced 5 times of storm, 18 times of flood conditions and 2 times of fire accident. According to Township Information, the losses from natural disaster are as following table.

Table 6.17 Record of Natural Disaster in Madaya Township

| No. | Cases | Frequency | Death/Loss Person | Building Failure | Value of Losses (Million Kyats) |
|--------------|---------------|-----------|-------------------|------------------|---------------------------------|
| 1. | Storm | 5 | 1 | 21 | 3.4022 |
| 2. | Flood Diaster | 18 | - | 70 | 8.15 |
| 3. | Fire Diaster | 2 | - | 3 | 0.19 |
| Total | | 25 | 1 | 94 | 11.7422 |

Source: GAD Townships Information (2020) for Madaya Township

6.4.7. Demographic Profile

Madaya Township is formed with 286 villages, 83 village tracts and 5 wards. The total population in Madaya Township is 255,810 and among them, only 9% are living in urban area and the remaining 91% are living in rural area. Village tracts and households are show in the following tables and population as per gender is shown in figure below.

Table 6.18 House/ Household

| No. | Item | House | Household | Ward | Village Tract | Village |
|--------------|-------|---------------|----------------|----------|---------------|------------|
| 1 | Urban | 5,395 | 9,417 | 5 | - | - |
| 2 | Rural | 51,980 | 95,695 | - | 88 | 286 |
| Total | | 57,375 | 105,112 | 5 | 88 | 286 |

Source: GAD Townships Information (2020) for Madaya Township

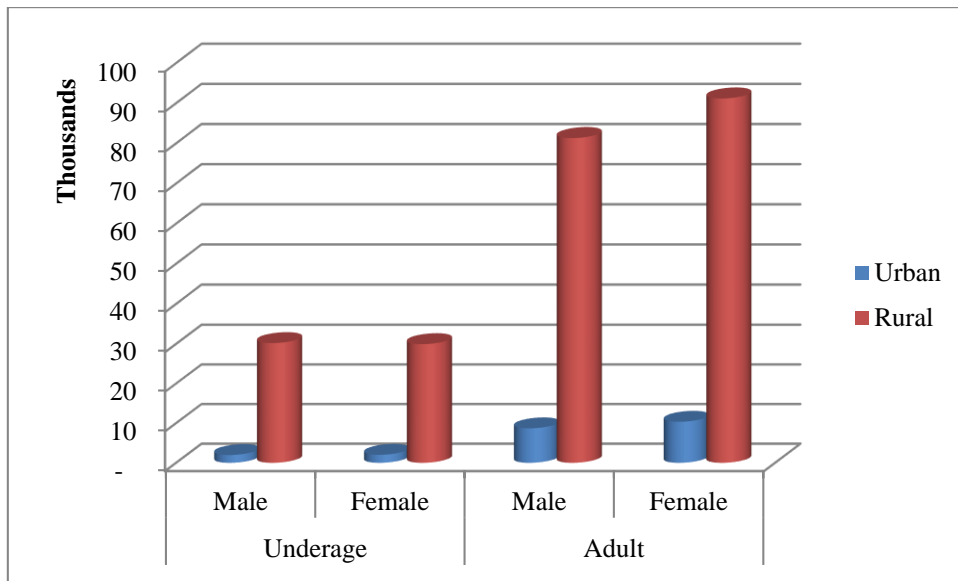


Figure 6.18 Population as per gender

Source: GAD Townships Information (2020) for Madaya Township

6.4.8. Occupation

Occupational status and social economic characteristic for Madaya Township can be seen as follows.

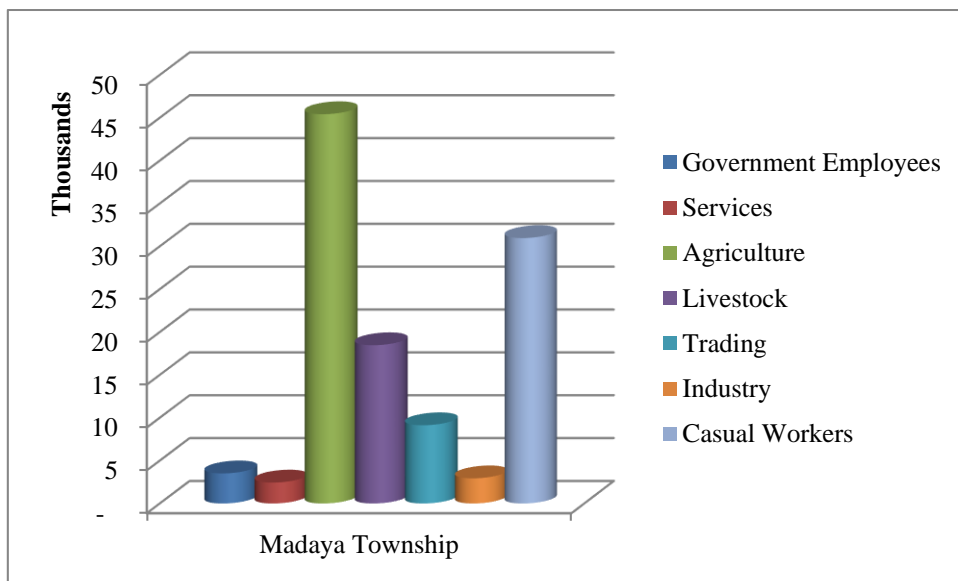


Figure 6.19 Occupation

Source: GAD Townships Information (2020) for Madaya Township

Table 6.19 Social Economic Characteristic in Madaya Township

| No. | Township | No. of workable person | No. of employed person | No. of unemployed person | % of unemployed person |
|-----|----------|------------------------|------------------------|--------------------------|------------------------|
| 1. | Madaya | 119,527 | 115,139 | 4,388 | 3.67 |

Source: GAD Townships Information (2020) for Madaya Township

6.4.9. Education and Literacy

Education system in Myanmar is composed of Basic Education and Higher Education. As per Madaya Township Data, there is no university or college in Madaya Township. The following table states numbers of schools existed in Madaya Township.

Table 6.20 Number of Schools in Madaya Township

| No. | Item | Total Number of School | Total Number of Teachers | Total Number of Students | Ratio of Teachers and Students |
|-----|---------------------------------------|------------------------|--------------------------|--------------------------|--------------------------------|
| 1. | Basic Education High School | 14 | 457 | 12,882 | 1:28 |
| 2. | Branch Basic Education High School | 26 | 477 | 10,677 | 1:22 |
| 3. | Basic Education Middle School | 17 | 206 | 4,238 | 1:21 |
| 4. | Branch Basic Education Middle School | 36 | 395 | 7,714 | 1:20 |
| 5. | Post Primary School | 42 | 349 | 5,291 | 1:15 |
| 6. | Basic Education Primary School | 62 | 285 | 3,325 | 1:11 |
| 7. | Branch Basic Education Primary School | 4 | 8 | 202 | 1:25 |
| 8. | Pre Primary School | 11 | 291 | 8,935 | 1:31 |
| 9. | Monastic School | 12 | 76 | 1,658 | 1:22 |

Source: GAD Townships Information (2020) for Madaya Township

Table 6.21 Literacy Rate in Madaya Township

| No. | Township | Total Population | Population over 15 years | Number of Literate Persons | Literacy Percentage |
|-----|----------|------------------|--------------------------|----------------------------|---------------------|
| 1 | Madaya | 255,810 | 203,803 | 203,803 | 100% |

Source: GAD Townships Information (2020) for Madaya Township

6.4.10. Health Facilities

The demographic structure of Madaya Township including number of hospitals, clinic, rural health department are shown in table below.

Table 6.22 Health Facilities

| No. | Health Facilities | Madaya Township |
|-----|-------------------------|-----------------|
| 1. | Public General Hospital | 7 |
| 2. | Clinics | 26 |
| 3. | Rural Health Department | 8 |
| 4. | Rural Health Division | 37 |

Source: GAD Townships Information (2020) for Madaya Township

6.4.11. Ethnic Minorities

The majority of ethnic group living in Madaya Township is Burmese people about 99% of total population (255,810) and other ethnic group can be seen rarely live in Madaya in the following table.

Table 6.23 Ethnic Minorities

| Ethnic Minorities | Population living | Total Population | Percentage |
|-------------------|-------------------|------------------|------------|
| Kachin | 10 | 255,810 | 0.00391 |
| Kayah | 1 | | 0.00039 |
| Kayin | 14 | | 0.00547 |
| Chin | 4 | | 0.00156 |
| Mon | - | | - |
| Burmese | 255,206 | | 99.76389 |
| Rakhine | 6 | | 0.00235 |
| Shan | 248 | | 0.09695 |
| Pa-O | - | | - |
| Danu | - | | - |
| Taung Yoe | - | | - |
| Pa Laung | - | | - |
| Other | 24 | | 0.00938 |
| Total | 255,513 | 255,810 | 99.88390 |

Source: GAD Townships Information (2020) for Madaya Township

CHAPTER 7 IDENTIFICATION OF ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

7.1. Methodology for Impact Assessments

The impact assessment is executed based on attention to the magnitude, duration, extent and frequency of activities which are going to be carried out and characteristics of the proposed project site. This assessment is qualitative and the significance of each impact is classified into 5 categories in overall. In order to assess the environmental impacts of the proposed project, the following methodology is applied. Each source of impact is assessed by four parameters, magnitude, duration, extent and probability and each assess point have 5 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 the environment | Moderate and will result in minor changes in the environment | High and will result insignificant changes on environment | Very high and will result in permanent changes on environment |
| Duration (D) | 0-1 year | 2-5 year | 6-15 year | Life of operation | Permanent |
| Extent (E) | Limited to the site | Limited to the local area | Limited to the region | National | International |
| Probability (P) | Very improbable | Improbable | Probable | Highly Probable | Definite |

Then, the significant point (SP) is calculated by following formula.

$$\text{Significant Point (SP)} = (\text{Magnitude} + \text{Duration} + \text{Extent}) * \text{Probability}$$

Based on calculated significant point, impacts significance can be categorized as follows:

Impact Significance

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

7.2. Development Phase

Based on the present environmental status and baseline data, onsite measurement had been done to identify and evaluate the potential impacts on the environment of the study area. The proposed solar power plant construction project may affect the physical and social environment during these phases;

Construction Phase: This phase includes the leveling of temporary sites, on-site road construction, civil engineering construction of switchyard, other temporary facilities, PV array foundation and support construction, PV module installation, installation of box inverter equipment and related power distribution devices, poles of overhead transmission line and stringing cables of 3.8 km overhead transmission line connected to T-connection point on the transmission line from Sedawgyi Power Plant substation and Aungpinle Power Plant substation. The construction period of the proposed project is 6 months.

Operation Phase: This phase includes generating electricity from solar energy and distributing to the Sedawgyi Substation through 132 kV overhead transmission line. The operation period of the proposed project is 20 years.

Decommissioning Phase: After operation period, the project proponent will extend operation period of the project many times to generate electricity from solar energy. Therefore, impacts identification, impacts assessment and mitigation measures formulating for decommissioning phase of the project is excluded in this Environmental Management Plan Report. E Guard Environmental Services Co., Ltd has consulted that the project owner must report project decommission plan to Environmental Conservation Department for prior permission.

7.3. Identification of Impact

Due to the implementation of the proposed project, there may be some positive and negative impacts in the surrounding environment of the project site due to the implementation of the project. The possible environmental impacts are identified based on the analysis of environmental baseline information and project activities. Most of the identified impacts have been quantified to the extent possible on the professional judgment.

Potential impacts from the various activities of the proposed project can be categorized as follows:

- | | |
|-------------------------|---|
| Positive Impacts | <ul style="list-style-type: none">✓ Employment Opportunities✓ Business Opportunities✓ Carbon Emission Reduction and Resources Conservation✓ Green Economy✓ Growing Investment in Solar Energy in Myanmar✓ Revenue to National and Local Government✓ CSR Developments |
| Negative Impacts | <ul style="list-style-type: none">✓ Impact on Environmental Resources<ul style="list-style-type: none">• Air Quality• Noise and Vibration• Water Quality• Soil Quality✓ Impact on Biological Environment<ul style="list-style-type: none">• Impacts on Flora• Impacts on Fauna✓ Impact on Human Resources<ul style="list-style-type: none">• Impact on Occupational Health and Safety |

- Impact on Community Health and Safety
- Fire Hazard
- Visual Impact
- Traffic
- ✓ Impact of Waste Generation
 - Solid Waste Generation Impacts
 - Liquid Waste Generation Impacts
 - Hazardous Waste Generation Impact

7.4. Potential Positive Impact in Construction Phase

7.4.1. Employment Opportunities

Providing job opportunities for civil engineers, electrical engineers, surveyors, electricians, machine operators, drivers, bricklayers, carpenters and general labors are one of the positive impacts of the project. Other service providers such as security services, cleaning and waste collection are will benefit indirectly. Especially, the proposed project will create job opportunities as 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 of the project. The net effect of job opportunities creation is livelihood and living standard improvement of local community and poverty reduction.

7.4.2. Business Opportunities

The proposed project will also lead to upgrading the economic status of the local community because 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. Additionally, the implementation of the project will also provide several business opportunities for small-scale traders and vendors of local community such as food stalls and cold drink stalls near the project site.

7.5. Potential Positive Impact in Construction Phase

7.5.1. Employment Opportunities

Providing job opportunities for several workers such as electrical engineers, electricians, managers, cleaners, securities and drivers is one of the positive impacts due to the operation of the project. Among them, local workers and local graduates will have the chance to obtain job opportunities.

7.5.2. Carbon Emission Reduction and Resources Conservation

Electric power generation from solar energy emit insignificant carbon into the atmosphere. This reduces carbon emission which compared to other types of 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.

7.5.3. 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 cost of solar power plant implementation continues to decline, it is expected that solar energy systems become more prevalent and lead to green economy.

7.5.4. Growing Investment in Solar Energy in Myanmar

The proposed project is anticipated to have benefits to society since the use of photovoltaic Power Plants in Myanmar is not widespread currently. The success implementation of this proposed solar power project will raise confidence for investors and aid agencies to develop further solar and other renewable projects in Myanmar. Implementations of such technology are able to increase the awareness of this alternative electricity generation and could lead to an increased market share in future. Ultimately, 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 CO₂ emission of Myanmar by substituting energy from the predominating coal-fired Power Plants. The flow on effects for the consumer will be lower and more stabilized long run electricity prices than would otherwise have been seen.

7.5.5. 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 as the positive impact.

7.5.6. CSR Developments

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

7.6. Potential Negative Impact on Environmental Resources

7.6.1. Impact on Air Quality

1) Ground Mounted Solar Power Plant

Construction Phase: Exhaust gases, including CO, CO₂, NO₂ and SO₂, will be emitted due to operating of heavy construction machines and vehicles such as wheel loaders, excavators, bulldozers, dump trucks, vibrating rollers, soil compactors and concrete batching plant as well as operating generators. Dust will be generated because of site clearance, excavation, leveling,

material transportation, construction activities, and operation of concrete batching plant and moving of construction vehicles. 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. Lump of sand within construction area may lead to cause dust emission to the air.

Operation Phase: No emissions are expected to be released during the operation phase, due to the fact that solar PV power plants do not release greenhouse gases or any toxic pollutants during their operation. However, gaseous emission is anticipated from office vehicles, generators, refrigerators and air conditioning system of the project and the impact is expected to be insignificant.

2) Overhead Transmission line

Construction phase: Dust and gaseous emissions can cause due to operating and movement of construction vehicles and transportation vehicles. Site clearing, leveling and earth moving activities for electricity pole construction of transmission line can also generate dust.

Operation phase: Operating and movement of maintenance vehicles can cause dust and gaseous emission.

7.6.2. Impact on Noise and Vibration

1) Ground Mounted Solar Power Plant

Construction Phase: Noise and vibration can be generated by construction activities such as earth working, excavation, backfilling, installation of PV panel, unloading electrical equipment, mobilization of heavy construction vehicles and equipment such as bulldozers, excavators, wheel loaders, dump trucks, single drum vibrating roller and small truck. Due to movement of vehicles for transporting construction material, waste disposal to/from the construction site will also cause noise pollution.

Operation Phase: During operation period, noise will be only generated from operating of generator, transformers, inverters and movement of maintenance vehicles come to office room. However, this impact is insignificant.

2) Overhead Transmission line

Construction Phase: Improper unloading electrical equipment and cables for overhead transmission line will generate noise and vibration. Operating and movement of construction machines and vehicles for erecting poles and stringing cables can also cause noise pollution.

Operation Phase: During the operation phase, main source of noise generation is from maintenance vehicles; however, this impact is insignificant.

7.6.3. Impact on Water Quality

1) *Ground Mounted Solar Power Plant*

Construction Phase: There is no surface water such as rivers, streams, lakes or reservoirs within the scope of the study area. During the construction phase, groundwater may be contaminated by runoff of wastewater from earth working and construction activities during rainy days. Oil spillage and leakage from construction machines, construction vehicles, transportation vehicles and generators will contaminate groundwater. Wastewater discharge from domestic usage and sewage disposed of from toilets used by construction workers can also lead to groundwater pollution. Accidental oil spillage and leakage from improper fuel storage, refueling and machineries maintenance area, improper temporary PV modules storage, damaged PV modules released from improper installing, can also cause groundwater pollution by penetrating into groundwater layer. Groundwater usage demand will also increase for site clearing, site preparation, water spraying activities and other water required construction activities and construction workers.

Operation Phase: During the operation phase, groundwater can be contaminated by oil and waste spillage and leakage from improper waste storage, fuel storage and refueling. 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, if cracked. Water consumption will also increase for cleaning PV modules in order to enhance their efficiency for generating electricity.

2) *Overhead Transmission Line*

Construction Phase: No significance impact is expected during construction phase.

7.6.4. Impact on Soil Quality

1) *Ground Mounted Solar Power Plant*

Construction Phase: Construction activities such as site preparation and leveling activities are expected to result in disturbance of soil structure and formation. Especially, soil excavation for the foundation of tracking brackets, booster station, multiple-use building and other buildings in the project 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. The other source of impact to soil is waste generation from construction activities like concrete residuals, accidental leakage of fuel, oil, or chemicals stored within a bunded area causing direct contamination to soil which may degrade lower layers of soil depending on the amount of spills. 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.

Operation Phase: Leakage from improper storage of fuel and other chemicals and improper waste storage, accidental spillage of lubricant, oil spill from vehicle which come to office room that may potentially cause soil degradation. Soil pollution may cause by 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, if cracked.

2) Overhead Transmission Line

Construction Phase: During the construction phase, 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.

7.7. Potential Impact on Biological Environment

7.7.1. Impacts on Flora

1) Ground Mounted Solar Power Plant

Construction Phase: The vegetation in the project area is dense, and the main vegetation types are low trees, shrubs, etc. These vegetation are widely distributed in the surrounding areas and have strong secondary nature. After preliminary site survey, the plants affected by the construction of PV power station are mostly local common species, which are distributed in a large number in the surrounding areas. The construction of the project will not affect the existing flora in this area. It will only lead to the loss of population of individual species.

2) Overhead Transmission Line

Construction Phase: Overhead transmission line will pass through mainly agricultural and farm land. Therefore, only bushes and small trees are found along the route of overhead transmission line.

7.7.2. Impact on Fauna

1) Ground Mounted Solar Power Plant

Construction Phase: There are no large mammals recorded in the project area, mainly rodents and small animals, and the implementation of the project will not lead to the disappearance of mammals in the project area or a sharp drop in population; In the long run, the species diversity of terrestrial animals in the project area will not change greatly. However, it may cause temporary disturbance to resident birds due to noise, dust and particulate emissions.

2) Overhead Transmission Line

Construction Phase: During foundation work for pole of transmission line, there may cause temporary disturbance to resident birds due to noise, dust and particulate emissions.

7.8. Potential Impact on Human Resources

7.8.1. Impact on Occupational Health and Safety

1) Ground Mounted Solar Power Plant

Construction Phase: The construction activities include site preparation, infrastructure utilities installation, building structures. As a result, will be potential impacts on workers' health and safety due to exposure to risks through construction activities that lead to accidents causing injuries and death. Construction workers' safety could be also affected by lack of adequate Personal Protective Equipment (PPEs). Tripping; falling from heights may cause because the installation of solar module will involve operation of cranes and other mechanical lifting equipment. Potential fire hazard may occur due to hot work, and electric shocks due to failure in electrical installation. The working at height has the risks of falling from the height and working on live wires carrying power has dangers of electric shock and electrocution. Site workers may suffer from health risks like injuries such as: lifting, lowering, pushing, pulling and carrying; temporary or hearing loss which usually comes from noise generated from machinery used for excavation and from compressors and concrete mixers etc.; heat stress and working during high temperatures; dermatitis that can arise from contact with substances that cause dermatitis such as wet cement, solvents used in paints., etc. Communicable diseases may break out during construction period due to a certain number of migrant construction workers will come into the project site for construction. 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.

Operation Phase: The common occupational health and safety impacts are falling from height related to ladder for maintenance which can cause fatal or permanent disabling injury. The electromagnetic field can be occurred due to the operations of PV modules and booster station, transformer, the commissioning of the inverter rooms and transmission line which involve live power lines. 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. Workers' safety could be affected by lack of adequate Personal Protective Equipment (PPEs) and lack of using lockout-tagout system while repair and maintenance for electrical equipment of solar power plant and overhead transmission line. 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.

2) Overhead Transmission Line

Construction Phase: The possible accidental injury sources during construction phase are falling from height related to ladder and poles of overhead transmission line for poles erection and cable stringing which can cause fatal or permanent disabling injury. Use of lifting equipment for overhead transmission line stringing can also impact on occupational health and safety. 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 can pose

temporary hazard such as physical contact, spill, dust emission, noise and vibration. Lack of adequate Personal Protective Equipment (PPEs) and warning signs can also impact on construction workers' safety.

Operation Phase: During the operation phase, falling from height related to poles of overhead transmission line for maintenance activities is main occupational health and safety impact. Other impact includes lack of adequate Personal Protective Equipment (PPEs) and lockout-tagout system while repair and maintenance for overhead transmission line.

7.8.2. Impact on Community Health and Safety

1) Ground Mounted Solar Power Plant

Construction Phase: There will be mobilization of construction equipment and transportation of construction materials to/from construction site using the existing village's concrete road as project's access road. At that moment, local traffic jam and number of traffic accident may be increased and will be common community health and safety impacts. Residents near project area may be affected physically and mentally due to noise and vibration from construction activities and movement of materials transportation vehicles. However, these impacts are insignificant because of short construction period and certain distance from nearby villages to project site.

Operation Phase: During the operation phase, risk of accidents and exposure to 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. Electric shock can also be anticipated due to entering into the project site without permission and climbing overhead transmission line by nearby villagers due to absent of proper notice board, warning sign board.

2) Overhead Transmission Line

Construction Phase: Overhead transmission line's cable stringing and poles erection along the route is main impact of community health and safety. Local communities and villagers near route of transmission line may expose to dust emission, noise and vibration impact due to operating and movement of construction machines and vehicles.

Operation Phase: During the operation phase, health and safety impacts to local communities and villagers near or adjacent to the transmission lines will be in terms of risk of accidents and exposure to electromagnetic fields due to climbing up poles of overhead transmission by nearby villagers, absence of proper notice board and proper warning sign board .

7.8.3. Fire Hazard

1) Ground Mounted Solar Power Plant

Construction Phase: Improper storage and handling of fuel, careless maintenance of electrical equipment, usage of damaged electrical equipment and cables or other related construction equipment, poor installation of electrical equipment and open burning on site can cause fire hazards.

Operation Phase: During the operation phase, improper and irregular maintenance of electrical equipment of ground mounted solar power plant and overhead transmission line 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.

2) Overhead Transmission Line

Operation Phase: During the operation phase, improper and irregular maintenance of overhead transmission line is main fire hazard impact. Careless open burning near or below the transmission lines by nearby villagers may cause fire hazard impact.

7.8.4. Visual Impact

1) Ground Mounted Solar Power Plant

Construction Phase: Visual impacts will also arise due to the presence of project infrastructure such as labor camp, batching plant, construction material storage area, temporary site office and erection and commissioning of various project components in the project footprints. The construction activities are likely to create a visual intrusion and a disruption to aesthetics including unused and damaged materials lay down, excavation. There are no close communities that would be within the visual radius of the project. Hence, the visual effects of the construction will be of low significance within the project area and potentially the employees.

Operation Phase: The operation of Photovoltaic solar power plant can cause some serious visual impacts as the local community is not used to seeing steel frames with solar panels. Besides, glint and glare from PV modules can effect on nearby local communities under particular conditions although, there is a certain distance from project site to local communities.

2) Overhead Transmission Line

There will no significant visual impact not only during construction, also operation phase.

7.8.5. Traffic

1) Ground Mounted Solar Power Plant

Construction Phase: During the Construction Phase, traffic is expected to increase to a certain degree due to the transport of equipment and slow moving heavy vehicles transporting material to and from the site through the existing infrastructure, especially the road network and local traffic. Vehicle traffic can cause congestion on local road and within the project site and thereby leading to potential accidents. The above potential traffic impacts can possible occurs during

construction period, especially during working hours and this is considered as a short-term impact. This impact is likely to happen but is not anticipated to cause any permanent effect on the receiving environment.

Operation Phase: Impact from traffic is not expected to occur during the operation phase due to minimal number of personnel present within the project site. Therefore, increased traffic load is not considered a significant impact. As a result, the impact is very low.

2) Overhead Transmission Line

Construction Phase: Traffic is expected to increase to a certain degree due to transportation of heavy construction vehicles conveying construction materials and electrical equipment to construction location of pole for transmission line through the existing infrastructure, especially the road network and local traffic. Therefore, traffic congestion will occur during the foundation works and pole installations and cable stringing period, but it will temporary and the impact is not significant.

Operation Phase: There will no significant impact on traffic during operation period.

7.9. Impact of Waste Generation

7.9.1. Solid Waste Generation Impact

1) Ground Mounted Solar Power Plant

Construction Phase: Wastes will be generated at various stages of project development. The primary forms of solid waste will be cement paper bags, broken bricks, concrete residual waste, scrap metals, glass, woods from construction activities and cutting trees. Improper solid waste management may lead to impact on visual environment and soil because those wastes may contain hazardous substance such as cement and other chemical substances, in addition to health and safety of workers. Construction soil waste will be generated by site clearance; earth working and leveling activities as well as vegetable 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, communal waste from construction workers camp are other sources of solid waste generation. Additionally, night soil may be generated from the construction base camp.

Operation Phase: During the operation phase, there is no operation solid waste which is 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. Waste can be generated in case of inappropriate behavior by personnel like careless littering.

2) Overhead Transmission Line

Construction phase: Vegetation debris will be generated during site clearance along right of way for overhead transmission line.

7.9.2. Liquid Waste Generation

1) Ground Mounted Solar Power Plant

Construction Phase: During the construction phase, cleaning construction machines and construction vehicles, concrete mixing plant within the project site will generate liquid waste. Sanitary wastewater will be discharged of from toilet depending on the number of workers involved. Domestic liquid waste from construction workers camp will be also discharged.

Operation Phase: During the operation phase, main source of operation liquid waste is cleaning activities for PV modules to promote their efficiency for electricity generation. Sanitary wastewater will be discharged of from water closet. Domestic liquid waste from multiple used building will be discharged.

2) Overhead Transmission Line

There is no liquid waste generated from not only construction but also operation activities of overhead transmission line.

7.9.3. Hazardous Waste Generation

1) Ground Mounted Solar Power Plant

Construction Phase: 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. Spillage or leakage of diesel and engine oil from vehicles and machine may release as hazardous waste.

Operation Phase: 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. Hazardous waste like waste oil and lubricants and oil containing jutes and rags will be generated during maintenance activities.

2) Overhead Transmission Line

There is no hazardous waste generated from not only construction but also operation activities of overhead transmission line.

7.10. Impact Significance Level Calculation during Construction Phase and Operation Phase

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 7.2 Calculation of Impact Significance Level for Ground Mounted Solar Power Plant during Construcion and Operation Phase

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----------|---|-----------|----------|--------|-------------|--------------|---------------------|
| 1. | Impact on Air Quality | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Emission of CO, CO₂, NO₂ and SO₂, due to operating of heavy construction machines and vehicles Dust generation because of site clearance, excavation, leveling, material transportation, construction activities. Gaseous emission and dust generation while delivering electrical equipment such as PV modules, tracking brackets, inverters, transformers and construction materials to the project site Lump of sand within construction area may lead to cause dust emission to the air. | 4 | 1 | 2 | 5 | 35 | Moderate |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Gaseous emission from office vehicles, maintenance vehicles, generators, refrigerators and air conditioning system. | 2 | 4 | 2 | 3 | 24 | Low |
| 2. | Impact on Noise and Vibration | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Noise and vibration can be generated by construction activities, PV panel installation, unloading electrical equipment, mobilization of heavy construction vehicles and equipment. | 4 | 1 | 2 | 5 | 35 | Moderate |

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----|--|-----------|----------|--------|-------------|--------------|---------------------|
| | <ul style="list-style-type: none"> Due to movement of vehicles for transporting construction material, waste disposal to/from the construction site will also cause noise pollution. | | | | | | |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Operating generators, movement of management vehicles and maintenance vehicles. Operating transformers and inverters. | 2 | 4 | 1 | 3 | 21 | Low |
| 3. | Impact on Water Quality | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Groundwater contamination by runoff of wastewater from earth working and construction activities during rainy days. Oil spillage and leakage from construction machines, construction vehicles, transportation vehicles and generators may cause groundwater contamination. Wastewater discharge from domestic usage and sewage disposed of from toilets used by construction workers. Accidental oil spillage and leakage from improper fuel storage, refueling and machineries maintenance area. Improper temporary PV modules storage, damaged PV modules released from improper installing, can also cause groundwater pollution by penetrating into groundwater layer. | 3 | 1 | 1 | 5 | 25 | Low |

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----------|---|-----------|----------|--------|-------------|--------------|---------------------|
| | <ul style="list-style-type: none"> Increase in usage of groundwater for site clearing, site preparation, water spraying activities and other water required construction activities and construction workers. | | | | | | |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Groundwater contamination by oil and waste spillage and leakage from improper waste storage, fuel storage and refueling. Improper handling of damaged PV modules due to improper cleaning and maintenance activities Uninstalled lifespan-expired PV modules can cause groundwater pollution because these PV modules release toxic chemicals, if cracked. Water consumption will also increase for cleaning PV modules in order to enhance their efficiency for generating electricity. | 4 | 4 | 2 | 4 | 40 | Moderate |
| 4. | Impact on Soil Quality | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Soil structure and formation will be disturbed due to site preparation and leveling activities Soil excavation for the foundation of tracking brackets, booster station, 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. | 4 | 1 | 1 | 5 | 30 | Moderate |

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----------|---|-----------|----------|--------|-------------|--------------|---------------------|
| | <ul style="list-style-type: none"> Waste generation from construction activities like concrete residuals, accidental leakage of fuel, oil causing direct contamination to soil which may degrade lower layers of soil depending on the amount of spills. Improper temporary PV modules storage damaged PV modules due to improper installing, improper waste storage, and fuel storage, refueling and machineries maintenance area. | | | | | | |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Soil degradation due to leakage from improper storage of fuel and other chemicals and improper waste storage, accidental spillage of lubricant, oil spill from office vehicle. Soil pollution by 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, if cracked. | 3 | 4 | 1 | 3 | 24 | Low |
| 5. | Impact on Flora and Fauna | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> The construction of PV power station will lead to the loss of population of individual local common species. Impact is insignificant due to those species are distributed in a large number in the surrounding areas. Construction activities may cause temporary disturbance to resident birds due to noise, dust and particulate emissions. | 2 | 1 | 1 | 3 | 12 | Very Low |
| 6. | Impact on Occupational Health and Safety | | | | | | |
| | <p>Construction Phase</p> | 5 | 1 | 1 | 4 | 28 | Low |

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----|--|-----------|----------|--------|-------------|--------------|---------------------|
| | <ul style="list-style-type: none"> • Potential impacts on workers' health and safety due to exposure to risks through construction activities that lead to accidents causing injuries and death. • Lack of adequate Personal Protective Equipment (PPEs) • Tripping; falling from heights may cause because the installation of solar module will involve operation of cranes and other mechanical lifting equipment. • Potential fire hazard may occur due to hot work, and electric shocks due to failure in electrical installation. • Risks: falling from the height and working on live wires carrying power has dangers of electric shock and electrocution. • Health risks like injuries such as: lifting, lowering, pushing, pulling and carrying; • Temporary or hearing loss which usually comes from noise generation • Heat stress and working during high temperatures; • Dermatitis that can arise from contact with substances that cause dermatitis such as wet cement, solvents used in paints. etc. • Communicable diseases may break out during construction period due to a certain number of migrant construction workers will come into the project site for construction. • COVID-19 virus infection during Pandemic period, if they do not follow strictly the instructions of Ministry of Health and Sports. | | | | | | |
| | Operation Phase | 5 | 4 | 1 | 4 | 40 | Moderate |

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----|---|-----------|----------|--------|-------------|--------------|---------------------|
| | <ul style="list-style-type: none"> Falling from height related to ladder for maintenance which can cause fatal or permanent disabling injury. The electromagnetic field can be occurred due to the operations of PV modules and booster station, transformer, the commissioning of the inverter rooms and transmission line which involve live power lines. Lack of adequate Personal Protective Equipment (PPEs) and lack of using lockout-tagout system while repair and maintenance for electrical equipment of solar power plant and overhead transmission line. COVID-19 virus infection during Pandemic period, if they do not follow strictly the instructions of Ministry of Health and Sports. | | | | | | |
| 7. | Impact on Community Health and Safety | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Mobilization of construction equipment and transportation of construction materials to/from construction site using the existing village's concrete road as project's access road. At that moment, local traffic jam and number of traffic accident may be increased and will be common community health and safety impacts. Residents near project area may be affected physically and mentally due to noise and vibration from construction activities and movement of materials transportation vehicles. | 4 | 1 | 2 | 4 | 28 | Low |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Risk of accidents and exposure to electromagnetic field can be occurred due to the operations of PV modules and switchyard, | 4 | 4 | 2 | 4 | 40 | Moderate |

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----------|---|-----------|----------|--------|-------------|--------------|---------------------|
| | <ul style="list-style-type: none"> Electric shock can also be anticipated due to entering into the project site without permission Absent of proper notice board, warning sign board. | | | | | | |
| 8. | Fire Hazard Impact | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Improper storage and handling of fuel, careless maintenance of electrical equipment, Usage of damaged electrical equipment and cables or other related construction equipment, Poor installation of electrical equipment and Open burning on site can cause fire hazards. | 4 | 1 | 1 | 4 | 24 | Low |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Improper and irregular maintenance of electrical equipment of ground mounted solar power plant. Fuel storage area, improper fuel handling, overloads, heating from bunched cables and damaged cables at multiple-use building. | 4 | 4 | 2 | 4 | 40 | Moderate |
| 9. | Visual Impact | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> The presence of project infrastructure such as labor camp, batching plant, construction material storage area, temporary site office and erection and commissioning of various project components in the project footprints. Visual intrusion and disruption due to construction activities, unused and damaged materials lay down. | 2 | 1 | 1 | 2 | 8 | Very Low |

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|------------|--|-----------|----------|--------|-------------|--------------|---------------------|
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Photovoltaic solar power plant can cause some serious visual impacts as the local community is not used to seeing steel frames with solar panels. Glint and glare from PV modules can effect on nearby local communities. | 3 | 4 | 2 | 2 | 18 | Low |
| 10. | Traffic | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Traffic is expected to increase to a certain degree due to the transport of equipment and slow moving heavy vehicles transporting material to and from the site through the existing local traffic road. Vehicle traffic can cause congestion on local road and thereby leading to potential accidents. | 3 | 1 | 2 | 3 | 18 | Low |
| 11. | Solid Waste Generation Impact | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> The primary forms of solid waste will be cement paper bags, broken bricks, concrete residual waste, scrap metals, glass, woods from construction activities and cutting trees. Improper solid waste management may lead to impact on visual environment and soil, in additional to health and safety of workers because those wastes may contain hazardous substance such as cement and other chemical substances. Construction soil waste and vegetable debris will be generated by site clearance; earth working and leveling activities. | 4 | 1 | 1 | 5 | 30 | Moderate |

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|------------|---|-----------|----------|--------|-------------|--------------|---------------------|
| | <ul style="list-style-type: none"> Domestic solid wastes such as garbage and organic waste, communal waste from construction workers camp. Night soil may be generated from the construction base camp. | | | | | | |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Domestic solid waste such as garbage, rejected office materials and organic waste from multiple-use building are common solid wastes generation. Waste can be generated in case of inappropriate behavior by personnel like careless littering. | 2 | 4 | 1 | 3 | 21 | Low |
| 12. | Liquid Waste Generation Impact | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Cleaning construction machines and construction vehicles, concrete mixing plant within the project site Sanitary wastewater will be discharged of from toilet depending on the number of workers involved. Domestic liquid waste from construction workers camp will be also discharged. | 3 | 1 | 1 | 3 | 15 | Very Low |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Liquid waste discharge of from cleaning activities of PV modules to promote their efficiency for electricity generation. Sanitary wastewater will be discharged of from water closet depending on the number of workers involved. | 4 | 4 | 1 | 4 | 36 | Moderate |

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|------------|--|-----------|----------|--------|-------------|--------------|---------------------|
| | <ul style="list-style-type: none"> Domestic liquid waste from multiple used building will be also discharged. | | | | | | |
| 13. | Hazardous Waste Generation Impact | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Damaged PV modules due to improper installation are common hazardous waste generation of the proposed project because PV modules contain toxic chemicals. Spillage or leakage of diesel and engine oil from vehicles and machine may release as hazardous waste. | 4 | 1 | 1 | 4 | 24 | Low |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> 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. Waste oil and lubricants and oil containing jutes and rags will be generated during maintenance activities. | 3 | 4 | 1 | 4 | 32 | Moderate |

Table 7.3 Calculation of Impact Significance Level for Overhead Transmission Line during Construcion and Operation Phase

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----------|---|-----------|----------|--------|-------------|--------------|---------------------|
| 1. | Impact on Air Quality | | | | | | |
| | <i>Construction Phase</i> <ul style="list-style-type: none"> Dust and gaseous emissions due to operating and movement of construction vehicles and transportation vehicles. Site clearing, leveling and earth moving activities for electricity pole construction of transmission line can also generate dust. | 4 | 1 | 2 | 3 | 21 | Low |
| | <i>Operation Phase</i> <ul style="list-style-type: none"> Operating and movement of maintenance vehicles can cause dust and gaseous emission. | 2 | 4 | 2 | 3 | 24 | Low |
| 2. | Impact on Noise and Vibration | | | | | | |
| | <i>Construction Phase</i> <ul style="list-style-type: none"> Improper unloading electrical equipment and cables for overhead transmission line will generate noise and vibration. Operating and movement of construction machines and vehicles for erecting poles and stringing cables can also cause noise pollution. | 3 | 1 | 2 | 3 | 18 | Low |
| 3. | Impact on Soil Quality | | | | | | |
| | <i>Construction Phase</i> <ul style="list-style-type: none"> 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. | 3 | 1 | 1 | 3 | 15 | Low |
| 4. | Impact on Flora and Fauna | | | | | | |

| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----------|--|-----------|----------|--------|-------------|--------------|---------------------|
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Overhead transmission line will pass through mainly agricultural and farm land. Therefore, only bushes and small trees are found along the route of overhead transmission line. Temporary disturbance to resident birds due to noise, dust and particulate emissions during foundation work for pole of transmission line. | 2 | 1 | 2 | 3 | 15 | Low |
| 5. | Impact on Occupational Health and Safety | | | | | | |
| | <p>Construction Phase</p> <ul style="list-style-type: none"> Falling from height related to ladder and poles of overhead transmission line for poles erection and cable stringing which can cause fatal or permanent disabling injury. Use of lifting equipment for overhead transmission line stringing 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 can also impact on construction workers' safety. | 4 | 1 | 1 | 4 | 24 | Low |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> 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. | 4 | 4 | 1 | 3 | 27 | Low |

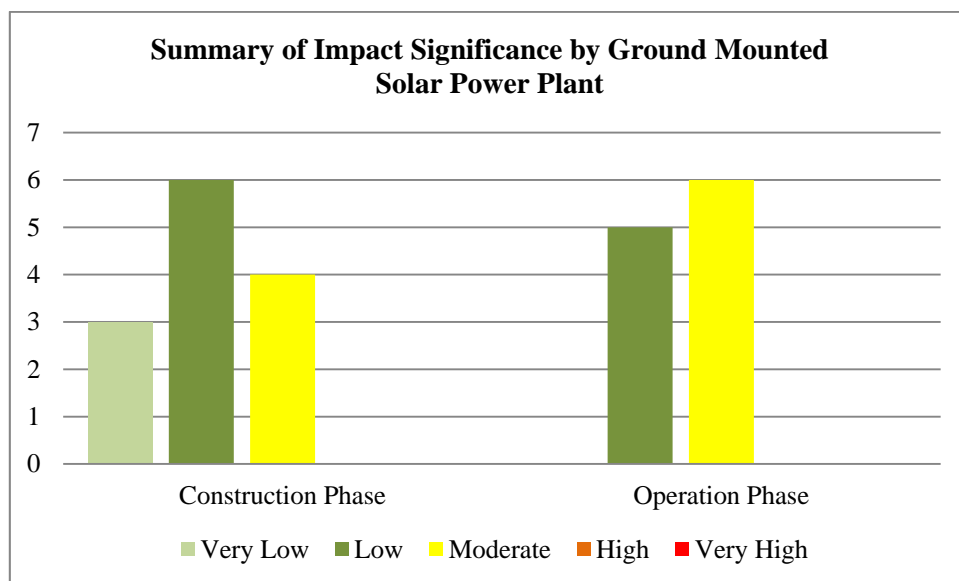
| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----------|---|-----------|----------|--------|-------------|--------------|---------------------|
| 6. | Impact on Community Health and Safety | | | | | | |
| | <p><i>Construction Phase</i></p> <ul style="list-style-type: none"> Overhead transmission line's cable stringing and poles erection along the route. Local communities and villagers near route of transmission line may expose to dust emission, noise and vibration impact due to operating and movement of construction machines and vehicles. | 3 | 1 | 2 | 3 | 18 | Low |
| | <p><i>Operation Phase</i></p> <ul style="list-style-type: none"> Risk of accidents and exposure to electromagnetic fields due to climbing up poles of overhead transmission by nearby villagers, absence of proper notice board and proper warning sign board. | 4 | 4 | 2 | 3 | 30 | Moderate |
| 7. | Fire Hazard Impact | | | | | | |
| | <p><i>Operation Phase</i></p> <ul style="list-style-type: none"> Improper and irregular maintenance of overhead transmission line is main fire hazard impact. Careless open burning near or below the transmission lines by nearby villagers may cause fire hazard impact. | 3 | 4 | 2 | 3 | 27 | Low |
| 8. | Traffic | | | | | | |
| | <p><i>Construction Phase</i></p> <ul style="list-style-type: none"> Traffic demand increased and traffic congestion will occur during the foundation works and pole installations and cable stringing period due to | 3 | 1 | 2 | 3 | 18 | Low |

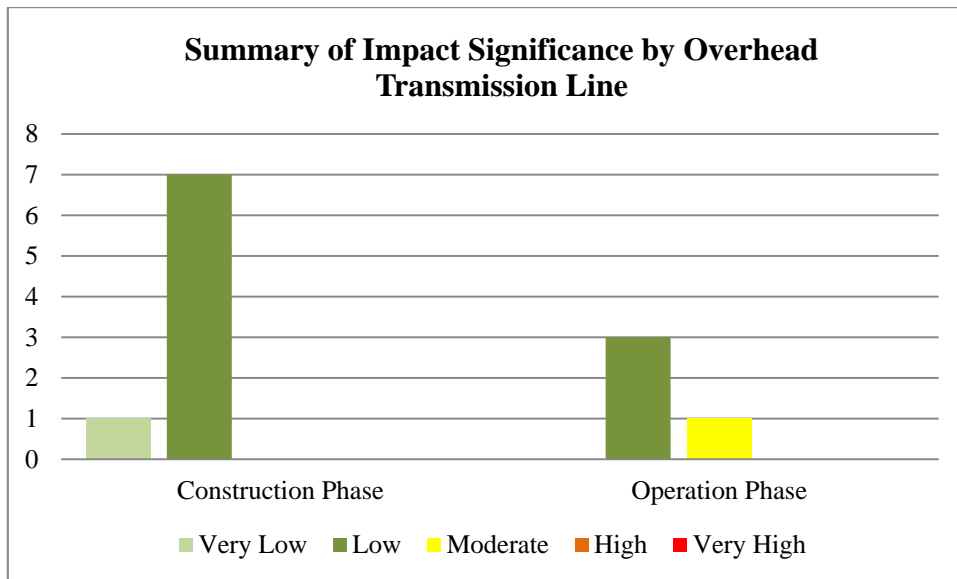
| No. | Potential Impact and Project Activities | Magnitude | Duration | Extent | Probability | Result Score | Impact Significance |
|-----------|--|-----------|----------|--------|-------------|--------------|---------------------|
| | transportation of heavy construction vehicles conveying construction materials and electrical equipment. | | | | | | |
| 9. | Solid Waste Generation Impact | | | | | | |
| | Construction Phase <ul style="list-style-type: none"> Vegetation debris will be generated during site clearance along right of way for overhead transmission line. | 2 | 1 | 1 | 3 | 12 | Very Low |

During the **construction phase of ground mounted solar power plant**, 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, hazardous waste generation impacts and traffic impact are categorized as **Low Impacts** as well as impact on flora and fauna, visual and 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, visual impact are categorized as **Low Impacts** according to the results of assessments.

As for **construction of overhead transmission line**, most of impacts are assessed as **Low Impact** except impact on solid waste generation are **Very Low** as per results of assessments. During **operation phase**, impact on air, occupational health and safety and fire hazards are considered as **Low Impact** and community health and safety will have **Moderate Impact**.

The following figure illustrates detail impact significances of potential adverse impacts of the proposed project.





Impact Significance of Potential Adverse Impacts of the Proposed Project

7.11. Mitigation Measures for Environmental Resources

7.11.1. Mitigation Measures for impact on Air Quality

1) Ground Mounted Solar Power Plant

Construction Phase: Low emission construction machinery shall be used to avoid high emission of exhaust gases. Generators, compressors, and other construction equipment shall be shut down when not in use. The speed of transportation vehicles for delivering construction materials must be controlled within the project site so that dust emission can be reduced. Trucks transporting of aggregate, fine materials, soil and waste to and from the Project site must be covered in order to reduce the release of dust. Water sprinkling shall be carried out to dampen the dust particularly near residential areas. Mask and other PPE should be provided to all the construction workers. Green Shade net fencing must be used to control dust emission from the site. If dust or pollutant emissions were found to be excessive, construction activities should be stopped until the source of such emissions have been identified and adequate control measures are implemented. Develop a regular inspection and scheduled maintenance program for vehicles, machinery, and equipment to be used throughout the construction phase for early detection of issue to avoid unnecessary pollutant emissions.

Operation Phase: During the operation phase, all roads within the project shall be paved in order to prevent dust emissions. Additionally, village concrete road shall be renovated after construction accomplished. Regular inspection and proper maintenance for generators, transportation vehicles and air conditioning system must be implemented to control gaseous emission from the proposed project. Some shady trees must be planted in terms of trapping air pollutants and dust.

2) Overhead Transmission Line

Construction Phase: Overhead transmission line construction activities and earth 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 in order to control dust emission to nearby local community. Trucks transporting of aggregate, fine materials, construction materials and waste must be covered in order to reduce the release of dust.

Operation Phase: The speed of maintenance vehicles must be controlled so that dust emission can be reduced.

7.11.2. Mitigation Measures for Impact on Noise

1) Ground Mounted Solar Power Plant

Construction Phase: Temporary noise barrier shall be installed around construction site in order to reduce noise pollution. Local residents must be given notices of intended noisy activities so as to reduce the degree of annoyances. Noisy works shall be done only in daytime. Construction machines, construction vehicles and transportation vehicles used in construction activities must be inspected regularly and well maintained for reducing noise and vibration. Ear protection (earmuffs) must be provided for every construction worker. Transportation vehicles' drivers must be instructed to avoid hooting when passing through existing village's road.

Operation Phase: During the operation phase, generators, inverters, transformers, management vehicles and maintenance vehicles must be inspected and maintained regularly to reduce noise pollution. Some shady trees must be planted around the power plant in order 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 Sedawgyi Substation via overhead transmission line do not generate vibration significantly.

2) Overhead Transmission Line

Construction Phase: 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 such as schools and hospitals across transportation routes. Noise and vibration generated construction activities must not be carried out at night, if possible.

Operation Phase: No mitigation measure is required as impact is insignificant during operation period.

7.11.3. Mitigation Measures for Water Quality

1) Ground Mounted Solar Power Plant

Construction Phase: To avoid groundwater contamination from oil spillage and leakage of fuel and lubricants, construction machines, transportation vehicles and generators will be properly maintained and inspected. Potable sanitation facilities with septic tank shall be provided at worker camps and construction yard. Domestic wastewater and night soil from worker camps shall be primarily treated and discharged to designated site and facilities. The project proponent must manage groundwater usage systematically in construction activities to prevent depletion of groundwater.

Operation Phase: During the operation phase, project proponent must install proper drainage system within the project site to reduce impacts on water. 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. Those personnel who are in charge of cleaning PV module shall be well trained for cleaning and maintenance of PV modules properly in order to prevent damaging PV modules. 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. After the completion of the project, the surface will be covered with panels, which will collect natural rainfall. The project proponent shall dig drainage ditches in low-lying areas to lead the water out of the PV field. Direct disposing domestic waste from multiple-use building into the drains must be prohibited to prevent drainage block.

7.11.4. Mitigation Measures for Soil Quality

1) Ground Mounted Solar Power Plant

Construction Phase: 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. In addition, in order to protect the surface soil erosion, trees, shrubs and perennials shall be planted and cultivated to prevent soil erosion around the area. All construction machineries and vehicles must be well maintained and checked regularly for fuel and oil spillages to prevent from permeability of hazardous liquids into soil and isolated machineries maintenance area must be identified with paved ground within the project site. Refueling must be done carefully for preventing oil spills and leakage. Concrete residue wastes should be collected and disposed at the designated place. PV modules installing must be carried out properly in order to prevent damaging PV modules. If PV modules are damaged, direct buried must be strongly prohibited and disposing with adequate packaging at authorized waste dealer must be implemented. 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.

Operation Phase: 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 authorized waste management services providers and direct buried must be strongly prohibited as PV modules contain chemical toxic which may cause soil contaminated . 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.

2) *Overhead Transmission Line*

Construction Phase: Earth working activities and concrete mixing processes for foundation of poles of overhead transmission line must be carried out properly. Proper management must be needed for cable stringing and vegetation clearance along right of way of overhead transmission line.

7.12. Mitigation Measures for Impact on Biological Environment

7.12.1. Mitigation Measures for Floral

1) *Ground Mounted Solar Power Plant*

Construction Phase: For this proposed project, site layout has been optimized in the scheme design, and the area with dense vegetation has been avoided. During the construction period, boundary of construction area shall be marked and informed to all relevant construction personnel and communities not to develop or cut trees and plants out of the project area. Vegetation restoration will be carried out in the temporarily occupied areas after the completion of construction.

2) *Overhead Transmission Line*

Construction Phase: Vegetation clearance within right of way of overhead transmission line must be minimized as much as possible.

7.12.2. Mitigation Measures for Fauna

1) *Ground Mounted Solar Power Plant*

Construction Phase: During construction phase, use construction material that impacts the observed habits of the local fauna as little as possible. Leave small holes in the fences in order to allow small animals to escape the project site and avoid affecting their natural movements.

2) *Overhead Transmission Line*

Construction Phase: Temporary noise barrier shall be installed while foundation work for pole of transmission line performed in order to reduce noise pollution. Construction machines and vehicles shall be well maintained and checked every day to reduce dust and particulate emission.

7.13. Mitigation Measures for Impact on Human Resources

7.13.1. Mitigation Measures for Occupational Health and Safety

1) Ground Mounted Solar Power Plant

Construction Phase: Personal Protective Equipment (PPE) such as glove, high visibility or reflective clothing, safety belt, earmuffs, masks, etc., must be provided for all construction workers. First aid training, OHS orientation training, firefighting training, basic hazard awareness, safe work practices and emergency procedure must also be provided for all construction workers and first aid kits must be provided in the project site. Vehicle speeds in construction area should be minimized. Safety signage, 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. 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. Safety Patrol at the construction site should be performed by the supervisors. Most of accident trends shall be reviewed and prevention measures shall be established. In addition, all workers should be instructed to report hazardous conditions whenever they occur and corrective action orders must be immediately issued to evaluate and abate the identified conditions. Furthermore, temporary shelters shall be provided in order to protect against heat stroke during working activities or for use as rest areas as needed. The project proponent must provide purified drinking water to prevent health risk of workers. Sufficient drainage facilities shall also be installing at the worker camp to prevent habitat for vector mosquito. 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.

Operation Phase: 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. Personal Protective Equipment (PPE) such as glove, high visibility or reflective clothing, safety boots, for all maintenance workers should be provided to reduce occupational health and safety impact. The project proponent or project supervisor 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.





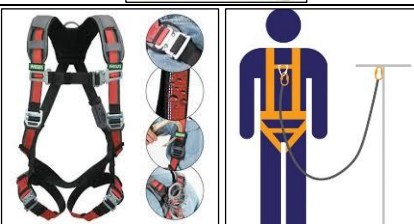
2) Overhead Transmission Line

Construction Phase: 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) 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. Cable stringing processes must be carried out properly to reduce occupational health and safety impacts. Construction machines and construction vehicles must be operated by trained and licensed industrial machine operators.

Operation phase: Personal fall restraint system must be provided for overhead transmission line maintenance workers who are working at height. 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.

Table 7.4 Types of PPEs and their Functions

| Function of PPEs | Feature and Characteristics |
|--|---|
| <i>Protective Goggles (Suitable for protection from dust, particle, chips, chemical splattering)</i> | |
| Goggles with direct vents are suitable for protection from chemical splattering or smoke. |  |
| <i>Hearing Protection</i> | |
| 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. |  |
| <i>Respiratory Protection</i> | |
| Dust mask: lightweight mask that is fitted over the nose and mouth and secured behind the head with elastic. |  |
| <i>Head Protection</i> | |

| | |
|---|---|
| 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. |  |

7.13.2. Mitigation Measures for Community Health and Safety

1) Ground Mounted Solar Power Plant

Construction Phase: Contractors or Project Proponent must conduct consultation with nearby residents or village to create awareness and understanding of project impacts prior to works occurring. During the construction phase, construction vehicle drivers and transportation vehicle drivers must drive carefully with low speed at exiting village's concrete road while mobilizing, transporting electrical equipment and construction materials. All transportation trucks must be covered appropriately while transporting construction materials such as sand, aggregate, cement as well as waste which may cause dust emission. Temporary noise barriers must be installed when conducting heavy construction works, which can have potential to noise problems.

Operation Phase: 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 Sedawgyi Substation. Safety notices and warning signs must be tagged at the fence

of the project site and poles of overhead transmission line in order to prohibit local people entering the project area without permission.

2) Overhead Transmission Line

Construction Phase: Cable stringing and poles construction for overhead transmission line must be informed to nearby local community and done properly to reduce community health and safety impacts.

Operation Phase: To prevent electric shocks and electrical hazards nearby transmission line and prohibit local people climbing electricity poles, the project proponent must set safety notices and warning signs in local languages near the transmission towers and lines, and adopt safety management. Public education is necessary to be done for locals and workers together with authorities from Ministry of Electricity and Energy (MOEE) and Sedawgyi Solar Power Co., Ltd.

7.13.3. Mitigation Measures for Fire Hazard Impact

1) Ground Mounted Solar Power Plant

Construction Phase: 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.

Operation Phase: 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.

2) Overhead Transmission Line

Operation Phase: During the operation phase, maintenance activities must be implemented regularly and properly for overhead transmission line to protect fire hazards. Provide adequate danger sign boards and notice boards for local communities in local languages to protect fire hazards by careless open burning.





Figure 7.1 Firefighting Equipment and Singage

7.13.4. Mitigation Measure for Visual Impact

1) Ground Mounted Solar Power Plant

Construction Phase: Construction machinery and equipment not currently in use should always be removed in a timely manner. Ensure proper housekeeping and instruct the workforce accordingly. All waste shall be removed on a daily basis and dispose of it in the appropriate manner.

Operation Phase: 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. A significant number of trees shall be planted around the Photovoltaic solar power plant to reduce visibility of the solar panels in the power plant as well as trapping air pollutants and dust.

2) Overhead Transmission Line

No mitigation measure is required as no visual impact is expected for overhead transmission line construction.

7.13.5. Mitigation Measures for Traffic

1) Ground Mounted Solar Power Plant

Construction Phase: Manage transportation during the construction in order to keep the increase in traffic to a minimum level. Implement a transport plan that enables to keep the impact on the existing infrastructure and the existing traffic on public roads to a minimum. Try to avoid accessing residential areas with slow moving heavy transportation vehicles. Ensure that all trucks and vehicles accessing the existing local road are operated by licensed operators and all project vehicles and trucks comply with the proposed speed limits.

Operation Phase: There are no significant impacts during operation phase, thus serious mitigation measures are not needed.

2) Overhead Transmission Line

Construction Phase: Manage transportation during the foundation works and pole installations and cable stringing period in order to keep the increase in traffic to a minimum level. Implement a transport plan that enables to keep the impact on the existing infrastructure and the existing

traffic on public roads to a minimum. Ensure that all trucks and vehicles accessing the existing local road are operated by licensed operators and all project vehicles and trucks comply with the proposed speed limits.

7.14. Mitigation Measures for Waste Generation

7.14.1. Mitigation Measures for Solid Waste Generation Impact

1) Ground Mounted Solar Power Plant

Construction Phase: Vegetable 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. Proper waste management plan shall be implemented by project proponent to reduce visual impact on environment and soil contamination. Make sure that no solid waste is being dumped on the land and the project proponent must define temporary disposal site within the project area, distribute sufficient numbers of bins and containers with respective labeling. Ensure that such containers are emptied or collected by respective contractors in a timely manner in order to prevent overflowing. Further, instruct the local workforce to keep the produced amount of waste at a minimum level by for example reusing materials where possible. Burning and landfilling solid waste at the project site must be strongly prohibited and final disposal must be transferred to the Township Development Committee.

Operation Phase: During the operation phase, there is no operation solid waste generation from the proposed project's operation processes. 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 Development Committee.

2) Overhead Transmission Line

Construction phase: Vegetation debris generated from land clearance activities along right of way of overhead transmission line must be collected at separate place and excavated soil must be reused as soil filing and leveling activities.



Figure 7.2 Sample of Waste Bins for Solid Waste Disposal

7.14.2. Mitigation Measures for Liquid Waste Generation Impact

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

Operation Phase: The project proponent shall dig drainage ditches in low-lying areas or shall install proper drainage system to lead the water out of the PV field after cleaning of PV module is carried out. Adequate sanitation facilities such as toilets, washing basins and septic tanks must be provided for workers in order to control domestic wastewater.

7.14.3. Mitigation Measures for Hazardous Waste Generation Impact

Construction Phase: 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. 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. Residual cement, concrete, 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 Development Committee.

Operation Phase: 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 due to exchanging new PV modules at the time of extending operation period of the project must be disposed with adequate packaging at authorized waste management services providers and direct buried must be strongly prohibited. Used oil must be disposed of by collecting with leak proof containers and final disposal of hazardous waste must be transferred to the Township Development Committee.

CHAPTER 8 INSTITUTIONAL REQUIREMENT AND 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 Sedawgyi 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 appoints one Health, Safety and Environment (HSE) Officer throughout the life span of the project. The HSE Officer 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 Sedawgyi Solar Power Co., Ltd. is responsible party for this Environmental Management Plan of 30 MW Ground Mounted Solar Power Plant Project. 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 Sedawgyi 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 Sedawgyi Solar Power Co., Ltd. had made commitment that we will construct and operate our project in line with 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 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.

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.

Myanmar Sedawgyi Solar Power 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

Implementation of the EMP, management practices and mitigation measures are the responsibility of all site personnel: however, key personnel (Project Director, Project Manager, HSE Director, 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 and responsibilities.

Table 8.1 Responsible Persons for EMP and Mitigation Measures

| No. | Name | Position | Department | Responsibilities and Duties |
|-----|---|-------------|--|--|
| 1. | Director | | Myanmar Sedawgyi Solar Power Co., Ltd. | <ul style="list-style-type: none"> • Implementation of the EMP • Supervision and management of the implementation of EMP |
| 2. | Project Manager | | | <ul style="list-style-type: none"> • Implementation of the EMP • Supervision and monitoring of the implementation of EMP |
| 3. | The project proponent shall appoint one HSE Coordinator | HSE Officer | | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • Monitoring and inspection of projects to determine compliance with all environmental and social requirements • The Ministry may impose penalties and/ or require the project proponent to undertake corrective action • Where, the Ministry views that the project is not in compliance, it shall <ul style="list-style-type: none"> ○ Promptly inform the project proponent |

| No. | Name | Position | Department | Responsibilities and Duties |
|-----|------|----------|------------|--|
| | | | | <ul style="list-style-type: none"> ○ Indicate specific non-compliances of the project environmental and social requirements; and ○ Specify a time period for the project proponent to bring the project into compliance ● In the event of noncompliance <ul style="list-style-type: none"> ○ 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: <ul style="list-style-type: none"> ○ Suspension of project operation; and ○ Employing third parties to correct non-compliance <p>Source: Environmental Impact Assessment Procedure (2015).</p> |

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

Table 8.2 Environmental Management Plan for Ground Mounted Solar Power Plant

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|----------------------------------|--------------------------------|---|--|
| Air Quality | <p>Construction Phase</p> <ul style="list-style-type: none"> • Low emission construction machinery shall be used. • Generators, compressors, and other construction equipment shall be shut down when not in use. • Controlled the speed of transportation vehicles for within the project site. • Trucks transporting of aggregate, fine materials, soil and waste must be covered. • Water sprinkling shall be carried out • Mask and other PPE should be provided to all the construction workers. • Green Shade net fencing must be used. • If dust or pollutant emissions were found to be excessive, construction activities should be stopped until the source of such emissions have been identified and adequate control measures are implemented. • Develop a regular inspection and scheduled maintenance program for vehicles, machinery, and equipment. | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> • All roads within the project shall be paved | Ground Mounted Solar Power Plant | Throughout Operation Period | | |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|--------------------------|--------------------------------|---|--|
| | <ul style="list-style-type: none"> Village concrete road shall be renovated after construction accomplished. Regular inspection and proper maintenance for generators, transportation vehicles and air conditioning system proposed project. Some shady trees must be planted in terms of trapping air pollutants and dust. | | | | |
| Noise and Vibration | <p>Construction Phase</p> <ul style="list-style-type: none"> Temporary noise barrier shall be installed around construction site. Local residents must be given notices of intended noisy activities. Noisy works shall be done only in daytime. Construction machines, transportation vehicles used in construction activities must be inspected regularly and well maintained. Ear protection (earmuffs) must be provided for every construction worker. Transportation vehicles' drivers must be instructed to avoid hooting when passing through existing village's road. | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| | <p>Operation Phase</p> | Ground Mounted | Throughout Operation Period | | |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|----------------------------------|--------------------------------|---|--|
| | <ul style="list-style-type: none"> Generators, inverters, transformers, management vehicles and maintenance vehicles must be inspected and maintained regularly. Some shady trees must be planted around the power plant. | Solar Power Plant | | | |
| Water Quality | <p>Construction Phase</p> <ul style="list-style-type: none"> To avoid groundwater contamination from oil spillage and leakage of fuel and lubricants, construction machines, transportation vehicles and generators will be properly maintained and inspected. Potable sanitation facilities with septic tank shall be provided at worker camps and construction yard. Domestic wastewater and night soil from worker camps shall be primarily treated and discharged to designated site and facilities. The project proponent must manage groundwater usage systematically in construction activities to prevent depletion of groundwater. | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Project proponent must install proper drainage system within the project site to reduce impacts on water. | Ground Mounted Solar Power Plant | Throughout Operation Period | | |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|---|--------------------------|--------------------------------|---|--|
| | <ul style="list-style-type: none"> Transformers, management vehicles, maintenance vehicles and generators must be inspected and maintained regularly. Refueling must be done properly and drainage system must be checked and cleaned properly. Those personnel who are in charge of cleaning PV module shall be well trained for cleaning and maintenance of PV modules properly in order to prevent damaging PV modules. 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. The project proponent shall dig drainage ditches in low-lying areas to lead the water out of the PV field. Direct disposing domestic waste from multiple-use building into the drains must be prohibited to prevent drainage block. | | | | |
| Soil Quality | <p>Construction Phase</p> <ul style="list-style-type: none"> 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. Trees, shrubs and perennials shall be planted and cultivated to prevent soil erosion around the area. All construction machineries and vehicles must be well maintained and checked regularly. | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|---|----------------------------------|-----------------------------|---|--|
| | <ul style="list-style-type: none"> Isolated machineries maintenance area must be identified with paved ground within the project site. Refueling must be done carefully for preventing oil spills and leakage. Concrete residue wastes should be collected and disposed at the designated place. PV modules installing must be carried out properly in order to prevent damaging PV modules. If PV modules are damaged, direct buried must be strongly prohibited and disposing with adequate packaging at authorized waste dealer must be implemented. 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. | | | | |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Project proponent must install proper drainage system within the project site to reduce impacts on soil. | Ground Mounted Solar Power Plant | Throughout Operation Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|--------------------------|--------------------------------------|---|--|
| | <ul style="list-style-type: none"> 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 authorized waste management services providers and direct buried must be strongly prohibited. 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. | | | | |
| Flora | <p>Construction Phase</p> <ul style="list-style-type: none"> Site layout has been optimized in the scheme design, and the area with dense vegetation has been avoided. Boundary of construction area shall be marked and informed to all relevant construction personnel and communities not to develop or cut trees and plants out of the project area. Vegetation restoration will be carried out in the temporarily occupied areas after the completion of construction. | Within Construction Site | Before and after construction period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|---------------------------------------|--|--------------------------|--------------------------------|---|--|
| Fauna | <p>Construction Phase</p> <ul style="list-style-type: none"> • Use construction material that impacts the observed habits of the local fauna as little as possible. • Leave small holes in the fences in order to allow small animals to escape the project site and avoid affecting their natural movements. | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| Occupational Health and Safety | <p>Construction Phase</p> <ul style="list-style-type: none"> • Personal Protective Equipment (PPE) such as glove, high visibility or reflective clothing, safety belt, earmuffs, masks, etc., must be provided. • First aid training, OHS orientation training, firefighting training, basic hazard awareness, safe work practices and emergency procedure must also be provided for all construction workers. • First aid kits must be provided in the project site. • Vehicle speeds in construction area should be minimized. • Safety signage, 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. • The project proponent must prepare health and safety management plan for construction workers based on the EMP | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|---|----------------------------------|-----------------------------|---|--|
| | <p>in Myanmar language and any other language that construction workers can read and display prominently at the project site.</p> <ul style="list-style-type: none"> • Safety Patrol at the construction site should be performed by the supervisors. • Most of accident trends shall be reviewed and prevention measures shall be established. • All workers should be instructed to report hazardous conditions whenever they occur and corrective action orders must be immediately issued to evaluate and abate the identified conditions. • Temporary shelters shall be provided in order to protect against heat stroke during working activities or for use as rest areas as needed. • The project proponent must provide purified drinking water to prevent health risk of workers. • Sufficient drainage facilities shall also be installing at the worker camp to prevent habitat for vector mosquito. • 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. | | | | |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> • Personal fall restraint system must be provided for maintenance workers who are working at height. | Ground Mounted Solar Power Plant | Throughout Operation Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|---|----------|------------|-------------------------------|-------------------|
| | <ul style="list-style-type: none"> • Lockout-tagout system must be used for maintenance of electrical equipment. • Personal Protective Equipment (PPE) such as glove, high visibility or reflective clothing, safety boots, for all maintenance workers should be provided. • The project proponent or project supervisor must monitor regularly whether maintenance workers use PPEs adequately or not for ensuring safe working site. • 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 • 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. | | | | |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|------------------------------------|---|--|---|---|--|
| | <ul style="list-style-type: none"> 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. | | | | |
| Community Health and Safety | <p>Construction Phase</p> <ul style="list-style-type: none"> Contractors or Project Proponent must conduct consultation with nearby residents or village to create awareness and understanding of project impacts prior to works occurring. Construction vehicle drivers and transportation vehicle drivers must drive carefully with low speed at exiting village's concrete road All transportation trucks must be covered appropriately while transporting construction materials such as sand, aggregate, cement as well as waste. Temporary noise barriers must be installed when conducting heavy construction work. | Within Construction Site and on rural road | Before and Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|---|----------------------------------|--------------------------------|---|--|
| | <p>Operation Phase</p> <ul style="list-style-type: none"> The power frequency electromagnetic field generated has little impacts on community health and safety as Voltage level of the project is low. The project proponent must follow international standards to generate electricity and distribute to Sedawgyi Substation. 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. | Ground Mounted Solar Power Plant | Throughout Operation Period | | |
| Fire Hazard | <p>Construction Phase</p> <ul style="list-style-type: none"> Construction machines, 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 camps. 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. | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|---|------------------------------------|-------------------------------|-------------------|
| | <ul style="list-style-type: none"> • 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. | | | | |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> • 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. | <p>Ground Mounted Solar Power Plant</p> | <p>Throughout Operation Period</p> | | |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|----------------------------------|--------------------------------|---|--|
| | <ul style="list-style-type: none"> • 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. | | | | |
| Visual Impact | Construction Phase <ul style="list-style-type: none"> • Construction machinery and equipment not currently in use should always be removed in a timely manner. • Ensure proper housekeeping and instruct the workforce accordingly. • All waste shall be removed on a daily basis and dispose of it in the appropriate manner. | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| | Operation Phase | Ground Mounted Solar Power Plant | Throughout Operation Period | | |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|--|--------------------------------|---|--|
| | <ul style="list-style-type: none"> • 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. • A significant number of trees shall be planted around the Photovoltaic solar power plant to reduce visibility of the solar panels in the power plant as well as trapping air pollutants and dust. | | | | |
| Traffic | <p>Construction Phase</p> <ul style="list-style-type: none"> • Manage transportation during the construction in order to keep the increase in traffic to a minimum level. • Implement a transport plan that enables to keep the impact on the existing infrastructure and the existing traffic on public roads to a minimum. • Try to avoid accessing residential areas with slow moving heavy transportation vehicles. • Ensure that all trucks and vehicles accessing the existing local road are operated by licensed operators and all project vehicles and trucks comply with the proposed speed limits. | Within Construction Site and on rural road | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| Solid Waste Generation | Construction Phase | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|---|----------|------------|-------------------------------|-------------------|
| | <ul style="list-style-type: none"> • Vegetable debris generated from land clearance activities must be collected at separate place. • Excavated soil must be reused at other places of the project as soil filing and leveling activities. • Proper waste management plan shall be implemented by project proponent to reduce visual impact on environment and soil contamination. • Make sure that no solid waste is being dumped on the land and the project proponent must define temporary disposal site within the project area. • Distribute sufficient numbers of bins and containers with respective labeling. • Ensure that such containers are emptied or collected by respective contractors in a timely manner in order to prevent overflowing. • Instruct the local workforce to keep the produced amount of waste at a minimum level by for example reusing materials where possible. • Burning and landfilling solid waste at the project site must be strongly prohibited and final disposal must be transferred to the Township Development Committee. | | | | |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|----------------------------------|--------------------------------|---|--|
| | <p>Operation Phase</p> <ul style="list-style-type: none"> The project proponent must define temporary disposal site within the project for domestic waste, before final disposal. 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 Development Committee. | Ground Mounted Solar Power Plant | Throughout Operation Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| Liquid Waste Generation | <p>Construction Phase</p> <ul style="list-style-type: none"> Adequate sanitation facilities such as toilets, washing basins and septic tanks must be provided for construction workers in order to control domestic wastewater. | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> The project proponent shall dig drainage ditches in low-lying areas or shall install proper drainage system to lead the water out of the PV field after cleaning of PV module is carried out. Adequate sanitation facilities such as toilets, washing basins and septic tanks must be provided for workers in order to control domestic wastewater. | Ground Mounted Solar Power Plant | Throughout Operation Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|-----------------------------------|--|----------------------------------|--------------------------------|---|--|
| Hazardous Waste Generation | <p>Construction Phase</p> <ul style="list-style-type: none"> 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. 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. Residual cement, concrete, 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 Development Committee. | Within Construction Site | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Fuel and lubricants for maintenance vehicles must be kept and handled systematically. Damaged PV modules and uninstalled lifespan-expired PV modules due to exchanging new PV modules at the time of extending operation period of the project must be disposed with adequate packaging at authorized waste management services providers and direct buried must be strongly prohibited. | Ground Mounted Solar Power Plant | Throughout Operation Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|----------|------------|-------------------------------|-------------------|
| | <ul style="list-style-type: none"> Used oil must be disposed of by collecting with leak proof containers and final disposal of hazardous waste must be transferred to the Township Development Committee. | | | | |

Table 8.3 Environmental Management Plan for Overhead Transmission Line

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|---------------------------------|--------------------------------|---|--|
| Air Quality | Construction Phase <ul style="list-style-type: none"> Overhead transmission line construction activities and earth 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 in order to control dust emission to nearby local community. Trucks transporting of aggregate, fine materials, construction materials and waste must be covered in order to reduce the release of dust. | Within ROW of Transmission Line | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| | Operation Phase | Within ROW of Transmission Line | Throughout Operation Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|---------------------------------|--------------------------------|---|--|
| | <ul style="list-style-type: none"> The speed of maintenance vehicles must be controlled so that dust emission can be reduced. | | | | |
| Noise and Vibration | <p>Construction Phase</p> <ul style="list-style-type: none"> 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 such as schools and hospitals across transportation routes. Noise and vibration generated construction activities must not be carried out at night, if possible. | Within ROW of Transmission Line | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| Soil Quality | <p>Construction Phase</p> <ul style="list-style-type: none"> Earth working activities and concrete mixing processes for foundation of poles of overhead transmission line must be carried out properly. Proper management must be needed for cable stringing and vegetation clearance along right of way of overhead transmission line. | Within ROW of Transmission Line | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|---------------------------------------|--|---|--------------------------------|---|--|
| Flora | <p>Construction Phase</p> <ul style="list-style-type: none"> Vegetation clearance within right of way of overhead transmission line must be minimized as much as possible. | Within ROW of Transmission Line | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| Fauna | <p>Construction Phase</p> <ul style="list-style-type: none"> Temporary noise barrier shall be installed while foundation work for pole of transmission line performed in order to reduce noise pollution. Construction machines and vehicles shall be well maintained and checked every day to reduce dust and particulate emission. | Within ROW of Transmission Line | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| Occupational Health and Safety | <p>Construction Phase</p> <ul style="list-style-type: none"> Personal fall restraint system must be provided for overhead transmission line installation workers who are working at height. The project proponent must provide Personal Protective Equipment (PPEs) for all construction workers. The project proponent must monitor regularly whether construction workers use PPEs adequately or not for ensuring safe working site. Cable stringing processes must be carried out properly to reduce occupational health and safety impacts. | Construction Site within ROW of Transmission Line | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|---------------------------------------|---------------------------------------|---|--|
| | <ul style="list-style-type: none"> Construction machines and construction vehicles must be operated by trained and licensed industrial machine operators. | | | | |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> Personal fall restraint system must be provided for overhead transmission line maintenance workers who are working at height. 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 for ensuring safe working site. | Maintenance Area of Transmission Line | Throughout Operation Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| Community Health and Safety | <p>Construction Phase</p> <ul style="list-style-type: none"> Cable stringing and poles construction for overhead transmission line must be informed to nearby local community and done properly to reduce community health and safety impacts. | Within ROW of Transmission Line | Before and within Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| | <p>Operation Phase</p> <ul style="list-style-type: none"> The project proponent must set safety notices and warning signs in local languages near the transmission towers and lines, and adopt safety management. | Within ROW of Transmission Line | Throughout Operation Period | | |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|---------------------------------|--------------------------------|---|--|
| | <ul style="list-style-type: none"> Public education is necessary to be done for locals and workers together with authorities from Ministry of Electricity and Energy (MOEE) and Sedawgyi Solar Power Co., Ltd. | | | | |
| Fire Hazard | <p>Operation Phase</p> <ul style="list-style-type: none"> Maintenance activities must be implemented regularly and properly for overhead transmission line to protect fire hazards. Provide adequate danger sign boards and notice boards for local communities in local languages to protect fire hazards by careless open burning. | Within ROW of Transmission Line | Throughout Operation Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| Traffic | <p>Construction Phase</p> <ul style="list-style-type: none"> Manage transportation during the foundation works and pole installations and cable stringing period in order to keep the increase in traffic to a minimum level. Implement a transport plan that enables to keep the impact on the existing infrastructure and the existing traffic on public roads to a minimum. Ensure that all trucks and vehicles accessing the existing local road are operated by licensed operators and all project vehicles and trucks comply with the proposed speed limits. | Within ROW of Transmission Line | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

| Potential Environmental Impact | Recommended Mitigation Measures | Location | Time Frame | Estimated Cost per Year (MMK) | Responsible Party |
|--------------------------------|--|---------------------------------|--------------------------------|---|--|
| Solid Waste Generation | <p>Construction Phase</p> <ul style="list-style-type: none"> • 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 filling and leveling activities. | Within ROW of Transmission Line | Throughout Construction Period | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

8.3. Environmental Monitoring Plan

Monitoring of the anticipated environmental and social impacts in the receiving environments is important in evaluating the effectiveness of mitigation plan and compliance with the regulatory measures in place. During the operation phase and decommissioning phase monitoring will be undertaken to ensure that proposed mitigation measures for negative impacts and enhancement measures for positive impacts are implemented.

Main objectives of environment monitoring plan include;

- To identify and resolve environmental issues and other functions that may arise during the operation phase
- To implement water quality, air quality and noise impact monitoring plan during the operation phase
- To check and quantify the overall environmental performance, implement action plans and recommend and implement remedial actions
- To conduct regular reviews of monitored data as the basis for assessing mitigation measures are identified, designed and implemented;
- To assess and interpret all environmental monitoring, data to ascertain whether environmental control measures and practices are functioning in accordance to specifications
- To predict the unforeseen impacts

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

| No. | Environmental Concern | Parameters | Target Level | Measurement Method | Frequency | Location | Estimated Cost per One Time (MMK) | Responsible Party |
|-----------|--|--|--|--|-------------|---|---|--|
| A. | Construction Phase (Ground Mounted Solar Power Plant) | | | | | | | |
| 1. | Air Quality | PM ₁₀ , PM _{2.5} , CO, CO ₂ , NO ₂ , SO ₂ | Within NEQ Guideline and International Standards | Relevant Air Quality Monitoring or Measuring Equipment | Once a Year | A suitable point within the project site | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 2. | Noise and Vibration | Equivalent Noise Level dB (A) | Within NEQ Guideline and International Standards | Relevant Noise and Vibration Meter Equipment | Once a Year | A suitable point within the project site and a suitable point at the boundary of project site | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 3. | Groundwater Quality | pH, Dissolve Oxygen, Turbidity, Conductivity, Salinity, Total Suspended Solids, Total Dissolved Solids, Biological Oxygen Demand 4.(BOD), Chemical Oxygen Demand (COD), Total Caliform Count | Within WHO Guideline | Sampling and Relevant Laboratory | Once a Year | An outlet from tube well within the project site | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

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| No. | Environmental Concern | Parameters | Target Level | Measurement Method | Frequency | Location | Estimated Cost per One Time (MMK) | Responsible Party |
|-----------|--|--|--|--|-------------|--|---|--|
| 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 Sedawgyi Solar Power Co., Ltd. |
| B. | Construction Phase (Overhead Transmission Line) | | | | | | | |
| 1. | Air Quality | PM ₁₀ , PM _{2.5} , CO, CO ₂ , NO ₂ , SO ₂ | Within NEQ Guideline and International Standards | Relevant Air Quality Monitoring or Measuring Equipment | Once a Year | In the middle of transmission line's route | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 2. | Noise level | Equivalent Noise Level dB (A) | Within NEQ Guideline and International Standards | Relevant Noise and Vibration Meter Equipment | Once a Year | In the middle of transmission line's route | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| C. | Operation Phase | | | | | | | |
| 1. | Air Quality | PM ₁₀ , PM _{2.5} , CO, CO ₂ , NO ₂ , SO ₂ | Within NEQ Guideline and International Standards | Relevant Air Quality Monitoring or Measuring Equipment | Once a Year | A suitable point within the project site | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 2. | Noise and Vibration | Equivalent Noise Level dB (A) | Within NEQ Guideline and International Standards | Relevant Noise and Vibration Meter Equipment | Once a Year | A suitable point within the project site and a suitable point at the | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |

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Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

| No. | Environmental Concern | Parameters | Target Level | Measurement Method | Frequency | Location | Estimated Cost per One Time (MMK) | Responsible Party |
|-----|---------------------------------|--|--|----------------------------------|-------------|--|---|--|
| | | | | | | boundary of project site | | |
| 3. | Groundwater Quality | pH, Dissolve Oxygen, Turbidity, Conductivity, Salinity, Total Suspended Solids, Total Dissolved Solids, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Caliform Count | Within WHO Guideline | Sampling and Relevant Laboratory | Once a Year | An outlet from tube well within the project site | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 4. | 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 | Within NEQ Guideline and WHO Standards | Relevant Laboratory | Once a Year | At final outlet of drainage system | Already included in cost estimation for EMP | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 5. | Waste Quantity | Amount of domestic solid waste and hazardous waste disposal | | | Quarterly | All operation area | Already included in cost | Myanmar Sedawgyi Solar Power Co., Ltd. |

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| No. | Environmental Concern | Parameters | Target Level | Measurement Method | Frequency | Location | Estimated Cost per One Time (MMK) | Responsible Party |
|-----|------------------------|---|--------------|--------------------|-------------|-----------------------|---|--|
| | | | | | | | estimation for EMP | |
| 6. | Environmental auditing | Assess the compliances with this EMP as well as laws, rules, policies and regulations | | | Once a year | At the project office | Already included in cost estimation for EMP | Myanmar Sedawgyi 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 Sedawgyi 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 | 3,000,000 |
| 2. | Provide Personal Protective Equipment (PPEs) to workers | | | Lump Sum | 1,000,000 |
| 3. | Provide adequate toilets and septic tanks facilities | | | Lump Sum | 800,000 |
| 5. | Provide first aid kits and training for workers | | | Lump Sum | 800,000 |
| 6. | Provide purified drinking water for workers | | | Lump Sum | 600,000 |
| 7. | Install fire extinguishers | | | Lump Sum | 500,000 |
| 8. | Wastes disposal | | | Lump Sum | 900,000 |
| Subtotal | | | | | 7,600,000 |
| 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 Protective Equipment (PPEs) for workers | | | Lump Sum | 500,000 |
| 5. | Provide first aid kits | | | Lump Sum | 500,000 |

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| No. | Item | Unit | Frequency | Unit Cost (MMK) | Cost (MMK) |
|--------------------|---|-------|-----------|-----------------|-------------------|
| | for workers | | | | |
| 6. | Provide purified drinking water for workers | | | Lump Sum | 1,000,000 |
| 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 | | | | | 9,500,000 |
| Contingency | | | | | 2,000,000 |
| Total | | | | | 19,100,000 |

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, Reporting 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 |
| B. | Supervision | | | | |
| 1. | Environmental Officer | Months | 12 | 500,000 | 6,500,000 |
| Subtotal | | | | | 9,500,000 |

| No. | Item | Unit | Quantity | Unit Cost (MMK) | Annual Cost (MMK) |
|--------------|---|------|----------|-----------------|-------------------|
| C. | Capacity Building (Training Programs for workers) | | | | 1500,000 |
| Total | | | | | 11,000,000 |

8.5. Air Quality Sub-Management Plan

(i) Objectives

The purposes of the plan are

- To minimize dust and gaseous emission from the project
- To sustain ambient air quality of the project

(ii) Legal Requirement

The project proponent shall adopt the requirements of National Laws and Regulations as described in Chapter 5: Policy, Legal and Institutional Framework

(iii) Action Plan

- To improve road design by using gravels rather than normal earth road
- Reduce traffic and use vehicles only for necessary cases.
- 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 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 line construction activities and earth 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
- Pave all roads within the project
- Implement regular maintenance and inspection for management vehicles, maintenance vehicles, generators, refrigerators, and air conditioning system
- Drive vehicles properly with low speed at public road
- Plant some shady trees

(iv) Implementation Schedule

The Action Plan will be implemented during the construction phase and operation phase.

(v) Monitoring Plans

The Environmental Monitoring Report will include the items listed in the following table.

| No. | Environmental Concerns | Parameters | Frequency | Location | Responsible Party |
|-----|-------------------------------------|--|-------------|--|--|
| 1. | Air quality (Construction Phase) | PM ₁₀ , PM _{2.5} , CO, CO ₂ , SO ₂ , NO ₂ | Once | A suitable point within the project site | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 2. | Air quality (Construction Phase) | PM ₁₀ , PM _{2.5} , CO, CO ₂ , SO ₂ , NO ₂ | Once | In the middle of transmission line's route | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 3. | Air quality (Operation Phase) | PM ₁₀ , PM _{2.5} , CO, CO ₂ , SO ₂ , NO ₂ | Once a year | A suitable point within the project site | Myanmar Sedawgyi Solar Power Co., Ltd. |

(vi) Budget Allocation

Estimated budget allocation for Air Quality Management Plan is already included in cost estimation for EMPs.

8.6. Water Quality Sub-Management Plan

(i) Objectives

The purposes of the plan are

- To minimize discharge from the project
- To sustain surface and groundwater quality of the project

(ii) Legal Requirement

The project proponent shall adopt the requirements of National Laws and Regulations as described in Chapter 5: Policy, Legal and Institutional Framework

(iii) Action Plan

- Establish green space just like garden in order to fill ground water from raining
- Avoid to build concrete flooring for a wide space

- Carry out site levelling with minimum alteration in contour level
- Provide toilets, washing basins and septic tanks adequately
- Manage groundwater usage systematically in construction activities
- Built systematic waterways, gutters, and canals direct to waste sedimentation ponds to prevent sediments flowing into irrigation weir through creeks
- Establish waste sedimentation pond for construction waste water
- Establish waste water treatment system for domestic waste water from staff housing and offices
- Domestic solid, liquid wastes and water discharged from construction activities shall not be discharged into the Mezali Weir nearby project site
- 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
- Inspect and maintain transformers, management vehicles, maintenance vehicles and generators regularly
- Carry out refuelling properly
- Check and clean drainage system properly
- Prohibit direct disposing domestic waste from multiple-use building into the drains
- Make sure that untreated site runoff water does not flow into the nearby water body, and manage systematically

(iv) Implementation Schedule

The Action Plan will be implemented during the construction phase and operation phase.

(v) Monitoring Plans

The Environmental Monitoring Report will include the items listed in the following table.

| No. | Environmental Concerns | Parameters | Frequency | Location | Responsible Party |
|-----|--|--|-----------|--|--|
| 1. | Surface water quality (Construction Phase) | 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 | Once | Same as baseline water quality sampling location | Myanmar Sedawgyi Solar Power Co., Ltd. |

| No. | Environmental Concerns | Parameters | Frequency | Location | Responsible Party |
|-----|---|---|-------------|--|--|
| | | Phosphorus, Total Suspended Solids | | | |
| 2. | Surface water quality (Operation Phase) | 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 a year | Same as baseline water quality sampling location | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 3. | Ground water quality (Operation Phase) | pH, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oil and Grease, Total Coliform Bacteria, Total Nitrogen, Total Phosphorus, Total Suspended Solids | Once a year | Same as baseline water quality sampling location | Myanmar Sedawgyi Solar Power Co., Ltd. |

(vi) Budget Allocation

Estimated budget allocation for Water Quality Management Plan is already included in cost estimation for EMPs.

8.7. Noise Sub-Management Plan

(i) Objectives

The purposes of the plan are

- To minimize noise level due to the project activities
- To minimize noise impacts of the project

(ii) Legal Requirement

The project proponent shall adopt the requirements of National Laws and Regulations as described in Chapter 5: Policy, Legal and Institutional Framework

(iii) Action Plan

- Notify excessive noise and vibration generated construction activities to nearby local communities
- 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 and generators in enclosures
- Avoid working noise and vibration generated construction activities at night, if possible
- 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 possible
- Inspect and maintain generators, inverters, transformers, management vehicles and maintenance vehicles regularly
- Install silence-type generators
- Plant some shady trees

(iv) Implementation Schedule

The Action Plan will be implemented during the construction phase and operation phase.

(v) Monitoring Plans

The Environmental Monitoring Report will include the items listed in the following table.

| No. | Environmental Concerns | Parameters | Frequency | Location | Responsible Party |
|-----|----------------------------------|-------------------------------|-----------|---|--|
| 1. | Noise level (Construction Phase) | Equivalent Noise Level dB (A) | Once | A suitable point within the project site and a suitable point at the boundary of project site | Myanmar Sedawgyi Solar Power Co., Ltd. |

| No. | Environmental Concerns | Parameters | Frequency | Location | Responsible Party |
|-----|----------------------------------|-------------------------------|-------------|---|--|
| 2. | Noise level (Construction Phase) | Equivalent Noise Level dB (A) | Once | In the middle of transmission line's route | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 3. | Noise level (Operation Phase) | Equivalent Noise Level dB (A) | Once a year | A suitable point within the project site and a suitable point at the boundary of project site | Myanmar Sedawgyi Solar Power Co., Ltd. |

(vi) Budget Allocation

Estimated budget allocation for Noise Management Plan is already included in cost estimation for EMPs.

8.8. Occupational Health and Safety Sub-Management Plan

(i) Objectives

The purposes of the plan are

- To reduce occupational health and safety impacts of the project
- To minimize near-miss, incidents and accidents due to the project activities

(ii) Legal Requirement

The project proponent shall adopt the requirements of National Laws and Regulations as described in Chapter 5: Policy, Legal and Institutional Framework

(iii) Action Plan

- Provide personal fall restraint system for installation workers who are working at height
- Use lockout-tagout system for installation and testing of electrical equipment
- 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
- Monitor regularly whether construction workers use PPEs adequately or not

- Tag safety notices and emergency contact numbers of the Fire Services Department, Hospitals and Police Stations and contact persons for emergency cases at noticeable places
- Provide First aid training, safety training, firefighting training, electrical equipment installation training and other essential trainings for construction activities
- Provide first aid kits at visible and convenient places
- Operate construction machines and construction vehicles by trained and licensed industrial machine operators
- 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
- Provide purified drinking water for construction workers
- Follow the instructions issued by the Ministry of Health and Sports to prevent COVID-19 virus infection during pandemic period
- 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 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
- Provide Personal Protective Equipment (PPEs) such as safety helmets, safety gloves, reflected safety suits and safety boots for all maintenance workers
- Monitor regularly whether maintenance workers use PPEs adequately or not
- Mark all energized electrical equipment with warning sign
- Carry out proper management for electricity generation and distributing such as checking all electrical cords, cables and do not use overload voltage
- Train and assign housekeeping staffs to do regular cleaning and housekeeping
- Manage the drainage systems of the project properly

(iv) Implementation Schedule

The Action Plan will be implemented during the construction phase and operation phase.

(v) Monitoring Plans

The Environmental Monitoring Report will include the items listed in the following table.

| No. | Environmental Concerns | Parameters | Frequency | Location | Responsible Party |
|-----|------------------------|---|-----------|----------------|--|
| 1. | Incident reporting | Description, causes, corrective and preventative measures for incidents | If occurs | Project Office | Myanmar Sedawgyi Solar Power Co., Ltd. |

(vi) Budget Allocation

Estimated budget allocation for Occupational Health and Safety Management Plan is already included in cost estimation for EMPs.

8.9. Waste Sub-Management Plan

(i) Objectives

The purposes of the plan are

- To ensure that classification of wastes and waste disposal are done properly
- To provide clear directions on waste management
- To ensure all personal involved with waste perform their roles and responsibilities as outlined
- To ensure proper implementation and compliance, including segregation

(ii) Legal Requirement

The project proponent shall adopt the requirements of National Laws and Regulations as described in Chapter 5: Policy, Legal and Institutional Framework

(iii) Action Plan

- Collect vegetable debris generated from land clearance activities at separate places
- Reuse excavated soil at other places of the project as soil filling and leveling
- Calculate detail requirement of raw materials for purchasing electrical equipment and construction materials
- Implement recycling, reuse, and refurbishment of solid waste
- 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
- Establish a certain pit or landfill area with adequate landfill system such as by using impermeable base to avoid soil and ground water contaminations
- Cover landfills and waste pits to protect from animals and avoid bad odors
- 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 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 is prohibited. Damaged PV modules are properly stored, transport with proper package and disposal at authorized waste disposal sites.
- Collect residual cement, solvent-based paints, and other lubricants separately at designated area
- Transfer final disposal of solid wastes and hazardous wastes to the Township Development Committee
- 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 levelling activities
- 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
- 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.
- Dispose of used oil by collecting with leak proof containers
- Transfer final disposal of solid wastes and hazardous wastes to the Township Development Committee

(iv) Implementation Schedule

The Action Plan will be implemented during the construction phase and operation phase.

(v) Monitoring Plans

The Environmental Monitoring Report will include the items listed in the following table.

| No. | Environmental Concerns | Parameters | Frequency | Location | Responsible Party |
|-----|-------------------------------------|--|------------------|-------------------------|--|
| 1. | Waste Quantity (Construction Phase) | Amount of construction solid waste, domestic solid waste, and hazardous waste disposal | Quarter per year | Within the project site | Myanmar Sedawgyi Solar Power Co., Ltd. |
| 2. | Waste Quantity (Operation Phase) | Amount of construction solid waste, domestic solid waste, and hazardous waste disposal | Quarter per year | Within the project site | Myanmar Sedawgyi Solar Power Co., Ltd. |

(vi) Budget Allocation

Estimated budget allocation for Waste Management Plan is already included in cost estimation for EMPs.

8.10. Firefighting Sub-Management Plan

(i) Objectives

The purposes of the plan are

- To reduce risks of fire in the project

(ii) Legal Requirement

The project proponent shall adopt the requirements of National Laws and Regulations as described in Chapter 5: Policy, Legal and Institutional Framework.

(iii) Action Plan

- 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.
- Fire hose reels and fire hydrants must be installed around the facility.
- Firefighting training and fire drills must be provided for all workers.
- Besides, safety notices and emergency contact numbers of Myanmar Fire Service Department, Hospitals and Police Stations of persons must be tagged at noticeable places in the project sites.
- An assembly point must be assigned for emergency cases to gather workers.

- Smoking must be strongly prohibited in the project site and must be assigned for smoking area.
- Visible and audible fire alarm system must be installed and emergency routes and exits must be assigned at multiple-use building, these emergency routes and exits must not block. Moreover, must assigned team as firefighting team, evacuation team and first-aid team.

Assembly point for the proposed project is attached in the Appendix (7).

(iv) Implementation Schedule

The Action Plan will be implemented during the construction phase and operation phase.

(v) Monitoring Plans

The Environmental Monitoring Report will include the items listed in the following table.

| No. | Environmental Concerns | Parameters | Frequency | Location | Responsible Party | |
|-----|------------------------|---|----------------------|-----------|-------------------|--|
| 1. | Incident reporting | Description, corrective and preventative measures for incidents | causes, and measures | If occurs | Project Office | Myanmar Sedawgyi Solar Power Co., Ltd. |

(vi) Budget Allocation

Estimated budget allocation for Firefighting Plan is already included in cost estimation for EMPs.

8.11. Emergency Preparedness and Response Plan

(i) Objectives

The purposes of the plan are

- To reduce risks of emergency cases like flood and earthquake in the project

(ii) Legal Requirement

The project proponent shall adopt the requirements of National Laws and Regulations as described in Chapter 5: Policy, Legal and Institutional Framework

(iii) Action Plan

In case of emergency, all the workers including guests must be evacuated systematically as soon as possible. Firefighting group must be assigned which will cooperate with Madaya

Township Fire Service Department. We 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 must be followed severe damages due to emergency cases.



Figure 8.1 Safety Card for Awareness of Emergency Case for Fire

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

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

- For electrical fire, oil and lubricant fire DO NOT USE WATER, rather use dry powder fire extinguishers
- If small, control using an extinguisher or fire hose reel
- Immediately contact Fire Services Department
- Once out of the building, stay outside. Do not allow people to go back into the burning building to collect valuables. While exiting the building, close doors to slow down the spread of fire but do not lock the door.
- Obey all instruction
- Proceed to assembly point
- First aiding to all injured persons and transfer to clinic or hospital



Figure 8.2 Safety card for Awareness of Emergency Cases for Earthquake

As the project is located within the **Zone III (Strong Zone)** earthquake zone, the emergency preparedness for earthquake must also be taken. The workers must have the knowledge concerning with the earthquake.

In case of earthquake-

If you are at indoors: “DROP, COVER AND HOLD ON”

- Stay inside.
- **Drop** under heavy furniture such as a table, desk, bed, or any solid furniture.
- **Cover** your head and torso to prevent being hit by falling objects.
- **Hold on** to the object that you are under so that you remain covered. Be prepared to move with the object until the shaking has finished.
- If you can't get under something strong, or if you are in a hallway, flatten yourself or crouch against an interior wall and protect your head and neck with your arms.
- If you are in a shopping mall, go into the nearest store. Stay away from windows, and shelves with heavy objects.
- If you are at school, get under a desk or table and hold on. Face away from windows.
- If you are in a wheelchair, lock the wheels and protect the back of your head and neck.

If you are at outdoors

- Stay outside.
- Go to an open area away from buildings. The most dangerous place is near exterior walls.
- If you are in a crowded public place, take cover where you won't be trampled.

If you are in a vehicle

- Pull over to a safe place where you are not blocking the road. Keep roads clear for rescue and emergency vehicles.
- Avoid bridges, overpasses, underpasses, buildings, or anything that could collapse.
- Stop the car and stay inside.
- Listen to your car radio for instructions from emergency officials.
- Do not attempt to get out of your car if downed power lines are across it. Wait to be rescued.
- Place a HELP sign in your window if you need assistance.
- If you are on a bus, stay in your seat until the bus stops. Take cover in a protected place. If you can't take cover, sit in a crouched position, and protect your head from falling debris.

AVOID the following in an earthquake

- Doorways. Doors may slam shut and cause injuries.
- Windows, bookcases, tall furniture, and light fixtures. You could be hurt by shattered glass or heavy objects.
- Elevators. If you are in an elevator during an earthquake, hit the button for every floor and get out as soon as you can.
- Downed power lines – stay at least 10 meters away to avoid injury

(iv) Implementation Schedule

The Action Plan will be implemented during the construction phase and operation phase.

(v) Monitoring Plans

The Environmental Monitoring Report will include the items listed in the following table.

| No. | Environmental Concerns | Parameters | Frequency | Location | Responsible Party |
|-----|------------------------|---|-----------|----------------|--|
| 1. | Incident reporting | Description, causes, corrective and preventative measures for incidents | If occurs | Project Office | Myanmar Sedawgyi Solar Power Co., Ltd. |

(vi) Budget Allocation

Estimated budget allocation for Emergency Preparedness and Response Plan is already included in cost estimation for EMPs.

8.12. Corporate Social Responsibility (CSR) Plan

Myanmar Sedawgyi 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% |

8.13. Grievance Redress Mechanism

Grievance Redress Mechanism (GRM) is a complaint and proposal consideration mechanism that provides an additional and accessible channel for submission of complaints and feedback to individuals and communities. The aim of the Grievance Redress Mechanisms (GRM) is to ensure that grievances and concerns raised by PAPs or other people within the communities can be effectively dealt with in a timely and satisfactory manner.

People who live near the project site or stakeholders concerned with the problems and impacts that they suffer by the proposed project; they can complain through Grievance Committee, which includes the responsible persons of the project proponent, representatives from Thangone Village and representative from General Administration Department (Madaya 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.

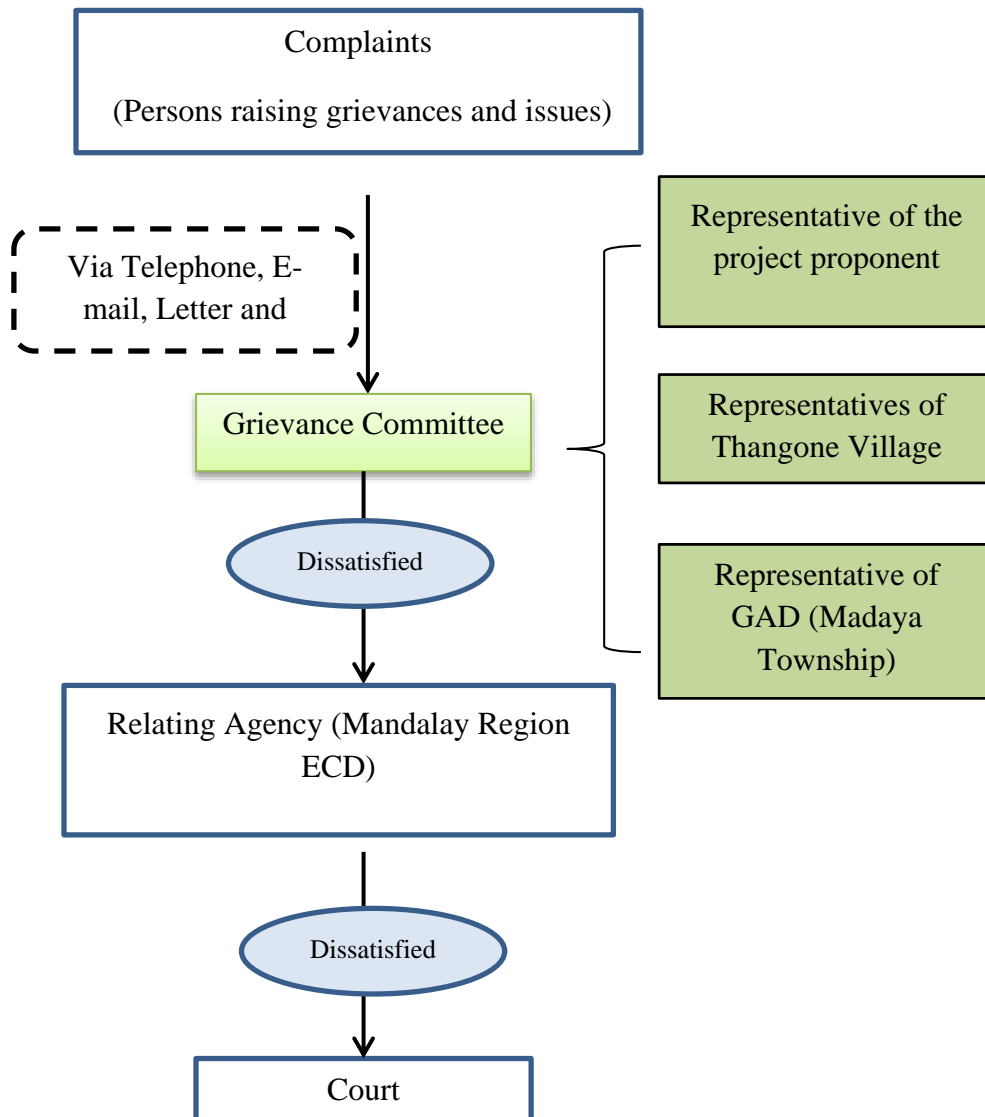


Figure 8.3 Grievance Redress Mechanism (GRM)

CHAPTER 9 RESULT OF PUBLIC CONSULTATION

9.1. Purpose of the Consultation 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. Consultation 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 public consultation meeting for the proposed project to local people within an adequate time needed for invitation. All feedbacks from public consultation 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 public consultation 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 Madaya Township General Administration Department, Mandalay 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.

Public consultation 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 Sedawgyi Substation, proposed by Myanmar Sedawgyi Solar Power Co., Ltd. was held on 20th May 2022 at Mani Myitzu Monastery, Thangone Village, Sakar Pin Village Tract, Madaya Township. The starting time was 01:00 pm and finished at 02:30 pm. 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. Due to the current conflict situation, the project proponent and study team couldn't manage to have appointment with Madaya Township Administrator and invited local people by negotiating with village administrators. As the public consultation meeting was held during COVID-19 Pandemic period and conflict condition, there were some limitations related to number of attendees, venue and social distancing. The attendance list, presentation file and photos are described in **Appendix**. The number of attendees in the meeting is briefly shown in the following table.

Table 9.1 Attendance List of Public Consultation Meeting

| No. | Category | Number of Participants |
|-----|--|------------------------|
| 1. | Local People from Thangone Village | 18 |
| 3. | Representatives of project proponent | 4 |
| 4. | Representatives of E Guard Environmental | 3 |

| No. | Category | Number of Participants |
|--------------|----------|------------------------|
| | Services | |
| Total | | 25 |

9.3. Agenda of Public Consultation Meeting

The meeting was held in accordance with the following agenda;

- 1) Opening the ceremony
- 2) Presentation of Project Information by Daw Nang Ngin Hom on behalf of Mr. Mu Zheng Jiang (Project Manager, Myanmar Sedawgyi Solar Power Co., Ltd.)
- 3) Presentation of Environmental Management Plan (EMP) for construction and operation of 30 MW ground mounted solar power plant project connected to Sedawgyi Substation by U Aung Si Thu Thein (Assistant Consultant, E Guard Environmental Services Co., Ltd.)
- 4) Questions, Comments and Suggestions from the attendees.
- 5) Closing the ceremony

The detail of each agenda is described in the following:

1. Opening Ceremony

2. Presentation of Project Information by Daw Nang Ngin Hom on behalf of Mr. Mu Zheng Jiang (Project Manager, Myanmar Sedawgyi Solar Power Co., Ltd.)

Daw Nang Ngin Hom briefly explained 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 Sedawgyi Substation by U Aung Si Thu Thein (Assistant Consultant, E Guard Environmental Services Co., Ltd.)

U Aung Si Thu Thein 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 Win Maung (Thangone Village) would like to know that how will project proponent consider our village serve concrete road as they use it every day for construction? Moreover, he hopes this project can create employment opportunities for local people.

Answer: U Aung Si Thu Thein (Assistant Consultant, E Guard Environmental Services) answered that the project shall have Communities Society Responsibility (CSR) Plan which means 2% of project net profit will be using for rural development such as donating in rural

library, clinic, as well as repair rural road, etc. for the near village after the construction. We will describe the fact that the project proponent shall renovate the road if it is damaged by the proposed project in Environmental Management Plan.

Question: U Kyaw Thu (Thangone Village) asked that what advantages will the village get regard to the proposed project?

Answer: U Aung Si Thu Thein (Assistant Consultant, E Guard Environmental Services) answered like same answer of previous question. The project proponent shall have Communities Society Responsibility (CSR) Plan which means 2% of project net profit will be using for rural development such as donating in rural library, clinic, as well as repair rural road, etc. for the near village after the construction.

Question: U Tun Aung (Thangone Village) would like to know that will the project provide job opportunities for the villagers. Moreover, he hope Thangone village should be prior when giving job offered as there are many qualified villager.

Answer: U Aung Si Thu Thein (Assistant Consultant, E Guard Environmental Services) answered that, in EMP report, we have to mention the project should provide job opportunities for villagers during construction and operation of the project: so that, they can also have job experiences.

Question: Ashin U Nandaw Bar Ta (Monk of Mani Myitzu Monastery) would like to confirm the information he heard that if they want to do small business like shop near project area, one of the family members have to be worker of the project. If not, they cannot do their small business.

Answer: Mr. Mu Zheng Jiang (Project Manager, Myanmar Sedawgyi Solar Power Co., Ltd.) answered that they never said like that before. Even if they want to open shop near the project site, they can be dangerous.

Requested By U Tin Shain (Thangone Village): They want the project proponent to negotiate with the villager how transmission line passes through and their entitlement. It's been a long time that we have been requesting to have meeting with the project proponent to negotiate about using 6" thick concrete road which is constructed by villagers, by their own cost and effort. We don't accept that the road will be renovated only when it is damaged.

Answer: Mr. Mu Zheng Jiang (Project Manager, Myanmar Sedawgyi Solar Power Co., Ltd.) answered that the usage of land for transmission tower will be responsible by other contractor and will inform them about your suggestion.

Suggestion By U Chit Hla (Thangone Village): We provided, are still providing and would like to continue providing assistance to project proponent so that the project to be successfully implemented but we consistently asked to get in touch with the responsible person from the site. Several team came to the site passing the village but we did not know what those team came and working on ground. There was no one from project proponent for a meeting face to

face with the villagers. We would like to request the project proponent to consider our village development and to negotiate with the villagers.

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

5. Closing Ceremony

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 CO₂ emission of Myanmar by substituting energy from the predominating coal-fired Power Plants.

REFERENCES

- Environmental Conservation Law (2012)
- Environmental Conservation Rules (2014)
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- General Administrative Department, 2020, Madaya Township Profile
- E Guard Environmental Services Co., Ltd., 2021, “*Environmental Management Plan for 30 MW Ground Mounted Solar Power Plant Project, Connected to Thapyaywa Substation*”
- http://go-go.tech/redirect?user_type=15&type=sr&redirect=eJzLKCKpKLbS1y8vL9dLTSpK0UvOz9VPyU8uzU3NKynWT80ryyzKzwNx9FOLMxN1TSxMzc10QUy9gpQ0BgZDMzM DQyMDcxNzhq4bv76UhjqWnB85vNZCaseAwDz4yOG&src=21e62e&via_page=1

APPENDIXES

1) Instructions to prepare EMP Report



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
ညွှန်ကြားရေးမှူးချုပ်ရုံး

စာအမှတ်၊ EIA - ၂/၉/ သဘောထား (PP-N)(၁၄၂/ ၂၀၂၂)
ရက်စွဲ ၊ ၂၀၂၂ ခုနှစ် ဩဂုတ်လ ၃ ရက်

သို့

အုပ်ချုပ်မှုဒါရိုက်တာ
Myanmar Sedawgyi Solar Power Co.,Ltd

အမှတ် (၆၈၀) စိန်ပန်းလမ်းနှင့် သရဖီလမ်းထောင့်၊ သပြေကုန်းရပ်ကွက်၊ မေဗူသီရိမြို့နယ်၊
နေပြည်တော်၊ ဖုန်း - ၀၉- ၂၂၅၀၉၈၂

အကြောင်းအရာ။ Myanmar Sedawgyi Solar Power Co.,Ltd ၏ ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်သုံး
လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းလုပ်ငန်းနှင့်ပတ်သက်၍ ပေးပို့လာသော
စီမံကိန်းအဆိုပြုလွှာအပေါ် သဘောထားမှတ်ချက်ပြန်ကြားခြင်း

- ရည်ညွှန်းချက်။ (၁) Myanmar Sedawgyi Solar Power Co.,Ltd ၏ ၂၁-၇-၂၀၂၂ ရက်နေ့
ရက်စွဲပါ စာအမှတ်၊ shwekyin/ECD/2022-01
- (၂) ဤဝန်ကြီးဌာန၊ ပြည်ထောင်စုဝန်ကြီးရုံး၏ ၂၂-၄-၂၀၂၁ ရက်စွဲပါ
စာအမှတ်၊ (သစ်တော) ၃(၂) /၀၃ (EC) / (၁၀၉၄ /၂၀၂၁)

၁။ အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ Myanmar Sedawgyi Solar Power Co.,Ltdက
မန္တလေးတိုင်းဒေသကြီး၊ ပြင်ဦးလွင်ခရိုင်၊ မတ္တရာမြို့နယ်၊ စကားပင်ကျေးရွာအုပ်စု၊ သန်ကုန်း
ကျေးရွာတွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်သုံးလျှပ်စစ်ဓာတ်အား
ထုတ်လုပ်မည့် စီမံကိန်းအတွက် စီမံကိန်းအဆိုပြုလွှာအား စိစစ်သုံးသပ်ပေးနိုင်ပါရန် ရည်ညွှန်း
(၁) ပါစာဖြင့် ပေးပို့တင်ပြလာပါသည်။

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

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

J

- (ခ) 540Wp monocrystalline silicon double-sided PV module အား တပ်ဆင် အသုံးပြုသွားမည်ဖြစ်ပြီး စုစုပေါင်း PV module 67,200 ခန့် တပ်ဆင်သွားမည် ဖြစ်ကြောင်း၊
- (ဂ) Photovoltaic Cells များမှ ထွက်ရှိလာသော 33kV လျှပ်စစ်ဓာတ်အားအား Power Collection Line တစ်ခုချင်းစီအနေဖြင့် PV Power 15MWac စုဆောင်းနိုင်သည့် Two Circuit Power Collection Lines အား အသုံးပြု၍ 132 kV booster station သို့ ပို့ဆောင်ထုတ်လွှတ်သွားမည်ဖြစ်ကြောင်း၊
- (ဃ) ဇီဝမျိုးစုံမျိုးကွဲများနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာအခြေအနေများအနေဖြင့် စီမံကိန်း ဧရိယာ အနီးတွင် Vegetation Cover မြင့်မားသော်လည်း အဖိုးတန်သစ်ပင်မျိုးများမရှိဘဲ ချုံနွယ်များအပင်ငယ်မျိုးများသာပေါက်ရောက်ကြောင်း၊ သတ္တဝါမျိုးစိတ်များအနေဖြင့်လည်း ကြီးမားသည့် နို့တိုက်သတ္တဝါမျိုးစိတ်များမရှိဘဲ ရှဉ့်နှင့်ကြွက်ကဲ့သို့သော အကောင်ငယ် များသာ ရှိကြောင်း။

၃။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်းဧည့်ခံစာတမ်းတွင်(က)ဆန်းစစ်ခြင်း ဆောင်ရွက်ရန်လိုအပ်သည့် စီမံကိန်းလုပ်ငန်းအမျိုးအစားများ သတ်မှတ်ချက်ဇယား အမှတ်စဉ် (၁၁) အရ နေရောင်ခြည်သုံးလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းလုပ်ငန်းအတွက်ထုတ်လုပ်မှုပမာဏ ၅၀ မဂ္ဂါဝပ် နှင့်အထက်လုပ်ငန်းများအနေဖြင့် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း ပြုလုပ်ရမည်ဖြစ်ပြီး ဝန်ကြီးဌာနက ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်ရန် လိုအပ်သည်ဟု သတ်မှတ်သည့် စီမံကိန်းအားလုံးကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်ရမည်ဟု ဖော်ပြပါရှိပါသည်။ ထို့အပြင် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ထုံးလုပ်နည်း အပိုဒ်(၂၄)တွင် “ဝန်ကြီးဌာနသည် အခြား မည်သည့်စီမံကိန်း သို့မဟုတ် လုပ်ငန်းကိုမဆို ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲရန် လိုအပ်ခြင်း ရှိ မရှိ ရွေးချယ် သတ်မှတ်နိုင်သည်”ဟု ဖော်ပြထားပါသည်။

၄။ သို့ဖြစ်ပါ၍ Myanmar Sedawgyi Solar Power Co.,Ltd မှ မန္တလေးတိုင်းဒေသကြီး၊ ပြင်ဦးလွင်ခရိုင်၊ မတ္တရာမြို့နယ်၊ စကားပင်ကျေးရွာအုပ်စု၊ သန်ကုန်းကျေးရွာတွင် အကောင်အထည် ဖော်ဆောင်ရွက်မည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်းနှင့် ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း အပိုဒ် (၂၄) အရ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် ရေးဆွဲရန်လိုအပ်ပါကြောင်း သုံးသပ်ရပါသဖြင့် အောက်ပါအတိုင်း ဆောင်ရွက်ရန်လိုအပ်ကြောင်း အကြောင်းပြန်ကြားပါသည်-

- (က) ၃၀မဂ္ဂါဝပ် နေရောင်ခြည်သုံးလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်း စီမံကိန်းနှင့် ၎င်း၏ ဆက်စပ်လုပ်ငန်းများဖြစ်သည့် Battery Square Area တည်ဆောက်ခြင်း၊ 132kV Booster Station တည်ဆောက်ခြင်း၊ ၃၃ကေစီ လျှပ်စစ်ဓာတ်အားလိုင်းသွယ်တန်းခြင်း။

၃

လမ်းဖောက်ခြင်း၊ ဝန်ထမ်းများနေထိုင်ရာနေရာများတည်ဆောက်ခြင်း စသည့်လုပ်ငန်းများအားလုံးကို ခြုံငုံသော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း အပိုဒ် ၆၃ (ဇ)နှင့် အပိုဒ် (၇၇) တို့နှင့်အညီ ရေးဆွဲ၍ သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသို့ တင်ပြ အတည်ပြုချက်ရယူရန်။

- (ခ) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲရာတွင် နေရောင်ခြည်သုံးလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းလုပ်ငန်းကြောင့် 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၊ ဒေသဆိုင်ရာအဖွဲ့အစည်းနှင့် အခြားအကျိုးသက်ဆိုင်သူများ သိရှိနိုင်စေရန် စီမံကိန်းသို့မဟုတ် စီမံကိန်းအဆိုပြုသူ၏ ဝက်ဘ်ဆိုဒ်များနှင့် သတင်းစာစသည့် ပြည်တွင်းမီဒီယာများမှ လည်းကောင်း၊ စာကြည့်တိုက်၊ လူထုစုဝေးခန်းမစသည့် အများပြည်သူစုဝေးရာနေရာများတွင်လည်းကောင်း၊ စီမံကိန်းအဆိုပြုသူ၏ ရုံးများတွင်လည်းကောင်း ထုတ်ပြန်ကြေညာ၍ထုတ်ပြန်ကြေညာကြောင်းအထောက်အထားသို့မဟုတ် ဝက်ဘ်ဆိုဒ်လိပ်စာတို့အား အစီရင်ခံစာတင်သွင်းပြီး ၁၅ ရက်အတွင်း reporting.eia@gmail.com သို့ တင်ပြရန်။

ညွှန်ကြားရေးမှူးချုပ် (ကိုယ်စား)
(ဒေါက်တာဆန်းဦး၊ ဒုတိယညွှန်ကြားရေးမှူးချုပ်)

မိတ္တူကို

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

2) Project Proponent's Company Registration Card



EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.



Myanmar Companies Online Registry - Company Extract

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

| Company Information | | |
|-----------------------------------|----------------------------|------------------------------|
| Registration Number | Registration Date | Status |
| 132890631 | 29/03/2022 | 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: | 29/03/2022 | 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 | | |
| 6,849,444 | | USD | | |
| Class | Description | Total Number | Total Amount Paid | Total Amount Unpaid |
| ORD | Ordinary | 6,849,444 | 200.00 | 6,849,244.00 |

| 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 | 6,849,444 | 200.00 | 6,849,244.00 |



Myanmar Companies Online Registry - Company Extract

| Company Name (English) | Company Name (Myanmar) |
|--|------------------------|
| MYANMAR SEDAWGYI 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 | 29/03/2022 |

3) Third-party's and its Experts' 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. 0028 Date 14.03.2018

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 သယ်စာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို အဖွဲ့အစည်းအား ထုတ်ပေးလိုက်သည်။)


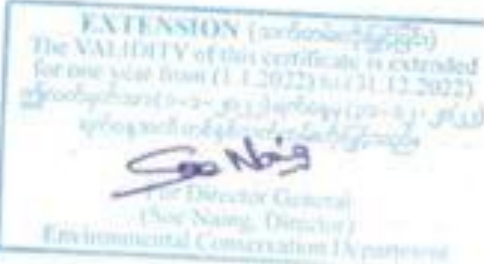



| | |
|--|--|
| (a) Name of Organization (အဖွဲ့အစည်းအမည်) | E Guard Environmental Services Co., Ltd. |
| (b) Name of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ အမည်) | U Aye Thiha |
| (c) Citizenship of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ နိုင်ငံသား) | 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
 The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)
 ဤလက်မှတ်၏ (၁-၁-၂၀၁၈) မှစ၍ (၂၀၁၉ ခုနှစ်) မတ်လ ၃၁ ရက်နေ့ထိ အကျိုးပြုစေရန် ဖြည့်စွက်ပေးခြင်းဖြစ်ပါသည်။

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

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

| Areas of Expertise Permitted (ဖွင့်ပြသည့် 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 |  |
| | |

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REPUBLIC OF THE UNION OF MYANMAR
Ministry of Natural Resources and Environmental Conservation
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(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)



No. 10067 Date 03.03.2018

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
သက်တမ်းတိုးခြင်း
The VALIDITY of this certificate is extended
for one year from (1.4.2018) to (31.3.2019)
ဤသက်တမ်းအား (၀-၄-၂၀၁၈) မှတ်တမ်း (၃၁.၃.၂၀၁၉)
မှတ်တမ်းထိ တိုးချဲ့ပေးခြင်း ဖြစ်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

Soe Naing

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

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
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 တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
See Naing
For Director General
(See Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
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)လသက်တမ်းတိုးမြှင့်သည်။
See Naing
For Director General
(See Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for six month from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား (၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁) ရက်နေ့အထိ (၆)လသက်တမ်းတိုးမြှင့်သည်။
See Naing
For Director General
(See Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
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)လသက်တမ်းတိုးမြှင့်သည်။
See Naing
For Director General
(See Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးမြှင့်ခြင်း)
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 တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
See Naing
For Director General
(See Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးမြှင့်ခြင်း)
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)လသက်တမ်းတိုးမြှင့်သည်။
Sa Aung Thu
For Director General
(Sa Aung Thu, Director)
Environmental Conservation Department

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.



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 သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

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|--|---|
| (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) | 30 th June, 2023. |



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

ဤအထောက်အထားလက်မှတ်သည် ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တာဝန်ယူပုဂ္ဂိုလ် 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 အသုံးပြုခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်ခြင်းမပြုရ။
 - (ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း 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 မပျက်မကွက် အကြောင်းကြားရမည်။
 - (စ) ဝန်ကြီးဌာနက အခါအားလျော်စွာ သတ်မှတ်သည့် စည်းကမ်းချက်များကိုလိုက်နာရမည်။
 - (ဆ) ဖော်ပြပါ စည်းကမ်းချက်တစ်ရပ်ရပ်ကို ဖောက်ဖျက်ခြင်း၊ လိုက်နာရန်ပျက်ကွက်ခြင်း တစ်စုံတစ်ရာ ဝေါပေါက်ပါက 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၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းမှု 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။



REPUBLIC OF THE UNION OF MYANMAR
Ministry of Natural Resources and Environmental Conservation
CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION



(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 10104 Date 12.03.2018

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 |



The VALIDITY of this certificate is extended
for one year from (1.4.2018) to (31.3.2019)
ဤလက်မှတ်အား (၀-၄-၂၀၁၈) မှတ်ပုံတင် (၃၁-၃-၂၀၁၉)
ရက်နေ့အထိ တစ်နှစ်ထပ်တင်ပေး ဖြစ်ပျက်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

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

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Forestry

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
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 တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
See Naing
For Director General
(See Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
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)လသက်တမ်း တိုးမြှင့်သည်။
See Naing
For Director General
(See Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for six month from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား (၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁)
ရက်နေ့အထိ (၆)လသက်တမ်းတိုးမြှင့်သည်။
See Naing
For Director General
(See Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးမြှင့်ခြင်း)
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 တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
See Naing
For Director General
(See Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးမြှင့်ခြင်း)
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)လသက်တမ်းတိုးမြှင့်သည်။
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. 00279 Date 13 FFH 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) | 30 th June, 2023. |



၁၃.၆.၂၀၂၃

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 အသုံးပြုခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်ခြင်းမပြုရ။
 - (ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း 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 မပျက်မကွက် 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 ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂိုလ်လုပ်ကိုင်သူ (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 1.3 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) | 30 th June, 2023. |



Handwritten signature

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

ဤအထောက်အထားလက်မှတ်သည် ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တာဝန်ယူပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလုပ်ကိုင်ဆိုင်ရာ 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 အသုံးပြုခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်ခြင်းမပြုရ။
 - (ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်။
 - (ဂ) ဤအထောက်အထားလက်မှတ်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူ လေ့လာဆန်းစစ်ရေးဆွဲခွင့်ရှိသည်။
 - (ဃ) မိမိအဖွဲ့အစည်းတွင် ပါဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်စုံတစ်ရာရှိပါက ကြားကာလ အကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသူဖြစ်သူ အစားထိုး ပြောင်းလဲရမည်။
 - (င) အဖွဲ့အစည်းဖြစ်ပါက အဖွဲ့အစည်းတွင် ဒါရိုက်တာဘုတ်အဖွဲ့ (Board of Director)၊ အကြံပေးပုဂ္ဂိုလ် (Consultant) များ ပြောင်းလဲလိုလျှင် တည်ဆဲဥပဒေများနှင့်အညီ ဆောင်ရွက်ပြီး ရက်ပေါင်း ၃၀ အတွင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ မပျက်မကွက် 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၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းမှု 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။

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.



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.



19.2.2023

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

ဤအထောက်အထားလက်မှတ်သည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဖြုလုပ်သည့် 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။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-
 - (က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်ခြင်းမပြုရ။
 - (ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းချက်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း 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 မပျက်မကွက် 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၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းမှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ မြန်လည်ပြင်ဆင်ခြင်း 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။

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.



THE REPUBLIC OF THE UNION OF MYANMAR
Ministry of Natural Resources and Environmental Conservation



CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION
(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00336 Date 15 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 သယ်စာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

- | | |
|--|---|
| (a) Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်) | Mr. Aung Moe Oo |
| (b) Citizenship (နိုင်ငံသား) | Myanmar |
| (c) Identity Card / Passport Number (မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်) | 7/DaOoNa (N) 177852 |
| (d) Address (ဆက်သွယ်ရန်လိပ်စာ) | No.31, 8 floor (A), Kyauk Myaung Zay Street, Tarmwe Township, Yangon. Mobile phone: 09794160360 E mail: aungmoeoo@eguardservices.com |
| (e) Organization (အဖွဲ့အစည်း) | E guard Environmental Services Co., Ltd |
| (f) Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Person |
| (g) Duration of validity (သက်တမ်းကုန်ဆုံးရက်) | 30 th 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. Water Pollution Control. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |
| 9. | 10. |
| 11. | 12. |
| 13. | 14. |

စည်းကမ်းချက်များ

- ၁။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-
 - (က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်ခြင်းမပြုရ။
 - (ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း 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 မပျက်မကွက် 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၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းမှု 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 လက်လှမ်းမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
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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.



(Handwritten signature)

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

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

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

- 1. Legal Analysis
- 3.
- 5.
- 7.
- 9.
- 11.
- 13.

- 2.
- 4.
- 6.
- 8.
- 10.
- 12.
- 14.

စည်းကမ်းချက်များ

- ၁။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-
 - (က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ အသုံးပြုခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်ခြင်းမပြုရ။
 - (ခ) ဤအထောက်အထားလက်မှတ်ကို သတ်မှတ်သည့် စည်းကမ်းဘောင်အတွင်း လုပ်ငန်းလုပ်ကိုင်ခွင့် အငြင်းပွားမှုများ၊ စောဒကတက်မှုများနှင့်စပ်လျဉ်း၍ တာဝန်ယူဖြေရှင်းရမည်။ ယင်းသို့ ဖြေရှင်းနိုင်ခြင်း မရှိပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း 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 မပျက်မကွက် 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၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းမှု 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။

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

4) Investment Plan

MYANMAR SEDAWGYI SOLAR POWER COMPANY LIMITED
INVESTMENT PLAN

| | | | Start Date | 2022-1-1 | 2022-2-1 | 2022-3-1 | 2022-4-1 | 2022-5-1 | 2022-6-1 |
|-------------------------------------|-------------------------------------|-----|-------------------|------------|-----------|-----------|-----------|-----------|-----------|
| | | | End Date | 2022-1-31 | 2022-2-28 | 2022-3-31 | 2022-4-30 | 2022-5-31 | 2022-6-30 |
| | | | 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% | 5% |
| | | 12 | 20% | 20% | 10% | 5% | 5% | 5% | |
| A | EPC | USD | 26,381,040 | 6,595,260 | 6,595,260 | 5,276,208 | 3,957,156 | 2,638,104 | 1,319,052 |
| | EPC (without CT) | USD | 26,381,040 | 6,595,260 | 6,595,260 | 5,276,208 | 3,957,156 | 2,638,104 | 1,319,052 |
| | EPC Offshore Portion | USD | 23,521,890 | | | | | | |
| | EPC Onshore Portion (Inc. CT) | USD | 2,859,150 | | | | | | |
| B | Non-EPC | USD | 443,025 | 381,825 | - | - | - | - | 61,200 |
| | Consulting Service Cost | USD | 241,825 | 241,825 | - | - | - | - | - |
| | Due Diligence | USD | 121,825 | 121,825 | - | - | - | - | - |
| | Feasibility Study | USD | 120,000 | 120,000 | - | - | - | - | - |
| | Development Cost | USD | 201,200 | 140,000 | - | - | - | - | 61,200 |
| | Project Land Cost | USD | 61,200 | - | - | - | - | - | 61,200 |
| | Licenses & Permits | USD | 40,000 | 40,000 | - | - | - | - | - |
| | Transmission Line Land Cost | USD | 100,000 | 100,000 | - | - | - | - | - |
| C | Financing Cost | USD | 848,747 | 449,479 | - | 164,862 | - | - | 234,405 |
| | Upfront Fee | USD | 319,302 | 319,302 | - | - | - | - | - |
| | Long-term Loan Interest | USD | 399,267 | 54,954 | 54,954 | 78,135 | 78,135 | 78,135 | 78,135 |
| | Long-term Loan Interest (Quarterly) | USD | 399,267 | - | - | 164,862 | - | - | 234,405 |
| | Loan Compensation | USD | - | - | - | - | - | - | - |
| | Sinasure Debt Premium | USD | 130,178 | 130,178 | - | - | - | - | - |
| D | Total Capital Cost | USD | 26,824,065 | 6,977,085 | 6,595,260 | 5,276,208 | 3,957,156 | 2,638,104 | 1,380,252 |
| E | Total Construction Cost | USD | 26,824,065 | 6,977,085 | 6,595,260 | 5,276,208 | 3,957,156 | 2,638,104 | 1,380,252 |
| F | Total Project Cost | USD | 27,672,812 | 7,426,564 | 6,595,260 | 5,441,070 | 3,957,156 | 2,638,104 | 1,614,657 |
| *****Sources of Project Cost | | | | | | | | | |
| TRUE | | | | | | | | | |
| | Total Project Cost | USD | 27,672,812 | 7,426,564 | 6,595,260 | 5,441,070 | 3,957,156 | 2,638,104 | 1,614,657 |
| | Project Equity | USD | 6,918,203 | 4,865,724 | - | - | 2,052,479 | - | - |
| | Project Debt | USD | 20,754,609 | 14,597,171 | - | - | 6,157,438 | - | - |
| *****End of Sheet | | | | | | | | | |

5) Engineering Structure Drawings

结构设计总说明

一、设计依据

- 本工程按照国家标准、规范编制
- 《建筑结构荷载规范》(GB50009-2018)
- 《建筑抗震设计规范》(GB50011-2010)
- 《混凝土结构设计规范》(GB50010-2010)
- 《建筑地基基础设计规范》(GB50007-2012)
- 《建筑结构荷载规范》(GB50009-2012)
- 《建筑抗震设计规范》(GB50011-2010)
- 《混凝土结构设计规范》(GB50010-2010)
- 《建筑地基基础设计规范》(GB50007-2012)
- 《建筑结构荷载规范》(GB50009-2012)
- 《建筑抗震设计规范》(GB50011-2010)
- 《混凝土结构设计规范》(GB50010-2010)
- 《建筑地基基础设计规范》(GB50007-2012)
- 《建筑结构荷载规范》(GB50009-2012)
- 《建筑抗震设计规范》(GB50011-2010)
- 《混凝土结构设计规范》(GB50010-2010)
- 《建筑地基基础设计规范》(GB50007-2012)
- 《建筑结构荷载规范》(GB50009-2012)
- 《建筑抗震设计规范》(GB50011-2010)
- 《混凝土结构设计规范》(GB50010-2010)
- 《建筑地基基础设计规范》(GB50007-2012)

二、工程概况

本工程为30MW地面光伏电站，位于... (text partially obscured)

三、设计内容

1. 基础设计

2. 上部结构设计

3. 屋面结构设计

4. 其他

四、材料要求

| 名称 | 规格 | 产地 | 备注 |
|-----|-----|-----|-----|
| 钢筋 | C30 | C30 | C25 |
| 混凝土 | C30 | C30 | C25 |

五、其他

六、附图

七、设计说明

1. 本工程为30MW地面光伏电站，位于... (text partially obscured)

2. 本工程按照国家标准、规范编制

3. 本工程抗震等级为... (text partially obscured)

4. 本工程混凝土强度等级为... (text partially obscured)

5. 本工程钢筋等级为... (text partially obscured)

6. 本工程基础埋深为... (text partially obscured)

7. 本工程上部结构为... (text partially obscured)

8. 本工程屋面结构为... (text partially obscured)

9. 本工程其他... (text partially obscured)

八、设计单位

昆明工程集团有限公司

九、设计日期

2022.05

十、设计人

王德波

十一、审核人

张德波

十二、批准人

张德波

十三、设计日期

2022.05

十四、设计人

王德波

十五、审核人

张德波

十六、批准人

张德波

十七、设计日期

2022.05

十八、设计人

王德波

十九、审核人

张德波

二十、批准人

张德波

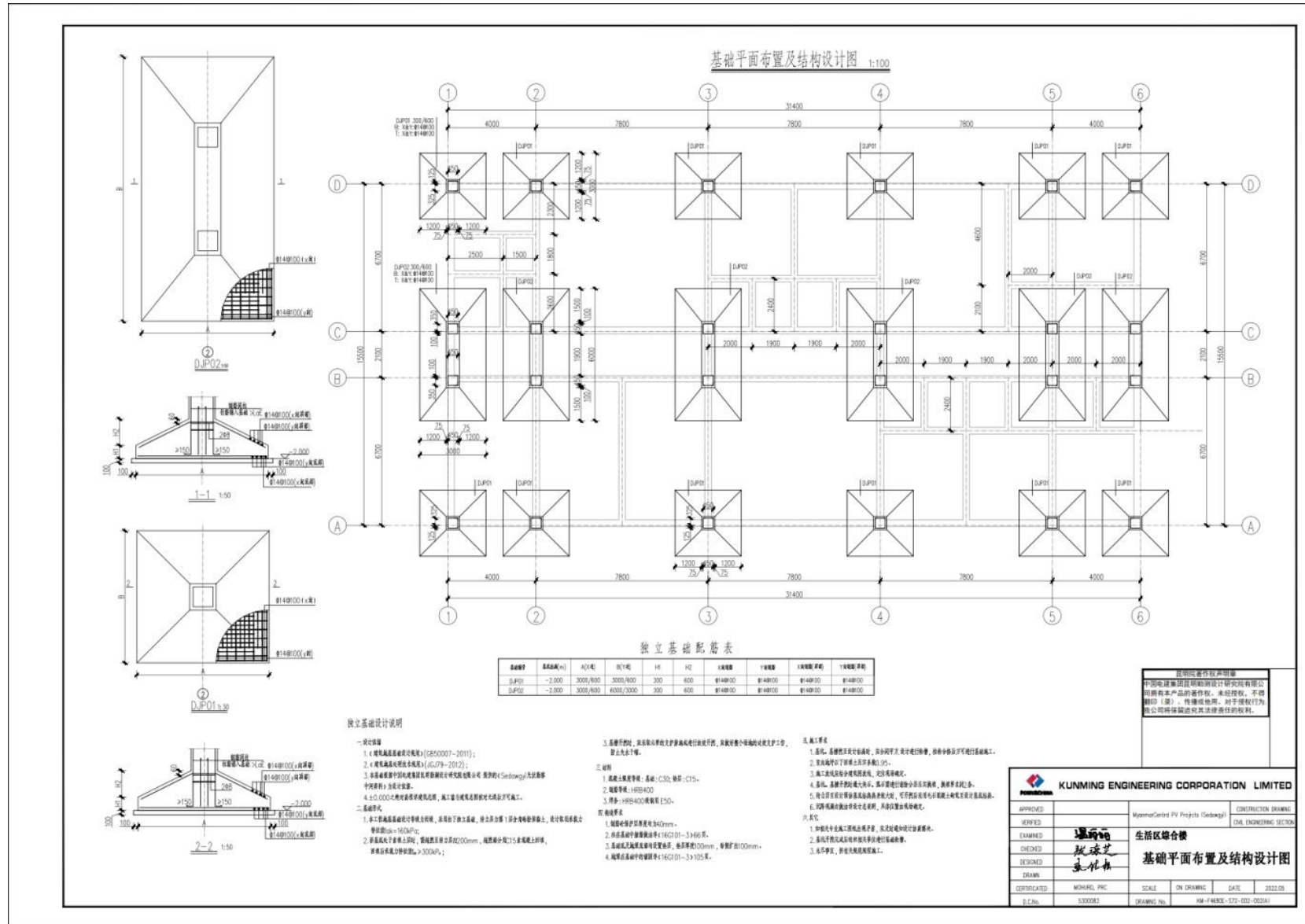
昆明工程集团有限公司

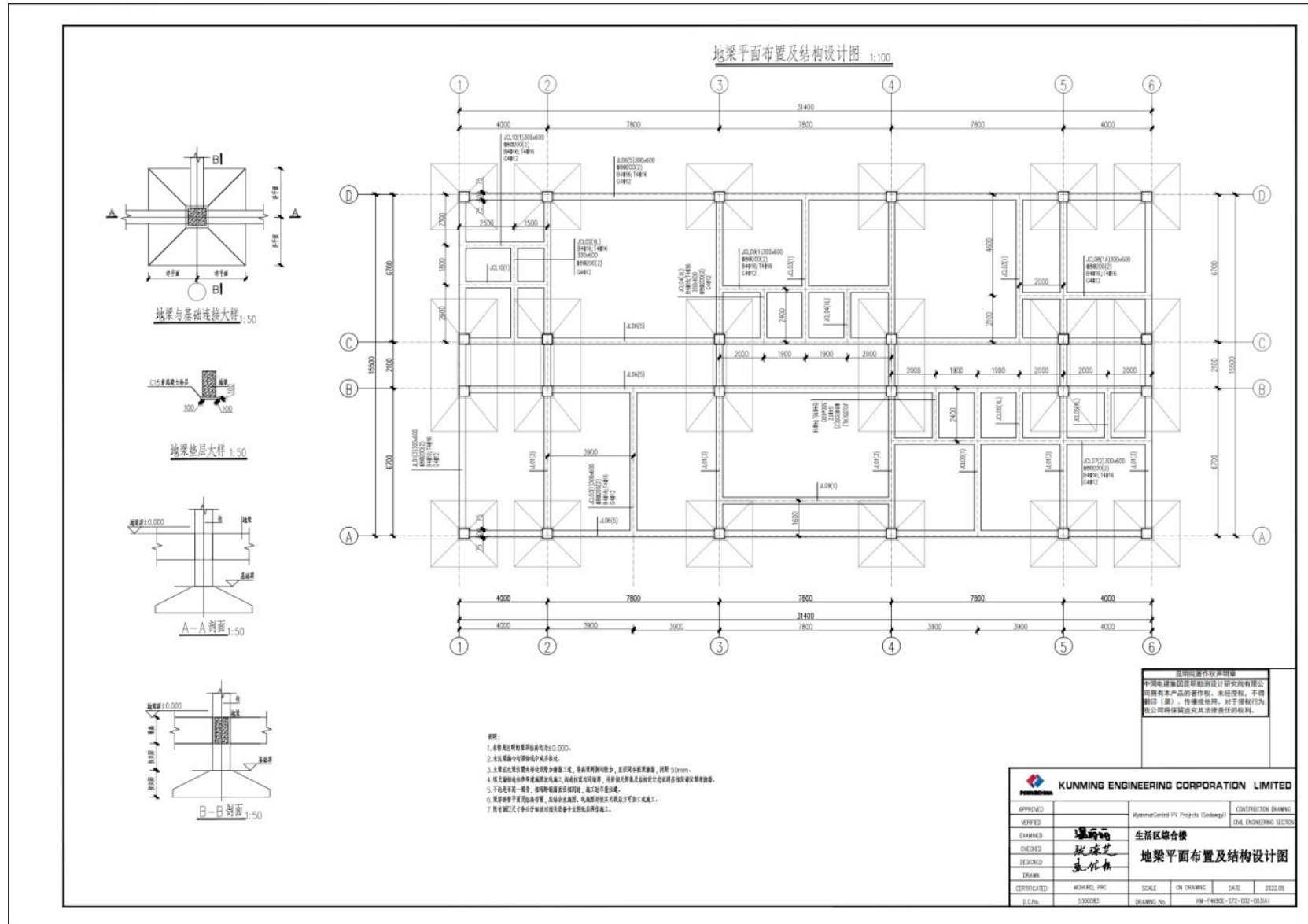
生活区综合楼

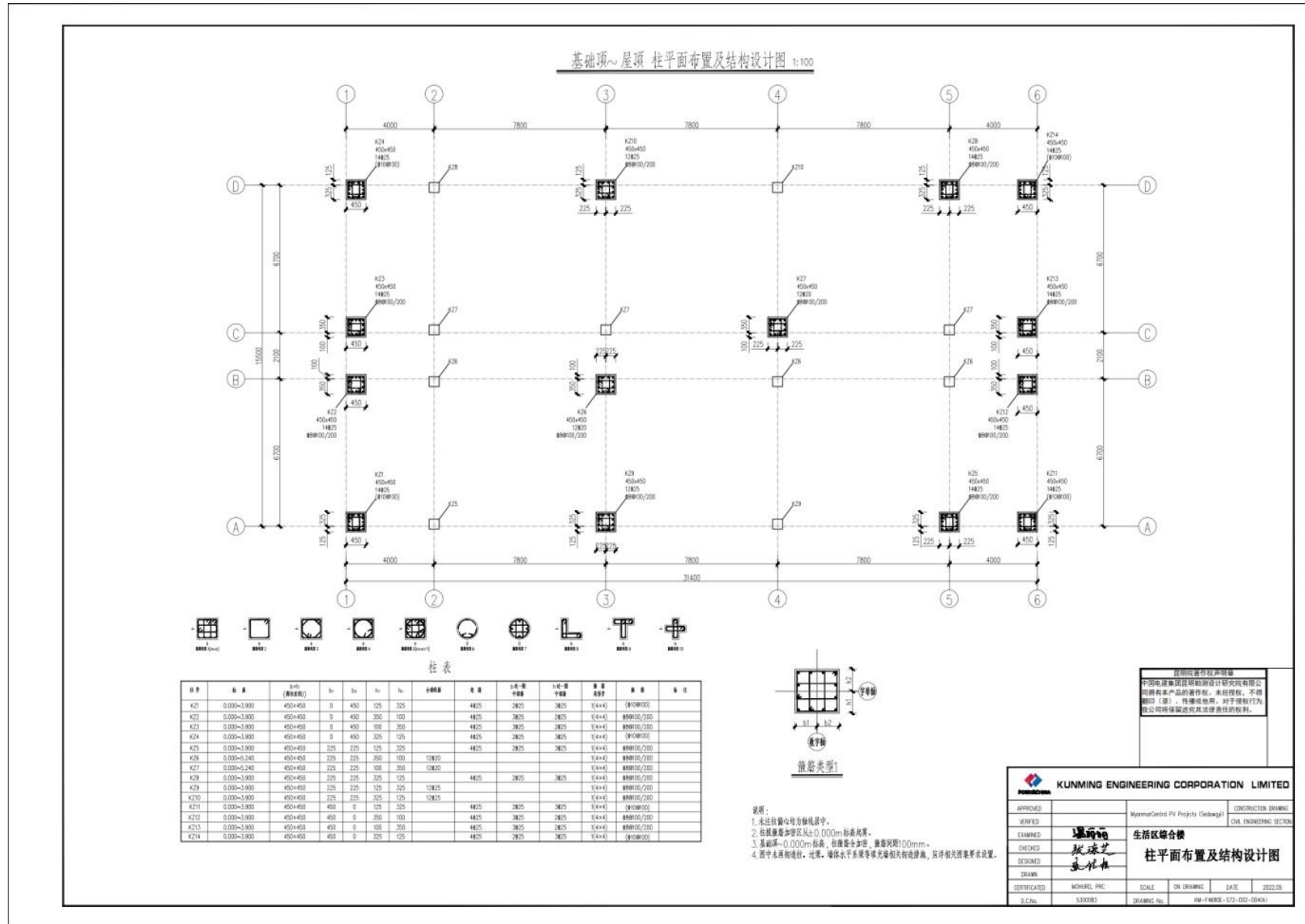
结构设计说明

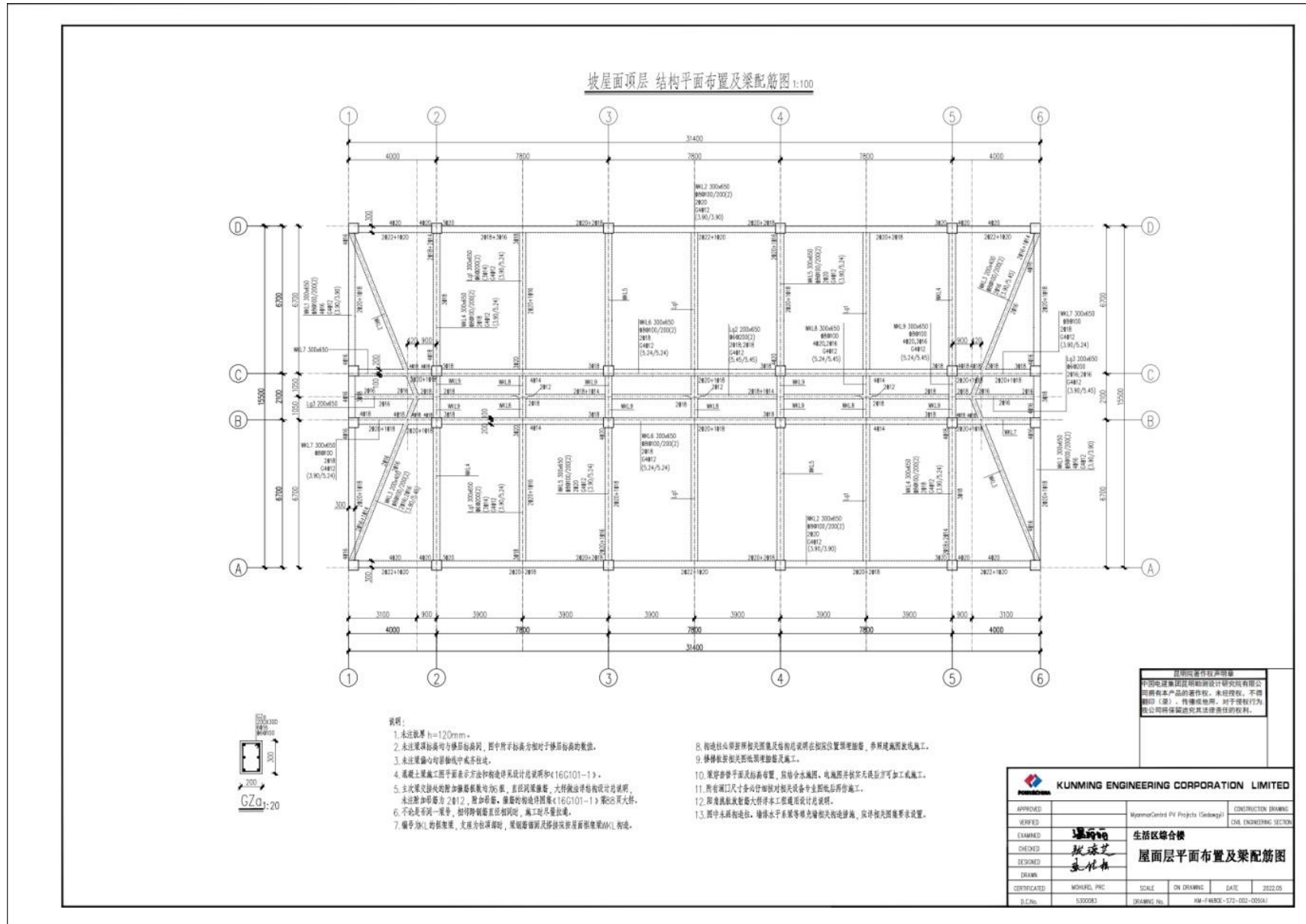
SCALE: ON DRAWING DATE: 2022.05

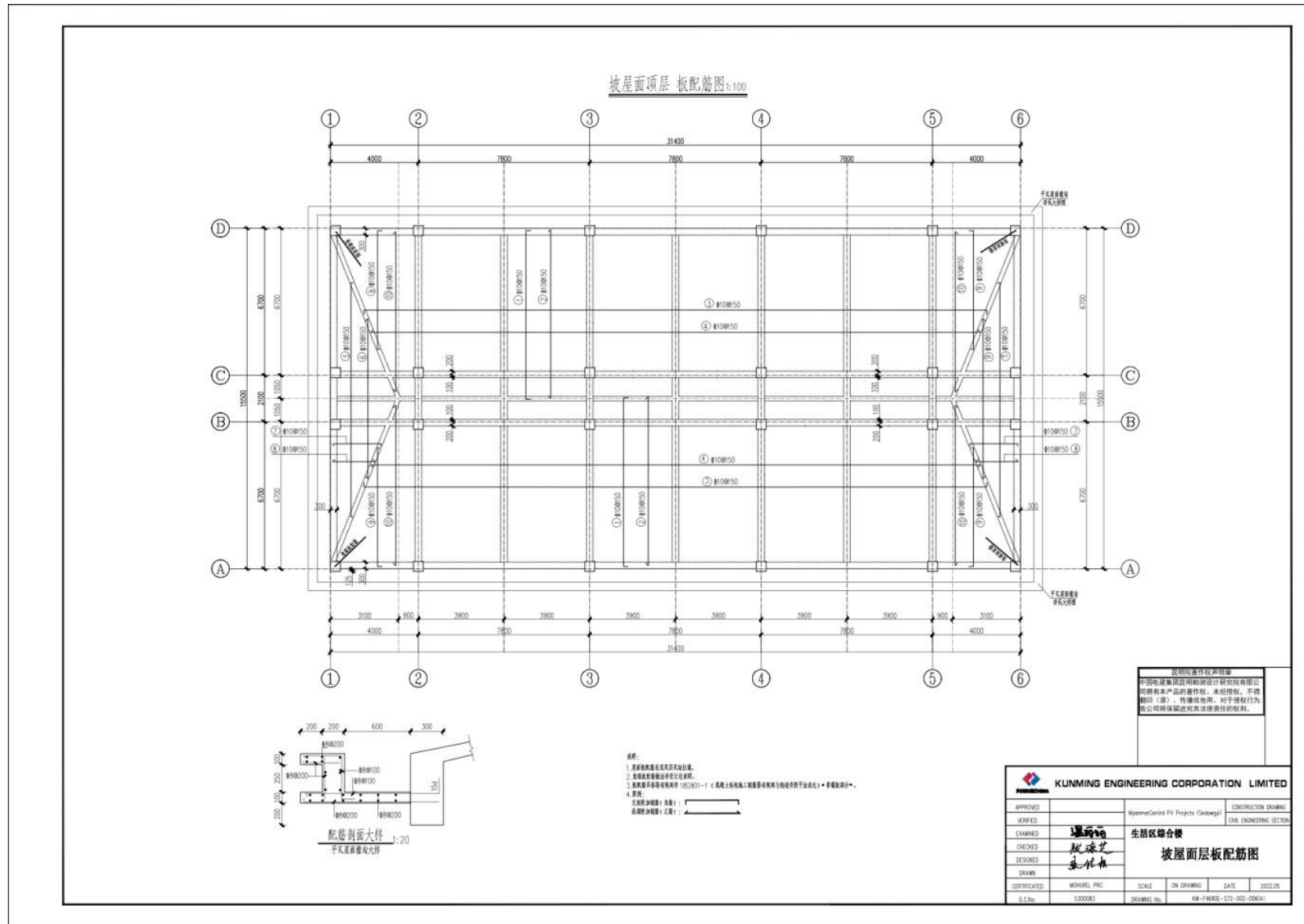
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EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

6) Equipment and Material Supply

| Sedawgyi Power Plan Equipment and Material Supply (Onshore Supply) Portion | | | | | | |
|---|---|-----|------|------------------|-------------------|--------|
| ITEM M/L | NAME & SPECIFICATION | Qty | Unit | Estimated Price | Origin of Country | Remark |
| | | | | USD | | |
| 1 | Steel material of pile foundation (600 * 76 / 4 steel pipe) | 1 | Unit | 114626 | Myanmar | |
| 2 | borchhole pump | 1 | Unit | 14981 | | |
| 3 | Electric shrinkage gate | 1 | Unit | 15889 | | |
| 4 | crawl | 1 | Unit | 163427 | | |
| 5 | Sand & stone&brick&concrete , etc | 1 | Unit | 1015368 | | |
| 6 | Pile foundation reinforcement | 1 | Unit | 227663 | | |
| 7 | concrete iron | 1 | Unit | 53908 | | |
| 8 | Hot galvanized steel pipe | 1 | Unit | 95333 | | |
| 9 | Ground flat steel | 1 | Unit | 176479 | | |
| 10 | light distribution box | 1 | Unit | 45396 | | |
| 11 | diesel generator | 1 | Unit | 153213 | | |
| 12 | wire | 1 | Unit | 34047 | | |
| 13 | Supply and drainage equipment | 1 | Unit | 130515 | | |
| 14 | PVC PIPE | 1 | Unit | 22732 | | |
| 15 | portable dwellings | 1 | Unit | 113491 | | |
| 16 | Temporary facilities | 1 | Unit | 146593 | | |
| 17 | Epidemic prevention materials | 1 | Unit | 87365 | | |
| 18 | Other sporadic materials | 1 | Unit | 248124 | | |
| | | | | 2,850,150 | | |

MYANMAR SEDAWGYI SOLAR POWER COMPANY LIMITED
EQUIPMENT AND MATERIAL SUPPLY(OFFSHORE SUPPLY) PORTION

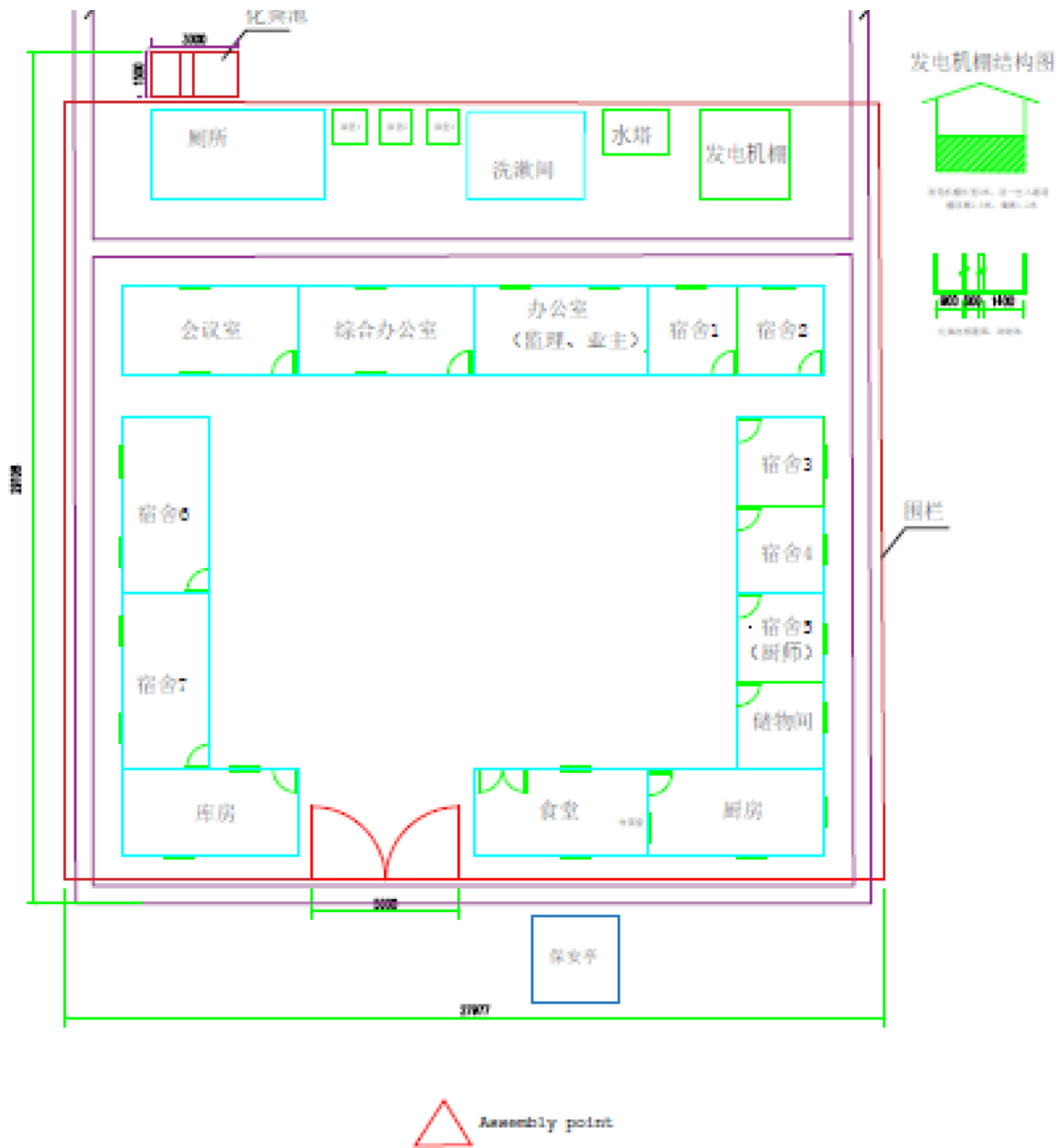
| ITEM M/L | HS CODE | NAME & SPECIFICATION | Unit | Qty | Estimated Price | Origin of Country | Preliminary Shipping Plan | Remark |
|----------|--------------|--|------|---------|-----------------|-------------------|---------------------------|--------|
| | | | | | USD | | | |
| 1 | 8541.4022.00 | PV module | U | 96186 | 13335851 | China | | |
| 2 | 7308.9099.00 | PV support bracket | kg | 1032000 | 2108081 | China | | |
| 3 | 8504.4040.00 | String inverters | U | 190 | 797416 | China | | |
| 4 | 8504.3429.00 | Packaged Transformer | U | 7 | 876478 | China | | |
| 5 | 8537.1092.00 | Communications cabinets (Including switch, anti PID control device, data management device, etc) | kg | 3600 | 53120 | China | | |
| 6 | 8544.4929.00 | PV cable (including accessories) | kg | 30000 | 870226 | China | | |
| 7 | 8544.6012.00 | Power cable (including accessories) | kg | 162600 | 355933 | China | | |
| 8 | 8544.6012.00 | Control cable (including accessories) | kg | 4800 | 340878 | China | | |
| 9 | 8504.2329.00 | Main transformer(including accessories) | U | 1 | 344995 | China | | |
| 10 | 8535.9010.00 | Neutral point equipment (including neutral isolating switch, current transformer, lightning arrester, etc.) | kg | 2400 | 172309 | China | | |
| 11 | 8535.9010.00 | 132kV line - transformer group interval | kg | 72000 | 210098 | China | | |
| 12 | 8535.9010.00 | 132kV outdoor equipment (132kV lightning arrester, attached discharge recorder, outdoor voltage transformer) | kg | 14400 | 63687 | China | | |
| 13 | 8537.1099.00 | Distribution Equipment | kg | 9600 | 304873 | China | | |
| 14 | 8543.7090.00 | Reactive power compensation device | U | 3 | 317429 | China | | |
| 15 | 8504.2192.00 | Station service electricity equipment | U | 10 | 141079 | China | | |
| 16 | 9015.8090.00 | environmental monitoring instrument | U | 2 | 31231 | China | | |
| 17 | 8507.2099.00 | Valve-controlled sealed lead-acid battery | U | 3 | 27424 | China | | |

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

| | | | | | | | | |
|------|--------------|--|----|-------|--------|-------|--|--|
| 18 | 9030.3390.00 | Fault recording cabinet | U | 2 | 17954 | China | | |
| 19 | 8543.7090.00 | Supervisory system | U | 6 | 351480 | China | | |
| 20 | 8535.9090.00 | Protection system | kg | 4800 | 287306 | China | | |
| 21 | 8517.6230.00 | Communication system | U | 6 | 257429 | China | | |
| 22 | 8504.4011.00 | DC and uninterruptible power supply system | U | 6 | 80196 | China | | |
| 23 | 9015.8090.00 | Power prediction system equipment | U | 2 | 32791 | China | | |
| 24 | 8415.1010.00 | Heating and ventilation system equipment | U | 3 | 40316 | China | | |
| 25 | 8424.1090.00 | Fire fighting equipment | U | 3 | 74036 | China | | |
| 26 | 8531.1020.00 | Fire alarm system | U | 3 | 129133 | China | | |
| 27 | 8537.1099.00 | Centralized control access device | kg | 2400 | 27153 | China | | |
| 28 | 8421.2122.00 | sewage treatment equipment | U | 2 | 69762 | China | | |
| 29 | 8517.6230.00 | Meeting system | U | 24 | 265599 | China | | |
| 30 | 8517.6230.00 | Internet equipment | U | 24 | 265599 | China | | |
| 31 | 8537.2090.00 | step-up substation equipment | KG | 50000 | 278463 | China | | |
| 32 | 3917.3999.00 | Carbon threaded pipe | kg | 7200 | 8049 | China | | |
| 33 | | Hot-dip galvanized steel pipe | | | | China | | |
| 33.1 | 7306.3099.00 | Hot-dip galvanized steel pipe | kg | 24000 | 19628 | China | | |
| 33.2 | 7308.9099.00 | Hot-dip Galvanized pipe pile | kg | 96000 | 176653 | China | | |
| 34 | 3816.0090.00 | Cable Fire Retardant Coating | kg | 2400 | 7891 | China | | |

| | | | | | | | | |
|--------------|--------------|--|----|--------|-------------------|-------|--|--|
| 35 | 8544.4299.00 | Panel ground wire | kg | 780 | 5738 | China | | |
| 36 | 3918.9019.00 | Anti-static computer room floor | kg | 7200 | 28651 | China | | |
| 37 | 7228.7090.00 | Galvanized Angle steel | kg | 20400 | 36648 | China | | |
| 38 | 3816.0090.00 | Fire blocking material | kg | 2400 | 9746 | China | | |
| 39 | 3208.9090.00 | Antirust paint | kg | 36 | 315 | China | | |
| 40 | 8535.4000.00 | Framing lightning rod | kg | 12000 | 101039 | China | | |
| 41 | 8413.8119.00 | Water supply and drainage equipment | U | 2 | 26016 | China | | |
| 42 | 8537.1099.00 | Lighting distribution box | kg | 960 | 7797 | China | | |
| 43 | 8544.1900.00 | Electric wire | kg | 540 | 5199 | China | | |
| 44 | 8502.2010.00 | Diesel generator | U | 2 | 53799 | China | | |
| 45 | | 132kV transmission line | | | | China | | |
| 45.1 | 7318.1590.00 | Anchor bolt | kg | 14400 | 15192 | China | | |
| 45.2 | 7308.2019.00 | Transmission line tower | kg | 360000 | 278517 | China | | |
| 45.3 | 7614.1090.00 | Steel core aluminum stranded wire | kg | 24000 | 126599 | China | | |
| 45.4 | 8538.9019.00 | Connector clamp for transmission lines | kg | 4800 | 35448 | China | | |
| 45.5 | 8546.1000.00 | Line insulator | kg | 20400 | 50640 | China | | |
| Total | | | | | 23,521,890 | | | |

7) Assembly Point for the Proposed Project



8) Public Consultation Meeting's Attendance List

မန္တလေးတိုင်းဒေသကြီး၊ ပြင်ဦးလွင်ခရိုင်၊ မတ္တရာမြို့နယ်၊ သန်းကုန်းကျေးရွာအုပ်စုတွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လွှတ်ခြင်း စီမံကိန်းအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ရေးဆွဲခြင်းလုပ်ငန်းနှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အုပ်စုပွဲ၊ ဆွေးနွေးခြင်း အခမ်းအနားသို့ တက်ရောက်လာသူများစာရင်း ရက်စွဲ။ ။ ၂၀၂၂ ခုနှစ်၊ မေလ၊ (၂၀) ရက်

| စဉ် | အမည် | နေရပ်လိပ်စာ | အလုပ်အကိုင် | ဖုန်းနံပါတ် | လက်မှတ် |
|-----|------------|-------------|-------------|--------------|-------------|
| ၁ | ကျော်မောင် | သန်းတန်း | လုပ်ငန်း | ၀၉-၇၅၃၃၆၀၆၄၄ | [Signature] |
| ၂ | ကျော်သူ | " | ကျေးရွာ | ၀၉-၈၈၀၆၉၄၅၇၈ | [Signature] |
| ၃ | ပင်မောင် | " | ကျေးရွာ | ၀၉-၇၉၈၉၇၈၅၅ | [Signature] |
| ၄ | ကျော်မောင် | " | " | ၀၉-၇၆၀၉၇၉၀၈ | [Signature] |
| ၅ | ဒေါ်မောင် | " | ကျေးရွာ | - | [Signature] |
| ၆ | ဒေါ်မောင် | " | " | ၀၉-၇၆၀၅၅၅၅၅ | [Signature] |
| ၇ | ဒေါ်မောင် | " | ကျေးရွာ | ၀၉-၇၆၀၅၅၅၅၅ | [Signature] |
| ၈ | ဒေါ်မောင် | " | " | ၀၉-၇၆၀၅၅၅၅၅ | [Signature] |
| ၉ | ဒေါ်မောင် | " | " | ၀၉-၇၆၀၅၅၅၅၅ | [Signature] |
| ၁၀ | ဒေါ်မောင် | " | " | ၀၉-၇၆၀၅၅၅၅၅ | [Signature] |
| ၁၁ | ဒေါ်မောင် | " | " | ၀၉-၇၆၀၅၅၅၅၅ | [Signature] |

မန္တလေးတိုင်းဒေသကြီး၊ ပြင်ဦးလွင်ခရိုင်၊ မတ္တရာမြို့နယ်၊ သန်းကုန်းကျေးရွာအုပ်စုတွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လွှတ်ခြင်း စီမံကိန်းအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ရေးဆွဲခြင်းလုပ်ငန်းနှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အုပ်စုပွဲ၊ ဆွေးနွေးခြင်း အခမ်းအနားသို့ တက်ရောက်လာသူများစာရင်း ရက်စွဲ။ ။ ၂၀၂၂ ခုနှစ်၊ မေလ၊ (၂၀) ရက်

| စဉ် | အမည် | နေရပ်လိပ်စာ | အလုပ်အကိုင် | ဖုန်းနံပါတ် | လက်မှတ် |
|-----|-----------|------------------|-------------------------|-------------|-------------|
| ၁၂ | ဒေါ်မောင် | သန်းကုန်းကျေးရွာ | (ရွာရွာအုပ်စု) ကောင်လေး | ၀၉၇၆၀၅၅၅၅၅ | [Signature] |
| ၁၃ | ဒေါ်မောင် | မန္တလေး | ဒါရိုက်တာ | ၀၉၇၆၀၅၅၅၅၅ | [Signature] |
| ၁၄ | ဒေါ်မောင် | သန်းကုန်း | ကျေးရွာ | ၀၉၇၆၀၅၅၅၅၅ | [Signature] |
| ၁၅ | ဒေါ်မောင် | " | " | ၀၉၇၆၀၅၅၅၅၅ | [Signature] |
| ၁၆ | ဒေါ်မောင် | " | " | ၀၉-၇၆၀၅၅၅၅၅ | [Signature] |
| | ဒေါ်မောင် | " | " | | [Signature] |
| | ဒေါ်မောင် | " | " | | [Signature] |
| | | | | | |
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| | | | | | |


EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

မန္တလေးတိုင်းဒေသကြီး၊ ပြင်ဦးလွင်ခရိုင်၊ မတ္တရာမြို့နယ်၊ သန်းကျန်းကျေးရွာအုပ်စုတွင်အကောင်အထည်ဖော်ဆောင်ရွက်မည့်
 ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံးလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်းအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်းလုပ်ငန်းနှင့်ပတ်သက်၍
 ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူပွဲ အခမ်းအနားသို့တက်ရောက်လာသူများစာရင်း

ရက်စွဲ။ ။ ၂၀၂၂ ခုနှစ်၊ မေလ (၂၀) ရက်။

| စဉ် | အမည် | ရာထူး | ဌာန/ အဖွဲ့အစည်း | ဆက်သွယ်ရန်ဖုန်းနံပါတ် | လက်မှတ် |
|-----|--------------------|--------------|--|-----------------------|---------|
| | Nang Hye Ngin Hom | Translator | Sinohydro (Myanmar) Myanmar Sedawgyi Solar Power Co., Ltd. | ၀၉၅၈၀၀၇၀၆၅ | |
| | ကိုသိန်းအောင် | " | " | ၀၉၂၆၀၁၉၁၈၀၈ | |
| | Mr. Wu Gang | Engineer | " | ၀၉၇၅၆၁၇၇၃၈၅ | |
| | Mr. Mu Chang Jiang | Site Manager | " | ၀၉၈၀၂၅၅၈၇၄၂ | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

9) Public Consultation's Meeting Minutes

| E Guard Environmental Services Co., Ltd. Meeting Minutes | |  |
|---|---|---|
| Subject : Public Consultation Meeting for Environmental Management Plan (EMP) of 30 MW Ground Mounted Solar Power Plant Project Connected to Sedawgyi Substation | Date: 20 th May, 2022 | |
| Venue: Mani Myitzu Monastery, Thangone Village, Sakar Pin Village Tract, Madaya Township | Time: 1:00 pm to 2:30 pm | |
| Attendee Lists | | |
| Local People from Thangone Village | - 18 | |
| Representatives from Project Proponent | - 4 | |
| Representatives from E Guard Environmental Services | - 3 | |
| Prepared By : Daw Nang Aye Thida | | |

Agenda:

The meeting was held in accordance with the following agenda;

- 1) Opening the ceremony
- 2) Presentation of Project Information by Daw Nang Ngin Hom on behalf of Mr. Mu Zheng Jiang (Project Manager, Myanmar Sedawgyi Solar Power Co., Ltd.)
- 3) Presentation of Environmental Management Plan (EMP) for construction and operation of 30 MW ground mounted solar power plant project connected to Sedawgyi Substation by U Aung Si Thu Thein (Assistant Consultant, E Guard Environmental Services Co., Ltd.)
- 4) Questions, Comments and Suggestions from the attendees.
- 5) Closing the ceremony

1. Opening Ceremony

2. Presentation of Project Information by Daw Nang Ngin Hom on behalf of Mr. Mu Zheng Jiang (Project Manager, Myanmar Sedawgyi Solar Power Co., Ltd.)

Daw Nang Ngin Hom briefly explained 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 Sedawgyi Substation by U Aung Si Thu Thein (Assistant Consultant, E Guard Environmental Services Co., Ltd.)

U Aung Si Thu Thein 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 Win Maung (Thangone Village) would like to know that how will project proponent consider our village serve concrete road as they use it every day for construction? Moreover, he hopes this project can create employment opportunities for local people.

Answer: U Aung Si Thu Thein (Assistant Consultant, E Guard Environmental Services) answered that the project shall have Communities Society Responsibility (CSR) Plan which means 2% of project net profit will be using for rural development such as donating in rural library, clinic, as well as repair rural road, etc. for the near village after the construction. We will describe the fact that the project proponent shall renovate the road if it is damaged by the proposed project in Environmental Management Plan.

Question: U Kyaw Thu (Thangone Village) asked that what advantages will the village get regard to the proposed project?

Answer: U Aung Si Thu Thein (Assistant Consultant, E Guard Environmental Services) answered like same answer of previous question. The project proponent shall have Communities Society Responsibility (CSR) Plan which means 2% of project net profit will be using for rural development such as donating in rural library, clinic, as well as repair rural road, etc. for the near village after the construction.

Question: U Tun Aung (Thangone Village) would like to know that will the project provide job opportunities for the villagers. Moreover, he hope Thangone village should be prior when giving job offered as there are many qualified villager.

Answer: U Aung Si Thu Thein (Assistant Consultant, E Guard Environmental Services) answered that, in EMP report, we have to mention the project should provide job opportunities for villagers during construction and operation of the project: so that, they can also have job experiences.

Question: Ashin U Nandaw Bar Ta (Monk of Mani Myitzu Monastery) would like to confirm the information he heard that if they want to do small business like shop near project area, one of the family members have to be worker of the project. If not, they cannot do their small business.

Answer: Mr. Mu Zheng Jiang (Project Manager, Myanmar Sedawgyi Solar Power Co., Ltd.) answered that they never said like that before. Even if they want to open shop near the project site, they can be dangerous.

Requested By U Tin Shain (Thangone Village): They want the project proponent to negotiate with the villager how transmission line passes through and their entitlement. It's been a long time that we have been requesting to have meeting with the project proponent to negotiate about using 6" thick concrete road which is constructed by villagers, by their own cost and effort. We don't accept that the road will be renovated only when it is damaged.

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.

Answer: Mr. Mu Zheng Jiang (Project Manager, Myanmar Sedawgyi Solar Power Co., Ltd.) answered that the usage of land for transmission tower will be responsible by other contractor and will inform them about your suggestion.

Suggestion By U Chit Hla (Thangone Village): We provided, are still providing and would like to continue providing assistance to project proponent so that the project to be successfully implemented but we consistently asked to get in touch with the responsible person from the site. Several team came to the site passing the village but we did not know what those team came and working on ground. There was no one from project proponent for a meeting face to face with the villagers. We would like to request the project proponent to consider our village development and to negotiate with the villagers.

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

5. Closing Ceremony

10) Public Consultation Meeting's Photo Records



Mani Myitzu Monastery where Public Consultation Meeting was held



Presented by Project Proponent (Myanmar Sedawgyi Solar Power Co., Ltd.)



Presented by U Aung Si Thu Thein (E Guard Environmental Services)



Questions, Comments and Suggestions from the Attendees



Questions, Comments and Suggestions from the Attendees



Questions, Comments and Suggestions from the Attendees

11) Presentation File of Public Consultation Meeting



နိဒါန်း

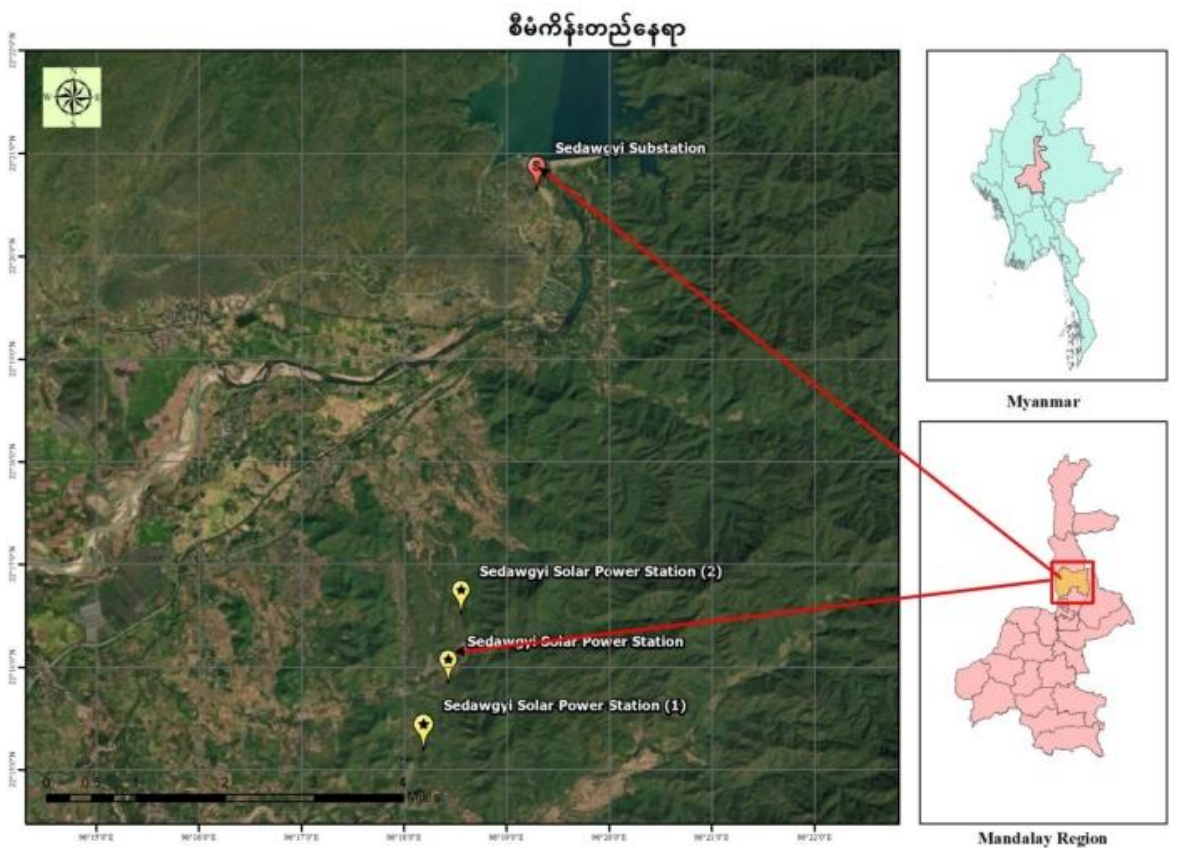
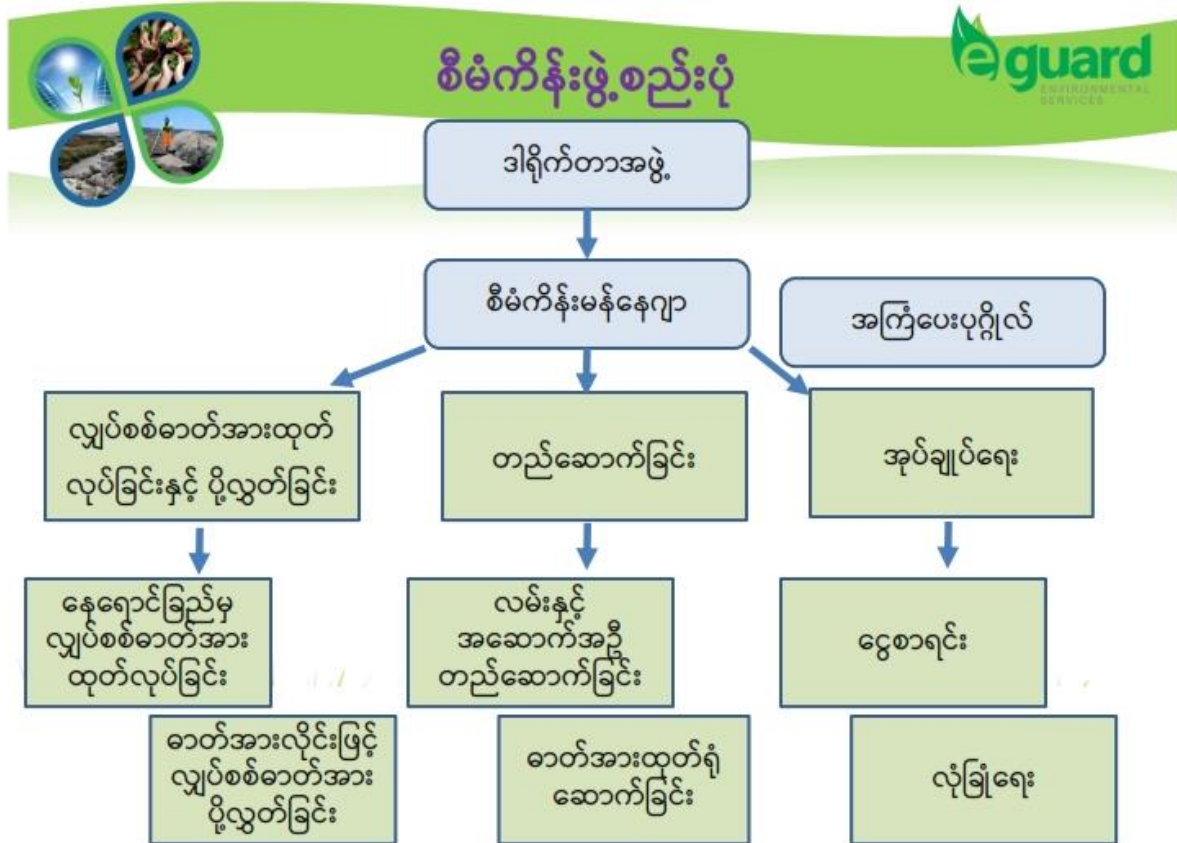
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| <p>စီမံကိန်းအကောင်အထည်ဖော်သူ</p> <p>ရင်းနှီးမြှုပ်နှံမှုပုံစံ</p> <p>လုပ်ငန်းအမျိုးအစား</p> <p>စီမံကိန်း၏အဓိကရည်ရွယ်ချက်</p> <p>စီမံကိန်းတည်နေရာ</p> | <p>- Myanmar Sedawgyi Solar Power Co., Ltd.</p> <p>- ပြည်ပရင်းနှီးမြှုပ်နှံမှု</p> <p>- နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းလုပ်ငန်း</p> <p>- နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ပြီး ဆည်တော်ကြီး ဓာတ်အားခွဲရုံသို့ ပို့လွှတ်ရန်</p> <p>- မန္တလေးတိုင်းဒေသကြီး၊ ပြင်ဦးလွင်ခရိုင်၊ မတ္တရာမြို့နယ်၊ စကားပင်ကျေးရွာအုပ်စု၊ သန်းကုန်းကျေးရွာ</p> |
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စီမံကိန်းအတွက်ရင်းနှီးမြှုပ်နှံမှုပုံစံ

Myanmar Sedawgyi Solar Power Co., Ltd.

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

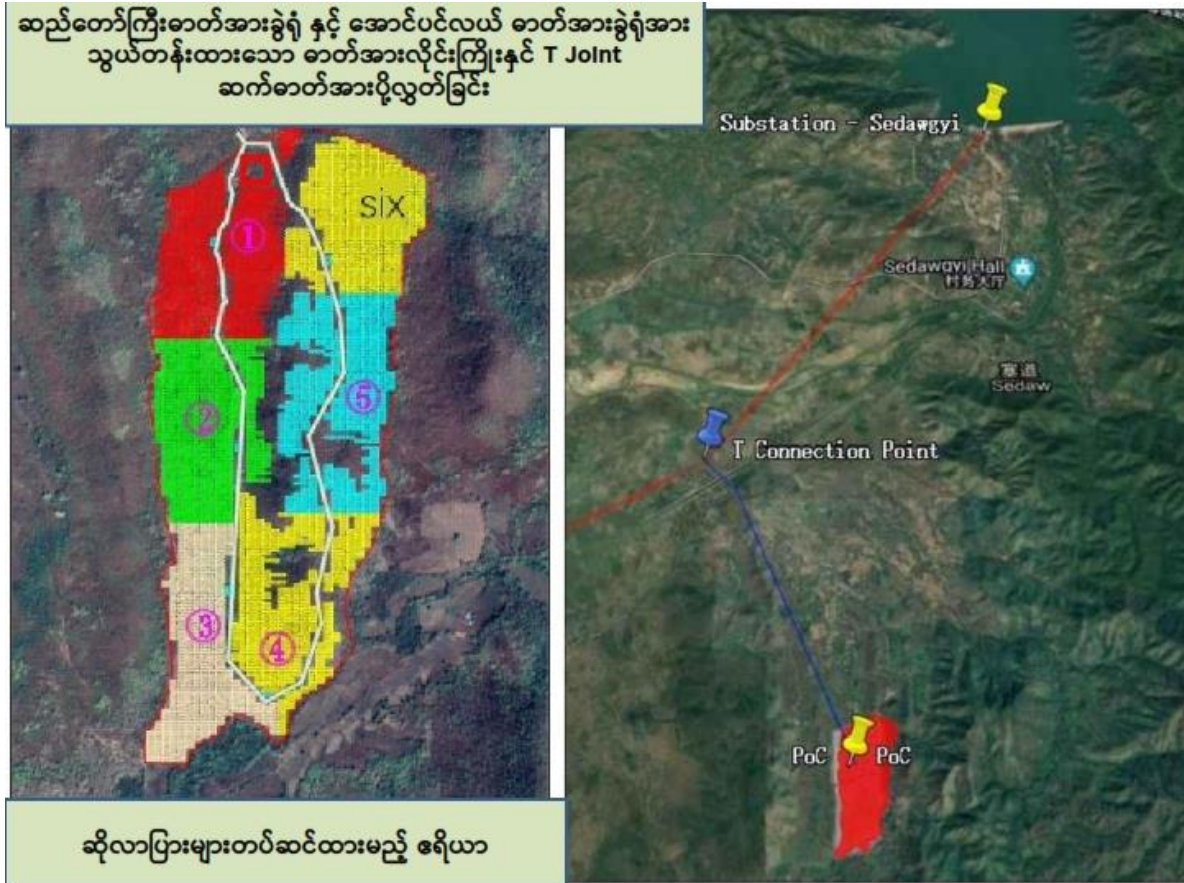


စီမံကိန်းဆိုင်ရာအချက်အလက်များ 

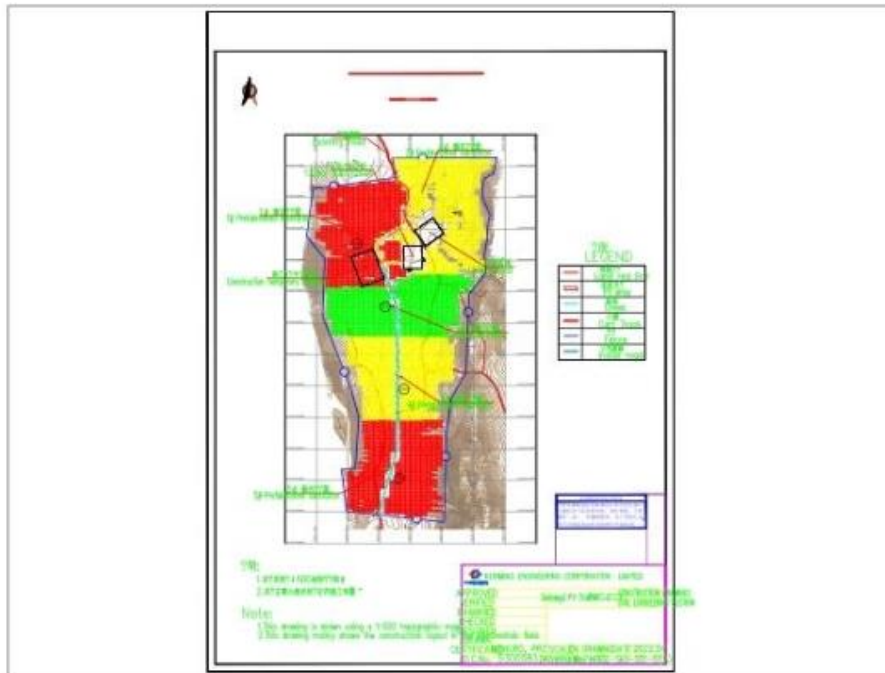
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|---|------------------------------|
| စီမံကိန်းတည်ဆောက်မည့်ကာလ | - (၆) လ |
| စီမံကိန်းလည်ပတ်မည့်ကာလ | - နှစ် (၂၅) |
| စီမံကိန်းအကျယ်အဝန်း | - (၁၅၀.၉၄) ဧက |
| ဓာတ်အားလိုင်းမှပို့လွှတ်နိုင်သည့်ပမာဏ | - (၃၀) မဂ္ဂါဝပ် |
| ဓာတ်အားလိုင်းအရှည် | - (၃.၈) ကီလိုမီတာခန့် |
| ဓာတ်အားစတင်ပို့လွှတ်မည့် အဆောက်အအုံ အကျယ် | - (၇၂.၈ x ၅၈.၈၀) စတုရန်းမီတာ |
| ဝန်ထမ်းအဆောက်အအုံ | - (၇၂.၈ x ၅၈.၈၀) စတုရန်းမီတာ |

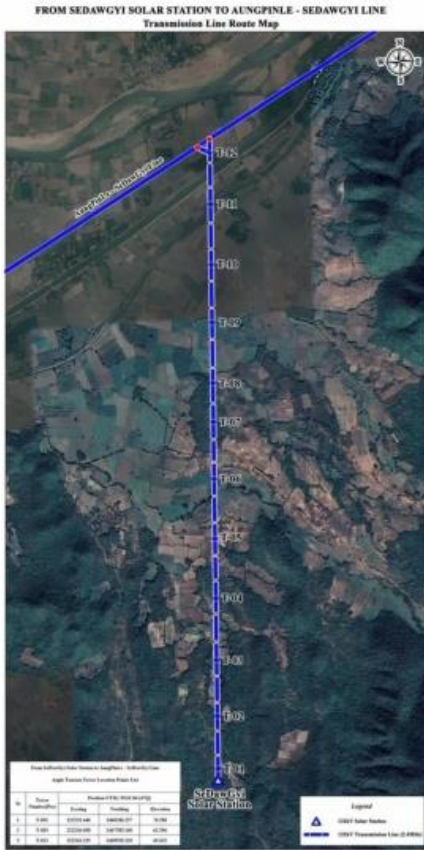
စီမံကိန်းဆိုင်ရာအချက်အလက်များ 

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| ဆိုလာပြားအမျိုးအစားနှင့် အရေအတွက် | - ၅၄၀ Wp ရှိ မျက်နှာပြင်တစ်ဖက် ပါသော မိုနိုခရစ်စတယ်လိုင်း ဆီလီကွန် ဆိုလာပြား (၆၇၂၀၀ ခု) |
| ဆိုလာပြားအောက်ရှိထောက်တိုင်အမျိုးအစားနှင့် အရေအတွက် | - အရှေ့အရပ်မှအနောက်အရပ်သို့ ရေပြင်ညီအတိုင်းလှည့်နိုင်သော ထောက်တိုင် (၂၄၀၀ ခု) |
| အင်ဗာတာအမျိုးအစားနှင့် အရေအတွက် | - 250 kW String inverter ၂၀ လုံး |
| ထရန်စဖော်မာအမျိုးအစားနှင့် အရေအတွက် | - 5000 kVA Box transformer (၃ လုံး) |
| ဓာတ်အားလိုင်းတွင်ပါဝင်မည့်ဓာတ်တိုင်အမျိုးအစား - Self- supporting Iron Tower | - ၁၉ တိုင် |

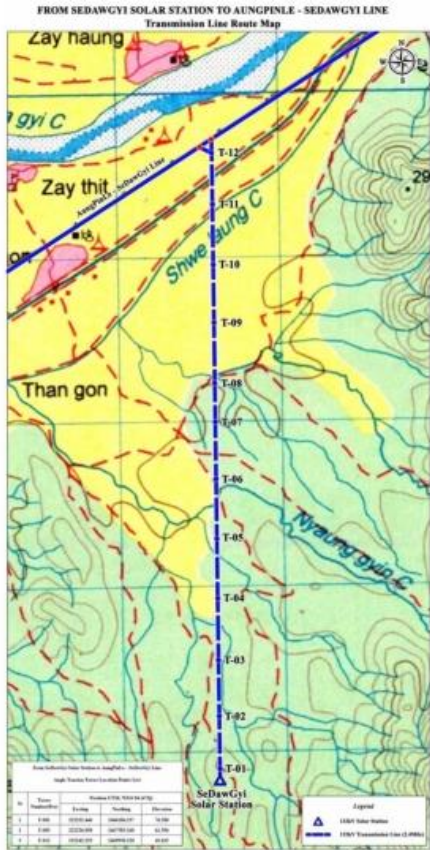


အဆိုပြုစီမံကိန်း၏ ဆောက်လုပ်ရေးလုပ်ငန်းပြ မြေပုံ





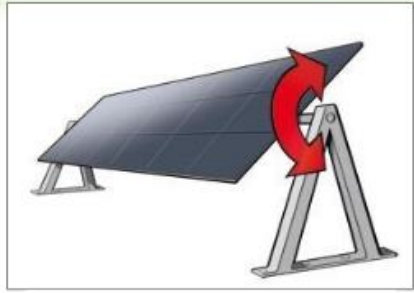
ဆည်တော်ကြီးဓာတ်အားစိုက်ခန်းနှင့် အောင်ပင်လယ် ဓာတ်အားစိုက်ခန်းအား ညွှန်ကြားထိန်းချုပ်ရေးနှင့် အောင်ပင်လယ် ဓာတ်အားစိုက်ခန်းအား ညွှန်ကြားထိန်းချုပ်ရေး ဝန်ကြီးဌာနမှ အတည်ပြုထားသော ဓာတ်အားလိုင်းကြီးနှင့် T Joint ဆက်၍ 132 KV ဓာတ်အားလိုင်း သွယ်တန်းမည့် လမ်းကြောင်းပြ မြေပုံ



စီမံကိန်းဆိုင်ရာအချက်အလက်များ 



ဆိုလာပြား

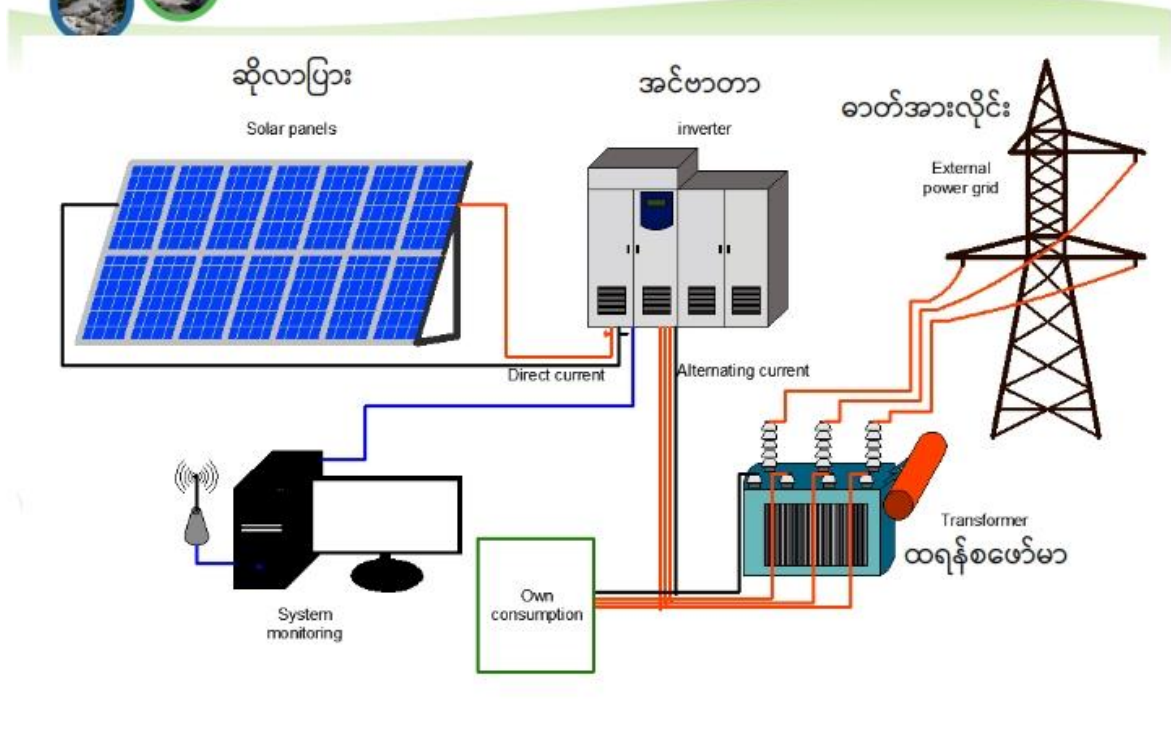


အင်ဗာတာ



ထရန်စဖော်မာ

စီမံကိန်းဆိုင်ရာအချက်အလက်များ 



ဘဏ္ဍာရေးစီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်း
 (Environmental Management Plan)
 E Guard Environmental Services



ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်း

စီမံကိန်း၏ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုများ

➔

စစ်ဆေးခြင်း

- ✓ သိသာထင်ရှားမှုရှိ၊ မရှိ
- ✓ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆောင်ရွက်ရန် လိုအပ်ခြင်းရှိ၊ မရှိ
- ✓ သတ်မှတ်ထားသော အထောက်အထားများ ပြုစုတင်ပြရန်လိုအပ်ခြင်းရှိ၊ မရှိ

ဆောင်ရွက်သည့်အဖွဲ့အစည်း - E Guard Environmental Services Co., Ltd.

စိစစ်ခွင့်ပြုမည့်အဖွဲ့အစည်း - သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

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| လိုက်နာရမည့်ဥပဒေ၊ နည်းဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ | ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော် (၂၀၀၈) ဖွဲ့စည်းပုံအခြေခံဥပဒေ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ |
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ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်း၏ ရည်ရွယ်ချက်များ

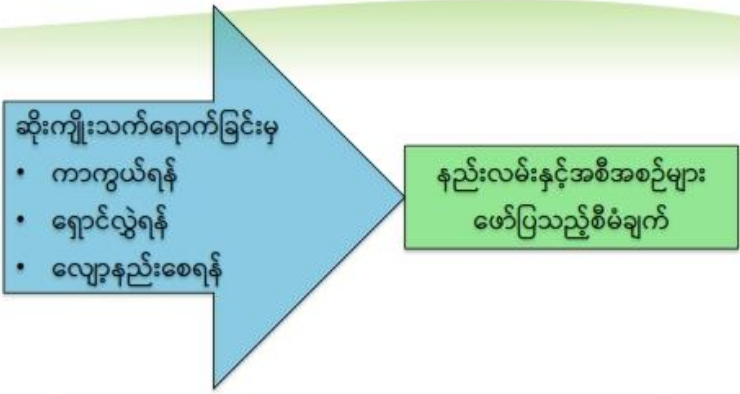
- စီမံကိန်းဆောင်ရွက်မှုများကြောင့် ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများကို ဆန်းစစ်လေ့လာခြင်း
- ဆိုးသောသက်ရောက်မှုများကို လျော့ချပေးနိုင်မည့်နည်းလမ်းများအား အကြံပြုတင်ပြခြင်း
- ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်များနှင့် အခြားအစီအစဉ်များအား ကြိုတင်ပြင်ဆင်ပြီး အကောင်အထည်ဖော်ဆောင်ရွက်ခြင်း

အများပြည်သူသဘောထားရယူခြင်း၏ရည်ရွယ်ချက်များ

- ဖြစ်ပေါ်လာနိုင်သည့် ကောင်းကျိုး၊ ဆိုးကျိုးများကိုတင်ပြခြင်း
- ပါဝင်ပတ်သက်သူများ၏ အမြင်နှင့်အကြံပြုချက်များ၊ ထိခိုက်သက်ရောက်လာနိုင်မှုများကို လျော့ချပေးနိုင်မည့်အစီအစဉ်များ၊ စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်များတွင် ထည့်သွင်းစဉ်းစားပေးခြင်း
- စီမံကိန်းတည်ဆောက်ခြင်းနှင့် လုပ်ငန်းလည်ပတ်ခြင်း၏ ပွင့်လင်းမြင်သာမှုနှင့်တာဝန်ယူနိုင်မှု တိုးတက်စေခြင်း
- အငြင်းပွားမှုများလျော့ချခြင်းနှင့် စီမံကိန်းအကောင်အထည်ဖော်ရာတွင် ချောမွေ့မှုရှိစေရန် ဆောင်ရွက်ခြင်း

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် 

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



လုပ်ငန်းလည်ပတ်သည့်ကာလ ပြီးဆုံးပါက စီမံကိန်းအား သက်တမ်းတိုးပြီး ဆက်လက်ဆောင်ရွက်မည်ဖြစ်သောကြောင့် စီမံကိန်းဖျက်သိမ်းသည့်ကာလအား ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်တွင် ထည့်သွင်းစဉ်းစားခြင်းမရှိပါ။

ဖြစ်ပေါ်လာနိုင်သည့်သက်ရောက်မှုများ 

- ကောင်းသောသက်ရောက်မှုများ
- ဆိုးသောသက်ရောက်မှုများ

 **ကောင်းသောသက်ရောက်မှုများ** 

• တည်ဆောက်သည့်ကာလ

- အလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
- စီးပွားရေးအခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း

• လုပ်ငန်းလည်ပတ်သည့်ကာလ

- အလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
- ဖန်လုံအိမ်ဓာတ်ငွေ့ထုတ်လုပ်မှုလျှော့ချနိုင်ခြင်း
- ပြန်လည်ပြည့်ဖြိုးမြဲစွမ်းအင်မှလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်း
- မြန်မာနိုင်ငံတွင် နေရောင်ခြည်သုံး လျှပ်စစ်ဓာတ်အားထုတ်လုပ်သည့် နယ်ပယ်တွင် ရင်းနှီးမြှုပ်နှံမှု တိုးများလာခြင်း
- နိုင်ငံတော်၏စီးပွားရေးဖွံ့ဖြိုးတိုးတက်ခြင်း

 **ဆိုးသောသက်ရောက်မှုများ** 

• တည်ဆောက်သည့်ကာလ

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

 ဆိုးသောသက်ရောက်မှုများ 

• လုပ်ငန်းလည်ပတ်သည့်ကာလ

- လေအရည်အသွေး
- ရေအရည်အသွေး
- မြေအရည်အသွေး
- ဆူညံသံနှင့်တုန်ခါမှု
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- စွန့်ပစ်ရေထွက်ရှိမှု
- အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းထွက်ရှိမှု

 ဆိုးသောသက်ရောက်မှုများ 

• စီမံကိန်းဖျက်သိမ်းသည့်ကာလ

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

 **လျှော့ချရန်နည်းလမ်းများ** 

- စီမံကိန်းရှိလမ်းများအား ရေဖြန်းခြင်း၊ လမ်းခင်းခြင်း
- လုပ်ငန်းသုံးယာဉ်များအား စနစ်တကျမောင်းနှင်စေခြင်းနှင့် ပုံမှန်ပြုပြင် ထိန်းသိမ်းခြင်း
- ညအချိန်တွင် ဆူညံသံနှင့်တုန်ခါမှုများသော စီမံကိန်းလုပ်ငန်းများ ဆောင်ရွက်ခြင်းအားရှောင်ရှားခြင်း
- ဆိုလာပြားများ၊ အင်ဗာတာများ၊ ထရန်စဖော်မာများအား စနစ်တကျတပ်ဆင်၊ ပြုပြင်ထိန်းသိမ်း၊ ဖြုတ်သိမ်းခြင်း
- ဓာတ်အားလိုင်းသွယ်တန်းရာတွင်စနစ်တကျဆောင်ရွက်ခြင်း
- ရေဆိုးသန့်စင်စက်တပ်ဆင်ခြင်းနှင့် ရေမြောင်းများစနစ်တကျဖောက်လုပ်ခြင်း
- လုပ်သားများအား လုပ်ငန်းခွင်ကာကွယ်ရေးပစ္စည်းများအသုံးပြုစေခြင်း၊ အမှန်တကယ်အသုံးပြုမပြုစစ်ဆေးခြင်း။

 **လျှော့ချရန်နည်းလမ်းများ** 

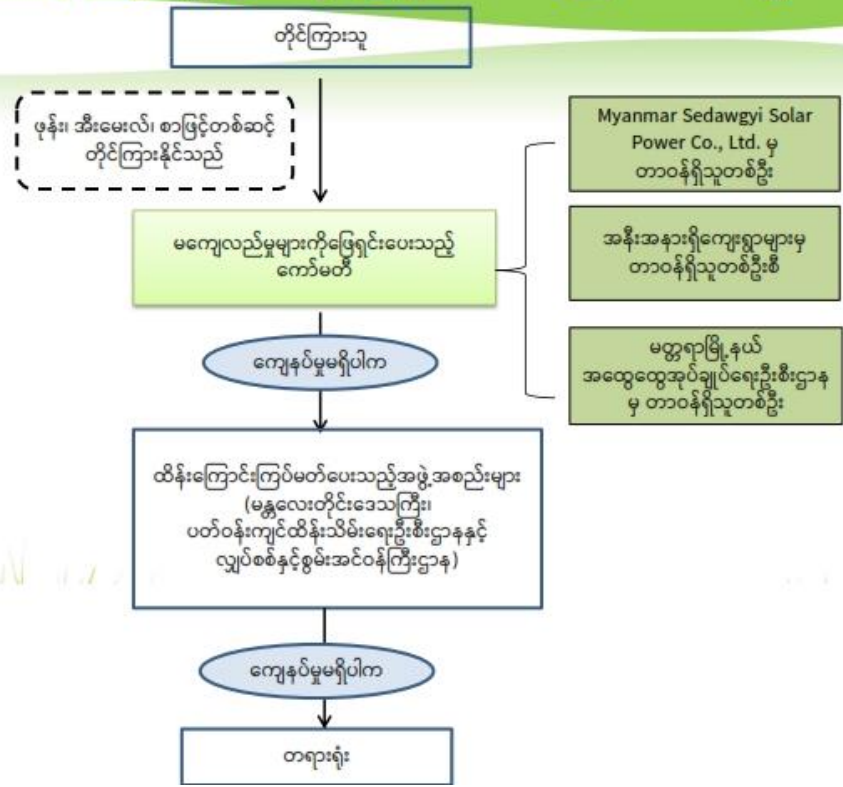
- ရပ်ရွာလူထုအား ဆူညံသံနှင့်တုန်ခါမှုမြင့်မားသော လုပ်ငန်းများဆောင်ရွက်ပါက ကြိုတင်အသိပေးခြင်း
- စီမံကိန်းခြံစည်းရိုးနှင့် ဓာတ်အားလိုင်းများတွင် သတိပေးဆိုင်းဘုတ်များ တပ်ဆင်ခြင်း
- စီမံကိန်းအတွင်းလုံလောက်သောအိမ်သာများ၊ လက်ဆေးကန်များထားပေးခြင်း
- မီးသတ်ဆေးဗူးများ၊ မီးသတ်ပိုက်များ၊ မီးသတ်ရေကန်များတပ်ဆင်ထားရှိခြင်း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

အခြားအစီအစဉ်များ



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

မကျေလည်မှုများကိုဖြေရှင်းပေးမည့်အစီအစဉ်



EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.



လေအရည်အသွေးတိုင်းတာခြင်း



ဆူညံသံပမာဏ တိုင်းတာခြင်း



မြေဆီလွှာ နမူနာကောက်ယူခြင်း



မြေအောက်ရေ နမူနာကောက်ယူခြင်း

26

12) Water Quality Laboratory's Result and On site Measurement Result of Groundwater



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



WTL-RE-001

Issue Date - 01-1-2016
Effective Date - 01-1-2016
Issue No - 1.0/ Page 1 of 1

M0522 024

WATER QUALITY TEST (MICROBIOLOGY) RESULTS FORM

Client 30 MW Ground Mounted Solar Power Project Connected To Sedawgyi Substation
Nature of Water Ground Water (P - 1)
Location Sedawgyi
Date and Time of collection 19.5.2022
Date and Time of arrival at Laboratory 20.5.2022
Date and Time of commencing examination 20.5.2022
Date and Time of completing 21.5.2022

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

| | | | |
|---------------------------------------|-------------------|-----------|--------------|
| Total Coliform Count | 8 | CFU/100ml | Not detected |
| Thermotolerant (fecal) Coliform Count | Not detected (<1) | CFU/100ml | Not detected |
| pH | 7.3 | | 6.5 - 8.5 |
| Turbidity | 7 | NTU | 5 NTU |
| Colour (True) | Nil | TCU | 15 TCU |
| Free Chlorine | Nil | mg/l | |
| Total Chlorine | Nil | mg/l | |

*Date & Time Sample Collection Error.

Remark : Unsatisfactory for drinking purpose.

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

: < - Less than

Tested by

Signature: *Heing*

Name: Zaw Hein Oo
B.Sc. Chemistry,
Sr.Chemist
ISO Tech Laboratory

Approved by

Signature: *Sos Thit*

Name: Sos 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

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.



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)

W0522 564

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

WATER QUALITY TEST RESULTS FORM

Client 30 MW Ground Manted Solar Power Project Connected To Sedawgyi Substation
Nature of Water Ground Water (P - 1)
Location Sedawgyi
Date and Time of collection 19.5.2022
Date and Time of arrival at Laboratory 20.5.2022
Date and Time of commencing examination 21.5.2022
Date and Time of completing 26.5.2022

Results of Water Analysis

**WHO Drinking Water Guideline
(Geneva - 1993)**

| | | | |
|---------------------------------|-----|---------------------------|-------------------------------|
| pH | 7.3 | | 6.5 - 8.5 |
| Colour (True) | | TCU | 15 TCU |
| Turbidity | 7 | NTU | 5 NTU |
| Conductivity | 574 | 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 | 16 | mg/l | |
| Total Dissolved Solids | 287 | 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 | 0.2 | ppt | |

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

Tested by

Signature:

Name:

Zaw Hein Oo
Zaw Hein Oo
B.Sc (Chemistry),
Sr. Chemist

Approved by

Signature:

Name:

Soo Thit
Soo Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.) ISO Tech Laboratory

No. 18, Lanthit Road, Nantthargone Quarter, Insein Township, Yangon, Myanmar.
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EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.



Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg. (Civil), Dip S.E.(Deflt) 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 564

WATER QUALITY TEST RESULTS FORM

Client 30 MW Ground Manted Solar Power Project Connected To Sedawgyi Substation
Nature of Water Ground Water (P - 1)
Location Sedawgyi
Date and Time of collection 19.5.2022
Date and Time of arrival at Laboratory 20.5.2022
Date and Time of commencing examination 21.5.2022
Date and Time of completing 26.5.2022

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) | 6.0 mg/l | |
| Chemical Oxygen Demand (COD) | 32 mg/l | |
| Biochemical Oxygen Demand (BOD) (5 days at 20 °C) | 4 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: *Heing*
Name: Zin Hein Oo
B.Sc (Chemistry),
Sr.Chemist
ISO Tech Laboratory

Approved by

Signature: *Saw Chit*
Name: Saw Chit
B.E (Civil) 1999,
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

EMP Report for 30 MW Ground Mounted Solar Power Plant Project
Proposed by Myanmar Sedawgyi Solar Power Co., Ltd.



ORIGINAL

Report No. : 22520-00054
Job Ref. : 5000124
Date : 26-May-22
Page 1 of 1

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 : 30 MW Grand Monted Solar Power Project Connected To Sedawgyi Substation (Ground Water)

Sampling Date : 19-May-22

Sample Condition : Glass and Plastic Bottle at Ambient Temperature

Lab Code : W-056

Date Sample(s) Received : 20-May-22

Testing Period : 23-May-22 TO 24-May-22

| No. | Test Items | Methods | Results | Units |
|-----|--------------------|--|---------|-------|
| 1 | Potassium | APHA 3500-K B (Flame Photometric Method) (23rd Edition) | 3.88 | 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) | <0.01 | mg/L |
| 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 *****

MCC

SGS (Myanmar) Limited

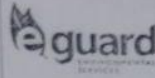
MCS
(Thia Thin Maw)
Laboratory Manager

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WARNING: The sample(s) to which the findings recorded herein (the "Findings") relate were/were drawn and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativeness of any goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) were said to be extracted.

SGS (Myanmar) Limited

Natural Resources, 79/D, Bo Chain Street, 6 1/2 Mile, Hlaing Township, Yangon, Myanmar
t +95(1) 654 795, 654 796, 654 864, 654 865 e sgs.myanmar@sgs.com

Member of SGS Group(SGS SA)

| | | | |
|---|--|-----------------------------------|---------------------------------------|
|  | Operation Department | E Guard-OD-EQ-F-10 Version :01 | Approved by MD |
| | Environmental Quality Baseline Sampling/Survey Field Notes | | On Date: 2/15/2019 Page 5 of 11 |

Water Quality Baseline Sampling/Survey Field Notes

| | |
|--|-------------------------------|
| Surveyor: <u>Wanna Law</u> | Date: <u>19.05.2022</u> |
| Location: <u>မောင်မောင် (35PP)</u> | Time: <u>1.30 Pm</u> |
| Lat. & Long.: <u>22°16'41" N 96°18'20" E</u> | Instrument: <u>HORIBA</u> |
| Weather: <u>Sunny</u> | Sample/Location ID: <u>GW</u> |
| | GPS Waypoint no: |
| | Temperature: <u>33.89°C</u> |
| | Time: |

Surface/Ground/Effluent Water

| Sr. No. | pH | Electrical Conductivity | | | DO (mg/l) | Turbidity (NTU) | ORP | Flow Rate (m/sec) | Depth (m) | Remarks |
|---------|------|-------------------------|-----------|----------------|-----------|-----------------|-----|-------------------|-----------|---------|
| | | EC (ms/cm) | TDS (g/l) | Salinity (ppt) | | | | | | |
| 1 | 5.18 | 0.659 | 0.422 | 0.3 | 7.21 | 10.8 | 266 | | 73.3m | |

Aim of Sampling

- > Quality, Consistency, Representative Sample, Prevent Deterioration, Prevent Contamination Suitable sampling techniques; Accurate field measurement; Transportation; Time; Preparation:
- > Monitoring Schedule; Review previous field sheets; Equipment checklist; Correct bottles and
- > Preservatives; Check bottle types required with lab; Add preservatives_ if required
- > Sampling Bottles
- > Preferable to use NEW bottles; If not new then rigorous cleaning before re-use, Store in clean, dry dust free environment before use; Adequate for volume required.

Notes

Sample sent to Lab (ISO, SGS)

Checked by: