

ENVIRONMENTAL MANAGEMENT PLAN (EMP) REPORT for

30 MW MYANMAR KINDAR SOLAR POWER PLANT PROJECT

Connected to Kindar Substation

Proposed by;

MYANMAR KINDAR SOLAR POWER COMPANY LIMITED

Myanmar Kindar Solar Power Co., Ltd.

Prepared by;



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May, 2023

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List of Abbreviations

%	: Percentage
$\mu\text{g}/\text{m}^3$: Micro Gram per Cubic meter
BOD	: Biochemical Oxygen Demand
CO	: Carbon Monoxide
CO ₂	: Carbon Dioxide
COD	: Chemical Oxygen Demand
CSR	: Corporate Social Responsibility
dB (A)	: Decibel unit
ECD	: Environmental Conservation Department
EMoP	: Environmental Monitoring Plan
EMP	: Environmental Management Plan
HSE	: Health, Safety and Environment
km	: Kilometer
kV	: Kilovolt
kWh	: Kilo Watt Hour
mg/l	: Milligram per Liter
MOEE	: Ministry of Electricity and Energy
MONREC	: Ministry of Natural Resources and Environmental Conservation
MWh	: Mega Watt Hour
NO ₂	: Nitrogen Dioxide
°C	: Degrees Celsius
pH	: Potential of Hydrogen
PM	: Particulate Matter
ppm	: Part Per Million
PV	: Photovoltaic
SO ₂	: Sulfur Dioxide
TSP	: Total Suspended Particulates
WHO	: World Health Organization

အကျဉ်းချုပ်အစီရင်ခံစာ

ဤပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီရင်ခံစာသည် Myanmar Kindar Solar Power Co., Ltd. တို့မှ အကျိုးတူပူးပေါင်းထားသည့် Myanmar Kindar Solar Power Co., Ltd. မှ အကောင်အထည်ဖော်ဆောင်ရွက်မည်ဖြစ်သော ကင်းတားဓာတ်အားခွဲရုံသို့ လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးမည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းစီမံကိန်းအတွက် ပြင်ဆင်ရေးဆွဲထားခြင်းဖြစ်သည်။ စီမံကိန်းအကောင်အထည်ဖော်သူသည် လျှပ်စစ်နှင့်စွမ်းအင် ဝန်ကြီးဌာနမှ ခေါ်ယူသောတင်ဒါ အား အောင်မြင်ခဲ့သဖြင့် အဆိုပြုစီမံကိန်းအတွက် တည်ဆောက်ရန်နှင့် လုပ်ငန်းလည်ပတ်ရန် ခွင့်ပြုမိန့်ရရှိခဲ့သည်။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သဘောထားမှတ်ချက်များအရ အဆိုပြုစီမံကိန်းသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီရင်ခံစာတင်ပြရန် လိုအပ်ပြီး E Guard Environmental Services Co., Ltd. သည် အဆိုပြုစီမံကိန်းအတွက် အစီရင်ခံစာ ပြင်ဆင်ရေးဆွဲရန် ပတ်ဝန်းကျင်ဆိုင်ရာ လေ့လာမှုများ ပြုလုပ်ခဲ့သည်။ ဤအစီရင်ခံစာတွင် လေ့လာမှုများသည် နေရောင်ခြည်စွမ်းအင်သုံးလျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းစီမံကိန်း တည်ဆောက်ခြင်းနှင့် ဓာတ်အားဖြန့်ဖြူးရန် ကောင်းကင်ဓာတ်အားလိုင်း သွယ်တန်းခြင်း၊ စီမံကိန်းမှ နေရောင်ခြည်စွမ်းအင် အသုံးပြု၍ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းနှင့် ကင်းတားဓာတ်အားခွဲရုံသို့ ၁၃၂ ကေဗီ ကောင်းကင်ဓာတ်အားလိုင်းဖြင့် လျှပ်စစ်ဓာတ်အားဖြန့်ဖြူးခြင်း လုပ်ငန်းများအတွက် ပြုလုပ်ခဲ့ခြင်းဖြစ်သည်။ နေရောင်ခြည်စွမ်းအင်သုံးလျှပ်စစ်စက်ရုံအတွက် လေ့လာမှုနယ်ပယ်အား စီမံကိန်းဗဟိုမှ ၁ ကီလိုမီတာ အချင်းဝက် ရှိသောဧရိယာ အတွင်းအဖြစ် သတ်မှတ်ပြီး စီမံကိန်းမှကင်းတားဓာတ်အားပေးစက်ရုံသို့ သွယ်တန်းထားသော ၁၃၂ KVA ဓာတ်အား လိုင်းအတွက် လေ့လာမှုနယ်ပယ်ကို ၎င်းဓာတ်အားလိုင်း၏ တဖက်တချက် မီတာ ၂၀၀ အတွင်း အဖြစ်သတ်မှတ်လေ့လာခဲ့ခြင်းဖြစ်ပြီး ထိုဧရိယာသည် စီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားဆိုင်ရာသက်ရောက်မှုများအတွက် လုံလောက်မှုရှိသည်။

အဆိုပြုစီမံကိန်းသည် ကျိုတိုင်ကျေးရွာအုပ်စု၊ မြစ်သားမြို့နယ်၊ ကျောက်ဆည်ခရိုင်၊ မန္တလေးတိုင်း ဒေသကြီး၊ မြန်မာနိုင်ငံတွင်တည်ရှိသည်။ စီမံကိန်း၏ တည်နေရာမှာ မြောက်လတ္တီကျု ၂၁ ဒီဂရီ ၁၀ မိနစ် ၄၅.၂၁ စက္ကန့်နှင့် အရှေ့လောင်ဂျီကျု ၉၆ ဒီဂရီ ၁၉ မိနစ် ၄၃.၇၅ စက္ကန့်ဖြစ်ကာ ပင်လယ်ရေမျက်နှာပြင်အမြင့် ၁၅၄-၁၈၇ မီတာတွင်တည်ရှိသည်။ အဆိုပြုစီမံကိန်း၏ တည်ဆောက်ခြင်းလုပ်ငန်းများတွင် box-type transformer များ၊ string inverter များ၊ ဆိုလာပြားများ တပ်ဆင်ရန်ဒေါက်တိုင်များ တပ်ဆင်ခြင်း၊ ဘက်စုံသုံးအဆောက်အဦ တည်ဆောက်ခြင်း၊ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ရန်နှင့် ဖြန့်ဖြူးရန် စက်ကိရိယာများ တပ်ဆင်ခြင်းနှင့် လျှပ်စစ်ဓာတ်အားဖြန့်ဖြူးရန် ၁၃၂ ကေဗီ ကောင်းကင်ဓာတ်အား လိုင်းသွယ်တန်းခြင်း လုပ်ငန်းများ ပါဝင်သည်။ အဆိုပြုစီမံကိန်း၏ ပြန်လှန်လျှပ်စီးစွမ်းရည်မှာ ၃၀ မဂ္ဂါဝပ်

ဖြစ်ပြီး တိုက်ရိုက်လျှပ်စီး စွမ်းရည်မှာ ၃၆.၂၈၈ မဂ္ဂါဝပ်ဖြစ်ကာ box-type transformer ၆ လုံးဖြင့် လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်သွားမည်ဖြစ်သည်။ စီမံကိန်းအဆိုပြုသူသည် စီမံကိန်းအတွက် မြေနေရာအား တရားဝင်ငှားရမ်းပြီးဖြစ်ကာ စီမံကိန်းအတွက် စုစုပေါင်းမြေဧရိယာ ၁၃၂.၃၅ ဧက (၅၃.၅၆ ဟတ်တာ) လိုအပ်သည်။ စီမံကိန်းအဆိုပြုသူများသည် စီမံကိန်းတွင် ဆိုလာပြား ၆၂၀၀ ခု၊ 250kW series inverters အစုံ ၂၀၊ box-type transformer ၆ လုံး၊ ဆိုလာပြားများတပ်ဆင်ရန်ဒေါက်တိုင် ၂,၄၀၀ ခုအား နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ရန် တပ်ဆင်သွားမည်ဖြစ်ပြီး တည်ဆောက်ခြင်း လုပ်ငန်းများ ဆောင်ရွက်ရန် ၈ လ ကြာမြင့်မည်ဖြစ်သည်။ **(အသေးစိတ်အား အခန်း ၂ တွင် ဖတ်ရှုပါရန်)**

တည်ဆောက်ခြင်းလုပ်ငန်းများပြီးစီးပါက အဆိုပြုစီမံကိန်းသည် နေရောင်ခြည်စွမ်းအင်အသုံးပြု၍ လျှပ်စစ် ဓာတ်အားထုတ်လုပ်မည်ဖြစ်ပြီး ကင်းတားဓာတ်အားခွဲရုံသို့ ၁၃၂ ကေဗီ မြေပေါ်ဓာတ်အား လိုင်းဖြင့် လျှပ်စစ်ဓာတ်အားဖြန့်ဖြူးသွား မည်ဖြစ်ကာ လုပ်ငန်းလည်ပတ်ရန် ကာလမှာ နှစ် ၂၀ ဖြစ်သည်။ အဆိုပြုစီမံကိန်းသည် BOO စနစ်ကိုအခြေခံဆောင်ရွက်သောကြောင့် နှစ် ၂၀ ပြီးဆုံးပါက စီမံကိန်း အကောင်အထည်ဖော်သူသည် လုပ်ငန်းလည်ပတ်ရန်ကာလအား သက်ဆိုင်ရာထံတွင် သက်တမ်းတိုးမြှင့်ပြီး စီမံကိန်းလုပ်ငန်းများ ဆက်လက်ဆောင်ရွက်သွားမည်ဖြစ်သည်။ သက်ဆိုင်ရာ စီမံကိန်းအကောင်အထည် ဖော်သူများ၏ ဒါရိုက်တာအဖွဲ့ဝင်များနှင့် ဖွဲ့စည်းပုံများ၊ အဆိုပြုစီမံကိန်း၏ ဖွဲ့စည်းပုံနှင့် ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်များအား ဖော်ပြထားသည်။ **(အသေးစိတ်အား အခန်း ၃ တွင် ဖတ်ရှုပါရန်)**

ဤပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီရင်ခံစာ ပြင်ဆင်ရာတွင် ပါဝင်သော ကျွမ်းကျင်ပညာရှင်များနှင့် ၎င်းတို့၏ တာဝန်များနှင့်ကျွမ်းကျင်မှုများအား **အခန်း ၄** တွင် ဖော်ပြထားသည်။ အဆိုပြုစီမံကိန်း တည်ဆောက်ခြင်းနှင့် လုပ်ငန်းလည်ပတ်ခြင်းတို့တွင် ပတ်ဝန်းကျင်အား ထိခိုက်မှုကာကွယ်ရန် လိုက်နာရမည့် နိုင်ငံတော်၏ တည်ဆဲဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများအား ဖော်ပြထားသည်။ **(အသေးစိတ်အား အခန်း ၅ တွင် ဖတ်ရှုပါရန်)**

လက်ရှိစီမံကိန်းအခြေအနေကို ကွင်းဆင်းလေ့လာခြင်းနှင့် ယခင်လေ့လာပြီးသော အချက်အလက်များ ရယူခြင်းသည် ပတ်ဝန်းကျင်ထိခိုက်မှုများ ဆန်းစစ်ခြင်းအတွက် အလွန်အရေးပါသည်။ ထို့ကြောင့် လက်ရှိစီမံကိန်း၏ ပတ်ဝန်းကျင်ဆိုင်ရာအခြေအနေများအား ကွင်းဆင်းလေ့လာခြင်းသည် ပတ်ဝန်းကျင် ဆိုင်ရာ လေ့လာမှုများပြုလုပ်ရာတွင် အရေးပါသော နေရာတွင်ပါဝင်သည်။ ထို့ကြောင့် E Guard Environmental Services Co., Ltd. သည် စီမံကိန်း၏ လေအရည်အသွေး၊ ရေအရည်အသွေးနှင့် ဆူညံသံပမာဏတို့အား ၂၀၂၂ ခုနှစ်၊ မေလ ၂၁ ရက်နှင့် ၂၂ ရက်တို့တွင် ၂၄ နာရီဆက်တိုက် စောင့်ကြပ် ကြည့်ရှုသည့်နည်းဖြင့် တိုင်းတာခဲ့သည်။ တိုင်းတာရရှိသော ရလဒ်များအား အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များနှင့် အခြားသက်ဆိုင်ရာလမ်းညွှန်ချက်များဖြင့် နှိုင်းယှဉ်

လေ့လာခဲ့သည်။ လေထုအတွင်း ဓာတ်ငွေ့ပါဝင်မှုရလဒ်များအား နှိုင်းယှဉ်လေ့လာခြင်းအရ သက်ဆိုင်ရာ လမ်းညွှန်ချက်တန်ဖိုးများအတွင်း ရှိကြောင်းလေ့လာတွေ့ရှိရသည်။ လေထုအတွင်း အမှုန်ပါဝင်မှု လေ့လာခြင်းရလဒ်များအရ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် တန်ဖိုးများအတွင်းရှိကြောင်း လေ့လာတွေ့ရှိရသည်။ ထို့ကြောင့် စီမံကိန်းဝန်းကျင်လေထုအရည်အသွေး သည် စီမံကိန်းမစတင်မီအချိန်တွင် ကောင်းမွန်လျှက်ရှိကြောင်းတွေ့ရသည်။ ရေအရည်အသွေးတိုင်းတာချိန် တွင် စီမံကိန်းသည် တည်ဆောက်ရေးလုပ်ငန်းများ စတင်ခြင်းမရှိသေးသကဲ့သို့ အဝီစိရေတွင်း တူးဖော် ထားရှိခြင်း မရှိသေးပါ။ ထို့ကြောင့် ရေအရည်အသွေးတိုင်းတာရန် စီမံကိန်းအနီးအနားတွင်ရှိသော ပန်းလောင်မြစ်မှ ရေနမူနာအား E Guard အဖွဲ့မှ ရွေးချယ်ခဲ့သည်။ ထိုရေနမူနာအား ရေအရည် အသွေးတိုင်းတာရန် ကိရိယာဖြင့်တိုင်းတာခြင်းနှင့် ရေနမူနာကောက်ယူခြင်း တို့ဖြင့်ဆောင်ရွက်ခဲ့သည်။ ရေအရည်အသွေး တိုင်းတာမှုရလဒ်များအရ တိုင်းတာသော Parameters အများစုသည် ကမ္ဘာ့ကျန်းမာရေး အဖွဲ့အစည်း၏ လမ်းညွှန်ချက်တန်ဖိုးများ အတွင်းရှိပါသည်။ ဆူညံသံပမာဏတိုင်းတာမှုအား စီမံကိန်းအတွင်းတွင်တိုင်းတာခဲ့ပြီး စီမံကိန်းအတွင်း (ဆူညံသံထွက်ပေါ်ရာနေရာ) တွင် နေ့အချိန် တိုင်းတာရရှိမှု ရလဒ်များ (၄၉.၁၁ dBA) နှင့် ညအချိန်တိုင်းတာရရှိမှု ရလဒ်များ (၄၂.၄၀ dBA) သည် လမ်းညွှန်ချက်တန်ဖိုးများအတွင်း ရှိကြောင်း လေ့လာတွေ့ရှိရသည်။ စီမံကိန်းပြင်ပ (ဆူညံသံလက်ခံမည့်နေရာ)တွင် နေ့အချိန်တိုင်းတာရရှိမှု ရလဒ်များ (၄၅.၄၂ dBA) နှင့် ညအချိန်တိုင်းတာရရှိမှု ရလဒ်များ (၄၃၀.၇၄ dBA) သည်လည်း လမ်းညွှန်ချက် တန်ဖိုးများအတွင်း ရှိကြောင်း လေ့လာတွေ့ရှိရသည်။ ထို့ကြောင့် စီမံကိန်းဝန်းကျင်ဆူညံသံပမာဏသည် စီမံကိန်းမစတင်မီ အချိန်တွင် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ အတွင်းရှိကြောင်း တွေ့ရသည်။ စီမံကိန်းတည်ဆောက်ခြင်းကာလတွင် တည်ဆောက်ရေးလုပ်ငန်း များကြောင့် စီမံကိန်း၏ ဝန်းကျင်လေထုအရည်အသွေး လျော့နည်းလာနိုင်ကြောင်းနှင့် ဆူညံသံပမာဏ မြင့်လာနိုင်ကြောင်း ခန့်မှန်းတွေ့ရှိရသည်။ ထို့ပြင် ယခင်လေ့လာပြီးသော အချက်အလက်များ ဖြစ်သည့် ရာသီဥတုဆိုင်ရာ အချက်အလက်များ၊ စီမံအုပ်ချုပ်မှုဆိုင်ရာအချက်အလက်များ၊ လူမှုစီးပွားဆိုင်ရာ အချက်အလက်များ၊ မြေအသုံးချမှုနှင့် အခြားလေ့လာပြီးသော အချက်အလက်များအား ဤအစီရင်ခံစာတွင် ဖော်ပြထားသည်။

(အသေးစိတ်အား အခန်း ၆ တွင် ဖတ်ရှုပါရန်)

စီမံကိန်းတည်ဆောက်ခြင်းနှင့် လုပ်ငန်းလည်ပတ်ခြင်းတို့ကြောင့် ပတ်ဝန်းကျင်ဆိုင်ရာ အရင်းအမြစ်များ၊ ဂေဟစနစ်များ၊ လူသားများနှင့် စွန့်ပစ်ပစ္စည်းစွန့်ပစ်မှုတို့အပေါ် ထိခိုက်နိုင်သော ဖြစ်နိုင်ခြေရှိသည့် သက်ရောက်မှုများအား ခွဲခြားခဲ့ပြီး ထိုသက်ရောက်မှုများအား International Association for Impact Assessment (IAIA) ၏ သက်ရောက်မှုဆန်းစစ်ခြင်းနည်းလမ်းကို အသုံးပြု၍ ဆန်းစစ်ခဲ့သည်။

သက်ရောက်မှုများဆန်းစစ်လေ့လာရာတွင် အဆိုပြုစီမံကိန်းအတွက် တည်ဆောက်ခြင်းကာလနှင့် လုပ်ငန်းလည်ပတ်သည့်ကာလဟူ၍ ကာလနှစ်ခု ခွဲခြားလေ့လာခဲ့သည်။

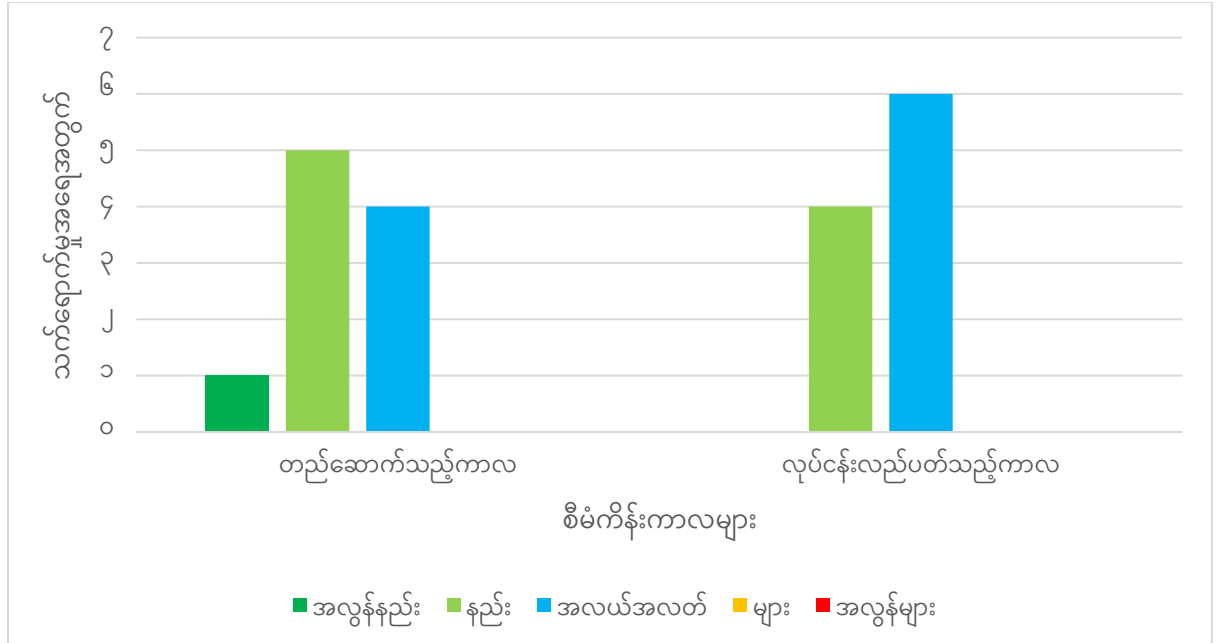
တည်ဆောက်ခြင်းကာလတွင် ဓာတ်အားစတင်ဖြန့်ဖြူးရန်နေရာနှင့် ဘက်စုံသုံးအဆောက်အဦ တည်ဆောက်ခြင်း၊ ဆိုလာပြားများ၊ ဆိုလာပြားများတပ်ဆင်ရန် ဒေါက်တိုင်များ၊ string inverter များ၊ box-type transformer များတပ်ဆင်ခြင်း၊ ကင်းတားဓာတ်အားခွဲရုံသို့ လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးရန် ကောင်းကင်ဓာတ်အားလိုင်း၏ ဓာတ်တိုင်များစိုက်ထူခြင်းနှင့် ဓာတ်အားလိုင်းသွယ်တန်းခြင်းတို့ ပါဝင်သည်။ တည်ဆောက်ခြင်းကာလမှာ ၆ လ ဖြစ်သည်။

လုပ်ငန်းလည်ပတ်သည့်ကာလတွင် နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ပြီး ကင်းတားဓာတ်အားခွဲရုံသို့ ၁၂၂ ကေဗီဓာတ်အားလိုင်းဖြင့် လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးခြင်းတို့ ပါဝင်ပြီး လုပ်ငန်းလည်ပတ်သည့်ကာလမှာ နှစ် ၂၀ ဖြစ်သည်။

လုပ်ငန်းဖျက်သိမ်းသည့်ကာလတွင် လုပ်ငန်းလည်ပတ်သည့်ကာလပြီးဆုံးပါက အဆိုပြုစီမံကိန်းသည် BOO စနစ်ကိုအခြေခံဆောင်ရွက်သောကြောင့် စီမံကိန်းအကောင်အထည်ဖော်သူသည် လုပ်ငန်းလည်ပတ်ရန် ကာလအား အကြိမ်များစွာ သက်တမ်းတိုးမြှင့်ပြီး နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းလုပ်ငန်းများ ဆက်လက် ဆောင်ရွက်သွားမည်ဖြစ်သည်။ ထို့ကြောင့် အဆိုပြုစီမံကိန်း၏ လုပ်ငန်းပိတ်သိမ်းသည့်ကာလနှင့် သက်ဆိုင်သော သက်ရောက်မှုများအား ခွဲခြားခြင်း၊ ဆန်းစစ်လေ့လာခြင်းနှင့် မကောင်းသော သက်ရောက်မှုများအား လျှော့ချရန်နည်းလမ်းများ ရေးဆွဲခြင်းတို့အား ဤအစီရင်ခံစာတွင် ထည့်သွင်းထားခြင်းမရှိပါ။ သို့သော် စီမံကိန်းပိုင်ရှင်သည် စီမံကိန်းအပြီးပိတ်သိမ်းမည်ဆိုပါက ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ Decommissioning Plan တင်ပြ၍ ကြိုတင်ခွင့်ပြုချက်ရယူရန်လိုအပ်ကြောင်း E Guard Environmental Services Co., Ltd က အကြံပြုဆွေးနွေးခဲ့ပါသည်။

တည်ဆောက်ခြင်းကာလတွင် လေအရည်အသွေးအပေါ်သက်ရောက်မှု၊ မြေအရည်အသွေးအပေါ် သက်ရောက်မှု၊ ဆူညံသံနှင့် တုန်ခါမှုသက်ရောက်မှု နှင့် အစိုင်အခဲစွန့်ပစ်ပစ္စည်းကြောင့် သက်ရောက်မှုများသည် **အလယ်အလတ်အဆင့် သက်ရောက်မှုများ**အဖြစ် ဆန်းစစ်လေ့လာ တွေ့ရှိရသည်။ အခြား သက်ရောက်မှုများဖြစ်သည့် ရေအရည်အသွေးအပေါ်သက်ရောက်မှု၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှု၊ လူထုကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှု၊ မီးဘေးအန္တရာယ်သက်ရောက်မှုနှင့် အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းကြောင့် သက်ရောက်မှုများသည် **နည်းသည့်အဆင့်သက်ရောက်မှုများ** အဖြစ်တွေ့ရှိရပြီး အရည်စွန့်ပစ်ပစ္စည်းကြောင့် သက်ရောက်မှုသည် **အလွန်နည်းသည့်အဆင့်သက်ရောက်မှု**အဖြစ် ဆန်းစစ်တွေ့ရှိရသည်။ **လုပ်ငန်း**

လည်ပတ်သည့်ကာလတွင် ရေအရည်အသွေးအပေါ် သက်ရောက်မှု၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးဆိုင်ရာ သက်ရောက်မှု၊ လူထုကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး ဆိုင်ရာသက်ရောက်မှု၊ မီးဘေးအန္တရာယ်သက်ရောက်မှု၊ အရည်စွန့်ပစ်ပစ္စည်းနှင့် အန္တရာယ်ရှိ စွန့်ပစ် ပစ္စည်းကြောင့် သက်ရောက်မှုများသည် **အလယ်အလတ်အဆင့်သက်ရောက်မှုများ**အဖြစ် ဆန်းစစ်တွေ့ရှိ ရသည်။ အခြားသက်ရောက်မှုများ ဖြစ်သည့် လေအရည်အသွေးအပေါ်သက်ရောက်မှု၊ မြေအရည်အသွေး အပေါ် သက်ရောက်မှု၊ ဆူညံသံသက်ရောက်မှုနှင့် အစိုင်အခဲစွန့်ပစ်ပစ္စည်းကြောင့်သက်ရောက်မှုများသည် **နည်းသည့်အဆင့် သက်ရောက်မှုများ**အဖြစ် ဆန်းစစ်လေ့လာခြင်းရလဒ်များအရ ဆန်းစစ်တွေ့ရှိရသည်။ အောက်ဖော်ပြပါပုံတွင် စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော မကောင်းသောသက်ရောက်မှုများ၏ အသေးစိတ်အဆင့်များအား ဖော်ပြထားသည်။



မကောင်းသောသက်ရောက်မှုများအား သက်ရောက်မှုလျော့ချရန်အတွက် လျော့ချရန်နည်းလမ်းများ သည် အရေးကြီးသည်။ ထိုလျော့ချရန်နည်းလမ်းများအား ဆောင်ရွက်ရန်လိုအပ်သော ဆောင်ရွက်ချက်များနှင့် နည်းပညာများအား သက်ရောက်မှုအမျိုးအစားပေါ် မူတည်ပြီး ဖော်ပြထားသည်။ အဆိုပြုစီမံကိန်းသည် အလုပ်အကိုင်အခွင့်အလမ်းများ ဖန်တီးပေးနိုင်ခြင်း၊ စီးပွားရေးအခွင့်အလမ်းများ ဖန်တီးပေးနိုင်ခြင်း၊ အခွန်ငွေရရှိနိုင်ခြင်း၊ လူမှုစီးပွားတာဝန်ယူမှု အစီအစဉ်များကြောင့် ဒေသတွင်းဖွံ့ဖြိုးတိုးတက်ခြင်း၊ ကာဗွန်ထုတ်လုပ်မှု လျော့ချခြင်း၊ သယံဇာတများထိန်းသိမ်းခြင်းနှင့် ပတ်ဝန်းကျင်နှင့်လိုက်လျောညီထွေသော စီးပွားရေးများ အစပြုနိုင်ခြင်း စသည့် ကောင်းသောသက်ရောက်မှုများကိုလည်း ဖြစ်ပေါ်စေနိုင်သည်။

(အသေးစိတ်အား အခန်း ၇ တွင် ဖတ်ရှုပါရန်)

လျှော့ချရန်နည်းလမ်းများနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များအား အကောင်အထည်ဖော် ဆောင်ရွက်ရာတွင် လိုအပ်သော အခြေခံလိုအပ်ချက်များနှင့် တာဝန်ရှိသူများအား ဤအစီရင်ခံစာတွင် ဖော်ပြထားသည်။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အား သက်ရောက်မှုများ လေ့လာ ဆန်းစစ်ချက်များနှင့် သက်ရောက်မှုအဆင့်များကို အခြေခံ၍ စီမံကိန်း၏ တည်ဆောက်ခြင်းကာလနှင့် လုပ်ငန်းလည်ပတ် သည့်ကာလတို့အတွက် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး မူဘောင်များနှင့် ရေးဆွဲထားခြင်း ဖြစ်သည်။ စီမံကိန်းအကောင်အထည်ဖော်သူသည် အဆိုပြုစီမံကိန်းအား အောက်ဖော်ပြပါအစီအစဉ်များ ပါဝင်သော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့်အညီ အကောင်အထည်ဖော် ဆောင်ရွက်ရမည်။

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

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

(အသေးစိတ်အား အခန်း ၈ တွင် ဖတ်ရှုပါရန်)

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီရင်ခံစာ ပြင်ဆင်ရေးဆွဲရာတွင် စီမံကိန်းအကြောင်းအရာများကို ရှင်းလင်း တင်ပြခြင်းသည် အရေးကြီးပြီး သက်ဆိုင်သူများ၏ အကြံဉာဏ်နှင့်အမြင်များကို အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားရေးဆွဲရမည်ဖြစ်သည်။ ထို့ကြောင့် အဆိုပြုစီမံကိန်းအတွက် အများပြည်သူသဘောထား ရယူခြင်းအခမ်းအနားကို ၂၀၂၂ ခုနှစ်၊ မေလ (၂) ရက်နေ့တွင် စီမံကိန်းလုပ်ငန်းတည်နေရာ၊ ကျီတိုင်ကျေးရွာအုပ်စု၊ မြစ်သားမြို့နယ်တွင် ကျင်းပခဲ့သည်။ အခမ်းအနားကို နံနက် ၁၀ နာရီ ၃၀မိနစ်တွင် စတင်ခဲ့ပြီး နံနက် ၁၂ နာရီခွဲတွင် ပြီးဆုံးခဲ့သည်။ အများပြည်သူသဘောထား ရယူခြင်းအခမ်းအနား၏ ရည်ရွယ်ချက်မှာ စီမံကိန်းအကြောင်းအရာများ၊ စီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများ၊ လျော့ချရန်နည်းလမ်းများဖော်ပြရန်နှင့် ဒေသခံပြည်သူများ၏ အကြံဉာဏ်နှင့်သုံးသပ်ချက်များ ရယူရန်ဖြစ်သည်။ စီမံကိန်းအကောင်အထည် ဖော်သူသည် အခမ်းအနားသို့တက်ရောက်ရန် ဒေသခံ ပြည်သူများအား ကျေးရွာအုပ်ချုပ်သူများမှ တင်ဆင့်ဖိတ်ကြားခဲ့သည်။ အခမ်းအနားအား ကိုဗစ်-၁၉ ရောဂါဖြစ်ပွားနေစဉ် ကာလအတွင်း ကျင်းပခဲ့သောကြောင့် တက်ရောက်သူအရေအတွက်၊ နေရာနှင့် လူထုအစုအဝေးပြုလုပ်ရန် ကဲ့သို့သော အကန့်အသတ်အချို့ရှိခဲ့သည်။ ကျီတိုင်ကျေးရွာနှင့် ကန်ဇယ် ကျေးရွာမှ ဒေသခံပြည်သူများ၊ စီမံကိန်းအကောင်အထည်ဖော်သူ၏ ကိုယ်စားလှယ်များနှင့် E Guard Environmental Services Co., Ltd. မှ ကိုယ်စားလှယ်များပါဝင်သည့် တက်ရောက်သူ စုစုပေါင်း ၂၃ ယောက် ရှိခဲ့ပြီး တက်ရောက်သူအချို့မှ သိရှိလိုသည်များကို မေးမြန်းဆွေးနွေး အကြံပြုခဲ့ကြသည်။ စီမံကိန်း ဆိုင်ရာအချက်အလက်များနှင့် ဤပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီရင်ခံစာကို အဆိုပြုစီမံကိန်း၊ E Guard Environmental Services Co., Ltd. ၏ရုံး နှင့် အောက်ပါ website link <https://tinyurl.com/solar-kindar> တွင် အများပြည်သူများနှင့် စီမံကိန်းနှင့်သက်ဆိုင်သူများ ဖတ်ရှုလေ့လာနိုင်ရန် ဖော်ပြထားပါသည်။

(အသေးစိတ်အား အခန်း ၉ တွင် ဖတ်ရှုပါရန်)

နိဂုံးချုပ်အားဖြင့် အဆိုပြုစီမံကိန်းသည် အလုပ်အကိုင်အခွင့်အလမ်းများ ဖန်တီးပေးနိုင်ခြင်း၊ စီးပွားရေးအခွင့်အလမ်းများ ဖန်တီးပေးနိုင်ခြင်း၊ အခွန်ငွေရရှိနိုင်ခြင်း၊ လူမှုစီးပွားတာဝန်ယူမှု အစီအစဉ်များကြောင့် ဒေသတွင်းဖွံ့ဖြိုးတိုးတက်ခြင်း၊ ကာဗွန်ထုတ်လုပ်မှု လျော့ချခြင်း၊ သယံဇာတများထိန်းသိမ်းခြင်းနှင့် ပတ်ဝန်းကျင်နှင့်လိုက်လျောညီထွေသော စီးပွားရေးများ အစပြုနိုင်ခြင်း စသည့် ကောင်းသောသက်ရောက်မှုများကို ဖြစ်ပေါ်စေသည်။ တည်ဆောက်ခြင်းကာလနှင့် လုပ်ငန်း လည်ပတ်သည့်ကာလတို့တွင် ဖြစ်ပေါ်နိုင်သော မကောင်းသောသက်ရောက်မှုများကိုလည်း လျော့ချရန် နည်းလမ်းများနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်များကို အသုံးပြု၍ လျော့ချနိုင်သည်။ ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်အား စီမံကိန်းပတ်ဝန်းကျင်အရည်အသွေးများအား စောင့်ကြပ်ကြည့်ရှုရန် အကောင်အထည်ဖော် ဆောင်ရွက်ရမည်။ စီမံကိန်းအကောင်အထည်ဖော်သူသည် ဤအစီရင်ခံစာအား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ စိစစ်သုံးသပ်ပြီးပါက ပေးပို့လာမည့် သဘောထား မှတ်ချက်များ နှင့် အကြံပြုချက်များကို လိုက်နာရမည်။ ဤအစီရင်ခံစာကို သက်ဆိုင်ရာမှ အတည်ပြုပြီးပါက စီမံကိန်းအကောင်အထည်ဖော်သူမှ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များအား

အကောင်အထည်ဖော် ဆောင်ရွက်ခြင်းသည် စီမံကိန်းအား ပတ်ဝန်းကျင်အပေါ်ထိခိုက်မှု အနည်းဆုံး ဖြစ်အောင် လည်ပတ်ခြင်းအတွက် အလွန်အရေးပါသည်။ စီမံကိန်းအကောင်အထည် ဖော်သူများသည် ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်၏ ပတ်ဝန်းကျင်ဆိုင်ရာတည်ဆဲ ဥပဒေ၊ နည်းဥပဒေ၊ မူဝါဒများနှင့် လမ်းညွှန်ချက်များကို စီမံကိန်းလည်ပတ်စဉ်ကာလတစ်လျှောက်လုံး လိုက်နာဆောင်ရွက် ရမည်ဖြစ်သည်။

(အသေးစိတ်အား အခန်း ၁၀ တွင် ဖတ်ရှုပါရန်)

1. Executive Summary

This Environmental Management Plan (EMP) report is prepared for 30 MW ground mounted solar power plant project connected to Kindar Substation, proposed by Myanmar Kindar Solar Power Co., Ltd., which is formed by formed by China ITS (Holdings) Co., Ltd. The project proponent won tender (*Tender No. (EPGE PV 02/2021-2022)*) from the Electric Power Generation Enterprise (EPGE), Ministry of Electricity and Energy and obtained construction and electricity generation permit for the proposed 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 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 Kindar Substation with 132 kV overhead transmission line. 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 and 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.

The proposed project is located at Kyi Taing Village Tract, Myittha Township, Kyaukse District, Mandalay Region, and Myanmar. Its coordinate points are 21°10'45.21"N, 96°19'43.75"E and the elevation is 154-187 m. The construction of the proposed project includes box transformer foundation, supporting bracket and foundation of solar power station, multiple-use building and outdoor equipment foundation construction as well as construction and stringing of 132 kV underground 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 six photovoltaic power generation units. The project proponent has acquired the land slot to construct the proposed project and total land requirement for the project is 132.35 acres (53.56 hectares). The proposed project will install 67200 pieces of 540Wp monocrystalline silicon PV modules, 20 sets of 250kW series inverters, 6 box-type transformers and 2,400 brackets to generate electricity from solar energy and construction phase of the project will take six months. (*See details in Chapter 2*).

After construction period, proposed project will generate electricity from solar energy and distribute to the Kindar Substation via 132 kV overhead transmission line and proposed operation period is 20 years. As the proposed project is a BOO basis project, project proponent will extend operation period at relevant authorities and continue operation activities after 20 years. List of directors and organizational structure of respective project proponent, organizational structure and detail investment plan of the proposed project are also described. (*See details in Chapter 3*).

The responsible persons of study team for this EMP report preparation are described in **Chapter 4**. National laws and regulations for environmental protection applicable for construction and operation of proposed project are compiled and presented. (*See details in Chapter 5*).

Primary data and secondary data collections are very important to assess environmental impacts. Primary data collection for environmental quality monitoring plays an important role for environmental studies. Therefore, E Guard Environmental Services conducted air quality, water quality and noise level measurements at project site on 21st and 22nd 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 are lower than the respective guideline values. For dust emissions, the observed values of PM₁₀ and PM_{2.5} 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 before the implementation of the project. Tube wells were not dug yet while site visit was conducted. Therefore, Environmental Quality (EQ) team decided to collect the surface water sample as baseline data to know the current water quality of nearby water-body (Panlaung River) which is about 700 m west from the project site before starting implementing the proposed project. The existing surface water quality was measured by two methods: on-site measurement and sampling water. According to the observed values, most of the parameter measured are within the WHO guideline value for drinking water. For noise level, monitoring was done at project site: result is lower than standard value not only at day time (45.42dBA) but also at night time (40.74dBA). Therefore, it can be considered that the noise level at the proposed project is within the guideline value of NEQEG before the implementation of the project. It is anticipated that ambient air quality will be decreased and noise level will be increased during the construction phase of the proposed project because of construction activities implementation. In addition, secondary data like climate data, administrative structure, socio-economic data, land use and other secondary data are described in this report. *(See details in Chapter 6).*

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

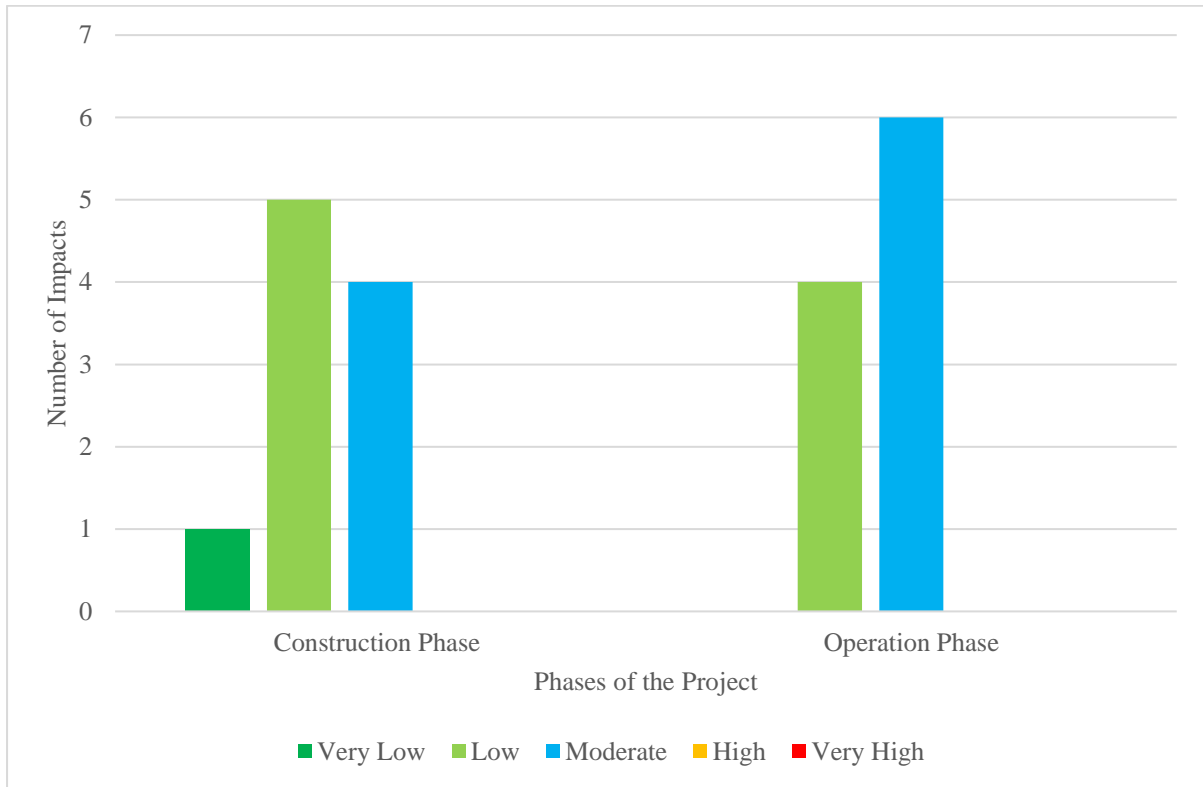
Construction Phase: includes construction of switchyard and multiple-use building, installation of PV modules, tracking brackets, inverters, transformers, poles of overhead transmission line and stringing cables of overhead transmission line, which will connect to the Kindar Substation. The construction period of the proposed project is 6 months.

Operation Phase: includes generating electricity from solar energy and distributing to the Kindar Substation through 33 kV overhead transmission line. The proposed 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 because the proposed project is a BOO basis project. 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*, impacts on air, soil, noise and vibration impacts and solid waste generation impacts are assessed as **Moderate Impacts** and other impacts such as impacts on water, occupational health and safety, community health and safety, fire hazards impacts and hazardous waste generation impacts are categorized as **Low Impacts** as well as liquid waste generation impact is considered as **Very Low Impact** as per the results of assessments. During

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



Mitigation measures are important to minimize and reduce these potential negative impacts. They are also described requirements of impacts mitigation tasks and technologies according to the types of impacts scales. However, the proposed project can ensure some positive impacts such as providing job opportunities, business opportunities, revenue to government, CSR development, carbon emission reduction, resources conservation and green economy. (*See details in Chapter 7*).

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

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

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

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 Kindar Substation, proposed by Myanmar Kindar Solar Power Co., Ltd. was held on 22nd May, 2022 at project site, Kyi Taing Village Tract, Myitthar Township, Kyaukse District, Mandalay Region, and Myanmar. The starting time was 10:30 am and finished at 12:00 am. The objective of the meeting is to disclose information of the project, potential impacts of project activities and mitigation measures and to receive public recommendations and feedbacks for the proposed project. The project proponent invited local people by negotiating with village administrators. As the public consultation meeting was held during COVID-19 Pandemic Period, there were some limitations related to number of attendees, venue and social distancing.

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 on 22nd May, 2022 at project site, Kyi Taing Village Tract, Myitthar Township, Kyaukse District, and Mandalay Region. The starting time was 10:30 am and finished at 12:00 am. The objective of the meeting is to disclose information of the project, potential impacts of project activities and mitigation measures and to receive public recommendations and feedbacks for the proposed project. The project proponent invited local people by negotiating with village administrators. As the public consultation meeting was held during COVID-19 Pandemic Period, there were some limitations related to number of attendees, venue and social distancing. Totally, 23 persons including local people from Kyi Taing Village and Kan Ze Village, representatives of project proponent and E Guard Environmental Services attended public consultation meeting and some attendees discussed with regards to the project. The project information and this Environmental Management Plan (EMP) report can be accessible via the link of <https://tinyurl.com/solar-kindar> and at the project site and E Guard Environmental Service Co., Ltd.'s Office for disclosure to public and stakeholders. (*See details in Chapter 9*).

In conclusion, the proposed project can ensure some positive impacts such as providing job opportunities, business opportunities, revenue to government, CSR development, carbon emission reduction, resources conservation and green economy. All of the negative impacts during construction and operation phases can be minimized by using mitigation measures and implementing Environmental Management Plan (EMP). Environmental Monitoring Plan

(EMoP) must need to implement for monitoring the environmental quality of the proposed project. Finally, the project proponent must follow the comments and suggestions that will be given by ECD after reviewing this EMP report. Once EMP report is approved by concerned authorities, effective implementation of EMP by the project proponent is essential to implement the project environmental soundly. The project proponent shall abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar throughout the lifespan of project. (*See details in Chapter 10*).

2. Project Description

This Environmental Management Plan (EMP) report is for the 30 MW Ground Mounted Solar Power Plant Project Connected to Kindar Substation, which is proposed by Myanmar Kindar Solar Power Co., Ltd. The project proponent, Myanmar Kindar Solar Power Co., Ltd., formed by China ITS (Holdings) Co., Ltd for the proposed project. The project proponent won tender from the Electric Power Generation Enterprise (EPGE), Ministry of Electricity and Energy and obtained permit for construction and electricity generation from solar energy of the proposed project. The proposed project will contribute to fulfill a goal for achieving universal access to electricity by 2030 as per Myanmar National Electrification Plan (NEP). Myanmar has one of the lowest rates of electrification in Southeast Asia; almost 61.8 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.

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

The specific objectives of this study are:

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

2.1 Scope of the Project

The scope of the study for EMP will vary on the scale and type of the development project. In this EMP, a study was made to cover construction of solar power plant and overhead transmission line as well as operation of solar power plant to generate electricity from solar energy and distribute to the Kindar Substation with 132 kV transmission line. This EMP is based on consideration of terrestrial and aquatic resources conservation, pollutant abatement on air quality, water quality and soil quality, noise level reduction, safe working environment ensuring for the workers. The site survey and baseline environmental quality measurement were carried out by a study team from E Guard Environmental Services, which has experiences in conducting assessments on environmental concerns for various kinds of development projects in Myanmar.

A study team from E Guard Environmental Services conducted site survey on 21st & 22nd 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 Kindar 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 Kindar substation by a primary 132kV line, with a total length of 2km. 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.

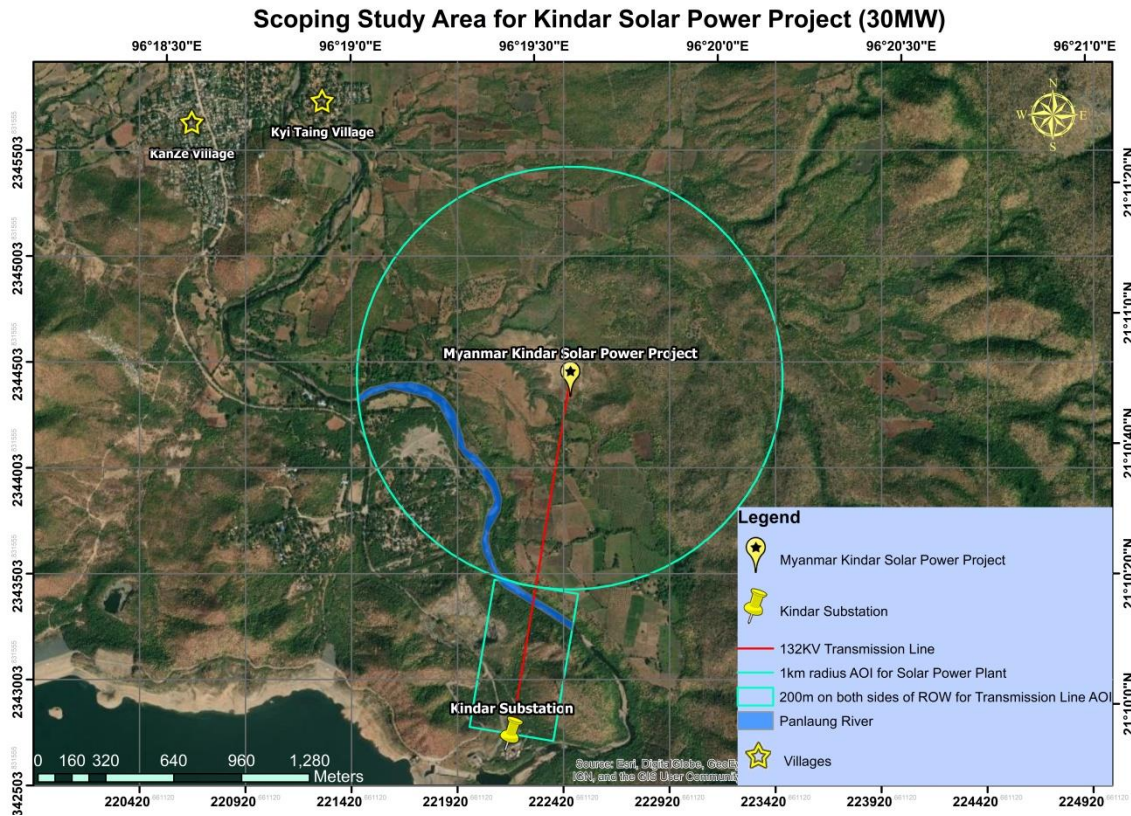


Figure 2. 1 Scope of the Study Area

2.2 Project Size and Location of the Project

The proposed project is located at Kyi Taing Village Tract, Myittha Township, Kyaukse District, Mandalay Region, and Myanmar. Its coordinate points are 21°10'45.21"N, 96°19'43.75"E and the elevation is 154-187 m. The construction of the proposed project includes box transformer foundation, supporting bracket and foundation of solar power station, multiple-use building and outdoor equipment foundation construction as well as construction and stringing of 132 kV underground transmission line.

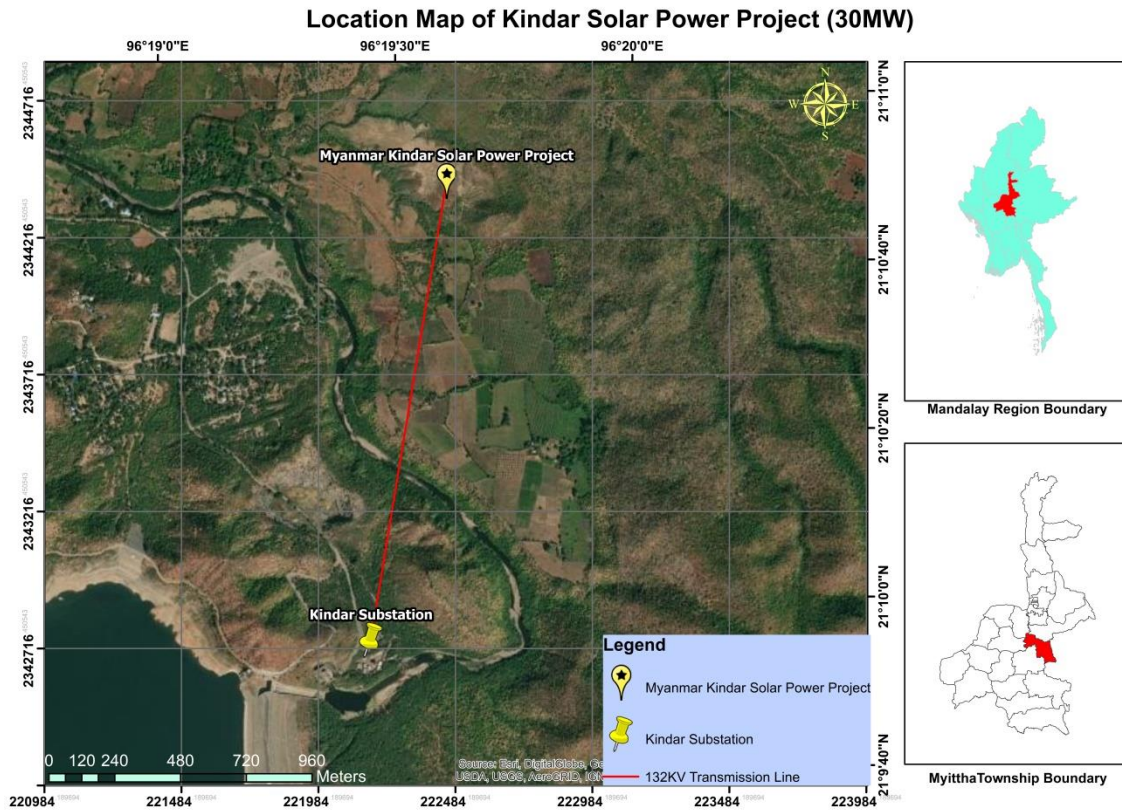


Figure 2. 2 Location Map of Myanmar Kindar Solar Power Project

A total of 67200 pieces of 540Wp monocrystalline silicon PV modules are used in Kindar PV power station, and 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. 20 sets of 250kW series inverters and one 5000kVA box transformer are used in each PV square array of Kindar PV power station, with a total of 6 sets, and the project scale is 30MWac. The total capacity of capacity of AC side of the proposed project is 30 MW and DC side is 36.288 MW, including six photovoltaic power generation units. The photovoltaic power station is connected to the 132 kV bus side of the 230 kV main transformers in the Kindar Substation. Total land areas of solar power plant is 132.35 acres (53.56 hectares) and the annual average radiation in horizontal plane and in inclined plane are 6430.2 MJ/m² and 6953.0 MJ/m² respectively; therefore, annual total solar radiation level of the project site is rich. The direct radiation amount takes a large proportion of the total radiation and the project site has a good development prospect, where is suitable for the construction of large-scale grid connected photovoltaic power station. The following figure describes annual total solar radiation level of the project site.

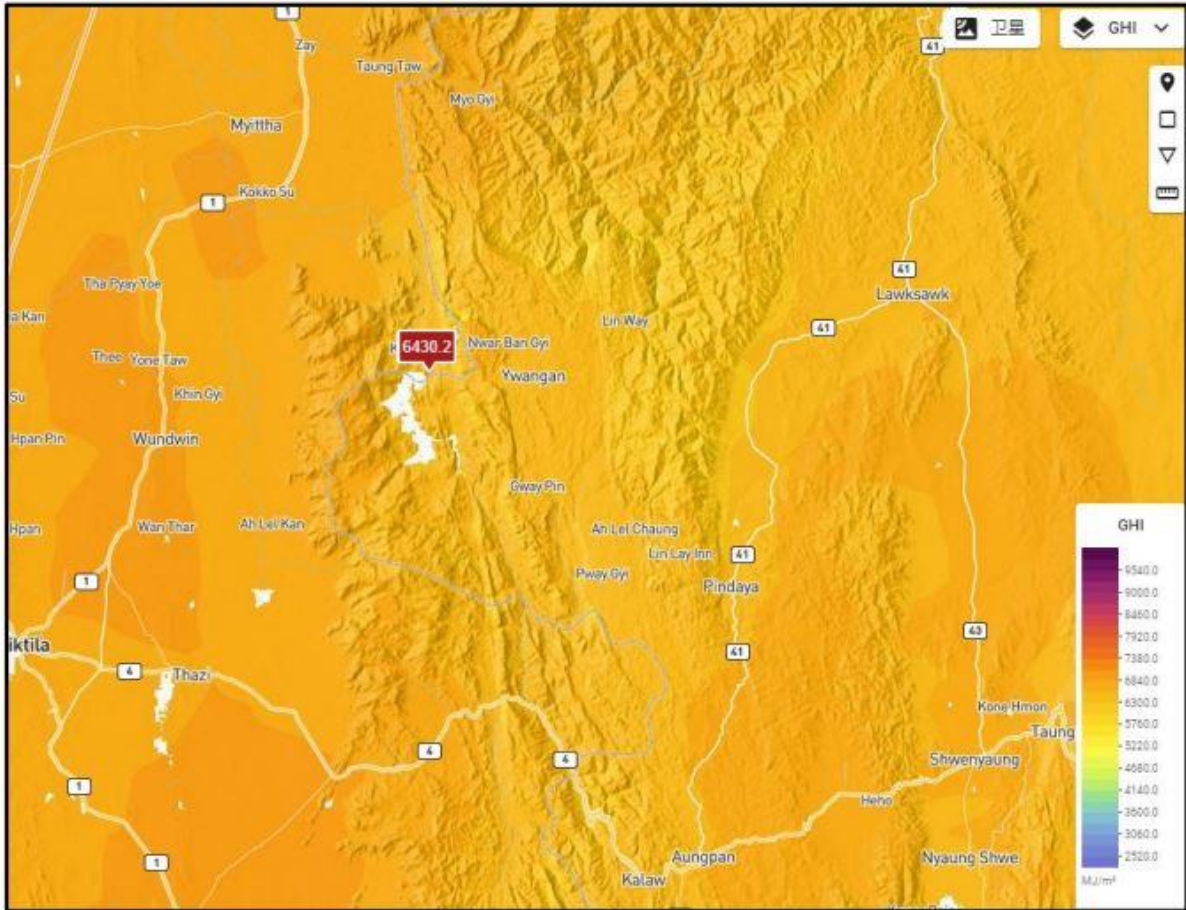


Figure 2. 3 Total monthly solar radiation at the project site

Table 2. 1 Overall Design of PV System

No.	Name	Specification	Unit	Number	Remarks
1.	PV module	Double-sided monocrystalline silicon PV module (540Wp)	Set	2,400	Trina Solar with connector and 1-meter cable, supplied in complete set by PV manufacturer
2.	String inverter	250kW Max efficiency-99.0% Isolation method-Transformerless Cooling method- Smart forced air cooling	Set	20	Origin: Chinas primary manufacture: Sun grow, Huawei
3.	Box-type transformer (double split)	Including step-up box transformer, internal cables, containers, measurement and control cabinets, communication cabinets etc. S11-5000 kVA/ 33	Set	6	Oil-immersed

No.	Name	Specification	Unit	Number	Remarks
		33±8×1.25% / 0.8/ 0.8 kV D, yn11, y11, Ud= 7.5%			
4.	Support Bracket	-	No.	2,400	Inclination angle-24
5.	Collector line	ZR-YJV _{22-26/35-3} × 70 mm ² , ZR-YJV _{22-26/35-3} × 120 mm ²	No.	2	

2.3 Proposed layout plan

According to the land use situation, topography and geomorphology conditions of the site and the initial access system scheme, a 132kV booster station is initially planned to be built in the south of the site, and six 5MWac PV power generation sub-arrays 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. It is proposed to enter the site for reconstruction and expansion of the part of the access road that 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 through more PV arrays as much as possible along the route. The total length of the construction 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 the sub-squares, so as to achieve the best layout scheme with better land use, saving connecting cables and shorter routine inspection lines.

The following figure illustrates the layout of PV field.

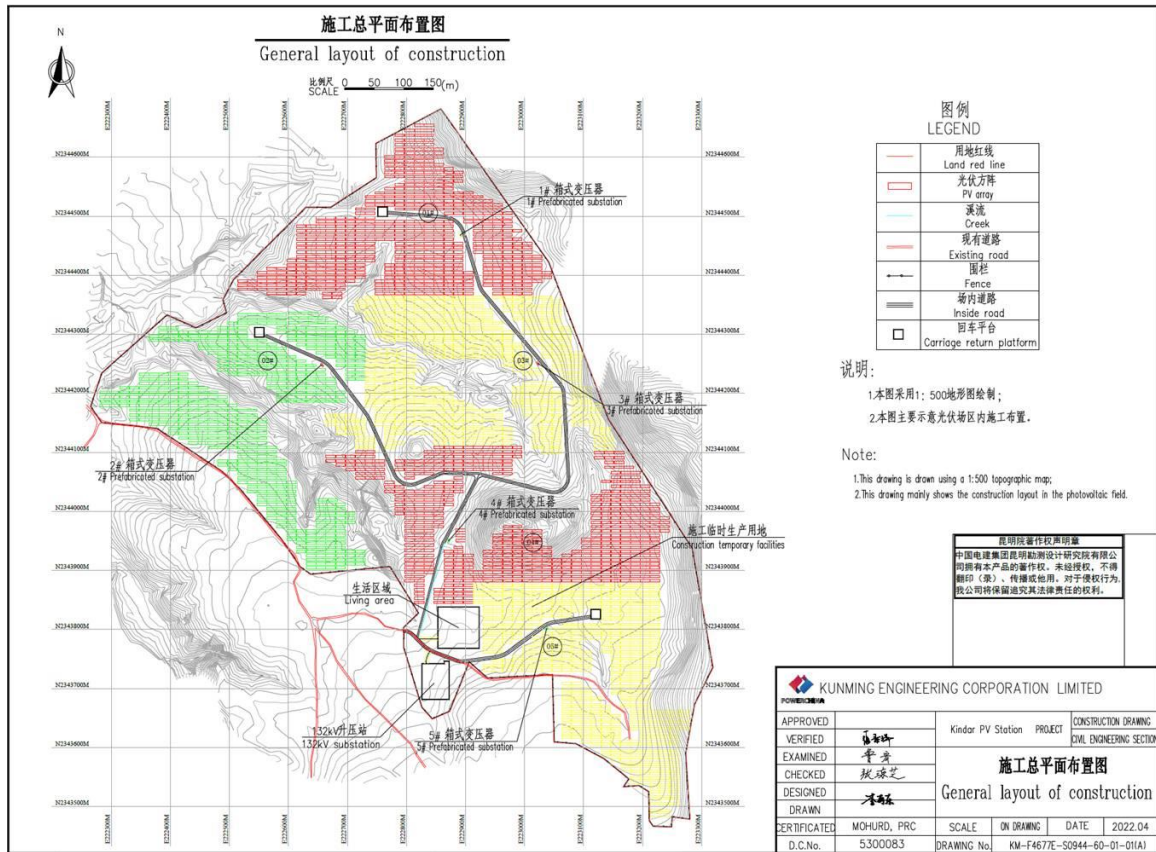


Figure 2. 4 Layout of PV Field

2.4 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 133.44 acres (54 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.

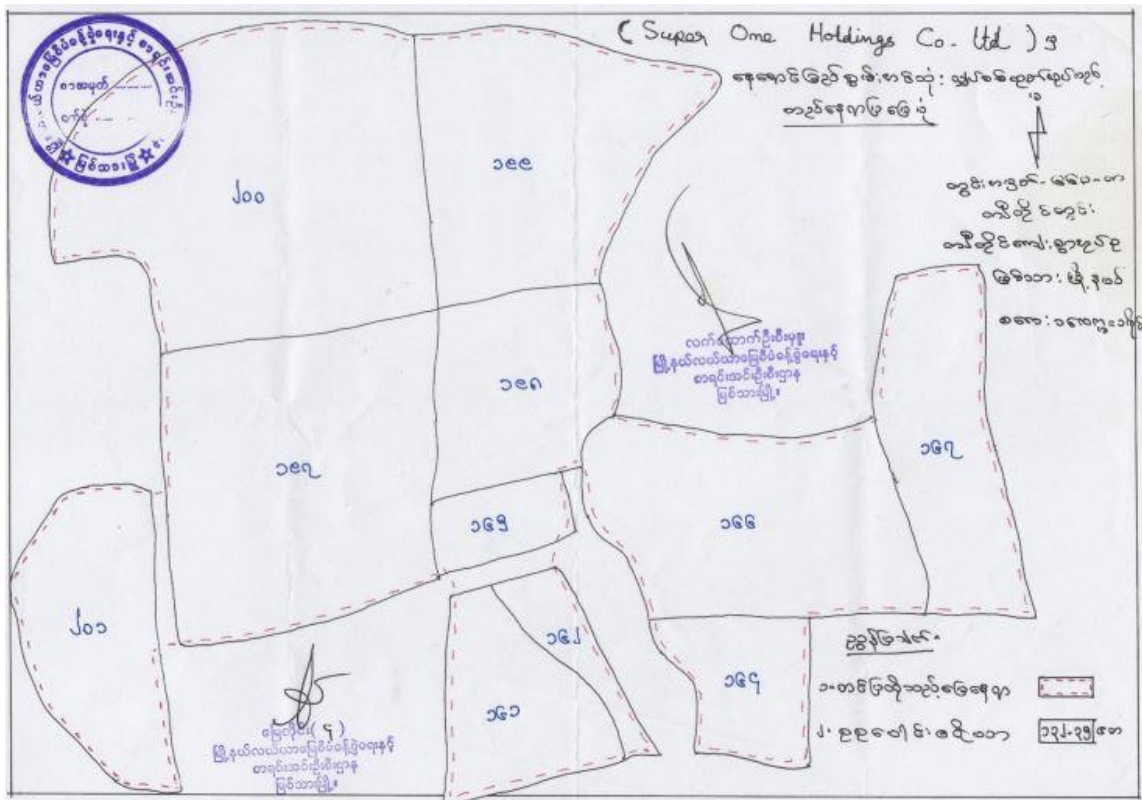
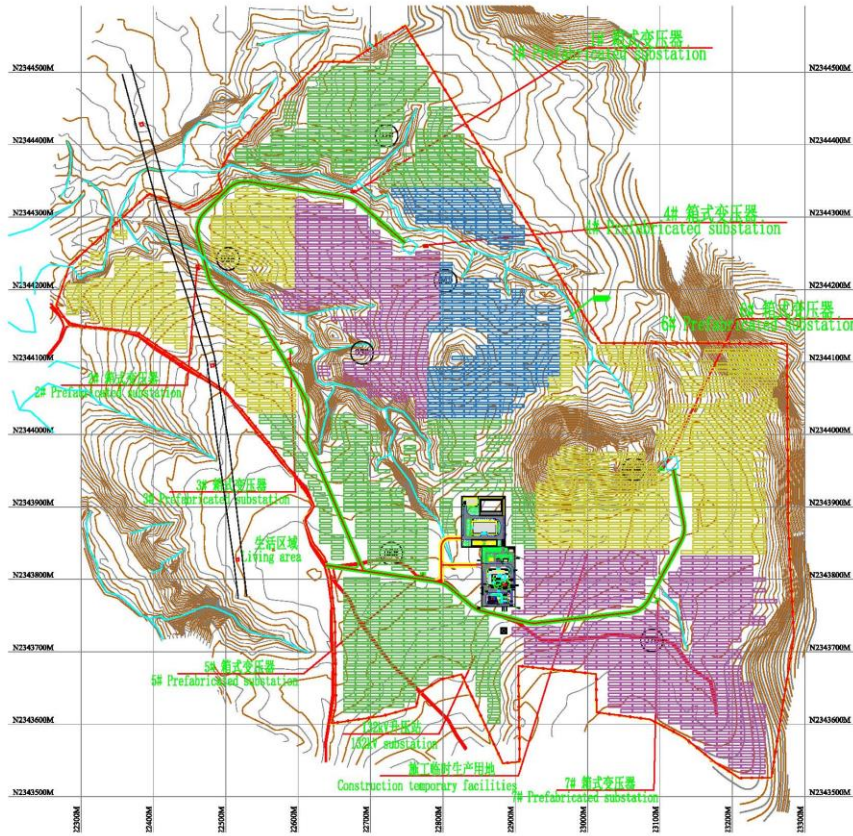


Figure 2. 5 Land Plot Map for Project Area

2.5 Project Description

2.5.1 PV Module

The proposed project will use double-sided monocrystalline silicon PV modules of 540Wp peak power. The following table shows the details specification of PV modules.

Table 2. 2 Details Specification of PV Module

Manufacturer	Longji, Jinko, GCL in China
Model number	540W LR5-72HBD
Power output	M10 wafer with gallium-doped technology P-PERC cell technology Half-cut cell with multi-busbars
Module efficiency	Voc: 49.5V Imp: 13.0A Power temperature coefficient: -0.35%/°C
Component size (height/ width)	2,256 × 1,133 mm
Weight	32.3 kg
Cell orientation	72 cells

2.5.1.1 Efficiency and degradation of PV modules

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.

2.5.2 String Inverter

The proposed project will use 250kW string inverter type and the following table shows the details specification of string inverter.

Table 2. 3 Details Specification of String Inverter

Manufacturer	Sun grow, Huawei, China
Type	String inverter
Type designation	SG250HX
Input (DC)	
Max. PV input voltage	1500 V
Min. PV input voltage/ Startup input voltage	500V/500V
Nominal PV input voltage	1160V
MPP voltage range	500 V – 1,500 V
MPP voltage range for nominal power	860 V – 1,300 V
No. of independent MPP inputs	12
Max. number of input connector per MPPT	2
Max. PV input current	30A*12
Max. DC short-circuit current	50A*12
Output (AC)	
AC output power	250kVA @30°C/225kVA @40°C/200kVA @50°C
Max. AC output current	180.5A
Nominal AC voltage	3/PE,800V

AC voltage range	680-880V
Nominal grid frequency/Grid frequency range	50Hz/45-55Hz, 60Hz/55-65Hz
THD	<3% (at nominal power)
DC current injection	<0.5% I _n
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%
General Data	
Dimensions (W*H*D)	1051*660*363 mm
Weight	99kg
Isolation method	Transformerless
Night power consumption	<2W
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

2.5.3 Box-type Transformer Design

In this project, each 5MW_{ac} PV power generation unit system adopts the unit connection mode of one 5000kW step-up transformer (boosted to 33kV).

Table 2. 4 Details Specification of Box-type Transformer

Rated capacity	5000kVA
Rated Voltage	33kV (8x1.25%/0.8kV)
Rated frequency	50 Hz
Voltage regulation mode	No excitation tap-changer is set on the high voltage side
Rated transformer ratio	33±8×1.25%/ 0.8 kV-0.8 kV
Impedance voltage	~ 7.5%
Cooling method	ONAN
Connection group	D, yn11
Neutral grounding mode	The neutral point on the 33kV side is not grounded
Number of phases	3 phases
Quantity	6 sets

2.5.4 Design of Support Bracket System

In this project, 540W_p monocrystalline silicon PV modules are used. The PV support bracket consists of 28 monocrystalline silicon PV modules arranged in 2 (rows) ×14 (columns) to form a support unit. The inclination angle of the support bracket is 24, and the lowest point of the support is 0.5m above the ground. (a fixed bracket is adopted in the bidding document, and it

can be adjusted to a tracking bracket in the later stage as an alternative to the technical solution). In this project, there are 2664 support brackets with installed capacity of 40.28MWp.

The PV support bracket is supported by q355 steel diagonal beams and crossbeams. Each support unit consists of five frames and four crossbeams. 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 rolled channel steel is used for inclined beams, and c90×45×15×2.0mm hot-dip galvanized cold-formed thin-walled rolled channel steel is used for crossbeams. u50×35×2.0mm hot-dip galvanized cold-formed thin-walled hemmed channel steel is adopted for diagonal braces, and ϕ 60×2.5mm hot-dip galvanized steel pipe is adopted for columns. The PV module is connected with the beam by bolts, and each PV panel 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 upright 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.

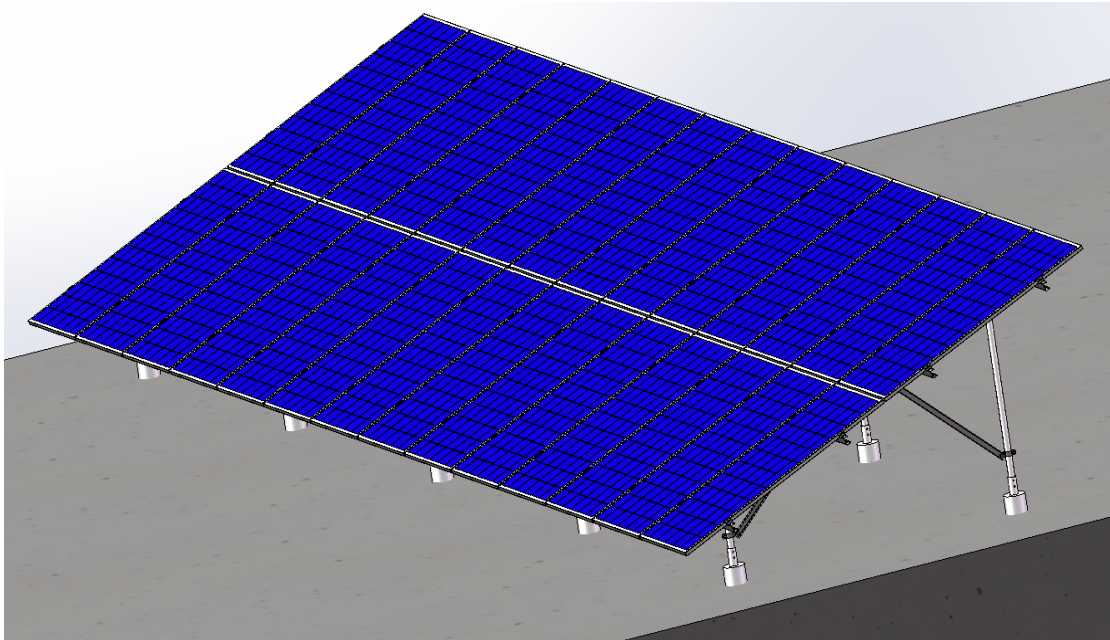


Figure 2. 6 Used bracket type

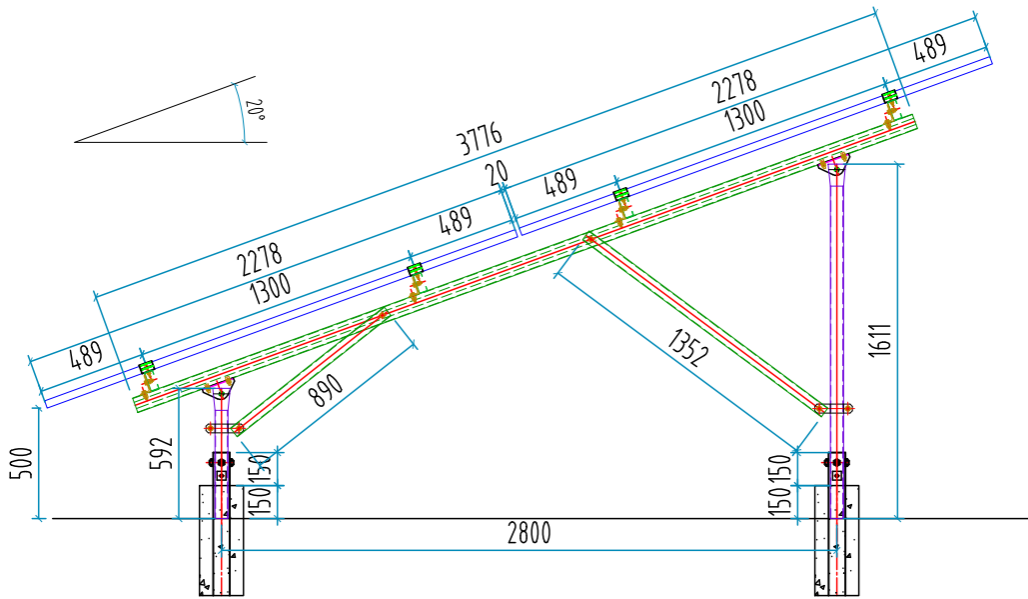


Figure 2. 7 Layout of Used bracket type

According to the site geology and bracket layout, each bracket is provided with 10 bored steel pipe cast-in-place pile foundations (arranged in front and back double rows). According to calculation, the steel pipe cast-in-place pile is proposed to have a pile length of 1.75m, a pile top with a height of 0.25m above the ground, a pile foundation drilling diameter of 200mm and a drilling depth of 1.5m. The steel pipe pile is formed by welding three 1.2m long ϕ 14 ribbed steel bars with ϕ ϕ 76 \times 4mm specifications. After drilling pile foundation, insert steel pipe pile, straighten steel pipe pile and pour c25 fine stone concrete into drilling gap.

2.5.5 Overhead Transmission Line Design

The installed capacity of this project is 30MWac. The outgoing line is connected to the nearby Kindar substation by a primary 132kV line, with a total length of 2km, and the whole line is erected in a single loop JL/GLA240/30 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.

In this project, it is proposed to adopt 35b19 module in 35kV tower catalogue module of typical design of power transmission and transformation project of state grid corporation of China with corresponding voltage grade. The module is a single-loop tower with an altitude of less than 1000m, a design wind speed of 35m/s, a conductor model of JL/GLA-240/30 and a ground wire of gj-50, which is designed according to the mountain planning. The straight tower and tension tower in the form of tower adopt "Up"-shaped iron tower.

Table 2. 5 Details Numbers of Poles Used for Overhead Transmission Line

No.	Content	Indicators
1.	Line length (km)	2
2.	Number of towers (base)	10

3.	Average span (m)	217
4.	Tensile ratio (%)	45.6
5.	Wire (kg/km)	1132
6.	Insulator (piece/km)	245
7.	Cross section conductor (mm ²)	240

2.5.6 Total Efficiency of Power Generation System

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

For grid-connected PV power generation systems in different regions, different climatic environments and different construction schemes, the above losses are different. See table for the evaluation of the above losses in this project in combination with the local climatic conditions and the proposed construction scheme.

Table 2. 6 Value of system efficiency evaluation

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

2.5.7 Electricity Power Generation Estimation

The power generation capacity of double-sided monocrystalline silicon PV cell module will be attenuated to some extent due to the aging of the cell module after working for a period of time. The operation period of this project is calculated as 20 years. The power generation gain of double-sided module is 4.5%, and the power attenuation of PV module in the first year is 2%, and then the power attenuation of PV module is 0.45% every year.

According to the above calculation principle, the annual average power generation of Kindar PV power station is 55945MW.h, and the annual power generation is shown in following table.

Table 2. 7 Annual Electricity Power Generation Estimation

Running period	Attenuation coefficient	Annual attention rate	Annual power generation (MW.h)
Year 1	0.98	2%	58497
Year 2	0.9755	0.45%	58228
Year 3	0.971	0.45%	57960
Year 4	0.9665	0.45%	57691
Year 5	0.962	0.45%	57422
Year 6	0.9575	0.45%	57154
Year 7	0.953	0.45%	56885
Year 8	0.9485	0.45%	56617
Year 9	0.944	0.45%	56348
Year 10	0.9395	0.45%	56079
Year 11	0.935	0.45%	55811
Year 12	0.9305	0.45%	55542
Year 13	0.926	0.45%	55274
Year 14	0.9215	0.45%	55005
Year 15	0.917	0.45%	54736
Year 16	0.9125	0.45%	54468
Year 17	0.908	0.45%	54199
Year 18	0.9035	0.45%	53931
Year 19	0.899	0.45%	53662
Year 20	0.8945	0.45%	53393
Annual Average			55945

2.5.8 Electrical Equipment Layout

(1) Layout of electrical equipment in PV field

a) The series inverter is arranged in the PV array, fixed on the PV bracket locally and installed outdoors.

b) The 33kV box-type transformer and the 33kV cable tap box are centralized arranged locally, and the cables are directly buried.

(2) Booster station layout

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.

An independent lightning rod with a height of 35m is set in the booster station, which is arranged beside the 33kV reactive power compensation device.

One set of 33kV reactive power compensation device is set up in the booster station, which is arranged outdoors in the north side of the booster station, and one set of 33kV substation and grounding transformer is arranged in the 33kV distribution room of the booster station.

The 33kV distribution equipment adopts kyn-40.5kV armored removable metal enclosed switchgear, which is arranged in a single row in the 33kV 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 structures

The cables and cable structures 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, combined with far and near, so as to reduce bending and crossing.

Outdoor, 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, such as indoor 33kV high-voltage switchgear and 0.4kV low-voltage panel, which are communicated with outdoor cable trenches.

In places where the number of cables is few and the location is relatively close, the cable burying scheme is adopted.

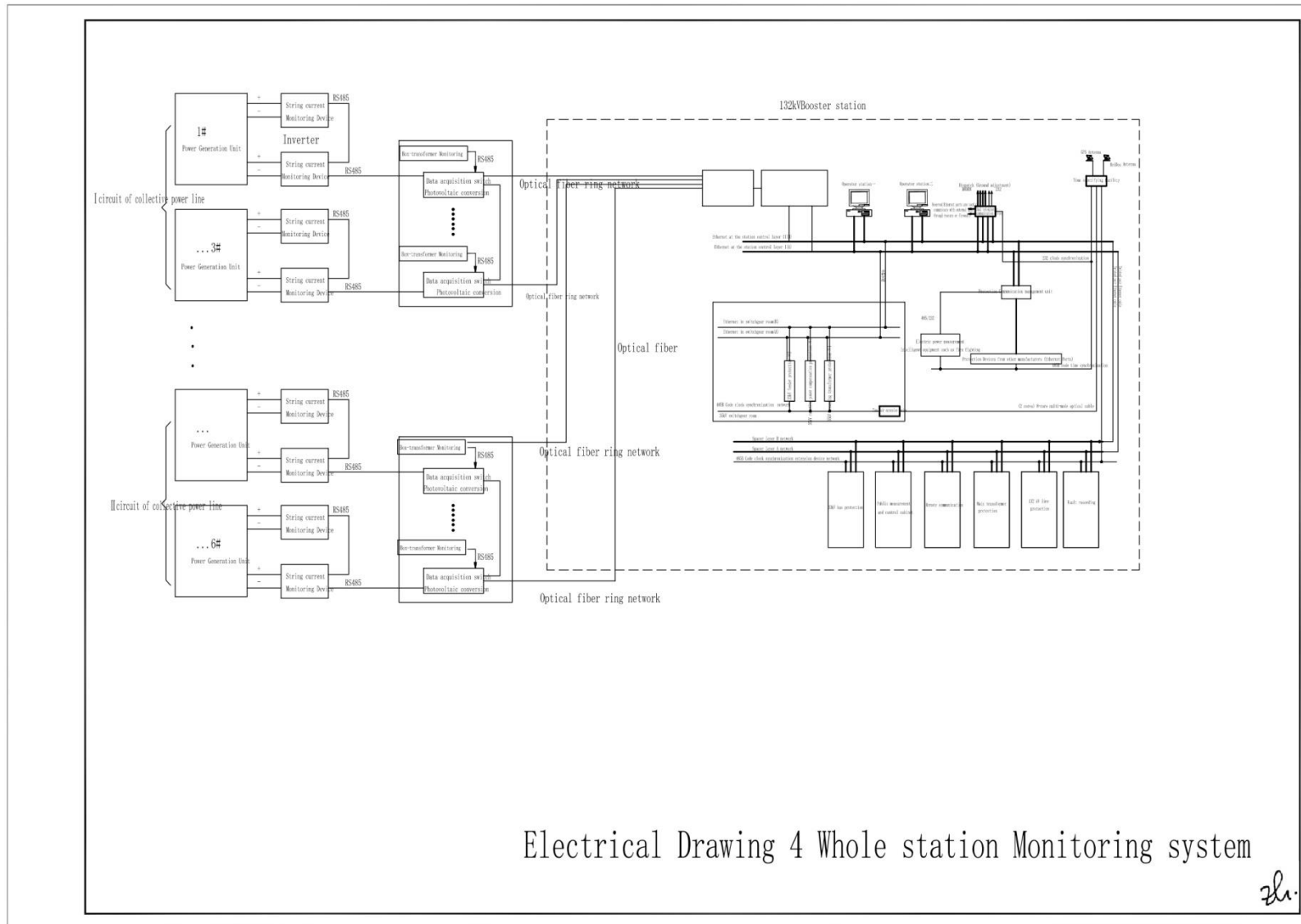


Figure 2. 8 132KV Booster Station Layout Plan

2.5.9 DC and UPS power supply

(1) 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 device is set 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.

(2) 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. AC uninterruptible power supply system uses rs485 interface to communicate with substation computer monitoring system.

2.5.10 Power Quality Monitoring Equipment

The booster station is equipped with a set of power quality monitoring device, which is used for real-time monitoring of voltage deviation, frequency deviation, three-phase unbalanced current, negative sequence current, harmonics, flicker, voltage fluctuation and continuous recording of other power quality indicators, so as to accurately evaluate the impact of grid-connected PV power station project on power quality of the power grid. According to the measured results, it is determined whether the filter device needs to be installed.

2.5.11 Single Line Diagram of Power Plant

The main electrical wiring of the 132kV booster station is specifically described as follows:

132kV outgoing line side: This project has completed one 132kV outgoing line to Kindar power plant transformer.

33kV distribution equipment: Single-bus configuration type, with one bus pt interval, two PV incoming intervals, one outgoing interval, one dynamic reactive power compensation interval and one station grounding transformer interval.

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

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

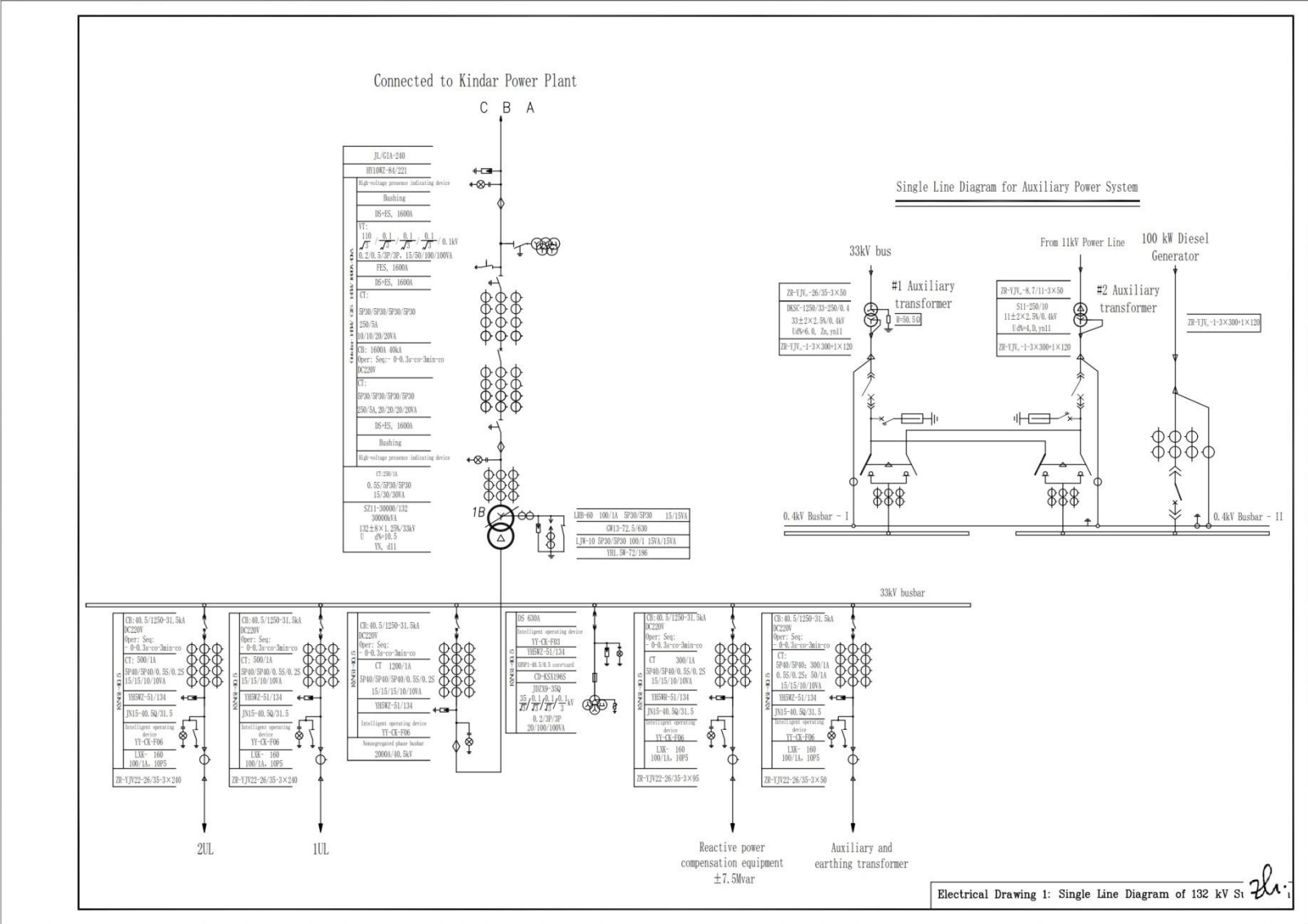


Figure 2. 9 Single Line Diagram

2.5.12 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 or few people on duty".

All equipment of this PV power station project are 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 on the spot 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 are monitored centrally; it can be dispatched remotely as required, monitor the whole PV power plant engineering equipment. The monitoring system of booster station and PV plant area is designed with a unified platform.

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 code and information, and solar PV battery series current, etc.) are monitored by the inverter control unit and passed through the inverter communication controller and upload it to the computer monitoring system of 132kV booster station by optical fiber transmission, and implement the monitoring, alarm and historical data storage of the above operating 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 starting and shutting down 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.

2.6 Implementation Schedule and Current Conditions of the Project

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 January. However, the current status of the project area is starting some preliminary activities such as to ensure that such preliminary activities do not cause Environmental Impacts. The following figure illustrates the implementing schedule of the project.

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



Figure 2. 11 Current Site Condition

2.7 Utilities

2.7.1 Construction Materials and Machines Requirement

With regards to construction materials, cement, gravel, sand, steel, wood and chain link will be exported as well as purchased from local providers for the proposed project.

Different types of construction machines and vehicles will be used for construction processes of the project. These include bulldozers, excavators, wheel loaders, motor graders, single drum vibrating rollers, crawler drills, mobile cranes, transporters, water bowers and dump trucks. The following table describes detail construction machines and vehicles used for proposed project.

Table 2. 8 List of Construction Machines and Vehicles

No.	Type of Machines and Vehicles	Number of Machines and Vehicles
1.	Bulldozer	1
2.	Excavator	1
3.	Wheel loader	1
4.	Motor grader	1
5.	Single drum vibrating roller	1
6.	Crawler drill	1
7.	Mobile crane (25T)	1
8.	Transporter	1
9.	Water bowser	1
10.	Dump truck	2
Total		11

Three vehicles will be used in operation phase of the project for administration, operation and utility purposes.

2.7.2 Water Requirement

Estimated water requirement for construction processes are 200,000 gallons per month and domestic water requirement is 15,000 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.

Regular cleaning of PV modules can improve the power generation efficiency of modules to a certain extent. The water consumption for cleaning PV modules is estimated as 1.6l/m², and the total water consumption for each cleaning is about 523 m³ per six months. A new tube well will be built within the project area. Deep well pumps are used to pump water to the 150m³ firefighting pool as the water source for the firefighting, greening and PV module cleaning. For domestic water utilization, the daily water consumption is 2m³/d for 10 people. The domestic water quality must meet the drinking water quality standard, and a purification treatment is set for treatment. After treatment, it is stored in a 4m³ water tank and is pressurized by variable frequency pump and supplied.

2.7.3 Electricity and Fuel Requirement

Electricity for construction phase will be obtained from national grid line and one 65 kVA generator will be installed for emergency cases.

Diesel will be mainly used for construction processes and estimated requirement is 15,000 gallons per month. Diesel will be purchased from nearby fuel station and stored with portable 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.

2.7.4 Human Resources Requirement

Totally, 220 workers are required for construction phase of the project, including 200 local workers and 20 foreign workers. Working hours is 8 hours per day and working days are 30 days per month. Working time is from 9:00 am to 5:00 pm and there is only one working shift in construction phase. There is a construction worker camp for migrant workers in the project site as well as some local workers will also be employed.

2.8 Waste Generation

2.8.1 Solid Wastes Generation

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

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

2.8.2 Liquid Waste Generation

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

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

2.8.3 Hazardous Waste Generation

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

During the operation phase, damaged PV modules due to improper handling during cleaning activities and maintenance activities are common hazardous wastes generation. Uninstalled lifespan-expired PV modules due to exchanging new PV modules at the time of extending

operation period of the project are also common hazardous wastes. Other hazardous wastes are used oil from transformers, oil spills and leakage from maintenance activities, vehicles, refueling and fuel storage area. For batteries waste, this project does not use batteries to store electricity from PV modules and will distribute directly to Kindar Substation via overhead transmission line.

3. Identification of Project proponent

The proposed 30 MW solar power plant project is proposed by Myanmar Kindar Solar Power Co., Ltd. formed by China ITS (Holdings) Co., Ltd., which is a China based company and a successful bidder for EPGE solar Tender PV (Bid No.: EPGE PV 02/2021-2022). The project is located at Kyi Taing Village Tract, Myitthar Township, Kyaukse District, Mandalay Region, and Myanmar. The construction processes of the proposed project will take about 6 months and then operation processes to generate electricity from solar energy and distribute to the Kindar Substation will take 20 years. After 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 KINDAR SOLAR POWER COMPANY LIMITED is in order to implement the proposed project. The following table describes the management responsible persons and List of Director of the proposed project.

Table 3. 1 Mangement Employments of Myanmar Kindar 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

Table 3. 2 List of Director

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

3.1.1 Bidder Information

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

Table 3. 3 Bidder of Proposed Project

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

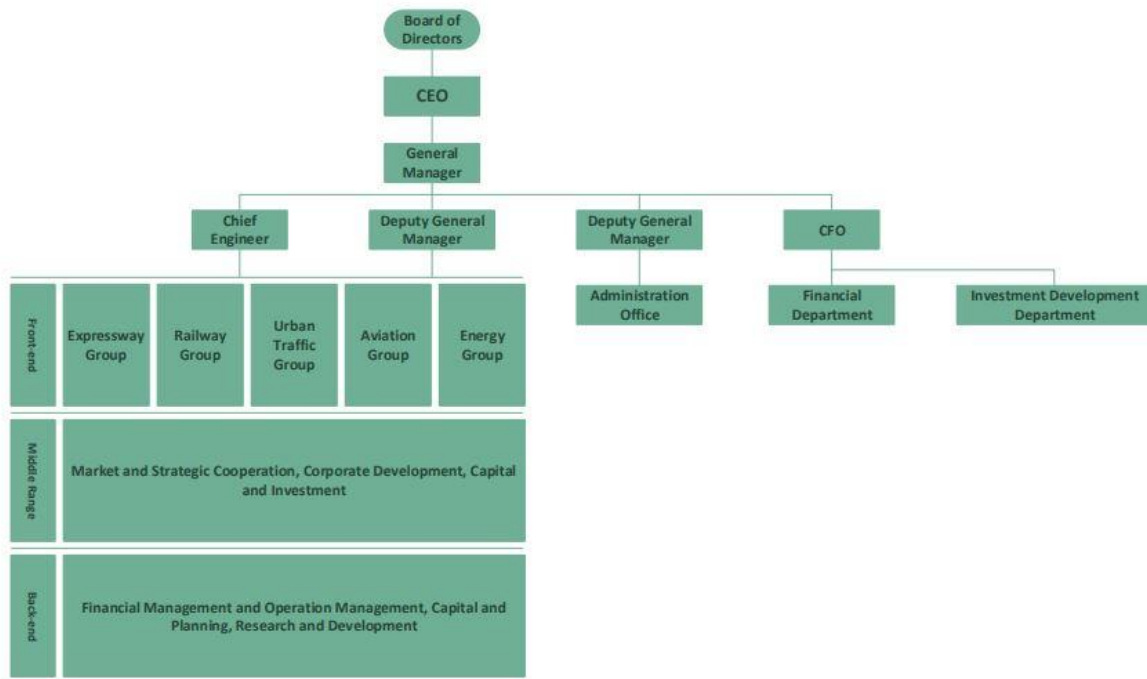


Figure 3. 1 Organization Chart of China ITS (Holdings) Co., Ltd.

3.3 Organizational Structure of 30MW Ground Mounted Solar Power Plant

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

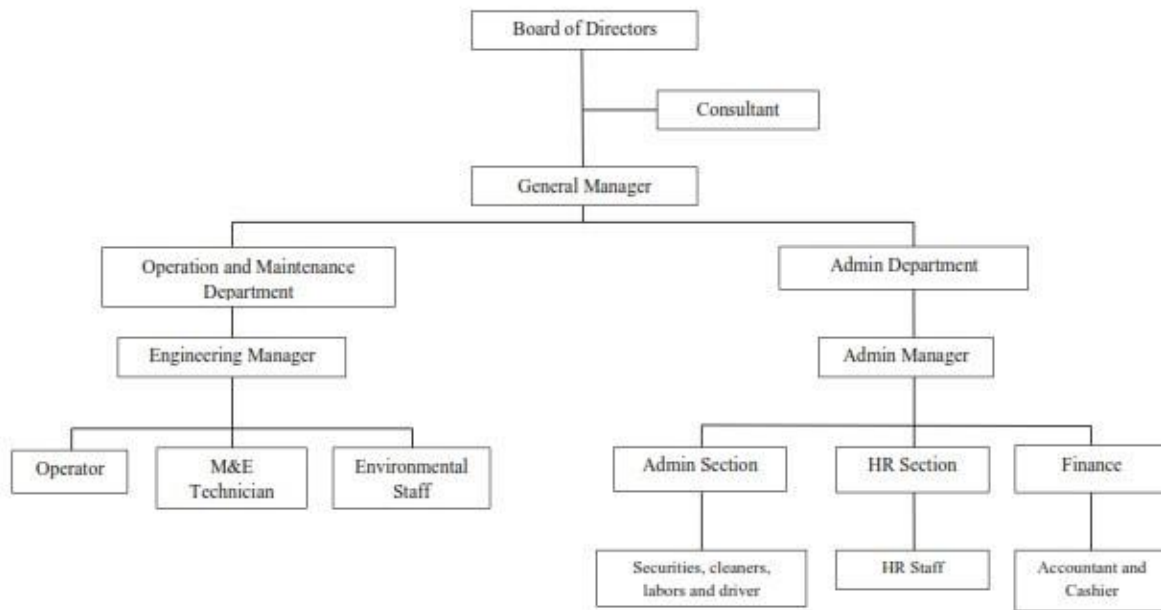


Figure 3. 2 Organization Chart of Myanmar Kindar Solar Power Co., Ltd.

3.4 Investment Plan

The total investment amount for the proposed project is 27 Million USD and it includes investment for EPC, Non EPC and Financing Cost. The following table (3.5) describes detail investment plan for the proposed project. The onshore and offshore equipment and material supplies can be seen in Appendix (8).

Table 3. 4 List of Shareholder

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. 5 Investment Plan

			<i>Start Date</i>	2022-3-1	2022-4-1	2022-5-1	2022-6-1	2022-7-1	2022-8-1	
			<i>End Date</i>	2022-3-31	2022-4-30	2022-5-31	2022-6-30	2022-7-31	2022-8-31	
			<i>Monthly Label</i>	1	2	3	4	5	6	
			<i>Quarterly Label</i>	1	1	1	2	2	2	
			<i>Yearly Label</i>	1	1	1	1	1	1	
*****Uses of Project Cost										
			<u>Schedule</u>	6	25%	25%	20%	15%	10%	5%
				9	20%	20%	15%	10%	10%	5%
				12	20%	20%	10%	5%	5%	5%
A	EPC	USD	26,154,610	6,538,653	6,538,653	5,230,922	3,923,192	2,615,461	1,307,731	
	EPC (Inc. CT)	USD	26,154,610	6,538,653	6,538,653	5,230,922	3,923,192	2,615,461	1,307,731	
	EPC Offshore Portion	USD	23,288,110							
	EPC Onshore Portion (Inc. CT)	USD	2,866,500							
B	Non-EPC	USD	402,953	341,753	-	-	-	-	61,200	
	Consulting Service Cost	USD	241,753	241,753	-	-	-	-	-	
	Due Diligence	USD	121,753	121,753	-	-	-	-	-	
	Feasibility Study	USD	120,000	120,000	-	-	-	-	-	
	Development Cost	USD	161,200	100,000	-	-	-	-	61,200	
	Project Land Cost	USD	61,200	-	-	-	-	-	61,200	
	Licenses & Permits	USD	40,000	40,000	-	-	-	-	-	
	Transmission Line Land Cost	USD	60,000	60,000	-	-	-	-	-	
C	Financing Cost	USD	840,214	445,011	-	163,128	-	-	232,075	
	Upfront Fee	USD	316,128	316,128	-	-	-	-	-	
	Long-term Loan Interest	USD	395,203	54,376	54,376	54,376	77,358	77,358	77,358	
	Long-term Loan Interest (Quarterly)	USD	395,203	-	-	163,128	-	-	232,075	
	Sinosure Debt Premium	USD	128,883	128,883	-	-	-	-	-	
D	Total Capital Cost	USD	26,557,563	6,880,406	6,538,653	5,230,922	3,923,192	2,615,461	1,368,931	
E	Total Construction Cost	USD	26,557,563	6,880,406	6,538,653	5,230,922	3,923,192	2,615,461	1,368,931	
F	Total Project Cost	USD	27,397,777	7,325,417	6,538,653	5,394,050	3,923,192	2,615,461	1,601,006	
*****Sources of Project Cost										
			TRUE							
	Total Project Cost	USD	27,397,777	7,325,417	6,538,653	5,394,050	3,923,192	2,615,461	1,601,006	
	Project Equity	USD	6,849,444	4,814,530	-	-	2,034,915	-	-	
	Project Debt	USD	20,548,333	14,443,589	-	-	6,104,744	-	-	

4. Identification of the EMP Experts

The Environmental Management Plan (EMP) for the proposed 30 MW Ground Mounted Solar Power Plant Project Connected to Kindar Substation is prepared by E Guard Environmental Services Co., Ltd. The environmental study was carried out by the study team and the following is a summary of team member's responsibilities.

U Soe Min (Director)

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

U Myint Oo (Advisor)

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

Daw Thein Mwe Khin (Associate Consultant)

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

working as a survey team leader for YCRL Updating Project and Dryzone Water Supply Project in 2014, 2015 and 2016 respectively. She had her 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.

U Aung Si Thu Thein (Assistant Consultant)

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

Daw Htet Shwe Sin Aung (Environmental Specialist)

Daw Htet Shwe Sin Aung is an Environmental Specialist at E Guard Environmental Services Co., Ltd. She graduated since 2017 with the Master of Science specialized in Zoology from Yangon University. She has three years experiences in surveying the fauna, writing report and good experience in lab works. Now she is responsible for surveying fauna data and report writing, gathering information for the environmental reports, conducting socioeconomic surveys, cooperating with clients including NGOs, Local and Governmental agencies for the projects, assisting and cooperating in writing of environmental reports. Her responsibilities are surveying fauna data analyzing and writing report.

U Kyaw Soe Moe (Project Associate)

U Kyaw Soe Moe is a Project Associate who received Bachelor of Civil Engineering from Taunggyi Technological University in 2016 and Post Graduate in GIS from Dagon University, Yangon in 2019. He has more than four year of experiences in report writing, conduction stakeholder engagement, public consultation, social survey and site visiting. His contributions on preparation of EMP for this project are report writing, stakeholder engagement, environmental quality analysis.

Contact: 09-797005211; kyawsoemoe@eguardservices.com

U Htet Aung (Project Associate)

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

Daw Thet Shwe Yee Aung (Project Associate)

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

Daw Nang Aye Thida (Project Associate)

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

U Nyein Chan Aung (Project Associate)

U Nyein Chan Aung is currently working as a Project Associate at E Guard Environmental Services Co., Ltd. He has received Bachelor Degree in Forestry from University of Forestry and Environmental Sciences (Yezin, Naypyitaw) in November, 2016. Now, he is trying to achieve a Diploma in Environmental Studies at University of Yangon (YU). He has about four years experiences in reporting, conduction stakeholder engagement, biodiversity survey, social survey, RAP survey and site visiting. He has completed various trainings regard with environmental management and GIS. Now he is responsible for report preparation, planning and identifying, coordinating, data analysis and impact assessment, stakeholder engagement and public consultation meeting and information gathering process.

Daw May Thu Win (Project Assistant)

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

Daw Shar Thae Hoy (Project Assistant)

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

U Wunna Zaw (Surveyor)

U Wunna Zaw is a Surveyor who 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.

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



E Guard Environmental Services Co., Ltd.

**No. (145, A2-3), Thiri Mingalar Street, Ward No. (4),
Mayangone Township, 11062, Yangon.**

Tel: +95 1 9667757,

Fax: (+95)1 9667757

E-mail: info@eguardservices.com

URL: www.eguardservices.com

5. Policy, Legal and Institutional Framework

We, Myanmar Kindar 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 Solar Power Plant Project Connected to Kindar Substation. Moreover, we also committed to operate the proposed project by following the plans and mitigation measures stated in this EMP report.

We, E Guard Environmental Services Co., Ltd. had also made commitment to follow and compliance with the related existing Laws, Environmental Conservation Law, Rules, Environmental Impact Assessment Procedure, National Environmental (Quality) Emission Guidelines, Standards and Mitigation Measures stated in this Environmental Management Plan (EMP) report for the proposed 30 MW Ground Mounted Solar Power Plant Project Connected to Kindar Substation operated by Myanmar Kindar 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. Labor Organization Law (2011)
18. Settlement of Labor 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. Protection of Biodiversity and Protected Area Law (2018)
30. Import and Export Law (2012)
31. Freshwater Fisheries Law (1991)
32. The Underground Water Act (1930)
33. The Electricity Law (2014)
34. The Farm Land Law (2012)
35. Land Acquisition, Resettlement and Rehabilitation Law (2019)
36. Natural Disaster Management Law (2013)

1. The Environmental Conservation Law (2012)

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

- The project proponent has to pay the compensation for damages if the project will cause injuries to environment, under the sub-section (o) of section 7 of said law.
- The project proponent has to purify, emit, dispose and keep the polluted materials in line with the stipulated standards, under section 14 of said law
- The project proponent has to install or use the apparatus, which can control or help to reduce, manage, control or monitor the impacts on the environment, under section 15 of said law.
- The project proponent has to allow relevant governmental organization or department to inspect whether performing is conformity with the terms and condition included in prior permission, issued by the ministry, or not, under section 24 of said law.
- The project proponent has to comply with the terms and conditions included in prior permission, under 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 phase, construction phase, operation phase, suspension phase, closure phase and post-closure phase, moreover has to implement the EMP with abiding the all conditions included in ECC, relevant laws & rules and this procedure, under paragraph 106.
- The project proponent has to submit, as soon as possible, the failures of his or her responsibility, other implementation, ECC or EMP. If dangerous impact caused by this failure or failure should be known by the Ministry the project proponent has to submit within 24 hours and other than this situation has to submit within 7 days from knowing it, under paragraph 107.
- The project proponent has to submit the monitoring report semiannually prescribed time by Ministry in line with the schedule of EMP, under paragraph 108.
- The project proponent has to prepare the monitoring report in accord with the rule 109.
- The project proponent has to show this monitoring report in public place such as library, hall and website and office of project for the purpose to know this report by public within 10 days from the date, which the report is submitted to the Ministry. Moreover has to give the copy of this report, by email or other way which way agreed with the asked person, to any asked person or organization, under paragraph 110.
- The project proponent has to allow inspector to enter and inspect in working time and if it is needed by Ministry has to allow inspector to enter and inspect in the office and work place of project and other work place related to this project in any time, under paragraph 113.
- The project proponent has to allow inspector to immediately enter and inspect in any time if it is emergency or failure to implement the requirements related to social or environment or caused to it, under paragraph 115.

- The project proponent has to allow inspector to inspect the contractor and sub-contractor who implements on behalf of project, under paragraph 117.

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

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

5. Myanmar National Environmental Policy (2019)

- Mission: To achieve a clean environment, with healthy and functioning ecosystems, that ensures inclusive development and wellbeing for all people in Myanmar.
- Vision To establish national environmental policy principles for guiding environmental protection and sustainable development and for mainstreaming environmental considerations into all policies, laws, regulations, plans, strategies, programs and projects in Myanmar.

6. Myanmar Climate Change Policy (2019)

- Vision: To be a climate-resilient, low carbon society that is sustainable, prosperous and inclusive, for the wellbeing of present and future generations.
- Purpose: To create and maximize opportunities for sustainable, low carbon, climate resilient development, ensuring benefits for all.

7. National Land Use Policy (2016)

Objectives:

- To promote sustainable land use management and protection of cultural heritage areas, environment, and natural resources in the interest of all people in the country;
- To strengthen land tenure security for the 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 ensure the prescribed insurance by rules, under section 73 of said law.

9. Foreign Investment Rules (2013)

The promoter or investor shall:

- (a) comply with Environmental Protection Law in dealing with environmental protection matters related to the business;
- (b) shall carry out socially responsible investment in the interest of the Union and its people;
- (c) shall co-operate with authorities for occasional or mandatory inspection;
- (d) 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;
- (e) 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)
 - (a) Mass death of animals included in birds or chicken;
 - (b) Mass death of mouse;
 - (c) Suspense of occurring of communicable disease or occurring of communicable disease;
 - (d) 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.
- 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 ensure the insurance for injured person under section 15 of said law.
- The project proponent has to ensure 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. Labor 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 labor organizations systematically and independently.

- The project owner promises to allow the labor 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 labor 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 labor 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 labor 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 labor laws under section 20 of said law.
- The project proponent promises the labor organization to participate in solving the collective bargains of the employees in accord with the labor laws under section 21 of said law.
- The project proponent promises the labor 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 Labor Organization under section 22 of said law.

18. Settlement of Labor 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 labor 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 wage in work place, moreover to be inspected.

- The project proponent has to pay the wages in line with section 12 of said law.
- The project proponent has to notify the prescribed wages obviously in work place under sub-section (a) of section 13 of said law.
- The project proponent has to record correctly the lists, schedules, documents, and wages, report these to the relevant department, and give if these are asked while inspecting, in accord with the stipulations under sub-section (b) (c) (d) of 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. Protection of Biodiversity and Protected Area Law (2018)

Purpose: to ensure abiding by the prohibitions and stipulations to protect biodiversity and protected area

- The project proponent has to avoid entering the prohibited area located in protected area without permission under sub-section (a) of section 35.

- The project proponent has to avoid digging on the land or carrying out any activity in protected area under sub-section (c) of section 35.
- The project proponent has to avoid extracting, collecting or destroying in any manner, any kind of wild or cultivated plant in protected area under sub-section (d) of section 35.
- The project proponent has to avoid polluting soil, water and air, damaging a water-course or poisoning water, electrification, using chemical or explosive materials in protected area under sub-section (a) of section 39.
- The project proponent has to avoid possessing or disposing of toxic objectives or mineral wastes in protected area under sub-section (b) of section 39.

30. Import and Export Law (2012)

Purpose: To ensure to abide by the permission for import

The project proponent has to abide by the conditions contained in permission for import if the boiler is imported, under section 7 of said law.

31. 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.

32. The Underground Water Act (1930)

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

- The project owner will obtain the license 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.

33. 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.

34. 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.

35. Land Acquisition, Resettlement and Rehabilitation Law (2019)

The project proponent shall provide concern with the compensation to landowner for the land acquisition and other related persons as the following processes-

- In the confiscated land, if there are no permanent buildings and other business buildings, the compensation for this land shall be issued to the landowner and the person concerned in the confiscated land under sub-section (a) of section 39 of said law.
- In the confiscated land, if there are permanent buildings and other business buildings, the compensation for land and building shall be issued to the landowner with local current market price under sub-section (b) of section 39 of said law.

- In the confiscated land, if there are no perennial plants, seasonal crops and livelihood business, the compensation for this land shall be issued to the landowner with local current market price under sub-section (c) of section 39 of said law.
- In the confiscated land, if there are perennial plants, seasonal crops and livelihood business as the following,
 - Three times of local current market price for perennial crop currently grown
 - Three times of local current market price based on the yield per acre for paddy and other crops grown
 - Estimated loss of income due to loss of livelihood and employment
 - Animals, other livestock and materials loss under sub-section (d) of section 39 of said law.
- The representative or effective person shall be identified and compensated for compensation under sub-section (e) of section 39 of said law.

The project proponent shall implement resettlement or rehabilitation as the following plan

- The process of land acquisition and transfer of land is initiated and the landowner is given the right to re-enforce the resettlement process under sub-section (a) of section 46 of said law.
- Housing development process, the necessary infrastructure and support for the livelihood of the households are needed. The resettlement process is including infrastructure and other needs for development of ward and village development under sub-section (b) of section 46 of said law.
- Rehabilitation processes that include livelihood activities and job placement arrangements under sub-section (c) of section 46

36. 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 programs in order to bring about better living conditions for victims.

- The project proponent has to perform preparatory and preventive measures for natural disaster risks reduction before the natural disaster strikes under sub section (a)(i) of section 13 of said law.
- The project proponent has to undertake rehabilitation and reconstruction activities for improving better living standard after the natural disaster strikes and conservation of the environment that has been affected by natural disaster under sub section (a)(iii) of section 13 of said law.
- The project proponent has to carry out better improvement on early warning system of natural disaster under sub section (b) of section 14 of said law.

- The project proponent has to carry out together with the measures of natural disaster risk reduction in development plans of the State under sub section (d) of section 14 of said law.
- Whoever if the natural disaster causes or is likely to be caused by any negligent act without examination or by willful action which is known that a disaster is likely to strike, shall be punished with imprisonment for a term not exceeding three years and may also be liable to fine under section 25 of said law.
- Whoever interferes, prevents, prohibits, assaults or coerces the department, organization or person assigned by this law to perform any natural disaster management shall, on conviction, be punished with imprisonment for a term not exceeding two years or with fine or with both under section 26 of said law.
- Whoever violates any prohibition contained in rules, notifications and orders issued under this law shall, on conviction, be punished with imprisonment for a term not exceeding one year or with fine or with both under section 29 of said law.
- Whoever willful failure to comply with any of the directives of the department, organization or person assigned by this law to perform any natural disaster management shall, on conviction, be punished with imprisonment for a term not exceeding one year or with fine or with both under sub section (a) of section 30 of said law.




6. Description of the Surrounding Environment

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

- i) **Onsite Measurements and Analysis** – Baseline environmental parameters such as wind speed, wind direction, air quality, water quality and noise level of the project were measured by using the appropriate environmental quality measuring equipment.
- ii) **Secondary Data Collection and Analysis** – Some data such as socio-economic condition, physical/biological environment and weather data were collected from official township data from the General Administration Department and analyzed by the study team.

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

Table 6. 1 Environmental Quality Measuring Equipment

No.	Name and Model of Instrument	Purpose	Measuring Instrument
1.	Haz-Scanner EPAS	PM ₁₀ , PM _{2.5} , CO, CO ₂ , SO ₂ , NO ₂	
2.	Digital Sound Level Meter	Noise level	
3.	Onsite Water Quality Monitor	Water quality	

6.1 Physical Environment

6.1.1 Climate

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

Temperature and Rainfall- The proposed project site is located at Myittha Township, Meiktila District, Mandalay Region. The highest temperature of Myittha Township is 41 °C and the lowest temperature is 12 °C. Rainfall and temperature of Myittha Township from 2016 to 2019 is described as followed.

Table 6. 2 Rainfall and Temperature of Myittha Township

No.	Year	Rainfall		Temperature	
		Rainy Days	Total Rainfall (inches)	Summer (°C)	Winter (°C)
				Highest	Lowest
1.	2016	45	40.57	42	11
2.	2017	48	32.57	42	16
3.	2018	52	32.59	42	15
4.	2019	34	22.00	42	-

Source; Myittha Township Data (GAD, 2019)

6.1.2 Wind Speed and Wind Direction

The following figures describe the wind speed, wind direction and wind class frequency distribution of the proposed project site on 21th to 22th May 2022. According to the observed data, wind blows mainly from North West with the highest speed of 2.45 m/s in the project site.

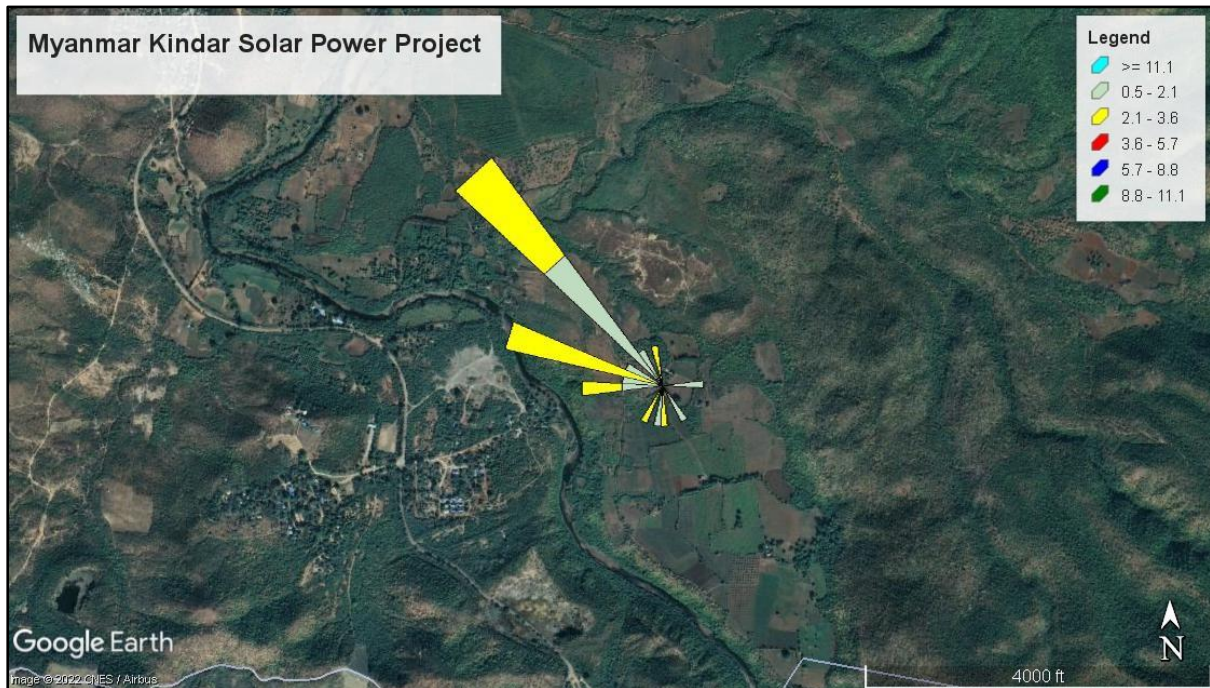


Figure 6. 1 Wind Speed and Wind Direction at the Proposed Project

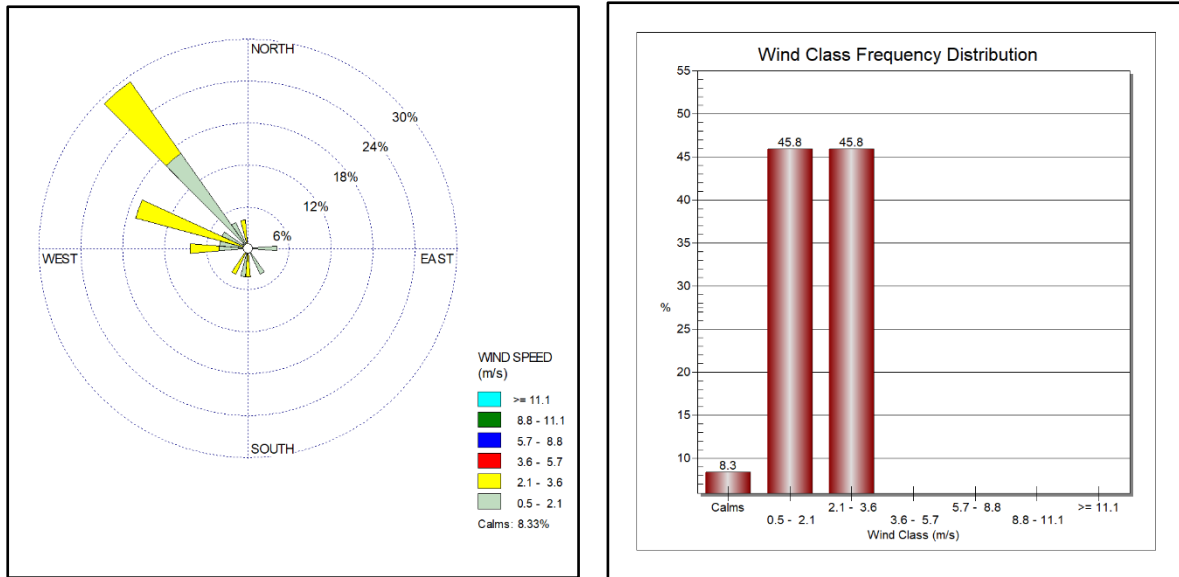


Figure 6. 2 Wind Class Frequency Distribution

6.1.3 Earthquake Intensity

Myanmar is exposed to multiple natural hazards including cyclones, earthquakes, floods and fire and it has been periodically exposed by natural disasters. Myittha Township is located close to the Sagaing Fault, which is a major tectonic structure that cuts through the center of Myanmar. The Sagaing Fault is a dextral-slip fault system and trending roughly north-south. The historical records of the northern half of the Sagaing fault may illustrate another complexity, multi-segment rupture. Earthquake intensity of the area in Myanmar can be seen in the following figure.

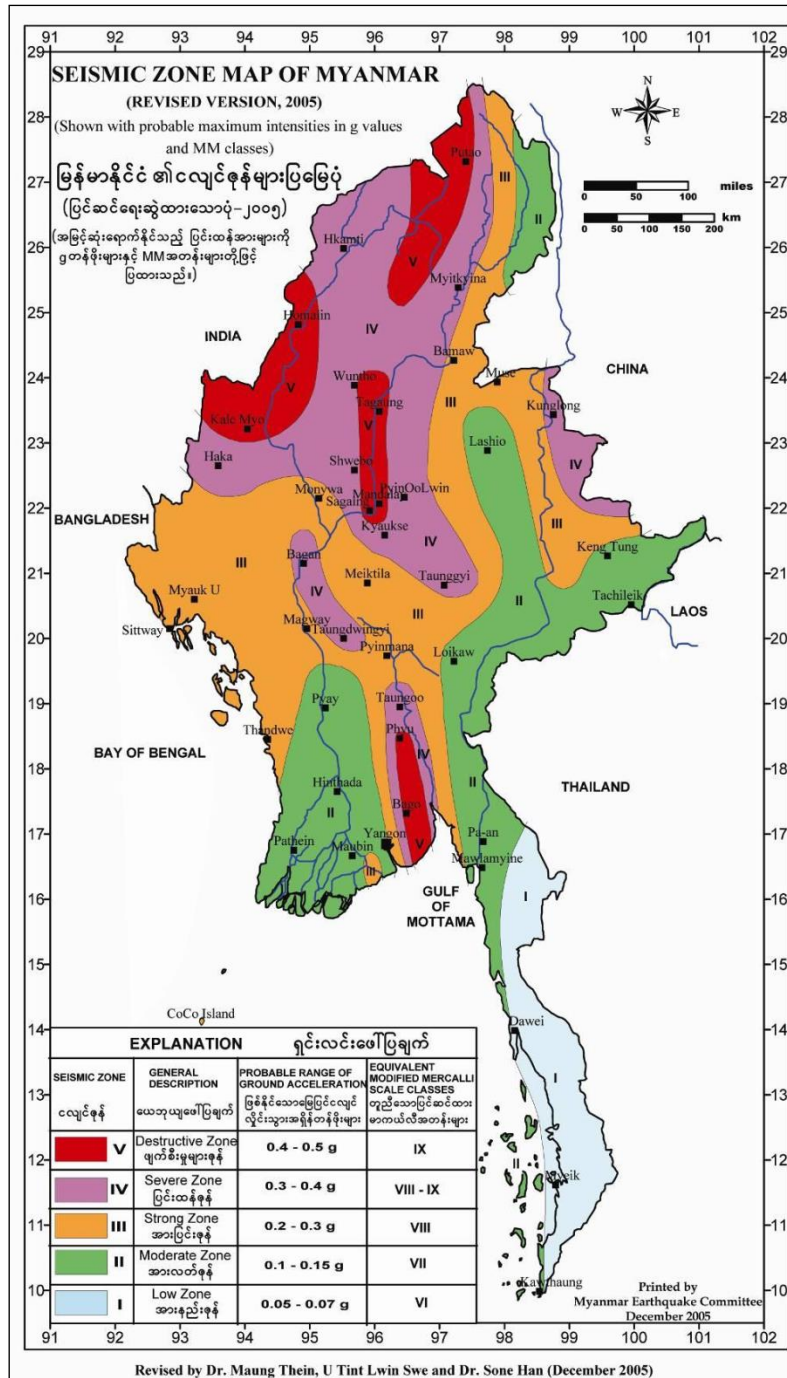


Figure 6. 3 Seismic Zone Map of Myanmar

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

As per map, the proposed project is located within the **Zone IV (Severe Zone)** and can damage good RC Buildings and cause major damage in ordinary brick buildings. The probable intensity range of Zone IV is 0.3-0.4 g (g=the acceleration of gravity). Regarding the probable range of ground acceleration, 1.0 g = 980 cm/s² or 32 ft per second per second) expected in various seismic zones.

Possibility of strong and major earthquakes along the Sagaing Fault is considerable and no seismic activity for more than half a century is displayed. Therefore, the project proponent shall consider all structural designs of the building and electrical equipment installation such as PV modules, inverters, box-type transformers and overhead transmission line in order to prevent earthquake risks.

6.1.4 Topography

Myittha Township is located at the southern part of Kyaukse plain. Most of the areas are generally flat alluvial plains and $\frac{3}{4}$ of the township areas are plains and the rest are hilly areas. Flat alluvial plain composed of silt and clay deposits and poor drainage. The well-known mountains are Pyat Kha Yweit, Pa Lin Gu, Shwe Min Wun, and Mone Mountains.

6.1.5 Hydrology

Myittha Township has a number of streams and creeks which flows from south to north. The Panlaung River flows from East to West is a well-known creek and flows into the Dokhtawaddy River in Tada-U Township. Samon River flows from South to North and Htone Gyi Creek flows from East to West through the villages within Myittha Township. Panlaung River is about 700 m west from the proposed project.

6.1.6 Soil Condition

The location where the soil sample was collected has already been cleared for project site. The site 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 dark. The texture of the soils are fine and clay loam both samples contain high amount of plant available nutrients. The dark compact soils are occurred in the Dry Zone in the level plains of Sagaing, Mandalay and Magway Division. They are found on the lowlands near the rivers and broad depression in the areas of Yellow Brown Forest 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 5 to 6. 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 medium concentration amount of nutrients such as Nitrogen (N) and Potassium (K), and forest can grow well.

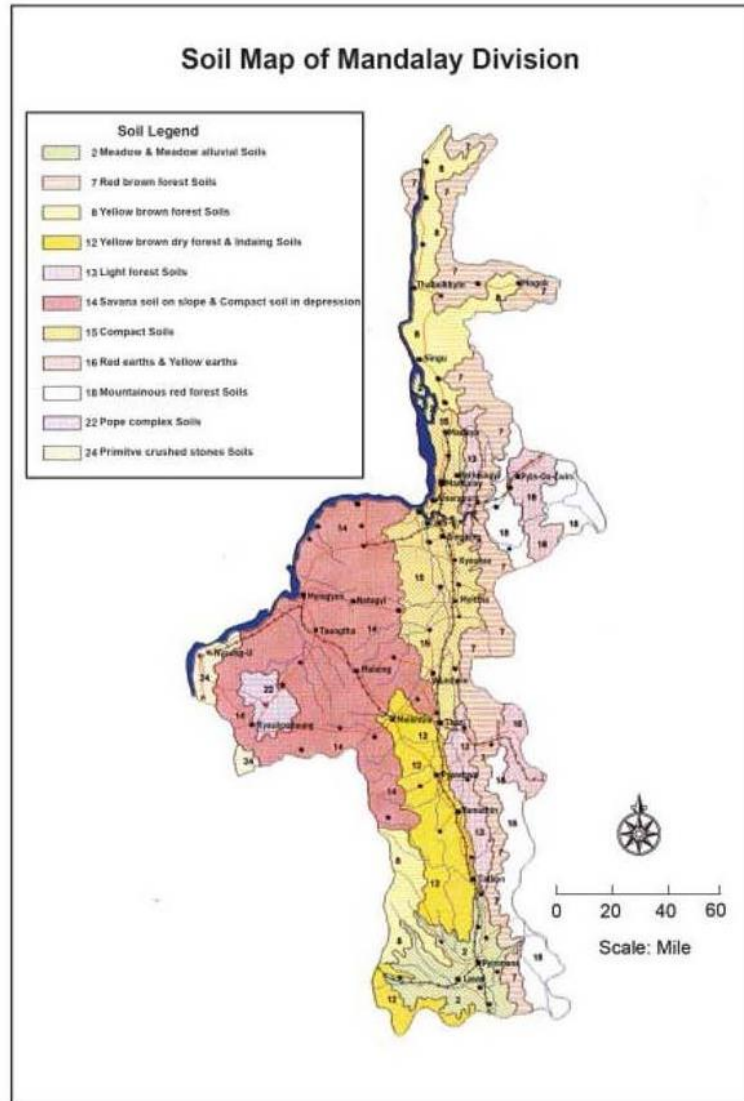


Figure 6. 4 Soil Map of Mandalay Division

6.1.7 Ambient Air Quality

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

Table 6. 3 Location and Parameters of Air Quality Monitoring

Date	Item	GPS Coordinates	Locations	Parameters
21.5.2022 – 22.5.2022	Air Monitoring Point	Lat- 21°10'36.00"N Long- 96°19'36.00"E	Within the project site	Gaseous Emission: CO, CO ₂ , SO ₂ , NO ₂

				Dust Emission: PM ₁₀ , PM _{2.5}
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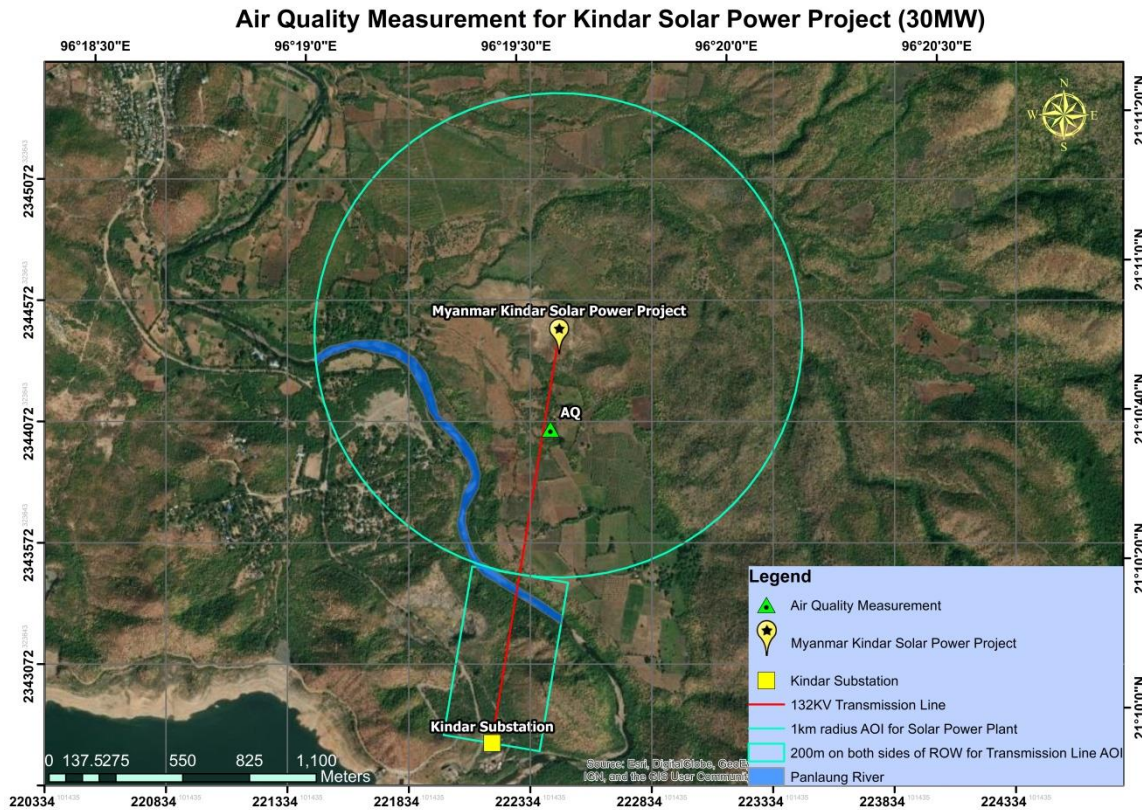


Figure 6. 5 Location of Air Quality Monitoring

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



Figure 6. 6 Air Quality Monitoring at the Proposed Project

Air quality monitoring was carried out in the project site on 21st to 22nd May, 2022. The

observed values of parameters are compared with National Environmental Quality (Emission) Guideline, National Ambient Air Quality Standards and American Conference of Governmental Industrial Hygienists. The following table describes the detail results of air quality monitoring which are compared with respective guideline values for the proposed project.

Table 6. 4 Air Quality Monitoring Results

Parameter	Observed Value	Guideline Value	Guideline	Unit	Averaging Period
Gaseous Emission					
SO ₂	0.22	20	NEQG	µg/m ³	24 hours
NO ₂	4.51	200	NEQG	µg/m ³	1 hour
CO	0.00034	9	NAAQS	ppm	8 hours
CO ₂	460.87	5000	ACGIH	ppm	8 hours
Dust Emission					
PM ₁₀	2.72	50	NEQG	µg/m ³	24 hours
PM _{2.5}	1.30	25	NEQG	µg/m ³	24 hours

According to the comparison results of gaseous emissions, the observed values of SO₂ (0.22 µg/m³), NO₂ (4.51 µg/m³), CO (0.00034 ppm) and CO₂ (460.87 ppm) are lower than the respective guideline values. For dust emissions, the observed values of PM₁₀ (2.72 µg/m³) and PM_{2.5} (1.30 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 before the implementation of the project. It is anticipated that ambient air quality will be decreased during the construction phase of the proposed project because of construction activities implementation. The following figures describe detail air quality monitoring results for 24 hours continuously at the proposed project.

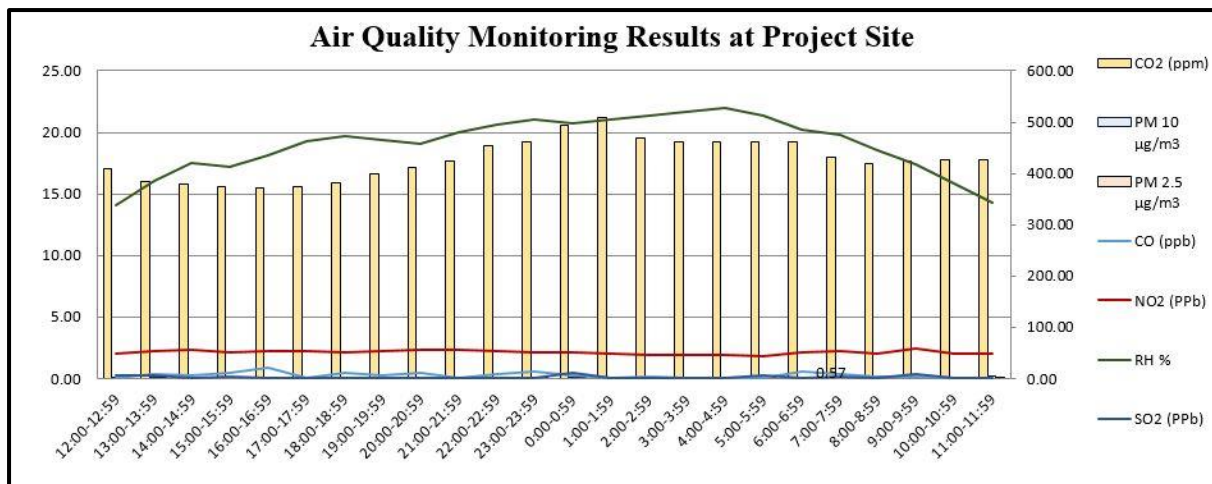


Figure 6. 7 Details Gaseous Emissions Monitoring Results

According to the results of gaseous emissions, steady emissions level is found during 24 hours continuously.

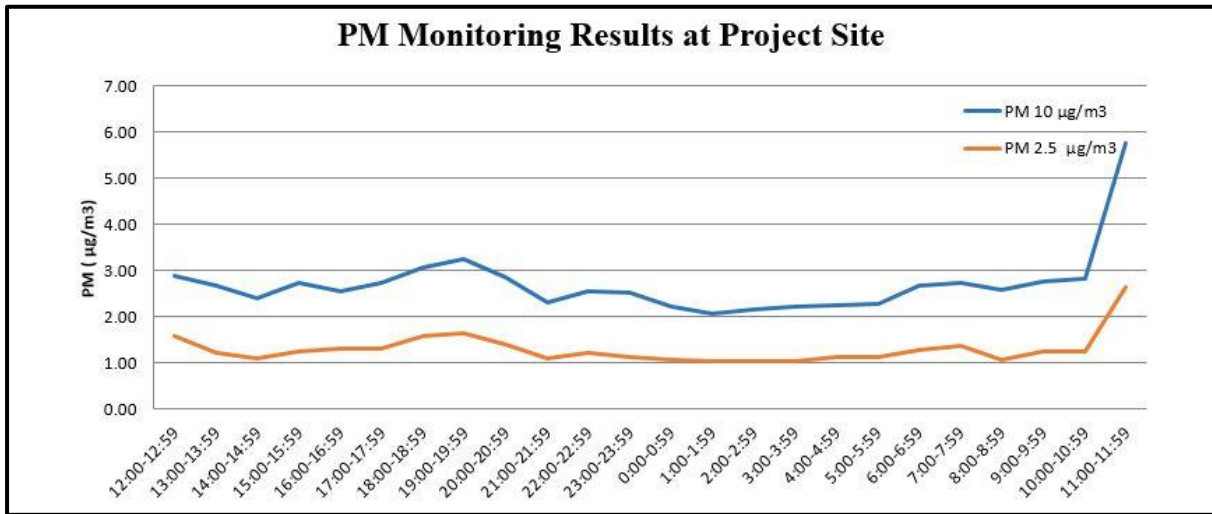


Figure 6. 8 Details Dust Emissions Monitoring Results

According to the results of dust emissions, steady dust level is found almost the whole day. After that, dust generation of both PM₁₀ and PM_{2.5} increased dramatically after 10:00.

6.1.8 Water Quality

Environmental Quality (EQ) team decided to collect the surface water sample as baseline data to know the current water quality of nearby water-body (Panlaung River) before starting implementing the proposed project. Therefore, it was taken from Panlaung River which is about 700 m west from the project site. Surface water sampling, laboratory analysis and quality monitoring will be done regularly as per monitoring management plan to monitor the water quality changes throughout the project implementation.

The water supply for the proposed project will be taken from tube wells within the project site. However, the project did not start construction activities and tube wells are not dug yet at the time of water quality measurement. Therefore, groundwater quality is not available to test at the project site. During operation phase, groundwater sampling, laboratory analysis and quality monitoring will be done regularly as per monitoring management plan.

The survey team from E Guard sampled groundwater on 22nd 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 surface water quality comparing with WHO Drinking Water Guideline (Geneva – 1993) is described in the following table. Water quality results from laboratories test are attached in **Appendix- 7**. The location of water quality measurement for surface water from tube-well is Latitude 21°10'11.36"N and Longitude 96°19'37.89"E. The following figures describe location of surface water sampling and on-site water quality measurement.

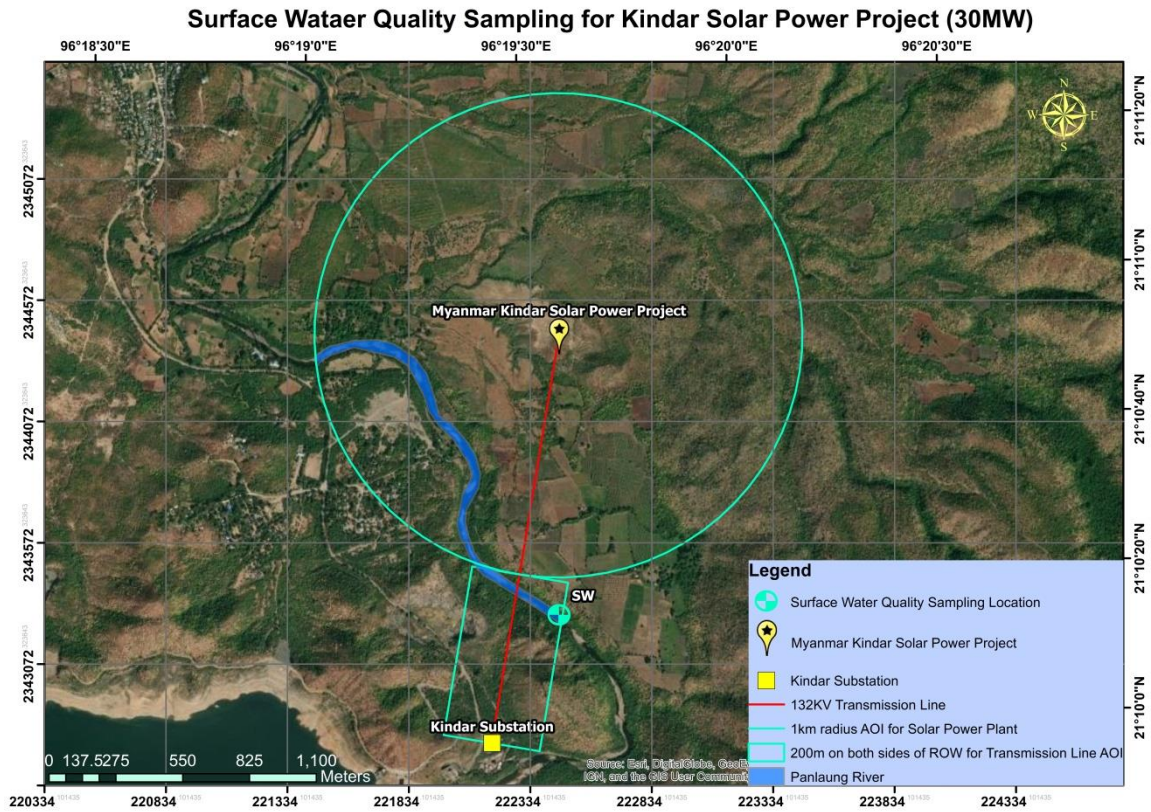


Figure 6. 9 Location of Surface water Quality Sampling



Figure 6. 10 On-site Water Quality Measurement and Water Sampling (Panlaung River nearby the proposed project)

Table 6. 5 Surface water Quality Results

No.	Parameters	Unit	Water Quality Result	WHO Guidelines for Water
1	pH	pH	7.6	6.5 ~ 8.5
2	EC	ms/cm	292	-
3	TDS	g/l	-	-
4	Salinity	ppt	0.1	-
5	Dissolve Oxygen	mg/l	7.2	-
6	Turbidity	NTU	20	5

No.	Parameters	Unit	Water Quality Result	WHO Guidelines for Water
7	Total Suspended Solids	mg/l	24	-
	Total Dissolved Solids	mg/l	146	1000
8	BOD (5 days at 20°)	mg/l	8	50
9	COD	mg/l	32	250
10	Total Coliform Bacteria	MPN/100ml	-	-
11	Nitrogen	mg/l	<1	-
12	Phosphorous	mg/l	<0.01	-
13	Oil and grease	mg/l	<5	-
14	Chromium	mg/l	<0.1	0.05
15	Aluminum	mg/l	-	<0.2
16	Potassium	mg/l	1.29	<20

According to the observed values, most of the parameters are within the limit of WHO standard except turbidity chromium. 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. Large aluminum intake may negatively influence human health, which was connected with nerve damage. Particularly people with kidney damage are susceptible to aluminum toxicity and there is a risk of allergies. Aluminum is probably mutagenic and carcinogenic. A correlation between aluminum uptake and an increased number of Alzheimer cases is suspected. Therefore, the project proponent must need to install purify system, if groundwater will be used as drinking water.

According to the observed results, the chromium value is higher than WHO drinking water guideline. The water sample was taken from Panlaung River. Local people go to the Panlaung River to wash and bathe, and they don't use it for drinking water. According to the site visit, the local people nearby project site uses purified drinking water bottle and tube well for drinking water. The USEPA regulates total chromium in drinking water and has set a Maximum Contaminant Level (MCL) of 0.1 mg/L. The World Health Organization (WHO) guideline is 0.05 mg/L for total chromium. Chromium is not harmful unless levels are very high. EPA is now reviewing data from a 2008 National Toxicology Program long-term animal study and other available research, which suggests that hexavalent chromium may be a human carcinogen if ingested.

6.1.9 Noise Level

Noise level LAeq (dBA) was measured at the selected location regarding as point source. Duration and frequency were monitored for 24 hours continuously at the selected location by using the digital sound level meters. Noise level was measured at the same time with air quality measurement. Measurement range of noise level measuring meter is 20-130 dBA. The environmental noise quality was recorded at every 1 minute for 24 hours. The following table and figure describe detail location of noise level monitoring at the proposed project.

Table 6. 6 Location and Parameter of Noise Level Monitoring

Sr.	GPS Coordinate	Location	Parameter
1.	Lat- 21°10'36.00"N Long- 96°19'36.00"E	Within the project site (source)	Noise: (L _{Aeq} (dB (A)) 1hr interval for 24 hours)

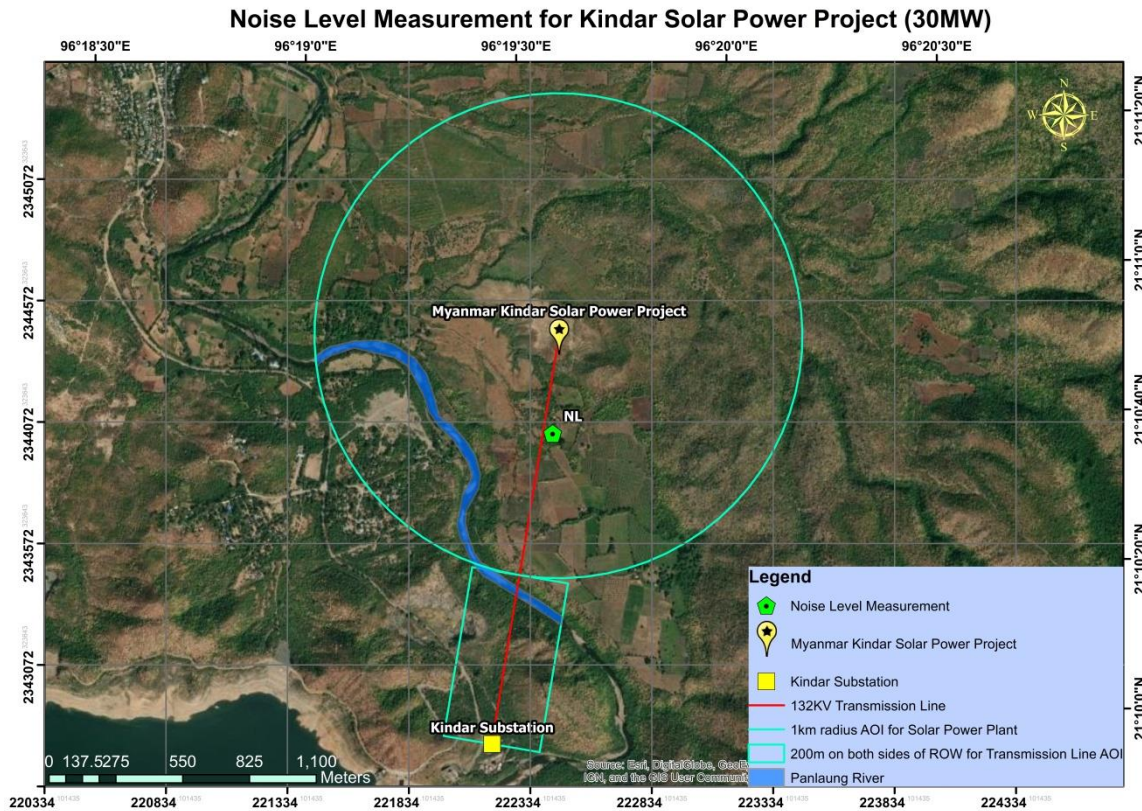


Figure 6. 11 Location of Noise Level Monitoring



Figure 6. 12 Noise Level Monitoring at the Proposed Project Site

Hourly averaged noise levels in energy weighted values of day and night time averages are shown in the following table. The results are compared with National Environmental Quality (Emission) Guidelines.

Table 6. 7 Noise Level Monitoring Results

Location	Measured Values (dB (A))	
	Day Time (07:00-22:00)	Night Time (22:00-7:00)
Within the project site	45.42	40.74
Noise Level Standards from National Environmental Quality (Emission) Guidelines		
Standard value for industrial, commercial	70	70
Standard value for residential	55	45

As the proposed project is located at residential area, standard values for noise level at day time is considered as 55 dBA and at night time is 45 dBA. With regards to noise level at source, the results are lower than standard value not only at day time (45.42 dBA) but also at night time (40.74 dBA). With regards to noise level at receptor, the results are lower than standard value not only at day time (45.42 dBA) but also at night time (40.74 dBA). Therefore, it can be considered that the noise level at the proposed project is within the guideline value of NEQEG before the implementation of the project. It is anticipated that noise level will be increased during the construction phase of the proposed project because of construction activities implementation. The following figures illustrate detail noise level at source and receptor of the proposed project.

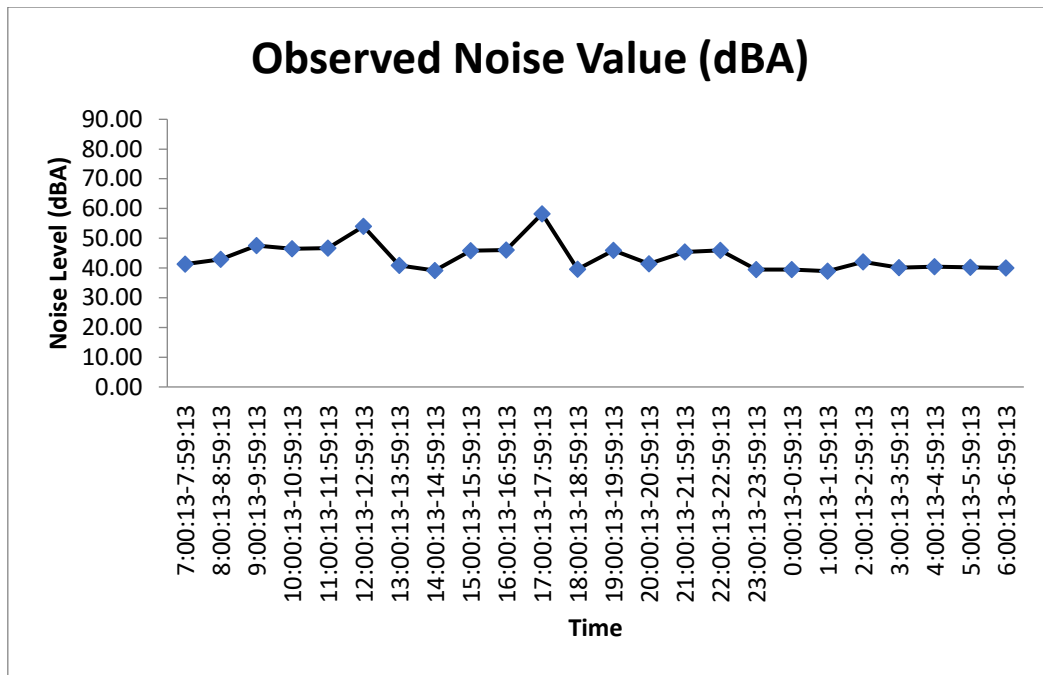


Figure 6. 13 Detail Noise Level Monitoring Results at Source

6.2 Biological Component

6.2.1 Flora and Fauna

The vegetation in the project area is dense, and the main vegetation types are small trees, shrubs, etc. These vegetation are widely distributed in the surrounding areas and have strong secondary nature. According to the preliminary field survey, the plants affected by the construction of PV power station are mostly local common species, which are widely distributed in the surrounding areas. The construction of the project including transmission line will not affect the existing flora in this area although it will only lead to the loss of population of individual species.

Table 6. 8 Biological Environment of the Proposed Project

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

6.3 Socio-economic Environment

6.3.1 Demographic Profile

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

Table 6. 9 Administrative Structure of Myittha Township

No.	Subject	Houses	Households	Quarters	Village Tracts	Villages
1.	Urban	6,403	6,684	11	-	-
2.	Rural	39,321	40,345	-	81	225
Total		45,724	47,029	11	81	225

Source; Myittha Township Data (GAD, 2019)

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

Table 6. 10 Population Status of Myittha Township

No.	Subject	Male	Female	Total
1.	Myittha	89,130	96,341	94,971
2.	Kume	5,841	6,586	102,927
Total				197,898

Source; Myittha Township Data (GAD, 2019)

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

Table 6. 11 Ethnic Status of Myittha Township

No.	Ethnic	Total Population in Township	Number of Ethnic People	Percentage of Total Population
1.	Kachin	197,898	-	-
2.	Kayah	197,898	-	-
3.	Kayin	197,898	-	-
4.	Chin	197,898	11	0.005
5.	Mon	197,898	-	-
6.	Burma	197,898	197,850	99.97
7.	Rakhine	197,898	-	-
8.	Shan	197,898	24	0.012
9.	Other	197,898	-	-
Total		197,898	197,885	99.99

Source; Myittha Township Data (GAD, 2019)

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

Table 6. 12 Religious Status of Myittha Township

No.	Religion	Number of People
1.	Buddhist	194,810
2.	Christian	34

No.	Religion	Number of People
3.	Hindu	8
4.	Islam	1,856
Total		197,898

Source; Myittha Township Data (GAD, 2019)

6.3.2 Socio-economic Profile

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

Table 6. 13 Socio-economic Conditions of Myittha Township

Socio-economic Profile	
Population of workers	Workable population- 139,222 Workers population- 128,293 Jobless population- 10,929 Jobless percentage- 7.8%
Per capita GDP	1,002,336(2016-2017) 1,118,157 (2017-2018) 1,333,618 (2018-2019)
Number of industries	Public factories- 3 factories Private factories- 3 factories Workshops- 12 workshops
Number of universities	N/A
Number of schools	14 Pre-primary schools 137 Primary schools 8 Post-primary schools 8 Middle schools 17 High schools 5 Monastery schools
Literacy percentage	99.84%
Public health facilities	Public general hospitals- 5 hospitals Private general hospitals- 2 hospitals Private clinics- 24 clinics Rural Health Department- 8 Sub-rural Health Department- 38
Transportation	The main transportation is occupied by roads and railways. There is no navigation and aviation transport.

Source; Myittha Township Data (GAD, 2019)

6.3.3 Land Use Status

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

Table 6. 14 Land Use Status of Myittha Township

No.	Type of Land	Area (Acres)
1.	Agricultural Land	126,591

No.	Type of Land	Area (Acres)
	Paddy land	70,107
	Dry land	55,954
	Alluvial	-
	Garden land	530
	Dani	-
2.	Fellow Land	10,163
	Paddy land	2,473
	Dry land	7,690
	Alluvial	-
	Garden land	-
	Dani	-
3.	Grazing Land	-
4.	Industrial Land	204
5.	Urban Land	382
6.	Rural Land	4,167
7.	Other type of Land	14,227
8.	Reserved Forest/ Protected Public Forest	21,985
9.	Virgin Land	1400
10.	Wild Land	970
11.	Non-agricultural Land	39,197
Total		219,286

Source; Myittha Township Data (GAD, 2019)

6.4 Historical and Well-known Places

Panlaung and Padalin Cave Wildlife Sanctuary is a protected area located in Shan State near Ywangan Township, stretching over an area of 333.8 km² (128.9 sq mi). It was established in 2002 under the Wildlife Protection Act of 1936. In elevation, it ranges from 150 to 1,555 m (492 to 5,102 ft) covering mixed deciduous and dipterocarp forest.

The topography of the sanctuary is mostly hilly with undulating hills covered with dense forest. Every year, the sanctuary receives south-west Monsoon rains. The rainfall recorded is up to 78.74 inches (2,000 mm) per year. The sanctuary receives heavy rainfall in June, July and August every year. The Paalaung River flows through the sanctuary. This location is an important watershed for the Kintarr Dam (about 2km South of the proposed project site). The altitude varies from 0.09321 miles (150 m) to 0.9662 miles (1,555 m).

The proposed project is about 2 km south of the protected area of the Panlaung and Padalin Cave Wildlife Sanctuary which is one of key biodiversity areas (KBA).

Protected Area Around Kindar Solar Power Plant

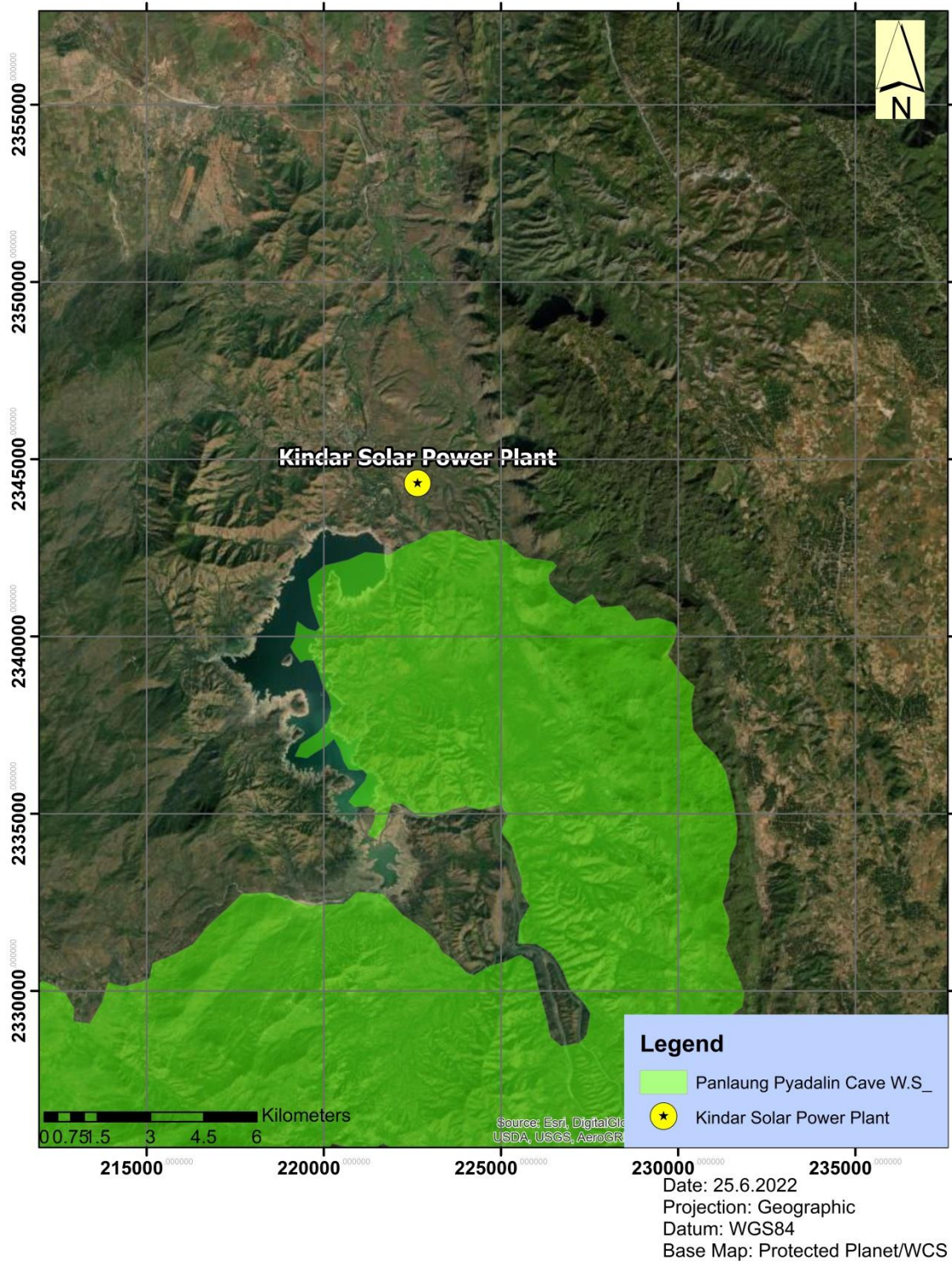


Figure 6. 14 Location Map of Panlaung and Padalin Cave Wildlife Sanctuary

7. Identification, Assessment and Mitigation Measures of Potential Impacts

7.1 Objectives of the Study

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

7.2 Phases of the Project

Potential impacts for the proposed projects are normally differentiated into three main categories, namely; Construction phase, Operation phase and Decommissioning phase:

Construction Phase: includes construction of switchyard and multiple-use building, installation of PV modules, tracking brackets, inverters, transformers, poles of overhead transmission line and stringing cables of overhead transmission line, which will connect to the Kindar Substation. The construction period of the proposed project is 6 months.

Operation Phase: includes generating electricity from solar energy and distributing to the Kindar Substation through 33 kV overhead transmission line about 2km long. 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 as per approval of relevant governmental department to generate electricity from solar energy because the proposed project is a BOO basis project. The project proponent will have prior to submission of the decommissioning plan if they have a plan to close their project permanently. Therefore, impacts identification, impacts assessment and mitigation measures formulating for decommissioning phase of the project is excluded in this Report.

7.3 Methodology for the Assessment

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

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

Table 7. 1 Impact Assessment Parameters and Its Scale

Assessment	Scale				
	1	2	3	4	5
Magnitude (M)	Insignificant	Small and will have no effect on working environment	Moderate and will result in minor changes on	High and will result in significant changes on	Very high and will result in permanent changes on

Assessment	Scale				
	1	2	3	4	5
			working environment	working environment	working environment
Duration (D)	0-1 year	2-5 years	6-15 years	Life of operation	Post closure
Extent (E)	Limited to the site	Limited to the local area	Limited to the region	National	International
Probability	Very improbable	Improbable	Probable	Highly probably	Definite

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

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

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

Table 7. 2 Impact Significance

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

7.4 Identification of Impacts

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

7.5 Positive Impacts

7.5.1 Construction Phase

Job Opportunities

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

Business Opportunities

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

7.5.2 Operation Phase

Job Opportunities

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

Revenue to National and Local Government

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

CSR Developments

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

Carbon Emission Reduction and Resources Conservation

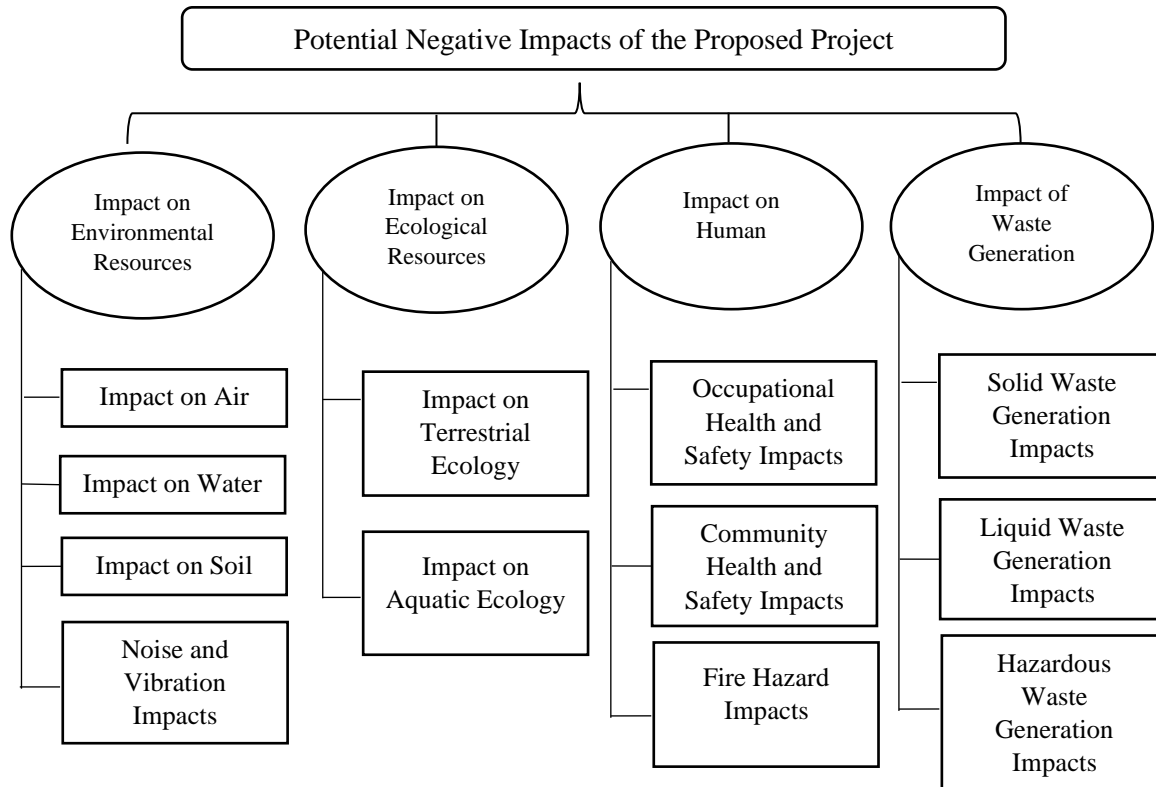
Electricity generation from solar energy emit insignificant carbon into the atmosphere. This leads carbon emission reduction that compared to other electricity generations such as coal, oil and gas power plant. With fewer carbon emissions, solar power plant has a much lower effect on climate change than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

Green Economy

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

7.6 Negative Impacts

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



7.6.1 Impacts on Environmental Resources

Impact on Air

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

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

Overhead Transmission Line: During the construction phase, dust and gaseous emissions can cause due to operating and movement of construction vehicles and transportation vehicles. Site clearing, leveling and earth moving activities can also generate dust.

During the operation phase, operating and movement of maintenance vehicles can cause dust and gaseous emission.

Impact on Water

Solar Power Plant: Panlaung River is about 700 m west from the project site. During the construction phase, surface water and groundwater may be contaminated by earth working activities during rainy days. Water discharged from construction activities of solar power plant may lead to water pollution. Especially, concrete foundation of tracking brackets, iron tower, switchyard, multiple-use building will excavate surface layer of earth and deeply excavated foundation processes need to use cement and hardener chemicals, which may impact negatively on groundwater quality. Sewage disposed of from toilets used by construction workers can also lead to groundwater pollution. Improper temporary PV modules storage, damaged PV modules released from improper installing, improper waste storage, fuel storage, refueling and machineries maintenance area can also cause groundwater pollution by penetrating into groundwater layer. Water usage demand will also increase for site clearing, site preparation, water spraying activities and other water required construction activities and construction workers. Oil spillage and leakage from construction machines, construction vehicles, transportation vehicles and generators may lead to groundwater contamination. Site runoff water, especially during rainy season, can flow into the nearby water body if there is no any wastewater management measures and that can affect the quality of surface water nearby project site.

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

Overhead Transmission Line: During the construction phase, water discharged from construction activities may also contaminate groundwater and nearby surface water (Panlaung River).

Impacts on Soil

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

generators and transportation vehicles. Improper temporary PV modules storage, damaged PV modules due to improper installing, improper waste storage, and fuel storage, refueling and machineries maintenance area will also cause soil pollution.

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

Overhead Transmission Line: During the construction phase, soil structure and formation may be disturbed due to soil excavation for the foundation of overhead transmission line.

Noise and Vibration Impacts

Solar Power Plant: During the construction phase, operating construction vehicles such as loaders, excavators, dumpers, bulldozers, backhoes, road rollers, water bowsers, cranes, trucks and concrete mixers as well as transportation vehicles and generators will generate noise and vibration. Improper unloading electrical equipment for ground mounted solar power plant and overhead transmission line, construction materials and other equipment will also cause noise pollution.

Overhead Transmission Line: During the operation phase, the main reason for noise impacts is operating generators, management vehicles and maintenance vehicles. Other sources include transformers and inverters, however, this impact is insignificant. Stringing cables for overhead transmission line can also cause noise pollution.

7.6.2 Impacts on Ecological Resources

Impacts on Terrestrial Ecology

Solar Power Plant: The vegetation in the project area is dense, and the main vegetation types are small trees, shrubs, etc. These vegetation are widely distributed in the surrounding areas and have strong secondary nature. According to the preliminary field survey, the plants affected by the construction of PV power station are mostly local common species, which are widely distributed in the surrounding areas. The construction of the project including transmission line will not affect the existing flora in this area although it will only lead to the loss of population of individual species. 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. In the long run, the species diversity of terrestrial animals in the project area will not change greatly. There is no national park, reserved forest, protected public forest, protected area and wildlife within the scope of study area for the proposed project. No significant adverse impacts on the habitat of terrestrial animals in Padalin Cave (KBA) are expected due to the project operation activities.

Overhead Transmission Line: 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.

Impacts on Aquatic Ecology

Solar Power Plant: The impact on aquatic ecology is insignificant in construction and operation phases because there is no marine park, coastal resource, mangrove area. Although Panlaung River is about 700m West from the project site, the project activities during construction and operation phases will not impact on aquatic ecology significantly. No significant adverse impacts on the habitat of aquatic animals in Padalin Cave (KBA) are expected.

Overhead Transmission Line: There is no aquatic ecology along the route of overhead transmission line as well as marine Park, coastal resource and mangrove area are not situated within the scope of study area for the project.

7.6.3 Impacts on Human Resources

Impacts on Occupational Health and Safety

Solar Power Plant: During the construction phase, the common possible accidental injuries include falling from height related to ladder which can cause fatal or permanent disabling injury. Small injuries due to slips and falls, accidents and electric shock can also occur due to mismanagement. Improper management of construction activities in erection and installation of electrical equipment, metal grinding, welding and cutting, concrete work, piling, access roads construction, high-speed vehicles driving, absence of proper traffic sign and warning sign board can impact on the workers' 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 construction site can pose temporary hazard such as physical contact, spill, dust emission, noise and vibration. Construction workers' safety could be also affected by lack of adequate Personal Protective Equipment (PPEs). Domestic wastewater such as grey water and black water discharged by construction workers can impact on worker's health if not managed properly because of its adverse smell. A certain number of migrant construction workers will enter into the project site for construction, which can lead the issues related to infectious diseases including insect borne disease, water borne disease, and sexually transmitted infections (STIs), including HIV/AIDS. The construction workers can also be infected COVID-19 virus during Pandemic period, if they do not follow strictly the instructions.

During the operation phase, the common occupational health and safety impacts are falling from height related to ladder for maintenance activities which can cause fatal or permanent disabling injury. Small injuries due to slips and falls, accidents and electric shock can also happen. The electromagnetic field can be occurred due to the operations of PV modules and switchyard, which can impact on occupational health of workers. 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 lockout-tagout system while repair and maintenance for electrical equipment of solar power plant. Domestic wastewater such as grey water and black water from the project can impact on occupational health if not managed properly because of its adverse smell. Poor waste management at multiple-use

building, staff quarters, briefing hall, kitchen and dining hall can also lead to the blocking of drains, which in turn can lead to flooding and unsanitary conditions within the project site. Improper housekeeping is also an important factor in causing injuries, illness and property damage that may result from hazards such as trips, slips and falls, fires and pest infestation. The operation workers and staffs can also be infected COVID-19 virus during Pandemic period, if they do not follow strictly the instructions.

Overhead Transmission Line: During the construction phase, the possible accidental injury sources are falling from height related to overhead transmission line for iron tower 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.

During the operation phase, falling from height related to tower 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.

Impacts on Community Health and Safety

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

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

Overhead Transmission Line: During the construction phase, overhead transmission line's cable stringing and iron tower erection along the route is main impact of community health and safety. Other impacts are operating and movement of construction machines and vehicles.

During the operation phase, maintenance activities for overhead transmission line and climbing tower of overhead transmission line by nearby villagers are main community health and safety impacts.

Fire Hazards Impacts

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

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

Overhead Transmission Line: During the operation phase, improper and irregular maintenance of overhead transmission line is main fire hazard impact.

7.6.4 Wastes Generation Impacts

Solid Wastes Generation Impacts

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, switchyard, multiple-use building, staff quarters, briefing hall, kitchen and dining hall construction. Domestic solid wastes such as garbage and organic waste from construction workers camp and staff quarters, briefing hall, kitchen and dining hall 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, briefing hall, kitchen and dining hall 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.

Liquid Waste Generation Impacts

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

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

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

Hazardous Waste Generation Impacts

Solar Power Plant: During the construction phase, damaged PV modules due to improper installation are common hazardous waste generation of the proposed project because PV modules includes heavy metals such as chromium and lead, 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.

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

7.7 Impact Significance

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

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

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
A. Construction Phase								
1.	Impacts on Air	<p>Solar Power Plant:</p> <ul style="list-style-type: none"> • Site clearing and earth moving activities, which will get worse during dry season • Dust and gaseous emission due to operating construction machines and vehicles • Gaseous emission due to operating generators • Dust and gaseous emission due to movement of transportation vehicles for electrical equipment and construction materials • Odor from painting of multiple-use building <p>Overhead Transmission Line:</p>	4	1	2	5	35	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> Dust and gaseous emission can occur due to operating and movement of construction vehicles and transportation vehicles Site clearing, leveling and earth moving activities 						
2.	Impacts on Water	<p>Solar Power Plant:</p> <ul style="list-style-type: none"> Earth working activities during rainy days Oil spillage and leakage from construction machines, construction vehicles, transportation vehicles and generators Water discharged from construction activities Deeply excavated concrete foundation processes of tracking brackets, switchyard and multiple-use building Sewage disposed of from toilets used by construction workers 	4	1	2	4	28	Low

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> • Improper temporary PV modules storage, damaged PV modules due to improper installing, improper waste storage, fuel storage, refueling and machineries maintenance area • Water usage demand increasing due to site clearing, site preparation, water spraying activities and other water required construction activities and construction workers • Especially during rainy season, site runoff water discharged from excavation activities and <p>Overhead Transmission Line:</p> <ul style="list-style-type: none"> • Groundwater and surface water quality will be negatively impacted by water discharged from construction activities • Especially, concrete foundation of poles of overhead transmission line 						
3.	Impacts on Soil	Solar Power Plant:	4	1	1	5	30	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> • Site preparation and leveling activities • Foundation activities for tracking brackets, switchyard and multiple-use building • Oil spills and leakage from construction machines, construction vehicles, generators and transportation vehicles • Improper temporary PV modules storage, damaged PV modules due to improper installing, improper waste storage, fuel storage, refueling and machineries maintenance area <p>Overhead Transmission Line:</p> <ul style="list-style-type: none"> • Soil structure and formation may be disturbed due to soil excavation for the foundation of iron tower of overhead transmission line 						

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> Stringing cables for overhead transmission line will also disturb soil structure and upper soil layer 						
4.	Noise and Vibration Impacts	<p>Solar Power Plant:</p> <ul style="list-style-type: none"> Operating construction vehicles, generators and transportation vehicles Improper unloading electrical equipment, construction materials and other equipment <p>Overhead Transmission Line:</p> <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 	4	1	1	5	30	Moderate
5.	Impacts on Occupational Health and Safety	<p>Solar Power Plant:</p>	5	1	1	4	28	Low

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> • Small injuries due to slips and falls, accidents and electric shock • Improper management of construction activities in erection and installation of electrical equipment, metal grinding and cutting, concrete works • Access roads construction, high-speed vehicles driving, absence of proper traffic sign and warning sign board • Poor working conditions and operating machinery and using materials in the construction site • Lack of adequate Personal Protective Equipment (PPEs) • Improper management of domestic wastewater such as grey water and black water • Increasing issues related to infectious diseases due to migrant construction workers 						

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> • COVID-19 virus infection during Pandemic period <p>Overhead Transmission Line:</p> <ul style="list-style-type: none"> • Falling from height related to ladder and poles of overhead transmission line for cable stringing • Use of lifting equipment • Poor working conditions will damage health and put workers at risk as well as operating machinery and using materials in the overhead transmission line construction • Lack of adequate Personal Protective Equipment (PPEs) and warning signs 						
6.	Impacts on Community Health and Safety	<p>Solar Power Plant:</p> <ul style="list-style-type: none"> • Accidents due to operating construction vehicles and transportation vehicles at public roads 	4	1	2	4	28	Low

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> Dust, gases emission, noise and vibration generation due to earth working, switchyard, multiple-use building and access road construction <p>Overhead Transmission Line:</p> <ul style="list-style-type: none"> Overhead transmission line's cable stringing and tower erection along the route Movement of construction machines and vehicles 						
7.	Fire Hazard Impacts	<ul style="list-style-type: none"> Poor installation of electrical equipment and overloads Heating from bunched cables and damaged cables at construction workers camp Improper storage of raw materials for electrical equipment and construction materials Fuel storage area, improper fuel handling and improper maintenance 	5	1	1	4	28	Low

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		of construction machines and construction vehicles						
8.	Solid Waste Generation Impacts	<p>Solar Power Plant:</p> <ul style="list-style-type: none"> • Rejected components and packaging materials of electrical equipment and building materials • Surplus materials, papers, containers, broken bricks, solvent containers • Construction soil wastes from site preparation, access road construction and leveling activities • Vegetation debris from land clearance for PV modules, switchyard, and multiple-use building • Domestic solid wastes such as garbage and organic waste from construction workers camp <p>Overhead Transmission Line:</p> <ul style="list-style-type: none"> • During the construction phase, vegetation debris will be generated 	4	1	1	5	30	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		during site clearance along right of way for overhead transmission line						
9.	Liquid Waste Generation Impacts	<ul style="list-style-type: none"> Cleaning construction machines and construction vehicles within the project site Domestic liquid waste such as black water from toilets used by construction workers and grey water from basins and bathrooms in construction workers camp 	2	1	1	3	12	Very Low
10.	Hazardous Waste Generation Impacts	<ul style="list-style-type: none"> Damaged PV modules due to improper installation Used oil disposed of from repair and maintenance of construction machines and construction vehicles Oil spills and leakage from refueling, fuel storage area and machineries maintenance area 	4	1	1	4	24	Low
B.	Operation Phase							
1.	Impacts on Air	Solar Power Plant:	3	4	2	3	27	Low

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> Dust and gaseous emission due to operating office vehicles, maintenance vehicles, generators, refrigerators and air conditioning system Odor and smoke from kitchen of multiple-use building <p>Overhead Transmission Line:</p> <ul style="list-style-type: none"> Operating and movement of maintenance vehicles 						
2.	Impacts on Water	<p>Solar Power Plant:</p> <ul style="list-style-type: none"> Oil and waste spillage and leakage from transformers, improper waste storage, fuel storage and refueling Poor waste management Poor waste management may also lead to blocking of drains, which will lead to flooding and unsanitary conditions Improper handling of damaged PV modules due to improper cleaning and maintenance activities 	4	4	2	4	40	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> 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 						
3.	Impacts on Soil	<ul style="list-style-type: none"> Improper handling of damaged PV modules due to improper cleaning and maintenance activities and uninstalled lifespan-expired PV modules Leakage from improper waste storage Oil spillage and leakage from transformers, fuel storage and refueling 	3	4	1	3	24	Low
4.	Noise Impacts	<p>Solar Power Plant:</p> <ul style="list-style-type: none"> Operating generators, management vehicles and maintenance vehicles 	3	4	1	3	24	Low

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> Operating transformers and inverters <p>Overhead Transmission Line:</p> <ul style="list-style-type: none"> Operating and movement of maintenance vehicles 						
5.	Impacts on Occupational Health and Safety	<p>Solar Power Plant:</p> <ul style="list-style-type: none"> Falling from height related to ladder for maintenance activities Small injuries due to slips and falls, accidents and electric shock Electromagnetic field can be occurred due to the operations of PV modules and switchyard Lack of adequate Personal Protective Equipment (PPEs) and lockout-tagout system while repair and maintenance Domestic wastewater such as grey water and black water from the project if not managed properly because of its adverse smell 	5	4	1	4	40	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> Poor waste management at multiple-use building, staff quarters, briefing hall, kitchen and dining hall can also lead to the blocking of drains, which in turn can lead to flooding and unsanitary conditions Operation workers and staffs can also be infected COVID-19 virus during Pandemic period <p>Overhead Transmission Line:</p> <ul style="list-style-type: none"> Falling from height related to iron towers of overhead transmission line for maintenance activities Lack of adequate Personal Protective Equipment (PPEs) and lockout-tagout system while repair and maintenance for overhead transmission line 						
6.	Impacts on Community Health and Safety	<p>Solar Power Plant:</p> <ul style="list-style-type: none"> Electromagnetic field can be occurred due to the operations of PV modules and switchyard 	4	4	2	4	40	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> • Glint and glare from PV modules • Electric shock can also be anticipated due to entering into the project site without permission by nearby villagers • Operating management vehicles and maintenance vehicles at public roads <p>Overhead Transmission Line:</p> <ul style="list-style-type: none"> • Maintenance activities for overhead transmission line • Climbing towers of overhead transmission line by nearby villagers 						
7.	Fire Hazard Impacts	<p>Solar Power Plant:</p> <ul style="list-style-type: none"> • Improper and irregular maintenance of electrical equipment • Fuel storage area and improper fuel handling 	5	4	1	4	40	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		<ul style="list-style-type: none"> Overloads and heating from bunched cables and damaged cables at multiple-use building <p>Overhead Transmission Line:</p> <ul style="list-style-type: none"> Improper and irregular maintenance of overhead transmission line 						
8.	Solid Waste Generation Impacts	<ul style="list-style-type: none"> Domestic solid waste such as garbage, rejected office materials and organic waste from multiple-use building, staff houses and office 	2	4	1	3	21	Low
9.	Liquid Waste Generation Impacts	<ul style="list-style-type: none"> Cleaning activities for PV modules to promote their efficiency for electricity generation Domestic liquid waste such as black water from toilets and grey water from basins and bathrooms within the project site 	3	4	1	5	40	Moderate
10.	Hazardous Waste Generation Impacts	<ul style="list-style-type: none"> Damaged PV modules due to improper handling during cleaning 	4	4	1	4	36	Moderate

No.	Potential Adverse Impacts	Project Activities	Significance of Potential Adverse Impacts					Impact Significance
			M	D	E	P	SP	
		activities and maintenance activities <ul style="list-style-type: none"> • Uninstalled lifespan-expired PV modules due to exchanging new PV modules at the time of extending operation period of the project • Used oil from transformers • Oil spills and leakage from maintenance activities, vehicles, refueling and fuel storage area 						

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

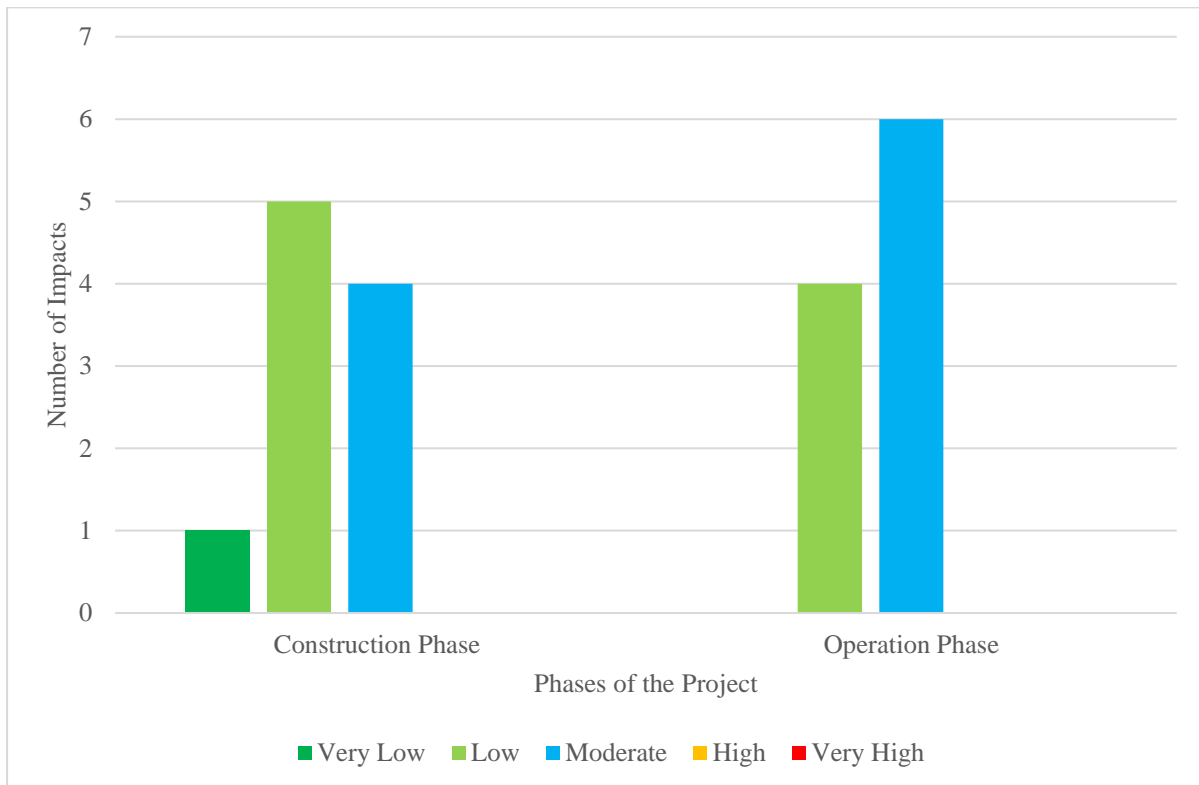


Figure 7. 2 Impact Significance of Potential Adverse Impacts of the Proposde Project

7.8 Mitigation Measures
7.8.1 Mitigation Measures for Impacts on Environmental Resources
Mitigation Measures for Impacts on Air

Solar Power Plant: During the construction phase, speed of construction vehicles and transportation vehicles must be controlled within the project site and nearby local community to control the dust emission. The assess road that passes through the Kyi Taing and Kan Ze Villages will be upgraded into paved road to control the dust emission. Regular water spraying on access roads and working places must be carried out in order to control dust emission by increasing humidity of working area. If possible, access roads of the project should pave to control dust emission. Transportation vehicles must need to install proper covers when carrying soil, sand and cement to avoid falling down along route of transportation and dust emission.

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

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

Overhead Transmission Line: During the construction phase, 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.

Mitigation Measures for Impacts on Water

Solar Power Plant: During the construction phase, site leveling should be done with minimum alteration in contour level to prevent natural drainage system of the project. Regular inspection for construction machines, generators, construction vehicles and transportation vehicles must be done to prevent oil leak and spillage. Toilets, washing basins and septic tanks must be provided adequately for the construction workers to reduce impacts on water. Moreover, the project proponent must manage groundwater usage systematically in construction activities to prevent depletion of groundwater. The project proponent must make sure that untreated site runoff water does not flow into the nearby water body (Panlaung River) and manage well.

During the operation phase, project proponent must install proper drainage system within the project site to reduce impacts on water. PV modules cleaning and maintenance must be carried out properly in order to prevent damaging PV modules. Damaged PV modules and uninstalled lifespan-expired PV modules must be disposed with adequate packaging at authorized waste management services providers and direct buried must be strongly prohibited. Transformers, management vehicles, maintenance vehicles and generators must be inspected and maintained regularly to reduce oil spillage. Refueling must be done properly and drainage system must be checked and cleaned properly. Direct disposing domestic waste from multiple-use building into the drains must be prohibited to prevent drainage block.

Overhead Transmission Line: During the construction phase, domestic solid, liquid wastes and water discharged from construction activities shall not be discharged into the Paulaung River.

Mitigation Measures for Impacts on Soil

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

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. Fuel storage area and generators area must be designed with impervious surface in order to prevent seepage into soil layer. Electrical equipment maintenance especially for transformers must be carried out systematically by technicians and experts. Temporary domestic waste storage area, fuel storage area and switchyard must be inspected regularly to reduce impacts on soil.

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

Mitigation Measures for Noise and Vibration Impacts

Solar Power Plant: During the construction phase, excessive noise and vibration generated construction activities must be notified to nearby local communities, firstly. Construction machines, construction vehicles and transportation vehicles used in construction activities must be inspected and maintained regularly for reducing noise and vibration. Drivers must drive carefully with low speed at public road while passing through the villages. Personal Protective Equipment (PPEs) such as earplugs and earmuffs must be provided for construction workers who work in excessive noise generated area. Transportation vehicles' drivers should be instructed to avoid gunning of vehicle engines or hooting when passing through sensitive areas such as schools and hospitals across transportation routes. Highly noise and vibration generated construction machines and generators must be placed in enclosures to minimize noise

generation. Noise and vibration generated construction activities must not be carried out at night, if possible.

During the operation phase, generators, inverters, transformers, management vehicles and maintenance vehicles must be inspected and maintained regularly to reduce noise pollution. Drivers must drive carefully with low speed at public road while passing through the villages. Silence-type generators are recommended to use and some shady trees must be planted around the project boundary 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 Kindar Substation via overhead transmission line do not generate vibration significantly.

Overhead Transmission Line: During the 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.

7.8.2 Mitigation Measures for Impacts on Ecological Resources

Mitigation Measures for Impacts on Terrestrial Ecology

Solar Power Plant: Vegetation clearance beyond designated area of ground mounted solar power plant must be prohibited strongly. Introduction of exotic species by workers shall not be allowed during the construction and operation phase of the project. The project proponent will implement replantation at designated area (near project site) as per guidance of relevant governmental department.

Overhead Transmission Line: Vegetation clearance within right of way of overhead transmission line must be minimized as much as possible.

Mitigation Measures for Impacts on Aquatic Ecology

The project proponent makes sure that the untreated site runoff water, which can cause water pollution and can impact on aquatic ecology, does not flows into the Panlaung River.

7.8.3 Mitigation Measures for Impacts on Human

Mitigation Measures for Occupational Health and Safety Impacts

Solar Power Plant: During the construction phase, personal fall restraint system must be provided for installation workers who are working at height. Lockout-tagout system must be used for installation of electrical equipment. The project proponent must provide Personal Protective Equipment (PPEs) such as safety helmets, splash goggles, dust respirators, ear muffs, safety gloves, reflected safety suits and safety boots for all construction workers to reduce occupational health and safety impacts. The project proponent must monitor regularly whether construction workers use PPEs adequately or not for ensuring safe working site. Besides, safety notices and emergency contact numbers of the Fire Services Department,

Hospitals and Police Stations and contact persons for emergency cases must be tagged at noticeable places of the project site. First aid training, safety training, firefighting training, electrical equipment installation training and other essential trainings for construction activities must be arranged for all construction workers and first aid kits must be provided in the project site. Construction machines and construction vehicles must be operated by trained and licensed industrial machine operators. The project proponent must prepare health and safety management plan for construction workers based on the EMP in Myanmar language and any other language that construction workers can read and display prominently at the project site. The project proponent must provide purified drinking water to prevent health risk of workers. Especially, all construction workers must follow the instructions issued by the Ministry of Health and Sports to prevent COVID-19 virus infection during pandemic period.

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






Overhead Transmission Line: During the construction phase, personal fall restraint system must be provided for 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.





During the 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.



Figure 7. 3 Safety Signages

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	
<i>Hand and Arm Protection</i>	

Function of PPEs	Feature and Characteristics
Gloves for common tasks (cotton/ leather)	
<i>Foot Protection</i>	
Select footwear that fits the purpose and conforms to recognized safety standards.	
<i>Body Protection</i>	
Reflective clothing: For working in busy traffic: brightly-colored reflective clothing can increase the visibility of employees and reduce their chances of being struck by vehicles or machinery	
High fall protective equipment (personal fall restraint system): to prevent construction workers from falling off of overhead platforms, elevated work stations or into holes in the floor and walls.	

Mitigation Measures for Community Health and Safety Impacts

Solar Power Plant: During the construction phase, construction vehicle drivers and transportation vehicle drivers must drive carefully with low speed at public road while mobilizing, transporting electrical equipment and construction materials. Cable stringing and poles construction for overhead transmission line must be informed to nearby local community to reduce community health and safety impacts.

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 Kindar Substation. Before PV modules installation, project proponent must assess glint and glare on nearby local communities and consult with experts to reduce glint and glare impacts. Safety notices and warning signs must be tagged at the fence of the project site and iron towers of overhead transmission line in order to prohibit local people entering the project area without permission and climbing poles of overhead transmission line. Vehicle drivers must drive carefully with low speed at public road while passing through the villages.

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

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

Mitigation Measures for Fire Hazard Impacts

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

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

Overhead Transmission Line: During the construction and operation phases, construction and maintenance activities must be implemented regularly and properly for overhead transmission line to protect fire hazards.



Figure 7. 4 Firefighting Equipment and Singage

7.8.4 Mitigation Measures for Waste Generation Impacts

Mitigation Measures for Solid Waste Generation Impacts

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

Overhead Transmission Line: During the 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. 5 Waste Bins for Solid Waste Disposal

Mitigation Measures for Liquid Waste Generation Impacts

Solar Power Plant: During the construction phase, adequate sanitation facilities such as toilets, washing basins and septic tanks must be provided. Therefore, 7 toilets and 3 washing basins will be provided for construction workers in order to control domestic wastewater. The project proponent makes sure that the untreated site runoff water does not flow into the nearby water body and manage it systematically.

During the operation phase, project proponent must install proper drainage system within the project site to reduce liquid waste generation impacts. Adequate sanitation facilities such as

toilets, washing basins and septic tanks must be provided. Therefore, 9 toilets, 9 washing basins and 4 septic tanks will be provided for workers in order to control domestic wastewater. The project proponent makes sure that the untreated site runoff water does not flow into the nearby water body and manage it systematically.

Mitigation Measures for Hazardous Waste Generation Impacts

Solar Power Plant: 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, 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.

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.

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

8.2 Environmental Management Plan

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

- Construction Phase and
- Operation Phase

The objectives of EMP areas are as follows:

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

Myanmar Kindar 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
- Occupational Health and Safety Plan

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

Responsible Persons for EMP and Mitigation Measures

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

Table 8. 1 Responsible Persons for EMP and Mitigation Measures

No.	Name	Position	Department	Responsibilities and Duties
1.	Director		Myanmar Kindar Solar Power Co., Ltd.	<ul style="list-style-type: none"> • Implementation of the EMP • Supervision and management of the implementation of EMP
2.	Site 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 Coordinator		<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

No.	Name	Position	Department	Responsibilities and Duties
				<ul style="list-style-type: none"> ○ Promptly inform the project proponent ○ 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 Construction Phase

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
1.	Impacts on air	Solar Power Plant Area	Dust and gaseous emission	<ul style="list-style-type: none"> • 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 	Already included in cost estimation for EMP	Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Overhead Transmission line area		<p>Building Enclosures at excessive dust generated working area</p> <ul style="list-style-type: none"> • 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 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<p>which generate excessive dust must be avoided on extremely windy days</p> <ul style="list-style-type: none"> • Temporary building enclosures (green shade net fencing) must be installed at excessive dust generated working area 			
2.	Impacts on water	Solar Power Plant Area	Groundwater pollution and depletion, and Surface Water	<ul style="list-style-type: none"> • Carry out site leveling with minimum alteration in contour level • Make sure that untreated site runoff water does not flow into the nearby water body, and manage systematically. • Implement regular inspection for construction machines, 	Already included in cost estimation for EMP	Very Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				generators, construction vehicles and transportation vehicles <ul style="list-style-type: none"> • Provide toilets, washing basins and septic tanks adequately • Manage groundwater usage systematically in construction activities 			
		Overhead Transmission line area		<ul style="list-style-type: none"> • Domestic solid, liquid wastes and water discharged from construction activities shall not be discharged into the Panlaung River nearby project site 			
3.	Impact on soil	Solar Power Plant Area	Soil contamination	<ul style="list-style-type: none"> • Carry out earth working activities and concrete mixing processes for foundation systematically and properly 	Already included in cost estimation for EMP	Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<ul style="list-style-type: none"> • Use leak-proof fuel containers with secondary containments in fuel storage area • Carry out refueling carefully • Use modernized construction machines, construction vehicles and transportation vehicles • Maintain these machines and vehicles regularly • Identify isolated machineries maintenance area with paved ground • Carry out PV modules installing properly • If PV modules are damaged, direct buried 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Overhead Transmission line area		<p>must be strongly prohibited and disposing with adequate packaging at authorized waste dealer must be implemented</p> <ul style="list-style-type: none"> • Plant some shady trees • Define raw materials storage area with impervious surface • Manage cable stringing and vegetation clearance activities for right of way of overhead transmission line properly • Provide toilets, washing basins and septic tanks adequately 			
				<ul style="list-style-type: none"> • Earth working activities and concrete mixing processes for foundation of towers 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				must be carried out properly <ul style="list-style-type: none"> • Proper management must be needed for cable stringing and vegetation clearance along right of way of overhead transmission line 			
4.	Noise and vibration impacts	Solar Power Plant Area	Nuisance due to noise and vibration generation	<ul style="list-style-type: none"> • Notify excessive noise and vibration generated construction activities to nearby local communities • Vehicles drivers must drive with low speed while passing through the public road • Inspect and maintain construction machines, construction vehicles and transportation vehicles regularly 	Already included in cost estimation for EMP	Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<ul style="list-style-type: none"> • 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 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Overhead Transmission line		<p>at night, if possible</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 Noise and vibration generated construction activities must not be carried out at night, if possible 			
5.	Impacts on terrestrial ecology	Solar Power Plant Area	Disturbance terrestrial ecology and	<ul style="list-style-type: none"> Prohibit vegetation clearance beyond designated area of ground mounted solar 	Already included in cost estimation for	Very Low	Myanmar Kindar Solar Power Co.,

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Overhead Transmission line	habitats	power plant • Prohibit introduction of exotic species by workers • Minimize vegetation clearance within right of way of overhead transmission line as much as possible	EMP		Ltd.
6.	Occupational health and safety impacts	Solar Power Plant Area	Health and safety problems for construction workers	• 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	Already included in cost estimation for EMP	Very Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				respirators, ear muffs, safety gloves, reflected safety suits and safety boots for all construction workers <ul style="list-style-type: none"> • 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 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<p>training and other essential trainings for construction activities</p> <ul style="list-style-type: none"> • Provide first aid kits • 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 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Overhead Transmission line		<ul style="list-style-type: none"> • 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 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<ul style="list-style-type: none"> Cable stringing processes must be carried out properly Construction machines and construction vehicles must be operated by trained and licensed industrial machine operators 			
7.	Community health and safety impacts	Solar Power Plant Area	Health and safety problems for nearby local communities	<ul style="list-style-type: none"> Drive vehicles properly with low speed at public road while mobilizing, transporting electrical equipment and construction materials Public road, nearby project site, must be cleaned and repaired, if damaged after the construction period 	Already included in cost estimation for EMP	Very Low	Myanmar Kindar Solar Power Co., Ltd.
		Overhead Transmission		<ul style="list-style-type: none"> Cable stringing and iron towers 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		line		construction for overhead transmission line must be informed to nearby local community and done properly			
8.	Fire hazard impacts	All construction area	Loss of properties and life	<ul style="list-style-type: none"> • Inspect and maintain construction machines, generators, construction vehicles, transportation vehicles and electrical system of construction worker camp regularly • Install fire extinguishers near temporary raw materials storage area, fuel storage area, generators and construction worker camp • Inspect fire 	Already included in cost estimation for EMP	Very Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				extinguishers regularly <ul style="list-style-type: none"> • Store water for firefighting purposes adequately • Provide firefighting training and fire drills for all construction workers • 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 • Assign an assembly point • Prohibit smoking strictly in the project site 			
	Wastes	Solar Power	Water and soil	<ul style="list-style-type: none"> • Collect vegetation 	Already		Myanmar

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
9.	generation impacts	Plant Area	pollution and impacts on health	debris generated from land clearance activities at separate places <ul style="list-style-type: none"> • Reuse excavated soil at other places of the project as soil filing and leveling activities • Calculate detail requirement of raw materials for purchasing electrical equipment and construction materials • Implement recycling, reuse and refurbishment of solid waste • Define temporary disposal site within the project, before final disposal • Segregate solid wastes 	included in cost estimation for EMP	Low	Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				by using different appropriate waste bins <ul style="list-style-type: none"> • Prohibit burning and landfilling solid waste at the project site strictly • Provide adequate sanitation facilities such as toilets, washing basins and septic tanks for construction workers • Keep and handle fuel and lubricants for construction machines and vehicles systematically • Dispose of used oil by collecting with leak proof containers with secondary containments • Identify isolated 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<p>machineries maintenance area with paved ground</p> <ul style="list-style-type: none"> • If PV modules are damaged during installing, direct buried must be strongly prohibited and disposing with adequate packaging at authorized waste dealer must be implemented • Collect residual cement, solvent-based paints and other lubricants separately at designated area • Transfer final disposal of solid wastes and hazardous wastes to the Township Development Committee 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Overhead Transmission line		<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 filing and leveling activities 			

Table 8. 3 Environmental Management Plan for Operation Phase

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
1.	Impacts on air	All operation area	Dust and gaseous emission	<ul style="list-style-type: none"> Pave all roads within the project Implement regular maintenance and inspection for 	Already included in cost estimation for EMP	Very Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				management vehicles, maintenance vehicles, generators, refrigerators and air conditioning system <ul style="list-style-type: none"> • Drive vehicles properly with low speed at public road • Plant some shady trees 			
2.	Impacts on water	All operation area	Groundwater pollution and depletion, and Surface water	<ul style="list-style-type: none"> • 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 	Already included in cost estimation for EMP	Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<p>waste management services providers and direct buried must be strongly prohibited</p> <ul style="list-style-type: none"> • Inspect and maintain transformers, management vehicles, maintenance vehicles and generators regularly • Carry out refueling properly • Check and clean drainage system properly • Prohibit direct disposing domestic waste from multiple-use building into the drains • Make sure that untreated site runoff water does not flow 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				into the nearby water body, and manage systematically			
3.	Impact on soil	All operation area	Soil contamination	<ul style="list-style-type: none"> • 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. • Design fuel storage area and generators area with impervious surface 	Already included in cost estimation for EMP	Very Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<ul style="list-style-type: none"> Carry out electrical equipment maintenance, especially for transformers, by technicians and experts properly Inspect temporary domestic waste storage area, fuel storage area and switchyard regularly 			
4.	Noise and vibration impacts	All operation area	Nuisance due to noise and vibration generation	<ul style="list-style-type: none"> Inspect and maintain generators, inverters, transformers, management vehicles and maintenance vehicles regularly Install silence-type generators Plant some shady trees 	Already included in cost estimation for EMP	Very Low	Myanmar Kindar Solar Power Co., Ltd.
5.	Impacts on terrestrial	All operation area	Disturbance terrestrial	<ul style="list-style-type: none"> Prohibit introduction of exotic species by 	Already included in cost	Very Low	Myanmar Kindar Solar

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
	ecology		ecology and habitats	workers	estimation for EMP		Power Co., Ltd.
6.	Occupational health and safety impacts	Solar Power Plant Area	Health and safety problems for construction workers	<ul style="list-style-type: none"> • Provide personal fall restraint system for maintenance workers who are working at height • Use lockout-tagout system for maintenance of electrical equipment • 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 • Tag safety notices and emergency contact 	Already included in cost estimation for EMP	Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<p>numbers of the Fire Services Department, Hospitals and Police Stations and contact persons for emergency cases at noticeable places</p> <ul style="list-style-type: none"> • Provide 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 • Provide first aid kits • Mark all energized electrical equipment with warning sign • Carry out proper 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<p>management for electricity generation and distributing such as checking all electrical cords, cables and do not use overload voltage</p> <ul style="list-style-type: none"> • Train and assign housekeeping staffs to do regular cleaning and housekeeping • Manage the drainage systems of the project properly • Provide purified drinking water for workers • Follow the instructions issued by the Ministry of Health and Sports to prevent COVID-19 virus infection during pandemic period 			
		Overhead		<ul style="list-style-type: none"> • Personal fall restraint 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
		Transmission Line		<p>system must be provided for overhead transmission line maintenance workers who are working at height</p> <ul style="list-style-type: none"> • The project proponent must provide Personal Protective Equipment (PPEs) The project proponent must provide Personal Protective Equipment (PPEs) for all maintenance workers • The project proponent must monitor regularly whether maintenance workers use PPEs adequately or not 			
7.	Community health and	Solar Power Plant Area	Health and safety problems for	<ul style="list-style-type: none"> • Follow international standards to generate electricity and 	Already included in cost estimation for	Low	Myanmar Kindar Solar Power Co.,

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
	safety impacts		nearby local communities	distribute to Kindar Substation <ul style="list-style-type: none"> Assess glint and glare on nearby local communities and consult with experts, before PV modules installation Tag safety notices and warning signs at the fence of the project site and poles of overhead transmission line 	EMP		Ltd.
		Overhead Transmission Line		<ul style="list-style-type: none"> Safety notices and warning signs must be tagged at poles of overhead transmission line 			
8.	Fire hazard impacts	Solar Power Plant Area	Loss of properties and life	<ul style="list-style-type: none"> Implement maintenance activities regularly and properly Install fire extinguishers must be 	Already included in cost estimation for EMP	Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<p>installed near fuel storage area, generators, switchyard, multiple-use building</p> <ul style="list-style-type: none"> • Inspect fire extinguishers regularly • Use dry powder type fire extinguishers to extinguish electrical fire and water shall not be used • Store water adequately and properly with storage tanks for other type of fire cases • Install fire hose reels and fire hydrants to extinguish fire by using water • Provide firefighting training and fire drills for all workers • Implement fire 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<p>protection lane in dry season around the project site</p> <ul style="list-style-type: none"> • 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 • Assign an assembly point for emergency cases • Prohibit smoking strongly within the project site • Install visible and audible fire alarm system • Assign emergency routes and exists at 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				multiple-use building, these emergency routes and exists must not be blocked			
		Overhead Transmission Line		<ul style="list-style-type: none"> Maintenance activities must be implemented regularly and properly 			
9.	Wastes generation impacts	All operation area	Water and soil pollution and impacts on health	<ul style="list-style-type: none"> 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 	Already included in cost estimation for EMP	Low	Myanmar Kindar Solar Power Co., Ltd.

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				<p>sanitation facilities such as toilets, washing basins and septic tanks</p> <ul style="list-style-type: none"> • 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 			

No.	Potential Impacts	Location	Impacts	Mitigation Measures	Estimated Cost of Proposed Measures	Residual Impacts	Responsible Party
				Development Committee			

8.3 Environmental Monitoring Plan

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

Table 8. 4 Environmental Monitoring Plan

No.	Environmental Concerns	Parameters	Frequency	Location	Estimated Cost	Responsible Party
A. Construction Phase (Solar Power Plant)						
1.	Air quality	PM ₁₀ , PM _{2.5} , CO, CO ₂ , SO ₂ , NO ₂	Once	A suitable point within the project site	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.
2.	Surface water quality	pH, Color (true), Turbidity, Conductivity, Total Alkalinity, Iron, Chloride, Manganese, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oil and Grease, Total Coliform Bacteria, Total Nitrogen, Total	Once	Same as baseline water quality sampling location (Panlaung River)	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.

No.	Environmental Concerns	Parameters	Frequency	Location	Estimated Cost	Responsible Party
		Phosphorus, Total Suspended Solids				
3.	Noise level	Equivalent Noise Level dB (A)	Once	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 Kindar Solar Power Co., Ltd.
4.	Waste Quantity	Amount of construction solid waste, domestic solid waste and hazardous waste disposal	Quarterly	Within the project site	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.
B. Construction Phase (Overhead Transmission Line)						
1.	Air quality	PM ₁₀ , PM _{2.5} , CO, CO ₂ , SO ₂ , NO ₂	Once	In the middle of transmission line's route	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.
2.	Noise level	Equivalent Noise Level dB (A)	Once	In the middle of transmission line's route	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.
B. Operation Phase						
1.	Air quality	PM ₁₀ , PM _{2.5} , CO, CO ₂ , SO ₂ , NO ₂	Once a year	A suitable point within the project site	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.
2.	Surface water quality	pH, Color (true), Turbidity, Conductivity, Total Alkalinity, Iron, Chloride, Manganese, Biological Oxygen Demand	Once a year	Same as baseline water quality sampling location	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.

No.	Environmental Concerns	Parameters	Frequency	Location	Estimated Cost	Responsible Party
		(BOD), Chemical Oxygen Demand (COD), Oil and Grease, Total Coliform Bacteria, Total Nitrogen, Total Phosphorus, Total Suspended Solids		(Panlaung River)		
3.	Site Discharged Water quality	pH, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oil and Grease, Total Coliform Bacteria, Total Nitrogen, Total Phosphorus, Total Suspended Solids	Once a year	At final outlet of drainage system	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.
4.	Ground water quality	pH, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oil and Grease, Total Coliform Bacteria, Total Nitrogen, Total Phosphorus, Total Suspended Solids	Once a year	Tube well within a project site	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.
5.	Noise level	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	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.

No.	Environmental Concerns	Parameters	Frequency	Location	Estimated Cost	Responsible Party
6.	Waste Quantity	Amount of construction solid waste, domestic solid waste and hazardous waste disposal	Quarterly	Within the project site	Already included in cost estimation for EMP	Myanmar Kindar Solar Power Co., Ltd.
7.	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 Kindar 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 Kindar 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
4.	Use leak-proof fuel containers with secondary containments			Lump Sum	500,000
5.	Provide first aid kits and training for workers			Lump Sum	800,000
6.	Provide purified drinking water for workers			Lump Sum	500,000
7.	Install fire extinguishers			Lump Sum	500,000
8.	Solid and liquid Wastes disposal			Lump Sum	900,000
Subtotal					8,000,000
B.	Mitigation Measures for Operation Phase				
1.	Install good ventilation system			Lump Sum	2,500,000
2.	Plant some shady trees			Lump Sum	1,000,000
3.	Install proper drainage system			Lump Sum	1,500,000
4.	Provide Personal			Lump Sum	500,000

No.	Item	Unit	Frequency	Unit Cost (MMK)	Cost (MMK)
	Protective Equipment (PPEs) for workers				
5.	Provide first aid kits for workers			Lump Sum	500,000
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.	Solid and liquid Wastes disposal	Month	12	100,000	1,200,000
Subtotal					9,500,000
Contingency					1,500,000
Total					19,000,000

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

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

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

No.	Item	Unit	Quantity	Unit Cost (MMK)	Annual Cost (MMK)
	Reporting	per year			
Subtotal					3,500,000
B.	Supervision				
1.	Environmental Officer	Months	12	500,000	6,000,000
Subtotal					6,000,000
C.	Capacity Building Programs (Training for workers)				1,500,000
Total					11,000,000

8.5 Occupational Health and Safety (OHS) Plan

The project proponent carries out and implements the occupational health and safety plan includes the following sectors.

- (1) Health Care Services for Employees
- (2) Personal Protective Equipment
- (3) Safe working at site

1) Health Care Services for Employees

- Premedical checkup for employees is provided at the time of employment
- The first aid facilities are provided to those all employees
- First aid training for all employees is necessary
- First aid kit should be placed at the project site

2) Personal Protective Equipment

Personal Protective Equipment (PPE) may be required to protect accidents and injuries during general, specific and hazardous tasks. PPE is the least effective way to control risk and is always the last resort to protect workers. The types of PPE used at might include:

- ✓ Respirators and masks
- ✓ Foot protection (safety shoes and boots)
- ✓ Body protection (high visibility clothing, long sleeves, gloves)
- ✓ Head protection (helmets)

If required, employees are obliged to use PPE when required and when reasonably practicable. Other requirements include:

- ✓ Employees should be fully trained in the safe use, storage and maintenance of PPE.
- ✓ PPE must be checked before use for the correct type, fit and undamaged.
- ✓ Do not reuse disposable, contaminated or damaged PPE.
- ✓ Store PPE correctly.

3) Safe working at site

The possible hazard that can be occurred is accidents. This can also be mitigated by following the safety procedures to prevent accidents.

- Keep clean and hygiene work environment
- Specific warning signs and cautions must be installed for diesel fuel handling and filling
- Fire Emergency Alarm system is installed
- Proper security system is provided
- Specific warning devices and signs such as flashing light should be provided at the project site
- Workers must be properly trained in safety procedures and are aware of the warning signs and cautions

8.6 Corporate Social Responsibility (CSR) Plan

Myanmar Kindar 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.

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%

8.7 Grievance Redress Mechanism

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

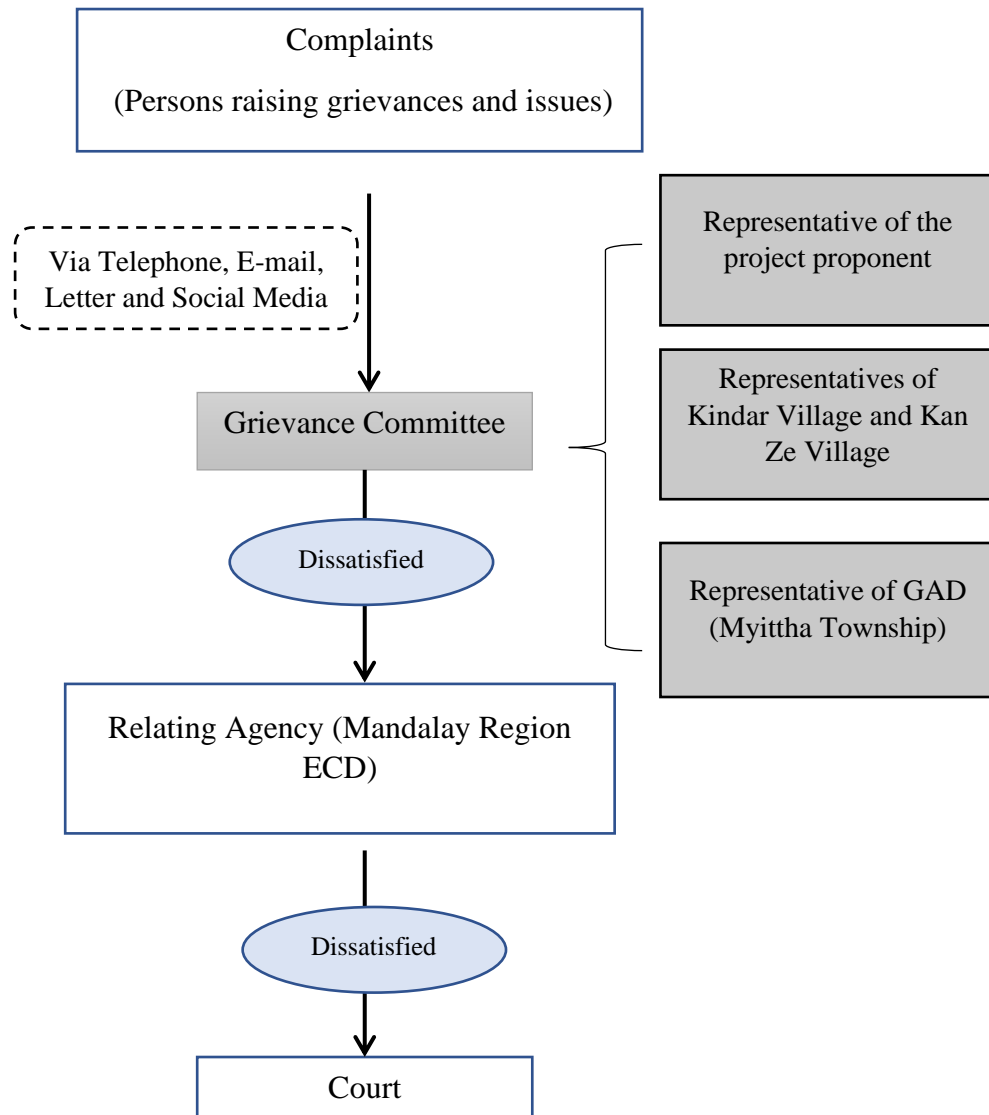


Figure 8. 1 Grievance Redress Mechanism for the Proposed Project

8.8 Firefighting 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 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. 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. Moreover, the project proponent will assign teams for firefighting such as preparedness team, extinguishing team, evacuation team and first aid team. In extinguishing team, there will be 15

members to extinguish fire effectively and there will be 15 members in evacuation team to evacuate properties and human to safe place. The following figures describe firefighting equipment and sign that the proponent will install.



Figure 8. 2 Firefighting Equipment and Singages

8.9 Emergency Response and Preparedness Plan

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

As the project is located within the **Zone IV (Severe Zone)** earthquake zone, the emergency preparedness for earthquake must also be taken. The multiple-use building and electrical equipment including switchyard and overhead transmission line must be built with the international standards to withstand the risk of earthquake. The workers should have the knowledge concerning with the earthquake.

For all emergency cases, emergency response plan must be developed by the project proponent and train to all workers in order to evacuate systematically during emergency cases. Recovery

plan must be developed because recovery plan should be followed after severe damages due to emergency cases.



[FIRE]

A fire is both frightening and destructive. Fires are a danger to buildings and residents in equal measure. Keep your cool in the event of a fire by following these SAFE STEPS:

BE PREPARED...

 <p style="font-size: 10px; background-color: yellow; padding: 2px;">PREPARE YOUR GO-BAGS</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">KNOW AND PRACTICE YOUR ESCAPE ROUTE</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">CARRY OUT ANNUAL CHECKS, ENSURE FIRE ALARMS WORK</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">DO NOT LEAVE BURNING CIGARETTES OR CANDLES UNATTENDED</p>
 <p style="font-size: 10px; background-color: yellow; padding: 2px;">PREPARE FIRE FIGHTING EQUIPMENT...</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">AND KNOW HOW TO EXTINGUISH A FIRE</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">IF USING EXTINGUISHER, PULL PIN, AIM AND SQUEEZE HANDLE, SWEEP BASE OF FIRE</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">NEVER USE WATER OR FOAM EXTINGUISHER ON AN OIL OR ELECTRICAL FIRE</p>

IN CASE OF FIRE...

 <p style="font-size: 10px; background-color: yellow; padding: 2px;">STOP WHERE YOU ARE</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">DROP TO THE GROUND</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">ROLL ON THE FLOOR TO PUT OUT THE FLAMES</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">GET DOWN LOW - COVER YOUR MOUTH WITH A DAMP CLOTH AND GET OUT!</p>
 <p style="font-size: 10px; background-color: yellow; padding: 2px;">GET OUT THROUGH A SAFE EXIT</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">SOUND ALARM AND CALL FOR HELP</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">BEWARE OF GAS LEAKS AND EXPOSED WIRE</p>	 <p style="font-size: 10px; background-color: yellow; padding: 2px;">DO NOT GO HOME UNLESS LOCAL AUTHORITIES DEEM IT SAFE</p>



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Figure 8. 3 Safety Cards for Awareness of Emergency Cases

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

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

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

In case of an earthquake,

When an emergency occurs, the first priority is always life safety. The second priority is the stabilization of the incident. There are many actions that can be taken to stabilize an incident and minimize potential damage.

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

The following actions should be followed for personnel indoors:

- Drop to the ground and take cover by getting under a sturdy desk or other piece of furniture and hold on until the shaking stops. If there isn't a desk or sturdy piece of furniture near you, cover your face and head with your arms and crouch in an inside corner of the building.
- Stay away from glass, windows, outside doors and walls, and anything that could fall such as lighting fixtures or furniture.
- Use a doorway for shelter only if it is in close proximity to you and if you know it is a strongly supported load bearing doorway.
- Stay inside until the shaking stops and it is safe to go outside.

The following actions should be followed for personnel outdoors:

- If you are already outdoors, stay there.
- Move away from buildings, structures, light poles, and utility wires.

9. Results of the 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 Myittha 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 Kindar Substation, proposed by Myanmar Kindar Solar Power Co., Ltd. was held on 22nd May, 2022 at project site, Kyi Taing Village Tract, Myitthar Township, Kyaukse District, Mandalay Region, and Myanmar. The starting time was 10:30 am and finished at 12:00 am. The objective of the meeting is to disclose information of the project, potential impacts of project activities and mitigation measures and to receive public recommendations and feedbacks for the proposed project. The project proponent invited local people by negotiating with village administrators. As the public consultation meeting was held during COVID-19 Pandemic Period, there were some limitations related to number of attendees, venue and social distancing. The attendance list, presentation file and photos are described in **Appendix- 4, 5, 6 and 7**. 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 Kan ZeVillage	11
2.	Local People from Kyee TaingVillage	4
3.	Representatives of project proponent	5
4.	Representatives of E Guard Environmental Services	3
Total		23

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 U Aung Zin Oo (Site Engineer, Chin Dwin Yadanar Co., Ltd.) on behalf of Mr. Shi Huo (Project Engineer, China 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 Kindar Substation by U Kyaw Soe Moe (Project Associate, E Guard Environmental Services Co., Ltd.)
- 4) Questions, Comments and Suggestions from the attendees.
- 5) Closing the ceremony

Details of each agenda are described in the following:

1. Opening Ceremony

2. Presentation of Project Information by U Aung Zin Oo (Site Engineer, Chin Dwin Yadanar Co., Ltd.) on behalf of Mr. Shi Huo (Project Engineer, China Power Co., Ltd.)

U Aung Zin Oo 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 Kyaw Soe Moe (Project Associate, E Guard Environmental Services Co., Ltd.)

U Kyaw Soe Moe 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 Phoe Ni (Kye Taing Village Tract Leader) asked to get electrical access from this solar power plant for villages nearby the project site.

Answer: U Aung Zin Oo (Site Engineer, Chin Dwin Yadanar Co., Ltd.) answered that the electricity generated from this project will be directly transmitted to the Kindar Substation. The government will resell the electricity meter per unit. The villages nearby the project site will get more electricity access.

Suggestion: U Phoe Ni (Kye Taing Village Tract Leader) would like the project proponent to ensure that the site runoff water and storm water will not pollute the water quality of Pan Laung River.

Answer: U Kyaw Soe Moe (Project Associate, E Guard Environmental Services) answered that the project proponent have to follow the Environmental Management Plan and have to build temporary wastewater tank to collect and reduce sediments and oil & grease from the site runoff water.

Suggestion: U Phoe Ni (Kye Taing Village Tract Leader) would like the project proponent to give job opportunities for local villagers nearby the project site.

Answer: U Aung Zin Oo (Site Engineer, Chin Dwin Yadanar Co., Ltd.) answered that the project proponent will try to provide job opportunities for local villagers.

Suggestion: U Phoe Ni (Kye Taing Village Tract Leader) would like the project proponent to ensure that the vehicles passing through the villages must drive less than 30 mile per hour because there are locals who go to the farms and children who go to the school.

Answer: U Aung Zin Oo answered that the project proponent will be careful not to harm any local villagers.

Suggestion: U Phoe Ni (Kye Taing Village Tract Leader) would like to submit issues concerned about farmland to the related governmental department. As the forest department has designated the project area from the forest land to industrial land, so also the village plantations area around the project site should be designated as farmland.

Suggestion: U Phoe Ni (Kye Taing Village Tract Leader) would like the project proponent to negotiate when the access road construction will be done because of the land issues.

Question: U Phoe Ni (Kye Taing Village Tract Leader) would like to know how will the project contribute the good opportunities to the villages nearby the site.

Answer: U Kyaw Soe Moe (Project Associate, 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.

10. Conclusion and Recommendations

10.1 Conclusion

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

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

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

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

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

The findings of the EMP study indicated that the proposed project would generate positive impacts such as local employment and business opportunities, and enhancement of capabilities and working skills of the employees. Consequently, local socio-economic in the region is expected to be improved. Successful implementation of the proposed project will raise confidence for investors and aid agencies to develop further solar and other renewable projects in Myanmar. Major benefits of this project is that it will increase the supply of electrical energy in Myanmar from a renewable source, which is in line with the aim of the Myanmar Government to increase energy supply and reduce the overall CO₂ emission of Myanmar by substituting energy from the predominating coal-fired Power Plants.

10.2 Recommendations for Future Works

The following recommendations are mandatory for effective and efficient implementation of Environmental Management Plan and Environmental Monitoring Plan of the proposed project. The project proponent shall:

- ✓ Assign one HSE Coordinator,
- ✓ Provide a safe and healthy environment for the workers,
- ✓ Provide the necessary resources for managing health and safety in the project site,
- ✓ Issue safety rules and safe working procedures and ensure that the rules and procedures comply with legislation,
- ✓ Ensure that experience and capacity of the workers are commensurate with the assigned task,
- ✓ Ensure that responsibilities for managing safety and health are appropriately assigned, and duties are effectively carried out by the staff concerned,
- ✓ Ensure that all accidents, incidents and near misses are investigated and preventative and corrective measures made are properly followed up,
- ✓ Provide first aid trainings, firefighting trainings and other essential trainings for the workers,
- ✓ Definitely follow construction working hours to avoid noise and vibration pollution at night,
- ✓ Define specific places for fuel storage and construction machines maintenance area with impervious surface,
- ✓ Implement Grievance Redress Mechanism (GRM) to solve the complaints,
- ✓ Implement Corporate Social Responsibility (CSR) plan,
- ✓ Manage drainage system properly,
- ✓ Implement EMP and EMoP for balancing development and environmental conservation.

Finally, the project proponent shall follow comments and suggestions made by ECD after reviewing this EMP report. Once EMP report is approved by concerned authorities, effective implementation of EMP and EMoP by the project proponent is essential. The proponents shall abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar during the lifespan of the project.

References

- General Administration Department (Myittha Township), 2019, “*Myittha Township Data*”.
- Ministry of Environmental Conservation and Forestry (MOECAAF), 2015, “*Environmental Impact Assessment Procedure*”.
- Ministry of Environmental Conservation and Forestry (MOECAAF), 2015, “*National Environmental Quality (Emission) Guidelines*”.
- Myanmar Survey Research (MSR), 2017, “*Environmental and Socio-economic Impact Assessment (ESIA) Report for Implementing Solar Power Plant Project in Minbu District, Magwe Region*”.

Appendix

Appendix 1 Project Proponent's Commitment Letter

MYANMAR KINDAR 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 KINDAR 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 of

MYANMAR KINDAR SOLAR POWER COMPANY LIMITED

Appendix 2 Third Party's Commitment Letter



E GUARD ENVIRONMENTAL SERVICES

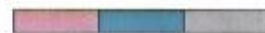
No. 145 (A2-3), Thiri Mingalar Street (သီရိမင်္ဂလာ လမ်းလွှာ ၁၂၅),
Ward No. (4), 8 Mile-Pyay Road, Mayangone Township, 11062, Yangon,
the Republic of the Union of Myanmar
Ph: (+95) 1 9667757, (+95) 9 797005151
www.eguardservices.com; info@eguardservices.com



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


With regards to the above matter, we, E Guard Environmental Services Co., Ltd. Has prepared the Environmental Management Plans (EMP) Report for 30 MW Ground Mounted Solar Power Plant Project connected to Kindar Substation, proposed by Myanmar Kindar 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
Eguard Environmental Services



www.facebook.com/EGuardmm/

Appendix 3 Instructions to prepare EMP report



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
 သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
 ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
 ညွှန်ကြားရေးမှူးချုပ်ရုံး

စာအမှတ်၊ EIA - ၂/၉/ သဘောထား (PP-N)(၁၆၂၃/ ၂၀၂၂)
 ရက်စွဲ ၊ ၂၀၂၂ ခုနှစ် ဩဂုတ်လ ၂ ရက်

သို့

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

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

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

၁။ အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ Myanmar Kindar Solar Power Co.,Ltd က
 မန္တလေးတိုင်းဒေသကြီး၊ ကျောက်ဆည်ခရိုင်၊ မြစ်သားမြို့နယ်၊ ကျီးတိုင်ကျေးရွာအုပ်စုတွင် အကောင်
 အထည်ဖော်ဆောင်ရွက်မည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်သုံးလျှပ်စစ်ဓာတ်အားထုတ်လုပ်မည့် စီမံကိန်း
 အတွက် စီမံကိန်းအဆိုပြုလွှာအားစိစစ်သုံးသပ်ပေးနိုင်ပါရန် ရည်ညွှန်း (၁) ပါစာဖြင့် ပေးပို့
 တင်ပြလာပါသည်။

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


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

၃

ဓာတ်အားလိုင်းသွယ်တန်းခြင်း၊ လမ်းဖောက်ခြင်း၊ ဝန်ထမ်းများနေထိုင်ရာနေရာ များ တည်ဆောက်ခြင်းစသည့်လုပ်ငန်းများအားလုံးကို ခြုံငုံသော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်ကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ် ၆၃ (ဇ) နှင့် အပိုဒ် ၇၇ တို့နှင့်အညီရေးဆွဲ၍ သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာနသို့ တင်ပြအတည်ပြုချက်ရယူရန်၊

(ခ) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲရာတွင် နေရောင်ခြည်သုံးလျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းလုပ်ငန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ သက်ရောက်မှုများဖြစ်သော ဂေဟစနစ်နှင့် ဇီဝမျိုးစုံမျိုးကွဲ၊ မြေအသုံးချမှု၊ စွန့်ပစ်ပစ္စည်း (အစိုင်အခဲ/အရည်) စီမံခန့်ခွဲခြင်း၊ လူမှုစီးပွားရေး၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး၊ စီမံကိန်းမှ ၂ ကီလိုမီတာအကွာတွင် တည်ရှိသော Key Biodiversity Area တစ်ခုဖြစ်သည့် ပြဒါးလင်းဂူအား စီမံကိန်းလုပ်ငန်းများ ဆောင်ရွက်မှုကြောင့် ထိခိုက်မှုမရှိစေရန် ဆောင်ရွက်မည့်အစီအမံများ စသည့် နယ်ပယ်များဆိုင်ရာ ကျွမ်းကျင်ပညာရှင်များဖြင့် ပြည့်စုံစွာရေးဆွဲတင်ပြရန်၊

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


ညွှန်ကြားရေးမှူးချုပ် (ကိုယ်စား)
(ဒေါက်တာဆန်းဦး၊ ဒုတိယညွှန်ကြားရေးမှူးချုပ်)
၂၆ ၅၈ ၃


မိတ္တူကို

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

Appendix 4 Project proponent's company registration card



Appendix 5 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. 10028

Date 15/03/2018

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 သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို အဖွဲ့အစည်းအား ထုတ်ပေးလိုက်သည်။)

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

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း

The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)
ဤလက်မှတ်အား (၀-၄-၂၀၁၈) ရက်နေ့မှ (၃၁-၃-၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်အတွက်တစ် နှစ်တိုးမြှင့်သည်။

See Note
For Director General
(See Naing, Director)
Environmental Conservation Department



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

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

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

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



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

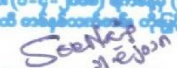


No. 10067 Date 01 APR 2018

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
 သက်တမ်းတိုးမြှင့်ခြင်း
 The VALIDITY of this certificate is extended
 for one year from (1.4.2018) to (31.3.2019)
 ဤလက်မှတ်အား (၀-၄-၂၀၁၈) မှတ်တမ်း (၃၁.၃.၂၀၁၉)
 ရက်အထိ တစ်နှစ်အတွက် တိုးမြှင့်သည်။

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



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

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Air Pollution Control
2. 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 တစ်နှစ်သက်တမ်း တိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe 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။
Soe Naing
17.6.19
For Director General
(Soe Naing, Director)
Environmental Conservation Department



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



No. 10104 Date 14.03.2018

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) မှစ၍ (၃၁.၃.၂၀၁၉) မှတ်ပုံတင်ထိ တက်တက်ဆက်ဆက် တက်တက်ဆက်ဆက် ဖြစ်ပေါ်သည်။
 For Director General
 (Soe Naing, Director)
 Environmental Conservation Department

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

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Forestry

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

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for six months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁-၁၂-၂၀၁၉) ရက်နေ့အထိ (၉)လသက်တမ်း တိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe 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။
Soe Naing
For Director General
(Soe 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။
Soe Naing
For Director General
(Soe 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. 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။)

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



(Handwritten signature)

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

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

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

- | | |
|------------------------------|-------------|
| 1. Ecology and Biodiversity; | 2. 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 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၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်။
- ၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတ်ယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်။
- ၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။



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



CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION
(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00279 Date 13 FEB 2023

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

- (a) Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်) Ms. Shwe Ya Min Bo
- (b) Citizenship (နိုင်ငံသား) Myanmar
- (c) Identity Card / Passport Number (မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်) 8/MaKaNa (N) 218158
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- (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 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 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၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စီစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်။
- ၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်။
- ၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။



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



CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION
(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 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 သယ်စာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

- | | |
|--|---|
| (a) Name of Consultant
(အကြံပေးပုဂ္ဂိုလ်အမည်) | Ms. Htet Shwe Sin Aung |
| (b) Citizenship
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| (c) Identity Card / Passport Number
(မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်) | 12/TaMaNa (N) 117189 |
| (d) Address
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Mobile phone: 09797005151
Telephone: 951 9667757
E mail: shwesinhтет@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 တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းများလုပ်ငန်းလုပ်ဆောင်ရာ လုပ်ထုံးလုပ်နည်း ထုတ်ပြန်သည်ရက်မှစ၍ (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 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 စီစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်။
- ၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်။
- ၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။



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



CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION
(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00377 Date 17 FEB 2023

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

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



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

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

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

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

စည်းကမ်းချက်များ

- ၁။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-
 - (က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ 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 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၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းတို့အရ စိစစ်သုံးသပ်ပြီး ကနဦးသဘောထားမှတ်ချက်နှင့်အညီ ပြန်လည်ပြင်ဆင်ခြင်း မရှိကြောင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ သတ်မှတ်ဆုံးဖြတ်ခြင်းခံရလျှင် အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း ခံရမည်။
- ၄။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံကိန်းအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်ရန် တတိယအဖွဲ့အစည်းအတည်ပြုချက်ရယူရာ၌ မိမိအဖွဲ့အစည်းတွင် မှတ်ပုံတင်ထားသည့် အကြံပေး ပုဂ္ဂိုလ်များ၏ အမည်စာရင်းကိုသာ တင်ပြရမည်။
- ၅။ အထောက်အထားလက်မှတ်ရရှိသော အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လှမ်းမမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။



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



CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION
(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00380 Date 17 FEB 2023

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

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



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

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

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

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

စည်းကမ်းချက်များ

- ၁။ ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-
 - (က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ဆီးခြင်း၊ ပြင်ဆင်ခြင်း၊ မသက်ဆိုင်သူတစ်ဦးဦးသို့ ငှားရမ်းခြင်း၊ အမည်ခံ 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။



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
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- (d) Address (ဆက်သွယ်ရန်လိပ်စာ) (141), Yeikthar (2) Lane, Waizayandar Garden Housing, Mi Gyaung Kan (1) Ward, Thingangyun township, Yangon.
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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.



၁၇.၂.၂၀၂၃

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

ဤအထောက်အထားလက်မှတ်သည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တာဝန်ယူပုဂ္ဂိုလ် 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 အသုံးပြုစေခြင်းနှင့် တစ်ဆင့်လွှဲပြောင်းကိုင်ဆောင်စေခြင်းမပြုရ။
 - (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 တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။



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



CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION
(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00376 Date 1.7.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. Nyein Chan Aung |
| (b) Citizenship
(နိုင်ငံသား) | Myanmar |
| (c) Identity Card / Passport Number
(မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်) | 5/KaLaNa (C) 059799 |
| (d) Address
(ဆက်သွယ်ရန်လိပ်စာ) | No. 39, Bayint Naung 1st, 1 Ward, Mayangone Township, Yangon, Myanmar.
Mobile phone: 959798627909,
09893244228,
E mail: nyeinchamaung1993@gmail.com ,
nyeinnca1993@gmail.com |
| (e) Organization
(အဖွဲ့အစည်း) | E Guard Environmental Services Company Limited. |
| (f) Type of Consultancy
(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Person |
| (g) Duration of validity
(သက်တမ်းကုန်ဆုံးရက်) | 30 th June, 2023. |



(Handwritten signature)

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

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

Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

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

စည်းကမ်းချက်များ

- ၁။ 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 လက်လှမ်းမီသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်ရေးဆွဲ ဆောင်ရွက်နိုင်ရန် ကြားကာလအကြံပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိပြီးဖြစ်သည့် တစ်သီးပုဂ္ဂလလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံကိန်း အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။

Appendix 6 Public consultation meeting's attendance lists

မန္တလေးတိုင်းဒေသကြီး၊ ကျောက်ဆည်ခရိုင်၊ မြစ်သာဖြူနယ်၊ ကြည်တိုင်ကျေးရွာအုပ်စုတွင်အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံးလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်းအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်းလုပ်ငန်းနှင့်ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူပွဲ အခမ်းအနားသို့တက်ရောက်လာသူများစာရင်း

ရက်စွဲ။ ။ ၂၀၂၂ ခုနှစ်၊ မေလ (၂၂) ရက်။

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦးပေါက်	ကံဆည်ရွာ	ကျွန်း		ပေါက်
၂။	ဦးတော်ရွှေ	ကံဆည်ရွာ	ကျွန်း	၀၉-၂၄၅၆၀၄၆၅၇၀	
၃။	ဦးစိုင်းထွန်း	ကြည်တိုင်ရွာ	ကောင်းသူ		
၄။	ဦးစိုင်းစိုင်း	ဆလင် ကြို့ရွာ	ကျွန်း	၀၉-၄၂၅၀ ၈၁၄၅၉	
၅။	ဦးပိုင်ဖြူ	ကံဆည်ရွာ	ကျွန်း		
၆။	ဦးစိုင်းစိုင်း	ကံဆည်ရွာ	အောင်လှမြင့်ကျေးရွာ	၀၉-၄၄၄၁၁၁၆၅၄	
၇။	ဦးစိုင်းထွန်း	ကံဆည်ရွာ	လုပ်သား		
၈။	ဦးစိုင်းထွန်း	ကံဆည်ရွာ	လုပ်သား		
၉။	ဦးစိုင်းထွန်း	ကြည်တိုင်ရွာ	"	၀၉ ၄၅၆၅၅၄၀၈၄	
၁၀။	ဦးစိုင်းထွန်း	ကံဆည်ရွာ	"	၀၉ ၄၄၄ ၂၂၇၂၃၀	

မန္တလေးတိုင်းဒေသကြီး၊ ကျောက်ဆည်ခရိုင်၊ မြစ်သာဖြူနယ်၊ ကြည်တိုင်ကျေးရွာအုပ်စုတွင်အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံးလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်းအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်းလုပ်ငန်းနှင့်ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူပွဲ အခမ်းအနားသို့တက်ရောက်လာသူများစာရင်း

ရက်စွဲ။ ။ ၂၀၂၂ ခုနှစ်၊ မေလ (၂၂) ရက်။

စဉ်	အမည်	ရာထူး	ဌာန/ အဖွဲ့အစည်း	ဆက်သွယ်ရန်ဖုန်းနံပါတ်	လက်မှတ်
၁။	ကို ဦးဟောကီ	Project engineer	China power	၀၉ -	Shi Hao
၂။	အောင်ကျော်	အထွေထွေ	"		အောင်ကျော်
၃။	ဦးစိုင်းထွန်း	အထွေထွေ	"	၀၉-၄၄၄၀၆၆၆၆	
၄။	ကိုစိုင်းထွန်း	အထွေထွေ	"	၀၉-၂၅၄၅၅၅၅၅	
၅။	ဦးစိုင်းထွန်း	Site engineer	"	၀၉-၂၀၂၇၅၅၅၅	

EMP Report for 30 MW Myanmar Kindar Solar Power Project

မန္တလေးတိုင်းဒေသကြီး၊ ကျောက်ဆည်ခရိုင်၊ မြစ်သာဖြူနယ်၊ ကြည်တိုင်ကျေးရွာအုပ်စုတွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့်
 ၃၀ မဂ္ဂါဝပ် နေရောင်ခြည်စွမ်းအင်သုံးလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်းအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်းလုပ်ငန်းနှင့်ပတ်သက်၍
 ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူပွဲ အခမ်းအနားသို့ တက်ရောက်လာသူများစာရင်း

ရက်စွဲ။ ။ ၂၀၂၂ ခုနှစ်၊ မေလ ၂၂၊ ရက်။

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဆက်သွယ်ရန်ဖုန်းနံပါတ်	လက်မှတ်
၁၁.	ဦးမျိုးကျော်	ကံဆည်ရွာ	လုပ်သား	၀၉၄၄၇၅၂၈၈၄၁	ဦး
၁၂.	ဦးအောင်	"	"	၀၉၄၀၅၅၀၅၈၈၁	ဦး
၁၃.	Shah Isre ko	kan se	ကျပ်သား	၀၉-၄၄၇၅၂၈၈၄၁	Shah
၁၄.	ကျော်စော	ကံဆည်	ဆိုင်ခွက်	၀၉၇၂၆၅၀၂၅၈၈	ကျော်စော
၁၅.	စိုးအောင်	ကံဆည်	"	၀၉-၄၄၄၆၂၈၈၀၈	စိုး

Appendix 7 Public consultation meeting's photos



Meeting with U Phoe Ni (Kan Ze Village Head)



Meeting with site engineer



Meeting with project engineer



Presented by U Kyaw Soe Moe (E Guard Environmental Services)



Presented by U Aung Zin Oo (Site Engineer, Chin Dwin Yadanar Co., Ltd.) on behalf of Mr. Shi Huo (Project Engineer, China Power Co., Ltd.)



Questions, Comments and Suggestions from the Attendees

Appendix 8 Presentation file of public consultation meeting




Myanmar Kindar Solar Power Co., Ltd.

၃၀ မဂ္ဂါဝပ်နေရောင်ခြည်စွမ်းအင်သုံး
လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်းစီမံကိန်း

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်းလုပ်ငန်းနှင့်ပတ်သက်၍
ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်းအခမ်းအနား

၂၀၂၂ ခုနှစ်၊ မေလ (၂၂) ရက်



နိဒါန်း

စီမံကိန်းအကောင်အထည်ဖော်သူ	- Myanmar Kindar Solar Power Co., Ltd.
ရင်းနှီးမြှုပ်နှံမှုပုံစံ	- ပြည်ပရင်းနှီးမြှုပ်နှံမှု
လုပ်ငန်းအမျိုးအစား	- နေရောင်ခြည်စွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ခြင်းလုပ်ငန်း
စီမံကိန်း၏အဓိကရည်ရွယ်ချက်	- နေရောင်ခြည်စွမ်းအင်မှ လျှပ်စစ်ဓာတ်အား ထုတ်လုပ်ပြီး ကင်းတားဓာတ်အားခွဲရုံသို့ ပို့လွှတ်ရန်
စီမံကိန်းတည်နေရာ	- မန္တလေးတိုင်းဒေသကြီး၊ ကျောက်ဆည်ခရိုင်၊ မြစ်သားမြို့နယ်၊ ကြည်တိုင်ကျေးရွာ

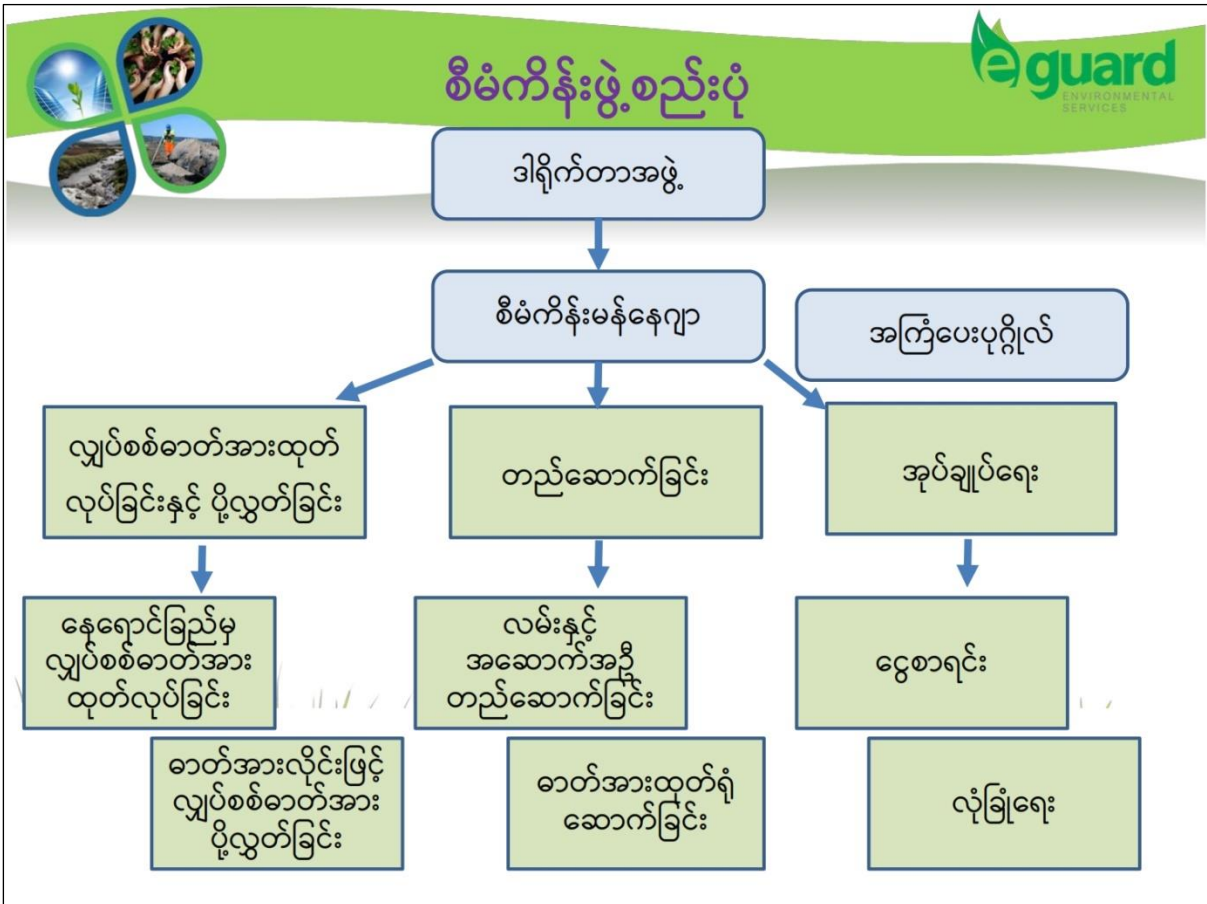


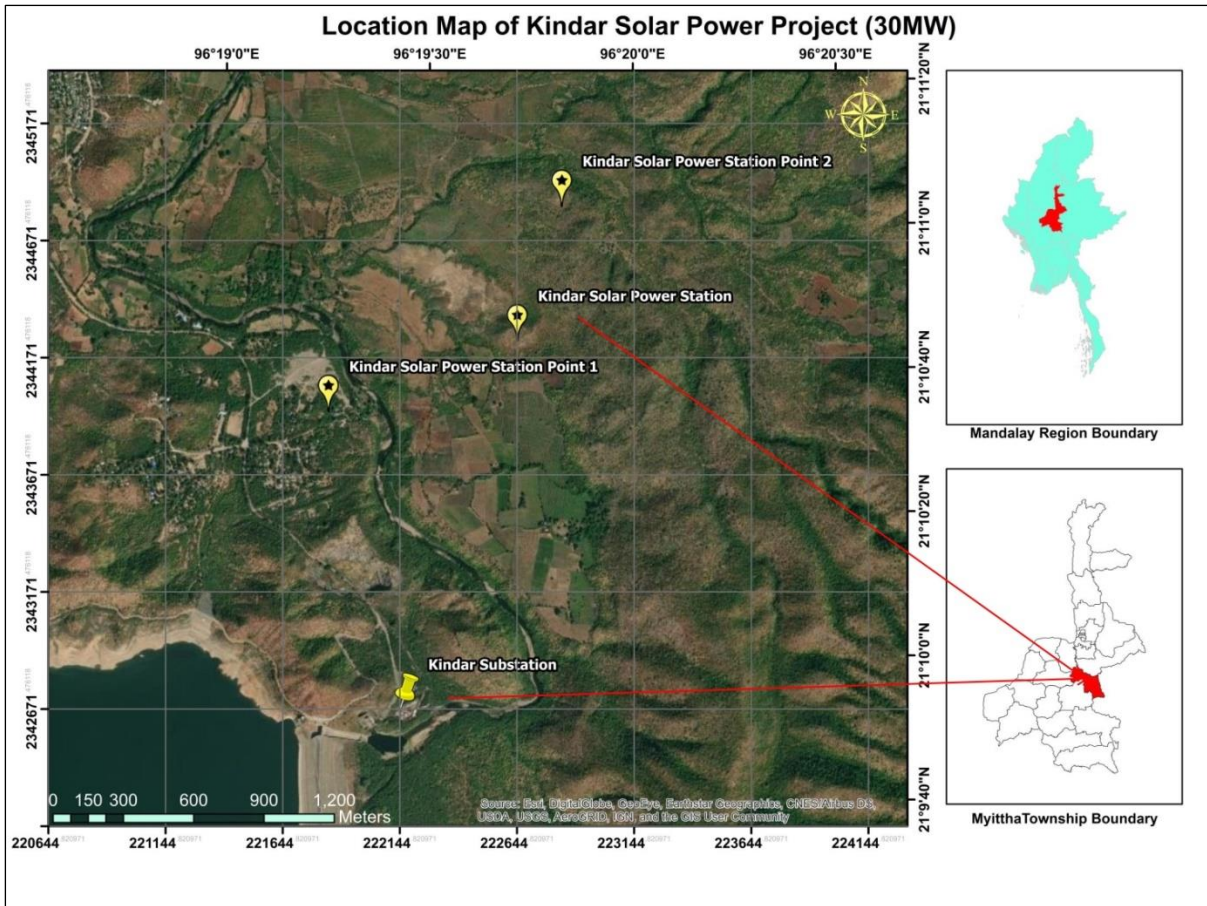
စီမံကိန်းအတွက်ရင်းနှီးမြှုပ်နှံမှုပုံစံ





Myanmar Kindar Solar Power Co., Ltd.

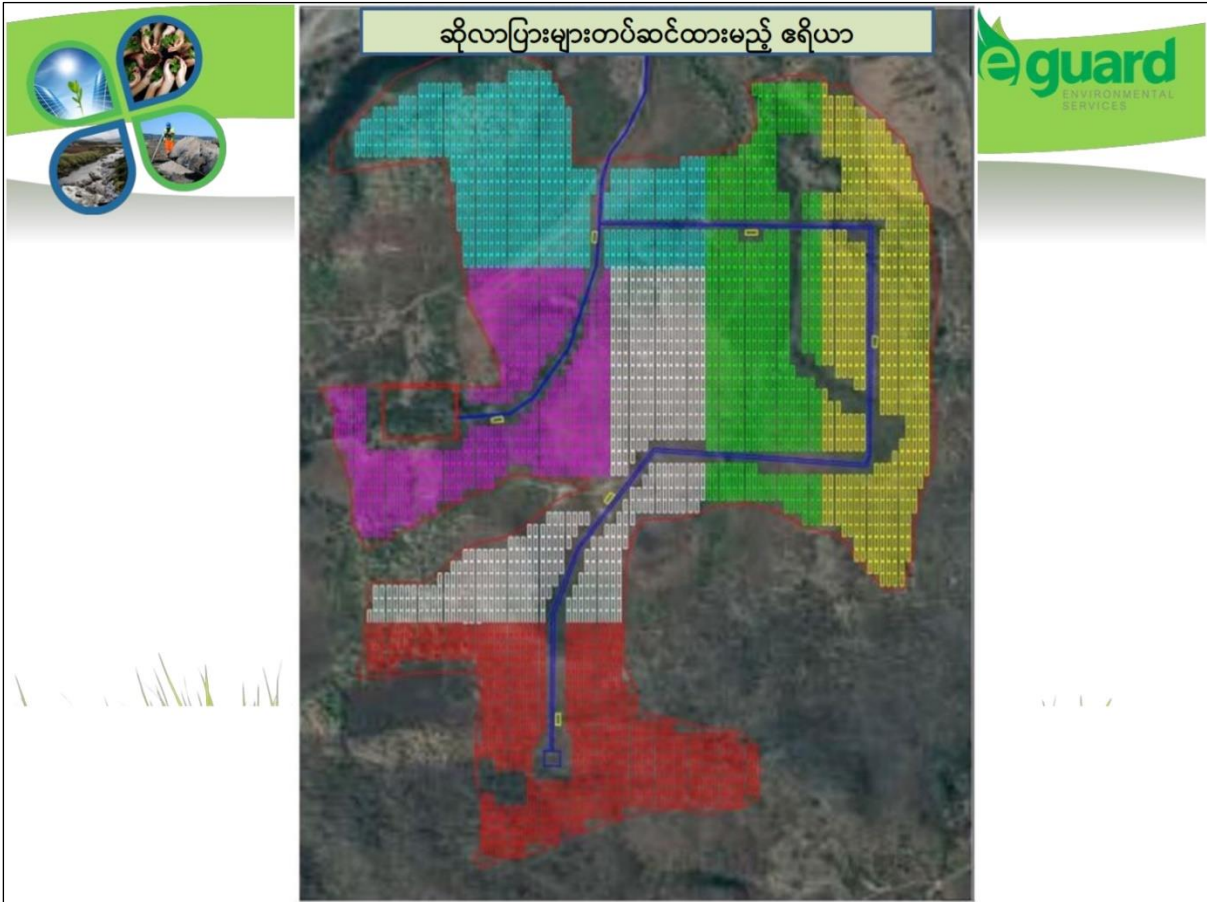
- ကွင်းဆင်းဆောင်ရွက်ခြင်းနှင့် ဒီဇိုင်းရေးဆွဲခြင်း
- တည်ဆောက်ရေးလုပ်ငန်းများ ဆောင်ရွက်ခြင်း
- ဓာတ်အားလိုင်းသွယ်တန်းခြင်း
- ကွန်ပျူတာစနစ်ဖြင့်ဓာတ်အားထုတ်လုပ်မှု၊ ပို့လွှတ်မှုများအား ထိန်းချုပ်ခြင်း

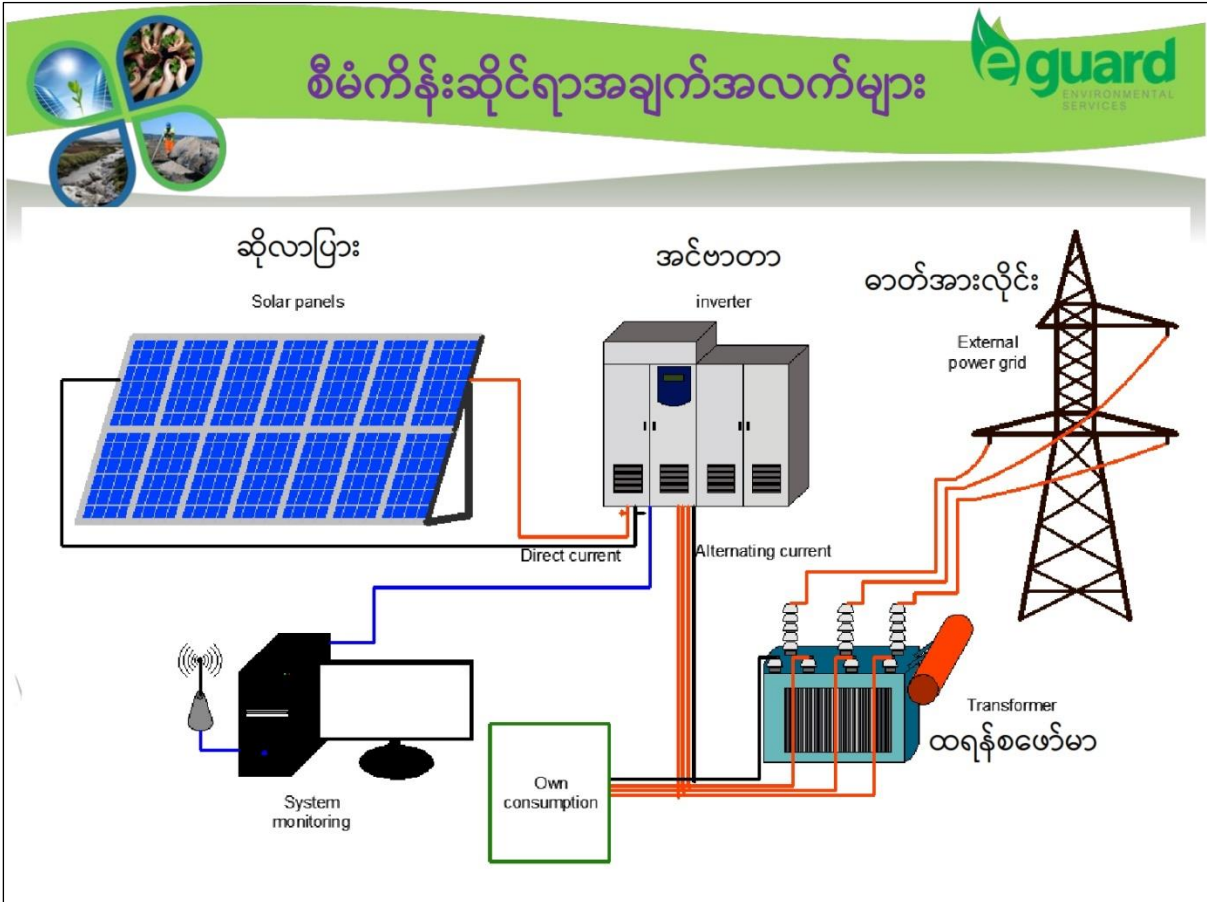
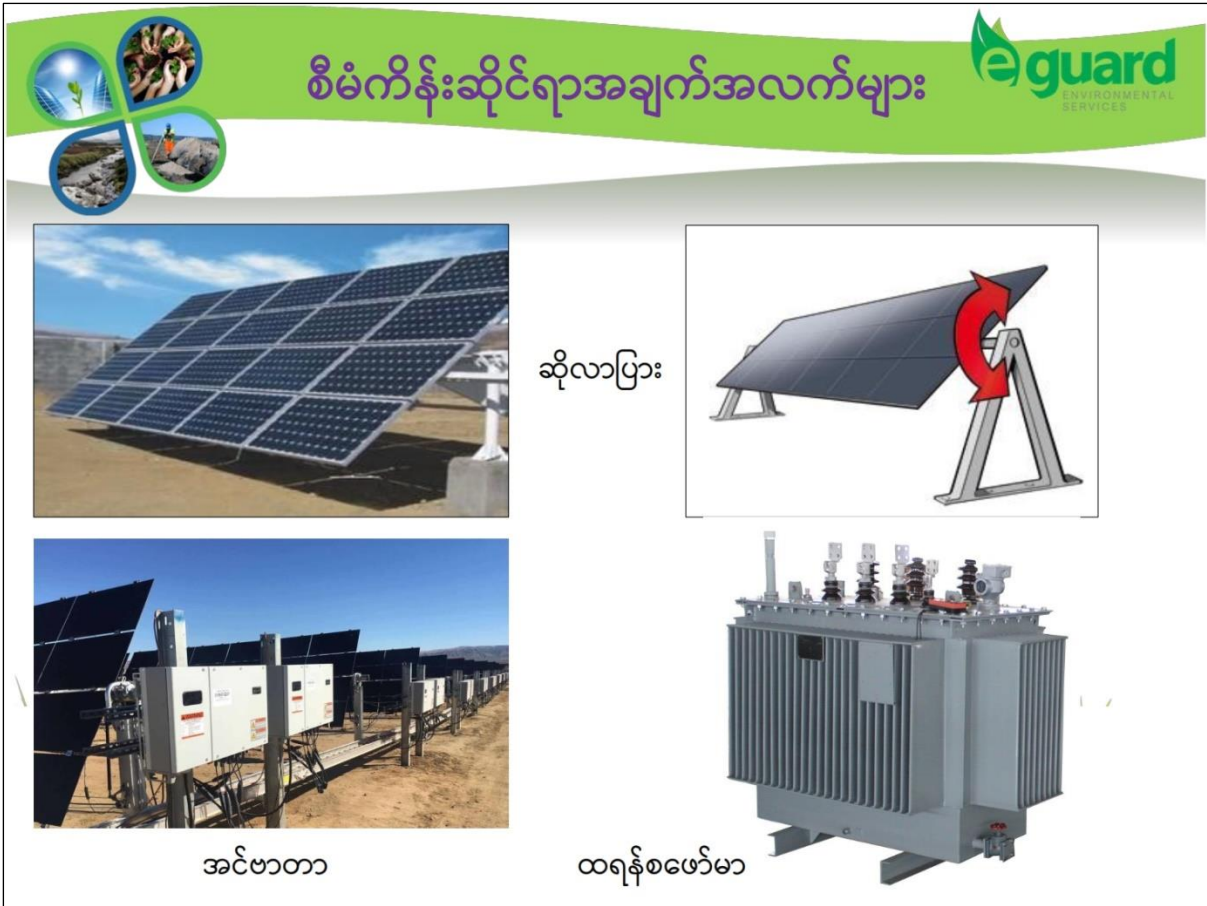




 စီမံကိန်းဆိုင်ရာအချက်အလက်များ 	
စီမံကိန်းတည်ဆောက်မည့်ကာလ	- (၆) လ
စီမံကိန်းလည်ပတ်မည့်ကာလ	- နှစ် (၂၅)
စီမံကိန်းအကျယ်အဝန်း	- (၁၃၂.၃၅) ဧက
ဓာတ်အားလှိုင်းမှပို့လွှတ်နိုင်သည့်ပမာဏ	- (၃၀) မဂ္ဂါဝပ်
ဓာတ်အားလှိုင်းအရှည်	- (၂) ကီလိုမီတာခန့်
ဓာတ်အားစတင်ပို့လွှတ်မည့် အဆောက်အဦ အကျယ်	- (၁၈၀) စတုရန်းမီတာ
စုစုပေါင်းဆောက်လုပ်မည့် ဧရိယာ	- (၃၄၀) စတုရန်းမီတာ

 စီမံကိန်းဆိုင်ရာအချက်အလက်များ 	
ဆိုလာပြားအမျိုးအစားနှင့် အရေအတွက်	- ၅၄၀ Wp ရှိ မျက်နှာပြင်တစ်ဖက် ပါသော မိုနိုခရစ်စတယ်လိုင်း ဆီလီကွန် ဆိုလာပြား (၆၇,၂၀၀ခု)
ဆိုလာပြားအောက်ရှိထောက်တိုင်အမျိုးအစားနှင့် အရေအတွက်	- အရှေ့အရပ်မှအနောက်အရပ်သို့ ရေပြင်ညီအတိုင်းလှည့်နိုင်သော ထောက်တိုင် (၂၄၀၀ခု)
အင်ဗာတာအမျိုးအစားနှင့် အရေအတွက်	- 250 kW String inverter ၂၀ လုံး
ထရန်စဖော်မာအမျိုးအစားနှင့် အရေအတွက်	- 5000 KVA Box transformer (၆ လုံး)
ဓာတ်အားလိုင်းတွင်ပါဝင်မည့်ဓာတ်တိုင်အမျိုးအစား - Self- supporting Iron Tower	- ၁၀ တိုင်








ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်း (Environmental Management Plan)

E Guard Environmental Services

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စီမံကိန်း၏ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုများ

➔

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

ဆောင်ရွက်သည့်အဖွဲ့အစည်း	- E Guard Environmental Services Co., Ltd.
စိစစ်ခွင့်ပြုမည့်အဖွဲ့အစည်း	- သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
လိုက်နာရမည့်ဥပဒေ၊ နည်းဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ	ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော် (၂၀၀၈) ဖွဲ့စည်းပုံအခြေခံဥပဒေ၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ

3




ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲခြင်း၏ ရည်ရွယ်ချက်များ

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

အများပြည်သူသဘောထားရယူခြင်း၏ရည်ရွယ်ချက်များ

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




ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

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

ဆိုးကျိုးသက်ရောက်ခြင်းမှ


- ကာကွယ်ရန်
- ရှောင်လွှဲရန်
- လျော့နည်းစေရန်

နည်းလမ်းနှင့်အစီအစဉ်များ ဖော်ပြသည့်စီမံချက်




ဖြစ်ပေါ်လာနိုင်သည့်သက်ရောက်မှုများ

- ကောင်းသောသက်ရောက်မှုများ
- ဆိုးသောသက်ရောက်မှုများ




ကောင်းသောသက်ရောက်မှုများ

- တည်ဆောက်သည့်ကာလ
 - အလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
 - စီးပွားရေးအခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
- လုပ်ငန်းလည်ပတ်သည့်ကာလ
 - အလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
 - ပြန်လည်ပြည့်ဖြိုးမြဲစွမ်းအင်မှလျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်း
 - ဖန်လုံအိမ်ဓာတ်ငွေ့ထုတ်လုပ်မှုလျှော့ချနိုင်ခြင်း
 - နိုင်ငံတော်၏စီးပွားရေးဖွံ့ဖြိုးတိုးတက်ခြင်း
- စီမံကိန်းဖျက်သိမ်းသည့်ကာလ
 - အလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
 - စီးပွားရေးအခွင့်အလမ်းများဖန်တီးပေးနိုင်ခြင်း
 - ဖျက်သိမ်းပြီးလျှင်စစ်ပစ္စည်းများအားပြန်လည်အသုံးပြုနိုင်ခြင်း





ဆိုးသောသက်ရောက်မှုများ

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





ဆိုးသောသက်ရောက်မှုများ

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



ဆိုးသောသက်ရောက်မှုများ

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



လျှော့ချရန်နည်းလမ်းများ

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

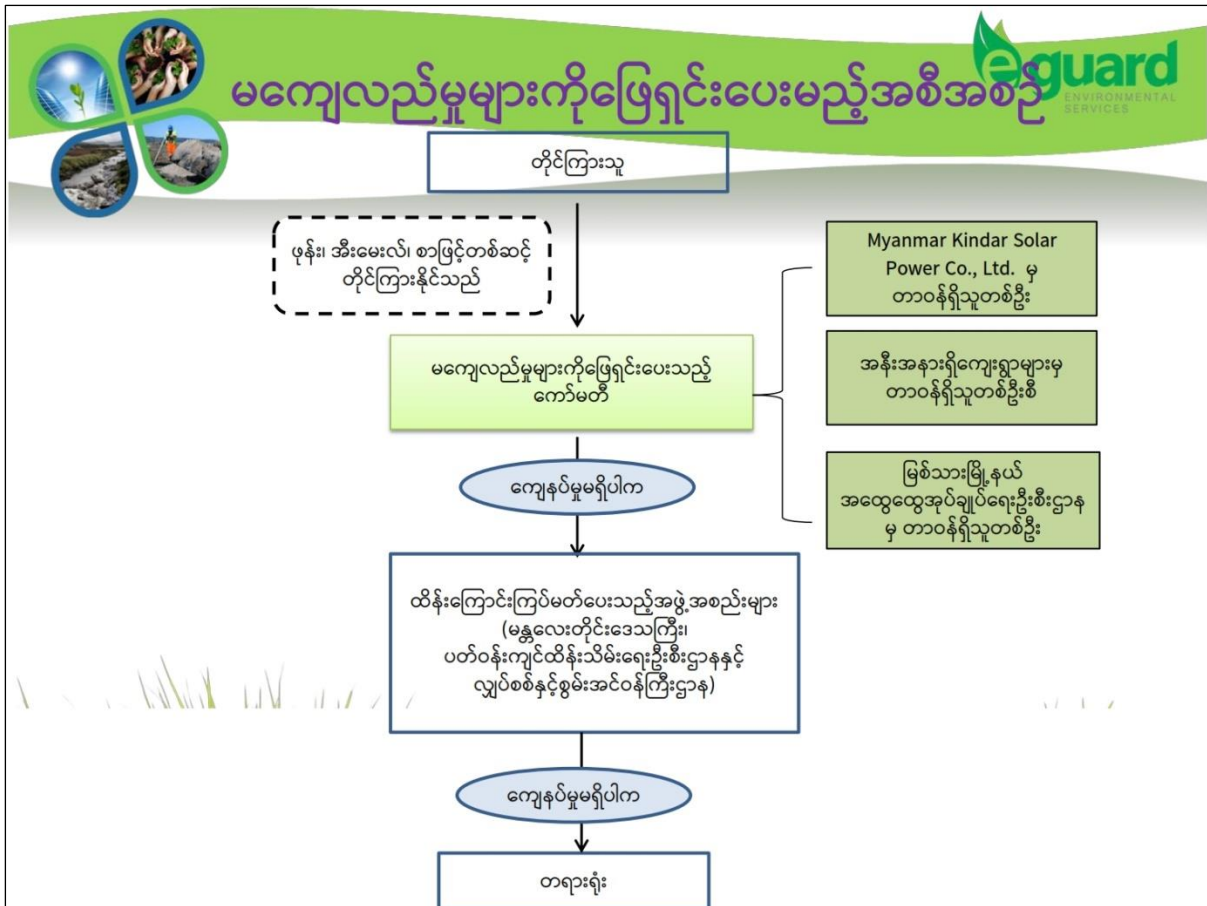
လျှော့ချရန်နည်းလမ်းများ

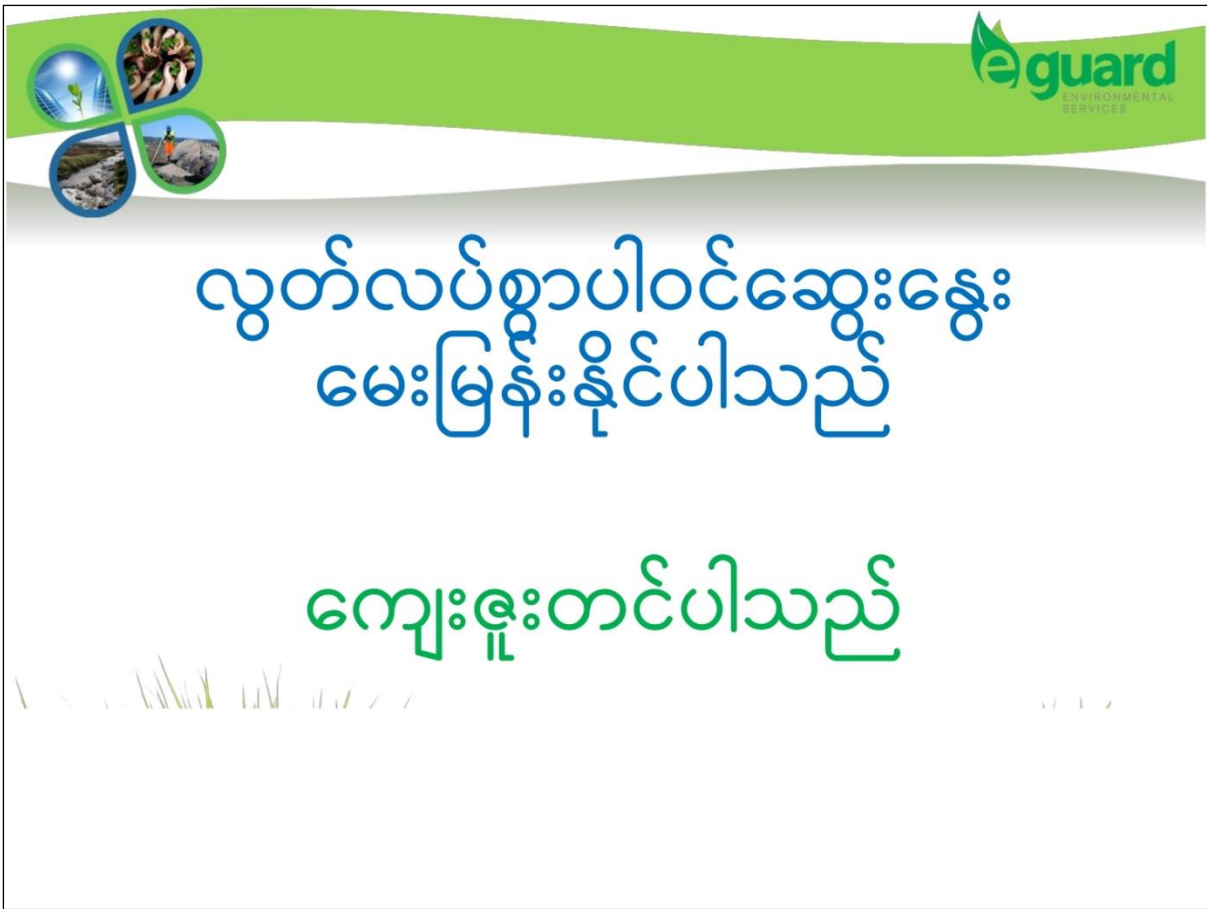
- ရပ်ရွာလူထုအား ဆူညံသံနှင့်တုန်ခါမှုမြင့်မားသော လုပ်ငန်းများဆောင်ရွက်ပါက ကြိုတင်အသိပေးခြင်း
- စီမံကိန်းခြံစည်းရိုးနှင့် ဓာတ်အားလိုင်းများတွင် သတိပေးဆိုင်းဘုတ်များ တပ်ဆင်ခြင်း
- စီမံကိန်းအတွင်းလုံလောက်သောအိမ်သာများ၊ လက်ဆေးကန်များထားပေးခြင်း
- မီးသတ်ဆေးဗူးများ၊ မီးသတ်ပိုက်များ၊ မီးသတ်ရေကန်များတပ်ဆင်ထားရှိခြင်း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


အခြားအစီအစဉ်များ

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







Appendix 9 Water quality's laboratory results result



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)





ISO 9001:2015 Cert. No.688283

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

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WATER QUALITY TEST RESULTS FORM


Client _____	Myanmar Kintar Solar Power Project (EMP)
Nature of Water _____	Surface Water
Location _____	ကြည်တိုင်ကျေးရွာ၊ မြစ်သားမြို့နယ်၊ မန္တလေးတိုင်း။
Date and Time of collection _____	22.5.2022
Date and Time of arrival at Laboratory _____	23.5.2022
Date and Time of commencing examination _____	24.5.2022
Date and Time of completing _____	29.5.2022


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)	7.2 mg/l	
Chemical Oxygen Demand (COD)	32 mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	8 mg/l	
Cyanide (CN)	mg/l	0.07 mg/l
Zinc (Zn)	mg/l	3 mg/l
Copper (Cu)	mg/l	2 mg/l
Silica (SiO ₂)	mg/l	

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

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

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

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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



Laboratory Technical Consultant: U Saw Christopher Maung
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WATER QUALITY TEST RESULTS FORM

Client Myanmar Kintar Solar Power Project (EMP)
 Nature of Water Surface Water
 Location ကြည်တိုင်ကျေးရွာ၊ မြစ်သားမြို့နယ်၊ မန္တလေးတိုင်း၊
 Date and Time of collection 22.5.2022
 Date and Time of arrival at Laboratory 23.5.2022
 Date and Time of commencing examination 24.5.2022
 Date and Time of completing 29.5.2022

Results of Water Analysis

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

pH	7.6		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	20	NTU	5 NTU
Conductivity	292	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	24	mg/l	
Total Dissolved Solids	146	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	0.1	ppt	

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

Tested by

Signature: Zaw Hein Oo

Name: B.Sc (Chemistry),
Sr.Chemist

Approved by

Signature: Soe Thit

Name: B.E (Civil) 1990,
Technical Officer
ISO TECH Laboratory

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ORIGINAL

Report No. : 22520-00057
 Job Ref. : 5000127
 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 : Myanmar Kintar Solar Power Plant Project
 Myit Thar Township, Mandalay Region (Surface Water)
 Sampling Date & Time : 22-May-22 & 11:00
Sample Condition : Glass and Plastic Bottle at Chilled
Lab Code : W-059
Date Sample(s) Received : 23-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)	1.29	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 *****

M.C.Z

SGS (Myanmar) Limited

 (Thin Thin Maw)
 Laboratory Manager

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Member of SGS Group(SGS SA)

Appendix 10 Equipment & Material Supply (Offshore and Onshore) Portion

MYANMAR KINDAR 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	12935595	China		
2	7308.9099.00	PV support bracket	kg	1032000	2071021	China		
3	8504.4040.00	String inverters	U	190	774717	China		
4	8504.3429.00	Packaged Transformer	U	10	861615	China		
5	8537.1092.00	Communications cabinets (Including switch, anti PID control device, data management device, etc)	kg	3600	52218	China		
6	8544.4929.00	PV cable (including accessories)	kg	30000	903667	China		
7	8544.6012.00	Power cable (including accessories)	kg	162600	333979	China		
8	8544.6012.00	Control cable (including accessories)	kg	4800	343848	China		
9	8504.2329.00	Main transformer(including accessories)	U	2	337179	China		
10	8535.9010.00	Neutral point equipment (including neutral isolating switch, current transformer, lightning arrester, etc.)	KG	2000	141359	China		
11	8535.9010.00	132kV line - transformer group interval	kg	72000	204572	China		
12	8535.9010.00	132kV outdoor equipment (132kV lightning arrester, attached discharge recorder, outdoor voltage transformer)	kg	14400	55977	China		
13	8537.1099.00	Distribution Equipment	KG	8000	302974	China		
14	8543.7090.00	Reactive power compensation device	U	3	313682	China		
15	8504.2192.00	Station service electricity equipment	U	10	138684	China		
16	9015.8090.00	environmental monitoring instrument	U	2	30701	China		
17	8507.2099.00	Valve-controlled sealed lead-acid battery	U	3	26958	China		
18	9030.3390.00	Fault recording cabinet	U	2	17651	China		
19	8543.7090.00	Supervisory system	U	6	347471	China		
20	8535.9090.00	Protection system	kg	4800	251073	China		
21	8517.6230.00	Communication system	U	6	291510	China		
22	8504.4011.00	DC and uninterruptible power supply system	U	6	80678	China		
23	9015.8090.00	Power prediction system equipment	U	2	32236	China		
24	8415.1010.00	Heating and ventilation system equipment	U	3	39632	China		

EMP Report for 30 MW Myanmar Kindar Solar Power Project

25	8424.1090.00	Fire fighting equipment	U	3	72780	China		
26	8531.1020.00	Fire alarm system	U	3	126945	China		
27	8537.1099.00	Centralized control access device	kg	2400	26693	China		
28	8421.2122.00	sewage treatment equipment	U	2	68910	China		
29	8517.6230.00	Meeting system	U	24	261095	China		
30	8517.6230.00	Internet equipment	U	24	261095	China		
31	8537.2090.00	step-up substation equipment	KG	50000	257740	China		
32	3917.3999.00	Carbon threaded pipe	kg	7200	8099	China		
33		Hot-dip galvanized steel pipe				China		
33.1	7306.3099.00	Hot-dip Galvanized steel pipe	kg	24000	19628.1	China		
33.2	7308.9099.00	Hot-dip Galvanized pipe pile	kg	96000	176652.9	China		
34	3816.0090.00	Cable Fire Retardant Coating	kg	2400	7940	China		
35	8544.4299.00	Panel ground wire	kg	960	5773	China		

36	3918.9019.00	Anti-static computer room floor	kg	7200	25787	China		
37	7228.7090.00	Galvanized Angle steel	kg	20400	36874	China		
38	3816.0090.00	Fire blocking material	kg	3600	9906	China		
39	3208.9090.00	Antirust paint	kg	36	317	China		
40	8535.4000.00	Framing lightning rod	kg	12000	101039	China		
41	8413.8119.00	Water supply and drainage equipment	U	2	26176	China		
42	8537.1099.00	Lighting distribution box	kg	960	7845	China		
43	8544.1900.00	Electric wire	kg	480	5231	China		
44	8502.2010.00	Diesel generator	U	2	53799	China		
45		132kV transmission line				China		
45.1	7318.1590.00	Anchor bolt	kg	20400	25167	China		
45.2	7308.2019.00	Transmission line tower	kg	504000	461388	China		
45.3	7614.1090.00	Steel core aluminum stranded wire	kg	36000	209722	China		

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45.4	8538.9019.00	Connector clamp for transmission lines	kg	7200	58722	China		
45.5	8546.1000.00	Line insulator	kg	30000	83889	China		
Total					23,288,110			

Kindar Power Plant Equipment and Material Supply (Onshore Supply) Portion						
ITEM M/L	NAME & SPECIFICATION	Qty	Unit	Estamated Price	Origin of Country	Remark
				USD		
1	borehole pump	1	Unit	12086	Myanmar	
2	Electric shrinkage gate	1	Unit	15382		
3	crawl	1	Unit	260388		
4	Sand & stone&brick&concrete , etc	1	Unit	1094494		
5	Pile foundation reinforcement	1	Unit	220396		
6	concrete iron	1	Unit	52187		
7	Hot galvanized steel pipe	1	Unit	92289		
8	Ground flat steel	1	Unit	170845		
9	light distribution box	1	Unit	43947		
10	diesel generator	1	Unit	148322		
11	wire	1	Unit	32961		
12	Supply and drainage equipment	1	Unit	126349		
13	PVC PIPE	1	Unit	21974		
14	portable dwellings	1	Unit	109868		
15	Temporary facilities	1	Unit	141913		
16	Epidemic prevention materials	1	Unit	91634		
17	Other sporadic materials	1	Unit	231465		
				2866500		