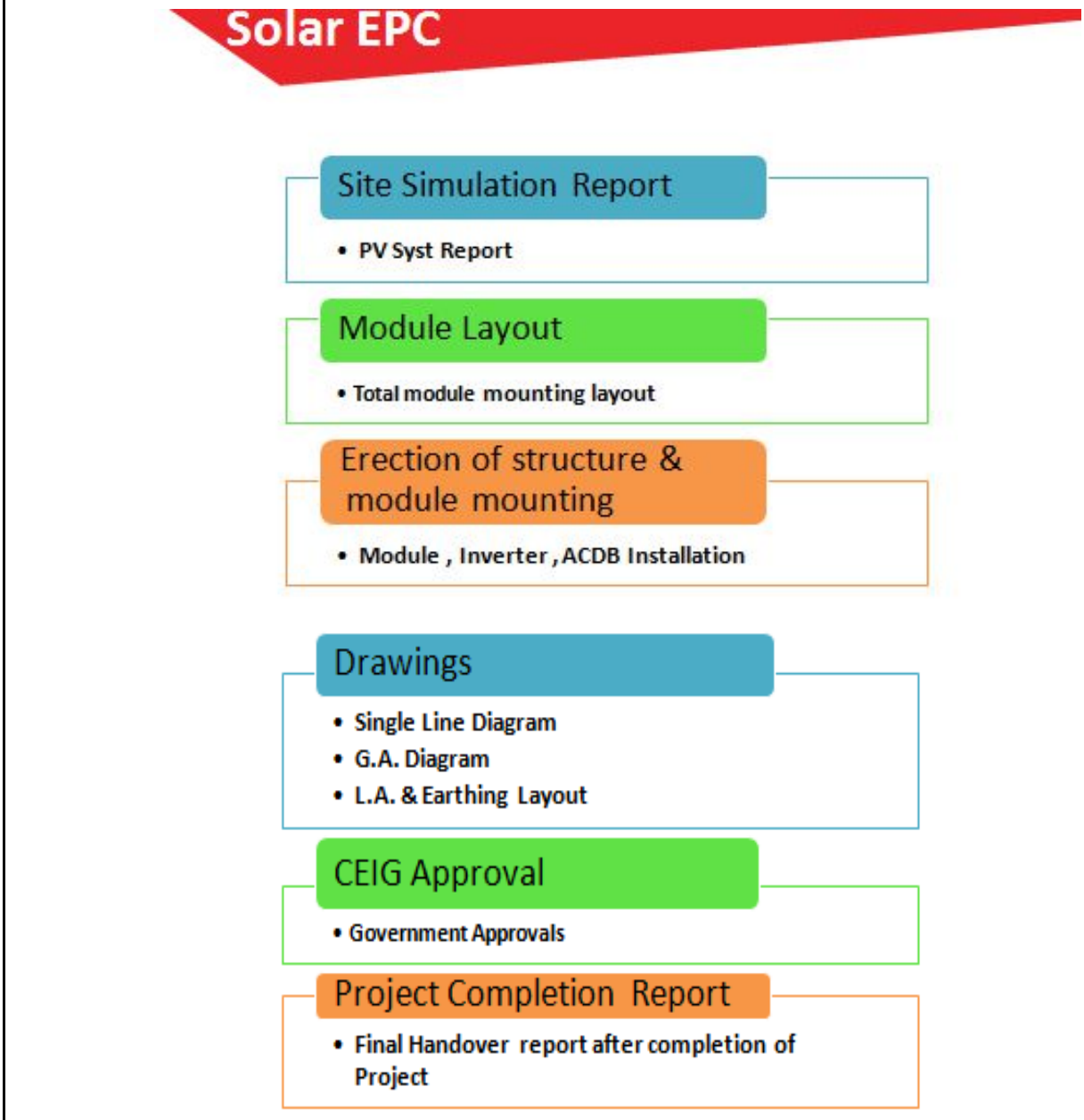
Solar EPC


Solar EPC
Site Simulation Report
• PV Syst Report
Module Layout
• Total module mounting layout
Erection of structure & module mounting
• Module , Inverter , ACDB Installation
Drawings
• Single Line Diagram
• G.A. Diagram
• L.A. & Earthing Layout
CEIG Approval
• Government Approvals
Project Completion Report
• Final Handover report after completion of Project

Site Simulation Report

Grid-Connected System: Simulation parameters

Project : **ETL B1/3**

Geographical Site	**Chakan**		Country	**India**
Situation	Latitude	18.74° N	Longitude	73.81° E
Time defined as	Legal Time	Time zone UT+5.5	Altitude	446 m
	Albedo	0.20		
Meteo data:	**Chakan**	Synthetic		

Simulation variant : **MACHINE SHOP 2**

	Simulation date	04/09/19 18h15
	Simulation for the	**1st year of operation**

Simulation parameters	System type	**No 3D scene defined, no shadings**		
2 orientations	tilts/azimuths	15°/0° and 15°/180°		
Models used	Transposition	Perez	Diffuse	Perez, Meteonorm
Horizon	Free Horizon			
Near Shadings	No Shadings			
User's needs :	Unlimited load (grid)			

PV Arrays Characteristics (2 kinds of array defined)

PV module Si-poly	Model	**Eldora VSP.72.330.05**		
Original PVsyst database	Manufacturer	Vikram Solar		
Sub-array "SOUTH Side"	Orientation	#1	Tilt/Azimuth	15°/0°
Number of PV modules	In series	18 modules	In parallel	36 strings
Total number of PV modules	Nb. modules	648	Unit Nom. Power	330 Wp
Array global power	Nominal (STC)	**214 kWp**	At operating cond.	194 kWp (50°C)
Array operating characteristics (50°C)	U mpp	614 V	I mpp	316 A
Sub-array "NORTH side"	Orientation	#2	Tilt/Azimuth	15°/180°
Number of PV modules	In series	19 modules	In parallel	4 strings
Total number of PV modules	Nb. modules	76	Unit Nom. Power	330 Wp
Array global power	Nominal (STC)	**25.08 kWp**	At operating cond.	22.73 kWp (50°C)
Array operating characteristics (50°C)	U mpp	648 V	I mpp	35 A
Total Arrays global power	Nominal (STC)	**239 kWp**	Total	724 modules
	Module area	**1405 m²**		

Inverter	Model	**SUN2000-50KTL-M0_400Vac**		
Custom parameters definition	Manufacturer	Huawei Technologies		
Characteristics	Operating Voltage	200-1000 V	Unit Nom. Power	50.0 kWac
			Max. power (=>49°C)	55.0 kWac
Sub-array "SOUTH Side"	Nb. of inverters	21 * MPPT 17 %	Total Power	175 kWac
			Pnom ratio	1.22
Sub-array "NORTH side"	Nb. of inverters	3 * MPPT 17 %	Total Power	25 kWac
			Pnom ratio	1.00
Total	Nb. of inverters	4	Total Power	200 kWac

PV Array loss factors

Array Soiling Losses			Loss Fraction	3.0 %
Thermal Loss factor	Uc (const)	29.0 W/m²K	Uv (wind)	2.5 W/m²K / m/s
Wiring Ohmic Loss	Array#1	17 mOhm	Loss Fraction	0.8 % at STC
	Array#2	161 mOhm	Loss Fraction	0.8 % at STC
	Global		Loss Fraction	0.8 % at STC
Serie Diode Loss	Voltage Drop	0.8 V	Loss Fraction	0.1 % at STC

Grid-Connected System: Main results

Project : **ETL B1/3**

Simulation variant : **MACHINE SHOP 2**

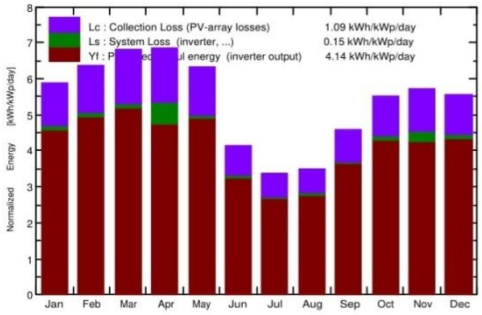
Simulation for the 1st year of operation

Main system parameters				
System type	**No 3D scene defined, no shadings**			
PV Field Orientation	2 orientations	Tilt/Azimuth = 15°/0° and 15°/180°		
PV modules	Model	Eldora VSP.72.330.05	Pnom	330 Wp
PV Array	Nb. of modules	724	Pnom total	**239 kWp**
Inverter	Model	SUN2000-50KTL-M0_400Vac		50.0 kW ac
Inverter pack	Nb. of units	4.0	Pnom total	**200 kW ac**
User's needs	Unlimited load (grid)			

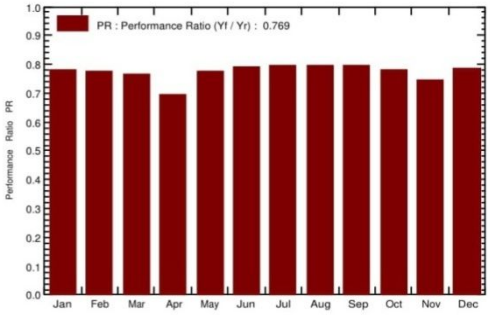
Main simulation results

System Production	**Produced Energy**	**360.8 MWh/year**	Specific prod.	1510 kWh/kWp/year
	Performance Ratio PR	76.93 %		

Normalized productions (per installed kWp): Nominal power 239 kWp



Performance Ratio PR



MACHINE SHOP 2

Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	PR
January	157.5	34.72	24.04	182.4	171.6	34.81	34.04	0.781
February	161.0	36.96	25.03	178.6	168.4	33.89	33.13	0.776
March	200.9	48.36	27.01	211.2	198.7	39.49	38.58	0.765
April	205.8	54.90	27.46	205.3	193.2	38.49	34.01	0.693
May	203.7	65.72	26.75	195.5	183.5	37.10	36.28	0.777
June	130.2	71.70	25.34	123.9	115.3	23.81	23.33	0.788
July	109.1	70.06	24.45	104.8	97.3	20.26	19.86	0.794
August	110.4	69.13	23.90	108.3	100.6	21.02	20.63	0.797
September	134.4	64.50	23.81	137.6	128.4	26.61	26.07	0.793
October	158.4	52.39	25.38	171.4	160.7	32.70	32.01	0.782
November	149.7	38.10	25.54	171.3	161.1	32.72	30.49	0.745
December	146.9	34.41	24.14	172.5	162.3	33.03	32.31	0.784
Year	1868.0	640.95	25.24	1962.7	1841.2	373.94	360.75	0.769

Legends:

GlobHor	Horizontal global irradiation	GlobEff	Effective Global, corr. for IAM and shadings
DiffHor	Horizontal diffuse irradiation	EArray	Effective energy at the output of the array
T_Amb	Ambient Temperature	E_Grid	Energy injected into grid
GlobInc	Global incident in coll. plane	PR	Performance Ratio

Grid-Connected System: Loss diagram

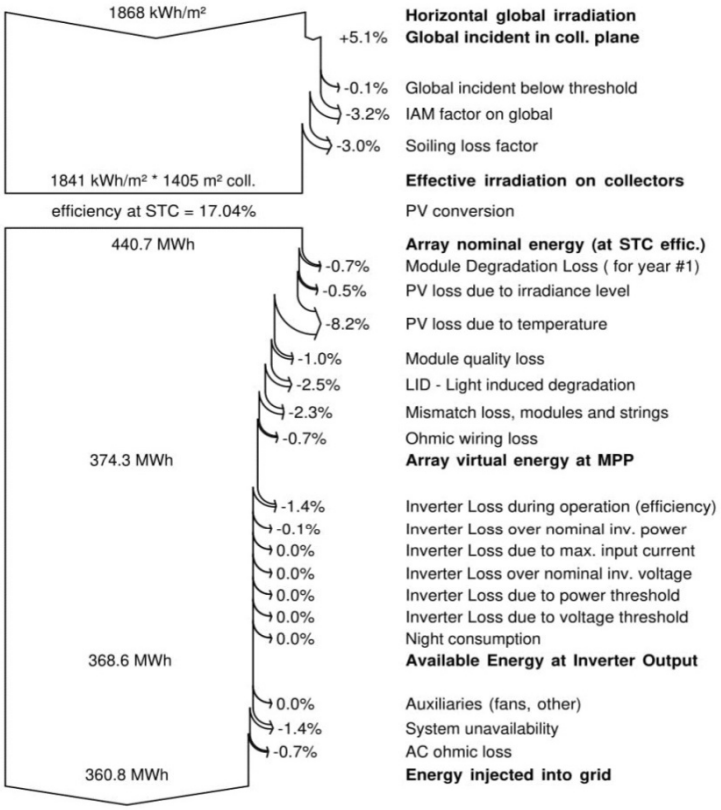
Project : **ETL B1/3**

Simulation variant : **MACHINE SHOP 2**

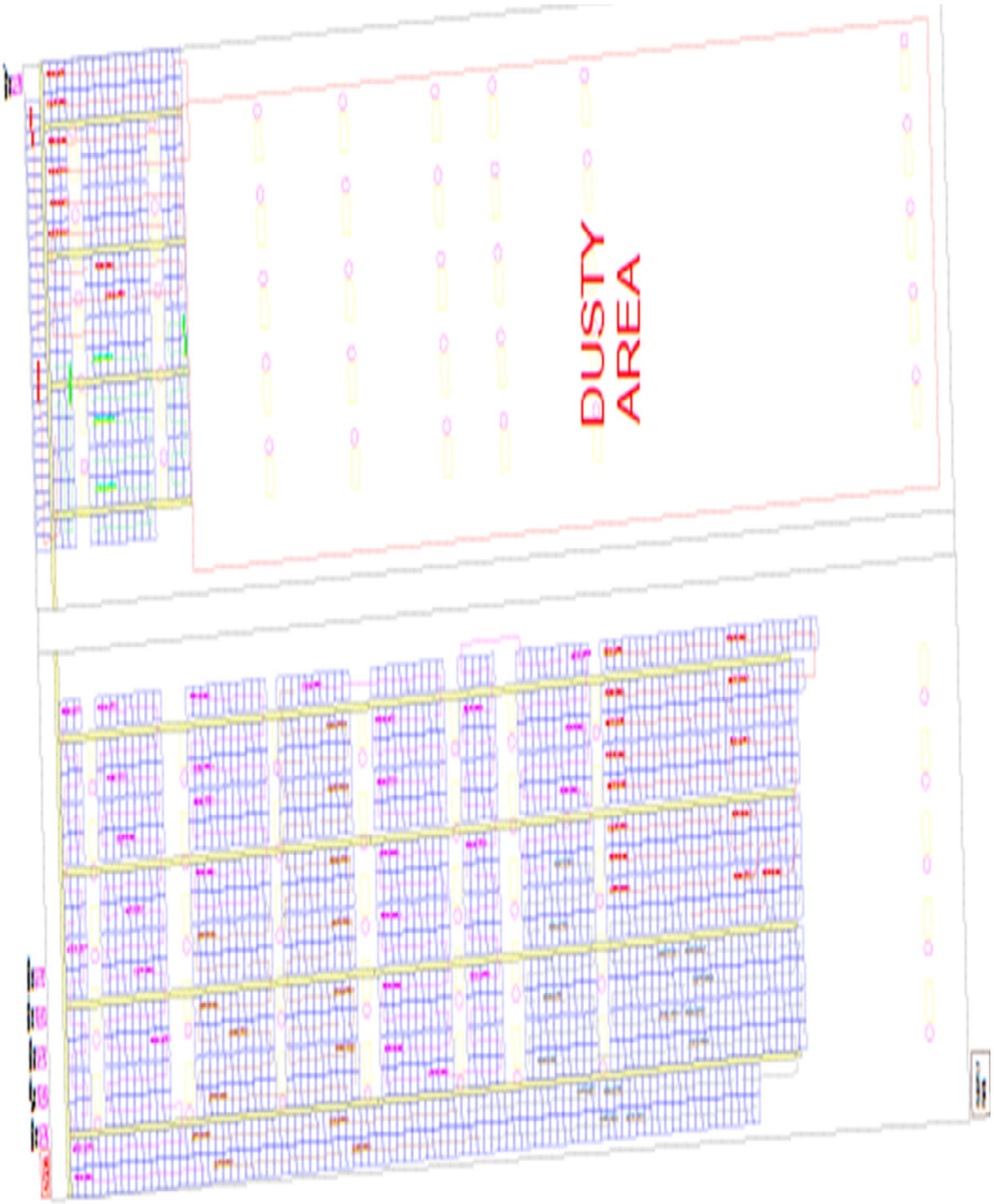
Simulation for the 1st year of operation

Main system parameters	System type	**No 3D scene defined, no shadings**		
PV Field Orientation	2 orientations	Tilt/Azimuth = 15°/0° and 15°/180°		
PV modules	Model	Eldora VSP.72.330.05	Pnom	330 Wp
PV Array	Nb. of modules	724	Pnom total	**239 kWp**
Inverter	Model	SUN2000-50KTL-M0_400Vac		50.0 kW ac
Inverter pack	Nb. of units	4.0	Pnom total	**200 kW ac**
User's needs	Unlimited load (grid)			

Loss diagram over the whole year



Module Layout

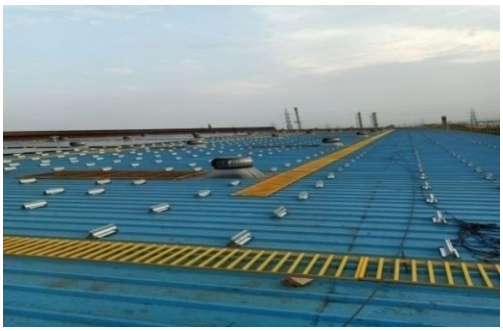


Erection of structure and module mounting

Structure Building

Module Mounting

Railings



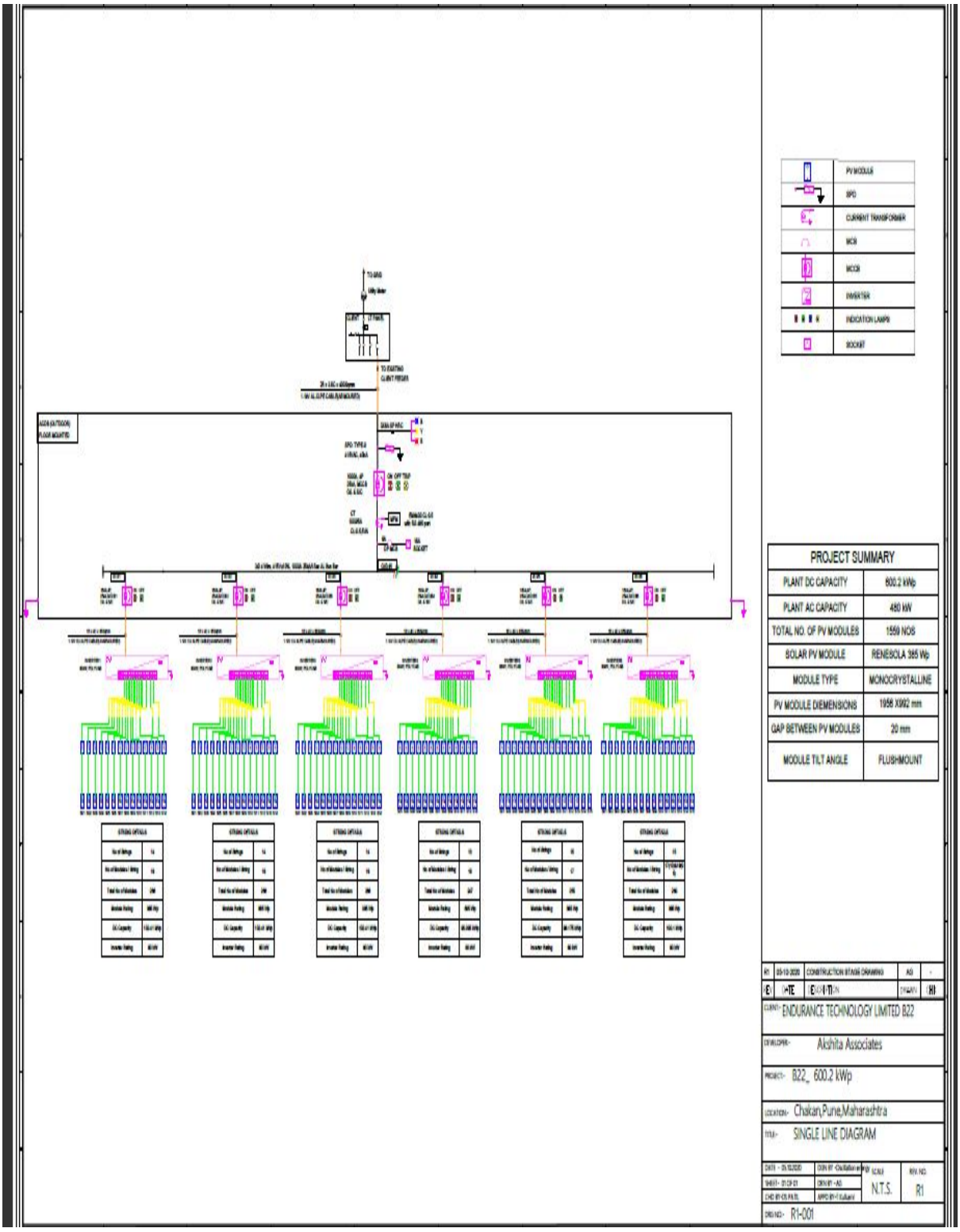
Inverter

Total Installation

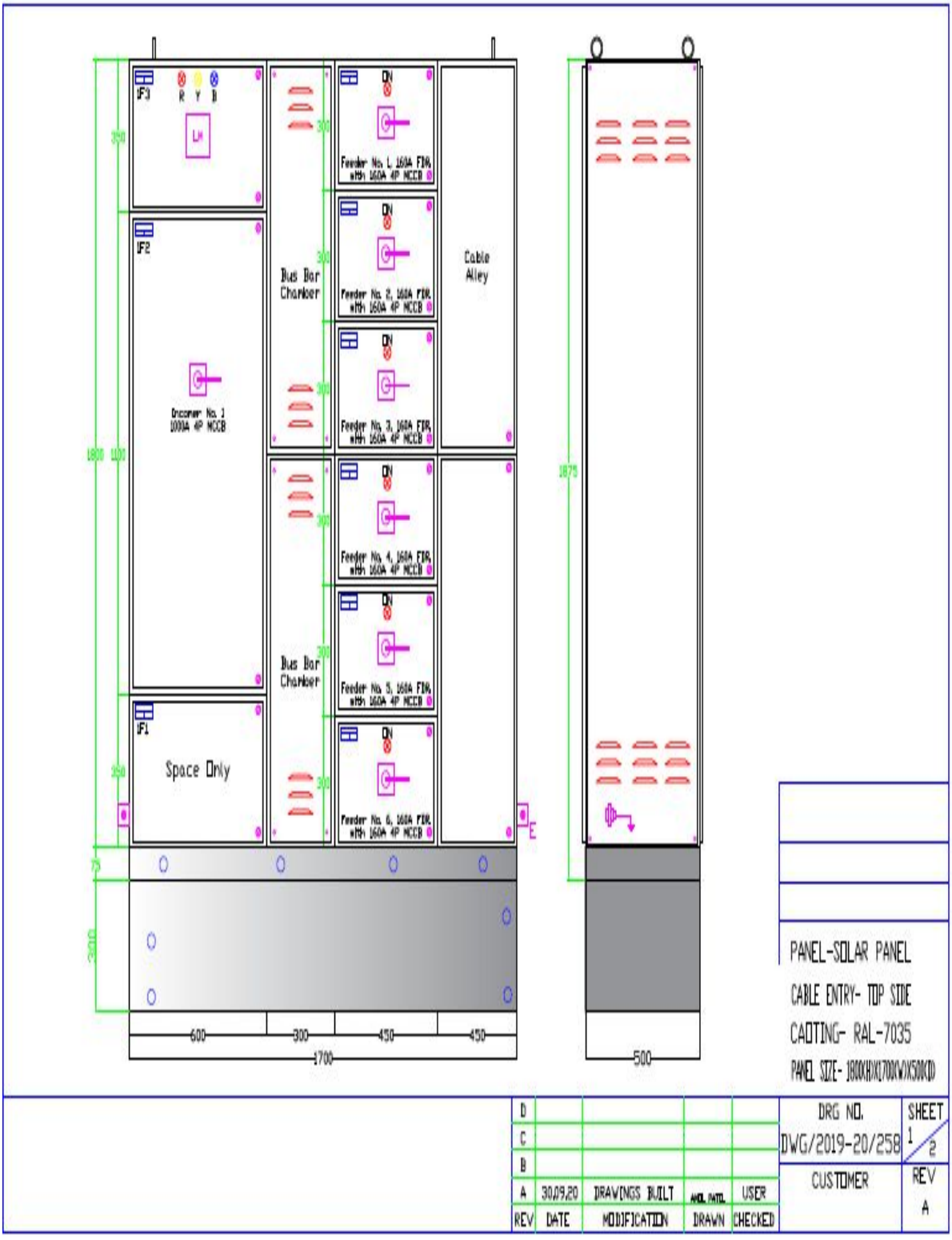
ACDB

Drawings

Single line Diagram



G.A. Diagram



REV	DATE	MODIFICATION	DRAWN	CHECKED
D				
C				
B				
A	30.09.20	DRAWINGS BUILT	AMOL PATIL	USER

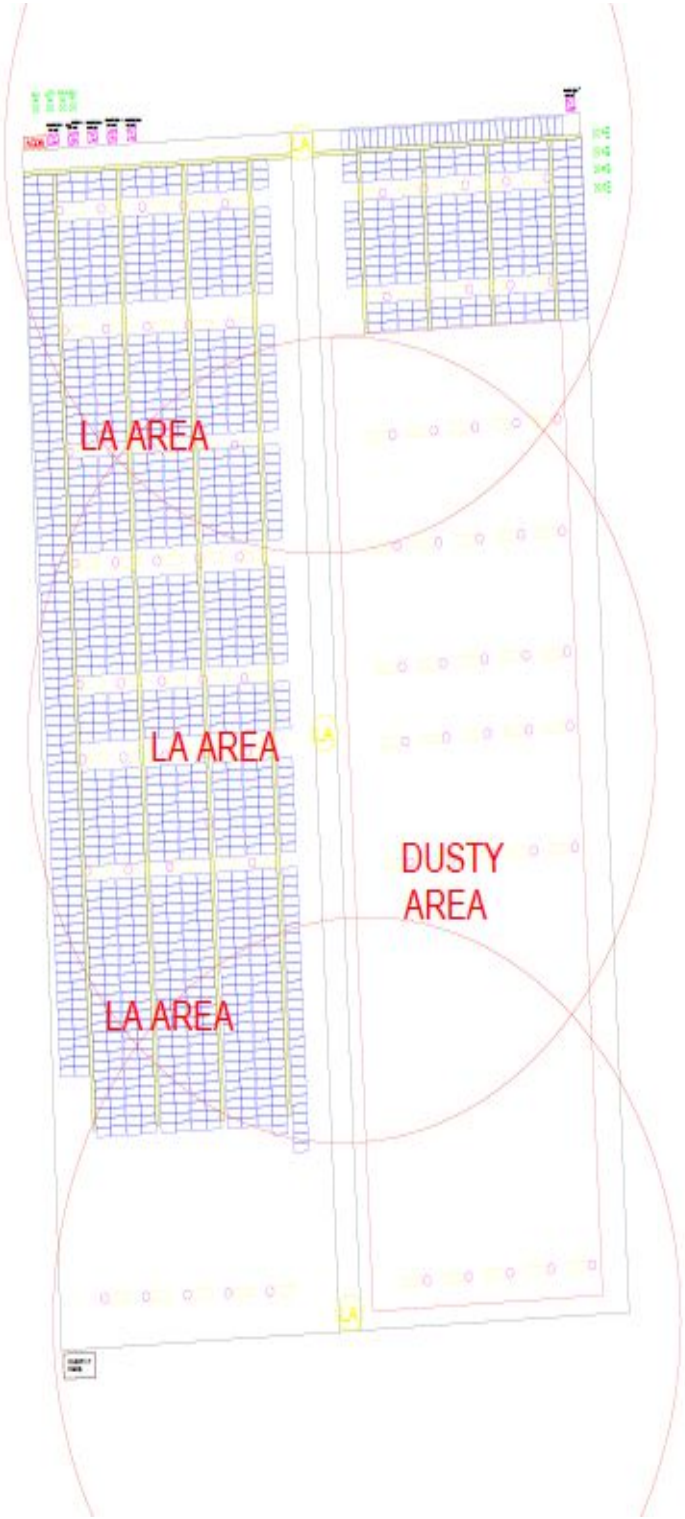
DRG NO. DWG/2019-20/258

SHEET 1 / 2

CUSTOMER

REV A

L.A & Earthing Layout



CEIG Approval

१८५१५४१४०४३१२FF२१३३६

महाराष्ट्र शासन

अध्ीक्षक अभियंता, औरंगाबाद

उद्योग, ऊर्जा व कामगार विभाग

अधीक्षक अभियंता, औरंगाबाद अधीक्षक अभियंता प्रादेशिक विद्युत निरीक्षण मंडळ, शिवदास ट्रेड सेंटर, प्लॉट नं.११,हॉल नं.४,पहिला मजला, त्रिमुर्ती चौक,जवाहर कॉलनी, हेडगेवार हॉस्पीटल रोड, औरंगाबाद-४३१००५

E-mail ID : seaurangabad.nrg-mh@gov.in
Permission No.: ०SE५१५०००५०३२०१९००६९१

दूरध्वनी क्र. : ०२४०-२४८७०४६
दिनांक : ०५/०३/२०१९

प्रति,
ANURANG NARESH CHADRA JAIN ,
ENDURANCE TECHNOLOGIES LTD

विषय :- ENDURANCE TECHNOILOGIES LTD. PLOT NO.२२६/१, येथील २६२ केव्हीए क्षमतेची Industrial कारणासाठी @SubCategoryType विद्युत निर्मिती संच मांडणी कार्यान्वित करण्यास कायमस्वरुपी परवानगी देण्याबाबत.

संदर्भ :-१) नकाशा मंजुरी क्रमांक: १८५१५४१४०४३११E०AA०BE दिनांक: ०१/०३/२०१९
२) M/S ANURANG NARESH CHADRA JAIN यांचे पत्र क्र १८५१५४१४०४३१२FF२१३३६ दिनांक: ०५/०३/२०१९

वरील संदर्भांकित विषयास अनुसरुन वर उल्लेखलेल्या ठिकाणच्या जनित्रसंचमांडणीचे निरीक्षण ह्या कार्यालया मार्फत दिनांक: ०५/०३/२०१९ रोजी करण्यात आले. त्यास केंद्रीय विद्युत प्राधिकरण (विद्युत पुरवठा व सुरक्षा संबधी उपाय योजना) विनियम २०१० चे विनियम ३२ अन्वये कार्यान्वित करण्याची कायमस्वरुपी परवानगी याव्दारे खालील अटींच्या अधीन राहून देण्यात येत आहे.

१) विद्युत कायदा २००३ व केंद्रीय विद्युत प्राधिकरण विनियम २०१० (व सुधारीत विनियम २०१५ मधील तरतुदींचे सुरक्षिततेच्या दृष्टीने काटेकोर पालन करावे.
२)जनित्रसंचमाडणीतील बदल देखभाल व दुरुस्ती केंद्रीय विद्युत प्राधिकरण विनियम २०१० चे विनियम २९ अन्वये परवानाधारक विद्युत ठेकेदार/प्राधिकृत व्यक्तीमार्फतच करण्यात यावी. यात दुर्लक्ष केलेले आढळल्यास त्यास आपण सर्वस्वी जबाबदार राहाल याची नोंद घ्यावी .
३)जनित्र निर्मित वीज उत्पादनाची नोंदवही विहीत नमुन्यात ठेवावी.
४) नियमित परतावे व विद्युत शुल्क मुदतीत भरणे जनित्र धारकास बंधनकारक आहे.
५) विद्युत निरीक्षकाच्या पूर्व परवानगी शिवाय सदर संचमांडणीत कोणताही फेरबदल करु नये अन्यथा सदर परवानगी आपोआप रद्द होईल याची नोंद घ्यावी.
६) सदर संचमांडणी ६ महिन्यात कार्यान्वित न केल्यास ग्राह्य राहणार नाही.
७) विद्युत संचमाडणीच्या प्राप्त चाचणी अहवालानुसार त्याच्या सत्यतेची जबाबदारी मे.म.ठे.क्र VEDANT ENERGY SOLUTIONS LLP , ३२३०१ म.प.क्र ५३०९६ या विद्युत ठेकेदाराची राहील
८) प्रत्यक्ष जोडभार/ वापरानुसार नियंत्रक स्विचगिअर रिलेचे सेटिंग करुन घेणे बंधनकारक राहील.
९) जनित्र वापर- कॅप्टीव्ह / त्रयस्थ पक्ष वापर

Signature valid
Digitally Signed by ASHOK GANPATI KANASE
Date:05-03-2019 11:44:25

Project Complition Report

Project Completion Report

Project Name	Shree Pressings L15 MIDC Waluj Aurangabad.
Project Capacity	150 KWp DC
Project Commissioning Date	08 Aug 2020

Purpose:

The purpose of the project is to install Solar PV power project, and synchronize the output to the local grid to meet the self-electricity requirement

Project Scope:

Scope	Remark
Designing of the Solar PV project	Completed
Supply of Solar inverter, Module mounting structure, AC & DC Cables, ACDB,AC & DC Switchgear, Protection Device, Earthing material, Lighting Arrestor, Solar Energy Meter	Completed
Erection of the project	Completed
Commissioning of the project	Completed
Installation of Zero Export Controller	Not Applicable
Operation & Maintenance Contract Signed	Not Signed

Feedback

Objective	Satisfactory Level (Excellent/Good/Average/Poor)
Quality of Product	
Workmanship	
Timeline management	
No Leakage from Roof	

Sign – off:

By signing this report we agree to the completion of the **150 KWp** Solar PV project in all respect, and found it to be satisfactory.

For Shree Pressings

Authorized Signatory

For Akshita Associates

Authorized Signatory