SUNGROW

Clean power for all

GRID TIE SOLAR INVERTER

Presented by

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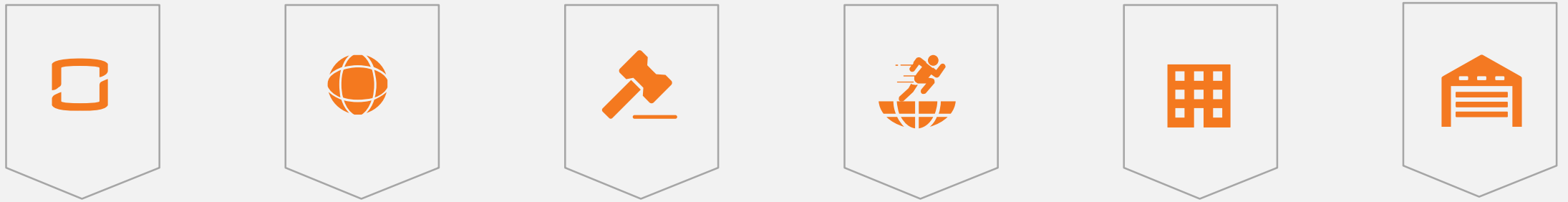
About Sungrow

The World's Most Bankable Inverter Brand

- **No.1** supplier in financed projects
- **100%** bankable

Source : BloombergNEF

SUNGROW
Clean power for all



1997

Founded by University Professor Cao Renxian

2006

Expanded to the Global Market with Products Installed Internationally

2011

Listed on Shenzhen Stock Exchange

2015

Secured #1 Position of Global Market Share

2018

Opened the Company's First Factory Outside China in India

2019

Became the First Inverter Company to Hit 100GW

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17.1GW

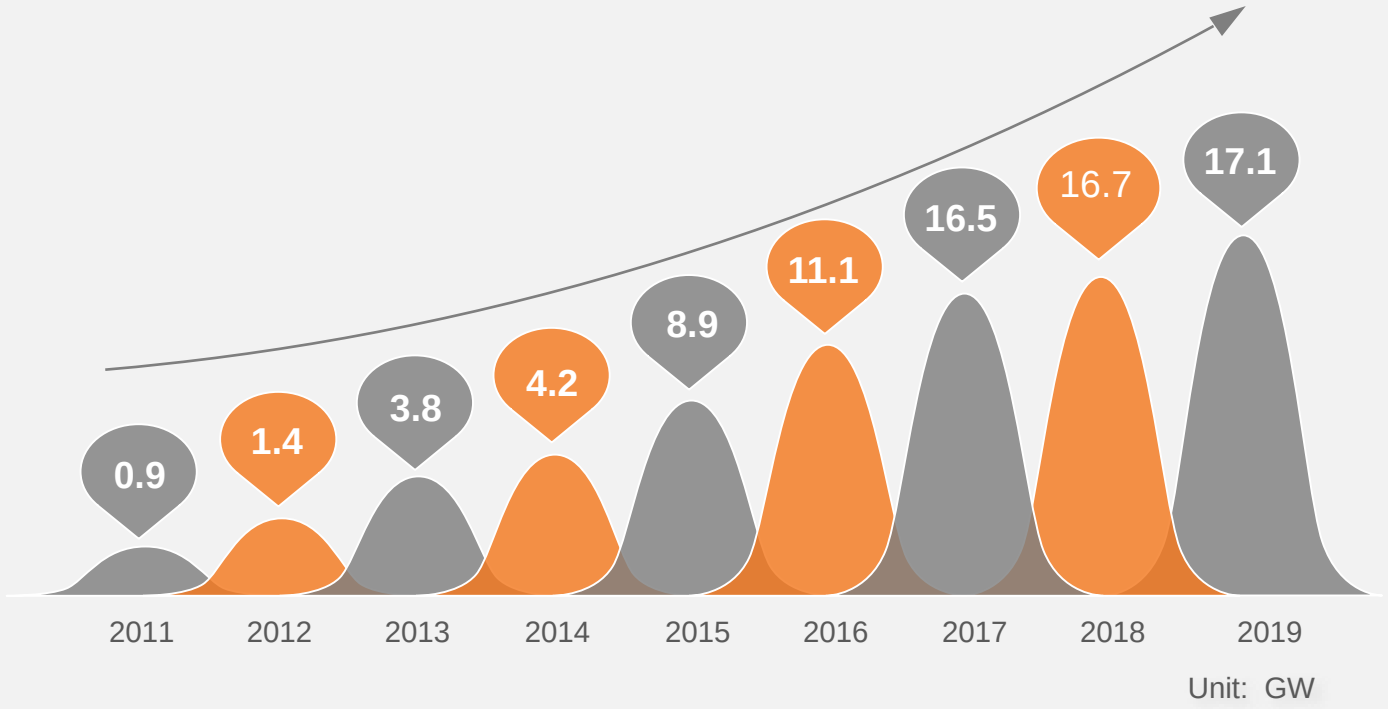
Shipments Hit in 2019

Domestic 8.1GW, International 9GW

100GW+

Accumulated installations

By the end of 2019



50 GW / Year
Global Production Capacity

China Factory
47 GW / Year
ESS 6 GW / 6GWh

India Factory
3 GW / Year

About Sungrow/ India Manufacturing Unit

3GW Annual Production capacity

Catering to Indian and Global Market

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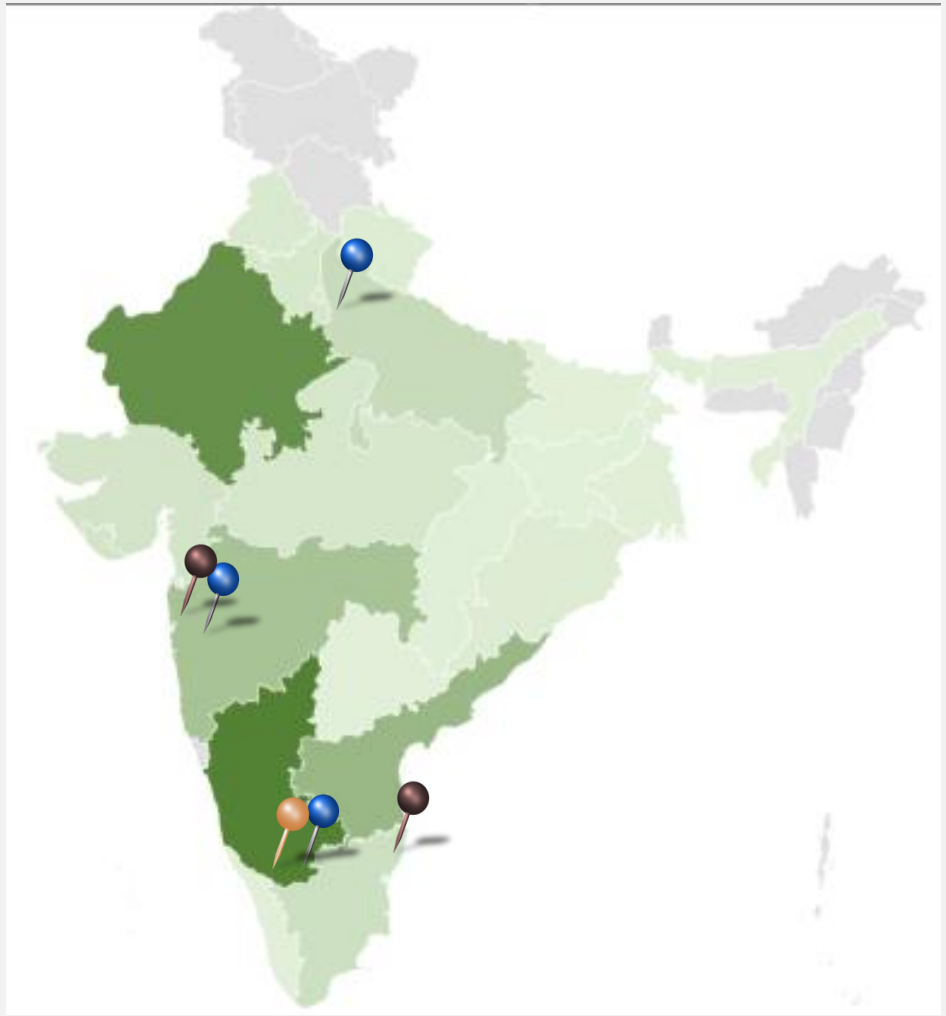
$73 M
Invested in R&D in 2018

40%+
Proportion of technical R&D personnel

2000+
Patent applications accumulated

NO.1
Holder of patents in the industry

Sungrow in India/ Presence & Milestones



- Branch Offices (Gurugram, Mumbai, Bengaluru)
- Manufacturing Facility (Bengaluru)
- FTWZ Warehouse (Chennai, Mumbai)

8 GW+

Order closure

5+

Years of successful performance

12,000+

Inverters installed

22+

States

Contents

APPLICATIONS & CHALLENGES

Applications of the Residential Inverter

Residential rooftop

Dispersed users

PV plant capacity
2 - 20kW in general

Grid voltage
220V/380V
230V/400V

Investment mode
Self-investment

C&I Application Scenarios

- Commercial and Industrial Roof

- Plants Features

PV plant capacity

Industrial and commercial: ≤5MW

On-grid mode

Energy Bills reduced
Self consumption
Full on-grid

Client Premises

High safety

Challenges

Challenges
High ROI Driven
Dispersed users, Difficult Installation and O&M
Low EMI, Safety First

Inverters

High Yield & High Reliability

High efficiency:

High reliability:

High yield: Adapt to challenging grid conditions, maximum energy yields.

Easy O&M

Easy installation: Light weight, plug and play terminals.

Easy commissioning via APP; Easy O&M: easy connection with the plant monitoring platform for remote troubleshooting and parameter setting.

High Safety

Lightning protection: Specific for the PV system.

High security: High-precision electric leakage protector.

High power quality: No interference on the client equipment.

Low EMI: Compliance with home appliances standards

INTRODUCTION OF SOLAR PV INVERTERS

Introduction: PV Inverters

Solar PV Inverters come in different form factors like

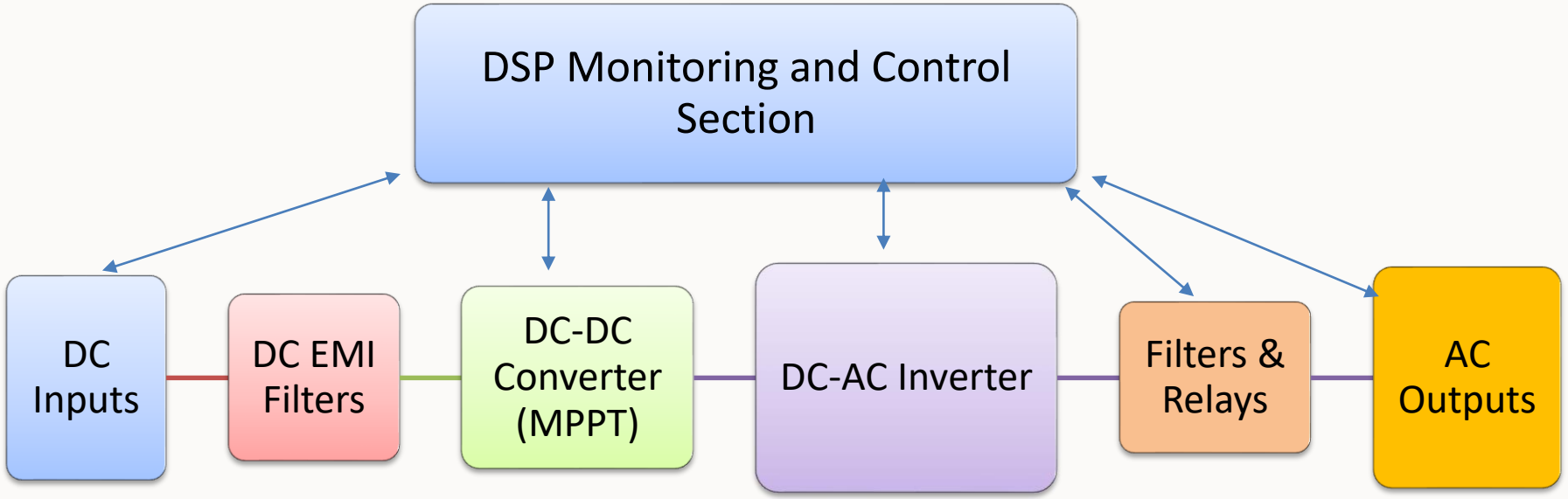
String PV inverter

Indoor Central PV Inverter

Outdoor Central PV Inverter

The internal structure is similar

Block Diagram of string inverter



PV Inverters Interface

Input Interface of Inverter

- Consists of Direct string connectors(MC4) or Busbar for field connections from Combiner boxes

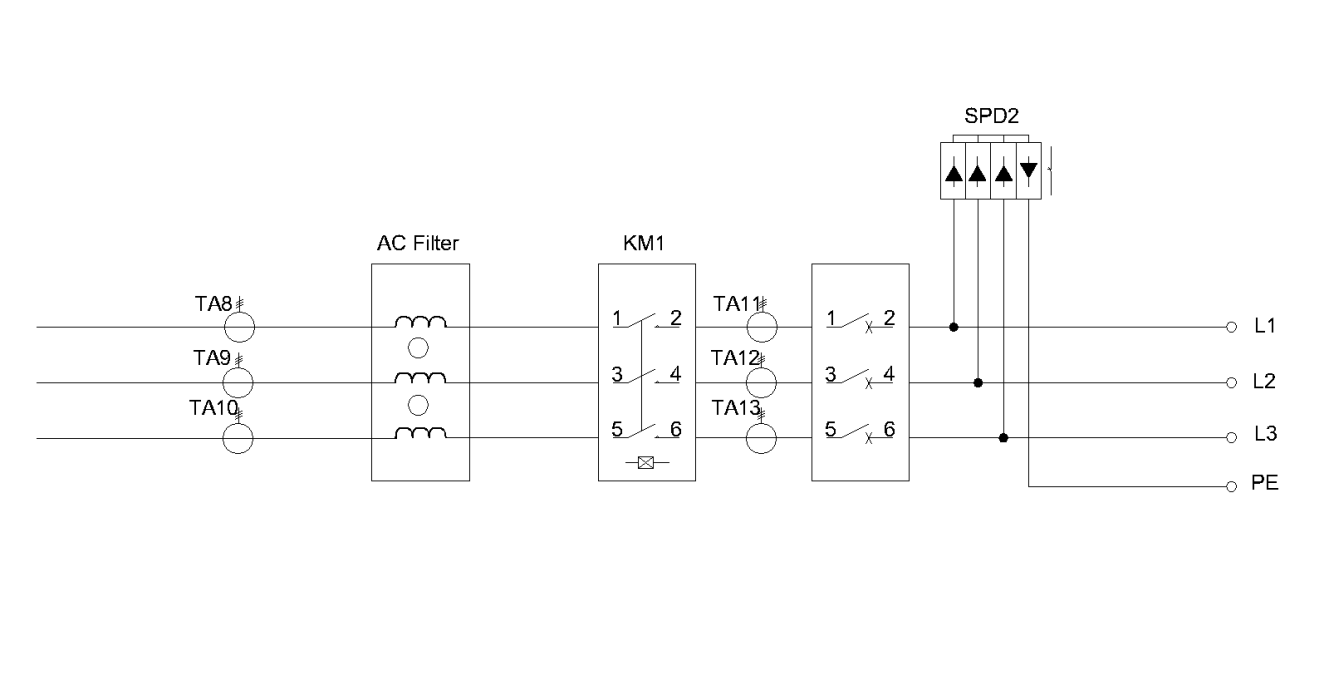
- The input is merged on to a single bus and filtered for EM noise from switching circuit

PV Inverters Interface

Output Interface of Inverter

- Consists of Terminal Blocks/Bus Bar for AC cable connections.

- The output from converter stage is merged on to a single bus and tuned for fundamental frequency via sine wave and EMI filters

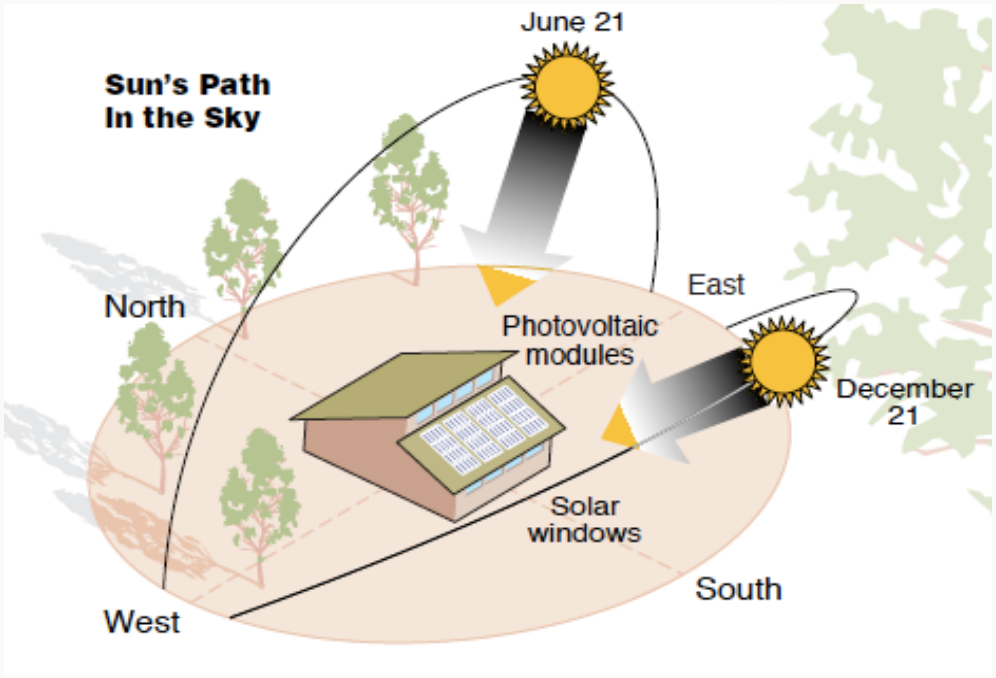


Power Quality and Reliability Standards

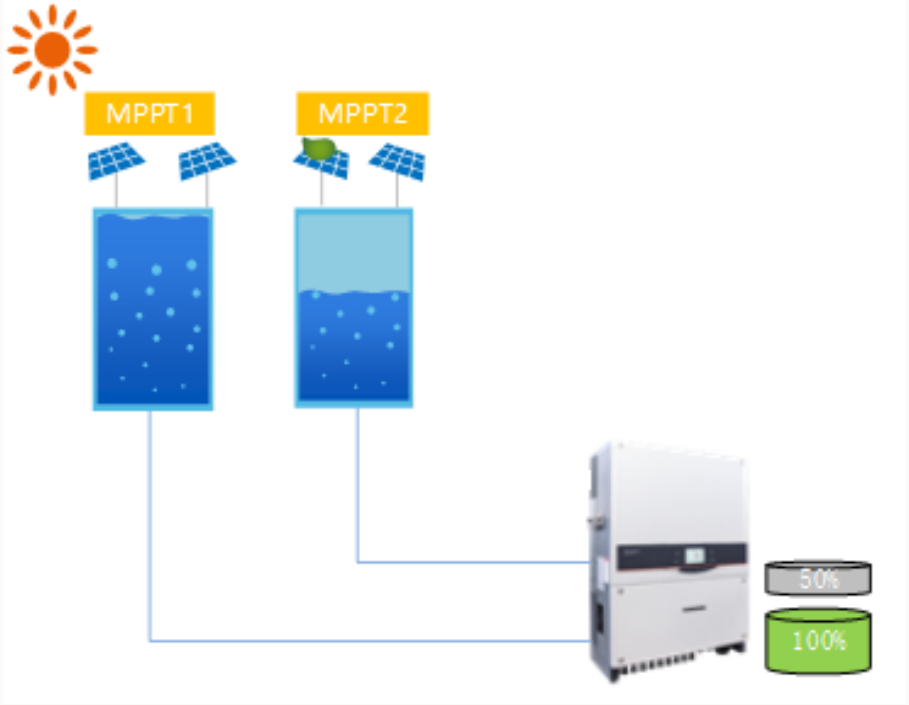
- IEC 61727 Photovoltaic (PV) systems - Characteristics of the utility interface
- IEC 61683 Photovoltaic systems –Power Conditioners – Procedure for measuring efficiency
- IEC 62116-2014 Utility-interconnected photovoltaic inverters – Test procedure of islanding prevention measures
- IEC 62109-1 & 2 Safety of power converters for use in photovoltaic power systems
- IEC 61000 Electromagnetic Compatibility
- IEC 60068 Environmental Testing
- EN 50530 - Overall efficiency of grid connected photovoltaic inverters

INVERTER KEY FEATURES

Inverter Different Features

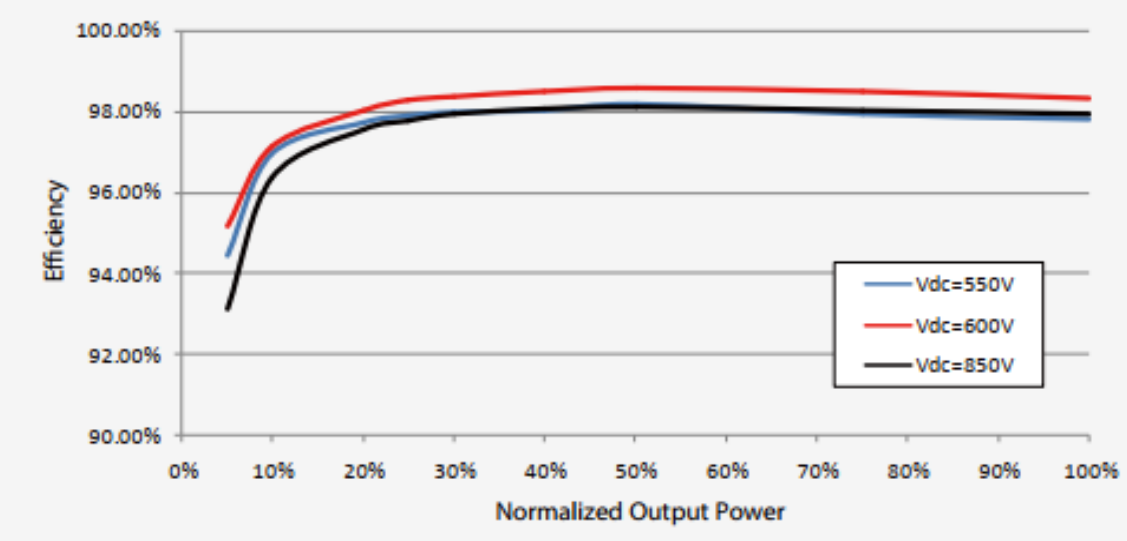


Low start up voltage (250V) enables long generation hour
Voltage range: 200V – 1000V

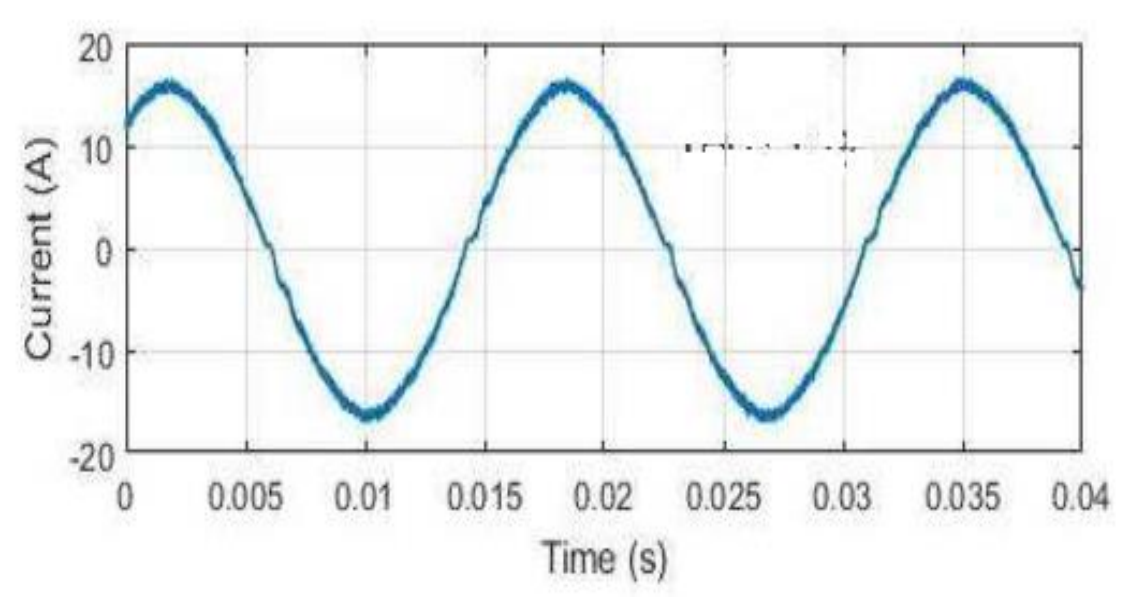


Multi MPPT will keep supplying power to grid during partial shadow

Inverter Different Features

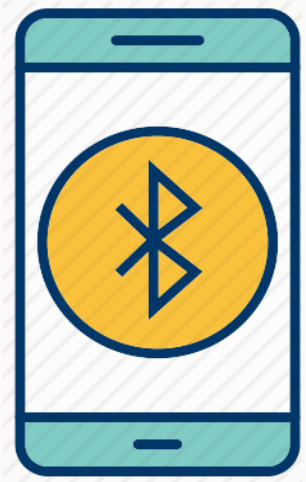


High Euro Efficiency enables conversion loss minimum at any load.



High power quality with <3% current THD

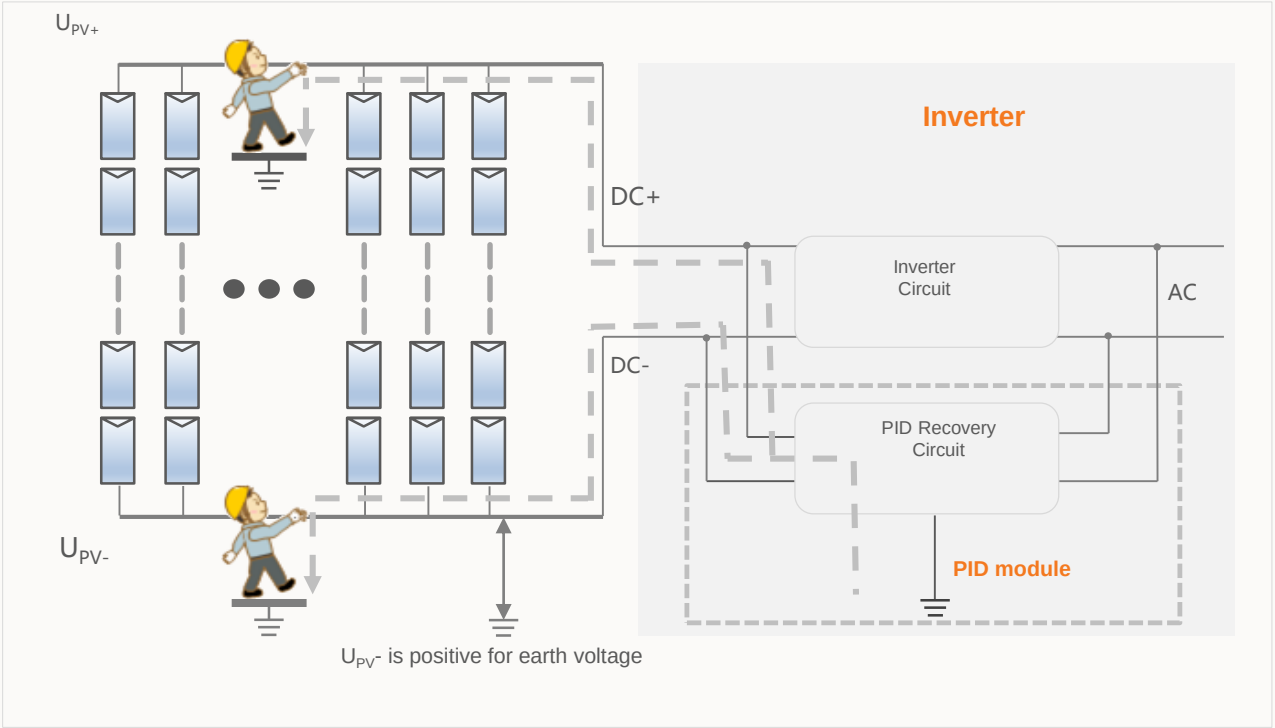
Inverter Different Features



RS485 for remote monitoring;

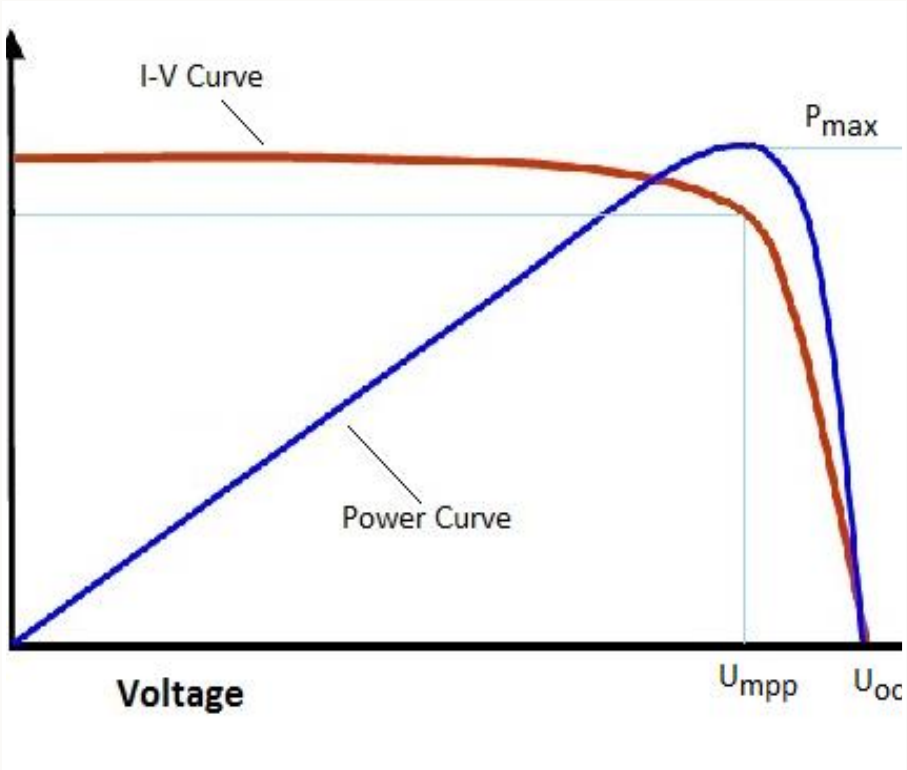
Bluetooth + Mobile app communication for easy monitoring (No requirement of poor quality LCD display and multiple replacements);

Wi-Fi optional



PID recovery solution

MPPT

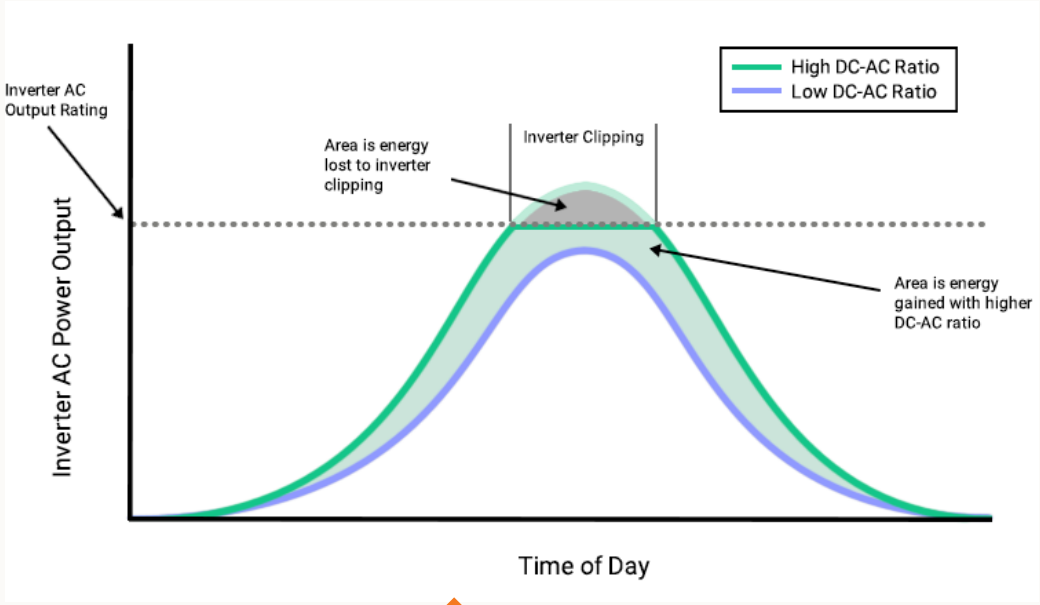


MPPT Converter stage

- Perturbation and Observation

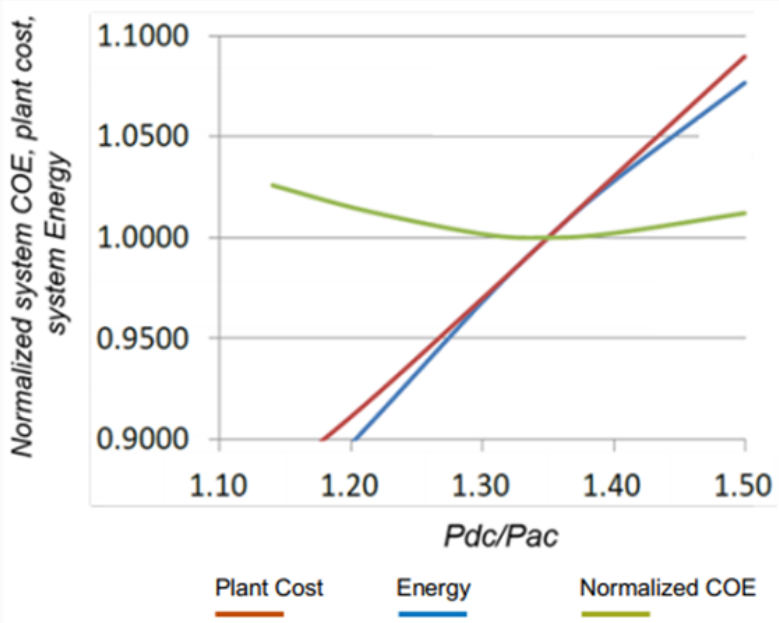
- In the P&O method, the “dP/dV” value of the system is continuously tracked.

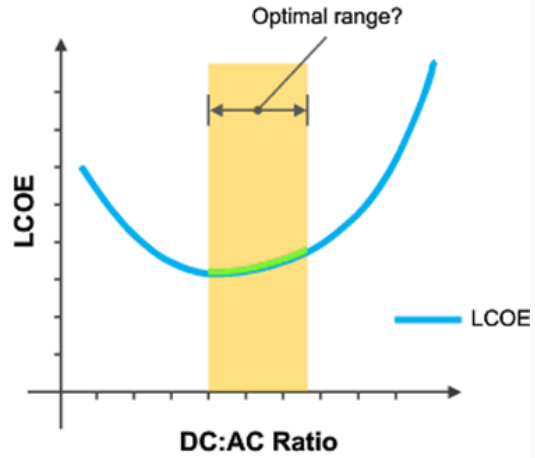
DC/AC Ratio



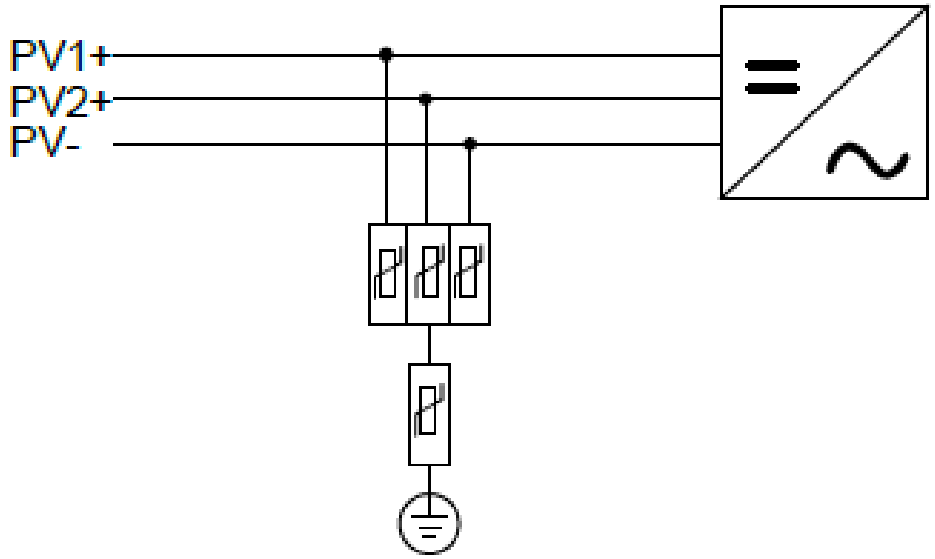
Energy generation throughout the day for different DC/AC Ratio

Effect on LCOE on DC/AC ratio

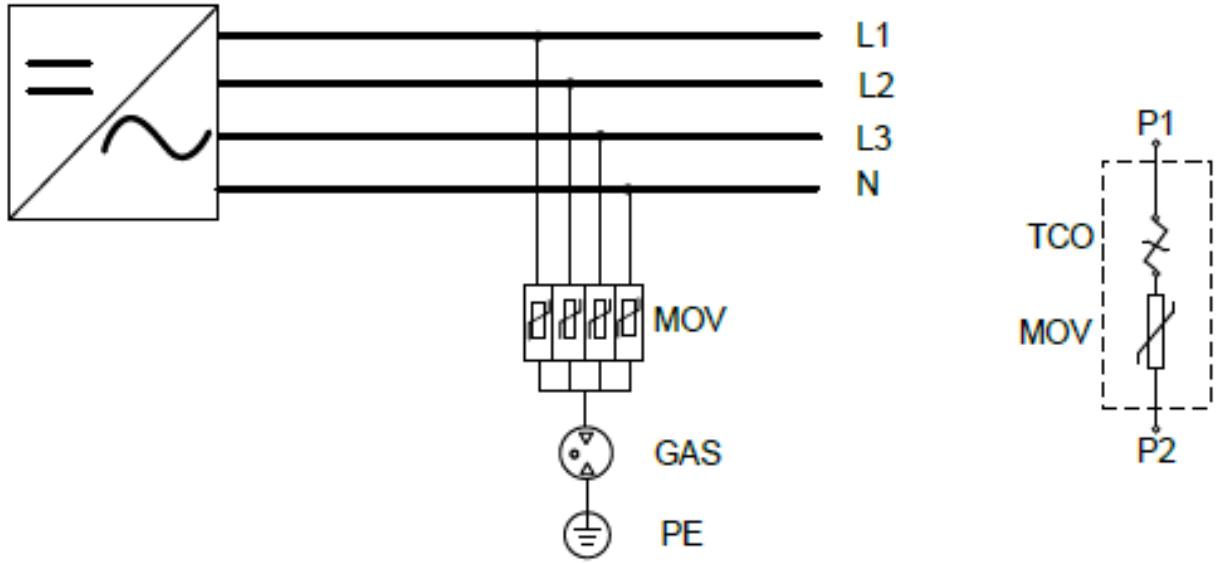




Surge Protection



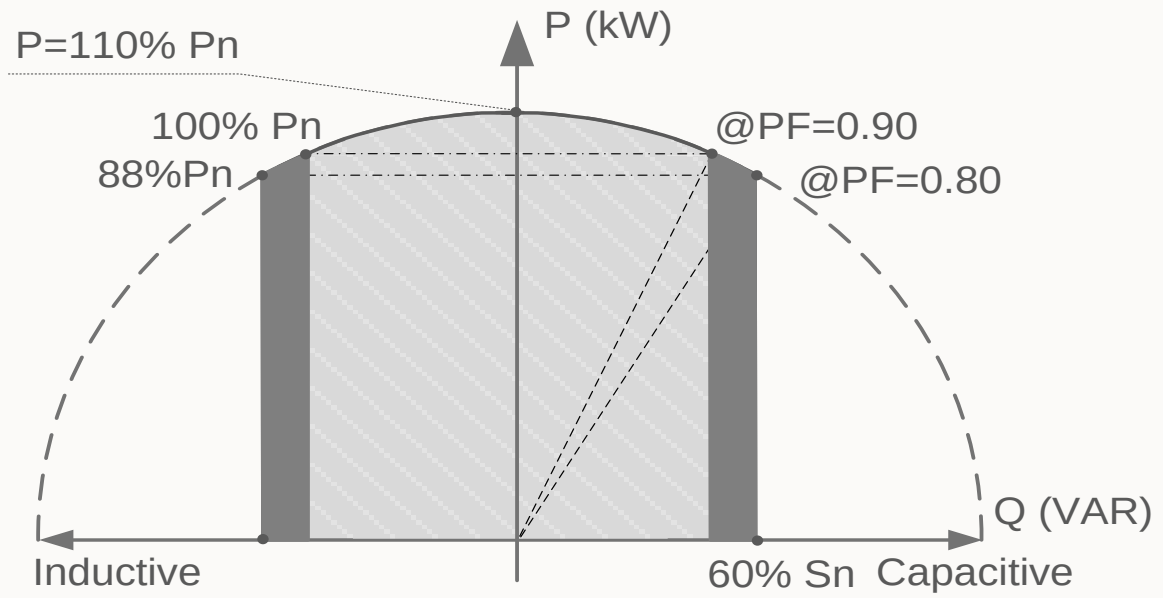
DC Side SPD



AC Side SPD

- Inbuilt Type II Surge Protection device (SPD) both at AC & DC side
- SPD’s conforming International standard IEC61643-11
- Inverter safety is taken care with IEC62109-1&2

Reactive Power Support



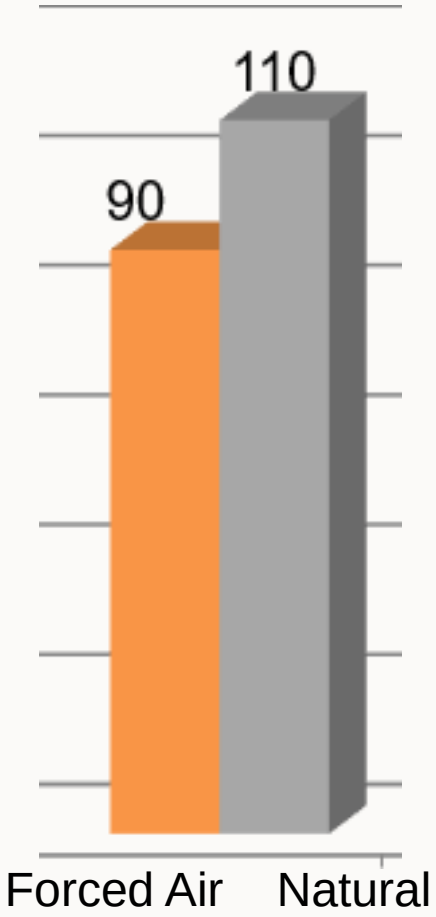
Great reactive capacity

Reactive fast response

Four control modes

Save investment

Forced Air Cooling, Lower temperature, Longer lifetime



IGBT Temp comparison by
Forced Air cooling vs
Natural cooling

The lifetime of electronic devices get halved for every 10℃ increase in temperature

Anti-Corrosion

- C5 Anti Corrosion is the highest grade available and best suitable for highly corrosive, salty, mist environment..

Applicable Environment

- Suitable for areas within 350 meters away from the sea with high temperature, high humidity, high pollutant and high salinity

Place: Japan
On-grid time: 2017

Capacity: 200kW
Features: within 100m away from sea

Weight

Easy Operation, Accessibility

String Inverter

- Whole unit replacement
- Easy & Quick replacement
- More failure points due to more devices

SUNGROW SOLUTION

Products & Solutions / India

Utility

SG5000UD-20

SG3125HV-20

SG250HX-IN

C&I

SG110CX

SG33/50CX

SG15/20 KTL-M

SG10/12 KTL-M

Residential

SG3K-D,
SG5K-D

Monitoring

iSolarcloud

COM100D/A

APP

EyeM4/ Wifi

C&I inverter Specifications

Critical Parameters	SG50CX
Input (DC)	
No. of MPPT * Number per MPPT	5*2
Output (AC)	
Nominal AC voltage	
AC output power	55 kVA @ 40 ℃ / 50 kVA @ 45 ℃
Max. AC output current	83.6A
General Data	
Max, efficiency / Euro. Efficiency	98.7% / 98.4%
Degree of protection & corrosion	IP66 & C5
Dimensions (W*H*D)	782 * 645 * 310 mm
Weight	62kg

SUNGROW- C&I REFERENCES

C&I Applications/ Indian Railways

Gandhi Nagar Railway Station

Multiple projects across various Indian Railway Stations

Total Project Size	**50 MW+**
Inverter capacity	**10kW, 20kW, 33kW, 50kW, 100 kW**
Running since	**2017 - 2019**

C&I Applications/ Metro Station

Vinod Nagar & Kalkaji Metro, Delhi

Project Size	**1.25 MW**
Inverter capacity	**50 kW**
Running since	**2017**

C&I Applications/ Automobile

Ashok Leyland

Total Project Size	**4 MW**
Inverter capacity	**50 kW, 60 kW**
Running since	**2017**

C&I Applications/ Healthcare

AIIMS Bhubaneswar

Total Project Size	**1 MW**
Inverter capacity	**50 kW**
Running since	**2019**

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THANK YOU!

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