

Central Electronics Limited



Integration of Solar from Building to Cities
School of Planning and Architecture(SPA), New Delhi
16 February , 2017





Central Electronics Limited

Established in 1974 with the objective
of

Commercializing Technologies Developed by National Laboratories

- Status : Public Sector Undertaking
(under DSIR, Ministry of Science & Technology, Govt. of India)
- Location : Site 4, Industrial Area,
Saur Urja Marg, Sahibabad, UP
- Registered Office : 781, Desh Bandhu Gupta Road,
Karol Bagh, New Delhi
- 

Products Developed/ Commercialized (Past)



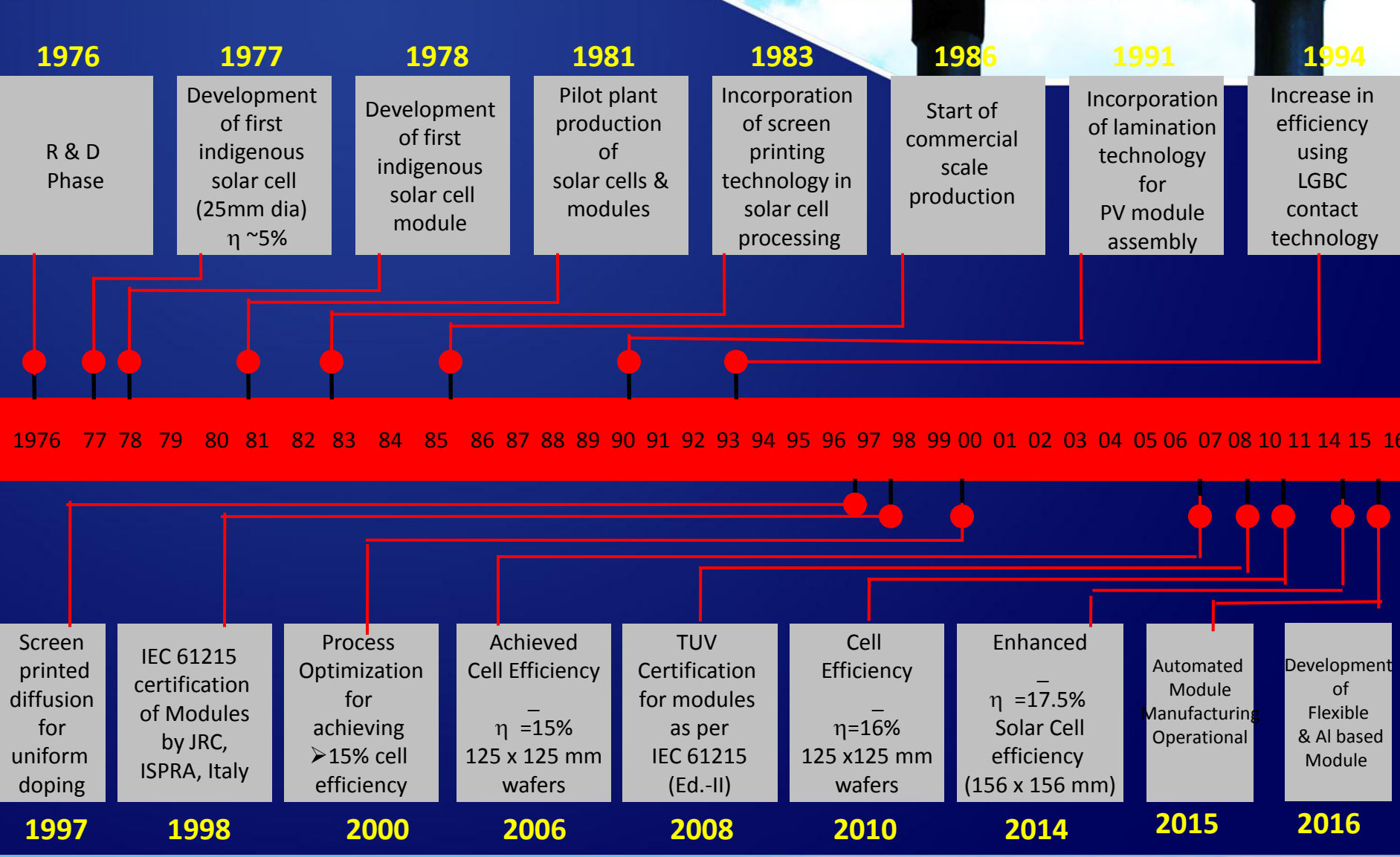
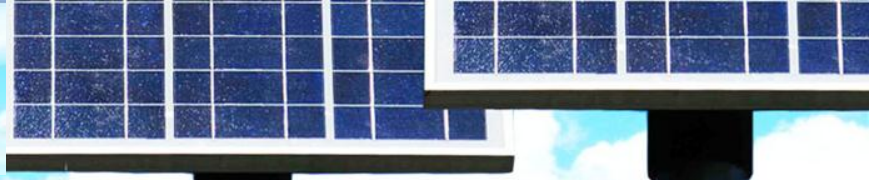
1974	• Ferrite Core	• NPL
1976	• LED/LCD	• NPL/IITD
1977	• Solar Cells (India's First)	• In-house
1977	• Ceramic Capacitors	• ARDE
1978	• Solar Modules (India's First)	• In-house
1979	• Piezo Elements	• ARDE
1979	• Scanning Electron Microscope	• CSIO/IITD
1979	• High Intensity Monochromators	• BARC
1980	• Diffraction Grating	• BARC
1980	• Aerial Camera	• BARC
1981	• Synchronization & Dissolve unit	• CEERI
1981	• Axle Counter	• IITD/IITK
1982	• Hot Box Detection System	• IITD/NPL
1982	• Gas Laser	• IITK/BARC
1982	• IR Spectrophotometer	• NCL
1985	• Color TV	• CEERI
1986	• Signal Averager	• IITK
1989	• PABX	• BARC
1990	• Projection TV	• ITT, Germany
1992	• PV Power Plant (India's First)	• In-house
1998	• RAX	• C-DOT

Present Activities

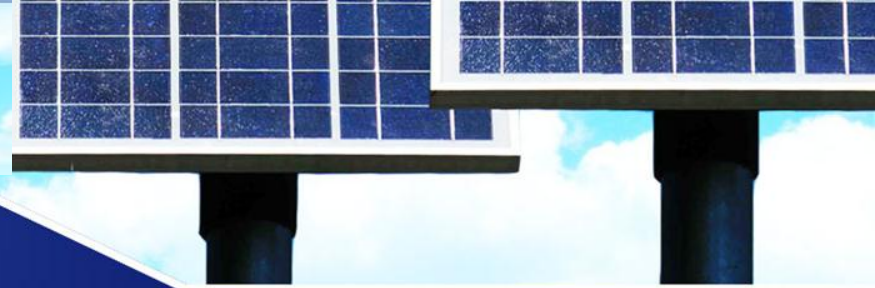


- **Solar Photovoltaics (Plant Capacity Solar Cells: 10 MW, Module: 50 MW)**
 - **Railways Safety & Signaling Systems**
 - **Strategic Electronics - For Defence Application**
 - **Security and Surveillance Systems**
- 

Pioneering Solar Photovoltaics



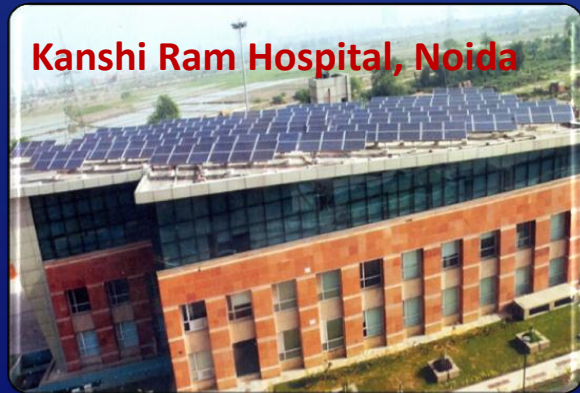
Milestones of SPV



**India First (100 KWp)
Kalyanpur, UP**



Kanshi Ram Hospital, Noida

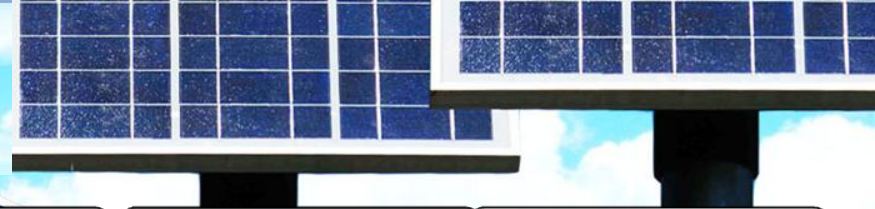


**Flexible Panels
on Railway Coach**



Installations	Year	Capacity (kWp)
India 's First Solar Power Plant, UP	1992	100
India 's First grid connected Solar Power Plant Chennai	1993	10
First International solar plant by CEL, Cuba	1995	10
World's Highest Altitude Solar Plant, Ladakh	1999	30
First & largest grid- tied BIPV Chandigarh	2002	25
First largest off-grid plant Manesar	2006	200
Power plant Afghanistan	2006	15
Metro Bhawan New Delhi	2008	5
President House New Delhi	2010	50
Jantar Mantar New Delhi	2010	9
MNRE (Grid tied+ Standalone) New Delhi	2010	(20+2.5)
Power plant Kargil	2011	2.5 x 30
SSB Himachal Pradesh	2011	100x 4
G B University Noida	2014	500
Kanshi Ram Hospital Noida	2014	500
Greater Noida (IBC Modules) G.Noida	2014	1000
Flexible Panels for Railways Science Express	2015	9

Role in National Development



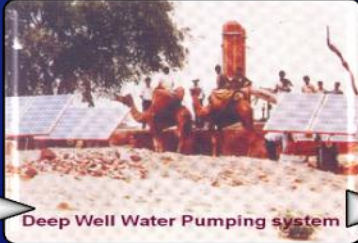
Rural: Electrification



Water Pumping



Entertainment, Street / Parking light & Railways



Offshore Oil platform/Wireless & Military Application



International Efforts

AFGANISTAN

Year: 2002
 101 village electrification
 Indoor Lights: 5200 & for Mosque:100
 Under Ministry of External Affairs (MEA), Govt. of India



Teachers Training Centre (Agha Khan Development)

NEPAL

Village electrification > 14



NAMIBIA

Year: 2000
 Electrification villages: 2
 Home Lighting : 140
 Street Lighting : 40
 Community light: 2
 Refrigeration :2
 Drinking water : 2
 Lanterns :10.



Children Hostel

MYANMAR

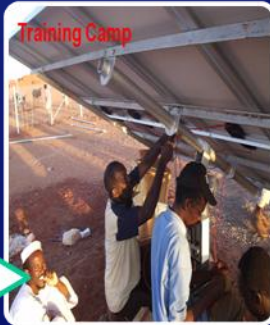
Year: 2002
 Village "Yammyoang" electrification under By-Literal Co-operation Programme of MNES (Govt. of India)



MOZAMBIQUE

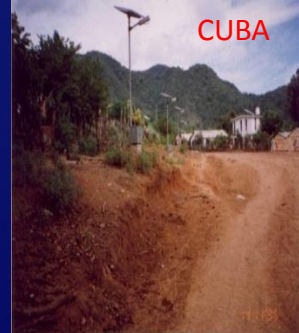


SUDAN

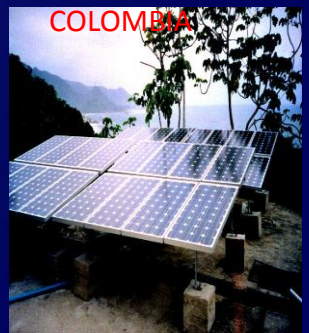


Training Camp

CUBA



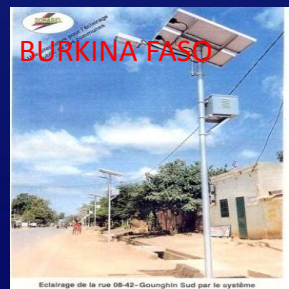
COLOMBIA



MONGOLIA



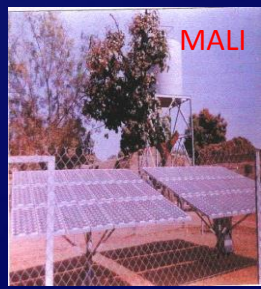
BURKINA FASO



OMAN



MALI



GERMANY



Other Countries:
 Bangladesh, Bhutan, Indonesia, Philippines, Srilanka, Syria, Egypt, Gambia, Libya, Nigeria, Uganda, Zambia, Guyana, Austria

Transfer of Technology: Solar Module



REIL, India

Year=1985-86
Capacity=130KW
(Single silt basis)



SYRIA

Year = 1995
Capacity=250KW
(Single silt basis)
"Indo-Syrian technical co-operation Programme"
Scientific Studies & Research Centre (SSRC), Syria



SUDAN

Year = 2006
Capacity=1 MW
(Single silt basis)

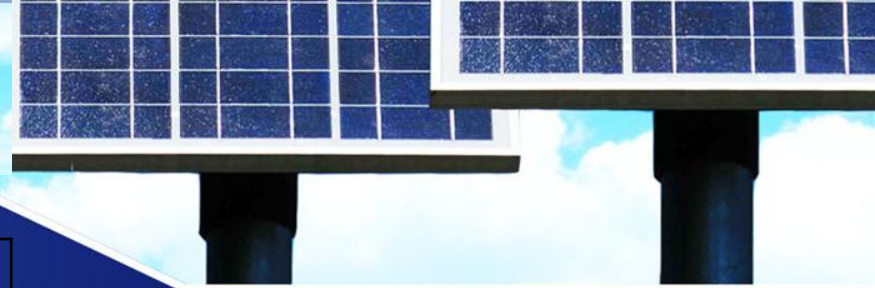


MOZAMBIQUE

Year = 2013
Capacity=5 MW
(Single silt basis)



Man pack Solar Charger for Military Applications



Technical Specifications:

Parameter	Single Panel	Two Panels in Parallel	Two Panels in Series
Open Circuit Voltage (Voc) (V)	20.50	20.50	41.00
Short Circuit Current (A)	1.75	3.50	1.75
Peak Electrical Power (W)	24.00	48.00	48.00
Peak Charging Current (A)	1.50	3.00	1.50
Suitable for Battery	12 V (3 to 7 Ah)	12 V (5 to 12 Ah)	24 V/18V (6 to 7 Ah)

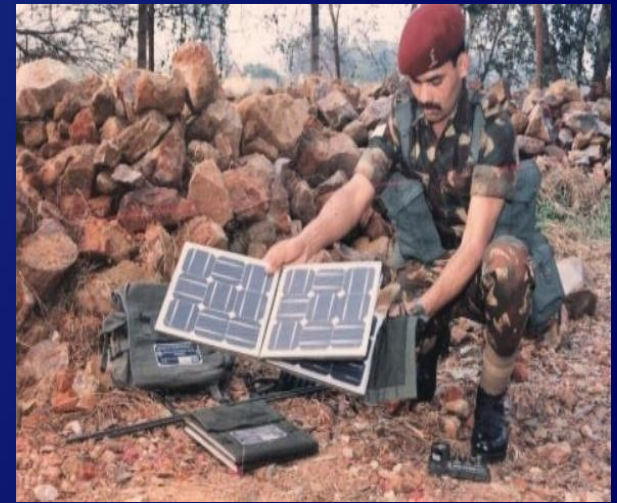
Mechanical:

Panel	Closed (mm)	Open (mm)
Length	280	280
Width	280	1270
Height	50	10

Weight:

Single Panel : 4.0 Kg,

Two Panel : 7.5 Kg

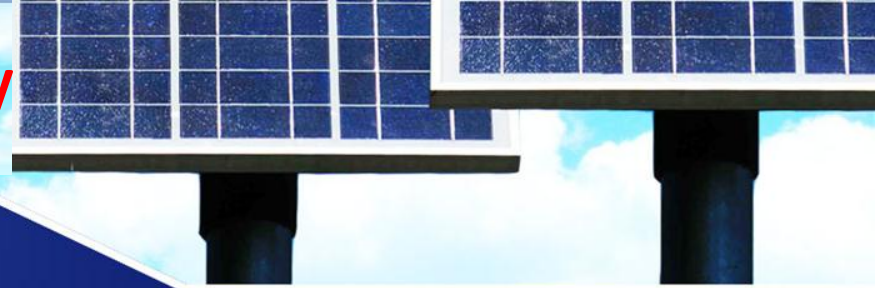




Recent Projects /Activities



New Solar Panel Manufacturing Facility

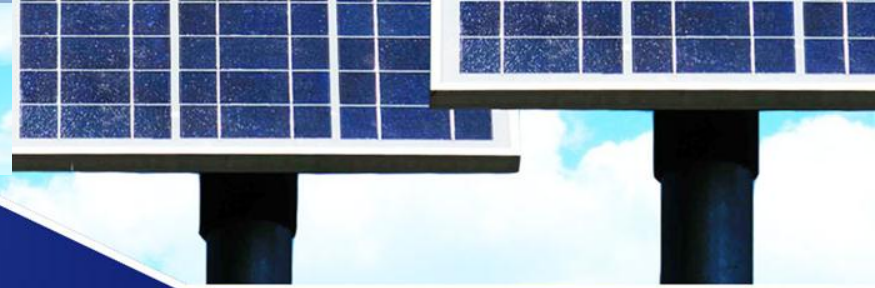


- Installed state-of-the-art automated Panel Manufacturing line
- CII- “Manufacturing Excellence”

Plant



CEL Flexible Modules on "Science Express"



CEL Flexible Modules



Flag off 15/10/2015



IBC Flexible Modules

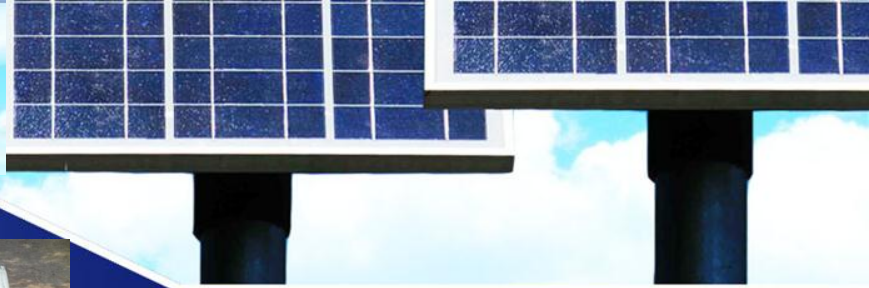


CIGS Flexible Modules

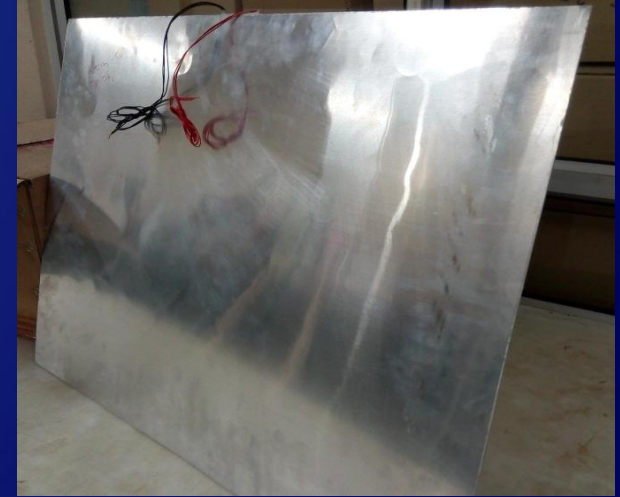
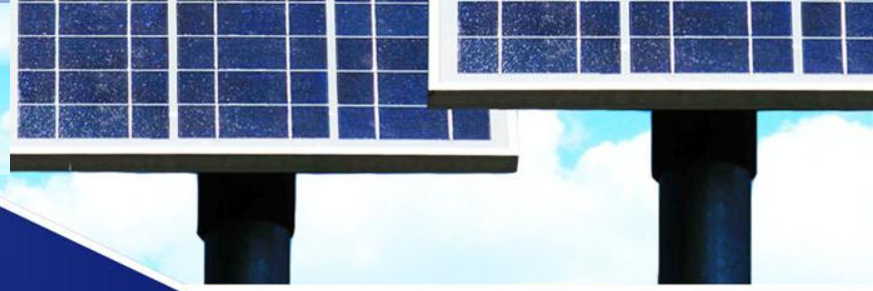


Solar Window

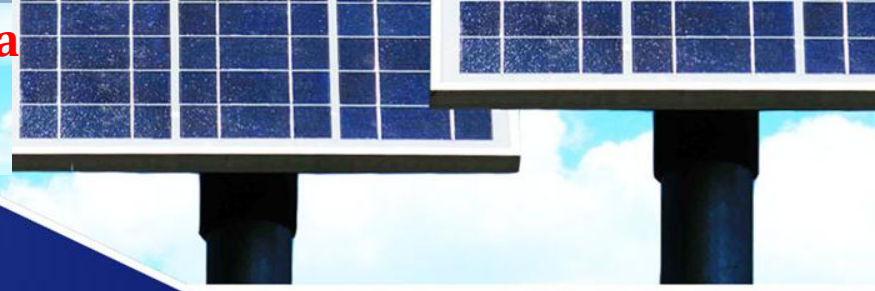
Solar Rickshaw & Golf Cart



Aluminum Back Sheet Module



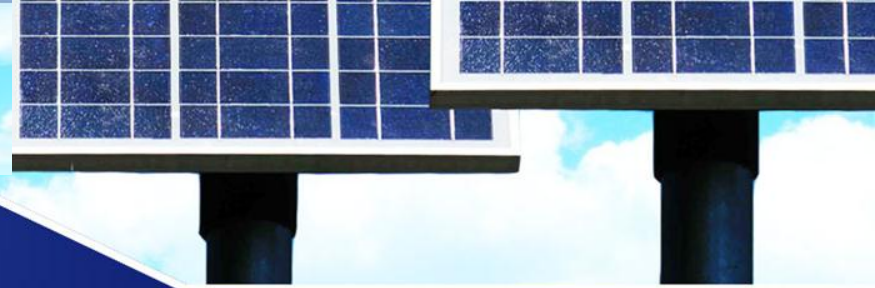
Aluminium Based Flexible Installed on Charkha Museum, Palika Bazaar, New Delhi



Plant Capacity : 7.2 KWp
Module Wattage : 150 Wp
Module Size : 1010 x 990 mm
Module Installed : 48 (No.)



Administrative Complex - Net Zero Energy Complex

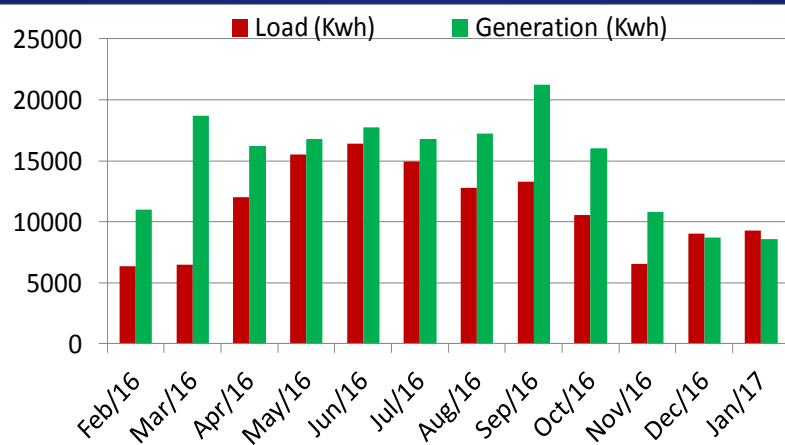


Total Solar Generation & Load (from Feb 2016 to Jan 2017)

Generation : 176729 KWh

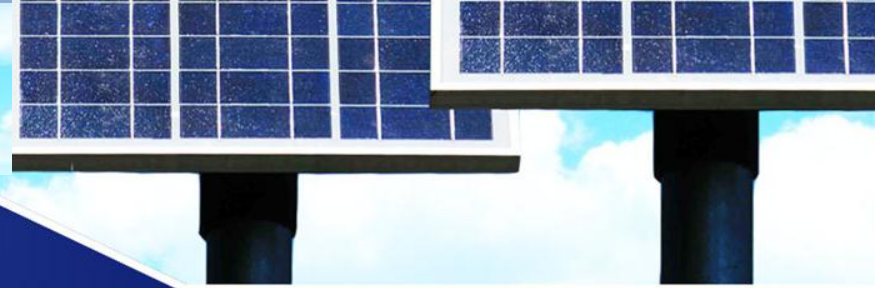
Load : 133185 KWh

Module	Power (W)	Size (mm)	Power Density (W/m ²)
IBC	327	1559 x 1045	200
HIT	240	1580 x 798	190
Standard C-Si	300	1965 x 990	154



The energy generation from rooftop PV of the Buildings is more than the consumption

Installation of BIPV Solar Plant in Car Parking



Capacity: 178 KWp

Design for Car Parking Area

Row (4)

Row (3)

Row (2)

Row (1)

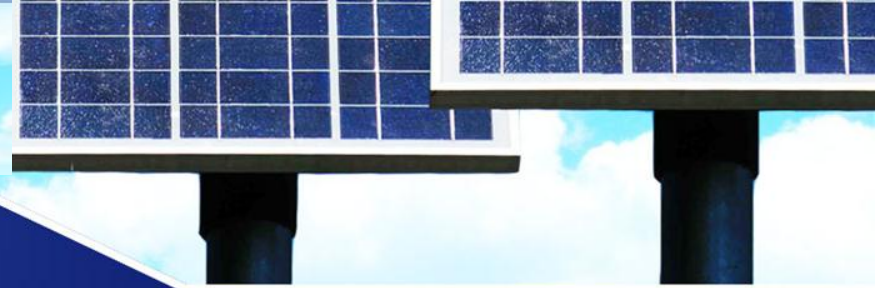


- Showcase for Railways Platform, industrial Sheds etc

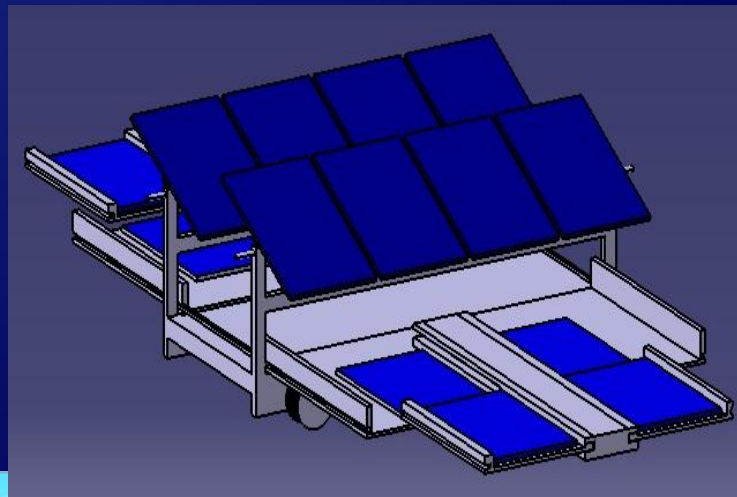
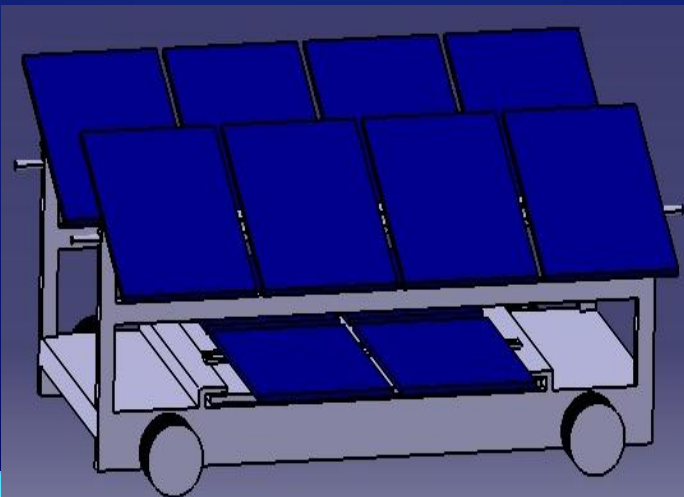
Solar Hybrid BIPV Power Plant in Car Parking



Portable Solar Water Pumping System



- Consist of foldable module mounting structure => 250W modules 8 nos (2 KWp)
- Movable and Foldable system => Used as , when and where required.
- Pulled by Bullock Cart or Tractor => depending on availability in Village Area.



New Designs for 3 KWp and 5 KWp Bullock Cart

Smart Solar Tree

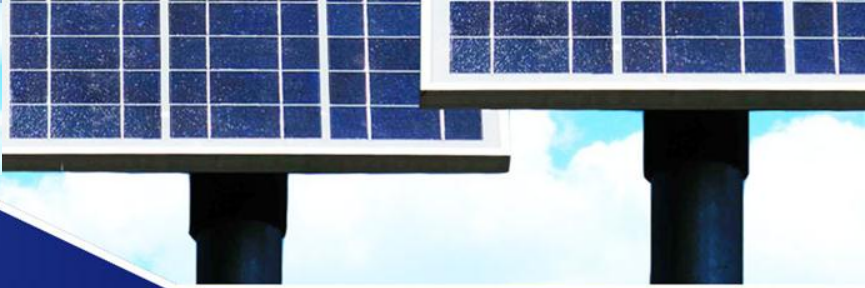


- Efficient land use
- Lighting
- Wi-Fi node (All equipment to be Wi-Fi)

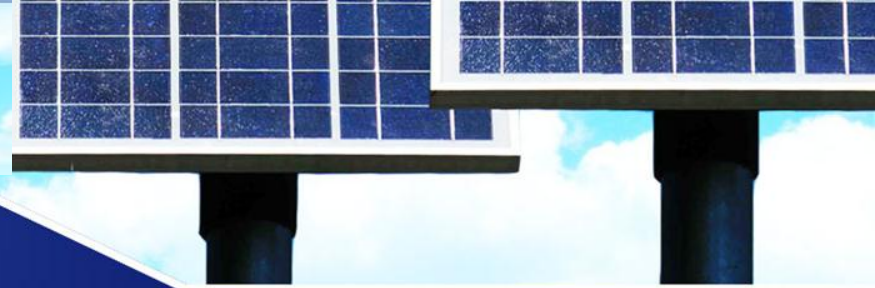
Platform for Smart Cities

- Surveillance Camera node
 - Pollution monitoring
 - Weather monitoring
 - Seating on ground space
 - Pedestrian/vehicle count
 - Women safety alarm
- ☐ Solar Tree Power Simulation with CSIR CEERI-Chennai

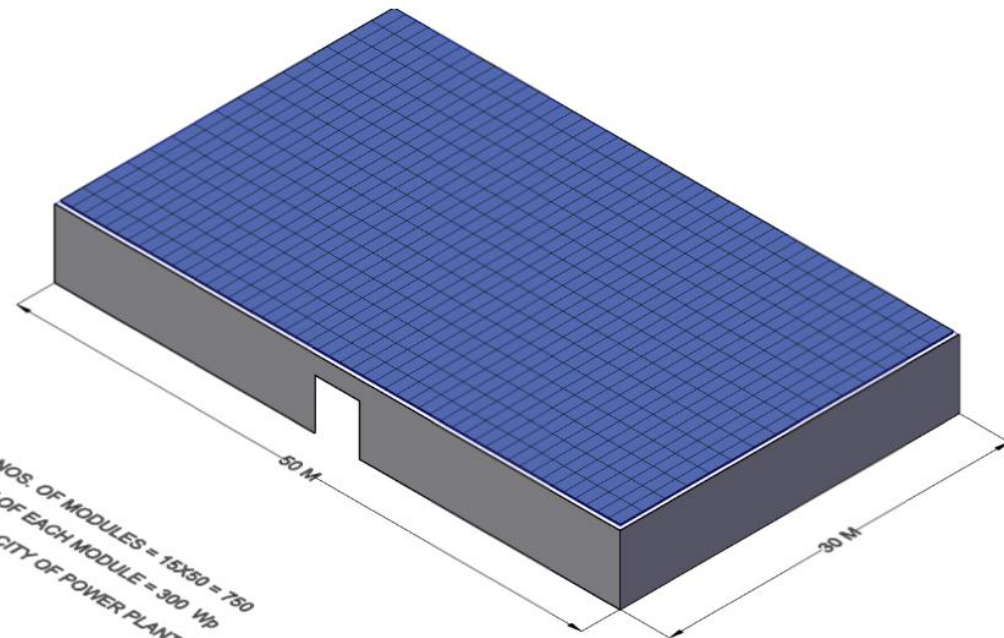
Solar Pavement



Application Development

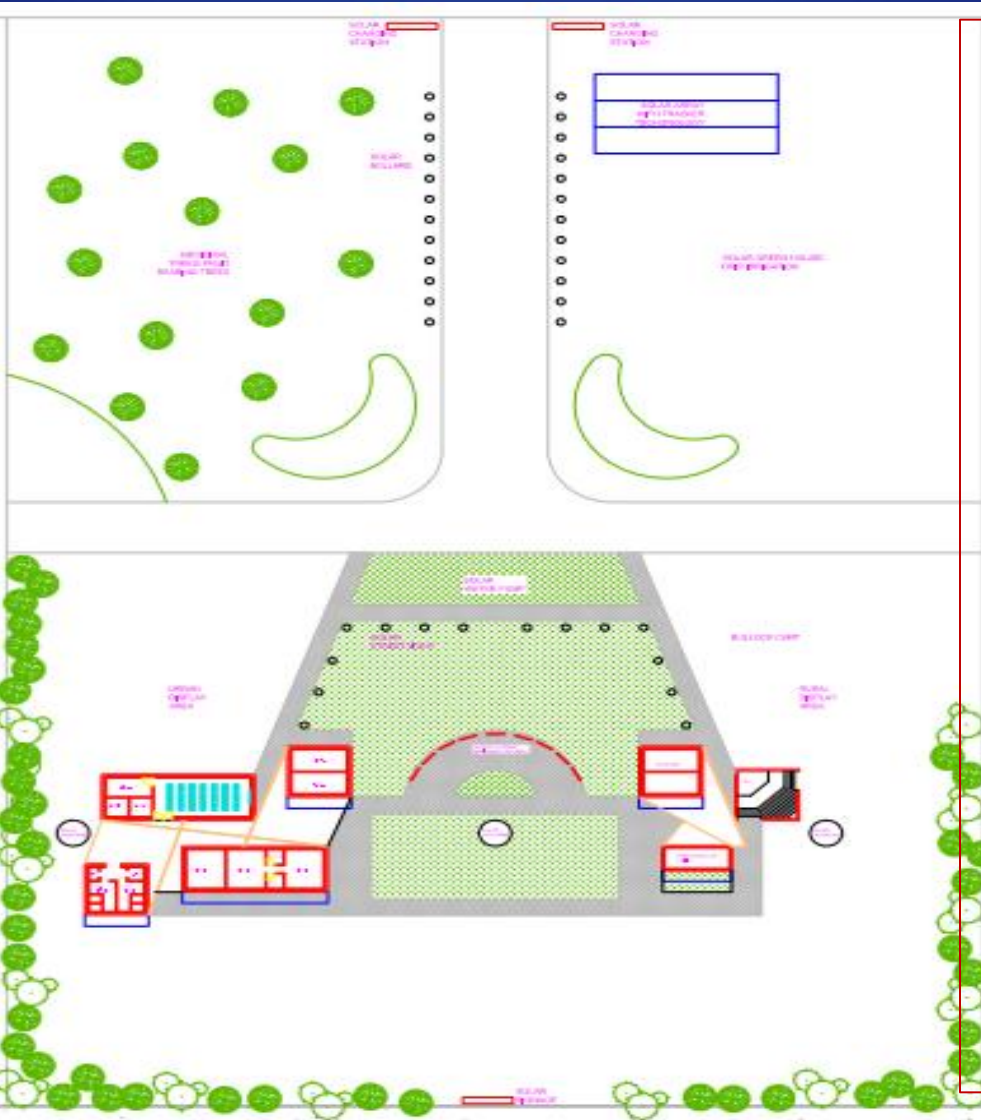
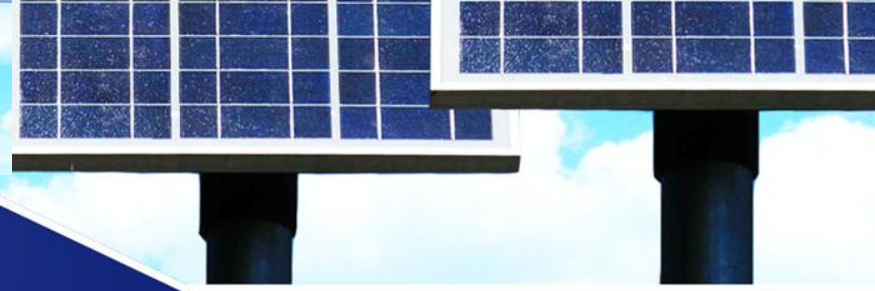


- ❑ ~ 1.5 MW Solar Power Plants (High efficiency/BIPV/ warehouse/rooftop/ground mounted)
- ❑ Central Energy Storage Solution for large scale Solar PV plants
- ❑ Conversion of entire Campus into Green Campus
 - Energy Audit
 - Green Certification
- ❑ Floating Panels
- ❑ Solar Warehouse



NOTE:
1. TOTAL NOS. OF MODULES = $15 \times 50 = 750$
2. CAPACITY OF EACH MODULE = 300 Wp
3. TOTAL CAPACITY OF POWER PLANT = $750 \times 300 \text{ Wp} = 225 \text{ KWp}$

Green Campus Project



Solar/ Eco Park

A function area housing training centre demonstrating low cost construction technology

Solar Display Area

- Solar Mini Grid
- Solar Water Pumping System with drip irrigation and drinking water facility
- Street Lighting System (SLS)
- Home Lighting System (HLS)
- Net metering demo for residential application
- Energy efficient construction technology
 - Walls
 - Roof
 - Flooring
 - Doors
 - Windows
- Geothermal/passive cooling

Other R & D Activities

- ❑ New Technology for High Efficiency Solar cells
 - ❑ PERC (Passivated Emitter Rear Cells) Flexible
- ❑ Development of Flexible Modules
 - ❑ CIGS/CZTS for Defence Application
- ❑ Development of Solar Inverter
- ❑ Development of LED based Lantern
- ❑ Development of Solar Train=> MOU Signed with IR





THANK YOU



The background is a solid dark blue color. A white diagonal cutout is present at the top right, revealing a photograph of solar panels on a roof. The panels are dark blue with a grid pattern, mounted on black brackets against a bright blue sky with white clouds. The text 'THANK YOU' is centered in the blue area in a bold, light blue, sans-serif font. Below the text is a faint, semi-transparent reflection of the text.