एनटीपीसी
NTPC
A Maharatna Company

100 kWp FLOATING SOLAR PV SYSTEM

AT NTPC Kayamkulam

(A Joint Initiative of NETRA and NTPC Kayamkulam)

100 kWp FLOATING SOLAR PV SYSTEM at NTPC - KAYAMKULAM

INTRODUCTION

Floating solar PV system i.e. installation of solar panels on water bodies, is emerging as an alternative for conventional ground mounted PV installations, which are land intensive. Presently the technology of floating platform is limited to very few manufacturers and too expensive compared to conventional PV systems. In order to indigenously develop a cost economic floater platform, a collaborative project has been taken up by **NETRA** with Central Institute for Plastic Engineering and Technology **(CIPET)**, Chennai.

In Phase I of the project, basic design, prototype development was done along with installation of 5 kWp pilot floating system, at NTPC Kayamkulam reservoir. The design and manufacturing process of the floaters were further revised to produce floaters for installation of the 100 kWp system as a second pilot system at the same location.

SALIENT FEATURES

Floating Solar PV system & Components of floating platform: Solar & Access floater, Connector, Gasket, Nut & Bolt

- Indigenously developed Floating platform (Patent pending)
- Cost effective compared to commercially available floating PV systems
- 1st Installation of its kind at NTPC
- Largest installed system in India as on date
- Modular design for scalability
- Feasible for large scale installation

SYSTEM DESCRIPTION

The Floating PV System consists of a Floater Platform & components of PV System. The floater platform is made of a) Main/Solar Floater which supports PV module, b) Access Floater which are used for walkways, c) Connector, Nut & Bolt to interconnect the Floaters, d) Rubber gaskets to fix PV modules on to main floaters. It is oriented towards southern direction and anchored in the required position through PE ropes & concrete blocks kept on the shore.

The solar part consist of 324 no of PV modules, each of 315 Wp divided into 18 no of strings each having 18 no of modules. These modules are connected through water resistant cable to five no of Array Junction Boxes (AJBs) and subsequently to five no of Delta 20 kVA Inverters. Output of the inverters are combined in an AC distribution board (ACDPB) which is connected to the main grid at reservoir substation. The system has been installed by **Swelect Energy Systems Ltd., Chennai.**

FUTURE POSSIBILITIES

The system is ready to be scaled up to MW level with a distinct cost economic advantage compared to existing commercial options. Potential of installation of such type of Floating PV system is enormous in the context of India because of abundance of water bodies and approx. 800 MWp alone in various reservoirs in NTPC stations. It could play an important role in ongoing expansion of renewable portfolio for NTPC, committed to add 15 GWp of Solar PV capacity by 2022.

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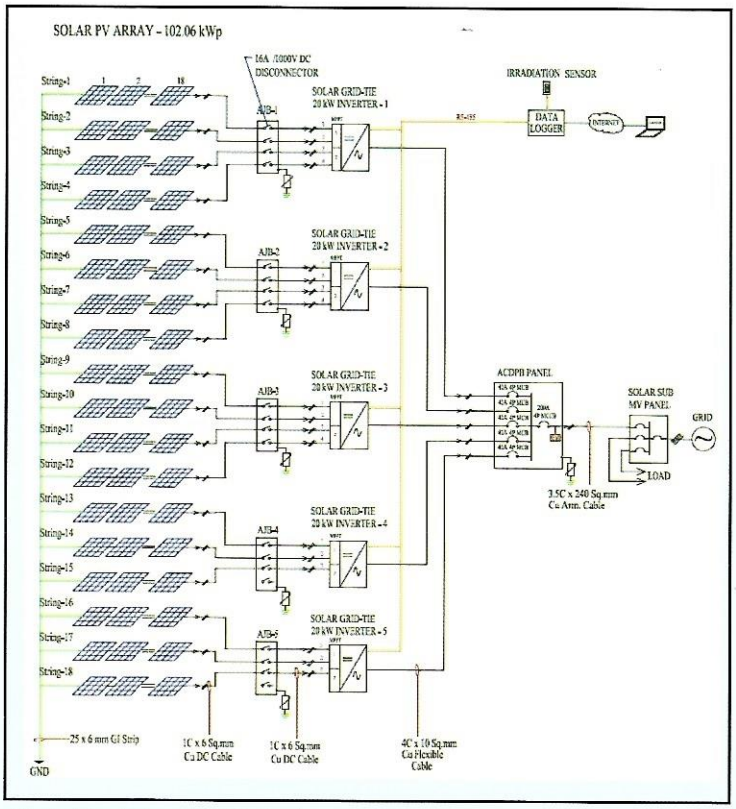
DETAILS OF SOLAR PV SYSTEM:

- **PV Modules:**
  - Make: HHV Solar, 72 cells poly C-Si, each of 315 Wp
  - Quantity: Total 324 nos, 102.6 kWp DC Capacity
  - Dimension: 1968 x 987 x 40 mm
  - Efficiency: 16.3%
- **Inverters:**
  - Make: DELTA RPI M20A, 5 no of 20 kVA each
- **DC Cable:**

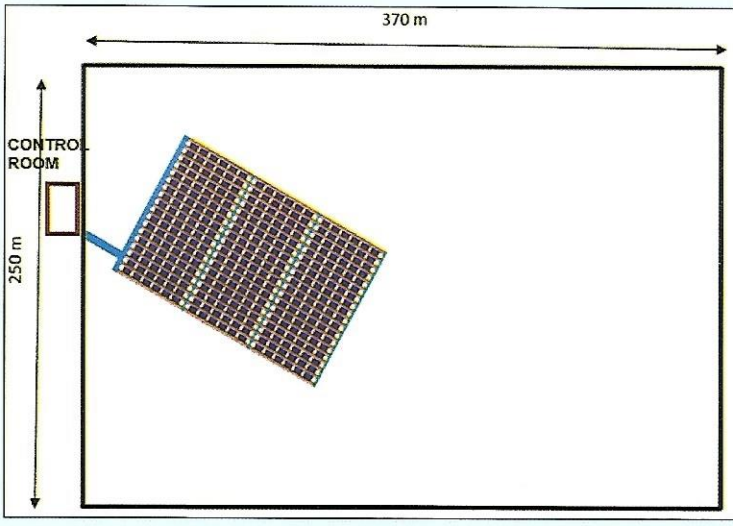
  Lapp OLFLEX Water resistant cable
- **Details of String arrangement:**
  - 18 no of strings, Each of 18 PV Modules
  - 3 Inverters: 4 Strings each & 2 Inverters: 3 Strings each



Single Line Diagram of Solar System

DETAILS OF FLOATING PLATFORM

- Made of HDPE material with UV stabilizer
- Consists of: Main & Access Floaters, Connectors, Nuts & Bolts, Gaskets
- No of Main floaters (to support solar panels): 722
- No of Access floaters (for walking): 244
- Anchoring: Concrete blocks with PE ropes
- Footprint: 43 x 30 m (except access pathway)



Layout of Floating PV system in reservoir

BENEFITS:

- Reduced cost of Floating PV system compared to existing options
- No requirement of land (no land cost, no land availability / acquisition issues)
- Reduction of evaporation of water
- Expected increased generation because of cooling effect on PV panels
- Reduction of algae growths in water-bodies
- Could be implemented at large scale MW level system

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