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# **RENEWABLE ENERGY INITIATIVES AT THE DAYALBAGH EDUCATIONAL INSTITUTE (DEEMED UNIVERSITY), AGRA**

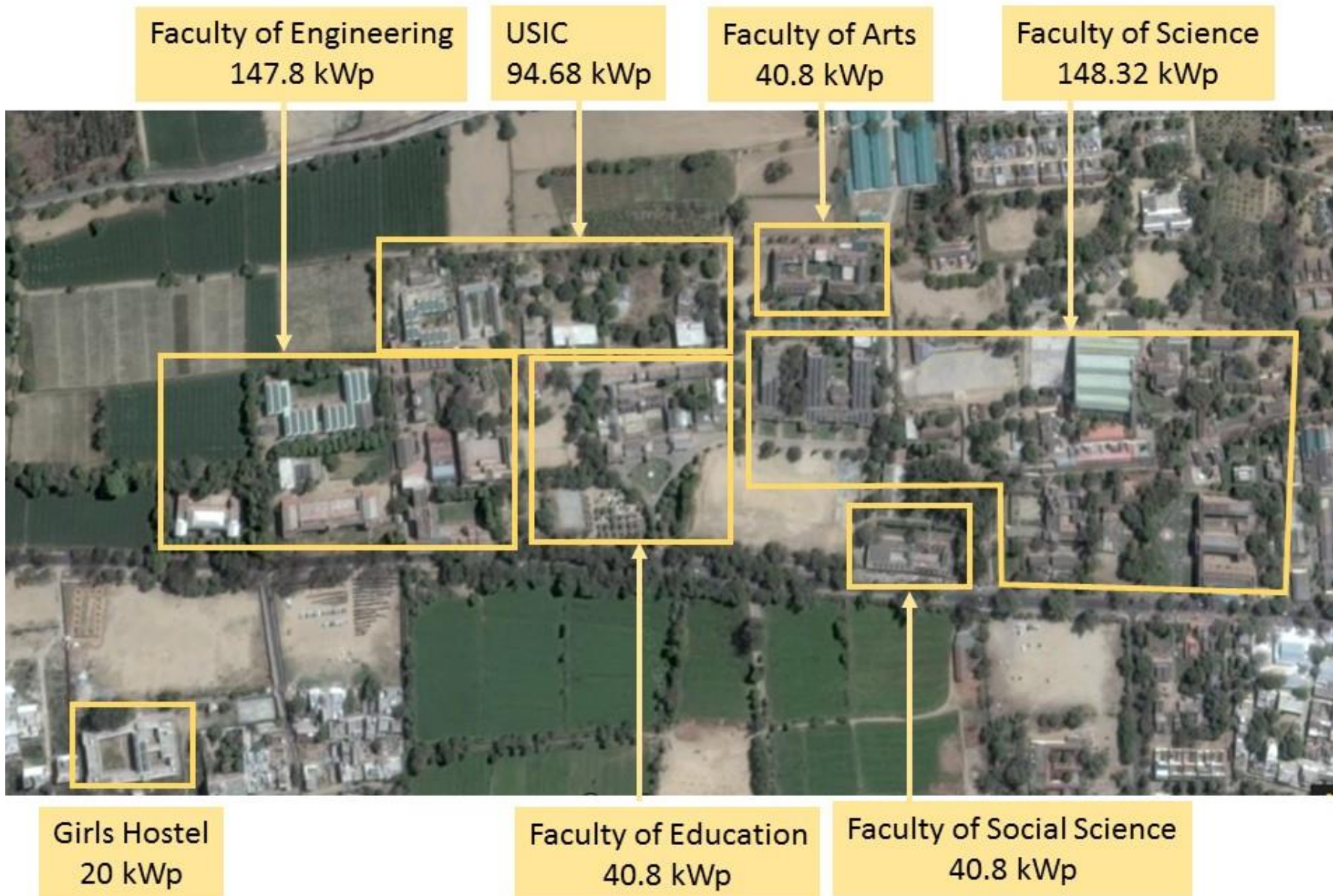
# DAYALBAGH EDUCATIONAL INSTITUTE

- In order to attain the lofty vision through sustainable developmental activities in agreement with the concept of Eco-Village, Dayalbagh Educational Institute has taken initiatives in harnessing the non-conventional and renewable energy through Solar thermal and Solar Photovoltaic power plants with projects costing over 12 Crores already installed and an elaborate future roadmap.
- The institute is unique in its commitment toward the cause of protection of environment and self-sufficiency in renewable energy through Gracious Vision, Initiative, Guidance and Encouragement of Revered Chairman, Advisory Committee on Education, **Prof. Prem Saran Satsangi Sahab**

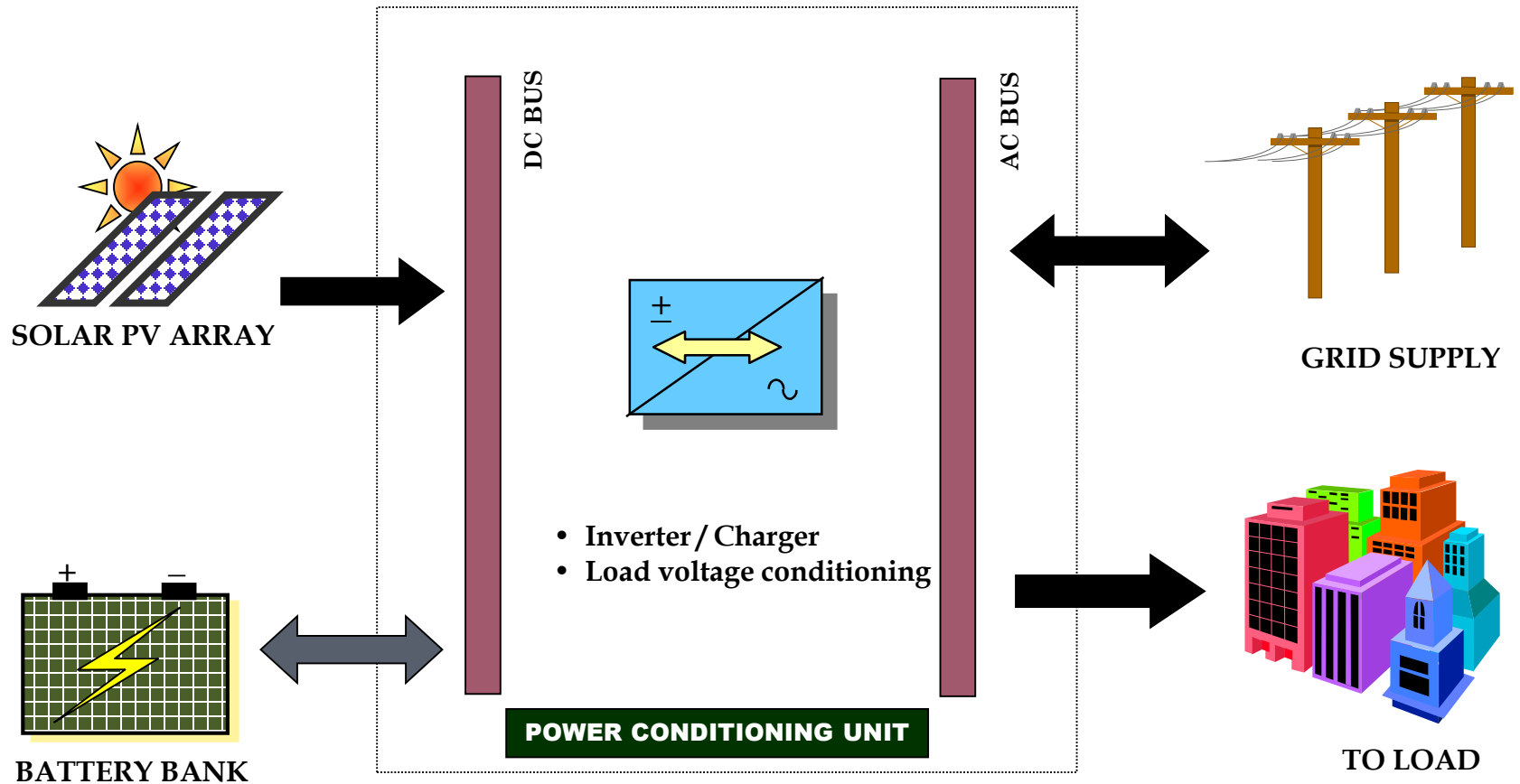
# GREEN ENERGY INITIATIVES

- The whole university campus is powered by 11 Distributed Roof-Top Solar PV Power Plants aggregating to a total of 658.2kWp to ensure uninterrupted supply. On a clear day, all the electricity requirement of the institute is catered by solar power plants.
- The institute has Solar Thermal Cooking Systems in all the hostels (Two in pipeline) to provide low cost cooking solution.
- Solar Electric Vehicles
- Bio Gas Plant
- Solar and Wind systems in Distance Education Centers

# DAYALBAGH EDUCATIONAL INSTITUTE



# SOLAR ELECTRIC POWER PLANT



GRID SUPPORT CONDITIONING (GSC) SYSTEM



# GLIMPSES : FACULTY OF SOCIAL SCIENCE



# GLIMPSES: FACULTY OF SOCIAL SCIENCE





# GLIMPSES: FACULTY OF ENGINEERING





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# GLIMPSES: FACULTY OF ENGINEERING





# GLIMPSES: FACULTY OF SCIENCE





# GLIMPSES: FACULTY OF SCIENCE



# GLIMPSES: FACULTY OF ENGINEERING

SAN containers : Styrene Acrylo Nitrile polymer





# GLIMPSES: FACULTY OF SCIENCE





# SOLAR VAN (2009)



# SOLAR COOKING

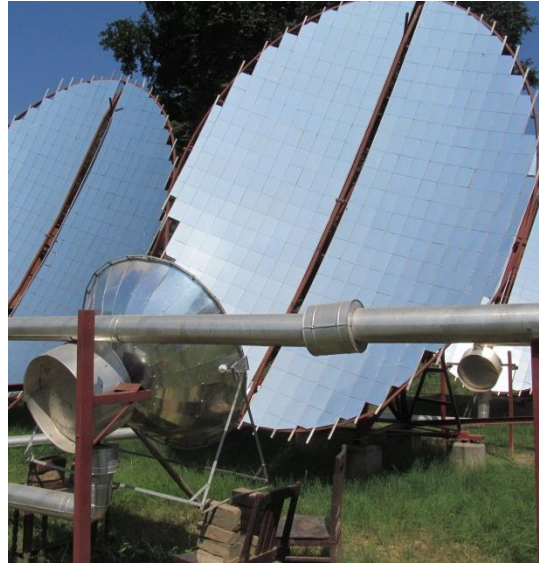
- Three systems in Hostels, One in pipeline
  - Number of Dish: 5 dishes of 16 sq. mt each
  - Used for boiling Emblica (Amla) and preparing decoction of herbs for Ayurvedic Pharmacy during lean hours
  - Also used for boiling wheat porridge for cattle in Dayalbagh Dairy
- 
- **Savings : 19 kg LPG gas per day for Hostel Mess**
  - **Saving : 80Kg of Coal per day for Ayurvedic Pharmacy**
  - **Increased yield of milk in Dairy**





# DIRECT SOLAR COOKING

- Cost of LPG has increased from Rs. 400 to Rs. 1100 suddenly
- Budget of hostel mess had gone haywire
- Trying to solve the problem by minimizing the LPG and resorting to direct cooking early in the morning
- Also boiling milk for school children by 9:30 a.m.





# CHALLENGES

To come up with an

- Efficient
- Reliable and
- Economically viable system

In the presence of

- Dynamic loading conditions
- Generation dependent on the vagaries of weather
- Unreliable Utility supply

# SMART MICRO GRID : THE ROAD AHEAD

- Integrated operation, monitoring, communication, control and fault diagnosis of all the Solar Electric Power Plants, through a central control centre.
- Decision Support System to assist the operator for optimal efficiency, economy and reliability in system operation

# R&D IN SOLAR PHOTOVOLTAIC SYSTEMS

- comprehensive optimal operation, control, monitoring and security system for Solar Photovoltaic Power Plants
  - Remote monitoring and control of Solar Inverters
  - Remote monitoring and control of Switchgear
  - Remote Metering and protection
  - Optimal Sun Tracking of Solar Panels
  - String Monitoring and Diagnosis
  - Smart Battery Storage System
  - Remote monitoring & Control of Water Pumping
  - Decision Support System for optimal operation





**Decision Support System** : development of a data driven goal programming environment

- Excel based warning/alerts and analytics
- Microsoft Azure based Analytics and Machine Learning tools
- R-environment based statistical analysis tools and machine learning tools
- Microsoft Power BI business intelligence tool



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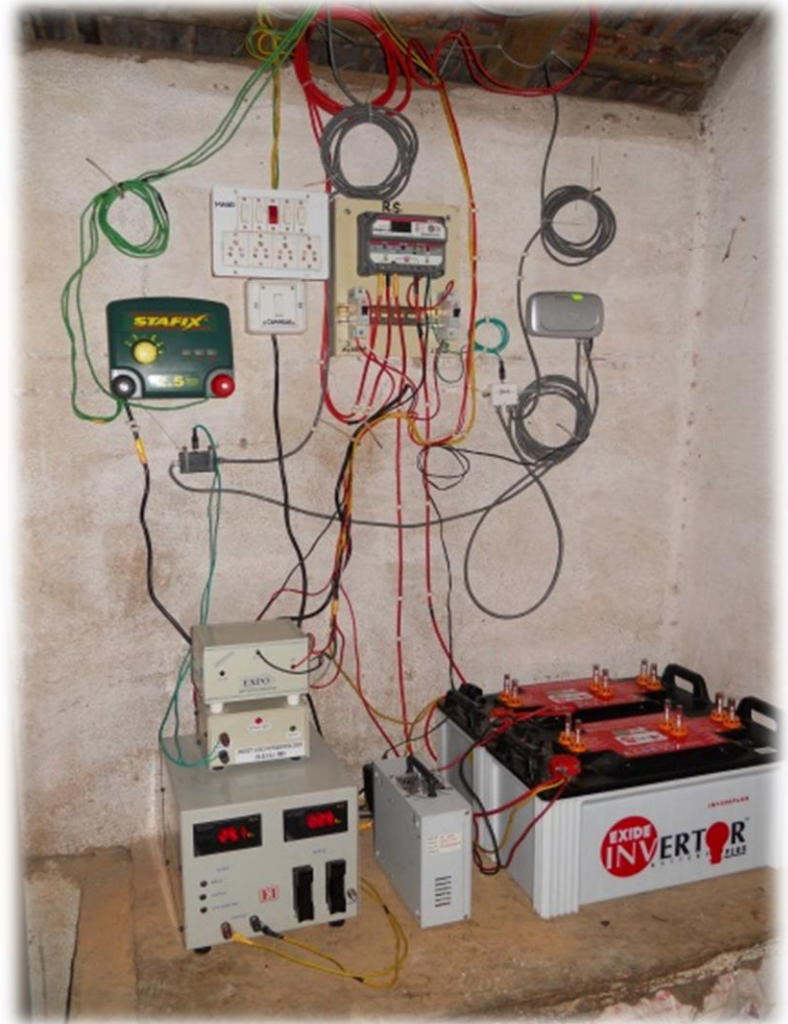
# **Distance Education Centers**

# RAJABORARI (CLUSTER OF TRIBAL VILLAGES)





# SOLAR POWER FOR 54Km Wi-Fi LINK AT RAJABORARI



# RAJABORARI



## **Specifications :**

**Solar Panels:** Two 24V, 170W<sub>p</sub> panels

**Battery:** 2x 12V, 120Ah batteries

**Charge Controller :** Morning Star 24V, 30A

**Electric Shock Energizer :** 6kV, 5mJ pulses

24V Electric Charger (SOS)

# RAJABORARI

1. **Rajaborari High School** : 5kWp Solar, (3kVA+2kVA) inverters, 2x48V 900Ah Battery bank
2. **Hostel** : 2kWp Solar, 3kVA inverter, 48V 600Ah Battery bank (used for water pumping also)
3. **Hospital** : 5kWp Solar, 10kVA 3- $\Phi$  inverter, 48V 600Ah Battery bank (used for water pumping also)
4. **Rest House Complex**: 2kWp Solar, 2kVA inverter, 48V 600Ah Battery bank
5. **Rajaborari Office** : 1kWp Solar, 1kVA inverter, 48V 600Ah Battery bank
6. **Timarni High School**: 3kWp Solar, 3kVA inverter, 48V 900Ah Battery bank
7. **Timarni Office** : 2kWp Solar, 2kVA inverter, 48V 600Ah Battery bank



# RAJABORARI



# RAJABORARI



# TIMARNI (MP)

1. **Timarni High School**: 3kWp Solar, 3kVA inverter, 48V 900Ah Battery bank
2. **Timarni Office** : 2kWp Solar, 2kVA inverter, 48V 600Ah Battery bank





## MURAR, BIHAR

- 2kWp SPV system caters to DEI ICT CE Center, School, Satsang Hall



## ROORKEE, UTTARAKHAND

- 2kWp SPV system caters to DEI ICT CE Center, School, Satsang Hall



## MTV PURAM, TIRUNELVELI, TAMILNADU (2013)

- 3kWp SPV + 2kW Wind Turbine integrated system
- Remote monitoring

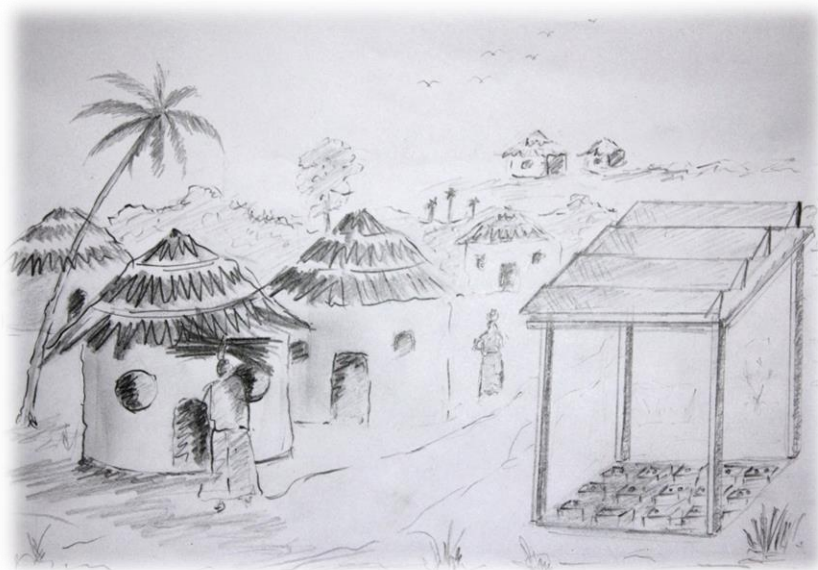




# NEW SYSTEMS IN PIPELINE

- 250 kWp capacity Solar systems, street lights, high mast lights, solar pumps etc. in the 10 hamlets and schools of Rajaborari, M.P.
- 150 Cubic-feet Bio Gas Plant in Dayalbagh Dairy Campus
- 20 kWp Solar System in Information-Cognitive-Neuro-Computing Technology Assisted Language Lab in DEI.
- 10 kWp Solar System at DEI DEC IC Center, Amritsar
- 5 kWp solar system at DEI IC Center, Murar.





**THANK YOU**