

# Development of Artificial Intelligence model for estimation, analysis and prediction of soiling and PV losses for solar photovoltaic plants

## Graphical Abstract/ Lavout



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**Name of the Funding Agency**  
Department of Science and  
Technology (DST)

**Name of the Scheme**  
DST-ASEAN

**Sanctioned Amount (in Rupees)**  
Rs. 35,00,000

**Duration of the Project (years)**  
3

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### Project Description:

Large solar photovoltaic (PV) plant output is hindered by the soiling caused due to dust, sand, bird droppings and snow. Soiling primarily refers to the accumulation of different particulates that forms a layer on the panels of the PV array. Depending on the soiling rate and intensity, the annual energy loss due to soiling ranges from 7% in some regions of the United States to as much as 50% in the Middle East

Nevertheless, prediction of soiling effect in a PV array is quite helpful prior to PV system installation; hence, this proposal envisages predicting the soiling effect via Artificial Neural Network model with experiments conducted among ASEAN countries. Thus, this proposal is a much-needed initiative that experiments are perpetually carried out in the partnering institutes of ASEAN countries to arrive at a formidable ANN model that helps in predicting soiling rate and arrive at cleaning schedules for large solar power plants.

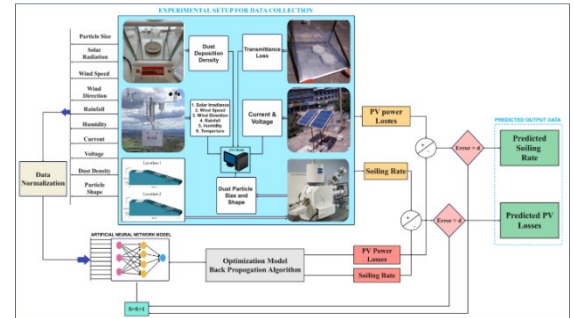
### Salient Features:

- Enhanced Artificial Neural Network (ANN) model suitable for soiling rate prediction and Photovoltaic losses estimation.
- Categorization and development of cleaning strategies for large solar PV plants based on ANN model predicted soiling rate suitable for India, Malaysia, and Thailand climatic conditions.
- Development of smart ANN model suitable, for commercial solar panel cleaning robot, for overall PV system performance enhancement.

### Key Outcomes:

- Evolve reliable experimental arrangement suitable for different countries with capability to determine the soiling parameters more accurately on any geographical conditions.
- Arrival of generic ANN model with capability to predict soiling rate for any locations based on the input parameters.
- Build ANN model for the solar cleaning robot to arrive at the best possible cleaning schedule and performance.

### Products/ Instruments/ Results/ Outreach Activities (Pictures):



Sponsored Research and Industrial Consultancy (SpORIC)