DEPT. OF ELECTRICAL & ELECTRONIC ENGINEERING

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TEAM NAME

Engineer Bunnies

IDEA CONTEST POSTER

WEATHER FORECASTING-BASED SMART SOLAR POWER PLANT

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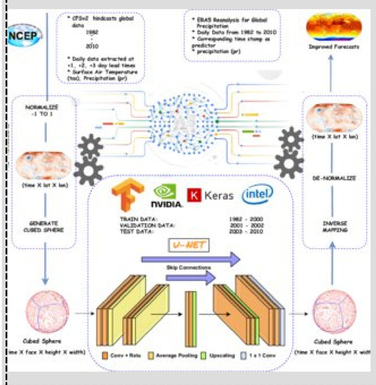
01 INTRODUCTION

Solar energy is a critical renewable resource, yet it depends heavily on weather conditions for optimal power output. This variability can lead to grid instability, especially in large-scale solar installations. Our project, Weather Forecasting-Based Smart Solar Power Plant, aims to address this challenge by using advanced weather forecasting to predict sunlight availability. With accurate weather predictions, our system will help grid operators anticipate solar power output for the coming days (7, 10, or even 30-day forecasts). This proactive approach will allow for better load management, preventing power disruptions and ensuring grid stability. By integrating weather forecasting with solar power planning, our project has the potential to make solar energy a more reliable component of the power grid.



02 OBJECTIVE

The objective of the Weather Forecasting-Based Smart Solar Power Plant project is to improve the efficiency and reliability of solar power generation by using weather forecasts to predict solar radiation levels. By anticipating sunlight availability, the system aims to optimize energy production, ensure grid stability, and prevent blackouts caused by fluctuating solar output. Additionally, it seeks to support the seamless integration of renewable energy into the power grid by providing accurate solar forecasts up to 30 days in advance, helping to maximize solar energy utilization even during unpredictable weather conditions.

03 METHODOLOGY

Our project uses advanced weather prediction models to forecast solar power availability. By analyzing atmospheric data like temperature, humidity, and wind speed, Numerical Weather Prediction (NWP) models predict sunlight intensity and cloud cover for up to 30 days. Using this weather data, machine learning algorithms then predict solar energy output by learning from historical solar power generation data and adjusting for different weather conditions. This allows us to estimate solar power generation accurately, optimizing energy use and helping to maintain grid stability. By combining weather forecasts with solar power data, the system ensures efficient solar energy utilization and better management of solar power plants.

04 CONCLUSION

The Weather Forecasting-Based Smart Solar Power Plant project provides an innovative solution to optimize solar power generation and enhance grid stability. By accurately predicting sunlight availability using advanced weather forecasting models and machine learning, our system helps ensure efficient use of solar energy, even during fluctuating weather conditions. This approach not only maximizes the potential of solar power but also supports the seamless integration of renewable energy into the grid, contributing to a more sustainable and reliable energy future.