POWERRPAL

Efficiency Meets Innovation
From Watts to Wisdom

SCULPT YOUR ENERGY FUTURE, ONE WATT AT A TIME.

PowerPal

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OVERVIEW

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PowerPal revolutionizes home energy management with real-time monitoring and a powerful savings simulator that shows you exactly how to cut costs and optimize efficiency. No guesswork—just actionable insights and real savings.

UPLOAD

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AGENDA

PowerPal empowers users to make informed energy decisions, reducing household electricity costs by up to 20–30%. It encourages sustainable power usage, leading to lower carbon footprints and reduced strain on local grids.

- Main features
- Technologies used
- Working principle
- Practical implications

FEATURES

ENERGY MONITORING

- Live monitoring of electricity consumption using NILM to detect inefficiencies instantly.
- Peak-hour alerts to help you reduce unnecessary power costs.
- Granular breakdown of energy usage by device, time, and cost.
- AI-driven insights to improve consumption habits and lower bills effortlessly.

SAVING STIMULATOR

- Personalized savings roadmap based on your energy habits and home setup.
- Simulate the impact of energy-efficient choices before making changes.
- Accurate cost projections on appliance upgrades and solar investments.
- Detailed, actionable reports to maximize savings and sustainability.

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Track & Optimize – Real-time monitoring reveals inefficiencies and cuts waste.

Smart Recommendations – AI-powered insights suggest upgrades and behavioral changes.

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• Tech Stack

Real-time monitoring (Using NILM)

- **NILM (Non Invasive Load Monitoring)**
- A single monitoring device is installed at the electrical panel or meter
- Installation & Calibration:The monitoring device is installed at the distribution panel
- Basic home profile created (size, occupancy, location)
- System establishes baseline power consumption patterns

Data Analysis

- Uses anomaly detection to identify need for maintanence and declining efficiency
- Calculate energy efficiency ratings by comparing actual energy consumption against expected energy consumption based on previous trends
- These analysis methods use python for data analysis using modules like **scikit-learn, pandas, numpy**

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SOLAR PANEL RECOMMENDATION

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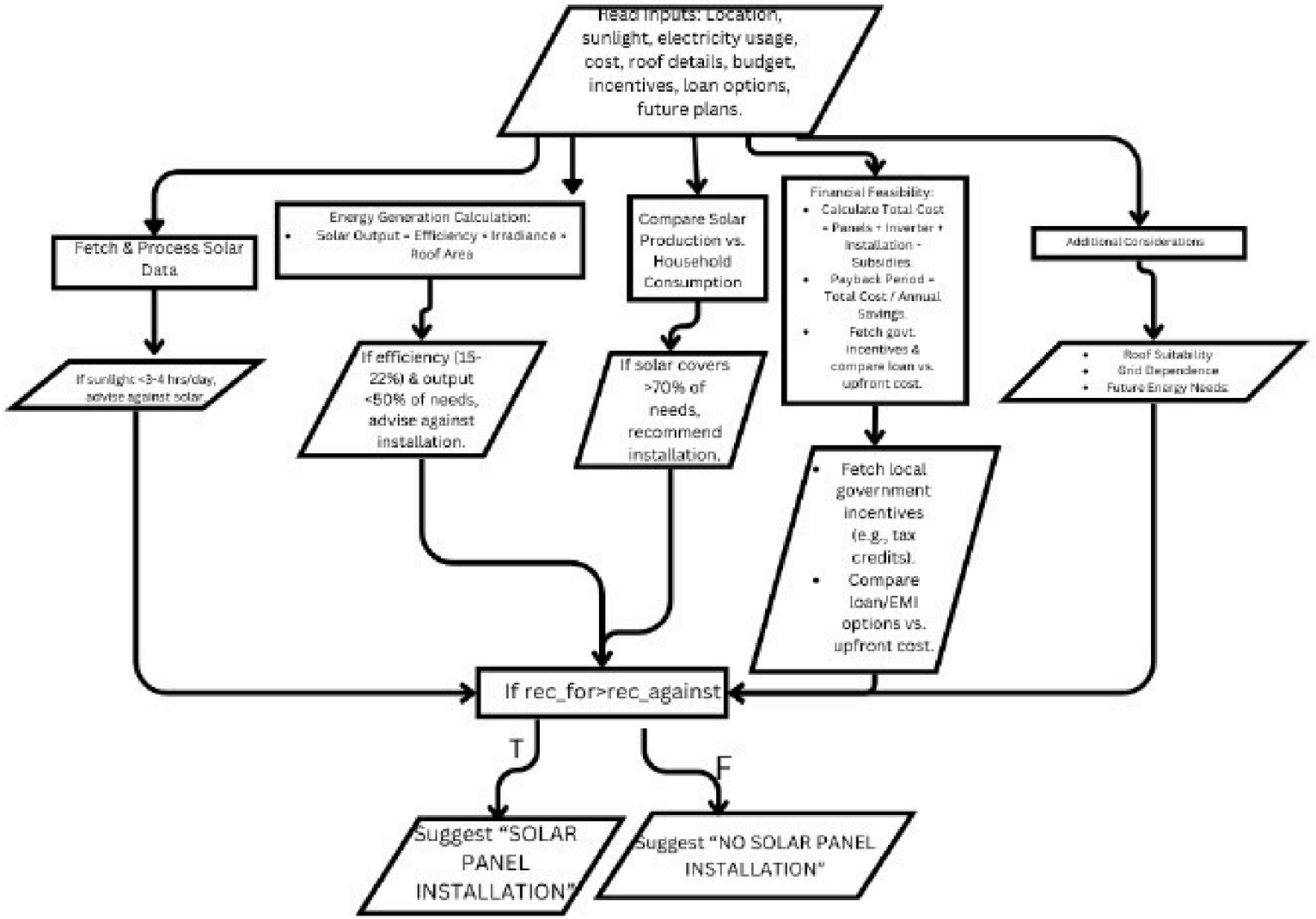

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SAVINGS SIMULATOR

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Start

Click / Select **Appliances to upgrade**
Select Electricity Rate(What rate is in your area)
Select Period (Years of use)
(input)

For Prediction of Total Savings Summary–
ML model – Linear Regression

For Saving Over Time Generation –
ML Models–
LSTM which is a type of RNN

For Report Generation –
Python – Reportlab library function

Displays **Total Savings Summary**
Initial Investment, Total Savings, Monthly Savings, Break-even Point and Saving Over Time.

Click To **Display Generate Detailed Report**

Displays Generated Detailed Report

Stop

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HOW IT HELPS?

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BUSINESS

Target Market

- Homeowners and businesses.
- Utility companies and real estate developers.

Monthly Electric Bill

- ₹1,200–₹2,000/month on electricity
- .Up to 20–30% of household energy is **wasted.**
- By adopting solar system and PowerPal, households **can save ₹500–₹600/month**

SCALABILITY

- **Households**: Optimize energy use, cut bills by 20–30%.
- **Industries**: Reduce factory energy costs by 10–20%.
- **Healthcare:** Ensure reliable power for hospitals.
- **Agriculture:** Solar solutions for irrigation and storage.

OTHER WEBSITES

1. **Opower:** Utility-focused insights.
2. **Sense**: Real-time home energy monitoring.
3. **Tado°**: Smart thermostats.
4. **Wattsight**: Energy management for businesses.
5. **SolarEdge**: Solar optimization.

PowerPal is Better in

1. **Holistic**: Combines efficiency, solar, and cost optimization.
2. **AI-Driven**: Personalized, dynamic insights.
3. **User-Friendly:** Intuitive, actionable, and scenario-based