SMART INDIA HACKATHON 2025

ECO-BREEZE POLE

- **Problem Statement ID - 25010**
- **Problem Statement Title - Smart Crop Advisory System for Small and Marginal Farmers.**
- **Theme – Clean and Green technology**
- **PS Category - Software**
- **Team ID - 68247**
- **Team Name - Sustainable sparks**

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Proposed_solution:

- Integrates vertical gardens + air purification with solar-powered street lighting.
- Supplies surplus energy to irrigation or EV charging only after garden + lighting loads are met.

How it Addresses the problem?

- Air pollution & lack of greenery in towns/villages
- Limited power for farmers
- Community well-being

Innovation and Uniqueness:

- Street lighting + air purification + EV charging + agricultural irrigation
- Solar-powered and self-sustainable
- Supports nearby crop growth and micro-climate
- Space-efficient, multi-functional design

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TECHNICAL APPROACH

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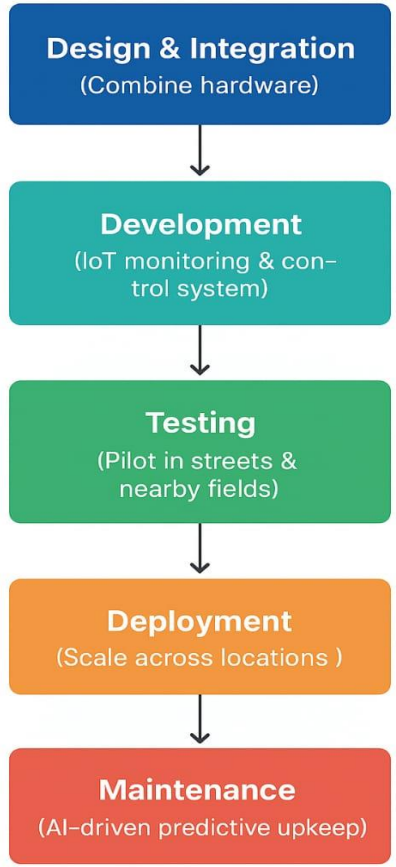
Software:

- IoT platforms (Arduino/Raspberry Pi), Python/C++
- AI/ML for automated lighting, air purification, irrigation, and EV charging control

Process:

- Design & Integration: Combine all hardware into one pole
- Development: Build IoT monitoring & control system
- Testing: Pilot in streets and nearby fields
- Deployment: Scale across locations
- Maintenance: AI-driven predictive upkeep



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FEASIBILITY AND VIABILITY

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Feasibility analysis:

- Solar power + Filters + EV charging+ Agriculture irrigation.
- Suitable in rural and urban areas for both agriculture and solar power.
- IoT sensors monitor air quality and energy usage

Challenges & Risks:

- Maintenance of filters, sensors, irrigation system, and solar panels.
- Risk of vandalism or misuse.

Solution:

- Implement AI-driven predictive maintenance.
- Engage community and local authorities for protection and support.

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IMPACT AND BENEFITS

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Target Audience:

- Rural & Peri-Urban Populations , Local Government , Communities

Wider Impact:

- Promotes green , air-purifying street pole with power.
- Improves health , environment and farming support.
- Lowers energy costs with renewable solar power.

Benefits:

- Triple-utility in one pole → saves land, wiring, and costs (light + irrigation + EV).
- Micro-grid ready → poles can link together to form a local farm-power network.
- Pay-as-you-use model possible → farmers can access irrigation power via token/RFID without owning pumps.

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RESEARCH AND REFERENCES

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Articles (Newspapers):

- *Times of India – "Maharashtra installed more solar pumps in two years than rest of country collectively"*

IEEE-Research paper:

- *Smart Crop Advisory System (AgroXAI) February 26, 2025 (ResearchGate upload)*