ANURAG UNIVERSITY IUCEE STUDENT CHAPTER

1. Title Page

Project Title: **GreenLink** – Smart Geo-Mapping for Renewable Energy Partnerships

Team Name: SmartGriders
College Name:Anurag University
IUCEE Student Chapter: Yes
Submission Date: June 30, 2025

2. Chosen SDG Target

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all
Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix.

3. Problem Statement

Fossil fuels continue to dominate India's energy mix, contributing to over 75% of total consumption. This leads to significant greenhouse gas emissions and long-term environmental harm. Despite growing renewable potential in solar, wind, and biomass energy, many regions remain untapped due to a lack of localized energy planning tools, user awareness, and connection to energy providers. Additionally, individuals and small industries struggle to estimate feasibility or reach renewable energy companies for implementation.

4. Detailed Description of the Problem

The key issues include:

1. Inaccessibility of real-time geographic and weather data to analyze renewable potential.
2. Lack of visibility into nearby renewable energy sources or providers.
3. Difficulty in initiating contracts or partnerships for renewable energy services.

Impact:

1. Rural and semi-urban communities continue to face frequent power outages and high energy costs, relying heavily on diesel generators due to limited access to clean, reliable energy solutions.

2. Renewable companies struggle to expand into these regions due to lack of localized insights.
3. Government sustainability goals remain underachieved.

Stakeholders Affected:

1. Households and small businesses
2. Renewable energy suppliers
3. Energy policy makers

5. Proposed Solution & Objectives

Proposed Solution: We propose **GREEN LINK**, a web-based platform that:

1. Collects user location and energy needs.
2. Uses real-time data to suggest the most suitable renewable energy option.
3. Shows nearby existing energy plants or companies.
4. Auto-generates contract requests to initiate partnerships.

Objectives:

1. Promote localized, data-driven renewable energy adoption.
2. Connect users to existing clean energy providers.
3. Estimate feasibility, cost.
4. Empower communities to make informed energy decisions.

6. Detailed Explanation of the Solution

Technical Details:

1. **Frontend**: HTML/React-based user interface with location input form.
2. **Backend**: Python/Node.js server to process inputs, call APIs, and run logic.
3. **APIs Used**:
    a. NASA POWER API for solar/wind data **/** ISRO's BHUVAN API
    b. Google Maps API for geo-coordinates
    c. Open Government Energy datasets for provider mapping

Workflow:

1. User enters location & energy need.
2. Platform analyzes weather, terrain, and nearby sources.
3. Suggests best renewable type (e.g., solar, wind, hybrid).
4. Lists nearby companies and enables direct contact.

5. Auto-generates email with basic contract inquiry.

Interdisciplinary Aspects:

1. Environmental science
2. Data engineering & web development
3. Public policy and sustainability

Design Thinking Use:

1. Empathize: User and company pain points
2. Define: Mismatch in renewable resource usage
3. Ideate: Platform to bridge this gap
4. Prototype: Build a working web app
5. Test: Validate with real data and potential users

7. Proof of Concept

Our solution is highly feasible both technically and economically. It leverages publicly available APIs like NASA POWER and Google Maps, and uses a lightweight tech stack (HTML, Python/Node.js) that requires minimal resources to develop and deploy. The estimated cost to build and host the platform is under ₹10,000, making it suitable even for educational and pilot-scale implementations. Operationally, the platform is user-friendly and scalable—it can be accessed by individuals, NGOs, or local governing bodies to assess renewable energy feasibility without needing advanced technical skills.

While existing solutions such as the MNRE portal, ReNew Power websites, and Tata Solar's calculator provide some information, they lack three key aspects: personalized geo-intelligent suggestions, discovery of nearby providers, and a direct way to contact companies or request contracts. Most of these platforms are passive, one-way information sources tailored for urban or commercial users. There is no single platform today that combines real-time geolocation, energy potential analysis, and automated connection with service providers.

Our platform, RE-GEO, introduces several innovations. First, it intelligently recommends the best renewable energy type for a user's location by analyzing solar insolation, wind speed, rainfall, and terrain. Second, it locates nearby renewable energy companies and shows their distance, type of energy offered, and estimated cost. Third, it provides a one-click system to generate and send contract requests to those companies—something that currently does not exist in the public domain.

To back this up, we refer to statistics from MNRE and public energy datasets: while India has over 1,000 GW of renewable energy potential, only about 180 GW is currently installed. Over

30% of Indian land receives high solar radiation, yet less than 10% of it is utilized. Many rural and semi-urban users remain unaware of how to access renewable solutions or connect with companies, showing a clear need for an accessible, intelligent tool like RE-GEO.

8. Expected Outcomes

Short-Term:

1. Users get clarity on renewable options.
2. Increased inquiries to local clean energy providers.
3. Better planning for localized green energy.

Long-Term:

1. Accelerated renewable energy adoption in underserved areas.
2. Reduction in dependency on fossil fuels.
3. Contribution to India's net-zero targets.

Impact:

1. Environmental: Reduced emissions
2. Social: Community empowerment
3. Economic: Energy cost savings

9. Resources Required

Materials/Tools:

- APIs and data access
- Firebase or MongoDB for database

Budget (Approx.):

- Domain & Hosting: ₹1,000/year
- Cloud services: ₹5,000
- Miscellaneous (internet, testing): ₹2,000

Expertise/Mentorship Needed:

- Renewable energy systems
- Web development (frontend + backend)
- Energy policy/legal contracting

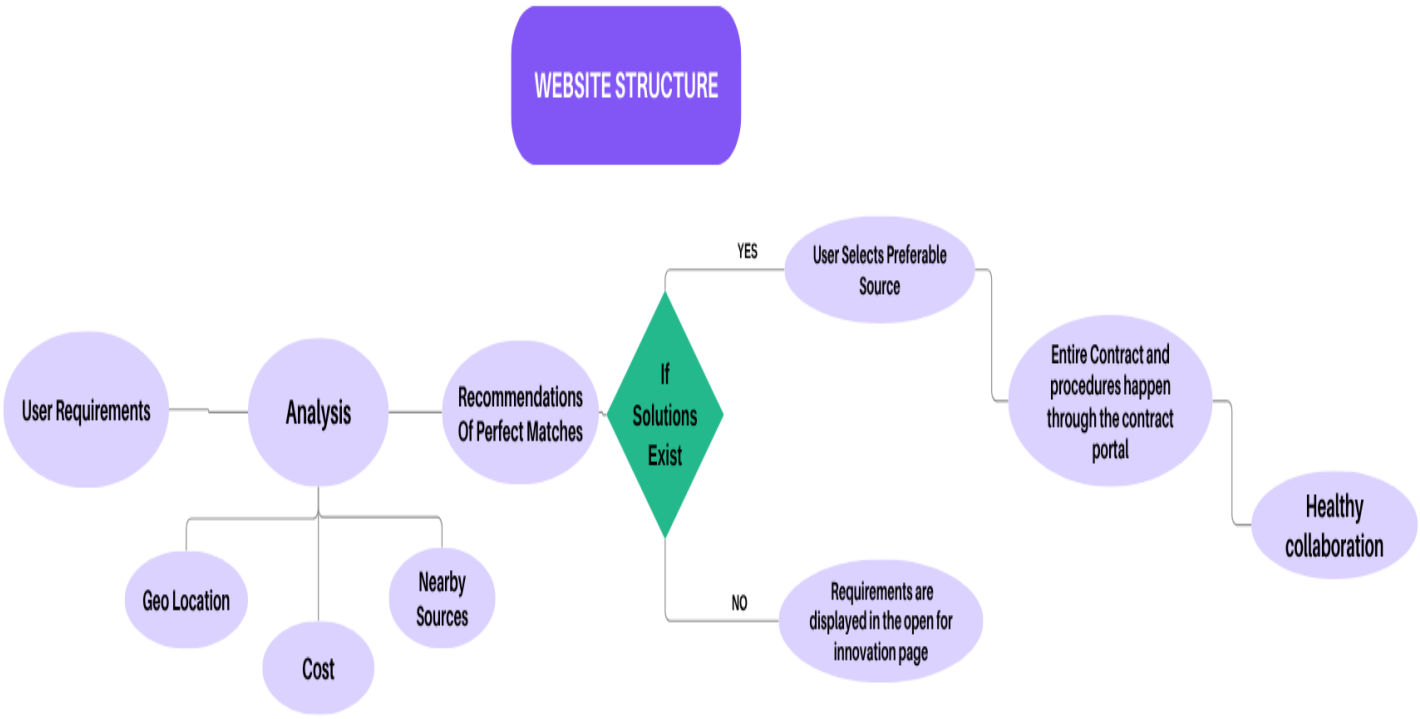
10. Team Details

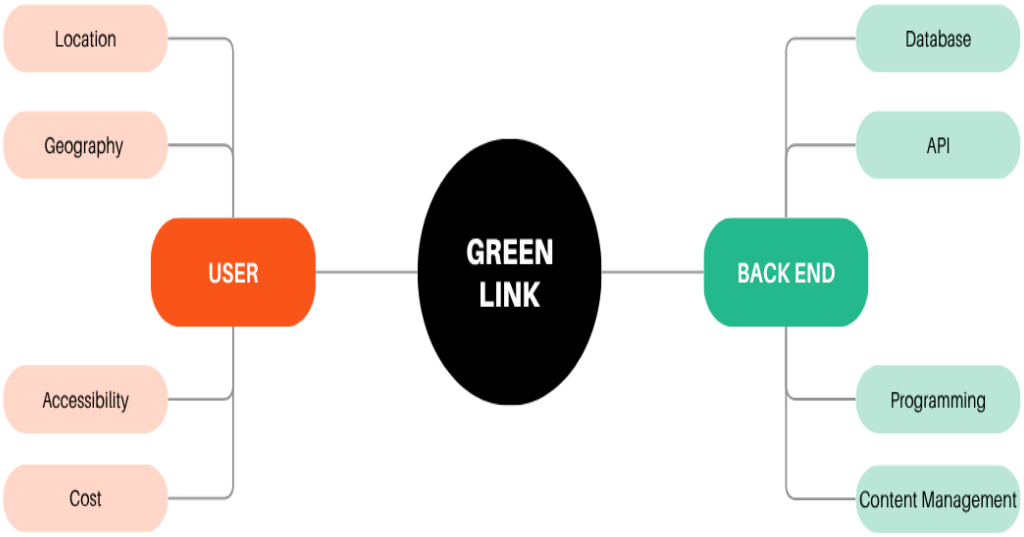
Name	Department	Year
G.Saketh	AI	3rd
B.Abhiram	ECE	4th
K.Sai Sruthi	ECE	3rd
R.Harshitha	AI	3rd

11. Faculty Mentor

Name: Dr.Narendar singh
Designation & Department: Associate Professor, Electrical Engineering
Email:

Statement of Support: "This is a promising interdisciplinary project that bridges engineering and sustainability. I fully support the team’s effort to connect users to clean energy providers."


WEBSITE STRUCTURE
User Requirements
Analysis
Geo Location
Cost
Nearby Sources
Recommendations Of Perfect Matches
If Solutions Exist
YES
User Selects Preferable Source
Entire Contract and procedures happen through the contract portal
Healthy collaboration
NO
Requirements are displayed in the open for innovation page


Location
Geography
USER
Accessibility
Cost
GREEN LINK
Database
API
BACK END
Programming
Content Management