

TEAM ECOVISIONARIES:

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REBALANCING THE FLOW

Cover & Introduction

Energy is the invisible lifeblood of every community, powering movement, lighting, communication, and commerce. Yet, despite its ubiquity, energy is often taken for granted, used inefficiently, or wasted entirely.

Every flick of a light switch, every turn of a vehicle wheel, and every hum of electronics represents both a potential opportunity and a responsibility. Observing the flow of energy in our surroundings can reveal untapped sources, highlight inefficiencies, and inspire solutions that improve equity, efficiency, and sustainability.

This project emerges from an energy walk around my local community, where I sought to carefully observe how energy flows in everyday life. From streetlights to stores, vehicles to pedestrian movement, I traced the patterns of energy consumption and waste. I aimed to identify opportunities to **rebalance the flow**, to transform overlooked energy into usable power, while engaging the community and inspiring collective action.

Understanding Energy in Our Daily Lives

Energy is not limited to electricity or fuel; it exists in motion, activity, and potential. A morning jogger produces kinetic energy; a car on the street consumes mechanical energy; a streetlight emits electrical energy. In observing my community, I realized that energy manifests in both human and mechanical forms, yet the balance is often skewed. Fossil fuels dominate vehicular transport, lighting systems remain unnecessarily inefficient, and human activity produces energy that is completely untapped.

The challenge lies in recognizing these flows, understanding where waste occurs, and imagining realistic ways to capture potential energy. By taking a closer look at everyday activities, we can transform small actions into measurable contributions to sustainability, while fostering a culture of awareness, responsibility, and wellness.



The Energy Walk: Observations

During the energy walk, I began by observing traffic patterns. The streets were filled with vehicles, predominantly petrol and CNG, interspersed with diesel and a few electric vehicles. Each vehicle represented energy consumption that contributes to carbon emissions and environmental degradation. The contrast between traditional fossil fuel use and the emerging adoption of electric vehicles highlighted both a challenge and an opportunity: while some energy sources are moving toward sustainability, widespread adoption is still limited. Turning to the sidewalks and park areas, I observed a steady stream of walkers and joggers. These individuals were active, healthy, and moving consistently, yet their motion produced entirely untapped energy. The repetitive kinetic activity of walking, jogging, or even casual strolling represented a significant, renewable resource that could be captured with minimal intervention.



Next, I focused on energy consumption in buildings and public infrastructure. Local shops varied in their energy usage: some relied entirely on sunlight streaming through windows, illuminating interiors naturally, while others switched on electric lights even in the early morning. Streetlights remained on even as daylight increased, consuming electricity unnecessarily. Heating systems, small appliances, and electronic devices contributed silently to overall energy consumption, with minimal efficiency measures in place. These observations highlighted a recurring theme: energy flows are abundant but poorly balanced. Some areas experienced waste, while others lacked access to efficient power sources. This imbalance underscored the potential for interventions that optimize energy usage while integrating renewable sources, particularly those generated by human activity.

Identifying Key Opportunities

From the observations, one realistic improvement became clear: capturing human kinetic energy through pedestrian activity. Walking and jogging are already widely practiced for wellness and commuting, meaning this energy is naturally produced and consistent. By designing a system that harnesses this motion, it becomes possible to power streetlights, charge electric vehicles, and provide community-wide benefits without requiring significant behavioral change.

Furthermore, motion-sensor streetlights and optimized lighting schedules can drastically reduce energy waste. By combining human energy capture with smart infrastructure, the community can create a more balanced energy flow that aligns with both local needs and global sustainability goals.

Introducing Step2Power

The solution I designed is called Step2Power, a system that converts pedestrian movement into electricity. The core idea is simple: kinetic energy tiles installed along high-footfall paths capture the energy generated by footsteps, store it in battery units, and then use it to power streetlights or EV charging stations. Motion sensors ensure that lights are active only when needed, further enhancing efficiency.

Step2Power integrates human wellness, technology, and sustainability in one cohesive system. By placing tiles where people already walk and jog, the system harnesses energy passively, making everyday movement a meaningful contribution to renewable power. Digital dashboards can provide feedback to users, showing how much energy they have generated collectively, fostering motivation and engagement.

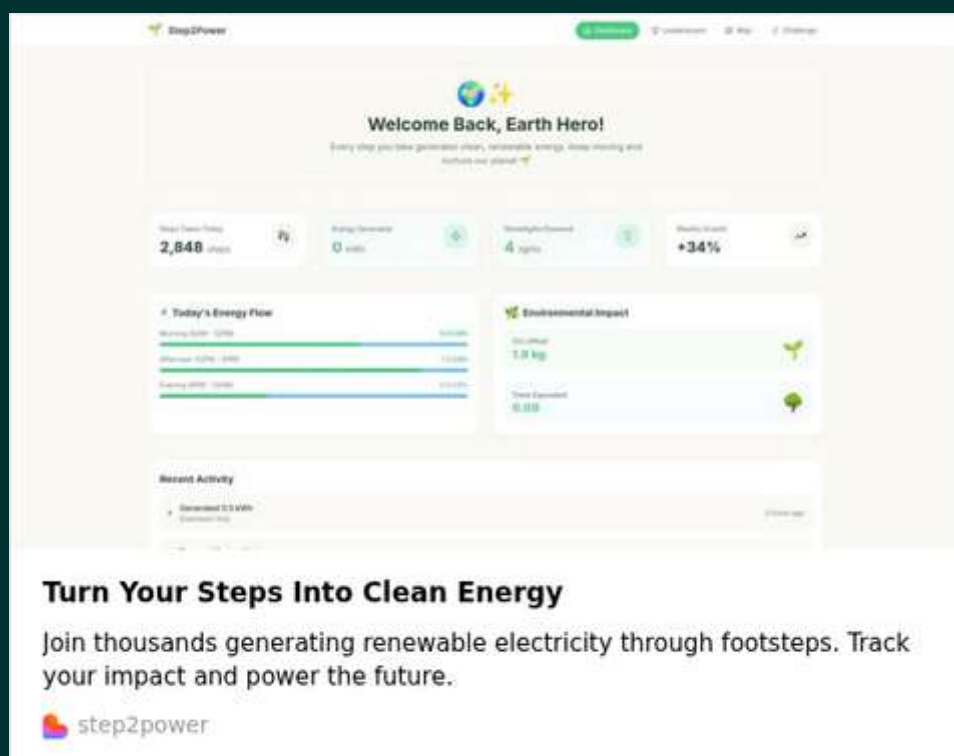
Prototype Design

The Step2Power prototype consists of several integrated components:

1. Kinetic Energy Tiles: Durable tiles that convert mechanical energy from footsteps into electrical energy.
2. Battery Storage Units: Store harvested energy for consistent use in powering streetlights and EV charging.
3. Motion-Sensor Streetlights: Activate only when pedestrians or vehicles are present, minimizing waste.
4. EV Charging Stations: Supplemented by harvested energy, supporting local electric vehicle adoption.
5. Digital Dashboard: Tracks energy contributions and encourages community participation.

This prototype is designed to be modular, scalable, and easily integrated into public spaces. Its strength lies in combining simplicity with visibility: residents can see the impact of their daily activity on local energy sustainability.

Link to the dashboard prototype: <https://step2power-prototype.lovable.app/>



Pilot Implementation Plan

- Begin with 50–100 tiles along high-footfall paths in parks and sidewalks.
- Connect a small battery unit to power a single streetlight, testing energy capture efficiency.
- Monitor data daily to adjust tile placement and sensor settings for optimal output.
- Deploy tiles in additional public spaces, schools, sports tracks, and pedestrian bridges. Integrate multiple streetlights and EV charging stations with centralized battery storage.
- Collect ongoing feedback and adjust as needed.

Phase 1 – Pilot Installation

Phase 2 – Community Awareness

Phase 3 – Expansion

- Launch the Every Step Counts campaign, posting signs explaining the system and encouraging participation.
- Social media campaigns and QR codes linked to dashboards make energy contribution visible and fun.

Step2Power is inclusive: all pedestrians contribute, regardless of age, income, or mobility. Motion-sensor streetlights enhance safety while reducing energy waste.

By linking daily movement to tangible energy outcomes, the project fosters collective responsibility, integrates wellness culture into sustainability, and creates measurable environmental benefits.

Connecting Local Action to Global Goals

While Step2Power is rooted in a single community, its purpose aligns deeply with global clean energy goals. The project directly contributes to the United Nations Sustainable Development Goals (SDGs), especially SDG 7: Affordable and Clean Energy, SDG 11: Sustainable Cities and Communities, and SDG 13: Climate Action.

By capturing renewable kinetic energy from human movement, Step2Power provides a decentralized and inclusive model of clean power generation.

It empowers citizens to become energy contributors rather than mere consumers, transforming everyday motion into a form of participation in climate action. Moreover, the project enhances urban resilience by integrating smart lighting systems that optimize efficiency and safety.

Local energy solutions like Step2Power prove that innovation doesn't always require vast resources; sometimes it just requires reimagining what's already around us. Every step taken in a park or along a sidewalk can ripple outward, contributing to global sustainability in tangible ways.

Taking the First Step Toward Action

Ideas only have power when we start acting on them, and Step2Power was no different. To move the concept from observation to tangible action, I began by submitting the proposal to citizen-engagement portals such as Republic India and MyGov, where suggestions reach authorities responsible for urban development and sustainability.

Simultaneously, I designed a simple awareness poster to share with neighbors, friends, and local social media groups and channels. The goal wasn't to generate electricity yet, but to help people see the connection between everyday walking, sustainability, and the energy potential of human movement.

To make the concept even more tangible, I created a DIY kinetic tile mini demo using cardboard, a push button, a battery, wires, and an LED. Each step on the tile lights the LED, visually showing how pedestrian movement can generate electricity. This hands-on demonstration transformed Step2Power from an abstract idea into a visible, interactive project, helping others understand its potential impact and inviting community participation in rebalancing the flow of energy.



How Step2Power Improves Equity, Access, and Efficiency

Step2Power is a community-centered initiative that transforms everyday pedestrian movement into usable electricity. By capturing kinetic energy from footsteps, this system powers streetlights and micro EV charging stations, creating an equitable energy solution accessible to all citizens regardless of income or location.

Motion-sensor streetlights reduce unnecessary consumption, ensuring electricity is only used when needed, while micro EV stations make clean transportation more accessible.

Wellness activities like walking and jogging are directly linked to tangible energy contributions, fostering inclusion and collective responsibility.

By integrating human activity into energy production, Step2Power increases efficiency while raising awareness of sustainable practices.

This initiative empowers communities to actively participate in renewable energy solutions, promotes safety through well-lit spaces, and demonstrates that even small daily actions can have measurable environmental impact, bridging the gap between lifestyle, sustainability, and local clean energy adoption.

Instagram Post:

https://www.instagram.com/p/DQO6lAzgmpG/?utm_source=ig_web_copy_link&igsh=MzRlODBiNWFlZA==

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Suggestion for Innovative Solar & Renewable Energy Initiative – Step2Power

Sidhi Sareen <sidhis0623@gmail.com>
to info

5:01PM (0 minutes ago) ☆ 😊 ↶ ⋮

Dear Ministry of New and Renewable Energy Team,

I am writing to submit a suggestion for a renewable energy initiative called **Step2Power**, which aims to harness pedestrian movement to generate electricity for streetlights and micro EV charging stations.

Step2Power transforms human activity into usable energy by installing **kinetic energy tiles** along sidewalks, parks, and high-footfall walking paths. The electricity generated is stored in weatherproof battery units and used to power motion-sensor streetlights and small EV charging stations. A digital dashboard allows communities to track energy contributions and fosters awareness and participation in clean energy adoption.

This initiative is low-cost, scalable, and promotes both sustainability and community engagement. Even a small pilot can demonstrate measurable environmental, social, and technological benefits.

I respectfully request that the Ministry consider reviewing this suggestion for potential implementation or pilot testing.

Thank you for your time and consideration.

Sincerely,
Sidhi Sareen
Student from Ambala, Haryana, India

One attachment • Scanned by Gmail   Add to Drive

Step2Power: Harnessing Pedestrian Energy to Power Streetlights and EV Charging



Step2Power: Harnessing Pedestrian Energy to Power Streetlights and EV Charging

Submitted by: Sidhi Sareen

Executive Summary

Energy is the lifeblood of every community, yet much of it is wasted through inefficient lighting, building systems, and transport. Step2Power is an innovative, community-centered solution that transforms human movement into usable electricity. By capturing kinetic energy from footsteps in sidewalks, parks, and walking paths, Step2Power powers motion-sensor streetlights and micro EV charging stations. This project integrates sustainability, wellness, and citizen engagement into a practical, scalable model for urban energy efficiency.

Personal Motivation

As a member of my local community, I have observed firsthand how energy is consumed and often wasted in daily life. Walking paths and jogging trails are bustling with activity, yet the energy generated through human movement goes completely untapped. Step2Power was conceived from this simple observation: every step we take can contribute to a cleaner, smarter, and more equitable energy system. I am passionate about translating this everyday movement into tangible energy benefits for my community while fostering awareness and participation.

Problem Statement

Urban areas often face a dual challenge: excessive energy consumption and untapped renewable sources. Public lighting frequently operates even when not needed, consuming electricity and increasing carbon emissions, while pedestrians generate kinetic energy that is completely unused. This represents a lost opportunity for both energy efficiency and community engagement.

Proposed Solution

Step2Power proposes the installation of **kinetic energy tiles** in high-footfall areas such as sidewalks, parks, and community pathways. Footsteps are converted into electricity and stored in **small, weatherproof battery units**. Stored energy powers **motion-sensor streetlights**, which illuminate paths only when needed, and **micro EV charging stations**, supporting the adoption of electric vehicles. A digital dashboard tracks energy generation, allowing the community to visualize their collective impact and fostering participation in local sustainability initiatives.

Benefits

- **Environmental Impact:** Reduces electricity consumption, lowers greenhouse gas emissions, and promotes renewable energy use.
- **Community Engagement:** Encourages citizen participation, integrates wellness culture into sustainability, and improves safety through responsive street lighting.
- **Scalability:** The solution can be implemented in schools, parks, sports tracks, and pedestrian bridges, serving as a model for other cities.

Action Plan

1. **Pilot Installation:** Deploy tiles along a high-footfall park or sidewalk.
2. **Awareness Campaign:** Launch a short "Every Step Counts" campaign to encourage community involvement.
3. **Monitoring & Reporting:** Track energy generated, streetlight usage, and community participation to measure impact.
4. **Scaling Up:** Present outcomes to municipal authorities and expand installation to additional locations based on pilot success.

Closing Statement

Step2Power is a low-cost, high-impact initiative that transforms everyday activity into meaningful energy generation. By bridging human movement, technology, and sustainability, it empowers citizens to actively participate in clean energy adoption. I respectfully submit this proposal for consideration, confident that even a small pilot can demonstrate measurable environmental, social, and technological benefits while fostering community ownership of sustainable urban energy solutions.



Step2Power

– Every Step Counts!