

Leveraging citizen science for energy transitions

4 April 2024



What is an energy transition?



16

You

Please can you tell me what an energy transition is?



ChatGPT

Certainly! An energy transition refers to a fundamental change in the way a society produces, distributes, and consumes energy. This transformation is typically characterized by a shift from traditional, non-renewable energy sources, such as fossil fuels (coal, oil, and natural gas), to more sustainable and renewable sources of energy. The primary goals of an energy transition are to address environmental concerns, reduce greenhouse gas emissions, and enhance energy security.

Key components of an energy transition include:

1. **Renewable Energy Adoption:** Increasing the use of renewable energy sources like solar, wind, hydro, geothermal, and biomass to generate electricity and meet various energy needs.
2. **Decentralization:** Moving away from centralized energy production, where power is generated at a few large facilities, towards a more decentralized model with smaller-scale, distributed energy sources.
3. **Electrification:** Expanding the use of electricity in different sectors, such as transportation and heating, often replacing conventional fossil fuel-based technologies.
4. **Energy Efficiency:** Improving the efficiency of energy use in both production and consumption to reduce overall energy demand.
5. **Technological Innovation:** Embracing and developing new technologies that contribute to cleaner and more sustainable energy systems.
6. **Policy and Regulation:** Implementing supportive policies and regulations that incentivize the transition to cleaner energy and discourage reliance on fossil fuels.
7. **Public Awareness and Engagement:** Increasing public awareness about the importance of sustainable energy practices and encouraging individuals and businesses to actively participate in the transition.



How does this look in practice?

- **Shift in power dynamics.**

- Citizens become stakeholders, decision-makers, and change agents in shaping a sustainable energy future.

- **Democratizing and decentralisation of the energy landscape.**

- Low carbon energy transitions involve fundamental shifts in energy production, distribution, and consumption.
- Examples of community energy initiatives as evidence of citizen participation in the energy sector.

What are the different areas in need of attention/research to enable an energy transition?

Society, culture, and behaviour	Equity and justice	Knowledge	Energy markets	Energy policy	Finance	Infrastructure	Institutions
<ul style="list-style-type: none">• Consumer acceptance• Social acceptance• Public awareness	<ul style="list-style-type: none">• Distributional equity• Climate and resource justice	<ul style="list-style-type: none">• School education• Highly skilled workers• Highly skilled policy makers and decision makers	<ul style="list-style-type: none">• Liberalisation of energy market• Elimination of trade barriers• Strengthening domestic economies• Ownership structure	<ul style="list-style-type: none">• Good governance	<ul style="list-style-type: none">• Financial participation	<ul style="list-style-type: none">• Strengthening existing local infrastructure• Introducing technologies	<ul style="list-style-type: none">• Research• Testing innovations

What has happened already in the citizen science and energy transition space?

Project review – search terms; Citizen Science + Energy

eu-citizen.science

ECSA

Cordis

Zooniverse

Scopus

SciStarter

Web of Science

Google Scholar

What activity has there been to date?



The first platform to create a unique solar energy community and promote data exchange between photovoltaic installation owners and scientists.

Sign up or log in to share as many photovoltaic installations as you can and...

- Take part in an environmentally committed international community
- Provide valuable open data for research and management
- Face new individual and community challenges
- Chat with other European citizens to share interests
- Invite friends to join the network
- Help put the community squarely on the map
- Get public data to analyse the behaviour of decentralized energy

What activity has there been to date?



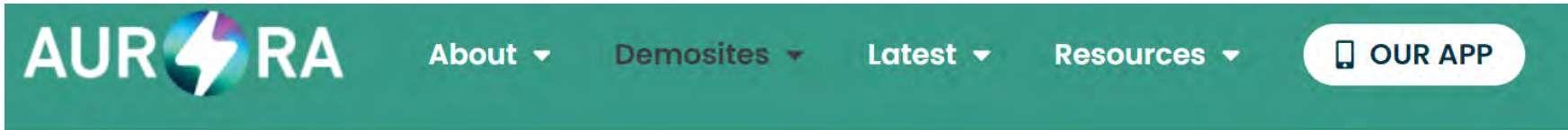
The neighbourhood electricity sharing mechanisms enabled by this law can incentivise residents and tenants to increase self-consumption, save electricity costs, adapt their energy-consuming behaviour and contribute to CO₂-mitigation. However, Tenant Electricity Law is only rarely applied in multi-family buildings, hence having a still very large untapped potential.

Step Change will assess the potential benefits and the main setbacks of neighbourhood electricity sharing by developing three case studies in three diverse energy communities in Germany. Data on energy consumption and production will be collected continuously for 1 year, and the involved households will receive a monthly report about their consumptions as well as have real-time access to their data. Moreover, living labs will be developed in each of the communities part of the initiative.

By directly engaging citizens as scientists, the Citizen Science Initiative will shed light on both the potential and barriers of these energy sharing mechanisms. The initiative will tackle this issue in an energy citizenship perspective, namely focusing on three different dimensions: energy consumptions, energy-related lifestyles, and energy culture.



What activity has there been to date?



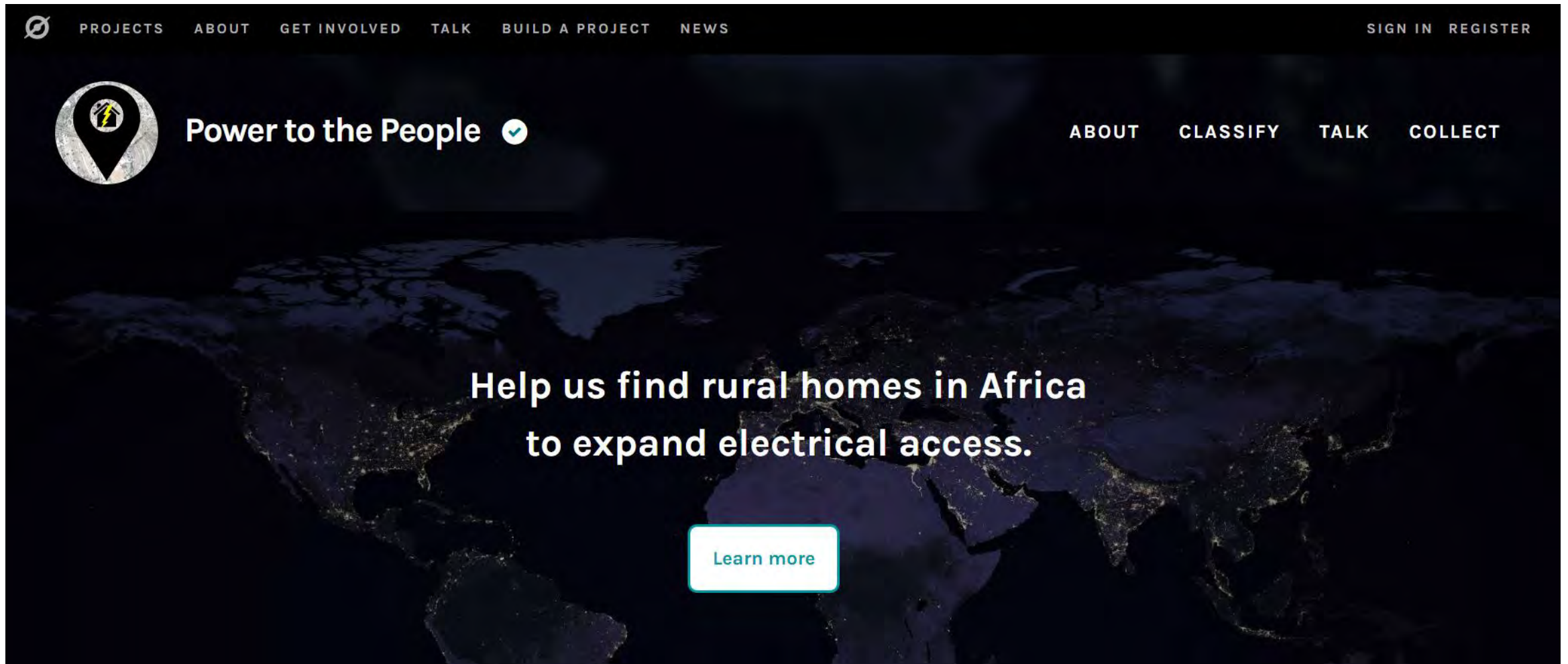
Our Demosites

Communities Driving Behavioural and Policy Change

AURORA is empowering citizens to make more informed decisions about their energy use. These local energy communities have been established in five locations across Europe.





What activity has there been to date?



The screenshot shows the website for "Power to the People". The top navigation bar includes links for PROJECTS, ABOUT, GET INVOLVED, TALK, BUILD A PROJECT, NEWS, SIGN IN, and REGISTER. The main header features the organization's logo (a location pin with a lightning bolt) and the name "Power to the People" with a checkmark icon. To the right of the header are links for ABOUT, CLASSIFY, TALK, and COLLECT. The main content area has a dark background with a world map, highlighting Africa. The text reads: "Help us find rural homes in Africa to expand electrical access." Below this text is a "Learn more" button.

PROJECTS ABOUT GET INVOLVED TALK BUILD A PROJECT NEWS SIGN IN REGISTER

 Power to the People 

ABOUT CLASSIFY TALK COLLECT

Help us find rural homes in Africa
to expand electrical access.

[Learn more](#)

What activity has there been to date?



[Home](#)

[About](#)
▼

[Citizen Science
Initiatives](#) ▼

















[Horizontal
Activities](#) ▼



Off-Grid Renewable Energy in Agriculture

Renewable energy in agricultural production can be a useful way of responding to the increasing energy demand of the sector as well as a means for promoting social and environmental sustainability. STEP CHANGE will develop knowledge about the impact of renewable energy technology for productive use in rural Uganda via a citizen science approach. Citizen scientists selected from farmers of six agricultural cooperatives and interested community members, will participate in the initiative.

What outcomes have these projects generated?

	Data collection / monitoring	Site identification	Technology testing / validation	Policy advocacy	Public engagement	Impact assessment	Testing business models
Step Change - Energy Communities/ Tenant Electricity							
AURORA							
STEP Change-Uganda							
Generation Solar							
Power to the People							

How do these projects map onto the energy transition framework?

Society, culture, and behaviour

- Data collection / technology testing / public engagement / testing business models

Equity and justice

- Data collection / technology testing / public engagement

Knowledge

- Data collection / technology testing / policy advocacy / public engagement

Energy markets

- Data collection / policy advocacy / public engagement

Energy policy

- Public engagement / Policy advocacy / Data collection / public engagement

Finance

- Testing business models

Infrastructure

- Site identification / technology testing / testing business models

Institutions

- Technology testing / data collection

Why should we be advancing work in this space?

Existing projects demonstration suitability of Citizen Science to tackle the varying pillars of Energy Transitions.

However, remaining gaps include activities surrounding **energy markets, institutions, and finances** during energy transitions.

Relative scarcity of citizen science initiatives in energy transitions could be influenced by:

- **Complexity** of energy transition projects requiring diverse skills.
- **Constraint** of resources, including funding and skills.
- Use of **alternative terminology** like 'participatory methods' and 'energy citizenship'.

Thank you!

For further discussion;
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