

Engineering X

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Transforming Systems through Partnership



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COMMUNITY SOLAR ENERGY IN COLOMBIA

Lead partner: Professor Juan Manuel España, Universidad EIA, Colombia

THE CHALLENGE

The transition to green energy creates opportunities for traditional energy users to start to produce, store and manage clean energy, as well as using it. Emerging digital technologies can accelerate this transformation and help integrate new market solutions. Colombia has a dynamic and growing economy and offers significant capacity in renewable resources. However, the country lacks capacity for generating evidence for testing and adopting the adequate technology innovations to facilitate this energy transition. The UK has one of the most liberalised energy markets, so it can share lessons learnt and guidance on how the regulatory environment should change to embed new innovative market solutions.



THE PROJECT

Between 2019 and 2022, three successive projects, implemented by the same team, addressed the rapidly changing nature of energy markets, reflecting on the need to integrate solar energy and storage in national power systems. The projects were led by Universidad EIA in Colombia and other partners included UCL (UK), EPM (a Colombian utility company), ERCO (a Colombian distributed energy resources company), and the Colombian Ministry for

THE PEOPLE

Professor Juan Manuel España, Universidad EIA
Professor Santiago Ortega Arango, Universidad EIA
Professor David Shipworth, UCL-Energy Institute
Alexandra Schneiders, UCL-Energy Institute
Carlos Enrique Velez, EPM
Silvia Castro, ERCO
Julián Zuluaga, Ministry for Mines and Energy

Mines and Energy (involved in the third project). EIA and EPM had collaborated previously several times, so their partnership on these three projects built on an existing successful relationship.

IMPACTS

One of the project's main achievements was successfully implementing a **pioneering peer-to-peer energy trading pilot** with 25 households in the city of Medellín in Colombia. This pilot, co-designed and co-developed with the community, helped better understand technical implementation challenges and regulatory barriers. It also created new business models.

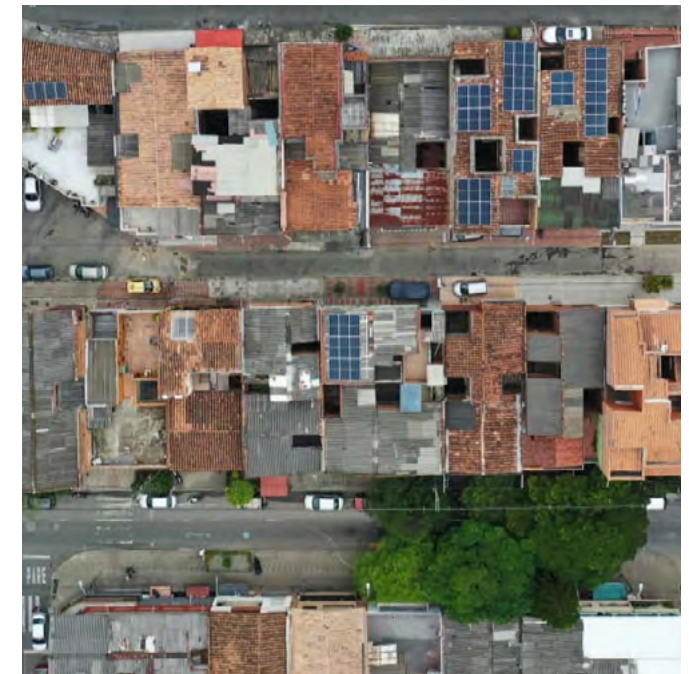
"We are seeing energy savings, more environmental awareness, more cohesion and collaboration among the participants of the pilot."

Professor Juan Manuel España, Universidad EIA, team leader

As part of the pilot, solar photovoltaic panels were installed in low-income households and a cultural centre serving Medellín's under-resourced neighbourhoods. This has led to **energy savings for households** who otherwise would not have been able to access renewable energy technology.

The partnership was based on an equitable model of cooperation between Colombian and UK organisations.

The projects have **increased Universidad EIA's reputation** as a research leader in community renewable energy in Colombia. A number of



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scientific publications have been published because of the projects. EIA has also become a member of the Transnational Centre for Just Transitions in Energy, Climate and Sustainability (TRAJECTS), a network of experts, offering local and transnational responses and ideas on climate change mitigation and just transitions. This has led to a six-month visit by a professor from the Technical University of Berlin at EIA. Building on the project experience, EIA has become an important member of the Latin American Network of Energy Communities.

“We are capitalising on the networks right now and we have [further] support from the Academy (a Frontiers Champions grant). We are looking at how university-academia collaborations in the region are consolidating, which is one of the key steps for future work.”

Professor Juan Manuel España, Universidad EIA, team leader



By participating in the projects, UCL built experience with community renewable energy solutions outside the UK. By working with Universidad EIA and ERCO, UCL developed and tested the robust peer-to-peer design process and explored how it can inform innovative problem-based learning environments. The projects have also **increased UCL’s profile** in an important emerging market economy.

The projects have **attracted international students** to Universidad EIA, from countries such as Morocco, France and Mexico, and other students are working on their theses in this area. In addition, the knowledge generated on the projects has allowed Universidad EIA to **develop a new undergraduate course** on energy-related topics.

The involvement of the Colombian Ministry of Mines and Energy has **paved the way for a quicker roll-out of the peer-to-peer energy trading**

model, by working with other key national and international actors. The projects have allowed the Ministry to **better understand the challenges and opportunities linked to integrating user-centred energy systems**.

Participation in the projects has positioned the industry partners, EPM and ERCO, as leaders in developing peer-to-peer energy trading solutions in Latin America. The projects have allowed them to **build networks and collaboration platforms with companies in other countries**.

THE FUTURE

The project team is actively looking for new funding opportunities to continue the successful partnership, and is open to working with additional partners. The team plans to engage with more energy utility companies in the region in order to move towards scaling up the peer-to-peer energy trading model. The team recognises that in the future, they will need to involve a larger share of the sector, not only one or two industrial partners, and this remains a challenge ahead.

SOURCES

This impact case study was prepared using information from an interview with the team leader, online resources and the final report.

- Project IAPP18/19_239: application and final report
- Project TSP19/20_1171: application and final report
- Project TSP20/21_100067: application and interim report
- Interview with Professor Juan Manuel España



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