

Could Colombia lead the Peer-to-Peer Energy Revolution?

What is peer-to-peer energy trading?

Peer-to-Peer (P2P) energy markets refers to the possibility that users have for transacting electricity with each other. The increase in decentralised energy, such as solar and battery resources, allow individuals and businesses to become *prosumers*, who can generate, store, trade, sell or share energy using digital technologies, including blockchain. P2P allows prosumers, who are producing more energy than they need, to trade with others for profit or donate energy. As with community self-consumption and other transactive energy models, P2P implies a new paradigm for planning and operating energy systems and a challenge to the traditional electricity sector, as modifications will be needed to facilitate a future energy system that will likely be user-centred, integrating a wide set of preferences and consumer behaviours.

The international case for peer-to-peer

P2P provides one of the tools needed by consumers to interact with energy markets and choose the way they produce, consume and interact with energy. In addition, disruptive technologies, including blockchain, Internet of Things (IoT) and Artificial Intelligence (AI), are penetrating all sectors of society and rapidly changing the way we live, work, and interact with one another. Thus, the combination of digital technologies and decentralized energy resources is likely to empower users and companies to develop disruptive business models in the energy sector. To understand these changes, utilities, start-ups and universities around the world are rolling out small and medium-scale trials with residential and commercial users. Box 1 provides examples of two exciting initiatives in Medellin and London.

Transactive Energy Initiative Colombia, Medellin

This pilot will connect 13 residential users across Medellin and a community centre, with different income levels, through a virtual platform. Three low-income users and the community centre will have solar panels installed on their rooftops and will trade energy with high-income users. The aim of this project is to understand what energy attributes are most valuable to different end user groups. This pilot is being developed by Universidad EIA, EPM, Erco Energía and University College London

CommUNITY Project, London

This initiative enables P2P energy trading by allowing residents at a social housing complex in London to exchange energy generated from solar panels installed on the rooftop. Using a mobile app, residents are assigned an amount of solar energy that they can use, share or sell to their neighbours. This project is part of the innovation trials approved by the UK regulator as part of its sandbox (Innovation Link) and aims to assess how people make decisions about P2P considering their understanding of the model, different tariff structures and their relationship with other members of the project. This pilot is being developed by EDF, Repowering London and University College London

P2P – an opportunity for Colombia’s energy transition?

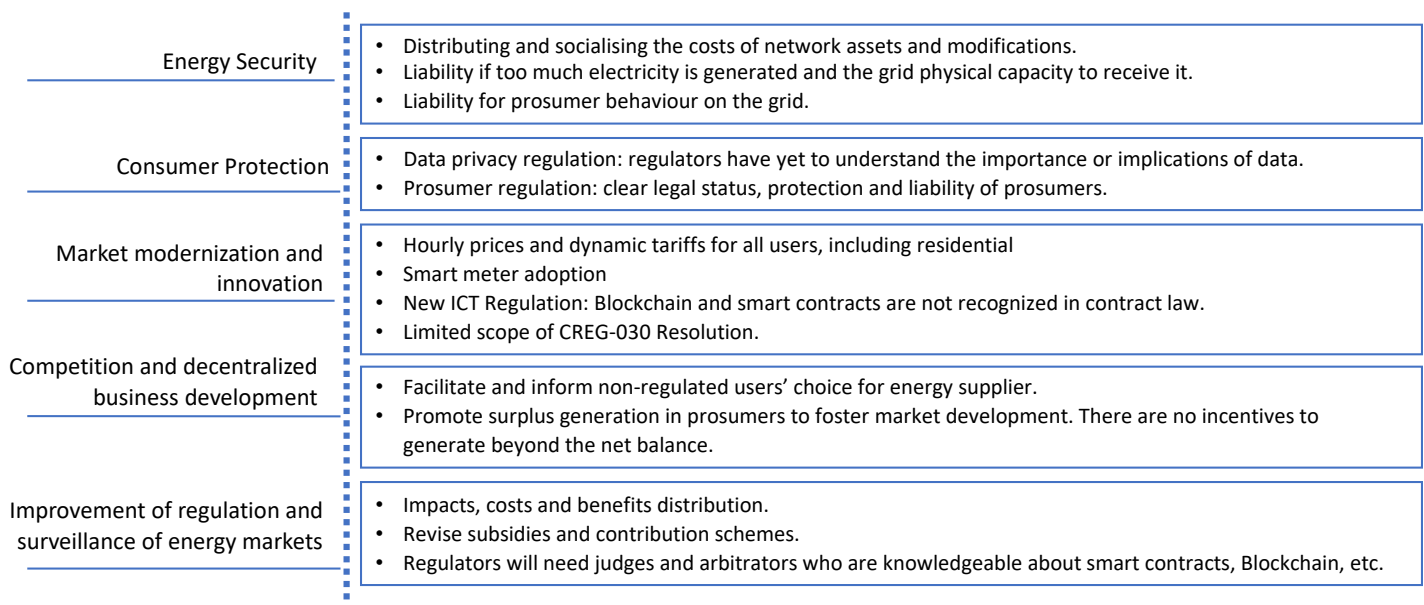
In 2019, the Colombian Ministry of Mines and Energy announced an expert mission to foster the energy transition that includes a strategic focus on decentralization, digitalization and efficient demand management. Aligned with this mission, P2P supports the transition to a user-centred energy system by creating new business opportunities for people and businesses. This is particularly interesting for rural and post-conflict areas, where communities are often dependent on agriculture and are most vulnerable to the impacts of climate change. P2P may help to improve the financial performance of renewable energy projects fostering economic growth in vulnerable regions.

However, several barriers should be addressed before P2P can become a viable possibility in Colombia, these include:

- *Incentives.* Currently, users have no incentive to generate and sell excess power beyond net-metering. This limits the possibility for P2P markets and reduces the generation potential of end users.
- *Smart meters.* Colombia aims to install smart meters across the country by 2030. However, to effectively create the conditions for early adoption of P2P markets and demand response, this roll-out should be accelerated.
- *Consumer choice.* Consumers currently have little choice regarding energy providers or tariffs. This lack of options constrains end-user understanding of energy behaviours, costs and alternatives.

As shown in Figure 1, these barriers are part of a wider set of regulatory challenges faced by P2P in Colombia.

Figure 1. Key regulatory barriers to P2P in Colombia



Recommendations for regulators

The continuing decline in the costs of distributed energy technologies offers an exciting opportunity for new energy models, such as P2P markets. Yet, the lack of an adequate legal framework may mean that users in P2P pilots could bypass the current market structure or go off-grid. Consumers could also be exposed to risks relating to data privacy and transparency. It is therefore vital that regulators address these issues in order to capitalise on the opportunities provided by these new energy configurations.

Key Colombian energy institutions, such as UPME, CREG and the Superintendence of Public Utilities, should work together and provide regulatory windows to give feedback to utilities, start-ups, and universities experimenting with new business models. Such 'regulatory sandboxes', which have been trialled in France, the Netherlands and the UK, can help provide an evidence-based framework to develop public policy in a complex and rapidly-changing environment.

Global collaboration with researchers and regulators will be crucial. Although every country is different, the challenges for energy systems and regulators resulting from P2P are similar. Colombia will need to engage actively in international activities on P2P, such as the Global Observatory on Peer-to-Peer, Community Self-Consumption & Transactive Energy Models, an Annex of the User-Centred Technology Collaboration Programme by the International Energy Agency.

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For further information on the Global Observatory on Peer-to-peer, visit <https://userstcp.org/annex/peer-to-peer-energy-trading/>