



European
University
Institute

ROBERT
SCHUMAN
CENTRE FOR
ADVANCED
STUDIES

FSR ENERGY &
CLIMATE
Florence School of Regulation

Peer2Peer:

New ways of Trading in electricity markets?

Jean-Michel Glachant (Florence School of Regulation)

16 December 2020 – 5th AIEE Symposium

Markets evolve & New Markets appear

- *Wholesale*
- *Retail*
- *Balancing*

- *How can they work?*
- *Are they useful?*
- *Do they have optimal designs?*
- *Do they have typical failures?*

- *Peer2Peer*
New type of market because new type of transaction: from “small” to “small”

- *How does it work? 4 Step*
 1. *Transaction loop*
 2. *Transaction ↔ Price Mechanism*
 3. *Transac+PriceMech ↔ Delivery loop*
 4. Σ ► *Choices for Governance*

1. The Transaction Loop

- *Providers not professionals & of small size*
- *cannot personally handle whole sequence of trade (signalling – matching – settlement- ex post disputes)*
- *cannot put products in ‘open place’ easy to visit (shop or shopping mall)*

- *Digitalization helps a lot*
- *Provides key information, records, scoring = giving signals, guarantees, reputation*
- *Strong synergies between “Digitalization” & “Decentralization of supply”*
 - > Jean Tirole (2016) substitutes to Akerlof (1970)*

1. The Transaction Loop (end)

- *Alternative products*
= *different characteristics*

- *Can be 'Energy' (as any electricity)*
- *Can be 'Renewable'*

(mundane RES? Idiosyncratic RES?)

- *Can be 'System Flexibility'*
(from demand response, storage, Electric Vehicles, etc)

- *Transaction loop*
= *core of Trade*

- *NO Trade if NO Transaction Loop beforehand*

- *Candidate to “automated transaction loop”*: **Blockchain** *(includes automation of payments; but Handling of Disputes?)*

2. The Price Mechanism

- *Price able to attract non-pro Providers & small Consumers*
- *Electricity already universal access ~ P2P has to attract both parties (kind of two-sided market)*
- *New value proposals ~ trigger price?*
- *Different prices for the different types of products?*
- *Each product-type's value is also fluctuating (time, location, system conditions as losses, congestion)*

- *Behaviour of non-pro & small Providers & Consumers varies*
- *Both traders small & non-professional ~ less microeconomics, more 'behavioural economics'*
- *Management of \sum DERs, storage, EVs, demand response, induces several "thresholds" on behaviour both sides*
- > *Need of sophisticated algorithms to get prices optimizing such particular trade*

2. *The Price Mechanism (end)*

- Σ (*Transaction Loop*) + (*Price Mechanism*)
= *Digital Platform?*
- *Yes, but...*
- *“Peer2Peer” is NOT a pure digital platform world*
- *Something very big is still missing...*

3. *The Delivery Loop*

- *Digital Platform cannot guarantee delivery <*> Blockade*
- *NO @Amazon here*
- *Elec. Grids control delivery in “Universal Access” world*
- *Off-grid, micro grid = meager niches*
- *Elec. Grids highly regulated: connection, operations, usages, tariffs*
- *Iconic “Brooklyn Microgrid” never built its private grid > cooperation with distribution company Edison*

- *Coordination of the 3 “TransacLoop”+“PricingMech” + “DelivLoop” is core & key*
- *“Sandboxing” interesting; but never coordinates “real life” of 3 pillars*
- *Only real life **coordination these 3** can tell what options & set of options are workable, scalable, business viable*
- ***Disruption** (TransacLoop + PricingMech) **needs Incumbent** (DeliLoop) = No simple agreement!*

4. Governance issues

- *Very demanding to coordinate the 3 (TransacLoop+PricingMech+DeliLoop)*
 - > *Special Governance needed*
- *Many candidates*

1- Platform (operating TransacLoop + PriceMech) with Grid Agreement = Intermediated Prosumers2P (IPr2P 😊)

2- Community of Peers acting collectively (internalizing TransacLoop + PriceMech) with grid agreement (or minigrid) = Collective P2P (CP2P 😊)

3- External Providers of “collective action” management transforming Energy Communities into “franchises” = Franchised Collective P2P (FCP2P 😊)

4- Aggregators, managing P2P relations & P2Grids relations in whole “energy services” contract (UK: Tesla – Octopus) = Business Internalizing P2P (B2P2P)

5- Grid Monopsony managing its own procurement from Peers with a sub-contracted “Digital Platform” = Peer2Grid (One-eye, One-arm P2)

4. Governance issues (end)

- *1st Family of Governance Structures*

“Simpler” Digital & Delivery Transac.

Products are:

- *Energy*
- *RES (mundane; or idiosyncratic)*

> Digital Skills for {TransacLoop + PriceMech}

↔ Benevolence of Grids for small RES

- *2nd Family of Governance Structures*

“Deeper” Digital & Delivery Transac.

Products added are:

- *Management of consumption & storage*
- *Delivery of System Flexibility*

> Higher Digital & Delivery Skills

↔ intimate coordination with grid system operation

Work in progress... Other Conclusions next Year 😊 😊 😊

THANKs to Anna Gorbatcheva (UCL) & Nicolo Rossetto (FSR) for stimulating discussions

And to go deeper into the topic... a few papers of mine

European University Institute
ROBERT SCHUMAN CENTRE FOR ADVANCED STUDIES
Issue 2018/16
September 2018

FSR ENERGY
Florence School of Regulation

The Digital World Knocks at Electricity's Door: Six Building Blocks to Understand Why
By Jean-Michel Glachant and Nicolò Rossetto,
Florence School of Regulation

Highlights

- Digitalisation is invading the electricity sector. How will it play out? Six building blocks, grouped into three categories, can provide the analytical framework required to navigate through the emerging digital world and the transformations that are taking place in the electricity sector.

European University Institute
ROBERT SCHUMAN CENTRE FOR ADVANCED STUDIES

WORKING PAPERS

RSCAS 2019/44
Robert Schuman Centre for Advanced Studies
Florence School of Regulation

New business models in the electricity sector

European University Institute
ROBERT SCHUMAN CENTRE FOR ADVANCED STUDIES
Issue 2020/36
October 2020

FSR ENERGY
Florence School of Regulation

Peer-2-Peer in the Electricity Sector: an Academic Compass in the Making
By Jean-Michel Glachant, Florence School of Regulation

Highlights

What is "Peer-2-Peer"?

- It is a new form of trading between small players: buyers and sellers. It became possible about a decade ago with a new wave of digitalization (internet, smart phones, cloud computing...) where small buyers and small sellers are easily able to meet, match, and trade.

What are the three pillars of P2P trade?

- P2P trade is demanding and builds on three pillars. 1° A "Pricing mechanism" able to give enough incentives to both small buyers and small sellers to trade in small-size units of goods. 2° A "Digital Transaction Loop" which permits these buyers and sellers to easily search for each other; match expectations; settle on quantities, characteristics, etc.; plus a dispute-resolution mechanism. 3° A "Delivery Loop" is as important as the transaction loop, because any trade will only satisfy the buyer if the delivery meets all his or her expectations.

Thank you for your attention
You can follow me on Twitter @JMGlachant
... already 76,000 tweets

