Summary: Launch Event of GO-P2P

The Global Observatory on Peer-to-Peer, Community Self-Consumption and Transactive Energy Models (GO-P2P) was launched on 2-3 September 2019 at University College London (London, United Kingdom). It was attended by 110 stakeholders from a range of sectors, including national and international policymakers, industry representatives, start-ups, utilities, non-profits and academics. Up to 15 countries were represented, mainly from Europe but also Asia, Australia, North America and South America.

This document provides a summary of both days. For further information on the Observatory please contact Alexandra Schneiders (a.schneiders@ucl.ac.uk).

Day 1- International Symposium (2 September, 10:00-17:00)

Session 1- Introducing the Global Observatory: why is it necessary, who will be involved and what will it achieve?

Welcome and introduction from Professor David Shipworth, DSM TCP Chair and Alexandra Schneiders, GO-P2P Operating Agent.

Some background: 'Meet the parents'

- There are 38 Technology Collaboration Programmes (TCPs) operating under the auspices of the International Energy Agency (IEA). The aim of TCPs is to develop evidence and research deliverables for use by participating Member States.
- The Observatory will be an 'Annex' of the Demand-Side Management TCP (DSM TCP). For more information on the TCP and its member countries, visit www.ieadsm.org.
- The DSM TCP will be renamed to User-Centred Energy Systems TCP ('Users TCP') in October 2019. The TCP's vision is to be the world-leading international collaboration platform for policy-relevant socio-technical research on user-centred energy systems.

What is the Observatory?

- Global drivers for local energy systems: Decarbonisation; Distribution; Digitalisation; Disintermediation; Democratisation; Differentiation. These are driving new user-centred business models in energy such as peer-to-peer (P2P)/transactive energy (TE) and community self-consumption (CSC). P2P/TE/CSC trials are being rolled out all over the world.
- To date there is no international forum for pre-competitive and early stage research collaboration into the whole systems implications of these models.
- The Observatory will provide a global platform for the exchange of valuable evidence on factors determining the uptake of these models and their viability across member countries.
- The aim of the Global Observatory is ultimately to inform national and international policy-making in an independent (i.e. unbiased and constructively critical), technology-neutral, evidence-based, pre-competitive way that is focused on collective good.

- The IEA is leading multilateral collaboration between global institutions including Clean Energy Ministerial (CEM) and Mission Innovation (MI). CEM is a ministerial-level organisation drawing together some IEA members. The aim is for Observatory findings to be fed into the IEA and CEM's outputs.
- Observatory member countries so far: Australia, Belgium, Italy, the Netherlands, Switzerland, the United Kingdom and United States. Note that we are keen for new countries to join!
- Project duration: 3 years and a 6-month reporting phase.

Management

- University College London (UCL) will be the Operating Agent of GO-P2P and will be represented by Alexandra Schneiders. She will be in charge of overall management.
- The Operating Agent is funded by the UK Industrial Strategy Challenge Fund 'Prospering from the Energy Revolution', through the EnergyREV research consortium. The consortium's aim is to study smart local energy systems in the United Kingdom (UK), including P2P.

Structure

- The bulk of the Observatory's work will be driven by researchers ('National Experts') from member countries. Note that the term 'researchers' here is not limited to academics but also experts working in industry and non-profits.
- It is envisaged that all research participants will be involved in collecting data from case studies (i.e. pilots/trials) in their own country, by participating in any of the sub-tasks of their choice outlined below.
- The Observatory will be structured into 'sub-tasks' (ST) representing the key aspects for the functioning of peer-to-peer and community self-consumption and led by leading research institutions in the field. They are the following:

1) Power systems integration- led by Delft University of Technology, the Netherlands;
2) Hardware, software & data- led by SLAC National Accelerator Laboratory, United States;
3) Transactions and markets- led by Carnegie Mellon University, United States;
4) Economic and social value- led by University of New South Wales, Australia;
5) Policy and regulation- led by European University Institute (Florence School of Regulation), Italy;
6) Observatory management and analysis of findings- led by University College London, United Kingdom.

Aims

- The evidence gathered by researchers from case studies will form the main evidence base for the Observatory's deliverables. These will be analysed to produce outputs including:

1) Reports on the common success factors for uptake of P2P/TE/CSC business models across different member countries;
2) A 'Readiness Index' determining how ready each country is for uptake of these models.

- In parallel, participants will be encouraged to collaborate on additional outputs such as joint publications and event organisation.

How would participation benefit me?

- The Observatory's aim is to provide evidence for all stakeholders in the peer-to-peer, community self-consumption and transactive energy fields.

- **Benefits for policymakers:**
  - International comparative evidence base for policymaking;
  - Early identification of policy challenges from other countries;
  - Early access to the latest research from leading research institutions.
- **Benefits for businesses/non-profits:**
  - Market knowledge on case studies and national readiness;
  - Work in a pre-competitive environment with all stakeholders;
  - Engage with leading researchers and research students.
- **Benefits for researchers:**
  - Join a global community of leading researchers in the field;
  - Maximise your impact through informing global bodies like IEA & CEM;
  - Work collaboratively to define and grow the field.

How can I join the Observatory?

- Please note that only DSM TCP member countries (see the list here: http://www.ieadsm.org/participation/) can join the Observatory. We welcome new member countries to the TCP, for more information on this please get in touch with the DSM TCP Chair David Shipworth (d.shipworth@ucl.ac.uk).
- **Policymakers from member countries & international policymakers**: Letting Alexandra Schneiders (a.schneiders@ucl.ac.uk) know that you would like to be kept informed of the Observatory's work; and/or being appointed as a national designated delegate to the DSM TCP by your national government, allowing you to attend its bi-yearly Executive Committee meetings;
- **Industry/non-profits established in member countries**: Becoming a research participant of the Observatory and joining one or more of its sub-tasks; and/or becoming a sponsor of the DSM TCP (10,000 euros/year), allowing you to attend its Executive Committee meetings and participate in any of the TCP's Annexes. For more information on sponsoring please contact David Shipworth.
- **Researchers based in member countries**: Becoming a research participant of the Observatory and joining one or more of its sub-tasks (note that participation is not remunerated, although some countries do provide funds for e.g. travel).
- For any information on becoming an Observatory participant, please contact Alexandra Schneiders (a.schneiders@ucl.ac.uk).

Session 2- Introducing the sub-tasks: Critical challenges in peer-to-peer energy trading & community self-consumption

In this session, sub-task leads introduced themselves and set out their visions on what the key design criteria are for peer-to-peer/transactive energy and community self-consumption systems from the point of view of their discipline. They also set out the opportunities and challenges presented by these models.

Sub-task 1- Power systems integration

Presenters: Ayman Esmat, Postdoctoral Researcher and Han La Poutré, Professor, Delft University of Technology (The Netherlands)

Ayman and Han are part of a lab building a blockchain platform called Xchange and are working on developing the peer-to-peer market layer that will be integrated within the platform.

Key design criteria for successful power system integration of peer-to-peer energy trading models:

1) Continuous balance of supply and demand;
2) Mechanisms for enabling flexibility;
3) Satisfying network constraints;
4) Making use of proper ICT systems.

Opportunities:

For consumers

- Awareness of achieving common goals: More renewable energy use will give consumers a feeling of contributing to wider societal and environmental goals;
- Competitiveness: Prosumers operate on the energy markets, directly or via aggregators or suppliers, on a level playing field without distorting competition. This competitiveness in turn leads to an increase in social welfare;
- Higher level of energy independence and control: Prosumers are entitled to own, establish, lease, and autonomously manage community networks.

For the grid

- Aggregation services yield more local flexibility;
- Increased flexibility leads to efficient network operation and utilisation;
- Decrease of peaks, losses and better congestion management in networks;
- New market opportunities and business models in network services.

Key challenges:

Technical challenges

- Operations and control techniques for imbalances in P2P markets;

- Taking into account network constraints in trading activities (including dynamic pricing);
- A fast and secure database for all P2P transactions and executions (e.g. Blockchain).

Legal challenges

- Rights and obligations of traders within a P2P trading community;
- Taxing of traders' revenues;
- Eligibility of (dynamic) tariffs for network usage;
- Market organisation of energy system- who is responsible for what? New roles and responsibilities.

Social challenges

- Unpredictability of human behaviour;
- Raising consumers' awareness of the changing energy system;
- Social acceptance of e.g. information sharing between peers.

Sub-task 2- Hardware, software & data

Presenter: Placeholder presentation by Professor David Shipworth (for sub-task lead SLAC National Accelerator Laboratory (United States))

Key design criteria for successful integration of P2P energy trading from an ICT and data perspective:

1) Revenue streams and investable business cases;
2) Risk management of liabilities;
3) Clarity and stability of privacy and data law;
4) Regulatory change to avoid data silo-ing.

Opportunities:

- Digitalisation is required for decentralisation and bi-directional energy flows at the grid edge;
- New business models;
- Development of new markets.

Key challenges:

- Security of cyber-physical systems;
- Recovery from data loss;
- Reducing data latency;
- Integration of new and legacy systems.

Questions for other sub-tasks:

- ST-1 (Power systems): What forms and volumes of data do you need captured, stored and transferred to manage power systems?

- ST-3 (Markets and transactions): How much and what forms of missingness can there be in the data before markets fail?
- ST-4 (Economic and social aspects): What forms of non-energy data are needed to construct economic and social value?
- ST-5 (Policy and regulation): What constraints do data privacy regulations place on the types and anonymisation of data?

Sub-task 3- Transactions and markets

Presenter: Lynne Kiesling, Co-Director of the Institute for Regulatory Law & Economics, Carnegie Mellon University (United States)

Working on Transactive Energy Service Systems (TESS) project with SLAC Lab, which looks at design issues of transactive energy, such as:

- Effects of Transactive Energy coordination on distribution system stability;
- Implications of TE coordination for grid architecture. Creation of several market layers with different locations, time and space. How can coordination across markets maintain physical balance of system?
- Use of a token-based ledger system for data security, as well as for the balancing and settlement of transactions.

Opportunities:

- Market design to make market rules match up with new cost profiles and dispatchability of distributed energy resources (DERs) as they proliferate in the system;
- Increase capacity utilisation by using market process and automation as coordination mechanisms;
- Avoid operational problems caused by increase in DERs.

Key challenges:

- Operational uncertainty- stability, spatial and temporal issues. Implications of spatially distributed markets for operational considerations (balancing, distribution etc.);
- Customer and utility adoption motivation. Financial and non-financial factors that will motivate whether they will be interested in adopting transactive systems;
- These small local markets are very granular in time and space, bringing up questions of liquidity and market power;
- Design questions, e.g. double auction or continuous order book? Extent to which transactive systems rely on price systems as the mechanism for communicating knowledge throughout the system;
- Regulatory barriers to experimentation and innovation.

Sub-task 4- Economic and social value

Presenter: Declan Kuch, Research Fellow, University of New South Wales (Australia)

Based on experience leading the Social License to Automate Annex within the DSM TCP, key design questions to take into account when considering the economic and social value of P2P/TE/CSC are:

- The importance of the why- how to connect to end-users with wider system problems, e.g. climate change, RE transition, local voltage (significant in Australia with increased solar penetration), ability to give to friends or neighbours. Understand people as social creatures, not just market actors responding to price signals;
- User and context sensitive design, e.g. work with users' knowledge, instead of assuming a deficit of it;
- What kinds of exchanges are desirable (money, barter, gifts etc.)? Cultural view of exchange.

Key challenges:

- Where is the whole system going? Is P2P looking to displace existing corporate structures or become a new distributed system? Is the challenge to scale 'up' or 'out'?
- If scaling up- run into regulatory issues (e.g. consumer & labour rights, market power rules) that you might expect in a normal enterprise. If out, how do you sensitise to the local area you are scaling into (i.e. local issues) and how do you build networks horizontally?
- Keeping end-users interested in system's underlying models, e.g. installation process of smart meters and batteries.

Questions for other sub-tasks:

- ST-1 (Power systems): How do you design a system in user-sensitive ways, e.g. shut off batteries during storms?
- ST2 (Hardware, software & data): How are privacy risks understood and managed in your jurisdiction? How do people weigh up the risk of privacy breach and solidarity if privacy is violated (this is a cultural question)?
- ST-3 (Markets and transactions): How can a diversity of transactions (such as gifts) be designed into the system? Cultural question of which type of transactions are valued by market actors;
- ST-5 (Policy and regulation): Who is the imagined subject of regulation- a customer, citizen, client?

Sub-task 5- Policy and regulation

Presenter: Tim Schittekatte, Research Associate, European University Institute/Florence School of Regulation (Italy)

Based on FSR's work as a training centre for energy regulators and research facility, it can say that these are some of the key policy/regulation considerations when it comes to the designing of P2P/TE/CSC models:

- There is an ongoing wave of 'electricity revolutions', all consumer-centric ('C2x'). Two main types are peer-to-peer and energy communities;
- A key question is why promote P2P models- Is their promotion in the energy market an end in its own right? Should regulation have an enabling or constraining role?
- It depends on the policy goals of governments, which actors will be impacted (and what their roles will be), and how to achieve these goals (i.e. regulatory choices available);
- The latter depends on the country, with some having several levels of regulation, e.g. federal regulatory structures and strong regional/local powers.

Opportunities:

- Increased awareness of energy efficiency potential and demand-side management;
- Wider socio-economic goals being met;
- Savings to future infrastructure costs.

Key challenges:

- A key challenge will be how to accommodate these models in an overly regulated energy sector. There are two layers of regulation ('hard', i.e. operation regulation and 'soft', e.g. consumer rights). These are very fragmented in some countries;
- Need to further define roles and obligations of new entities introduced by European Union legislation such as Citizens Energy Communities (CECs) and Renewable Energy Communities (RECs);
- Who should be the regulating authority? National Regulatory Authorities in some countries regulate some but not all actors/activities, e.g. suppliers/grid managers but not consumers. Consumers are protected by consumer authorities/data regulators. These authorities have competing interests, e.g. data protection type issues versus promoting risk-taking/flexibility as active consumers.

Q&A Session

- There seems to be a theme of common challenges and opportunities presented by data across all sub-tasks.
- The priority as an Observatory should be to collect quality empirical evidence from existing trials, rather than try to predict the future.
- An issue will be the interoperability between old and new solutions. Standards will need to be developed, and regulatory tools such as sandboxes will also be key in assessing regulatory options.

- Technology options such as Blockchain will need to be evaluated. The assessment of the technology supporting transaction tracking (e.g. Distributed Ledger Technology) will be done within the ICT/data layer sub-task.
- There are contrasting challenges in different regions, and a wide range of regions/continents will be included in the Observatory.

Session 3: What can we learn from current trials and tools?

One of the main aims of the Observatory will be to draw lessons from current tools and trials. This session focused on current trials being rolled out in the United Kingdom, across Europe, and internationally in Colombia (Medellín). Presenters were asked to set out their trial's main benefits, challenges and what they think is needed for it to evolve into a full commercial offering.

James Johnston (CEO, Piclo Energy) on Project LEO in the UK

- Project LEO (Local Energy Oxfordshire) addresses the challenges of adding renewable electricity into an already constrained distribution grid. Project timeline: April 2019-March 2022. Lead partner is the local Distribution System Operator (UKPN).
- The goal of the project is to launch a series of practical trials to demonstrate commercially viable P2P, TE and CSC models at county scale.
- Piclo has developed a marketplace for trading flexibility online locally. So far 4.5GW of flexibility has been registered from 200+ providers. £450k of flexibility transacted in first DSO auction.
- Key outputs include: novel local (flexible) markets and investment models, finding out what the future DSO model will be (i.e. how can it act as a neutral facilitator for markets?), datasets for research (understanding how the project can be replicated elsewhere) etc.

Three market models are being explored through the project:

1) DSO procures flexibility services;
2) DSO plays a crucial role in facilitating local operations but is not the one buying services. The DSO creates boundary conditions where value is created and transacted;
3) No central role played by DSO, assets optimise own services.

Examples drawn from within model 2:

1. Making flexible connections a tradable commodity
- Agreement with DSO to connect but only under certain circumstances.
- Making capacity a tradable commodity - enabling generators who want to connect to the grid to take offers from local flexibility services.
- Requires intervention from DSO.
- Can be done market-led within constraints, rather than top-down.
- Benefits: include faster connections, lower cost (i.e. make offers for flexible connections a competitive process).

- Challenges: how to interact with complex DSO connection processes, bankability of flexible alternatives.

2. Authorised supply capacity trading (ASC)
- Large buildings have agreed capacity, they can take up to a certain amount from the grid.
- Capacity is not currently seen as a tradable commodity. Under this model, unused capacity could be traded.
- Benefits: market mechanism to allow increased utilisation of distribution grid through reallocation of authorised supply capacity.
- Challenges: lack of strong commercial initiative, how to integrate with legacy DSO ICT systems.

Thoughts on commercialisation:

- P2P: this model requires locational nodal pricing (LNP), and there is hesitation from the regulator to move to a radical LNP model in the short term (perhaps due to a perception of lack of fairness?).
- Another way of P2P trading, such as P2P capacity trading (flexible connections and ASC trading) may get more traction in the short term. This presents its own challenges to still be overcome.

Natalie Samovich (Head of R&I, Enercoutim) on the European projects SHAR-Q H2020 and VICINITY H2020

Three developments have enabled P2P:

1. Development of solar - Leading to distributed energy;
2. Intelligent edge - Devices that can communicate and produce additional value;
3. Connectivity - 5G, reduction of transaction costs in exchanging energy.

Involved in two Horizon 2020 research projects on digitalisation and decarbonisation, spanning several European countries and aiming to enable P2P not only in the electricity sector but also beyond.

VICINITY:

- Digital platform to unlock semantic interoperability. Platform allows connection of various digitally enabled devices to participate in flexibility and P2P trading.
- Platform can be used by various actors in market, e.g. node operators.
- Passive measures along active measures are needed: financial incentives, carbon offset, electricity cost reduction and systems monitoring; along with consumption patterns optimisation, existing systems performance optimisation and blockchain incentives.

SHAR-Q:

- A smart collaborative platform enabling P2P by connecting the capacities of the neighbourhood and wide regional electricity generation as well as storage capacities.
- Aims to create an innovative, responsive, smart and active neighbourhood and optimum utilisation of DER assets.

- Demand response programmes can be deployed to leverage local prosumers' production, helping DSOs to balance the grid and cover the peaks.
- SHAR-Q provides optimisation of consumption patterns thanks to accurate weather prediction services and consumption estimations. The platform communicates when it is beneficial for the neighbourhood to use large consumption appliances.

Upcoming project in Guincho (Portugal) looking at future energy community models:

- Key question there is on the optimal size of the community.
- Start with 100Kw - doesn't get to DSO services; really local P2P.
- What is the smallest, most optimal scale we can operate with?

Additional considerations:

- Golden rule: interoperable, instant, scalable, transactive and secure power platforms.
- Building blocks for more flexible, highly participatory and multi-sided cross-domain marketplaces of the future: Internet of things, artificial intelligence, distributed ledger technologies and governance ethics.
- Economic incentives for energy communities and P2P are important but even if participants want to be part of the system, they are asking about payback/value of participating; e.g. as a contributing individual for carbon offset, what recognition do I get?
- Latest AIOTI White Paper sets out the stages of IoT marketplaces.

Juan Manuel España Forero & Santiago Ortega Arango (Universidad EIA) on P2P trading in Medellín, Colombia

Involved in the Transactive Energy Colombia Initiative.

Project aims:

- Implement a transactive energy pilot based on blockchain platform with DERs;
- Provide technical and regulatory recommendations for transactive energy (TE) models in Colombia;
- Define a scaling route for TE models and design a business model for the Colombian case.

Project details:

- Timeframe: April 2019- September 2020. Main funders are UK Royal Academy of Engineering and Empresas Públicas de Medellín (EPM).
- Part of the project is a pilot in Medellín, which will start in October 2019 and will be gathering data over the next 12 months.
- Pilot demonstrates P2P as a way of enabling the democratisation of energy.

- Participants: 3 low-income households (w/ PV and smart meter), a community house in the lower income area (w/ PV, battery and smart meter); and 3 high-income prosumers (w/ smart meter), as well as 6 medium-high income consumers (w/ smart meter).
- Virtual P2P network set up to enable virtual 'trading' (provided by Erco Energía).
- Benefits: allows people without rooftop space to purchase solar power; a direct market beyond cross-subsidies between socioeconomic strata.
- Side note on cross-subsidies: Public policy instrument in Colombia to allocate cross-subsidies between well-off and poorer areas, i.e. energy consumers in poorest parts of country get subsidies, while residents of richer areas pay more for their energy to cover the cost of subsidies.
- Challenges: There is no regulation in Colombia that allows for such a P2P scheme (yet). The pilot will use real data, but users will trade in a 'virtual market'.

Some key economic, social and regulatory considerations:

- Very different social context to Europe. How will different population groups in Colombia perceive P2P? Will it depend on who produces the energy, i.e. it is part of a social transition, such as supporting neighbourhoods recovering from violence? Consumers, particularly from richer areas, might be willing to pay more because of values beyond monetary ones.
- How much are consumers willing to pay? What would be the most appropriate market scheme taking into account their preferences? How do we capture this value and make it into a business model?
- The project will evaluate a "virtual market" using data from real users. A regulatory window to have a real pilot will need to be established- could this be in the form of a regulatory sandbox?

Q&A Session

- Questions of whether consumers should be told which technologies are used in the trials. Panel members agree that it is not of relevance to participating consumers which technology underpins the system. The interface with the customer is more important than the technology.
- Stages of project LEO (3 years): 1st year is for understanding which models will be tested, 2nd year is for small scale trials, and 3rd year is for a large-scale trial.
- Questions around whether results from pilots are generalisable: if they do not involve prosumers' own resources and money then how can you measure willingness to take risks?

Session 4: What are stakeholders' key evidence needs?

This session consisted of short contributions from key Observatory stakeholders such as policymakers, industry representatives, non-profit entities, SMEs, and utilities. During the session they each set out their evidence needs to help them assess the merits of peer-to-peer, transactive energy and community self-consumption business models. These will be key for the Observatory to take into account in its deliverables.

Power Ledger (start-up)- Jemma Green, Co-Founder and Chairman

- Background: Currently rolling out trials of P2P and transacting of environmental commodities in Australia and other countries such as Austria, United States, and Thailand.
- In the centralised energy sector, physical system provides pre-conditions for what the market should look like.
- Transition to decentralised market thanks to increase in solar PV and battery storage. There is a limit to the extent to which new market models can change the physical system. Blockchain technology is a market mechanism that could radically change the physical system.
- It would remove the need for intermediaries and create a scenario where households with solar PV could dispatch energy into the grid as virtual power plants (VPP) and receive payment the same day, based on the amount of battery electricity that is dispatched.
- These households will need to have bigger batteries to participate. If there is no market mechanism, they will install a small battery to only supply themselves.
- Market mechanism can change behaviours of prosumers and overarching system.

Electron (start-up) – Jon Ferris, Strategy Director

- Background: London-based energy technology company, combining blockchain and energy expertise to design and build digital infrastructure for the energy industry.
- With transactive energy, there will be a move towards dynamic tariffs and markets that reflect the true value of the system. However, cost-reflective prices may adversely affect those least able to pay.
- There will need to be a socialisation of costs based on time and location, as well as embedded benefits. However, tariffs interact with and may distort markets.

Key information needed from GO-P2P:

- How can regulators regulate and understand what's going on in the market 'beneath the radar'? How can they enable innovation?
- Need definitions of community energy, P2P, transactive energy etc.
- How to allow value to emerge rather than determining where it needs to be (i.e. value is increasingly locational, dynamic and not necessarily sustainable).
- When prosumers are able to sell excess power is correlated with when prices are lowest: is there value in this market? What are the other attributes that will make value sufficient for prosumers to participate in P2P?

EDF Energy (energy company) – Maria Brucoli, Manager, Smart Energy Systems

- EDF Energy R&D UK Centre is involved in the CommUNITY (Community Urban Neighbourhoods Internal Trading of energY) project in Brixton in South London, being delivered through the Ofgem regulatory sandbox.
- The trial is aimed at designing and implementing the new infrastructure to support a local energy market based on P2P energy trading.

- Energy trading will take place at building level, with PV installed on rooftop of building block.
- Developed a market with local assets, i.e. users are able to use their energy when needed and decide what to do with any excess (focus on empowerment). Through mobile app they can trade energy, able to set their own trading preferences.
- Data integration platform and marketplace algorithm - implemented some aspects using blockchain technology.

Key information needed from GO-P2P:

- Identify key values and performance indicators to enable comparison across projects. This is a challenge at the moment around P2P/TE- it is difficult to compare and get reliable information on trials.
- Understand whether people will engage. Social engagement and acceptance are very important aspects to consider, and we need data on this that we can trust in order to inform future investments.

Empresas Públicas de Medellín (utilities company)- Carlos Vélez Restrepo, EPM Innovation Department

- EPM is a multi-utility public company based in Colombia, which has investments across Latin America including Chile and Mexico and services up to 20 million people.
- The current regulation in Colombia does not allow for exchange of kWh between energy users (only with the utility).
- EPM has a venture capital fund that has invested in start-ups such as Erco Energía, which provides the platform for the energy trading pilot in Medellín (presented in Session 3).
- "In order to swim you have to jump into the pool": EPM's main objective as an incumbent operator is to assess the risks and opportunities of new business models such as P2P energy trading.
- Results from the pilot will be shared with regulators to inform the development of the regulatory framework around these business models.

Sustainability First (non-profit)- Judith Ward, Associate

- Think tank working on smart energy topics from consumer, policy/regulatory and commercial standpoints.
- Treatment of 'winners' and 'losers' is very important for questions of fairness and allocation of costs in the transition (and beyond), including for P2P.
- A transactive system designed to maximise flexibility is likely to be considerably more cost reflective, with a tendency to less cost-socialisation in the system.

Key information needed from GO-P2P:

- We need to understand not only the benefits and opportunities of P2P, but also how to address barriers to participation for those who might struggle to be flexible and at risk of 'being left behind'.

- How to consider what 'fair' looks like in a P2P world. How far should we seek to ensure that the residual – and / or peak-related – 'fixed' costs of the wider system do not simply fall on a shrinking pool of left-behind consumers? How can we ensure fair and inclusive retail tariffs?
- Need country comparisons from the Observatory on how policymakers and regulators tackle questions of who is left behind in transition and fairness in P2P models, as well as how they build the evidence base to answer this question.
- How best to understand the distributional impacts of P2P? Data is absolutely critical to this;
- Given privacy rules (and in Great Britain, smart meter privacy-by-design), will policy makers/regulators have access to enough and sufficiently granular consumer data to truly understand how markets are evolving and how to judge whether people will be left behind in a P2P world?

Swiss Federal Office of Energy (policymaker)- Marine Pasquier, Energy Supply and Monitoring Specialist

Key information needed from GO-P2P:

- In Switzerland there is an ongoing P2P trial called 'Quartierstrom' with 40 houses, which is not taking place within a sandbox, but is experiencing legal restrictions for example with defining flexible grid costs.
- Evidence of whether P2P models could have added value for the Swiss energy system and how they could help the country reach its energy and climate policy goals (i.e. Switzerland wants to phase out nuclear power, be CO2 neutral by 2050 etc).
- Influence on/from regulation - are there regulatory barriers restricting innovation in this area? Do we need a sandbox in Switzerland- if so, how can we implement it?
- Is P2P creating new roles in the energy system for the government/regulators? Will need to define who is responsible for maintaining security of supply.
- Other aspects such as contracts and insurance questions will be relevant. Should we wait for the market to come up with new regulation or should we be proactive and start defining new rules now?

Q&A Session

- A considerable focus in the UK sandbox is on fairness and communication with customers in particular. They need to be able to make informed decisions and it is challenging to explain P2P markets to them.
- Sandboxes should cover all topics related to P2P, where innovation is being restricted. These range from directly related issues such as metering and balancing & settlement, to non-energy specific issues such as contracts and data privacy.
- Current debates on the costs paid by consumers in their energy bills are arcane and very technical. Need to involve the consumer in these discussions more in order to be able to determine what is a fair way of charging them.
- Value proposition of P2P markets depends on countries, e.g. Colombia does not suffer from the same network constraints as the UK.

- Why the focus on P2P trading of electricity and not of other sources such as gas? At this moment it is easier to test P2P with electricity, due to increase in installation of solar PVs/other DERs. Gas market is still dominated by big players and not settled as frequently as electricity. In gas sector don't have local constraints leading to consumer behaviour change in electricity sector.
- There is a necessity for energy businesses and utilities to investigate new models such as P2P energy trading, since there is currently a demand for P2P markets in society (e.g. accommodation, transport). Energy businesses should not automatically think that their existence will be threatened by P2P models, but rather investigate what their role could be within these models.
- Need to have government intervention but also beware of trying to do everything top-down. P2P trials will bloom and will join up to form an ecosystem, slowly growing bottom-up. For these ecosystems we need to have (evidence-based) safeguards in place to protect consumers.

Close

Side-note on 'Watts the Deal?': The Peer-to-Peer Energy Trading Boardgame

- Attendees are invited to play the peer-to-peer energy trading boardgame 'Watts the Deal?', developed by the UCL Energy Institute (as part of the EPSRC grant PETRAS 'Internet of Things (IoT)').
- It was first tested with the public at the Manchester Science Festival in October 2018 and has since been played by a range of stakeholders, including the UK energy regulator and energy consumer association.
- While playing the game you are put in the shoes of a consumer engaging in P2P energy trading. This game challenges the top-down perspective taken so far when looking at this business model. It can be useful tool for engagement with e.g. trial participants, so they can get a sense of what P2P is about.
- The game can be downloaded online on http://wattsthedeal.org. If you wish to order a hard copy, please email Alexandra Schneiders (a.schneiders@ucl.ac.uk) or Michael Fell (michael.fell@ucl.ac.uk).

Photo credit: Manchester Science and Industry Museum

Day 2: First working meeting of (interested) research participants (3 September, 10:00-15:45)

The second day of the launch event was the first working meeting of Observatory participants, during which deliverables and the work programme for the next six months were discussed. Participation to the Observatory is open to academics (i.e. research staff and PhDs), as well as researchers/experts active in the field from industry, non-profits and international organisations.

Session 1: Introducing the DSM TCP and the Global Observatory

Welcome and introduction from Professor David Shipworth, DSM TCP Chair and Alexandra Schneiders, GO-P2P Operating Agent.

For background information on the Observatory, please read the summary of Day 1 (Session 1) above.

Benefits of cooperating with the IEA:

- The International Energy Agency is the only intergovernmental body that provides a legal basis for collaboration between countries on energy issues at the global scale.
- While the IEA includes OECD members, its TCPs have a more global focus, i.e. IEA Association & Accession countries as well as IEA Partner countries can join TCPs.
- The IEA is leading multilateral collaboration between global institutions including Clean Energy Ministerial (CEM) and Mission Innovation (MI). CEM is a ministerial-level organisation drawing together some IEA members. The aim is for Observatory findings to be fed into the IEA and CEM's outputs.
- A sense of the scale of output from a TCP Annex can be understood from the example of *Annex 66* of the EBC TCP on *Definition and Simulation of Occupant Behaviour in Buildings.* Researchers collaborating in the Annex have so far delivered 1 book, 105 journal papers and 19 conference proceedings over the three years of the Annex. They also created a new Annex 79, to continue the work.

Researcher participation:

- Researchers ('National Experts') will be the driving force of the Observatory, collectively shaping its deliverables.
- National Experts are expected to:
    - Join one or more sub-tasks aligning with their expertise (see list of sub-tasks below);
    - Help undertake case studies of P2P/TE/CSC pilot projects in their country to support the development of key Observatory deliverables (i.e. international comparative reports and Readiness Index);
    - Contribute to conferences sessions, special issues, etc as desired;
    - Attend bi-yearly Observatory meetings whenever possible and help host one of the meetings;

- Support the Operating Agent in disseminating the results of the Observatory's work, including among their own networks.

Observatory sub-tasks (STs):

1) Power systems integration- led by Delft University of Technology, the Netherlands;
2) Hardware, software & data- led by SLAC National Accelerator Laboratory, United States;
3) Transactions and markets- led by Carnegie Mellon University, United States;
4) Economic and social value- led by University of New South Wales, Australia;
5) Policy and regulation- led by European University Institute (Florence School of Regulation), Italy;
6) Observatory management and analysis of findings- led by University College London, United Kingdom.

Important points on participation:

- National Experts should ensure that the Observatory's work aligns with their current (funded) research/work on the topic. Participation is not remunerated (note that some governments fund related participation costs such as travel costs).
- There is no strict requirement as to how much time participants should dedicate to the Observatory. This is entirely up to the participants' discretion, depending on their commitments.
- There is no limit as to the number of participants that can take part from one organisation. In order to have a varied set of disciplines, the more organisations from a country that are willing to participate, the better.
- National Experts will be working at organisations established in one of the member countries of the Observatory (Australia, Belgium, Italy, The Netherlands, Switzerland, United Kingdom and United States). Note that we are keen to include new countries, so if you are a researcher from a non-member country and wish to participate, please get in touch with Alexandra Schneiders (a.schneiders@ucl.ac.uk).

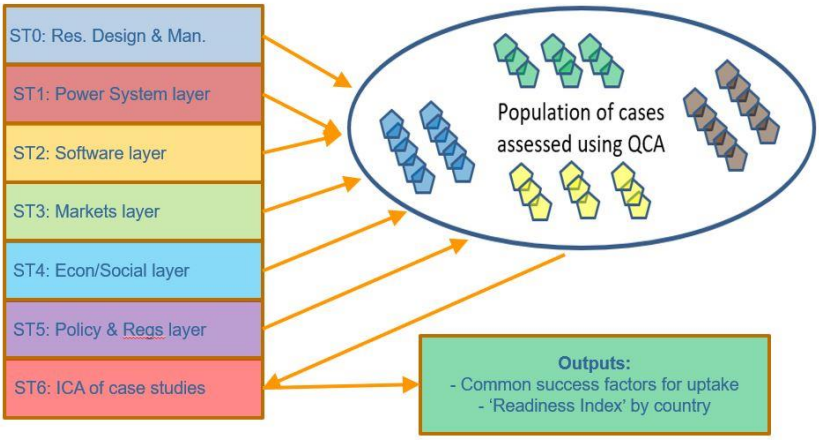
Management:

- University College London (UCL) as Operating Agent, represented by Alexandra Schneiders, will be responsible for the overall management of the Observatory ('sub-task 0'). This includes, amongst others, the scheduling of bi-yearly physical meetings, agreeing methods of collaborative working, establishing protocols of contact with case studies and coordinating sub-task outputs.
- The Operating Agent of the Observatory will also be responsible for regularly reporting back to the DSM TCP Executive Committee and the representatives of participating member countries on work progress of the Observatory.
- Sub-task leads will be responsible for providing intellectual and project leadership by coordinating their sub-task's deliverables, which will contribute to the main Observatory outputs of international comparative reports and Readiness Index. They will also be responsible for identifying additional opportunities for their sub-tasks such as writing joint articles and organising side events at conferences.

- Sub-task leads will be part of the Observatory Management Group, along with the Operating Agent. Each sub-task lead is responsible for a first quality check of the outputs of their own sub-task. The Operating Agent and the DSM TCP Executive Committee will provide a second quality check.

Data analysis:

- UCL will also be responsible for coordinating the analytical work underlying the Observatory's key deliverables ('sub-task 6').
- The evidence collected from the P2P/TE/CSC case studies, gathered by all the sub-tasks, will be analysed using a comparative analysis method such as Qualitative Comparative Analysis (QCA). For an overview see the image below.
- QCA enables the drawing of common contextual factors in different regulatory and social environments. It is useful in cross-country comparisons because of its ability to treat individual countries holistically as politically, historically and culturally unique entities with meaningful combinations of parts (instead of trying to make these countries fit single models).
- The use of QCA is however not set in stone, and we encourage discussion on whether there are other more suitable methods for comparative analysis.



Timeline of work:

The Observatory will be managed using agile methods (e.g. individual tasks carried out in 3-month 'sprints'), in order to produce useful outputs throughout the project's duration. There will be three broad phases (see Gantt chart below for overall timeline):

1. Task establishment (months 1-6)

The aim of this first phase is to establish the necessary research architecture to ensure that robust and policy relevant research is undertaken. The main tasks that will take place during this phase will be:

- Undertaking concept mapping and scope definition: How do different countries define P2P/TE/CSC trading?
- Undertaking policy epistemology interviews: What evidence is needed to inform policy and regulation in different countries?
- Developing the research design: What methods are best for delivering defensible evidence of the type most useful for policy makers? Which methods and templates do we use for the collection of case study data?
- Starting sub-task targeted literature reviews: What are the key factors in each sub-task layer constraining or shaping the design of P2P/TE/CSC business models?

2. Iterative development and review (months 7-33)

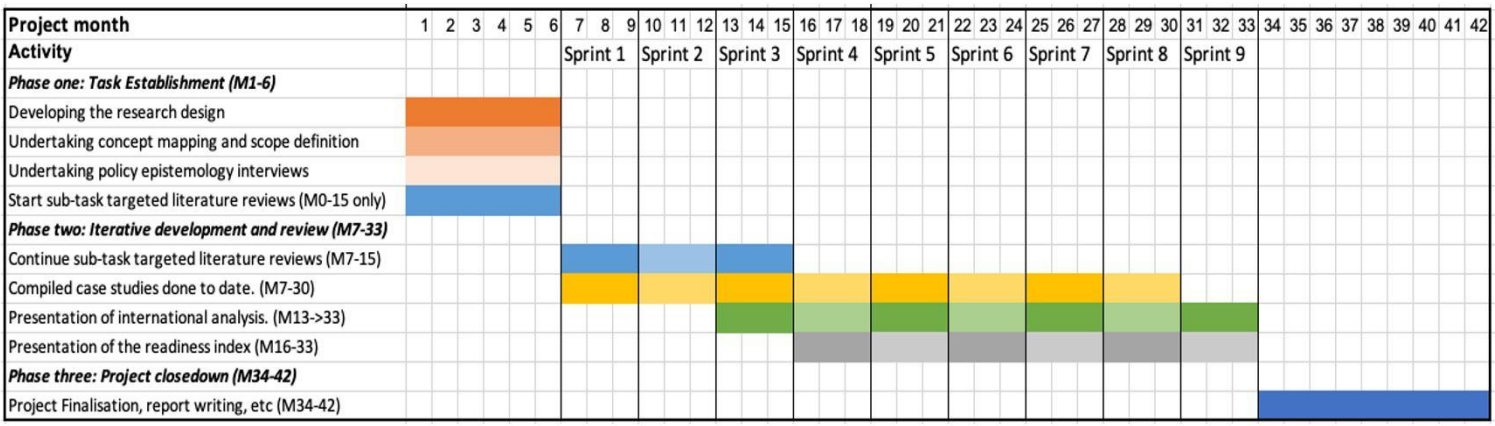
This phase will focus on data collection from case studies and data analysis, the result of which will be reports providing a comparative analysis of (factors influencing the) uptake of P2P/TE/CSC models across countries, as well as a Readiness Index. The main tasks undertaken during this phase will be:

- Finish literature reviews;
- Identify and undertake relevant case studies in each participating country;
- Undertake international comparative analysis based on the case study data using an appropriate analytical framework;
- Write reports on 'Key factors governing uptake of P2P/TE/CSC business models', i.e. when assessed globally, what common environmental (technical, social, economic policy & regulatory) factors can be identified for each sub-task layer that support or inhibit uptake of these business models in participating countries?
- Develop a National Readiness Index from the common success factors in participating countries and apply to each country, i.e. how ready is each participating country for adoption of P2P/TE/CSC business models? Which factors are limiting adoption?

3. Project Closedown (months 34-42)

- Finalising key deliverables;
- Preparation of Final Task Report for the DSM TCP Executive Committee.

Task Gantt Chart



Q&A Session

- Case studies will be studied by all sub-tasks, thereby covering all essential aspects of P2P/TE/CSC models. We should ensure that all member countries are represented in each sub-task.
- Topics such as waste disposal/management, circular economy and decarbonisation- will they be part of the Observatory's focus? It depends on the country's policy focus. If these are government priorities, then they can be taken into account when looking at case studies. Topics such as waste could also come to the forefront if they are found to be a direct consequence of P2P/TE/CSC models.
- In cases where the regional/local context is key in determining a pilot's success, the criteria for data collection will have to be re-adjusted (i.e. from a national to a local focus).
- No quantitative targets have been set with regards to the number of reports to be produced by the Observatory, the deliverables described above have been designed at a minimum. Participants can choose to go beyond this.
- Readiness Index: It will show how close a country is to commercialising P2P/TE/CSC business models and to adoption of these models. It could be based on a 'traffic light' system for each criterion. Worth considering renaming it to 'Progress Index', as these are constantly evolving business models.
- Failed trials should definitely be included in the research framework. Obtaining information from failed trials will be an interesting challenge for the Observatory.

Session 2: Presentations by Observatory sub-task leads on their vision for their particular sub-tasks

Sub-task 1- Power systems integration

Presenters: Ayman Esmat, Postdoctoral Researcher and Han La Poutré, Professor, Delft University of Technology (The Netherlands)

As made clear in the presentation of Day 1, the efficient operation of the power systems integration of P2P/TE/CSC models depends on the balancing of challenges and opportunities.

The mission of the sub-task will consist of a journey with four main 'stops':

1) Value proposition: Evaluate the main (technical and economic) benefits to the grid of P2P, as well as the challenges currently affecting power system operation;
2) P2P design: Assess the design of P2P mechanisms by looking at the impact of different configurations on the power system, taking into account network constraints in trading activities (including dynamic pricing) and asking ourselves 'how far should we aim when it comes to the "decentralisation" of the system?';
3) P2P issues: Consequently, we will focus on the issues relating to the integration of P2P market models, including:

- Operations and control techniques for imbalances in P2P markets;
- Market closure periods and settlements periods;
- Complexity of decentralised trading structures;
- Dealing with decentralised technical data.

4) Case Studies: Study national and international projects in order to see what others have done. This compilation of case studies will be followed up by further analysis such as on lessons learned.

This process will be accompanied by:

- Literature review and state of the art prognosis;
- Events will be organised with sub-task participants and other sub-tasks;
- Findings will be summarised in journal articles and reports.

Sub-task 2- Hardware, software & data

Presenter: Placeholder presentation by Professor David Shipworth (for sub-task lead SLAC National Accelerator Laboratory (United States))

Hardware, software, ICT and data aspects are the glue that bind and align the power grid and market layers of P2P/TE/CSC models. The aim of the sub-task will be to:

Evaluate the role of hardware, software and data ontologies on the functioning of P2P/TE/CSC markets. Topics include:

- Who has the capacity and responsibility to govern these structures if they are decentralised?
- What are suitable sensing technologies to collect the required data?
- Interoperability of algorithms.
- How to deal with distributed data, particularly data which is embedded in local parts of the system?

Evaluate the key enablers and constraints arising from existing and likely future ICT solutions. Topics include:

- The architecture of the hardware, data structure and locations will vary significantly between countries.
- Markets can be backwards or forward looking. Forward looking markets should be able to predict demand and generation reliably. There are also related data challenges.
- In the future there will be a mix of physical and virtual metering solutions. How can they be constructed and what data can be received from them?
- Interoperability of data standards in the integration of new and legacy systems.
- Risk of playing catch-up with regulation.
- Understanding what the new designs of data ontologies could enable.

Sub-task deliverables will include:

- Concept mapping and scope definition- How do different countries define P2P/TE/CSC?
- Targeted literature review and 'key factors' reports- What are the key factors in this sub-task layer constraining or shaping the design of P2P/TE/CSC business models?
- Study P2P/TE/CSC case studies.

Sub-task 3- Transactions and markets

Presenter: Lynne Kiesling, Co-Director of the Institute for Regulatory Law & Economics, Carnegie Mellon University (United States)

As a sub-task, we will need to set priority research areas for us to address, including but not limited to some of those set out on Day 1:

- Epistemology of market designs is necessary, when designing transactive systems using price systems to coordinate the actions of individuals with different resources in terms of size and location.
- As we move towards more automation, what should be the price content of the market design?
- Complexity of regulation (local, regional, federal, national) and its impact on innovation in market design.

We will need to ask ourselves the following questions when planning our work:

- What challenges would you add to/subtract from the above list and why? This can be heavily influenced by researchers' own projects.
- What are the deliverables we can produce through this initiative?
- How do those deliverables intersect with/incorporate the other sub tasks' deliverables?

These questions are important as we will aim to provide policymakers with evidence-based information, helping them make decisions on TE market designs. Furthermore, as there are overlaps with other sub-

tasks, we will need to ensure that STs inform one another and they complement instead of substitute each other's work.

Sub-task 4- Economic and social value

Presenter: Declan Kuch, Research Fellow, University of New South Wales (Australia)

Vision for the sub-task- Innovation often requires peripheral vision, rather than intense and narrow focus. Topics we will focus on:

1. Understanding the 'why': What are the main issues? Why are institutions configured a certain way?
2. Design arrangements: When and how can we bring end-users in? As highlighted in Day 1's presentation, installing and running P2P systems will be an iterative process with multiple actors involved. How can we keep end-users involved and interested throughout this process?
3. How to coordinate: What do participants *think* is happening in P2P systems? People should not be considered as simply responding to price signals but as social creatures with a much deeper characterisation. People are curious and interested in understanding, but they may understand things differently from experts (and/or via different routes).
4. View 'social' as a problem, not rather as something to be communicated. How are the boundaries between direct and indirect beneficiaries of a project configured?

Collaboration within the sub-task:

- Coordinated plan for how we can best harness each other's skills;
- Social not an afterthought of P2P systems ('…and the social'/'it is now time for society to adapt') but something that should be considered throughout the Observatory's entire duration.

Sub-task 5- Policy and regulation

Presenter: Nicolò Rossetto, Research Associate, European University Institute/Florence School of Regulation (Italy)

The team at FSR consists of lawyers, economists and engineers. They are actively working with national and European energy regulators. According to FSR, there are two sets of related but autonomous topics that will need to be addressed by the sub-task:

Regulatory bodies and issues

- What are the regulatory bodies and frameworks impacting the viability and implementation of P2P/TE/CSC systems?
- What are the relevant frameworks of regulation impacted by the emergence of these systems and what is their interdependence?
- What are the public policies that these models can address/impact?

Legal framework

- Are P2P/CSC/TE models legally defined and allowed? Are prosumers and energy communities legally defined, and what are their rights and duties? How are these enforced – by private or public law instruments?
- Issues of data privacy regulation, consumer protection, contract law etc.
- Other issues: land-use, planning and property ownership.

Sub-task deliverables:

- Report based on literature review setting out the key policy and regulatory factors shaping the design and supporting/constraining the uptake of these models;
- Compilation of case studies: Will need to think about which methodology to be used for this;
- While putting together these deliverables, we will need to bear in mind that eight countries with very different regulatory frameworks are members of the Observatory (e.g. four EU and four non-EU countries);
- We are at a key moment when provisions recently having been added to EU legislation, recognising P2P energy trading and several new types of energy communities, will need to be transposed by EU countries into their national laws (by 2020/2021). The manner of transposition will be key for our work.

Session 3: Reporting back from breakout sessions and agreeing work programme for next six months

After the lunch break, participants were asked to join one of the sub-task breakout discussion groups, led by the five sub-task leads.

The aim of the sub-task breakout groups was to discuss the delivery of the initial Observatory deliverables: 1) Concept mapping and scope definition, and 2) Sub-task layer targeted literature reviews & 'Key Factors' reports. Another aim was to work out what the sub-tasks see as the main research challenges they would like to focus on in the next six months. The Observatory will meet on a bi-yearly basis, so participants will meet again in Spring 2020 (at a still to be confirmed location).

Below are summaries of each group's discussion outputs.

Sub-task 1- Power systems integration

Aims for the sub-task:

- Due to the interdependencies between sub-tasks, it is desirable that a representative from each of the other sub-tasks will be involved in our work;
- It would be constructive, in light of interesting developments in these countries, to involve the United States and Australia in this sub-task;

- In the first few months we will need to work on the concept mapping and scope definition exercise. This includes defining concepts such as 'peers' and 'communities' and related questions (e.g. is a 'community' also virtual or only local? What is acceptable behaviour for a 'peer' on the network?).

Important research topics include:

- Can we imagine that P2P transactions take place outside the formal market (for instance among friends)? Do we restrict transactions to market mechanisms or widen the scope?
- From the power systems perspective, what is the ideal size for a P2P trading community? At which point does it become technically not feasible? Do local communities need to be on the same distribution feeder? Could communities trade between one another? Do network operators need to be involved in trading activities?
- How much "decentralisation" should we aim for? Who is accountable for imbalances (decentralisation = no central authority)? How do we deal with decentralised technical data (i.e. decentralised power flow models & limits to information sharing)?
- How long can a P2P transaction be time-wise (e.g. one hour, one year)? Can we have different timescales for contracts?

Sub-task 2- Hardware, software & data

Aims for the sub-task:

- Disentangling the various sub-tasks is less easy than envisaged, i.e. questions of governance and market design of distributed energy systems are relevant to this sub-task;
- IT systems are very different in different areas, i.e. Europe, China, Americas. The more continents we can have represented in the sub-task, the better.

Important research topics include:

- Exploring the limits of connectivity constraining/shaping the architecture of P2P/TE/CSC systems; How much in advance is it possible to do energy forecasting?
- Understanding the role of enabling technologies, such as Distributed Ledger Technologies (DLTs), AI and Big Data.
- Technology is not the limitation - the limitation is the regulation and social value (note: which regulators need to have proof of before they can regulate). How do we unlock and stack the social value? What are the non-energy values and what are the environmental externalities?
- Sharing the data, and permissioning the sharing is key to unlocking value. Agreements such as non-disclosure can make data processing very challenging.
- How do we transition to the decentralisation of data and where does the data processing take place? Need to make sure that data is processed at the appropriate level - learn from IoT field.

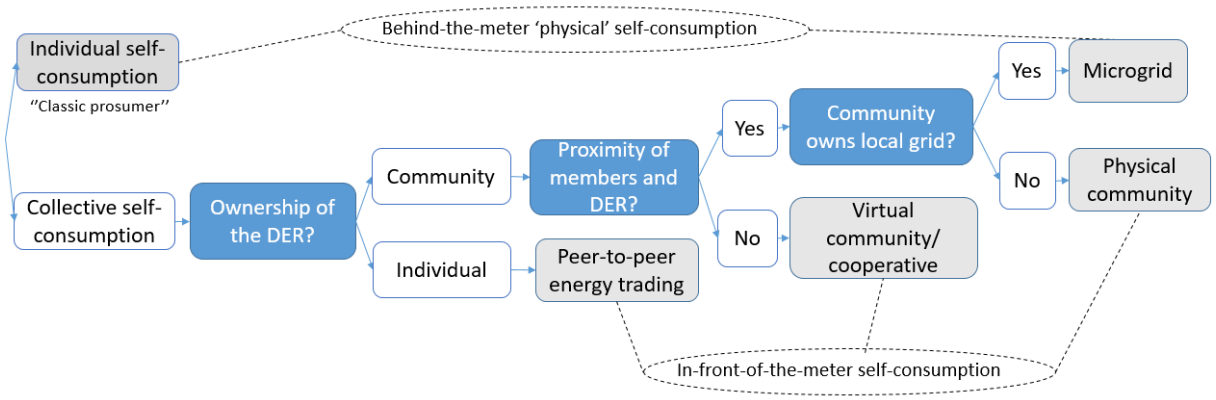
Sub-task 3- Transactions and markets

Aims for the sub-task:

- It is important to agree on common definitions and framework for taxonomy, e.g. CECs vs RECs in EU energy law (see diagram by Tim Schittekatte (FSR) below for an attempt at defining the taxonomy of P2P);
- Are we an Observatory that is simply 'observing', or should we provide more narrowed down recommendations/guidelines?
- How do we measure the 'success' of P2P/TE/CSC trials?

Important research topics include:

- Ensuring efficient transactions for viable markets at different levels of scale.
- Commercial entities versus communities' approach/interests.
- Considering the role of aggregators. Should they be user-centered, i.e. the user has a choice and can choose to aggregate?
- If we have more flexibility on the network, can this drive energy forecasting? Reducing the requirements for flexibility: shift from capacity to capability?
- Who are the main players in the markets- do we consider microgrids as a main player?
- Would P2P/TE/CSC models fit within existing markets and how would they interact with other neighbouring markets?
- Who owns the wires? Who sets the network charges? Will need assistance from other sub-tasks when tackling such questions.



CEP definitions: In a Citizen Energy Communities (CECs) the members and DER assets can be located physically near but not necessarily. If there is proximity and all electricity generation assets are renewable, the CEC is a Renewable Energy Communities (REC). However, RECs are not always a subgroup of CECs as RECs can also engage in the collective investment in other energy carriers, e.g. renewable gas, while CECs are limited to electricity.

Sub-task 4- Economic and social value

Aims for the sub-task:

- Short-term priority: Discuss framework to understand what 'value' is and map it, in cooperation with the different sub tasks; Develop ways of measuring social value;
- Long-term priority: Collect national statistics/data on societal impacts of P2P.

Important research topics include:

- Customer preferences and potential values - what kind of values would convince people to participate in P2P/TE/CSC models?
- The role of economic benefits - not a purely economic decision to enter into community energy, but economic incentive also needed.
- Distinction between social value and social benefit - e.g. Colombian P2P pilot (presented on Day 1) where economic value is delivered to low-income households selling energy vs the value derived by higher income households from knowing that they are supporting the community by buying energy from lower-income consumers. The goal is not always to reduce energy costs for everyone, some people may be willing to pay more.
- Understanding what P2P means for different segments of society.
- Understanding the 'intangible things' that will drive adoption.
- What are we talking about when we say 'economic and social value'? Value to whom? Just participants/prosumers or any stakeholders in the value chain? Look beyond personal value.
- Justice questions, i.e. the societal impact of P2P, distributional impacts.

Sub-task 5- Policy and regulation

Aims for the sub-task:

- Sub-task will be divided into 3 groups:

1) Group 1 will be in charge of harvesting the existing policy/law literature on P2P/TE/CSC and start the literature reviews;
2) Group 2 will start investigating the most advanced pilots and case studies in Observatory member countries like Switzerland and the Netherlands. We would also like to look at (non-Observatory members) Spain and Colombia, in light of the interesting developments going on there;
3) Group 3 will coordinate an organised and comprehensive collection of data from member countries via a survey to be submitted to national regulatory authorities and relevant governmental authorities on their evidence needs.

Important research topics include:

- How countries transpose new EU energy provisions recognising the right to P2P trading and new types of energy community entities. Countries have until 2020/2021 to transpose these into their national laws, so this will be a long-term objective for the sub-task.

- In the meantime, non-EU countries will be looked at and relevant non-energy fields such as consumer, competition and contract law will be focused on. These are important issues that P2P/TE/CSC project developers need to consider.
- How do international policy organisations, such as the World Economic Forum, perceive these new business models?
- How to look at the role of tech companies in P2P/TE/CSC models?
- What could be the role of sandboxes in the regulation of such innovative models?

Summary and close

Final note by David Shipworth and Alexandra Schneiders:

- It is clear that there is a high interdependency between the sub-tasks, they will need to work together.
- There is a clear need to study P2P/TE/CSC trials at an earlier stage than originally foreseen in the timeline of work, as some countries are already at an advanced stage in terms of pilot rollout.
- We will have to think about the geographical scope of studying pilots, as local/regional rules and conditions could be playing a large role in determining pilot success rate. The use of a multi-level analysis structure may help: first, a common analysis equal for all the countries, and then a second level with special data/content, differentiated for each country according to local structures.
- In order to work in an agile manner and have continuous communication between participants, it might be worth thinking about organising telco's/virtual meetings on a quarterly basis (i.e. every 3 months).
- Constant communication is also important as this is a very fast-moving area and value needs to be delivered on a frequent basis. The DSM TCP Executive Committee meets every 6 months and will be updated as regards progress of the Observatory's work.
- We need to involve countries from other continents such as Asia in order to have a more diverse range of views and experiences.
- University College London will be in touch with all attendees with further participation details as well as information on the next meeting of Observatory participants in Spring 2020. If you have any questions in the meantime, please don't hesitate to get in touch with Alexandra Schneiders (a.schneiders@ucl.ac.uk).

Side-note on the 'Ideas Parking Lot':

At the beginning of Day 2, attendees were told they could write at any point of the day on a whiteboard (located at the back of the room) their ideas for research topics the Observatory should focus on. This is what was written on the whiteboard:

- Circular economy
- National progress is uneven- how do we capture this?
- Sub-task 2: which data can we use, and how should we handle it? e.g. smart meter gives the utility a lot of new information, but how do we make this data useful/how do we analyse it?

- What are the new roles of energy sector actors (utility, DSO etc)?
- Which cost saving is needed to have an influence/to motivate people to get active/to have an influence on behaviour?

This summary note was written by Alexandra Schneiders (University College London) in September 2019.

The author would like to thank David Shipworth, Anna Gorbatcheva and Nicole Watson for their input in putting this summary together.