

Dok. ansvarlig: HJV
Sekretær:
Sagsnr: s2020-1197
Doknr: d2021-9230-5.0
27-04-2021

Highlights from MI-EUDP Workshop 22 April 2021: Stock-taking on DR development in the EU with particular focus on CEC

The Danish Technical University and the Danish Intelligent Energy Alliance hosted on 22 April a workshop aligned with the Mission-Innovation International Challenge #1 on smart grids and demand response, taking stock on the demand response developments within the EU – following the Clean Energy Package Electricity directive being implemented in the EU, and in particular, focusing on the potential of Citizen Energy Communities to engage the active consumer in the green transition.

MISSION INNOVATION AND DEMAND RESPONSE

- 1. Making the link to the work of Mission Innovation** (Co-leader of IC#1, Luciano Martini, Ricerca sul Sistema Energetico - RSE S.p.A.)

The goal of the Mission Innovation supported by 24 countries (G20+4 including the EU) is: *To dramatically accelerate the availability of clean, affordable and reliable clean energy around the world.* In phase 1 (2015-2020) of the MI, eight International Challenges (ICs) were outlined. IC#1 was *Smart grids innovation challenge* co-lead by Italy, China and India, of which one task on *demand response* was co-lead by Denmark (DTU) and Finland. Hence why DTU and The Danish Intelligent Energy Alliance have hosted 2 workshops to share demand response experience from the MI-activities as well as from other sources in support of the MI IC#1 and demand response task in particular.

MI countries having evaluated the phase 1 achievements decided in 2020 to continue the phase II of the MI, where key innovation areas will be:

- Affordable Renewable Energy

- System flexibility
- System integration

To do #1

The MI phase II - work has a focus which may provide relevant findings and new cases to inspire the future work on demand response, re system flexibility and system integration focus). Hence, we will monitor the future MI work in order to disseminate relevant results and experience across the involved countries.

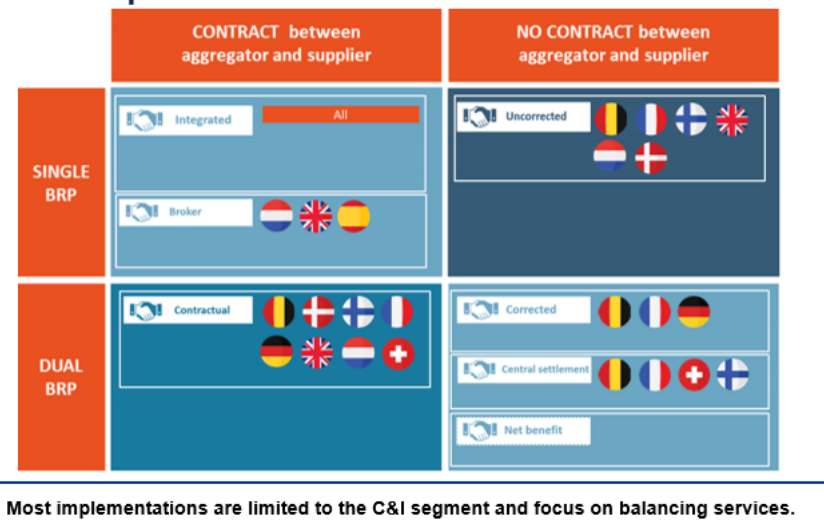
OVERVIEW ON EU DEVELOPMENTS IN DEMAND RESPOND

2. Aggregator implementation models (AIMs) across Europe (Aurora Saez and Hans de Heer, DNV)

The work conducted by DNV and presented in USEF-documents gives a comprehensive overview of the applied aggregator models across Europe.

In 2020 interviews were conducted and conclusion on what type of AIMs were applied across member states lead to this overview:

Overview aggregator implementation models for selected European countries¹



¹ source: Flexibility deployment in Europe, USEF (A. Saez, H. de Heer, M. van der Laan), 4 March 2021

The conclusions are:

- That split responsibility will improve the market access for the independent aggregator (The model implies that supply of energy to flexible assets is controlled by the Aggregator and the BRP-Aggregator with supply of energy by the Supp-Aggregator on one side and the supply of energy to non-flexible assets with no aggregator involved on the other side). This model will have the lowest impact on the market situation and on regulation. This

way of introducing the independent aggregator requires that the aggregator supplies energy for the active customer which is part of a flexibility service.

- DNVs cost-benefit-analyses concludes that including an extra model with dual BRP and no contract btw aggregator and supplier will improve the level playing field btw independent aggregators and existing market players (that is either the corrected model og the central settlement model), and the central settlement model will be an advantage to the consumer.

To do #2

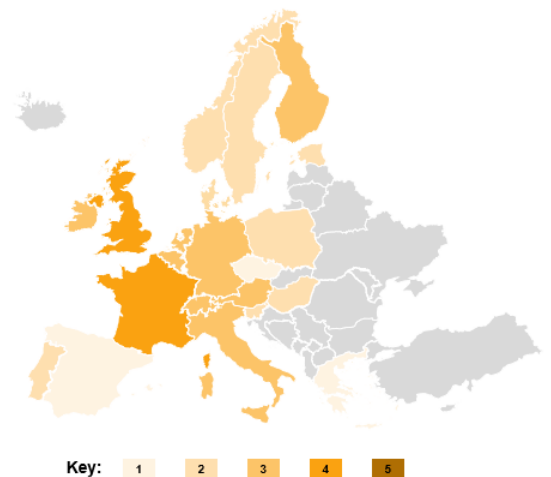
As verified by DELTA-EE (sse below) the implementation of the EU electricity directive is not in place, and it would be highly relevant ot continue to identify the aggregator models implemented in various countries.

3. Post Electricity directive implementation stock-taking by Joao Coelho, DELTA-EE

On behalf of SmartEN, DELTA-EE has several times made a mapping of progress in demand response flexibility across the EU. The score assigned for the various countries is not estimating the potential of demand response in the respective countries. It is a score telling about the current level of activities in the particular country, based on evaluation of the five indicators mentioned below.

Scope of Market Monitor:

- Availability and accessibility of DSF to value streams
- Monetisation of DSF in value streams
- Breadth of asset types used for DSF
- Breadth of customer segments engaged with DSF
- Number of stakeholders active with DSF



The overall picture looking over the past 8 years is that progress is happening, and things are moving in the right direction. France, UK, Ireland and Belgium are more advanced in the DR developments. Ancillary services in terms of value streams and industry in terms of customer segment play a significant role. Many aggregators are active across the EU but still the UK is leading in terms of highest numbers of aggregators in the market.

In terms of specific implementation of the Electricity directive ten countries were interviewed and the conclusion is that the implementation of Demand Side Flexibility provisions is far from fully implemented.

To do #3

There is a continuous need to follow-up on the overall market developments within demand response, and a particular need to follow-up on whether the electricity directive is fully implemented.

OVERVIEW ON PURPOSE AND STATUS OF CEC IMPLEMENTATION

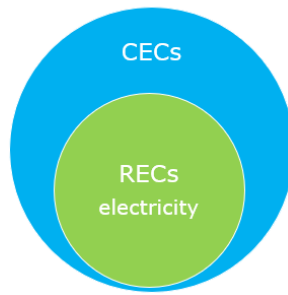
4. Clean Energy Package and Citizen Energy Communities by Achille Hannoset, DG ENER

One key purpose of the Clean Energy Package is to empower the consumer in the green transition, hence introducing Citizen Energy Communities (incl. REC and LEC) is a tool:

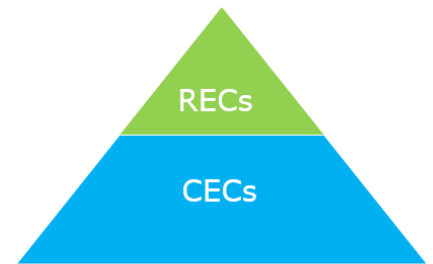
- To increase public acceptance for new energy projects
- To mobilise private capital and
- To create a potential tool for activating flexibility

The various elements of the Electricity directive and the RES directive forms the framework of the member state implementation. And leaves room for flexibility in the way member states can implement Citizen Energy Communities (CECs, Renewable Energy Communities (RECs) and Local Energy Communities (LEC). But the DG ENER underlines that in wording the directive there is:

- a fundamental focus on the Communities as a social concept and not a concept for chasing financial profits
- a focus on up-take of RE and active consumers engagement but not on incentivising parallel infrastructure or micro-grids. The directive is clear on the issue of direct lines etc.
- The rules for CECs includes rules for RECs, but it is more difficult to qualify as REC, so once this is done, RECs have more privileges



- ✓ Promotion of RES
- ✓ Favorable conditions for RES support
- ✓ Strict governance and participation criteria
- ✓ Geographical proximity



- ✓ Recognition as a market actor
- ✓ Ensure level playing field and non-discrimination
- ✓ Strict governance criteria, but open membership
- ✓ No geographical proximity

5. The new regulatory framework of CECs from a Danish Perspective by Jonas Katz, The Danish Energy Authority

The Danish process of implementation has revealed a number of challenges in order to establish “a fair and balanced implementation that is adapted to the current state of development and design of the Danish electricity market.”

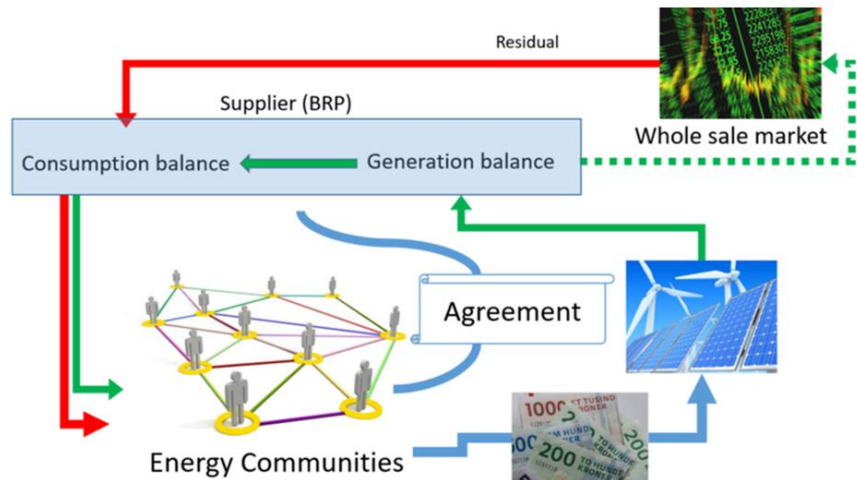
Specific challenges have been:

- To enable sharing through the public grid
- To ensure an appropriate recognition of benefits to the local grid
- To avoid cross-subsidisation at the expense of other system users

These have been addressed in the following way:

- No right to own, establish, purchase or lease distribution network
- Sharing of electricity:
 - Handled through established market processes on the public grid
 - Sharing renewable energy is based on guarantees of origin
 - Clearly distinguished from self-consumption
- Grid tariffs and taxes:
 - Consumption is subject to tariffs and taxes
 - Local communities should face tariffs reflecting benefits for the local grid if applicable
- Consistency with renewable energy communities
- No cross-border participation

Hence the implemented principles for energy sharing are pictured as shown below:



To do #4+5

From the presentation and discussions it is clear that those wanting to create CECs should be enabled to share energy but not create parallel grids / micro grids. However, this latter element seems to be key to the position of CECs when observing DSOs as being reluctant to co-operate with new CECs making it easier for them to implement a particular CEC where the business case falls due to the grid tariff and taxation.

From the EU Commission perspective as well as the DSO perspective, cost-reflectiveness in tariffs is essential, while also not wanting to stand in the way of CECs in their pursue of engaging the active customer. Hence on the to-do-list of the Danish Intelligent Energy Alliance we wish to collect cases (in Denmark and the EU) and continue the dialogue with CECs with a focus on:

- How are CECs supporting congestion challenges in the grid
- How are CECs able to deliver flexibility to balance the energy market (ancillary services)
- How are CECs able to mobilize the consumers
- Do CECs see a need for assistance from commercial players and a way to pave the way for new innovative business models where CECs facilitate the active consumers engagement in the green transition

6. Overview of EU developments on Citizen and Local Energy Communities, by Andreas Tuerk, Joanneum Research

EU developments on CECs have been assessed through the BRIDGE Horizon 2020-project and THINK-E and Joanneum Research are leading a taskforce on energy communities which concludes on future challenges based on the assessment. Conclusions is as demonstrated below.

Status of transposition

Country	Renewable energy communities	Citizen energy communities
Austria	✓	✓
Belgium: Wallonia	✓	-
Belgium: Flanders	✓	✓
Czech Republic	✓	✓
Croatia	draft	-
Denmark	-	✓
Estonia	draft	draft
Finland	-	-
France	draft	draft
Greece	✓	✓
Ireland	✓	-
Italy	✓	✓
Lithuania	✓	-
Luxemburg	✓	-
Portugal	✓	-
Poland	draft	-
Slovenia		draft
Spain	draft	-
Sweden	draft	draft

Furthermore, it is underlined that:

- “Many countries implement RECs but it is really just Collective-Self-Consumption” hence not adding to the overall purpose of active customer engagement in the green transition, as outlined by DG ENER.
- Many focus on electricity potentially expanding to other RE sources eventually, central and eastern European countries on renewable heat
- Physical expansion, proximity and governance have been assessed and the conclusion is e.g. that most member states requires that that a **majority of the members or all of the members of an REC** have to be located in or have ownership in defined spatial boundaries of the REC
- Most member states implement CECs without requirements of DSO procurement of flexibility, hence no link to what DG ENER points to as one out of three main purposes of the CECs/RECs/LECs

Conclusions based on interviews with regulators are:

- Benefits of ECs to system are unclear
- Indirect support via ECs takes place in Italy, Austria and Portugal through reduction of energy taxes and surcharges
- Strong focus on self-consumption

- Approach to flexibility services unclear (ECs transposition is too often seen and developed independent from article 32 of Electricity Market Directive- on flexibility, Belgium and Lithuania being the only exception)

Future challenges as concluded by the task force of JR and Think-E:

- Members states risk mixing policy and regulation – a question of weight on cost-reflectiveness vs. support/incentives for CECs
- Need for CBA considering all costs (metering, digital infrastructure, local assets and operational management) versus all benefits
- Baselines are missing, i.e. risk of remunerating “business as usual”
- Risk of conflicting messages (and investments) when targeting self-consumption as well as future flexibility
- Risk of overinvestments in technology, conflicting with the EU ambition on a circular economy

To do #6

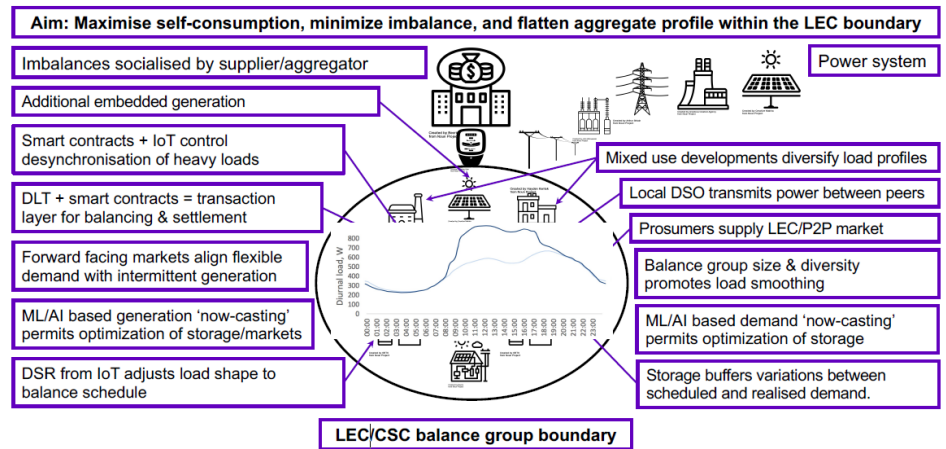
There is a need to reassess developments on an EU level, once more cases in various countries have been developed and may be assessed in terms of the three key purposes of the EU Commission:

- Public acceptance
- Capital mobilisation and
- Flexibility potential

7. International implementation of energy communities: Drivers and barriers, by David Shipworth: Chair – Users-Centred Energy Systems, A Technology Collaboration Programme (TCP), IEA

In the current activities of the TCP focus is on the work of Global Observatory on Peer-To-Peer, Community Self-Consumption and Transactive Energy (GO-P2P) launched in september 2019 with 170participating parties.

The aim of LECs is power balancing, as described in this slide:



The work of IEA in this field has assessed the literature on LECs implication of ECs (defined as *Peer-2-Peer*, *Transactive energy (US)* and *Collective-Self-Consumption and Citizen Energy-Communities*); in:

- the power system integration (eg. The risks of high Reintegration and the cyber risk, and the benefits in terms of peak shaving and taking pressure off substations etc.)
- the social and economic value (eg. demographic factors - younger, wealthier people with higher education are more likely to be part of an LEC-, complexity of the LEC eg. on data security issues; local benefits often economic and social etc.)
- as well as policy and regulatory challenges.(eg on the need for platforms enabling transactions of energy, the problem of a single supplier framework, the legal status of prosumers, – when selling to each other; data sharing af GDPR-issues)

The key challenges in implementing Energy Communities (ECs) are:

- this is work in progress so currently there is no best practice, no clear pathway to scale...
- The flow is that: a. policy outcome dictates b. the regulatory change c. which determines the business model d. which drives behaviour...
- BUT distributional impact matters

The observation is that narrow casting of RE production and energy demand is not yet made.

Theres a need to think carefully about the policy aims. If the aim is energy poverty vs. Renewable energy up-take then the incentivized tariff system will change the design of the entire system. This has not

been well thought through by policy makers when establishing the framework of ECs.

So if the policy aim is the power system integration: The advice is to look at where there are network constraints, this is where ECs make sense from a power system perspective.

To do #7

The evidence identified so far by the Global Observatory on Peer-To-Peer, Community Self-Consumption and Transactive Energy (GO-P2P) and literature review conducted is important to follow going forward, and include these evidence in the assessment of the EU experiences on the field of ECs in the coming years.

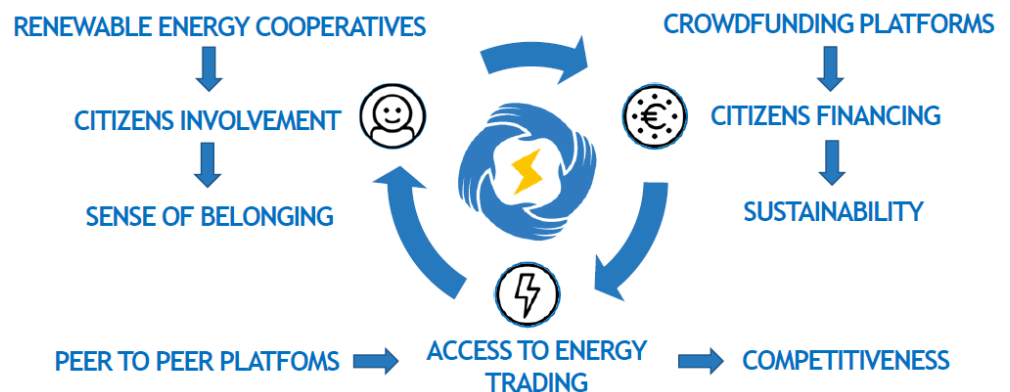
8. **socialRES** by Mikhail Hamwi, ESTIA, France

The aim of SocialRES is “ to close non technological research gaps that impede the widespread uptake of social innovation business and service models in the European energy sector”.

To achieve the project’s aim the following activities have or will be carried out:

- Definition of the driving factors for social innovation in the energy sector
- Comparative analysis of business models for social innovation
- Definition of the behavioural aspects related to social innovation
- SWOT analyses of the SocialRES case study and matchmaking events
- Policy recommendation for using the potential of social innovation

SocialRES strategy to foster Energy Democracy through Social Innovation



The expectation is that the project will enable:

- Larger up-take of RE and increase crowd-funding
- Enhance energy democracy because energy communities are more cost-effective than individual projects due to the aggregated potential
- Energy security is enhanced due to the RE-integration with aggregation of supply and demand-side flexibility
- Strengthened local economy, because the local revenue of ECs is 8 times higher than the local revenue of external investor-owned projects

So far the consortium behind the socialRES-project has conducted 9 case studies which have been assessed in terms of organizational practices behavioural aspects.

400 CECs in France, Spain and Germany took part in a survey:

- *Self assessing what was most important for their participation in the CEC:* In Germany more weight was put on high annual return in the CEC, Spain and France put more weight on CO2-reduction. The minimum investment came in as the second most important factor in all countries
- Contributing towards energy independency for the country as well but less so for the region was important to more than 50% of the CECs in all three countries
- Social benefits from being part of the CEC was given higher importance in Spain and France than in Germany

The socialRES study is finalized around the turn of the year 2021-2022.

To do #8

The report concluding that: *The local revenue of ECs is 8 times higher than the local revenue of external investor-owned projects* needs to be shared

The finalisation of the socialRES is of interest and will be looked into early 2022 when the project has been finalised.

9. Cases of inspiration

Brixton – UK case (David Shipworth) – there is a need of sandbox because of the conflicts with policies

Copenhagen carbon neutral by 2025 (Øystein Leonardsen):

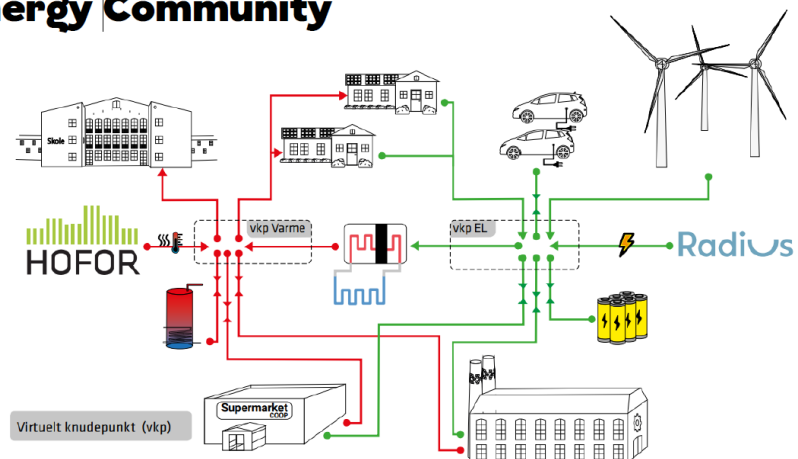
Copenhagen carbon neutral by 2025 (Øystein Leonardsen):

- o The Goal of Climate Task Force: Integrate the KBH2025 Climate Plan into local demonstration areas around Copenhagen; Engage citizens in the green transformation; Use the local demonstration areas as Living Labs scale the 'good solutions' to other parts of Copenhagen

- There are three thematic tracks: energy optimization; retrofitting of buildings and Renewable energy utilization. Local demonstration to take place in five neighbourhoods (e.g Folehaven and Aldersrogade-kvarteret).
- Key questions raised by the CPH-experience so far: Some questions to reflect on:
 - Legislation does not favor Citizens Energy Communities (CEC) which governance models can be used?
 - The mix between technologies and energy sources (heatpumps ,batteries, head storage, PV, heating, cooling and electricity) expands the complexity to ordinary citizens is IT the only solution?
 - One goal is engaging citizens in the green transition. How can CEC's be a locomotive in this process?
 - Renewables are unstable and often off season (no sun in the winter) can CECs really contribute to flexibility and lower the peak energy demand peak from centralized systems?

Københavns Kommune

Energy Community



Avedøre Green City by Erik Christiansen:

Avedøre Green City by Erik Christiansen:

- **Defined An Overall Development Plan:** First Step: A Strategic Energy Plan:
 - - What is sustainable energy in our area?
 - - Which technologies? Which data do we possess?
 - - Do we need changes in infrastructure?
 - - How can buildings and land improve our plan?
 - - How can we influence the energy infrastructure?
 - - Investment plan/time schedule?
- **Goals of the project:**
 - Data on energy consumption.

- Possible technologies?
- Sustainable technologies.
- Storing energy – limit peak hours.
- Flexibility control system.
- RES for transportation.
- Citizen engagement.
- Sustainable financing.
- **First Energy Steps – 2021-2023**
 - Infrastructure ready for reduced flow temperature.
 - Energy savings: 7-10 % - reduced heat bills.
 - Investments: € 30 million.
 - PV, PVT and Solar Thermal
 - Charging stations.
 - Grants (today): Approx. € 3,5 million (EIB).
- **Next Steps – 2024-2030**
 - "EnergyStation"
 - Expansion of sustainable district heating.
 - Renovation of facades – PVs and PVT.
 - Investments: € 98 million.
- **Challenges:**
 - Flexibility markets (the way it is organized today)
 - DSO/CEC negotiations: Connection requirements; Tariffs (peaks)/Energy savings; Meter placement – cadastre.

To do # 9

From the perspective of the Danish Intelligent Energy Alliance, the ability of ECs to activate consumers in energy system balancing and energy infrastructure balancing is of interest.

The presentations in general and the cases in particular is of interest to monitor.

The current framework is a first step in developing framework for ECs. In the coming years we need to gather more experience and accumulate knowledge especially on the social value stacking of ECs and hence its contribution to the total value stacking for citizens taking active part in the green transition of the economy.