COllective action Models for Energy Transition and Social Innovation

Report on the Comparative Case Studies

This document serves as Deliverable D4.2 'Report on comparative case studies'.

It is connected to WP4 'Investigating mechanisms of CAI's development in the energy sector', Task T4.2 'Co-developing a case study engagement strategy'.

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Abbreviations and acronyms

ARERA	Italian National Regulatory Agency for Energy, Grids and the Environment
CAI	Collective Action Initiative
CB	Consortium Benchmarking
CCAA	Autonomous Communities
CEDIS	Italian cooperative company that produces, sells and distributes energy
CO_2	Carbon Dioxide
COMETS	Collective Action Models for Energy Transition and Social Innovation
COME RES	Community Energy for the uptake of renewables in the electricity sector
COVID	CoronaVirus Disease
CVVP	Community Virtual Power Plant
EMD	Electricity Market Directive
EU	European Union
GA	General Assembly
GDPR	General Data Protection Regulation
GSE	Italian Energy Services Managing Authority
H2020	Horizon 2020 EU Research and Innovation programme
ICA	International Cooperative Association
ICT	Information and communications technology
IDEA	Institute for the Diversification and Savings of Energy
KoM	Kick of Meeting
MIRO	Online whiteboard application
NGO	Non-governmental organization
NRT	National Research Team
OVAM	Openbare Afvalstoffen Maatschappij
PV	Photovoltaic Solar Power
RD&D	Research Development and Demonstration

RE	Renewable Energy
REC	Renewable Energy Communities
RED II	Renewable Energy Directive
REDHCOOP	Renovatie en Hernieuwbare Energie Diensten via COÖPeraties
RES	Renewable energy sources
REScoop	The European federation of renewable energy cooperatives
RET	Renewable Energy Technology
RSE	Research on Energy Systems (Italian organization)
VLAIO	Vlaams Agentschap Innoveren en Ondernemen
WPN	Windpark Nijmegen (Netherlands)

Contribution history

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2	TECNALIA	Fundación Tecnalia Research and Innovation	Spain
3	HVL	Western Norway University	Norway
4	UB	Università Commerciale Luigi Bocconi	Italy
5	JRC	Joint Research Center – European Commission	Belgium
6	DTU	Danmarks Tekniske Universitet	Denmark
7	VITO	Vlaamse Instelling Voor Technologish Onderzoek	Belgium
8	ECOLISE	European Network For Community-Led Initiatives On Climate Change And Sustainability	Belgium
9	TREA	Mittetulundusuhing Tartu Regiooni Energiaagentuur	Estonia
10	RUG	Rijksuniversiteit Groningen	Netherlands
11	ECN	European Crowdfunding Network	Belgium
12	UJ	Uniwersytet Jagiellonski	Poland

1. Introduction and Overview

One of the emergent trends in the sustainable energy transition is the development of distributed power generation. In Europe, it is estimated that up half of citizens of the European Union (EU) could be energy self-sufficient, potentially supplying 45% of Europe's final energy demand by 2050 (Kampman, et al., 2016). While there are many challenges with a move towards more distributed, citizen-led energy projects, they are nevertheless supported and promoted by the EU in the RED II (EU Renewable Energy Directive as part of the 2016 "Clean Energy of all Europeans" initiative, directive 2018/2001/EU), which secures the right for citizens and communities to produce, store, consume and sell renewable energy, and other rights such as consumer's protection or access to all energy markets directly or through third parties.

Socially, this often takes the form of community energy projects in the form of collective action initiatives (CAI). CAIs, which include energy cooperatives, prosumer networks, and other citizen-led energy projects, are examples of social innovation (Gregg, et al., 2020) in how they organize and gain power through a social movement mechanism. Social innovation is the development of activities and services to meet a social need, and social innovations are primarily social in both their ends and their means. Among other things, energy CAIs are typically characterized by a focus on the community, open and voluntary participation, democratic governance, and autonomy and independence (ICA, 2021). The social benefits of energy CAIs include: developing local economies, addressing energy poverty, raising awareness about sustainable energy, promoting energy justice, giving a voice to the community, developing local skills and promoting social cohesion.

Current research on CAIs explores how they are defined and the different ownership structures (Gorroño-Albizu, 2019), and how they mobilize and attain power (Gregg et al., 2020). Other research traces the history of their development within specific contexts or geographical areas, and how they influence or are influenced by national energy policies (Wierling et al., 2018). Still other research uses the lens of organizational and institutional theory to understand the historical development of energy CAIs (Mey and Diesendorf, 2018).

1.1 Consortium Benchmarking

We apply the Consortium Benchmarking (CB) strategy as a novel approach to better understand CAIs, how they function within various national contexts, and to promote their engagement in the research process. CB focuses on identifying the best practices of organizations. The underlying philosophy of CB is collaborative and co-creative (Schiele H, Krummaker S, 2011; Brueck and Paralez, 2003). This is in contrast to methodologies where the researchers study cases with a predefined set of questions and methodologies, and then after data collection, the researchers independently analyze and summarize the data.

Therefore, to move away from this traditional "extractive" approach, the CB involves the multiple case studies as participants in a more cooperative manner. In CB: 1) all participants are co-

researchers, 2) the research is a team-effort that 3) uses different sources 4) with a particular focus on best-practices and 5) meta-discourse to produce the most relevant learning (Schiele H, Krummaker S, 2011). As such, the specific research questions, method for answering them, and the interpretation of the results are all done collectively. In this way, the CAIs are engaged and have a built-in interest in the research and the results. Moreover, through the process of co-creative workshops and discussion, the CAIs are able to build a network across their respective country. This opens the opportunity for shared learning and a more coordinated political voice.

The procedure for this joint academic-practitioner consortium benchmarking study consists of four phases, which can be seen in Figure 1 (Schiele H, Krummaker S, 2011)

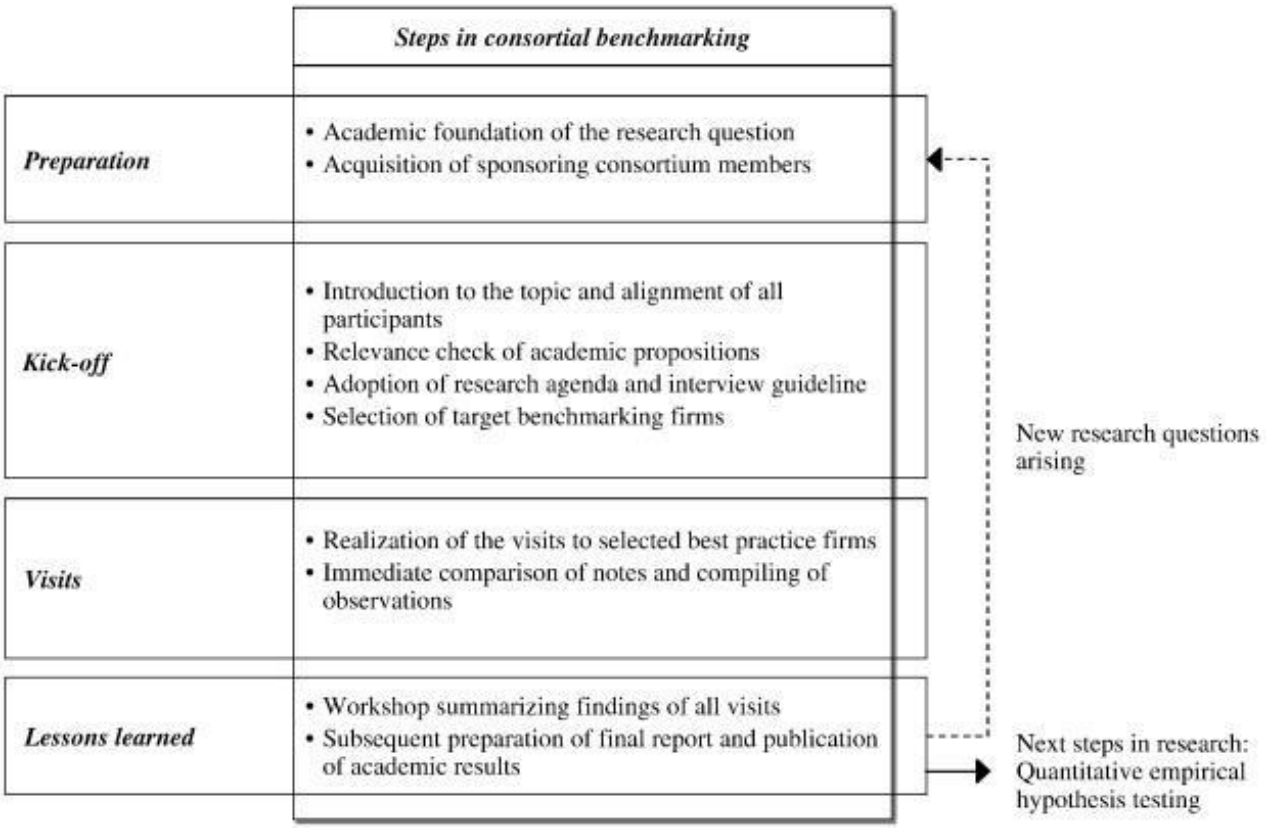

Figure 1. Four steps of a consortium benchmarking project. Adapted from Consortium Benchmarking: Collaborative academic-practitioner case study research by H. Schiele, & S. Krummaker, 2011, Journal of Business Research, 64, p. 1139.

Other researchers organize the CB strategy in these four main steps: plan, collect, analyze, report (Brueck and Paralez, 2003) (Figure 2). The planning step is where the study is first scoped and framed. The participants come to a consensus about what the topics and the boundaries for the study should be. It is also during this phase that the team of participants is codified, and participants must decide whether or not they wish to participate in the study based on their expected effort and benefits. In the collection step, the study is performed. This happens in a centralized way with the research team and the organizations that the research team members represent. After the initial data are collected, the research team meets for the analysis step, where

the findings are refined and any corrections are made. The team discusses interesting trends or discrepancies in the results, seeking to identify any beneficial or best practices. Finally, the study results are consolidated and reported to make it available to others as a useful reference.

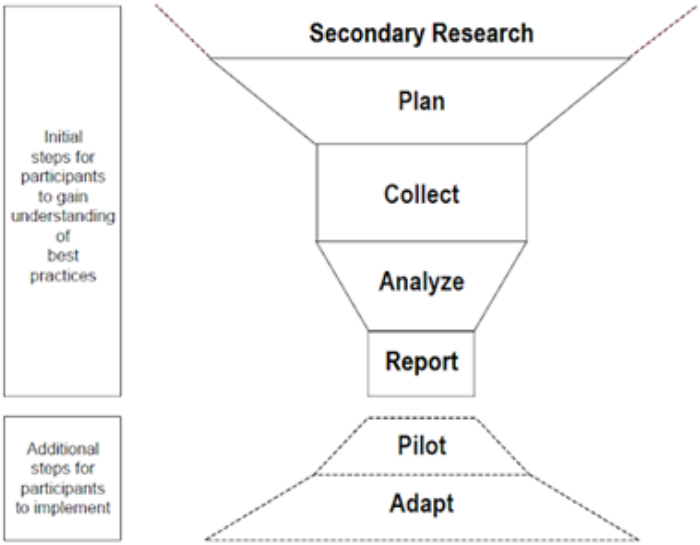

Figure 2. The CB approach uses the steps of plan, collect, analyze and report (Brueck and Paralez, 2003)

Because CAIs are a form of social innovation and linked to grassroots movements, community engagement, democratic processes, we choose the CB approach as a more intuitive strategy for understanding how CAIs function. It also gives us deeper insights into what issues concern them, the diversity of issues they face, and how these relate to the national context and national energy policies. The intention is to understand and address specific qualitative aspects of the selected CAIs within their own specific contexts, and to elucidate best practices that can be adapted and applied to those contexts. As such, this study (and report) is intended to be a deep dive into a select group of CAIs from countries, rather than a broad comprehensive survey. Finally, the strategy behind CB is to uncover best practices and to streamline their implementation, thereby bringing value back to the CAIs.

As such, there was not an *a priori* set of research questions or specifically designed study methodologies. Instead, the research coordinators provide general research questions as a framework to outline the basic objectives of the (COllective action Models for the Energy Transition and Social innovation - COMETS) project. Furthermore, the research coordinators provided a basic staged timeline, based on the CB approach. (The CB approach is at the heart of WP4 in COMETS).

Six countries were included in the study: Belgium, Estonia, Italy, Netherlands, Poland, and Spain. The countries were chosen for their different geographical regions (and renewable energy resource potentials), the different historical context (Eastern versus Western Europe) and the differences in their economies. National Research Teams (NRTs) were formed in each country and they co-defined the specific research questions and methods to answer them.

1.2 Questions and Objective of Study

In WP3 of COMETS, a survey was conducted of hundreds of Collective Action Initiatives (CAIs) where the questions were predefined and translated to the various national languages. The benefit of using this model for the survey is that it allowed direct, quantitative statistical comparison across a large number of subjects.

In WP4, the goal is to dive deeper and work closer with a select group of CAIs: 5-6 Comparative Case Studies, and 1 in-depth Participatory Case Study per country. CB was the methodology chosen for WP4 in COMETS in order to promote a higher level of engagement of the CAIs within the research process, and to ensure that their most pressing issues and concerns are studied and addressed. The intention in WP4 was to create a different type of analysis than what was done in WP3, and be able to understand and address specific qualitative aspects of the selected CAIs within their own specific contexts. After this, in WP5, further in-depth qualitative research focuses on the Participatory Case Study.

The overall objective is to understand how CAIs can improve their contribution to the energy transition. The framework questions provided to the NRTs were:

- What are CAIs?
- How do CAIs work?
- How relevant are CAIs to the Energy System?
- How can CAIs be supported?
- What is the future for CAIs?

The NRTs were free to use these framework questions at their own discretion. The specific learning objectives included the compelling needs questions that arose from the members of the NRT.

1.3 Process and Timeline

A detailed timeline of the benchmarking study and the further steps was shown to the NRT members during the KoM, see Figure 3. Also, the different level of involvement of the members of the NRT in the process was mentioned.

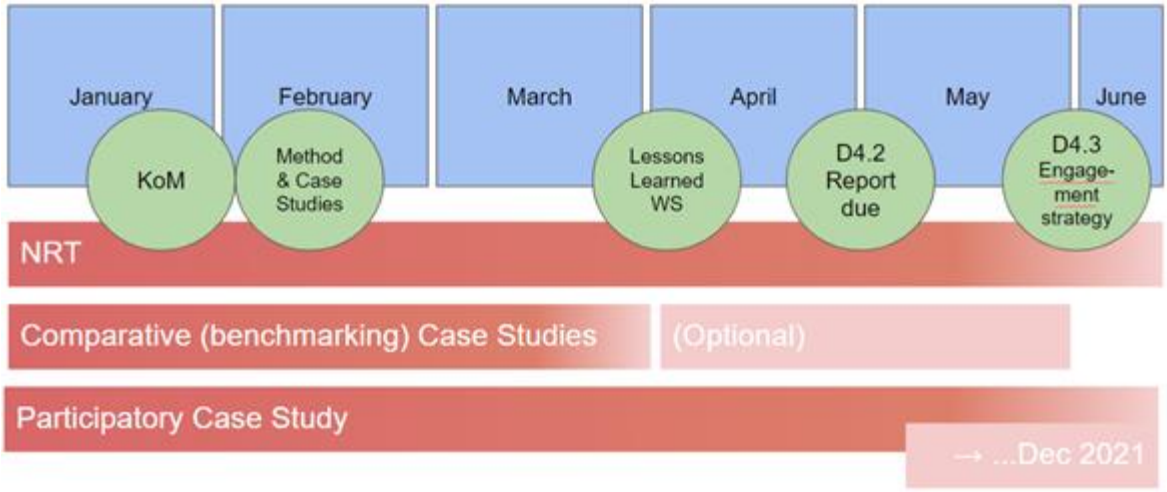

Figure 3. NRT Plan WP4

1.3.1 Plan

The research process took place from October 2020 to April 2021. The process began with a training workshop in October 2020. The training workshop included the research coordinators and the NRT leaders. The goal of the training workshop was to introduce the CB strategy and to brainstorm the important factors (including gender) in creating the NRT. After the training workshop, further discussions were held between the research coordinators and the NRT leaders, including virtual meetings, a digital "sharing basket" for resources and files, and individual coaching corners for each of the NRT leaders.

Next, the NRT leaders were responsible for identifying CAIs active on the energy transition and other energy stakeholders within their respective countries. The NRT leaders were responsible for creating the criteria for choosing the specific CAIs to be part of the NRT, with guidance from the research coordinators. They contacted these stakeholders and CAIs in December 2020 and January 2021, presented the concepts and conversed with them to explore their compelling learning needs and interest in being part of the NRT. Specific representatives of energy stakeholders and CAIs were formally invited to join the NRT, creating working groups of around 10 people in each NRT. For some of the NRTs, it was necessary and strategic to build the NRTs sequentially, so they hosted either scoping meetings or a series of bilateral information meetings. The NRTs chose approximately 5 CAIs (per country) to be comparative case studies. These comparative case studies could also be part of the NRT, but this was not a requirement.

Once the NRTs were formed, they each organized a Kick-Off Meeting (KoM) in January 2021. The purpose of the KoM was to assemble and formalize the NRT (though changes were still possible if deemed necessary by the NRT members) and motivate the team. The second objective of the workshop was to co-create and collect learning objectives and collectively form these into specific research questions. Establishing the research questions was done through workshop facilitation techniques and activities such as brainstorming, world cafes, dotmocracy, etc.

1.3.2 Collect

Data were collected from comparative case studies from February to March 2021. By February 2021, the NRTs prepared the data collection by making a proposal on how to obtain the answers for the questions they had developed and collectively decided upon. To prepare the data collection, the NRT needed to address the following questions: Which data need to be collected? What methods are available? What is feasible within the given time/resources? Complementary data collection methods (e.g. interviews, focus groups, shared experiences, etc.) were used, depending on the specific question and methods decided by the NRTs. The various NRT leaders also shared their experiences as digital resources with each other. Originally, visit tours were proposed as a method to collect information. The goal of the visit tours was to aid in building networks across the CAIs and the various NRT members and to finalize any additional data collection. However, this was not possible due to the COVID-19 situation, so virtual presentations and discussions were held instead.

1.3.3 Analyze

The findings from the comparative case studies were summarized, shared, discussed and analyzed by the respective NRTs. The research culminated with a lessons learned workshop in April of 2021. This objective of the workshop was to discuss, validate and integrate the lessons learned by the NRT.

1.3.4 Report

The NRT then reported to the research coordinators 1) the process of forming the NRTs and selecting the CAIs as comparative case studies, 2) the engagement strategies used, 3) the research questions, 4) the methodologies, 5) the summarized findings and 6) reflections about the process. This document represents the synthesis of the six national reports.

1.4 Future Direction

During the data collection phase of this study, the COMETS project launched a virtual platform, Communities for the Future to facilitate further networking and sharing among the CAIs[1]. Moreover, the research continues from here by developing futuring scenarios for one specific CAI within each country in order to integrate the learnings, and determine how different variables, drivers and morphologies can influence different scenarios. This leads to the implementation phases of piloting and adapting.

In each country, the NRTs selected one CAI from the comparative case studies to be the participatory case study. The participatory case study agreed to be engaged further for scenario based studies. The other CAIs and members of the NRTs were invited to continue their engagement as well.

[1] https://communitiesforfuture.org/

In summary, CAIs that were part of the NRT benefited from the learning that took place and the support of the NRT leaders and the research coordinators. They were involved in collecting data and interpreting the findings, but also they benefited from the networking and learning that arose from the questions of the other members of the NRT. One of the goals of this study is to have the CAIs, as potentially influential actors in the energy field, gain increased visibility and recognition; expand their networks; contribute to the learning and growth of CAIs in their respective countries and to thereby contribute to the energy transition. The CB approach was instrumental in helping to bring about these benefits.

2. The National Research Teams

In this section, we summarise the criteria used and process followed in selecting the NRT members, as well as for the choice of comparative case studies in each of the participating countries. While all country teams followed the overall approach as detailed on the project Grant Agreement, there were some innovations and differences worth mentioning, that reflect the local context and circumstances.

2.1 Criteria and process for selecting the NRT members

In all countries, the starting point for the selection of potential NRT members was the stakeholder mapping exercise completed for the COMETS project (deliverable 2.1), which provided a comprehensive overview and profile of potential NRT members, at the institutional - as opposed to individual - level. From this long list, each country team drew up a shorter list of 'key players', again at the institutional level.

In accordance with the project document guidance, NRT members were selected from among national partners, public and private stakeholders from the energy sector, and CAIs which served as comparative case studies within the COMETS project. Other national experts and academics were also consulted or included, though on a more ad-hoc basis. Achieving a good gender balance was a priority concern across all NRTs in the study countries, where project members recommended that membership should not number more than 10, though in Belgium, Estonia and Spain the NRT members exceeded 10.

National teams followed a similar process when it came to inviting potential NRT members, inviting relevant organisations to join online events where the COMETS project was presented, along with stakeholder survey findings, aimed at stimulating interest in the research project. Flexibility was a common approach across all countries, given that potential NRT members were considering their involvement on a volunteer basis. Hence, the information sharing and conversations accommodated the schedules of potential NRT members.

Some project teams conducted an initial screen of potential partners based on previous knowledge and experience, while others, including The Netherlands, Belgium and Spain, selected at least one CAI ‘start-up’ among the list of potential NRT members, to give them the opportunity to share experiences with the more established CAIs and to have their perspective included in the main findings of the benchmarking study. In both Spain and Belgium the project teams also drew up a list of potential NRT members taking into account the geographical and political balance between the different regions within their countries.

In all cases, emphasis was placed on the co-creation process to define - as well as implement - the research, which is central to the philosophy and practical methodology of this part of the COMETS project. In doing so, there was a degree of self-selection and project buy-in that likely influenced

expressions of interest from among potential NRT members. The Dutch team, for example, pursued a 'snowballing' approach to inviting potential members, through their existing contacts in the national energy community.

Table 1 below summarises the criteria used and/or process followed in selecting the NRT members.

Table 1. NRT selection processes and criteria

Country	Process followed	Criteria used
Belgium	A short list of potential NRT members was drawn up, based on the stakeholder mapping exercise completed for COMETS deliverable 2.1 at national and local level.	Organised three meetings (Nov-Dec. 2020) to discuss following topics: 1) current context (e.g. transposition of RED II and EDM, COVID-situation, barriers/drivers); 2) interest of being a member of the NRT and availability; 3) topics that could be subject of further research by the NRT; 4) approach/methodology for co-creation process.
Estonia	Country team analyzed and considered various areas related to the establishment of energy communities and on this basis identified experts with relevant knowledge or competence, who received invitations to participate.	Representation of different energy experts, umbrella organizations, social innovation, and CAIs who had taken part of the COMETS WP3 survey and who had a broad overview of the field.
Italy	Invitations to candidate NRT members were mainly sent via email in Dec. 2020, containing a summary description of the COMETS project, the activities to be carried out by the NRT (composition, objectives, method, timing and duration, effort estimate, expected outcomes)	CAIs members were selected based on year of foundation; size (members, plants, energy generation); energy-CAIs and non-energy-CAIs (i.e., ecovillages); outreach (local, national); location (urban, rural/alpine).

Netherlands	CAI frontrunners and non-CAI energy professionals were identified on the basis of relevant experience and interest in collaboration. To this end, the team chose NRT members as case study, so that the process would become more participatory for CAI members as they would have an opportunity to learn from others, share their own project and approach, and get input from other NRT members on their questions.	CAIs should be frontrunners in an area within the community energy sector identified as in urgent need of knowledge development.
Poland	NRT members were selected among the participants of the COMETS WP3 survey and initiatives that were part of the Polish CAI inventory. Final selection was based on the most active and interested participants during the preliminary NRT meeting in February 2021.	Those members that are most active and interested in participation.
Spain	A short list of potential NRT members was drawn up, based on the stakeholder mapping exercise completed for COMETS deliverable 2.1 at national, regional and local level.	Criteria 1: The CAIs are selected based on the diversification of activities. Sub-criteria 1: Activities related to the energy transition at large Sub-criteria 2: Spatial, geographical scope Criteria 2: The CAIs must have citizens as targeted beneficiaries of the idea Criteria 3: The CAIs that expressed interest in participating in the project.

2.2 Criteria and process for selecting the comparative case studies

Each country selected a minimum of five CAIs as comparative case studies, of which one was to later become the subject of the in-depth participatory case study within the COMETS project (beyond the scope of this report). The criteria or processes used to select each CAI are given in Table 2.

Table 2. Comparative case study selection processes and criteria

Country	Criteria used or process followed
Belgium	● Participation in the COMETS survey ● Relevant energy related activities ● Activities related to the social inclusion/empowerment of targeted groups ● Activities related to the energy transition at large ● The CAIs must include citizens at the origin of the idea and must have citizens as targeted beneficiaries of the idea ● CAIs that expressed interest in participating to the project ● Geographical coverage (Flemish and Walloon Region) Exclusionary criteria: ● CAIs that do not have citizens at the origin of the initiatives ● CAI that do not have energy related activities
Estonia	● Participation in the COMETS CAI survey, May - July 2020 ● Active new energy communities, so-called new generation - and the existence of a new housing representative in order to study and point out the main differences in the mentality and history of the communities created today compared to the existing ones. ● Previous effective cooperation in various energy community projects and working groups.
Italy	All the CAIs that were invited to be part of the NRT were deemed good candidates for comparative case studies. All the seven CAIs accepted to be part of the NRT as comparative case studies.
Netherlands	Being a frontrunner in the community energy sector, able to contribute insights and knowledge in the following areas: ● Grid balancing / congestion solutions (e.g. cable pooling and smart grid) ● Business models for heat networks ● Social business models that are inclusive for low-income households ● Handling fierce competition with other actors on the market (cowboy market solar and wind projects) and the legal possibilities for (landowning) governments to mediate this; ● Inclusivity and social support of nearby living residents.

Poland	Following the discussion during the first and second NRT meeting, all the members agreed to choose the Krakowska Elektrownia Społeczna initiative as the research focus for a comparative case study.
Spain	● Activities related to the energy transition at large ● Good spatial, geographical scope ● The CAIs must have citizens as targeted beneficiaries of the idea ● The CAIs that expressed interest in participating to the project

2.3 Description of the members

The final selection of NRT members was fairly consistent in terms of profile, which to some extent reflects the use of broad standard criteria and a clear understanding of the shared project purpose. Average membership of the NRTs was less than 12: Belgium (11), Estonia (16), Italy (8), The Netherlands (8), Poland (9), Spain (11). Approx. 50% of whom were identified as CAIs, though in some cases, e.g. Poland, the legal definition of independent energy cooperatives meant that some organisations that would be considered CAIs elsewhere were not defined as such. Non-CAI membership of the NRT was split roughly equally between public-sector authorities and research-based and NGOs. Both Belgium and The Netherlands had a strong participation of energy and housing cooperatives, reflecting the prevalence and influence of these organisations in both countries, whereas NRT membership in other countries tended to reflect the more centralised governance structure with regard to utilities and public service provision. See annex 1 for a detailed list of NRT members.

3. Engagement strategy for workshops

3.1 Main Techniques and tools

The workshops and general engagement within and between NRTs were fundamentally shaped by the European-wide lockdowns put in place to control the COVID-19 pandemic from March 2020 onwards. As such, all consultations took place online. The NRTs in Belgium, Spain and Poland used MIRO to brainstorm ideas, discuss and agree work plans. MIRO works as a virtual notice board and can be used to supplement video conferencing calls, where participants can post 'sticky notes', which can be easily edited, grouped and moved around on a shared screen with color-coding to easily identify the contributing authors and emerging themes or categories. Overall, this approach worked well, overseen in most cases by the NRT leader (COMETS project member) who was able to structure the conversations, guide and assist participants on what and how to engage. The pandemic created a high degree of 'learning by doing' for online workshops and discussions and some NRT members expressed frustrations, arguing that the work could not be completed online. However, over time, the NRT members adjusted to the 'new normal' and on the whole the work progressed. Overall positive feedback was received from NRT members, in some cases this was registered via anonymous online surveys.

During the meetings, NRTs were encouraged to use Chatman house rules, i.e., comments are not affiliated with the speakers. This was deemed important to allow the free brainstorming of ideas and free expression of opinions. In general, meetings were held in the national language.

3.2 Other techniques and tools for engaging and benefiting the comparative case studies

The original project document anticipated a high degree of 'hands on' interaction and learning through site visits and in-person meetings. The NRT meetings were designed to exchange ideas and arguments, thus placing greater emphasis on prior knowledge or experience which tended to benefit the CAI members.

In some countries, e.g. Spain, the online meetings were used to present and discuss the Communities For Future platform as a means to promote CAIs in various forms. Perhaps one positive unintended consequence of the pandemic is that the lockdowns made such online platforms more visible and relevant, hence more likely to have an impact.

4. Research Questions

Selection of the specific research questions was the responsibility of the NRTs, with the intent that NRT team members, including CAIs,would co-create and develop questions that were relevant to

them. The process for generating these questions was also up to each NRT during their respective KoM.

As stated above, as a starting point, some of the NRTs (Estonia, Poland, and Spain) used the general framework questions provided by the COMETS project:

A) What are CAIs?

B) How do CAIs work?

C) How relevant are CAIs to the Energy System?

D) How can CAIs be supported?

E) What is the future for CAIs?

The Estonian NRT in particular used these questions as the basic frame for all of the specific research questions. Other NRTs (Belgium, Netherlands, Italy) did not use the general framework questions as prompts and instead took thematic ideas ahead of the KoM by email (Belgium), had bottom up question formation in breakout rooms (Italy) during the KoM or a general question formation from the whole NRT in the KoM (Netherlands).

In addition to the general COMETS questions, the NRTs drew inspiration and themes from the COMETS WP3 survey, the results of which became available in time before the national KoMs. Because many of CAIs on the NRTs took part in the survey, presentation of the survey results were featured in the KoMs, and were used as a starting point for asking deeper research questions.

From these, more detailed, country and context specific questions were created in the KoMs through collaborative, co-creative processes under the CB approach. It was therefore emphasized in CB training sessions for the NRT leaders that there would be no uniform set of specific research questions given across NRTs, because a) this was already the basis for the survey in WP3 of COMETS and b) to ensure a participatory rather than extractive approach. The goal of WP4 is to have the questions come from the members of the NRT so that it is possible to compare which issues are of importance to which countries. Also, the CB participatory process of co-creating research questions is designed to engage the NRT members by including them in issues which are important to them.

4.1 Selection Process for Research Questions

The main goal of the KoMs was for the NRTs to create a finalized list of research questions. In planning the KoMs, NRTs needed to strike a balance between an organic process where they let the questions freely emerge versus a structured process that kept the NRTs focused and on task. This

was to encourage the open participation of NRT members and free flow of ideas, but at the same time prevent having a chaotic workshop that went in too many different directions. Therefore the KoMs had a degree of flexibility while at the same time the NRTs would direct the conversations and activities, so that the participants would recognize that they are integral to defining and participating in the research work.

Various workshop tools and strategies were employed by the NRTs to develop and then to narrow down and finalize the question list (i.e., divergent and convergent processes). To aid in the brainstorming and question formation, virtual break-out rooms were used by some of the NRTs (Belgium, Italy and Spain). Some NRTs (e.g. Belgium) collected candidate topics and questions by email from the members prior to the meeting. Another technique involved a categorical (thematic) approach to developing questions, e.g. political, organizational, technological, social, etc. The NRTs would then develop and select the most important questions within each theme. All NRTs except Italy used some thematic grouping process in the development of their questions, either by first choosing the themes and developing questions, or by first brainstorming questions and grouping them into themes.

It was anticipated that more questions would emerge than could be answered in the given time frame, so it was expected that there would need to be collective decisions taken on which questions to focus upon. These included grouping similar questions together to condense them, and using a dot-macracy process where the participants have a given number of "marks" to spend on the various questions. Other voting techniques included participant scoring (Spain) and "priority" weighted voting (Italy).

The strategies employed involved collective decision making so that the processes would remain transparent and fair, and every participant would feel they had an important role in deciding the themes and questions.

Throughout the process, the NRTs were supported by bilateral coaching corners, virtual support meetings, and through a digital sharing basket. This allowed for discussion on problems as they arose, for example,, the Spanish NRT needed a second meeting to finalize the research questions.

The detailed procedures used by each NRT are given in Annex 3.

4.2 Themes

The NRTs were free to determine how to organize or cluster their questions around themes, resulting in different thematic categories. Italy did not cluster their questions in explicit themes, whereas other NRTs, such as Estonia, a priori themes for a basis for forming questions. In contrast, the Dutch and Spanish NRTs used a bottom up approach, first creating questions and then organizing them into themes. Other NRTs such as Belgium used an iterative approach, choosing

topics of interest from the survey in WP3 to inspire questions that were then clustered around new themes. The themes of the various NRTs are given in Table 3.

Table 3. Themes for Clustering Research Questions, by NRT

NRT	Themes / Clusters
Belgium	● Organization ● Citizen participation ● Growth ● Financing
Estonia	● What are CAIs (Collective Action Initiatives) in Estonia? ● How do CAIs work? ● How relevant are CAIs to the Energy System? ● How can CAIs be supported? ● What is the future for CAIs in Estonia?
Italy	n/a (no thematic clustering was done)
Netherlands	● Financing ● Regulation ● Relationships with market parties ● Relationships with public parties ● Organization
Poland	● The history of the initiative ● Citizens' involvement in the energy transition ● Economic conditions for initiating and functioning of initiatives ● Institutional law conditions for initiating and functioning of initiatives
Spain	● Citizen Participation and Engagement ○ Social Identity ○ Governance ○ Lifestyle Changes ○ Foundation of a CAI ● Growth ○ Role of Institutions: Drivers/ Facilitators ○ Funding ○ Scaling/ growth of a CAI: internal decisions ● Market and Ecosystem ○ Relationships ○ Activities Diversification ○ Relationship with traditional agents of the energy market

Collectively, the questions were synthesized into the following themes, based on the overlapping clusters in Table 3:

- Citizen Participation and Engagement
- Organization and Governance
- Growth and Scaling
- Financial, Business, Funding
- External Actors and Institutions
- Legal, Regulatory and Political
- Impact
- Other

4.3 Summary of Specific Research Questions

The specific research questions created by the NRTs were collated by each of the sythesized themes, and are given in Annex 3. This list includes any questions that were considered but ultimately discarded. Depending on the process for developing questions, not all NRTs had discarded questions, which result from a more iterative approach. Only the Italian, Dutch, and Spanish NRTs produced questions that were ultimately not addressed. In total across all NRTs, 31% of the questions were ultimately rejected. The greatest number (11) of rejected questions were from the theme of Organization and Governance. The highest rate of rejection (67%) occurred in the themes of Impact and Other; though fewer questions were asked in these themes all together. Table 4 and Figure 5 summarize the distribution of questions across the NRTs by synthesized theme.

Table 4. Number of questions in each theme from the NRTs (compound questions were counted as one).

Theme	Belgium	Estonia	Italy	Netherlands	Poland	Spain	TOTAL
Citizen Participation and Engagement	4	6	1	2	5	7	*25*
Organization and Governance	3	9	1	0	4	2	*19*
Growth and Scaling	5	1	0	1	1	4	*12*
Financial, Business, Funding	3	3	1	3	4	1	*15*
External Actors and Institutions	1	4	2	3	0	4	*14*
Legal, Regulatory and Political	6	3	1	5	2	2	*19*
Impact	0	2	1	0	0	0	*3*
Other	0	1	0	0	0	1	*2*
TOTAL	*22*	*29*	*7*	*14*	*16*	*21*	*109*

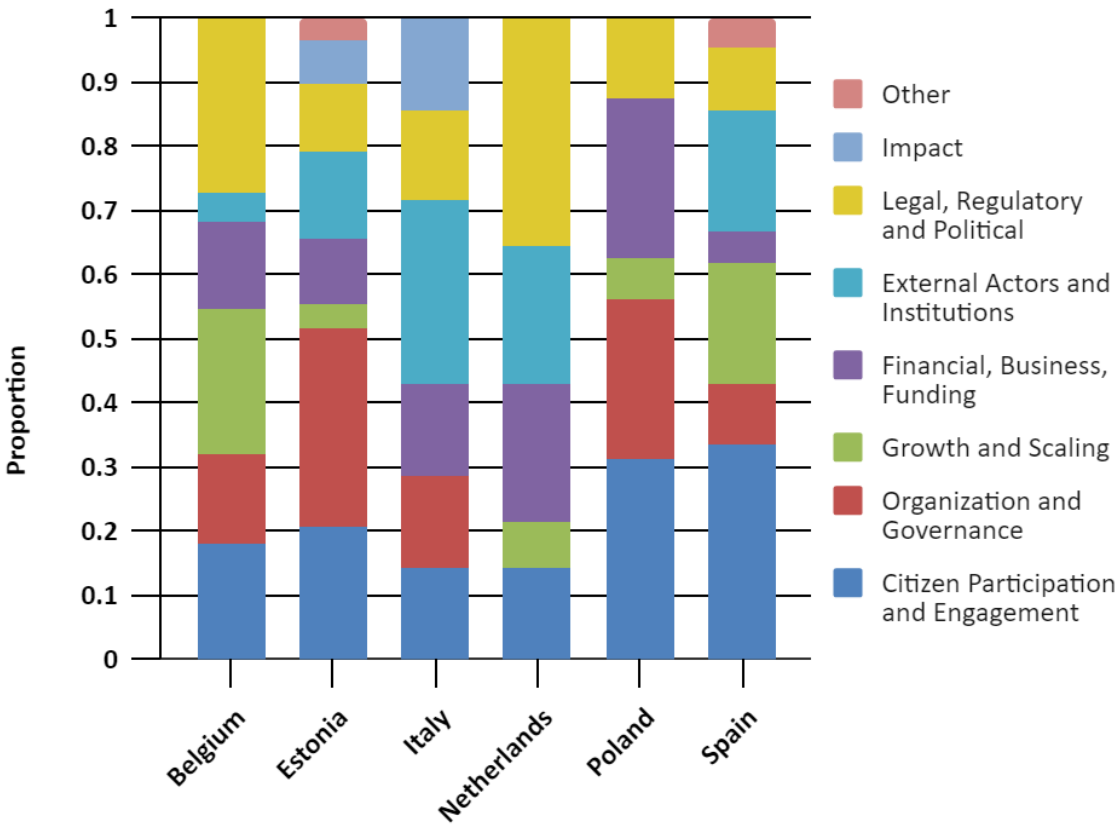

Figure 3. Thematic distribution of questions, by NRT.

From this distribution of questions, the following patterns are observed:

- The Spanish and Polish NRTs had high interest in citizen participation and engagement;
- The NRTs in Estonia and Poland both had a high proportion of questions about organization and governance of the CAIs;
- The Belgian and Spanish NRTs had the most interest in growth and scaling;
- The NRTs in Poland and the The Netherlands both had over 20% of questions related to funding and financial issues;
- The Italian and Dutch NRTs had comparatively high interest in external actors and institutions;
- Legal, regulatory, and political issues were relatively most important in the Belgian and Dutch NRTs;
- Impact was considered only by the Italian and Estonian NRTs.

5. Methodology

5.1 Process

While the NRTs were trained to use CB as an overall approach and strategy for engaging the NRT members and comparative case studies. As with the research questions, as part of the CB approach, the specific methodologies for answering the research questions were determined by the NRTs, in order to promote engagement in the research process.

Some of the NRTs (Belgium, Estonia, Netherlands) merged discussion and formation of the research questions with the outlining of the methodology during their respective KoMs. Others used the second workshop to define the methodology, or validate the methodologies developed by the NRT leaders in advance. A detailed description of the NRTs' processes for selecting the methodology can be found in Annex 4.

5.2 Methods used

Interviews were the main method used by the NRTs to answer the specific research questions they developed, and all NRTs except Estonia used them. The interviews were digitally recorded. Some of the NRTs transcribed the interviews in whole (e.g. Italy) or part (e.g., the Polish NRT only transcribed key statements that summarized main themes). The Estonian NRT used a survey; they gave the option to do an interview, but all the comparative case studies opted instead for the questionnaire.

In addition to case study interviews, some NRTs created a framework where the comparative case studies made presentations on the specific themes. It then would transition to an open question and answer session, where questions were taken from other NRT members (e.g., the Netherlands used this approach as the primary method). Similarly, the Belgian NRT used discussion fora to supplement the semi-structured interviews, and found them more useful for the themes of Citizen Participation and Engagement, Growth and Scaling, and Financing. Virtual visit tours were another method, where each CAI made a presentation to the rest of the NRTs that also included a summary of their NRT interview (e.g. Italy). Three of the NRTs requested secondary material from the comparative case studies, which included annual reports, statutes, organizational charts, description of processes, among other things. Some of this was used merely to give more contextual background (Spanish NRT).

All interviews, presentations and discussion fora were conducted online due to COVID restrictions. All of interviewees signed an ICF in line with GDPR policy of COMETS. Table 5 summarizes the various methods used by the NRTs. Explicit detail on each NRTs' methodology can be found in Annex 4.

Table 5. Methods used by the NRTs to address the research questions

NRT	Semi-Structured Interviews	Thematic Presentations	Q&A	Discussion Forum	Question-naire	Virtual Visit Tours	Secondary Material
Belgium	X			X			X
Estonia					X		
Italy	X					X	X
Netherlands	X	X	X				
Poland	X						
Spain	X			X		X	X (context)

6. Findings

6.1 Overview of the Comparative Case Studies

6.1.1 Belgium

The Belgian NRT studied 6 CAIs as comparative case studies. They were established between 1991 and 2018. They all produce renewable energy (RE) (mainly wind and PV, but also district heating and waste heat), and two run additional energy-related activities. Their size ranges from 79 to 59,321 members, and their 'social capital' is between 65,600 and 55,692,000 euros.

All the studied CAIs engaged in RE production, including wind, solar PV, hydro power, and biomass heat and/or power. Some undertook additional energy-related activities such as energy savings and participating in Research, Development and Demonstration (RD&D) projects addressing new technologies (e.g. hydrogen, storage, shared electric mobility), energy savings, and business models.

6.1.2 Estonia

The Estonian NRT included 4 representatives of CAIs and two representatives of CAI umbrella organisations, as well as experts and representatives of local and central government. All the CAIs (and umbrella organisations) were apartment associations, which is the only type of 'energy community' existing in Estonia. Only one of the 4 CAIs in the NRT was a newly established organization (a new building) and three of them were established CAIs. The CAI with the longest history in the energy area had produced solar PV power for 10 years. Hence, 'energy communities' in Estonia are characterised by being very young and by being first and foremost apartment associations that have decided to produce renewable energy (solar PV or solar heat) mainly for self-consumption, as an add on. The electricity or heat panels were typically installed as part of the general renovation of the buildings under a state support scheme. One CAI had also participated in a co-financed wind farm project (the report provides no details on this involvement).

The surveyed CAIs have deployed solar PV or solar heat (thermal collectors) equipment on the rooftop of participating buildings, often as part of a general building-renovation project. One CAI

had also installed solar PV on balconies. Heat pumps are also mentioned. Some CAIs moreover expressed interest in energy storage and charging systems for electric cars and bicycles. One community participates in a co-financed wind project.

6.1.3 Italy

The Italian NRT is composed of 11 members: 7 CAIs and 4 "external" stakeholders, where the 7 CAIs serve as the comparative case studies. One of the external stakeholders asked to also be a comparative case study. However, it was mutually decided not to go further with this possibility for different reasons: the Italian NRT would have had a number of comparative case studies much bigger than the other five NRTs and, more importantly, the proposed eighth comparative case study would result in a set that was deemed not to be sufficiently "consolidated". The comparative case studies consisted of 4 energy cooperatives, 2 ecovillages/ intentional communities, and a limited liability company.

6.1.4 Netherlands

The Dutch NRT studied five CAIs as comparative case studies, as follows: One innovative solar field established by the cooperative Zonnendorpen covering 5 villages, the wind cooperative Windpark Nijmegen (WPN), the neighbourhood-based energy cooperative Ketelhuis WG in Amsterdam (conversion of heat source from gas to aqua thermal heat pumps), and the 7-member neighbourhood-based working group "Houtlaan Minder op de Meter" in Assen aiming to meet the government's objective of 50% reduction of CO_2 by 2030 in their neighborhood of 136 detached houses through a combination of privately owned rooftop solar PV, e-cars, heat pumps and grid balancing, including storage. A sixth case study is the social enterprise Bronnen VanOns, which assists energy cooperatives in project development - especially when these involve collaboration with commercial developers.

The case studies included a wide variety of technologies, not just wind and solar PV, but also an innovative district heating system, flexibility-enhancing initiatives to overcome local grid constraints, or a diversified strategy to comply with national CO_2 reduction targets. Some of the CAIs have evolved quickly from their initial focus on wind or solar towards such more advanced ideas about what constitutes an 'energy community' building on holistic concepts such as the energy landscape, although many of these ideas still need to be implemented.

6.1.5 Poland

The Polish NRT consisted of 11 members, 3 of which were legal CAIs that constituted the comparative case studies. A five comparative case study was included. The CAIs included biogas energy clusters, energy efficiency clusters, housing associations, and geothermal heating.

A surprising element is that all the respondents concerned the Mój Prąd programme with reference to the gamification concept. The number of installations funded by this programme boosted the PV prosument market in Poland. The respondents see this as an element of gamification. In many cases, the reason for these investments is economical (it is easy to get 5,000 PLN of a subsidy) as well as *"my neighbour" has a PV installation and "I don't"* fact as an effective mechanism. This shows the whole process of winning the race for funding and then showing off to other residents that I made it. In terms of the small-scale PV installations, the next interesting thing is that PV installation could be seen as a provision for older people *"You invest now, but after a couple of years, when you are retired, and your income is lowered, you will have at least cheap energy. It is like a retirement fund."*

6.1.6 Spain

The Spanish NRT consisted of 13 people from 10 organisations, five of which were CAIs (1 start-up and 4 established CAIs). The CAI members of the Spanish NRT served as the comparative case studies that participated in the benchmarking study. The other members of the NRT are national policymakers, a national energy agency, academics and an association of energy cooperatives. The CAIs varied in geographical scope from local to regional to national. Four of the CAIs were non-profit cooperatives, and one was an associated work cooperative. Their activities varied from mobility, to self generation of power through solar and thermal energy, and renewable energy consulting.

In Spain the technological challenge is very relevant. CAIs need to collaborate with each other to empower and grow with technology as a key means to upscale. However, technological innovation often requires high investments that are difficult for CAIs to make. The CAIs consider joining resources or building alliances effective ways to be able to address this challenge. In addition, the role of public institutions could be very relevant in this case both in terms of financing technological innovation projects of CAIs and supporting alternative financing or novel schemes and models so that CAIs could get funding from private investors without going against their governance and participation models.

In Spain, activities linked to spaces and physical contacts have been greatly affected due to the COVID-19 pandemic, reducing interactions. The synergies that were produced by the interaction in these spaces disappear and with this the doors are closed for new opportunities or for continuing certain projects. "*It had a clear impact in our space, where meetings took place. The synergies that were created there disappeared. It impacts on the way of doing, of understanding, of being ... changing interactions to the screen has nothing to do with the physical meetings*".

However, it has allowed, by necessity, the promotion of the generalized use of information and communication technologies (ICTs) as substitutes for traditional channels of participation, and in some cases activity and participation has been maintained or increased.

The community has been referred to as an instrument of social innovation in which the impact of the pandemic on neighbours has been reduced through mutual support. It was possible thanks to the trust that proximity offers. The most resilient space is that of members. "*The concept of community was reinforced. These communities were closed and only those from that community could use the service. The users in this community were strengthened and the most resilient*."

6.2 Citizen Participation and Engagement

6.2.1 Belgium

Members were (and still are) recruited mainly from the local area or region where the RE facilities are located. A variety of recruitment methods are used, including meetings, presence at local events, flyers, posters, word of mouth, email, social media (Facebook) and the local press. Sometimes the website or newsletter of the local municipality is used. One CAI also paid for advertising on Facebook. It is only during project development, when a large amount of capital must be raised in a short time, that actual communication campaigns are carried out. One CAI noted a need to adapt the framing and language to attract different target groups, while two deliberately took a broad approach to reach a wide audience.

Municipalities seem to be the most important partner for most of the CAIs regarding communication to potential members, but cooperation with other organisations was also sought to organize events and share knowledge. In the Wallon region, 12 CAIs have formed an electricity supplier (cooperative society), through which financial incentives are provided to customers that join a CAI, while the CAIs on the other hand help advertise the energy supplier.

The CAIs provide their members with a variety of types and levels of participation in the CAI, from being passive members, over taking part in working groups and organising events, to being board members and taking part in project development. Participation (beyond financial participation) is voluntary and is not always actively encouraged by the CAI; in fact, there were different levels of expectations to member engagement among the studied CAIs. Some activities or responsibilities require specific knowledge (e.g. on digitalisation) and are thus often limited to board members or hired professionals, while certain professions or formal political roles limited participation in CAIs for some individuals. The latter constraint was in one case solved by forming a non-profit organisation in conjunction with the CAI. Time constraints, on the part of both board members (to organise activities) and members (to participate in them), were a major factor limiting participating in CAI activities.

Energy poverty and the inclusion of vulnerable consumers were topics familiar to most of the CAIs, yet only two had mechanisms to enable poor consumers to buy shares and so access the CAI. These mechanisms consisted of the possibility to pay off the share over a longer period (in installments or via the energy bill), while enjoying the full membership benefits from day one. Nevertheless, it is interesting that the CAIs addressed energy poverty through participation in various projects and/or

allocation of part of their profit to such projects. Energy poverty was addressed not only by facilitating access to cheap and clean energy, but also through energy saving measures. The legal framework for tackling energy poverty was deemed 'unclear' but not investigated further by the Belgian NRT.

6.2.2 Estonia

Participation in energy communities in Estonia occurs almost exclusively through membership in an apartment association, which has deployed solar PV or solar heat equipment on the rooftop of its buildings, often as part of a general building-renovation project. The associations are mainly motivated to undertake this investment by the prospect of lower electricity and heating bills. The awareness of the CAIs' RE-production is generally low and does not receive much attention at the association meetings. A further motivation to engage in RE production for the apartment associations is that it contributes to achieving the energy class required to receive state support for renovating the apartment building.

This said, in the CAI that has produced RE for the longest period (10 years), members have started to show greater awareness and pride in their RE solutions. Another exception is the apartment association that was formed recently (2020) in a new building, which more clearly identifies itself as an energy association and whose board is very energy-conscious and has innovative ideas for the association's further development. The NRT expects this kind of CAI to be a model for a new generation of energy communities in Estonia.

Only two CAIs had experienced skepticism from their members, but this concerned the whole building renovation process rather than the PV park alone.

6.2.3 Italy

In Italy, there are a variety of situations that show different participation profiles. As for the ecovillages that count on the particular category of resident members they reached a relatively relevant demographic expansion that is in any case far smaller than the other energy CAIs. The ways to become resident members are essentially two: by choice or by birth. Joining an ecovillage is a choice that requires a change of residence, generally a job change, as well as the transformation of the personal lifestyle and an investment of time and resources, which are much more demanding than what is required by the other types of initiatives. Ecovillages do not have their main source of identity and self-support in the energy theme but they provide services related to health care and spiritual research, training to non-violence, provision of cultural/recreational/ecological activities. As far as the contacts with the initiatives is not exclusively focused on the energy theme, ecovillage counts on partnership with University and schools. Moreover, ecovillages are involved in environmental associations and in activities in collaboration with external associations and networks.

As for the traditional energy cooperatives the number of members might vary two orders of magnitude, from around 50 members to more than 7,000, and the strategies vary consequently. Kennedy Energia has 50 members and it counts the same number of people that bought the shares of the plant that has been installed. They keep their members informed and involved by circulating a monthly report via email, by presenting an annual report at the annual assembly, by discussing possible new ideas. The enlargement of the membership base is seen as not strictly necessary while they are promoting several environmental awareness activities towards the citizens, they are making presentations in schools and they support the activities of a group of local young people. Energia Positiva, focused on energy production, increases its membership base when it acquires, mainly on the secondary market, new plants, whose shares are made available to the new and old members through its website. While at the beginning of its experience Energia Positiva enlarges its membership base through meetings with small groups of citizens, later on the attraction of new members is driven by the strengthening of its communication strategy, especially through its website, and by word of mouth of the members themselves.

Energia Positiva is actively searching for collaborations with diverse institutions and associations, even though any of the initial contacts carried out has led to the development of concrete projects by now. Ötzi, a consumption cooperative, increases its productive base following the increase of its membership base through the connection with other local initiatives to the new-born cooperative. Ötzi bases its communication and involvement strategies on the cooperative/participatory aspect, the environmental sustainability, its strong tie with territory (it sells renewable energy only produced in South Tyrol) and a competitive energy price. Ötzi sends a monthly newsletter to its members, in which it informs them about themes of potential interest (on a national and international level) and carries out training activities, for example on how to interpret energy bills but it has not yet organized activities specifically aimed at increasing the direct participation of its members, with the noticeable exception of the so-called “Ötzi Café”, that is an online aggregation space, which should take the form of a webinar open to the participation of members.

For CEDIS, a 100-year old cooperative company that produces, sells and distributes energy, those who currently work there have largely "inherited" a situation that from this point of view already existed and it does not face the problem of expanding the membership base, as it represents the almost totality of users present in the social territory. CEDIS records a lower sense of belonging of the younger generations, which however in no case leads to defections therefore they are planning to define a communication strategy to remember or make more evident the numerous and substantial benefits that they bring to members, users and, in general, to the territory, both in an environmental sense and in the social one.

Finally, the cooperative with the most consistent membership base, ènostra, has an official Participation Plan aimed not only at expanding the membership base, but also and above all at responding to the need for greater involvement of the members on issues concerning cooperative

life. Among the factors that lead people to join the strongest is certainly represented by the environmental element, which overcomes the economic one with people opting for the initiative on the basis of environmental / ethical considerations, they “embrace the ecological values”. Among the actions envisaged in the 4 axes of which it is composed, there is the construction of territorial groups through the "Communities of practices" the aim to spread good practices, knowledge and ideas useful to other members, for their application and dissemination on the territory. Currently, 4 territorial groups have been formed, which are located in the larger cities and now need to receive training in order to be able to "develop projects on their territory or simply promote ènostra on the territory". As far as training is concerned, this is aimed especially at members, but also at people outside the cooperative. Basically, starting from what emerged also in the communities of practices, ènostra intends to make the skills of its members available to other members, for example through webinars, in order to increase the training of its members on energy and environmental issues, and developing their ability to implement sustainable projects independently. In addition, a new site is being developed by ènostra, in which the members are allowed to share documents and ideas; there will be a section containing all the webinars that the members and other experts will do and the "Summer School of ènostra" has been planned. To conclude, ènostra is in contact with initiatives which are not strictly focused on the energy theme through its members, who have the opportunity, on a monthly basis, to present their story during interviews, which are made available and circulated through ènostra’s social media channels. The intention of these interviews is to draw attention and stimulate reflections on a wide array of themes not strictly focused on the energy issues, contributing to diffuse culture and to create community around them.

6.2.4 Netherlands

The Ketelhuis WG used both traditional and electronic means to communicate in their community, and found the social aspect to be important. The Houtlaan MOM had experienced difficulties in recruiting members for their alternative heating project. They found that it is difficult to convince people to shift their heating supplier if no economic gain can be demonstrated.

The case study identified the following insights regarding recruitment of members for the CAIs:

- Recruit members from your personal and professional network the moment you start.
- The closer you are to people the better: you should know your (prospective) members and, even more importantly, they should know you.
- In the case of an external stimulus, recruiting is fairly easy.
- Link a famous/well-known/familiar person to your initiative.
- While it is important to involve people early on, it is easier when your CAI reaches the implementation phase and the project becomes more concrete.

6.2.5 Poland

In Poland, the respondents who are representatives of the energy clusters (see Organization and Governance) stress that all the initiatives in the energy transition in Poland are top-down and that the main driver for people to join is economic. It is vital to convincing residents why it is profitable to join the changes in the energy market.

"The actions are top-down. An information campaign is needed about the need for the energy transition. The economic argument is the key. Renewable energy is becoming fashionable, and it is as important as environmental awareness. You do not need to explain about emissions (that's abstract). The economic argument is important. You have to take advantage of it" "Some of the initiatives notice that in any case citizens are more and more active in the field of the energy transition and more sensitive to environmental problems "

"…people want to breathe clean air, but they still wait for external support. However, the cluster does not work in the perception of residents. The authorities treat it more as a technical tool for the implementation of activities"

Residents are putting pressure on the local governments, but it is mainly because of the air pollution and the rising awareness of the health problems that it could cause and still the economic driver is the most relevant.

"Residents want to pay less for utilities. That was pressure from the inhabitants. Prizes and awards for actions are important".

Another issue is that absorbing the EU funds is a robust political argument, whether commune is influential or not. Considering that, local governments are trying to use the European funds and invest in showing their effectiveness.

6.2.6 Spain

In Spain, the engagement of people in CAIs takes advantage of a tradition of associationism and participation of community members, either in social or energy issues such as Consumer Groups, neighbourhood associations or other social movements. The main motivations that drive people engagement refer to the sharing of common values, to the willingness and confidence in their own capacity to switch the energy system towards a different economic and social model and they are reinforced by social and environmental awareness. The "sense of belonging" is then a relevant factor to enrol and maintain active CAIs members thus highlighting that, beyond the energy and environmental benefits, it is also essential that a community is created based on common values. In terms of initiator, it is stated that in all the cases in Spain there was a driving group/individual that fosters and creates the ideological and identity bases of the CAI while for the creation and implementation of some CAIs, in almost all the cases (four out of five) the local entities are considered as key factors since they play a driving role together with volunteers.

As for the socio-demographic perspective, CAIs members are mostly men, of medium-high socioeconomic level, with environmental concerns and with previous experience in collaborative dynamics. Vulnerable groups or groups with fewer resources *"…tend not to participate in these types of initiatives. The challenge is to find the mechanisms to integrate them into the CAIs…"*

For example, the regulative framework is too difficult and hard to understand, and only large companies or specialised organisations have resources to understand this regulatory framework. Developing public campaigns in a friendly way, in different languages, explaining the regulatory framework would incentivise the engagement of these vulnerable collectives. Moreover, neighbourhood and technical offices are proposed as means of communication and spreading the existence, benefits and the way that CAIs work. In addition, there are problems to further integrate vulnerable groups due to the inapplicability of the Social Bonus in the CAI mode. There are only limited, unstructured and punctual social inclusion activities. The will exists but the ways of integrating the groups that are being left behind have not been defined yet. Even so, there are some examples of social inclusion practices: in some cases, training actions are carried out for groups in vulnerable situations, or specific agreements with members. There are also affordable fees to guarantee a wider access to services or other types of tools such as the exchange of hours.

In terms of participation of women, even though some CAIs have achieved parity in their governance bodies, there is a need to involve more women in these bodies and to increase the participation of women in CAIs in general. However, CAIs consider their projects attractive to women because their approach fits well values that are considered feminine such as sustainability, proximity, community. Lack of time and having other priorities or tasks to perform is mentioned as one of the possible reasons for this low participation of women. It also highlighted the fact that both the topics of energy and mobility are seen as "masculine spaces".

Although limited, participation of women is characterized by the provision of proactive and leading tasks as declared by one of the interviewed:

"*…the president is a woman. Participation in assemblies is greater for women than for men. It is one more issue of the style of society we live in. Although those that are (participating) contribute a lot*."

6.3 Organization and Governance

6.3.1 Belgium

All the Belgian CAIs have the legal status of a cooperative, while two in addition run a non-profit organisation, and so they follow the principles outlined by the International Cooperative Alliance in the way they organize, manage, and develop their CAI. The CAIs have a formal structure to consult their cooperants about their current and future activities. The General Assembly (GA) is the sovereign decision-making body of the cooperative and takes all the strategic decisions, e.g. regarding investments in projects and the allocation of profit. In the GA, the cooperative is held accountable and must explain clearly to the cooperants what it is doing. The comparative case

studies also have informal consultation structures, such as cooperants' evenings where cooperants can make suggestions and ask critical questions.

All the CAIs work in a specific geographical region, i.e. a municipality, a cluster of municipalities, or province, and in one case, the entire region of Flanders.

While most of the CAIs depend largely on voluntary work from their members, they also identified a need for hiring professional and skilled staff on a full- or part-time basis for carrying many of their activities, such as project development and monitoring, as well as administrative tasks. However, it seems that finance is a perceived barrier for such a professionalisation and one CAI was considering the sharing of staff with other CAIs to increase affordability. In other cases, external projects helped finance professional staff.

The Belgian regulation of energy cooperatives stipulates that the dividend cannot exceed 6%. Two CAIs have moreover defined in their statutes to donate a percentage of their annual profit to a social cause before they payment of dividends.

6.3.2 Estonia

All the studied CAIs were apartment associations, whose governance structure is stipulated by law. None of the studied CAIs expressed motivation or opportunity to establish a separate organisation to manage the association's energy activities. The motivation of the members to support energy initiatives is overwhelmingly financial and so depends on the ability of the board to demonstrate cost effectiveness in the form of income (from sale of surplus electricity) or savings on heat or electricity bills. Green thinking and adoption innovative technologies were much less important motivations. How demographic or socio-economic factors affected members' support to RE could not be established from the survey data.

6.3.3 Italy

In Italy, there are different forms of CAIs exclusively or predominantly focused on the energy-related and energy transition issues, others, like the ecovillages, tackle the energy theme as one among many.

Ecovillages might adopt a more structured and formal internal organization, including specific adhesion procedures and use of decisional modes inspired by the method of the consensus through the engagement help of experts for residents to be trained into facilitation techniques.

As for the legal form chosen by other energy CAIs, the energy cooperative, including both the type oriented to energy selling and consumption as well as the type engaged in energy generation, is the main legal form prevailing among the case studies. The choice of the cooperative form derives from a varied set of motivations among which is relevant the longstanding local tradition, widespread especially in the Alps, where a group of cooperatives labelled as "historical cooperatives" exists, as

they are born between the end of the XIX century and the beginning of the XX century. While almost all the cooperatives of the NRT are part of the European network REScoop, there is one case study, ènostra, that represents a product of this network, as it stands as one of the two energy cooperative projects deriving from that experience (the REScoop 20-20-20 project), inspired by the prevailing European models in countries such as Germany, France and Spain. The cooperatives' landscape is enriched by the presence of a further initiative that, inspired by some existing Italian cooperative models, went for the joint-stock cooperative form with focus on energy production due to the desire to give citizens the opportunity not only to consume "green" energy but also to produce renewable energy through the acquisition of shares allowing members to compose "virtual" plants. Similarly to other examined initiatives, it offers the opportunity of a direct and continuous dialogue with its members - before, during and after the subscription - and provides its members not only with a uniform tariff, but also with the possibility to become owner of the means of energy production, highlighting the production-oriented dimension of its initiative. There is also an initiative taking the form of a Limited Liability Company whose choice to opt for this legal form is partly inspired by another local positive experience and partly driven by motivations of contingent feasibility, which brought the initiative's promoters to exclude alternative forms taken into consideration, such as the cooperative and the trust.

Overall, the ecovillages show a more complex formal architecture compared with the other energy CAIs, the network of associations, which mirrors both the variety of their objectives and the lack of an official institutional acknowledgment for this kind of initiatives. The analysis of the interviews made with the selected case studies reveals that some CAIs are available and interested in taking into consideration the transformation of their legal form, in order to foster the widening of the social engagement as well as the formation of renewable energy communities (REC), which represent the horizon where the initiatives are striving for. In fact, all the initiatives identify in the RECs the energy model of the future to which they attribute the potential to foster, not only the energy transition to renewable energy sources, but also the process of democratization of the energy sector. Every CAI then has its own peculiar interpretation of RECs, which strongly depends on their current situation and actual configuration and that might vary from being an aggregator to facilitator and manager to fostering acceptance of renewables in Italy (see Growth and scaling up: pathways and perspectives).

6.3.4 Netherlands

This point was discussed mainly in terms of external collaboration (see section on external actors and institutions), rather than the internal organisation of the CAI. Here, we summarise the lessons from the benchmarking session regarding how CAIs can strengthen its collaboration with partners by drawing on own and external resources:

- Many CAIs have a lot of expertise in-house, such as lawyers, bankers, etc., that helps in being recognized as a professional party when talking to developers.

- If a CAI has less in-house expertise it can seek collaboration with a bigger CAI to get access to certain knowledge. In some cases, larger cooperatives facilitate this.
- Project developers may approach cooperatives to realise jointly owned projects, to comply with the 50% ownership intention put forward in the 2019 Climate Agreement. Their expertise can then also be used.
- A CAI should not become too dependent on external experts and should prioritise experts specialized in representing community projects. In some regions, not many experts are available who know how to assist energy cooperatives and there is a need for an organisation that can facilitate access to relevant experts.
- Sharing knowledge is important and should have a stronger focus within the cooperative movement. Cooperatives should share logs or other documentation in which they outline the steps to take.

6.3.5 Poland

In Poland, several types of initiatives fulfilling the definition of the Collective Action Initiatives in the energy sector can be found: Energy Clusters, Energy Cooperatives, Housing Associations/ Communities and other local projects funded by the NGOs or local governments. Energy clusters are mainly commune or private-local government civic agreements. Such partnerships come primarily from the top-down perspective with the local government and businesses interested in creating a forum that could apply for governmental financial mechanisms to invest in renewable energy systems (RES). Polish energy CAIs need strong leaders that will move forward decisions and ideas and some of the initiatives entirely rely on the active leaders that are forcing the changes. This situation might drive the positive empowerment of specific groups to be able to take care of people's involvement.

"The general council [of the housing community] and the supervisory board got scared about the planned investments in RES, so the board changed to young people who took the responsibility. We start to publish a newspaper… we acted. People started to become active. Even though the community was reluctant to change, you had to convince them that it was worth acting."

6.3.6 Spain

In Spain, there are different points of view regarding the most suitable size for Collective Action Initiatives to be effective and handy. On the one hand, the preferred structure of the CAI ecosystem is that formed by many and small organisations that should have the following benefits: easier to manage and maintain, community dimensions fostered by the local proximity and easier to replicate. However, they are less efficient, and investment capacity is limited, so it is necessary to network, collaborate and seek synergies.

On the other hand, some participants opted for a model composed by those necessary number of CAIs and of a sufficient size to democratize the production and use of energy and facilitate distributed generation.

"Ideally many and small. But it is more complex, it requires more resources, and is less efficient. The ideal would be to agree and be associated. A commitment between efficiency and reaching all people."

Different models are in play that will shape the future of the energy transition and energy system: "Turnkey" model vs commitment and community model and centralized vs distributed model.

Little competition is observed amongst the CAIs since many of them operate in a very local sphere and there is space for all of them. People who participate in the CAIs look for different spaces, with certain values and organizational models and closeness and CAIs should not be duplicated but complement each other. These collective initiatives can live together. Large companies with large investment funds behind take over the social, inclusive and sustainable message implemented by true CAIs. The threat of initiatives disguised as CAIs is the scary one.

6.4 Market, Business models and Funding

6.4.1 Belgium

The cooperatives (CAIs) raise project finance mainly by selling shares in the RE production facilities to local citizens (cooperants), termed 'social capital'. This limits the level of debt of the CAI and hence the risk of loan default. In two cases, the CAI established a company for each new wind project that was legally independent from the CAI, and which could receive finance through the sale of shares to new cooperants or to cooperants from other CAIs. Bank loans seem to be taken only to a very limited extent and mainly to secure bridging capital or start-up capital. Banks are more reluctant to finance wind projects than other RE projects due to the long and uncertain permitting processes as well as to reputational risks related to social acceptance of turbines.

Two CAIs had received financial support from the local municipality or province to pay for the activities (legal, administrative, communication) needed to start-up a project (and raise social capital). Some of the more established CAIs had secured funding from a variety of public (from local to EU level) and private sources to engage in research, innovation or demonstration projects to explore new technologies or business models. Showing ability to attract such funding can increase public acceptance of projects and is perceived as a sign of recognition from the authorities. The CAIs did not find it difficult to attract external funding, but observed that such money imposed high administrative burdens on them, although this funding also enabled them to pay for professional staff or services.

Like other producers of RE in Belgium, the CAIs have received production (price) subsidies based on the green energy certificate system; however this system is being phased out for many technologies, which in particular has affected the profitability of roof-top PV. The green certificate

system has been (or is being) replaced by an investment subsidy implemented through an auction system in which the CAIs must bid for projects in competition with commercial actors; in Flanders, for example, this applies to wind turbines (10 - 300 kWe) and PV installations (40 kWp - 2 MWp). The many conditions attached to the auction system was deemed a disadvantage as it reduced flexibility in implementation. The CAIs also expressed concern that the auction system will favour large commercial actors. They noted that the regulatory framework for energy communities may increase the profitability of large PV systems, but how this framework will work is currently not clear and so it can not be used to calculate the business case for these installations.

Through a general support scheme aimed at motivating investments in start-up companies, individuals who invest in shares in a CAI get a 30-45% tax reduction on the value of the share. Three out of four CAIs eligible for this tax incentive made use of it and noted that it can help raise social capital for their projects. To ensure that cooperants do not join purely for short-term financial gains, one CAI required that investors keep their shares for a minimum of 10 years.

6.4.2 Estonia

Energy communities play a very minor role in Estonia's energy market, as this way of organising RE-production is confined to solar PV or solar heat installations on (or adjacent to) apartment buildings in cities. Some CAIs also use heat pumps. The production of energy is overwhelmingly for own use, although surplus electricity is sold especially during summer.

A State support programme for the complete renovation of apartment buildings has played a significant role in the establishment of renewable energy facilities by apartment associations. Grants are paid through Kredex, the foundation set up by the Ministry of Economic Affairs and Communications. The programme has run for more than ten years and has gained in popularity over the years. Six out seven apartment associations mentioned Kredex as a source of finance. Support from Kredex depends on achieving a certain energy class, and here the installment of a renewable energy production unit can work towards this goal, complementing energy-saving measures.

The fact that the RE facilities are financed as part of a general, comprehensive building renovation project possibly means greater acceptance of the investment costs, but at the same time it contributes to the collective debt of the association, although possibly in a relatively small way and on favourable lending terms. Still, this is a different financial model than for most of the CAIs studied by COMETS, where projects are financed 'up-front' through the selling of shares to individuals.

6.4.3 Italy

In Italy, the analysis of the case studies reveals that all the initiatives enter the Italian energy context proposing an alternative business model with respect to the dominant one, which is mainly

based on the energy provision to single citizens and families and ruled by market price mechanisms.

On the other hand, the CAIs emerge in the market emphasising the collective perspective and using tax relief and incentives offered by the existing Italian regulatory framework to promote renewable energy sources, as a factor of attraction.

Most of the examined CAIs declare that, even if the economic incentives have played a key role in their launch/activation and initial affirmation, the revenues deriving from the economic success let them become more and more independent from these forms of incentives, putting them into the perspective of increasingly more robust and ambitious self-support and self-funding schemes.

Nevertheless, for most of the CAIs, the economic dimension and the investments' returns remain an important element for the social involvement in the initiative also for the future. All the initiatives bet on a business model giving the possibility to their members to become active, proactive, consum-actors and prosumers of renewable energy.

6.4.4 Netherlands

The heat sector was a focus of the Dutch NRT. It was observed that it is difficult for energy communities to establish collective heating projects, partly because of the large size/cost and complexity of collective/district heating and partly due to a policy bias against energy cooperatives (see section on regulation). Established actors also seem reluctant to involve CAIs in such projects.

Another market topic addressed in this case study was how energy communities can compete with incumbent and commercial market actors. First of all, it is important that the energy cooperatives do not compete with each other, but instead work strategically together regarding choice of external partners. Secondly, there was experience that commercial actors had little interest in collaborating with energy communities. Thirdly, in cases where such collaboration is possible and desired by the CAI, it is important that the CAI acts strategically (e.g in relation to local permitting authorities) and that it hires in the necessary professional expertise (although it can be hard to find) and exploits its networks. In particular, in a competitive setting, the CAI needs to position itself properly and be aware of its strengths, e.g. the fact that the customers are the starting point for CAIs sets them apart from commercial developers.

6.4.5 Poland

In Poland financial barriers are not significant in some cases. Technologies are no longer expensive both for citizens and institutions. But, at the same time, some of the initiatives stress that not all the local governments are “brave enough” to conduct RES’s investments while there are not “not returnable” loans or programmes. In many cases, during the first years, funds “saved” on RES will be used to pay off the loan. Initiatives are planning to use the potential benefits for new investments. While regarding the housing communities and associations, all the investments were

financed by local or national funds. However, it is worth noticing that respondents stressed that most of the “right-know” benefits were used as funds for their contribution for another investment in thermo modernisation and energy transition of the commune.

6.4.6 Spain

In Spain, CAIs are aware of the threat from other companies in the energy sector and from "turnkey" energy management models, in which they provide a "community and green" energy service, without much involvement from the customer.

As for the financial support, grants tend to be given only in the initial phase. This fact shows a divergent assessment. On the one hand, it is considered positive, as it entails that the neighbours need to be the ones that maintain the initiative. And, on the other hand, it has a negative effect because some kind of support is needed along the whole lifetime of the collective. It is necessary to simplify the procedures for applications for public funding, extend the deadlines and provide security in legislative matters. It is considered essential to complement the aid with the definition of an energy and social model adopted by public institutions that contributes to the creation of common good and then the definition of regulations and rules to encourage initiatives that help to achieve this model.

Cooperatives need to be considered both by the decision makers and the members themselves as companies due to their ability to provide resilience, create jobs and contribute to society through taxes and they should be therefore supported all along their development. But the situation is still far from matching this need *“to be aware that the cooperative can also be a big company, and that the cooperative environment is a more transversal way to be part of the ecosystem. Cooperatives are part of the economy and should be integrated in that sense.”*

There is a lack of support from public and private funding because they do not have the same status as companies for investors. This lack of private funding poses a barrier for technological innovation of CAIs, since makes it difficult to find financing for their technological development. Subsidies, in some cases, have negative aspects, such as dependence on external agents or slowing down the involvement of citizens.

CAIs are complementary to large companies but that does not mean that this type of communities should play a residual role. The new model offered by the CAIs must be alternative and networked, sharing the same community spirit and focusing on achieving the common good.

In general, the CAIs obtain their financing from the investment of citizens as the main source. There are different financial means: members' contributions, debt issuance, volunteering, microcredits, contributions / loans from some partners, credits to financial entities and grants, cooperative-private sector cooperation. *“We are checking different business models. This way we could attract*

groups less involved but with a higher investing capacity. Economic incentives are very important too, so hybrid incentives could be developed".

6.5 External Actors and Institutions

6.5.1 Belgium

Most CAIS have collaborated with other CAIs in project development and in Flanders and Wallonia such collaboration is facilitated by regional networks of energy cooperatives. The cooperative associations in Wallonia have moreover developed partnerships with cooperatives in France, Germany and Spain. The cooperative associations also take up overarching issues such as energy poverty.

Municipalities are a key actor for the CAIs, particularly during project development and growth. On the one hand, the municipality can support or favour the CAI financially, through tendering processes (e.g developments on municipal lands or buildings), through communication to citizens, or as an investor. On the other hand, local political considerations, e.g. caused by citizen protests, can hinder especially wind projects from being realised. Hence, the CAIs also deem municipalities as a source of uncertainty.

Large energy (wind) companies tend to only involve CAIs to overcome challenges related to local public acceptance and even in these cases the CAI obtains only a small share of the project and not more than 20%.

6.5.2 Italy

In Italy, the role of local authorities and actors vary for each of the CAIs. As for the local authorities, sometimes they play as the promoter, such as in the case of Kennedy born after a call of the Municipality of Inzago (Metropolitan City of Milan), which launches a call for bids in order to implement a project inspired by the successful experience promoted. In this case, the support of the local administration has been vital both for the accomplishment of the project and for the follow up, like the promotion of awareness raising activities. In other cases (Energia Positiva) even if the cooperative has realised some projects in collaboration with public institutions, the role of local authorities and other local actors is not central for its activities now. For ecovillages instead the relationships with local authorities and actors are not a priority and are not intentionally sought, while they emerge as "relations of cordiality" over time, as long as the ecovillage's activities display their positive impact on the territory (e.g., summer theatre festival). The most important alliances and networks of the ecovillage do not have a geographical basis, but are mostly those with the groups and initiatives the ecovillage share the same values.

CAIs were of the opinion that they could benefit from the support of public institutions, but they should as much as possible take form (and keep the approach) from the bottom, also because public authorities tend to show an opportunistic attitude, i.e. they show interest and willingness to

sponsor and support new initiatives only after they prove to be solid and successful. The role of the local public administration raised then two delicate aspects related to the physiological political turnover: the need to keep a certain degree of independence for the local policy makers and the opportunity to broaden the project also beyond the town's horizon where the initiative is born.

As for other stakeholders, the three main actors the CAIs should/might have relations with are ARERA (National Regulatory Agency for Energy, Grids and the Environment), GSE (Energy Services Managing Authority) and RSE (Research on Energy Systems). As for ARERA none of the examined case studies has declared to have any particular kind of relation with it. They only use the online public consultations to communicate and they plan to keep using it. As for the contacts with GSE, they are limited to the procedures concerning the plants' realization and accruing incentives. Some of the CAIs are instead having stable contacts with RSE, which are mainly due to their activities in the research framework on pilot projects concerning renewable energy communities and collective self-consumption schemes. Two main factors drive the relations with RSE: the quality of the proposed projects and their "dimensions". The current research activities carried out by RSE, in fact, entail an evaluation process of projects' partners, which includes, on the one hand, the assessment of the proponent's capacity to accomplish the task, the verification of the model replicability as well as the potential impacts at systemic level (on the energy grid and taxation system), and on the other hand, considerations concerning the proponents or partners' dimensions, as well as their level of solidity, atypicality and organisational form, with respect to the habits and/or expectation of RSE itself.

Engagement of CAIs in relations with other stakeholders vary with the dimension and with the mission of the CAIs. Ènostra, the biggest Italian CAI, is the initiative with the most intense contacts with ARERA and GSE, due to the fact that it is acknowledged as an important stakeholder in the energy sector. Another initiative with more possibilities of being in contact with these regulatory entities are the group of the so-called "historical" cooperatives, which organizes regular meetings and conferences, where different actors are invited to participate, among which ARERA, GSE and RSE. Finally LUMEN is engaged in advocacy activities both at the Italian and at the European level. In fact, LUMEN is currently not only working to build a law draft on the so-called "intentional communities'' to be submitted to the Italian Parliament but it is also promoting its principles, values and ideas on health and environmental sustainability at the European Parliament.

6.5.3 Netherlands

One CAI collaborated extensively with actors at multiple levels, from city to national, and sought collaboration with other CAIs in the heat sector, both regarding knowledge sharing and lobbying. Another collaborated extensively with other CAIs in the area. It was observed that it could be difficult to cooperate with municipalities (see section 6.9.4), and that drawing on the experience, or partnering with, of other CAIs on the 'postcode rose cycle' can help in this regard. It was also noted

that cooperation at regional and provincial levels depends on financial support, as local CAIs focus their limited time resources on local activities.

The Dutch NRT obtained the following main insights regarding collaboration among CAIs:

- Instead of trying to reinvent the wheel, cooperatives should look for collaboration, especially at the early stage of project development.
- Collaborating across CAIs is more attractive for the smaller initiatives, while larger initiatives may feel that they don't need an umbrella organization.
- Umbrella structures have the advantage that key activities such as service provision can be jointly and more efficiently organized, which will save costs for the individual cooperatives.
- Sometimes collaboration depends on whether specific people like each other and can work with each other.
- Local structures are as important as collaboration, the local aspect facilitates approachability and eases tapping into local needs.
- Financing umbrella structures is an important issue because you want to have continuity when it comes to support organizations.
- CAIs should be willing to work with people with different motivations towards shared goals. The heterogeneity is an asset.

The CAIS had mixed experiences regarding local resistance to RE projects: the Ketelhouis WG did not experience this, while Houtlaam MOM experienced opposition from the local neighbourhood organisation, and hoped that this would be reduced if/when they could demonstrate financial gains.

The insights regarding local resistance from the benchmarking session were:

- The smaller the area, the easier it is to get people on board and avoid resistance.
- Local stakeholders should be involved as early as possible.
- If there is much resistance then cancelling the project should be considered.
- It is important to determine if many people oppose and why. It is almost unavoidable to have a few strong opponents who are very invested.
- It is a misconception that creating support is the purpose of the local energy movement. Local governments should create support for their policies.
- Transparency and accountability are very important values when it comes to contact with local stakeholders. A good communication strategy is key.

- When it comes to compensation schemes for negatively affected locals, you need to be very clear about who will benefit, and how, and by whom they are managed. Otherwise, this will not lead to a more positive attitude.
- Shaming and framing are difficult to deal with when it comes to organized resistance to large solar and wind parks. Working with a (cooperative) developer can help the CAI to stay in the background, and avoid direct confrontation between fellow village members.

6.5.4 Spain

In Spain, the role public institutions should play is the promotion, dissemination and awareness raising of the existence of CAIs, and thus of a new energy management model. This would support the promotion and implementation of collective energy initiatives. So far, institutions are the main economic driver in most of the initiatives at their initial stages. Afterwards, they should be just as any other entity participating in the CAI (sometimes they cannot be due to legislative issues), and at least they should create a positive context and be a facilitator for these Communities.

The administrative system is at risk of becoming an obstacle to change, as it is too bureaucratic and not flexible enough. In most cases, a change of model is sought, not based on the sale of electricity, and obtaining an economic return that in the CAIs is reinvested in economic sustainability and social transformation objectives. This new model should also search or strengthen the common good. Public institutions could participate in the CAIs at the same level as the rest of the members of the CAI, that is, without necessarily playing a leading role. However, they should take an active role in boosting those communities and creating a positive context. Public institutions should help citizens to understand the benefits that CAIs provide.

6.6 Regulation and Policies

6.6.1 Belgium

The Belgian case study did not address regulation and policy in deep way, however some important points and issues transpired:

- **Financial policies/conditions.** The change in financial policies/conditions of RE development in Belgium also affects the energy communities and seem to make it more difficult to develop new projects in the future. The phase-out of the green certificate system has a negative impact on especially large roof-top solar PV, while obtaining subsidies through participation in the new auction-based system may be difficult, especially regarding (the more expensive) wind projects, where CAIs must compete with large commercial actors for projects. Cooperation in project development with the latter is sometimes an option, but only if the CAI accepts to play a minor role. Policymakers also suggest to improve CAIs' access to fiscal instruments, such as the current tax reduction on investments

in start-ups, as this would increase the ability of energy cooperatives (more than large energy companies) to attract investment capital.

- **Importance of citizen participation.** It is therefore understandable that the CAIs encourage policymakers to consider the added value of citizen participation when designing tendering procedures and policy frameworks.
- **Improving the process for wind project permits.** CAIs experience considerable uncertainties and long waiting times when it comes to local permitting processes for wind turbine projects. They therefore urge policy makers to take action to enable a smooth processing of the appeal against a permit for a wind turbine to reduce legal and financial uncertainty of wind projects.
- **Supporting RD&D projects.** CAIs have also benefited from national and EU policies supporting clean energy RD&D projects, including projects on new technologies. Yet, wind and solar PV continue to dominate the examined CAIs, and the conditions for CAIs relying on the former two technologies seem to be worsening overall. In this light, it seems logical that the CAIs mention a need to support R&D projects via subsidies to explore new technologies and business models that can accelerate the energy transition but also support the development of energy cooperatives (and energy communities in general).

6.6.2 Estonia

Looking back at past investments in RE facilities by the energy communities in Estonia, three policies seem to have been central: 1) the law governing the apartment associations, 2) the policy providing state support to the renovation of apartment buildings, which has both stimulated and financially supported energy-efficiency investments as part of the renovation projects, and, 3) feed in tariffs for renewable energy.

Looking forward, the Estonian NRT identified the following areas of needed support:

- **Improved knowledge.** There is a need for better access to knowledge and expertise about RE, about how to create an energy cooperative, and about technical energy solutions. The technical experts currently supporting renovation projects should have expertise in energy. Additionally, there is a need for a knowledge-sharing and networking portal for energy communities.
- **Supporting RE development.** From 2021, the current support to renewable energy installations will be discontinued and there is a need to look at how RE can then be supported. Showcase successful pilot projects for other CAIs to learn from.
- **Increase Public Support for CAIs.** Make it easier to start and run an energy cooperative, e.g. by removing bureaucratic barriers, support from national and local governments, better

access to advice through e.g. energy agencies like TREA, and raising the awareness of RE and energy communities among public officials.

- **Increase support from aligned organizations**. Increase the support from Estonian cooperative umbrella organisations in a number of areas, including training of coops, organisation of information portals and seminars etc., learning from coops in other countries and analysing domestic .
- **Improve access to financial schemes**. Better access to affordable investment finance through, e.g., Kredex, savings and loan association, and private banks.

6.6.3 Netherlands

The Netherlands has introduced a draft legislation called Heat Act 2.0, which was a focal point of the Dutch NRT. The draft Act limits the opportunities for energy cooperatives to engage in the heating sector by restricting them to supplying up to 500 homes, while 1000-2500 homes is considered the minimum size for building cost effective collective heating systems. The Act is likely to further strengthen the dominant position of the current heat monopolies at the expense of climate goals and citizens' initiatives, according to one source.[2] The enactment of the new Heat Act is moreover postponed to 2023, creating uncertainty in the market and leaving municipalities with a large room for manoeuvre.

6.6.4 Italy

In Italy the main regulatory issue with which all the case studies are currently tackling is the uncertainty in the transposition of the definition of RECs within the RED II. In addition to the uncertainty there is also the theme of the relationship with the current temporary discipline on the topic, as Italian parliament has provisionally transposed the directive at the beginning of 2020 (D.L. 162/2019, art. 42bis).

6.6.5 Poland

In Poland the regulatory framework seems to be the weakest point of the Polish energy transition. They claim that law conditions are unsure. All the interviewed initiatives postulate the changes in the legal system both in the facilitation of functioning of CAIs and the stability of the legal system, e.g. with the legislation for energy clusters that does not have a clear formulation "*Today the law is very dynamic. The rules are changing all the time. We face a lot of problems with GDPR implementation during the project.*" In addition to the lack of stability, another issue concerning the regulation is the lack of clarity and the unrealistic target and requirements to be satisfied. "*Project indicators are sometimes too high. For example, we are frequently having a problem meeting the*

[2] See, https://drift.eur.nl/

formal and legal conditions. The financing institution requires quite careful preparation of these indicators. The way to complete it is not easy. It was difficult to settle invoices."

6.6.6 Spain

In terms of policy, Spain has a need for the deployment of policies that promote a more comprehensive vision of the territory and the contribution of the CAIs in it (territorial planning, urban planning, relations among CAIs and with energy system actors...). Moreover, these policies should seek collective solutions, not individual ones (for example, in urban planning and housing construction). A second policy need is to innovate, through proper policies and regulations, the financing instruments for CAIs. Some of candidates to provide adequate tools for CAIs to be financed are: soft loans, incentives, guarantee funds, crowdfunding. In terms of policy formulation a claim is made for a more horizontal and participatory way to design and define policy in the field. The regulatory field is often too difficult for citizens to be understood and therefore public campaigns should be organized in order to provide friendly and effective ways for people and communities to understand the regulatory framework. Regulation has therefore a potential for social and economic gap production "The legislative area is too tough to understand. Only large companies have resources to understand that legislation." The language used in regulation and policy frameworks pose a barrier for immigrants, who often do not know Spanish perfectly. "Publishing regulation in different languages could facilitate those immigrants who could get access to it, for example, publishing it in an inclusive way." At a regulatory level, public institutions should be facilitators. However, the bureaucratic dynamics of public institutions often represent an obstacle for CAIs to raise and to evolve, particularly if they rely too much on public funding. Therefore, public institutions should make some effort in overcoming the bureaucratic inertia and in providing a more flexible framework for CAIs.

6.7 Growth and Scaling up

6.7.1 Belgium

The CAIs studied differ in how they envision their future growth, as well as how they define and implement strategies for their future development. The cooperatives that are at the early stage of their development are more focused on the short-term day-to-day operations. They set up strategies in a more pragmatic way to create opportunities for RES projects and as such, to realize a more predictable, stable flow of revenues to support their professionalisation and future development. The more established energy cooperatives have been growing in a more organic way and feel the necessity for a more structured and strategic approach. They are currently doing a strategic exercise to come to a clear vision, mission and strategy for their long-term development. Some of the CAIs find it difficult to position themselves on the question of growth, as the concept itself may contradict the basic values on which they were established, such as 'limits to growth'.

The CAIs' growth visions and strategies are shaped by the initial values of the cooperatives and the ICA-principles of the cooperative movement:

- **Geographical expansion**: None of the CAIs seek to expand their geographical coverage beyond their initial area of operation, although one covers the entire region of Flanders. Focus is on maintaining local identity and keeping the connection to the citizens and the local context. This does not mean of course that new CAIs cannot be established in areas where none were before.
- **Diversification**: many CAIs attempt to develop new RE production facilities and business models, although most started with a single technology. Some take a proactive approach in creating opportunities by e.g., lobbying, applying for pilot projects, showcasing good practices and setting up networks.
- **Upscaling**: the ability to upscale depends on the opportunities to invest in and the available capacity in the energy cooperative to develop new projects. The energy cooperatives defined in their statutes a maximum amount of capital (shares) that can be invested per cooperant to have a broad outreach.
- **Professionalization**: most CAIs are based on voluntary labour or have a few full-time equivalents. The CAIs find that professionalization is necessary for their current activities but also to facilitate the increase the number of projects, although a predictable and stable flow of revenues is required to maintain professional staff.

6.7.2 Estonia

The average time from idea to implementation was 3-5 years for the surveyed CAIs. One CAI, which has been implementing renewable energy solutions since 2012, has completed several stages (solar thermal collectors, PV panels). The last stage (solar panels for balconies) was completed in autumn 2019 and was financed from the profit of previous renewable energy solutions. Most CAIs are interested in expanding their existing solar parks but are constrained by the lack of space in their urban areas. Another constraint to further investments are high debt burden from past renovation projects.

Cooperation with other CAIs in the local area is often mentioned as a central part of growth and diversification, e.g. regarding establishment of energy storage facilities, joint solar parks, and common parking and charging facilities for electric vehicles. Such neighbourhood cooperation would both improve liveability and the value of the buildings in the area.

Generally, the creation of energy communities is perceived to be in line with the trends of modern society. In terms of their contribution to the energy system and Estonian society, the NRT identified the following aspects and advantages of energy communities:

- Their prosumption increases the flexibility of the energy system and increases efficiency by reducing the need to transport energy over long distances. Cooperation among several communities would accentuate these efficiency gains.
- They increase the diversity of market participants, increase local autonomy, diversify risks, and reduce dependence on large companies.
- They provide local capital and contribute to a sustainable local economy and society
- They contribute to a greater sense of community and social cohesion, which is key to a well functioning civil society
- Synergies can be achieved the more cooperatives that are formed and cooperative and more pressure can be placed on improving legal frameworks that can put the larger energy system on the desired path.

A lack of specialised knowledge and technical experts was identified as an important barrier to the growth and diversification of energy communities. The (partly government funded) experts that assist the apartment associations' renovation projects are not experts on renewable energy or community energy.

6.7.3 Italy

In Italy the analysis reveals that it is not always easy to objectively identify the start of a CAI; in fact, the formal starting date is often a 'convention', which hides the intense work behind the formal beginning of the initiative. Here, a few details are reported to give an idea of the variety of trajectories of evolution for energy CAIs.

Kennedy Energia started as an initiative promoted by the city council of Inzago (Metropolitan City of Milan), where a group of citizens, composed of some individuals with varied local experience and background of technical competences that acted as activators and mediators of the project, launched the initiative very quickly.. One of the ecovillages (Villaggio Ecologico di Granara) started on the initiative of a group of young adults inspired by ideals and endowed not only with technical competences, but also with a strong attitude towards the challenges of "appropriate technologies". This group initiated the project in a sort of "waste land", where they renovated pre-existing abandoned (and ruined) buildings. Later on, the ecovillage started the so-called "Energy Project". The energy theme, the energy production from renewable resources, and the energy self-sufficiency are core values and ideals of the initiative since its very beginning. The energy-related activities, in fact, started very soon, following a slow, but constant development path, which experienced a turning point, with a relevant upward change of scale, when the ecovillage built a photovoltaic canopy, which strongly increased the CAI's energy production.

The other ecovillage (LUMEN also settled in an abandoned space, starting the initiative with an even smaller group of young adults. This group started to revitalize the place without the external

support of any association, but with the simple contribution of a growing number of people attracted by the initiative (which will eventually become a community), who populated the place with an ever increasing number of relations and activities. Later on, as soon as LUMEN opened its doors, through the "Festival NaturOlistica", and started its commitment in the management of the local administration and in several local environmental campaigns, the local inhabitants reduced their prejudice and suspicions on it. The energy theme is not central, but consistent with its primary goal, that is the promotion of health care through natural and sustainable methods. They did not develop a specific energy project, but the energy production, the reduction of energy consumption, the energy (and non-energy) self-sufficiency and the efficiency-driven renewal of buildings and plants are part of the activities gradually carried out by the ecovillage, in accordance with the principle "the right thing at the right time".

In Trentino-South Tyrol, which is a territory characterized by a dynamic and participatory cooperative fabric along with a rooted tradition of autonomous energy management, there are respectively the oldest and the youngest of our case studies. CEDIS, a 117 year-old cooperative and Ötzi, which is an 18 month-old cooperative. CEDIS, which took form in 1904 and it is one of the so-called "historical" cooperatives, shows a strong tie with the local territory, where the border between "we" and "the others'' is extremely blurred. he links between people and cooperatives are often strongly intertwined (e.g. not only people are part of cooperatives, but also cooperatives are part of other cooperatives). Beyond the energy services, CEDIS has recently started to provide other services, like the optical fiber, which allow the (alpine) territory to be a frontrunner from both the technical and technological viewpoint. Ötzi, on the other hand, offer the opportunity to "fill a gap" in South Tyrol, where, despite the long and widespread tradition of energy cooperatives, there is a wide portion of the local population who cannot benefit from a collective provision of renewable energy. Ötzi, like CEDIS, can count on a strong relation with the territory, which derives from the activities performed by SEV (Südtiroler Energieverband – South Tyrol Energy Federation), the biggest and oldest energy cooperative in South Tyrol.

Ènostra is the result of effective CAI, as it has been launched, together with another cooperative in Portugal, by the European project REScoop 20-20-20. If the REScoop project can be considered ènostra's "father", ènostra also has a "mother", Retenergie, another important Italian CAI in the energy field, with which ènostra will soon merge. While ènostra has an "historical" and prevailing relationship with the territories of Lombardy and Piedmont, the cooperative is active on a national scale. The national dimension of its activities mirrors in the thick web of relations that ènostra has, which are also fuelled by the actions of the so-called "active" members, who are increasingly engaging in the identification and implementation of widespread local projects. Therefore, ènostra has a diversified, flexible and context-specific strategy for the development of its activities and the realisation of its future projects.

Energia Positiva was founded on the initiative of ten people, who, hinging on the cooperative model, identified and developed a peculiar, yet successful business model, based on the production of energy from renewables. Energia Positiva, like ènostra, aims at operating on a national level.

Moving from the past to the future development, the pathways are perceived as strongly affected by the RECs implementation that the different CAIs interpret in a different way. Some of the energy cooperatives interpret RED as a tool aimed, not only at fostering the diffusion of renewables through the selling and the production of "green" energy, but also at reinforcing the acceptance of renewables in Italy. Others strongly believe in the model of the energy communities, which is seen as aligned to the cooperative's one, as energy communities take form from the 'bottom-up' and entails the ownership of the means of energy production The two cooperatives from Trentino-South Tyrol, identify in their strong relation with local territory the basis to activate energy communities and collective consumption configurations. The two ecovillages see RECs not only as a" technical matter", rather as a discourse to which the ecovillages can contribute with their background of experiences and relations, with the aim of triggering a discussion on the development of alternative empowering methods of decision-making, fostering the growth of aggregations pursuing a common goal, like that of the energy communities. However, two critical aspects around RECs can be detected. The first issue concerns the dimension, which should not be too small, in order to avoid the reduction of the initiative to a mere self-consumption and for the RECs to be effectively useful for the portion of the energy grid they are part of. The second issue concerns the form of the RECs, which can pose the need of defining a new category of cooperatives, so that they are not only focused on the provision of energy and they easily and fully can self-finance.

To conclude, even if there are significant differences among the selected case studies, both in terms of energy produced, sold and delivered, and in terms of internal organisation and number of people involved, all the initiatives are growing experiences, showing differently structured development plans for the future. CAIs look attentively at the paths towards collective self-consumption as an interesting solution to invest in for the future, even if it can pose and face some technical challenges.

6.7.4 Netherlands

The topic of growth and scaling was not specifically addressed by the Dutch NRT, other than in terms of the need for collaboration with other actors (see the relevant section). However, the profiles of the individual CAIs reveal significant ambition and expertise regarding upscaling and diversification:

- The Zonnendorpen cooperative started with an innovative solar park but is exploring other sustainability innovations (diversification): e-mobility, wind turbines, sea-salt battery storage. The CAI also wants to increase community wind and solar power (upscaling) to become independent of natural gas.

- The cooperative Windpark Nijmegen (WPN) supplies 7100 households with wind power, but has later developed the concept of the 'energy landscape' (addressing optimal land use, integration and balancing) based on which they plan first to develop a 4.4 GWh solar park and subsequently storage facilities in the form of P2G or P2H (diversification), and more wind turbines are also being considered (upscaling). As a result, the cooperative has grown to 1800 members with two limited companies (for wind and solar respectively).
- The young energy cooperative Ketelhuis WG aims to develop a new low-temperature district heating system for 800 homes (in 25 buildings) in the neighbourhood Wilhelmina Gasthuis, based on and aqua thermal heat pumps, while stimulating insolation of homes.
- The neighbourhood-based working group "Houtlaan Minder op de Meter" in Assen pursues a diversification strategy from the word "go" involving privately owned rooftop solar PV, e-cars, heat pumps and grid balancing including storage. This occurs in the context of an increasing number of individually-owned roof-top solar PV that have started to challenge the local grid (neighbourhood transformer).
- The social enterprise Bronnen VanOns works to reduce barriers to upscaling among CAIS but assisting energy cooperatives in project development when these involve collaboration with commercial developers.

It was also observed that the large size and complexity of heating projects makes it very important to involve experts, and at the same time to involve several experts to ensure high quality.

6.7.5 Spain

In Spain, it is considered essential to upscale the activities of the CAIs, but different and complementary approaches are appreciated such as:

- Grow locally, through diversification, innovation and expansion of services;
- Grow geographically;
- Grow as a network, supporting other initiatives, sharing resources or seeking synergies with other types of CAIs.

Being able to make new investments and developing technological capacity are considered necessary means to be able to upscale. In this case, a particularly important issue is how to attract investors and have alternative financing instruments that enable this growth. Growth in staff resources is considered necessary to upscale activities, although there is a certain fear of becoming a "giant" and losing the participation of the partners, losing the link or the interaction with the local level. It is then important to assess the replicability of the created model for this upscaling.

Some general emerging concepts or ideas that might affect to the past and future development of the initiatives refer to the following aspects:

- **Need for a territorial model.** This is a "must", where different economic and social aspects are considered along with the energy policies.
- **Relevance of managing energy.** in an integral way and integrating it in the economic and social models that society is asking for.
- **Existence of different administration levels.** playing different roles within Spain which is sometimes a burden for the coherent development of energy policies.
- **Explore different business models.** (e.g.: hybrid incentives, groups less involved but with a higher investing capacity…).

All topics that should be carefully considered and investigated to deepen the understanding of CAIs and their environment.

The technological challenge is enormous and has a large potential to impact on the evolution of the CAIs. Although existing CAIs have some experience on the technological challenge, it is necessary to step out of the comfort zone and seek collaboration among CAIs to explore new ways of developing this collaboration and to be able to seize the opportunities offered by new technologies.

6.8 Impact

6.8.1 Belgium

A variety of aspects related to impact were considered in the report:

- The phasing out of the green certificate system (in Flanders) and a shift to an auction-based system is considered to have an impact on future energy community projects.
- The impact of legal actions against wind projects were considered to have an impact on the further development of CAIs, both in terms of delays and refusals of permits and regarding the ability to get bank loans, and the problem warrant further study and action - for example regarding how appeals are treated.
- The CAIs lack systematic knowledge about the impact of their different communication and engagement activities.
- The NRT recommends that CAIs monitor the impact of their activities, e.g., impact of events on the recruitment of members, CO_2 avoided, impact on the local community, and that the CAIS collaborate in developing monitoring tools and procedures.
- The creation by several CAIs of a joint energy supplier in the Walloon region was considered to support the further development of individual CAIs, for example, in terms of recruitment of new cooperats, networking and institutional work, helping disadvantaged households, and engaging in development projects on new technologies.

6.8.2 Estonia

Impact was not discussed by the report as a separate topic but was addressed as part of other topics (see section on Growth and Scaling up).

6.8.3 Italy

In Italy it is considered of particular interest to have the opportunity and tools for the evaluation, forecast and communication of the monetary and non-monetary benefits produced by CAIs, with the purpose to increase the awareness and the dimension of the membership base involved in the CAIs. To this purpose, the examined CAIs have developed different methods and techniques to evaluate the monetary and non-monetary benefits of their activities, implementing various strategies of internal and external communication of these positive externalities.

Just to give a few examples, Kennedy Energia has created an evaluation matrix accounting for the economic, energy-related and environmental impacts of their initiative that is updated, and circulated, on a monthly basis, among the business members, with the aim of raising their awareness and attention about the positive implications that the initiative has on the territory. Ötzi has especially highlighted the social, collective and environmental advantages of its initiative, using its website and Youtube page as means of internal and external communication through which the cooperative is presented not only as an "economic entity", offering an appealing energy price, but also as an initiative inspired by the principles of self-organization, collective management and attentive to the needs of the territory. The ènostra cooperative stresses especially the participatory and environmental dimensions of its initiative and Energia Positiva does not only highlight the opportunity of tax relief for its members but also sponsors its economic and cultural model, which is different from that proposed by the prevailing market paradigm, which collects new customers by means of 'invasive' commercial proposals.

The two ecovillages, on their part, even if they are particularly attentive to the energy self-sufficiency topic by monitoring their production and consumption flows, they have not developed strong and systematic methods for assessing and communicating their monetary and non-monetary benefits yet. However, they underline the "positive impact" of their activities and have the plan to start collaborations aimed at performing research comparing the ecological footprint of such residential initiatives with that of more 'conventional' ones with emphasis on energy savings, attained through the 'sober' consumption of its community, also by virtue of the sharing of spaces and means (e.g., cars).

Overall, in Italy, CAIs subscription and communication strategies mainly hinge on the social and environmental factors, even though the economic dimension still plays a relevant role. However, citizens approach and enter these initiatives primarily because they allow an environmental and

collective engagement, which is attentive to the implications on the next generations and inspired by the principles of participatory democracy.

CAIs might play as people aggregator, facilitator or manager which contributes to transform people from passive consumers begging for the solution of energy issues by a remote multiutility, to proactive actors, taking their responsibility for tackling and solving their energy issues in a collective and democratic way.

6.8.4 Netherlands

The Dutch NRT studied several CAIs who expressed strong ambitions to have an impact on the local or larger energy system, in terms of 'pure' CO_2 savings through RE deployment, but there is also a strong emphasis on a wider technological energy-system transformation using enabling and integrating technologies. Furthermore, participating CAIs would like to have a transformative impact through empowering others who would like to do something similar through sharing their best practices. They are open to contact with starting CAIs, so that initiatives that want to do something similar can build on their experiences. Social aspects in terms of building local contacts and networks were generally found important, but it was unclear if this was a means or an end.

Reducing energy poverty was not considered by the Dutch NRT, but an expert identified knowledge gaps in the Dutch energy sector regarding social business models that are inclusive for low-income households as well as inclusivity and social support of nearby living residents.

6.9 Other Emerging National Issues

The generative approach that characterizes the consortium benchmarking process allowed us to identify other issues in addition to the focuses derived from the research questions that spontaneously emerged from the discussion. Given the sensitivity of these issues to the national socio-economic and institutional context and given their dependence from the specific qualitative and quantitative development of the CAIs' experience that vary a lot from country to country, it seems reasonable to report in the following these issues once more divided by country.

6.9.1 Belgium

In Belgium, the members of the NRT identified some topics that can be of interest for future research and policy design.

- **The variety of models for citizen participation.** Although the comparative case studies mainly focused on energy cooperatives, there are different models for citizen participation in renewable energy and energy-efficiency projects with varying degrees of involvement of local citizens and actors in the funding and governance of these projects. It would be interesting to gain more insights in other models for citizen participation in renewable energy projects and energy-efficiency projects and compare them with the energy

cooperative. The scope of this comparative assessment can be opened up to include cooperatives (and other citizen participation models) from outside the energy sector (e.g., agriculture, food industry, housing) and derive some cross-sectoral lessons learned. For the comparison between the different models the indicators for social innovation that were defined in the COMETS project can be used.

- **Risk of legal actions to wind projects.** also considering that the reputational risks related to wind projects make banks reluctant to finance. It would be interesting to understand the socio-institutional interplay leading to those numerous appeals, assess the impact of these legal actions on the development of wind projects and provide recommendations to improve the treatment of these appeals (e.g., establishment of the Board of Permit Disputes in Flanders) in order to reduce the risks that the different actors involved in the development and financing of wind projects are currently facing.
- **Role of local authorities in financing, developing and promoting a RES project**. It would be interesting to investigate more in depth the role of local authorities in the development and promotion of energy cooperatives (and energy communities in general). The study of IEW (2019) already provides an assessment of different innovative models for financial participation from citizens and municipalities in wind projects[3]. Fourth, the scaling up. It is interesting and important to address this topic as several research projects focus on "scaling up" of innovation and diffusion of RES and a specific effort should be dedicated to find an answer to questions such as: How do they envision their future development and what strategies will they implement? How do they address the limits to growth? To what extent needs the diffusion of RES to correlate with the growth of an initiative?
- **Energy related services beyond production**. Although the focus of the case studies is on the development of RES production installations, CAIs also want to diversify the goods and services that they provide and to explore other energy related activities, such as energy-efficiency, energy supply, relighting, shared electric mobility as part of their future development but also investigate how they can position themselves within the emerging context of energy communities. It would be interesting to identify successful business models and assess how these can be applied to the cooperative model (and energy communities in general).
- **Addressing energy poverty and vulnerable groups**. While the reflection on energy poverty is present in most comparative case studies, in practice there are limited activities

[3] It would be interesting to expand the scope of such an assessment with e.g., other RES-technologies, but also with other forms of collaboration then financial participation (e.g., the MECISE project - Mobilizing European Citizens to Invest in Sustainable Energy - demonstrates some successful collaborations between local authorities and cooperatives to support the implementation of the sustainable energy and climate action plans of municipalities)

or actions undertaken to target vulnerable consumers and increase the accessibility of the initiative for citizens with different socio-economic backgrounds[4]. As energy communities are expected to play a key role in addressing energy injustices while contributing to the energy transition, more insights are needed on how vulnerable consumers can be reached/targeted and engaged in the activities of an energy cooperative (and energy communities in general) and it would be interesting to include the lessons learned in the benchmarking study[5].

6.9.2 Estonia

In Estonia, the NRT pointed out several interesting directions of research that need to be further addressed, to study needs and opportunities in more detail, to analyze and supplement the existing legal framework, to develop the best models and scenarios.

- **Tools and strategies to enhance cooperation among CAIs**. Currently, Estonian initiatives are relatively small, operate separately and have a very local impact. In addition, due to their mostly urban environment, they are also geographically close. In this situation, the CAIs surveyed expressed a clear interest in cooperating with each other in the field of energy - for example, the creation of an energy cooperative with the participation of several apartment cooperatives. Various ideas for cooperation were expressed, such as the creation of a joint solar park, the creation of joint charging systems for new electric cars and bicycles, joint energy storage devices for several apartment associations, etc. Such kind of developments would be clearly innovative, modern and would make the living environment significantly more attractive and benefit the whole region. Such cooperation is an activity that has not been practiced in Estonia so far, but it is certainly the subject for further research and development.
- **Opportunities to invest the money accumulated in the cooperative mutual fund**, including investing in other renewable energy cooperatives. Investing the passive money of housing associations in new co-financing is a new and very innovative direction, which would firstly make the possibilities of using the money of the current CAIs more flexible, reinvest and would diversify the number and profile of participants in the electricity market.

[4] Currently, REScoop Wallonia and its members are drafting a shared vision and action plan to tackle energy poverty.

[5] In the recent policy brief of Engager-Energy.net (http://www.engager-energy.net/wp-content/uploads/2021/03/WG4-policy-brief-March-31.pdf. Accessed on 30 April 2021.) an overview is provided of the obstacles for Renewable Energy Communities to promote a new social and ecological contract and possible pathways towards a more fair energy transition (e.g. place equality and social justice at the core of the narratives, provide flexible membership rules, establish partnerships with local actors involved in energy poverty mitigation).

- **Communication and networking tools,** such as the supporting Communities for the Future Platform should be used more actively.

6.9.3 Italy

In Italy, the discussion within the NRT has focused on the evolving future of CAIs with respect to:

- **Forms of CAIs.** Primarily the rising concept of RECs, as introduced and ruled by RED II, whose transposition at the national level is currently an ongoing process. The NRT is currently waiting for the evolution of the national rules concerning this type of initiative, whose development and diffusion within the Italian energy system will require future in-depth investigations. In fact, even though some pioneering experiments have already been implemented or are the object of pilot projects, RECs are still at an early stage of development and their growth depends not only on the consolidation of their national legal framework, but also on the ongoing studies exploring the potential of such initiatives.
- **Collective self-consumption experiments.** This emerging type of initiative is in need of further debate and research efforts.

6.9.4 Netherlands

In the Netherlands, the NRT emphasised the role of local governments as both enablers and barriers for the participation of energy communities in the energy transition, highlighting the following insights:

- Municipalities often lack a sense of urgency as well as expert knowledge on the energy transition.
- Local governments should only be involved in the transition through formulating supportive policies and providing subsidies, leaving implementation to other actors.
- It is important for energy communities to have direct and good relations with the local government, including to individual politicians or their parties. Here, not only the part of the municipality working with sustainability but also with spatial planning is relevant.
- Sometimes there is competition between energy-community initiatives and the municipality when it comes to certain projects, e.g. in the heat sector. In this situation, lobbying activities are important, highlighting how CAIs are a unique asset that can create trust in the energy transition and realise projects at lower costs.
- If the municipalities do not orchestrate the transition of the heat sector and facilitate cooperative heat, incumbents will seize the opportunity and local initiative will not stand a chance.
- Citizens fora (Dutch: 'burgerfora') can help increase and validate the legitimacy of the local energy movement, and reveal whether there is broad support for a particular initiative. A

local initiative may only represent a small subsection of the population, making it hard for the local politicians to know how broadly supported the initiative is.

6.9.5 Poland

In Poland, during the analysis of the interviews, they identified different emerging and evolving concepts.

- **Strategies to fight against energy poverty**. Respondents suggested enabling prosumers to share their energy surplus with the vulnerable or excluded from the energy system. The legal mechanism that could be relevant is already existing. The possibility of Polish tax residents sharing1% of their income tax to a public benefit organisation can be used as a legal tool to implement this idea[6].
- **Gamification mechanism.** that emerged during the implementation of the *Mój Prąd* programme[7] and evaluate the relations between the legal system and CAIs' institutional conditions. The number of installations funded by this programme boosted the PV prosument market. The respondents see this as an element of gamification. In many cases, the reason for these investments is economical (it is easy to get 5.000 PLN of a subsidy) as well as the fact that an effective mechanism that "my neighbour" has a PV installation and "I don't". This shows the whole process of winning the race for funding and then showing off to other residents that I made it.
- **Strategic investment for older people.** Small-scale PV installations can complement pensions "*You invest now, but after a couple of years, when you are retired, and your income is lowered, you will have at least a cheap energy. It is like a retirement fund."*
- **Quick legal adjustments to technology and new social concepts.** Finally, it seems crucial to investigate whether changing the laws or developing new social concepts are more important with regard to the development of CAIs in Poland.

6.9.6 Spain

In Spain**,** a discussion session has been dedicated to delve into four evolving concepts.

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[6] A similar initiative is already existing in Poland. The Remigiusz Darmach agricultural holding shares the heat from the biogas facility with the neighbouring residents (Tygodnik Rolniczy, 2018 https://www.tygodnik-rolniczy.pl/articles/pieniadze-i-prawo/rolnicza-biogazownia-jakich-malo/) what is more, the biogas facility funded by the Poznań University of Life Sciences also shares the heat with the residents).

[7] *Mój Prąd i*s a governmental programme that supports the installations of RES technologies in individual households. The aim of the program is to increase the production of electricity from photovoltaic micro-installations in the territory of the Republic of Poland. https://mojprad.gov.pl/informacje-szczegółowe-o-programie-mój-prąd/ Accessed 30 April 2021

- **Technological challenges.** Although existing CAIs have some experience on the technological challenge, it is necessary to step out of the comfort zone and seek collaboration among CAIs to explore new ways of developing this collaboration and to be able to seize the opportunities offered by new technologies.
- **Social inclusion.** All the activities and strategies should be designed and implemented to address issues faced by the most vulnerable groups**.** Those groups with less resources tend not to participate in these types of initiatives. There is a need to understand the current situation, and which are the barriers that prevent these groups participating in CAIs. Moreover, another challenge is finding the mechanisms to integrate them into CAIs. For example, the regulative framework is too difficult and hard to understand, and only large companies or specialised organisations have resources to understand this regulatory framework. Developing public campaigns in a friendly way, in different languages, explaining the regulatory framework would incentivise the engagement of these vulnerable collectives. Moreover, neighbourhood and technical offices are proposed as means of communication and spreading the existence, benefits and the way that CAIs function.
- **The relationship of the CAI model with the rest of the ecosystem, between complementarity and competition.** CAIs are complementary to large companies but that does not mean that this type of communities should play a residual role. The new model offered by the CAIs must be alternative and networked, sharing the same community spirit and focusing on achieving the common good. The best way to spread the benefits of CAIs is *by doing.* One of the ways proposed is to deploy as many pilot projects as possible, where public institutions' role is to boost this type of community. These "experiments" will spread the benefits of the CAIs among citizens.
- **Role of public entities between agents of regulation regulatory and agents of change.** Public institutions could participate in the CAIs at the same level as the rest of the members of the CAI, that is, without necessarily playing a leading role. However, they should take an active role in boosting those communities and creating a positive context. Public institutions should help citizens to understand the benefits that CAIs provide. At a regulatory level, public institutions should be facilitators. However, the bureaucratic dynamics of public institutions often represent an obstacle for CAIs to raise and to evolve, particularly if they rely too much on public funding. Therefore, public institutions should make some effort in overcoming the bureaucratic inertia and in providing a more flexible framework for CAIs.

From Spain other emerging concepts and ideas came to the front for future research in order to deepen the understanding of CAIs development and the interaction with the wider environment:

- The need to have a territorial model is a "must", where different economic and social aspects are considered along with the energy policies.

- The relevance of integrating energy management into the economic and social models that society is asking for.
- The roles of different government levels which is sometimes a burden for the coherent development of energy policies.
- The need to explore different business models (e.g.: hybrid incentives, groups less involved but with a higher investing capacity, etc.).

7. Synthesis of Leanings

This section is focused on merging and synthesising as much as possible the experiences across countries and CAIs to find common lessons to be learned by CAIs, stakeholders and decision makers.

7.1 Citizen Participation and Engagement

There were large variations in the forms and levels of participation and engagement across the CAIs studied, relating to type and focus of the CAI, the cooperative culture in the host country, its size, development phase, geographical scope, and so on. Yet a strong participation and engagement of citizens were always considered very important. Below, we summarise and draw lessons across the case studies regarding how different forms of participation and engagement can be initiated, stimulated and enabled.

7.1.1 Leadership Participation

The initiative and actions of enthusiastic individuals (or small group of individuals) were central for initiating and driving CAIs and their projects in many cases; yet such individuals may still need support, e.g. in the form of training in organisational, technical and financial matters, or peer-to-peer guidance, which could be offered by cooperative umbrella organisations or government agencies.

7.1.2 Financial participation

The vast majority of CAIs relied on some form of financial participation from citizens in their area of operation. In most of the 'pure' energy communities, membership relies on the purchase of one or more shares offered for sale by the CAI to finance or co-finance a RE project. The case studies point to key strategies and enablers for achieving sufficient financial participation (and recruitment) in this critical start-up phase of a CAI/project:

- Recruit members from personal and professional networks, and build out from there; the closer you are to the members, the better;

- Use a variety of analog and digital communication channels; advertising may be necessary to raise large amounts of capital;
- Local governments should support the CAI/project and assist the recruitment, e.g. by publicly endorsing the CAI, using its communication channels, making land available, small start-up grants, etc.;
- Build on the traditions, strengths and networks of existing local organisations (e.g. neighbourhood associations, other cooperatives);
- Learn from the experiences of other energy cooperatives in the region/country; umbrella organisations (e.g. cooperative societies) may exist and hold specialised knowledge;
- Link a well-known/famous person to the project;
- Adapt the communication to different target groups; consider that people can be motivated to engage by both economic, environmental and social factors;
- Consider how to involve vulnerable groups as members, e.g., by offering shares with lower costs, collaborating with financial institutions for provision of affordable credit, and adapt the communication to reach these groups;
- Governments may give tax reductions on individuals' investments in energy cooperatives (start-up tax facility in Belgium)

7.1.3 Participation in CAI's activities

Many CAIs offered rich opportunities for members to participate regularly in the life of the CAI. This seemed to be particularly the case for CAIs with a diversified portfolio of projects/activities, or that wanted to diversify their activities, which in some CAIs went well beyond RE generation. Vivid examples are the Italian ecovillages that implement broad changes in lifestyle, and the Italian cooperative énostra that has developed an official participation plan, which among other things, has led to the construction of territorial groups through 'communities of practices' that can create projects and information activities in a broad range of topics and "diffuse culture and create a community around them". The connection to the territory/ local area / community, and building on common values - social or environmental - is indeed often mentioned as central aspects of participation and engagement. Findings from the Spanish NRT are a good example, i.e., that "the 'sense of belonging' is a relevant factor to enrol and maintain active CAIs members thus highlighting that beyond the energy and environmental benefits it is also essential that a community is created based on common values". However, not all CAIs had the intention or capacity to achieve deep or diversified participation from its members; in Estonia's apartment associations, for example, members were mainly motivated by financial incentives and engagement seemed to be limited to board members, while the Polish NRT observed that "all the initiatives in the energy transition are top-down" and even if environmental awareness is increasing and citizens are getting more active

in this transition, they still "wait for external support" to take action. Time, on the part of both board members and ordinary members, was identified as an important factor limiting active participation in CAIs. Another key factor is that some activities require specialised skills that only a few possess, and often there is a need to hire professional help. The organisation of regular training and knowledge-exchange sessions for members was emphasised by some NRTs as a form and means of engagement, and here the existence of strong umbrella organisations, like the cooperative associations in Belgium, seems valuable.

7.1.4 Participation through specialised skills and knowledge

Establishing and managing CAIs are knowledge- and skill-intensive endeavours, especially when there are ambitions to upscale and diversify into advanced energy technologies, or when collaboration with commercial actors is needed. Many NRTs highilighted the value of members contributing with professional skills (e.g., technological, legal, financial, administrative, communicative), but it was at the same time emphasised that CAIs frequently need to hire professional staff or firms for project development and that relevant expertise could be difficult to find. Public authorities, knowledge institutions, as well as umbrella organisations should play a stronger role in facilitating the access to such expertise for energy communities.

7.1.5 Participation of different social groups

This topic was addressed only by some of the case studies, and in different ways. Across most of the CAIs, there was an awareness of the need to be more inclusive with respect to vulnerable groups, but few had developed systematic approaches to this. In Spain, some activities had been carried out specifically targeting vulnerable members or groups, and affordable fees had been created, but the overall conclusion was that vulnerable groups tend not to participate in or establish energy communities for a variety of reasons that would need further analysis. Only the Spanish NRT reported on the gender dimension of participation. It was found that while some CAIs have achieved gender balance in their governance bodies, there is still a need to involve more women in management functions and to increase the participation of women in CAIs. The Spanish comparative case studies actually consider their projects attractive to women because they fit well values that are considered feminine such as sustainability, proximity, and community. One Spanish CAI observed that when women participate, they do so in a proactive way and take on leading tasks. Lack of time and the prioritisation of other activities may be a reason for the relatively low participation of women in energy communities. Another may be that energy and mobility are seen as masculine spaces. In this light, there should be a stronger focus on engaging women in energy communities, both from an equity and performance perspective, e.g. through better targeted communication and more focus on activities related to (perceived) feminine values. More knowledge is needed on this topic, drawing on a broader set of cases.

7.2 Organization and Governance

There are different forms of CAIs, within and across countries, included in this project. Most are exclusively focused on energy while others have broader aims and energy may play a relatively minor role in their portfolio of activities.

7.2.1 CAIs focused on energy only

The former category is dominated by actual energy cooperatives, which follow established, national and international (e.g., ICA, 2021) cooperative models of governance, complemented by informal forms of interaction, for example cooperants' evenings in Belgian CAIs. These cooperatives constitute a major or large part of the studied CAIs in Belgium, Italy, Netherlands, Poland, and Spain. Except for in Poland, they draw on their respective countries' or regions' histories of cooperative movements sometimes dating back to the late nineteenth century. Their size varies from less than 100 cooperants to several thousand, and while most of them have a very small geographical extent (villages or municipalities), others cover entire regions (e.g. South Tyrol or Flanders). Their connections to cooperative umbrella organisations or networks at regional, national or EU level were clearly an advantage to these CAIs as they facilitated access to knowledge, project partners, policy makers, and other resources. The European federation of energy cooperatives, REScoop.eu, is such a network, with a membership of 1900 European energy communities, including in Belgium, The Netherlands, Italy, and Spain, but none in Estonia and Poland.[8] The importance of regional REScoops, e.g. in Flanders and Wallonia in Belgium, was also highlighted by the NRTs.

In this light, it would seem appropriate to considerably strengthen energy-cooperative umbrella organisations such as REScoop with respect to their ability to provide professional expertise (technical, legal, market, ect.) and training to all their member coops, lobbying for their interests at national and EU levels, and so on, to ensure that local energy coops can grow and proliferate across Europe, can compete with the big commercial players (when relevant), and get adequately supported through national and local policies.

Stronger collaboration among CAIs within sub-national regions, including sharing of knowledge and experience, was also recommended by several NRTs and here umbrella REScoops should play a key role. In Italy, the energy initiative Kennedy Energia, started as an initiative promoted by the Municipality of Inzago (Metropolitan City of Milan), decided to take the form of a Limited Liability Company, after considering alternative organisational forms such as the cooperative and the trust.

[8] REScoop.eu was instrumental in the establishment of one of the studied energy cooperatives in Italy, ènostra.

Similarly, in Flanders, Belgium, two CAIs had created non-profit organisations for the purpose of implementing specific energy projects.[9]

In Poland, the 'pure' energy CAIs take the form of energy communities and so-called energy clusters. The latter are mainly commune or private-local government civic agreements. They are created primarily from a top-down perspective, with the local government and businesses wanting to create an organisation that can apply for government support to invest in RES, such as biomass and biogas, solar PV, or geothermal energy. Also in Poland, the energy efficiency association (Stowarzyszenie na rzecz efektywności) supports the formation of energy cooperatives, and cooperates with the Chamber of Energy Clusters to convince the government to support the social aspects of the energy sector.

7.2.2 CAIs with broader aims

The latter category of energy cooperatives with broader aims were part of the case studies in especially Estonia, Italy, and Poland. In Estonia, the CAIs were in fact apartment associations, whose governance is stipulated by law and includes elected board members. These CAIs had few skills and resources relating to energy and could not draw on the expertise of any umbrella organisation. In Italy, two ecovillages with 50 and 60 inhabitants respectively were included in the NRT. They display a more complex formal architecture, the network of associations, which mirrors both the variety of their objectives and the lack of an official institutional acknowledgment for this kind of initiative.[10] The Polish NRT included a teachers' housing association, had established an energy project consisting of digitalisation of heating processes and replacement of the coal heating system and installment of 500 PV panels, but not until the supervisory board had been replaced by young people who took action and convinced the community to change.

Finally, in Italy, it was interesting to note that some CAIs are considering the transformation of their legal form, in order to foster the widening of the social engagement and the formation of renewable energy communities, which represent the horizon where the initiatives are striving for.

7.3 Market, Business Models and Funding

The economic dimension is one of the main motivators for citizens to join and participate in a CAI- they want to receive a return on investment. Therefore CAIs need viable financing models in order

[9] A parallel to this can be found in Denmark, where many energy cooperatives are legally registered as a so-called 'partnership' ('intereressentskab') firm, normally used by sole proprietorship firms, as the law does not require any initial capital to establish it, or a particular management structure, etc. This form has shared, personal liability, but this is not seen as a risk as the energy coops do not have debts being financed by the sale of shares.

[10] To this purpose, the LUMEN ecovillage has recently co-submitted a draft law to the Italian Deputy Chamber, with the aim to acknowledge the so-called "intentional communities", which are projects pursuing experiences of community life, inspired by shared values and purposes, as a legal person.

to be successful. Many CAIs depend on government incentive schemes and favorable tax programs, yet aspire to create more financially independent and robust self-supporting and funding schemes that are not dependent on the vicissitudes of government funding.

7.3.1 Public Financial Incentives

Some tax incentives exist for individuals who invest in startups, including CAIs. Many CAIs take advantage of these tax incentives to raise social capital.

CAIs in energy communities within shared apartment buildings can take advantage of building renovation grants and use it to improve efficiency to a certain energy class, and/or install solar PV or heat pumps. This type of investment tends to be safer, as it adds to the collective debt of the association, which tends to have more favorable lending terms in the real estate market.

Some CAIs have also obtained startup funding and money for activities from local municipalities. Unfortunately, many programs and grants provide assistance only at the startup phase of a CAI. While this can encourage CAIs to be self-sufficient after being established, it is recognized that some support for mature CAIs would help the financing models.

7.3.2 Private Finance models

Other more established CAIs were successful for securing funding from public and private research and innovation funds to explore new technologies and business models. Attracting this type of funding lends legitimacy to the CAI, however, the downside of these funding sources were the high administrative burdens placed on the CAI membership. Simplifying the applications and procedures could help CAIs secure these types of funds. Moreover, CAIs do not have the same status and legitimacy as private companies for investors.

Receiving bank financing for renewable energy projects remains a challenge for many CAIs, particularly with wind projects. This is due to the high capital costs, the long and uncertain permitting processes and due to reputational risks related to social acceptance of turbines. Similar challenges exist with district heating projects. For other technologies, the capital costs have come down substantially, and CAIs can use the revenue from energy generation to pay off loans in the first few years.

Formally, CAIs sell shares (i.e., social capital) of the energy production facilities to the members. For most CAIs, this is the primary source of financing, i.e., it is obtained through their members (e.g., members' contributions, debt issuance, volunteering, microcredits, contributions / loans from some partners, credits to financial entities and grants, cooperative-private sector cooperation). This reduces the level of debt to the CAI. Some CAIs established a legally independent company for new projects that was able to receive financing by selling shares. To prevent speculation and to ensure stability of the CAIs finances, some CAIs require investors to keep shares a minimum number of years.

7.3.3 Threats and Competition from the Private sector

Traditionally, CAIs have benefitted from green certificate funds (production price subsidies). However, as renewable technologies such as wind turbines and rooftop solar PV mature, governments are phasing out these systems. In their place, they offer an investment subsidy, implemented through auctioning or tendering programs in which CAIs must now compete with commercial actors. These large, established commercial actors are often reluctant to accommodate or cooperate with CAIs in their business models.

Other commercial actors are now offering so-called "turn-key" solutions for green community energy without the element of social investment from the consumer. These can be seen as a threat to CAIs as they undermine the fabric of collective action and social engagement.

Cooperation among CAIs in choosing external partners is a strategy to remain competitive. By joining together and pooling resources, CAIs can have greater influence on local permitting authorities, and expanding their network to hire necessary professional expertise. The strength of CAIs is that the customers are at the center, which is distinct from commercial developers.

There is a clear need for more innovative financing models and more social acceptance of CAIs as a legitimate entity. Without this, CAIs will struggle to compete with private actors, and will also struggle to attract a diverse membership in terms of age and gender. This will diminish the social aspect of CAIs and limit the level of community engagement if there is a high personal financial risk (and barrier to entry) for joining a CAI and for the long term viability of CAIs.

7.4 External Actors and Institutions

Engagement of CAIs with other stakeholders depends on the nature and mission of the specific CAI. CAIs also have to find the right balance to maintain their independence and autonomy. In this light, the relationship with regional networks of other CAIs can help amplify their voice and reinforce shared values. On the other hand, relationships with government and commercial actors are more delicate.

7.4.1 Regional Networks

Many CAIs find support through regional networks and umbrella organizations of other CAIs, and one of the goals of this study in using the CB approach is to establish and strengthen those networks. These networks are a good platform for advancing the social agendas of CAIs, e.g., addressing energy poverty. These networks built on shared values are particularly important for ecovillages and intentional communities.

At early stages, CAIs benefit from collaborating with each other. This tends to be more attractive for smaller, newer CAIs, whereas larger, more established CAIs may feel that cross CAI collaboration and umbrella organizations have limited usefulness. Nevertheless, umbrella structures can more efficiently organize activities and provide know-how, thereby saving costs to individual CAIs.

7.4.2 Government

Cooperation at regional, provincial and national levels of government requires considerable financial support and time resources. As such, CAIs tend to focus on local activities and their relationship with local governments/ public administrations.

Municipalities are also important actors for CAIs, particularly in the startup phase. The municipality can provide key early financial support and through promotion and communication to the citizens. Strong energy CAIs can, in turn, create a sense of identity for a municipality, particularly in rural areas. Ecovillages and intentional communities can add value to municipalities by adding events, e.g., summer festivals, though there tends to be less involvement between these entities and their host municipalities.

There can be a lot of uncertainty in the relationship between local governments and CAIs, however, as the former are swayed by political forces and are susceptible to public pressure, e.g. opposition to wind turbines. On that note, there are also cases of public authorities acting opportunistically, i.e., showing support for CAIs only after they have proven to be successful and popular. Shifting political attitudes can be detrimental to the long term viability of CAIs that rely too much on local government support.

It is for this reason that it is important for CAIs to maintain the bottom up approach, but also strike a delicate balance between independence and support from local authorities.

7.4.3 Private Actors

The more localized a CAI is, the less resistance they will generally encounter, especially if local stakeholders are involved in the early stages. These early interactions should be marked by transparency and accountability.

Large energy (wind) companies have seen an opportunity in involving a small number of CAIs to improve their image and to garner better public acceptance. Often CAIs make up only a very small share of these initiatives and projects, and are perhaps serving more as token actors.

7.4.4 Regulatory Entities and Research Institutions

Research institutions can offer public consultations, and can gain technical assistance in new pilot projects. They can also provide, among other things, evaluation of project partners, feasibility assessment of tasks, assessment of replicability as well as the potential systemic impacts (e.g., on the energy grid). The regulatory entities can support CAIs with regular meetings and conferences, link CAIs to other important energy stakeholders, and can also serve as a political lobbying body.

7.5 Regulation and Policies

Overall, there was limited engagement by country case studies on the question of regulation and policies. To a large extent this reflects the inherent design and purpose of CAIs, which are often intended to operate outside of, or in parallel with, grid-based utilities and centralised decision

making processes. However, the following issues were raised by some of the country teams which can be divided into 'enabling' and 'constraining' factors:

Key enabling factors:

- Laws governing apartment associations and policies providing state support to the renovation of apartment buildings, which has both stimulated and financially supported energy-efficiency investments as part of the renovation projects, as in Estonia;
- Feed in tariffs for small-scale renewable energy systems and/or net-metering;
- Access to affordable financing for CAIs by dedicated banks or fund managers familiar with the profile, business models and risks of CAIs.

Key constraining factors:

- The phase-out of relatively simple subsidies such as the green certificates in Belgium had a negative impact on Renewable Energy Technologies (RETs) used by CAIs, especially large roof-top PV systems;
- The switch to auction-based subsidy support for investment in RETs in countries such as Belgium creates complications for CAIs that do not have the capacity to participate in a scheme that is designed for large-scale commercial projects;
- Uncertainties and long waiting times when it comes to local permitting processes for certain technologies, especially wind turbine projects;
- Arbitrary limits to the minimum size of households that can participate in district heating projects, e.g. the Heat Act 2.0 in the Netherlands;
- Bureaucratic procedures that slow down or complicate CAI project development, e.g. GDPR regulations as applied in Poland and the overly complicated procedures and language used by authorities in Spain.

Key arguments and recommendations: National energy policy can have a significant influence (either positive or negative) on the creation and scale up of CAIs and so if governments want to encourage their proliferation as part of a scale-up decarbonisation strategy then policy makers should consider the added value of citizen participation when designing tendering procedures and policy frameworks. This can also include tax incentives and streamlined approval processes. In terms of 'soft' policy support, there is a need for better access to knowledge and expertise about RE, about how to create an energy cooperative and about technical energy solutions in general, knowledge-sharing at the community level.

7.6 Growth and Scaling Up

The CAIs studied differ in how they envision their future growth, define and implement strategies for their future development. The cooperatives that are at the early stage of their development are more focused on the short-term day-to-day operations. They set up strategies in a more pragmatic way to create opportunities for RES projects and as such, to realize a more predictable, stable flow of revenues to support their 'professionalisation' and future development. The more established energy cooperatives have been growing in a more organic way and feel the necessity for a more structured and strategic approach. In the case of Belgium they are conducting a strategic exercise to come to a clear vision, mission and strategy for their long-term development. Some of the CAIs studied found it difficult to position themselves on the question of growth, as the concept itself may contradict the basic values on which they were established, such as 'limits to growth'.

In Belgium, none of the CAIs sought to expand their geographical coverage beyond their initial area of operation, although one covers the entire region of Flanders. Instead the focus is on maintaining local identity and keeping the connection to the citizens and the local context. Many CAIs attempt to develop new RE production facilities and business models, although most started with a single technology. Some take a proactive approach in creating opportunities by e.g., lobbying, applying for pilot projects, showcasing good practices and setting up networks.

The ability to scale-up depends on the opportunities to invest in and the available capacity in the energy cooperative to develop new projects. In Belgium, the comparative case studies had defined in their statutes a maximum amount of capital (shares) that can be invested per cooperant to have a broad outreach. Most CAIs are based on voluntary labour or have a few full-time equivalent staff. The CAIs find that professionalization is necessary for their current activities but also to facilitate an increase in the number of projects, although a predictable and stable flow of revenues is required to maintain professional staff.

In Estonia, the average time from idea to implementation was 3-5 years for the comparative case studies. One CAI, which has been implementing renewable energy solutions since 2012, has completed several stages (solar thermal collectors, PV panels), and the last stage (solar panels for balconies) was completed in autumn 2019 and was financed from the profit of previous renewable energy solutions. Most CAIs are interested in expanding their existing solar parks but are constrained by the lack of space in their urban areas. Another constraint to further investments are high debt burden from past renovation projects.

Cooperation with other CAIs in the local area is often mentioned as a central part of growth and diversification, e.g. regarding establishment of energy storage facilities, joint solar parks, and common parking and charging facilities for electric vehicles. Such neighbourhood cooperation would both improve liveability and the value of the buildings in the area. Generally, the creation of energy communities is perceived to be in line with the trends of modern society, based on the idea

that prosumption increases the flexibility of the energy systems and increases efficiency by reducing the need to transport energy over long distances. Cooperation among several communities would accentuate these efficiency gains and CAIs increase the diversity of market participants, increase local autonomy, diversify risks, and reduce dependence on large companies. Further, they provide local capital and contribute to a sustainable local economy and society and contribute to a greater sense of community and social cohesion, which is key to a well functioning civil society. Combined, these factors and characteristics serve to support the political and practical case for a growth in the number (if not size) of CAIs, across European countries that share these values. However, as with policies and regulation, a lack of specialised knowledge and technical experts was identified as an important barrier to the growth and diversification of energy communities across the study countries.

7.7 Impacts

7.7.1 Factors Impacting CAIs

Changing policies, particularly financial incentives, such as the phasing out green certificates, has been observed to have a large impact on CAIs. This corroborated literature where the number of CAIs is highly correlated with the introduction and removal of different energy policies and incentives (Wierling, et al., 2018). Changing social perceptions of wind power has resulted in legal actions against onshore wind projects. This has impacted CAIs in terms of delays, costs, and the ability to secure funding.

7.7.2 CAIs' iImpact on the Energy Transition

It is currently difficult to specifically quantify and qualify the impact CAIs have on the energy transition, economically, environmentally and socially. Reducing this uncertainty will help CAIs better shape their activities to attract more members, develop better financial models, reduce their environmental impact, and provide greater social benefits to the communities in which they serve.

Monitoring and assessment tools and procedures are needed so that CAIs can better see the impact of their various activities, e.g., impact of events on the recruitment of members, CO_2 avoided, ecological footprint, impact on the local community, helping disadvantaged households, energy-system transformation by developing enabling and integrating technologies, etc. Such evaluation tools would help forecast and articulate both the tangible and intangible benefits (e.g. the social value of shared assets such as vehicles) brought about by a CAI's activities. For instance, CAIs have the capacity to improve social cohesion within communities, which both improves livability and increases the economic value of the buildings in the area. They have the potential to provide local capital and contribute to a sustainable local economy and society. This could then be used to increase awareness and promote membership in CAIs.

Likewise, CAIs increase public awareness of the energy transition, in particular for their members and investors, but also to the larger community. As such, they are a mechanism that can transform

people from passive consumers (who feel a sense of helplessness in the face of the climatic and environmental challenges we collectively face), to proactive actors who take responsibility for finding local solutions to their energy issues in a collective and democratic way. In doing so, CAIs have a transformative impact through empowering people and inspiring others to follow their path. As such the phenomenon of CAIs in the energy transition is a social movement which seeks to enshrine the principles of participatory democracy within society while reducing the impact of the energy system on our environment.

8. Reflections

The NRTs were asked to reflect on the process of conducting the study using the CB approach. In particular, they were asked to consider how well the process worked and requested to consider how the findings could be used to transform CAIs, and the expected impacts for stakeholders, including new ideas, projects or practices. They were also asked to suggest ways how the process begun with this study could continue in the future, through, e.g. support structures and networks. The detailed reflections are included in Annex 5.

8.1 Limitations of the CB approach

The CB approach employed in this study risks being one sided, particularly with regard to policy measures. The NRTs were constructed to include stakeholders, but the focus was on the comparative case studies, so the findings emphasize the perspective of CAIs and not policy makers (Belgium). Similarly, the Dutch NRT recognized that the team could have benefited from a member that had legal experience in the energy field.

The CB approach also risks enshrining the status quo, as the issues brought up are those that are of the most interest to the participants. For example, solar panels and wind turbines were more in focus with the Belgian NRT members, rather than district heating or electric mobility. It can be difficult to find a balance on this issue. The Polish NRT noted that transferable best practices are more effective if all the CAIs are similar (e.g. energy clusters, municipalities, housing communities, agricultural cooperatives) while the Dutch NRT appreciated the diversity in the NRT.

On this note, care must be exercised in the workshop that a dominant member overpowers the group and propels their agenda to the top; fair, democratic processes are key to having the CB approach function well. Moreover, with multiple teams asking different suites of questions, it can create results that are difficult to directly compare.

Likewise, from the way the CB heavily involves practitioners, it is best suited for understanding the state of the art and current best practices, with a focus on what has happened thus far and it can be more forward looking.

Finally, it must also be acknowledged that the CB approach is more time intensive and it requires a lot of investment from the participants, (the NRT members and the comparative case studies in this case).

8.2 Relevance of the CB approach to CAIs

Despite these limitations, in general, the NRTs noted that it was fruitful in that it helped bridge the gap between knowledge generation and knowledge transfer. The comparative case studies found the process either relevant or very relevant in two polls by the Belgian NRT. They found it gave a good overview and learning service for newcomers. They felt the process was useful and interesting, however, they felt that exposed the enormous challenges of the energy transition and that the scale of CAIs was too small to have a significant impact.

Nevertheless, there was a great willingness for the CAIs to cooperate, work together, share knowledge and expertise. The Spanish, Italian, and Dutch NRTs also all reported positive feedback and a high level of engagement and commitment from the members and comparative case studies. Most NRTs are motivated to stay engaged in future stages of the COMETS project. The Dutch NRT also found the CB approach highly relevant with the discussions continuing outside and beyond this COMETS study. The NRT members felt it strengthened the network between the CAIs so that they could share best practices. And even though in Poland the NRT members were from different sectors and not all best practices were applicable, they nevertheless reported finding the networking quite valuable, since all the CAIs were relatively new and under development in a large country.

In general, interest in co-creation was more oriented towards knowledge development and sharing rather than on the level of process development. Therefore NRTs needed to find a balance between providing room to co-create the questions and knowledge while at the same time providing a productive structure in which this can happen.

In contrast, the Estonian NRT, representing the smallest country in the study, pointed out that the networks are already well established and the experts are already known in Estonia. In this case the CB strategy was not necessary to build a network, since it was already in place through existent national circles.

8.3 Next Steps

The Belgian NRT will share their findings with national network organizations, namely REScoop Flanders and REScoop Wallonia to distribute among their members. The Dutch NRT is working on ways to create useful outputs for the CAIs. Moreover, they are exploring ways to communicate the findings, through training seminars, popular articles, YouTube videos, blog posts, and newspaper articles. Exploring and expanding dissemination opportunities was also a major theme of the Spanish NRT.

As such, the Communities for the Future Platform seems promising. However, some NRTs (e.g. Netherlands, Belgium) have found that since similar functionality could be found on other platforms (e.g. Microsoft Teams), the usage so far has yet to create a critical mass. On the other hand, the Spanish NRT was very positive about the Communities for the Future Platform, and felt it filled a specific niche and that the platform could be the place where CAIs promote their models, share similar experiences and learn best practices across Europe.

Many of the NRT members will continue to volunteer their time to continue their collaboration and input to the scenario building with the participatory case study. The Dutch NRT even agreed to check in a year from now to see how the issues have evolved. One Italian NRT member was inspired to gain a legal designation as an "intentional community" with the goal of forming synergies with other international CAIs with this designation. With policy developments for renovation and renewable energy solutions (including emergent prosumer networks among the Estonian CAIs), the Estonian NRT sees a future that emphasizes apartment associations as a successful future model for CAIs.

Finally, all NRTs had optimistic outlooks for the role of CAIs in the energy transition, and felt this process helped shed light on practices to increase their impact.

9. References

Brueck T, Riddle R, Paralez L. Consortium benchmarking methodology guide. Denver: Awwa Research Foundation. 2003.

Gorroño-Albizu L, Sperling K, Djørup S. The past, present and uncertain future of community energy in Denmark: Critically reviewing and conceptualising citizen ownership. Energy Research & Social Science. 2019 Nov 1;57:101231.

Gregg JS, Nyborg S, Hansen M, Schwanitz VJ, Wierling A, Zeiss JP, Delvaux S, Saenz V, Polo-Alvarez L, Candelise C, Gilcrease W, Arrobbio O, Sciullo A, Padovan D. Collective action and social innovation in the energy sector: A mobilization model perspective. Energies. 2020 Jan;13(3):651.

IEW (2019) CTE 2018: *Identification de modèles innovants de participation financière citoyenne et communale dans les projets éoliens.* https://www.iew.be/wp-content/uploads/2019/09/CTE-CdS-190221-ParticipationEolien_Mode%CC%80lesInnovants.pdf. Accessed on 30 April 2021.

Kampman, B, Blommerde, J., Afman, M. The Potential of Energy Citizens in the European Union; Report by CE Delft for Greenpeace European Unit, Friends of the Earth Europe, European Renewable Energy Federation (EREF) and REScoop, Publication code: 16.3J00.75, CE Delft: Delft, The Netherlands, 2016, Available online: https://www.greenpeace.org/static/planet4-eu-unit-stateless/2018/08/2ef7fcdf-2ef7fcdf-160926-ce-delft-the-potential-of-energy-citizens-in-the-eu.pdf (accessed on 30 April 2021).

Mey F, Diesendorf M. Who owns an energy transition? Strategic action fields and community wind energy in Denmark. Energy Research & Social Science. 2018 Jan 1;35:108-17.

International Cooperative Alliance (ICA), Cooperative identity, values & principles. 2021. Available online: https://www.ica.coop/en/cooperatives/cooperative-identity (accessed on 30 April 2021)

Schiele H, Krummaker S. Consortium benchmarking: Collaborative academic–practitioner case study research. Journal of Business Research. 2011 Oct 1;64(10):1137-45.

Wierling A, Schwanitz VJ, Zeiß JP, Bout C, Candelise C, Gilcrease W, Gregg JS. Statistical evidence on the role of energy cooperatives for the energy transition in European countries. Sustainability. 2018 Sep;10(9):3339.

Annex 1. Description of NRT members

A1.1 Belgium

The following table gives an overview of the organisations that were contacted and whether they formally agreed to participate in the NRT. 11 organisations, of which 6 CAIs (i.e., 2 start-ups and 4 established CAIs which are also comparative case studies), formally agreed to be part of the NRT. The other members of the NRT are national policymakers, representatives of the cities and municipalities, academics and the association of energy cooperatives. Two CAIs agreed to participate in the interviews without being formal members of the NRT.

Table A1. Overview of NRT members and comparative case studies

Organisation	Region	Gender	Type of actor	NRT	Comparative case study
Flemish Government (VEKA)	Flanders	M	policy maker	x	-
Flemish Regulator of Electricity and Gas market (VREG)	Flanders	M	regulator	-	-
NAVITAS	Flanders	M	energy cooperative	x	-
RESCoop Vlaanderen	Flanders	M	federation of energy cooperatives	x	-

Zuidtrant	Flanders	F	energy cooperative & non-profit organisation	x	x
RESCoop Wallonie	Wallonia	M	federation of energy cooperatives	x	-
Energent	Flanders	M	energy cooperative	-	-
Apère	Wallonia/Brussels	M	association for promotion of renewable energy production	-	-
Klimaatpunt	Flanders	M & F	non-profit organisation	-	-
VVSG	Flanders	M	Flemish association of cities and municipalities	x	-
Cozéop	Wallonia	M & F	co-housing & energy cooperative	x	-
Ecopower	Flanders	M	energy cooperative	-	x

Klimaan	Flanders	M & F	energy cooperative & non-profit organisation	x	x
Nosse moulin	Wallonia	M	energy cooperative	-	x
Druifkracht	Flanders	M	energy cooperative	-	-
Technical University of Eindhoven	The Netherlands	F	university	x	-
WattArdenne	Wallonia	M	energy cooperative	x	x
UCVW	Wallonia	F	Walloon association of cities and municipalities	-	-
CLEF	Wallonia	M	energy cooperative	x	x

A1.2 Estonia

The Estonian NRT is composed of 16 participants:

- 4 representatives of CAIs
- 2 experts who have been actively involved in the topic of energy communities and established an energy co-operative
- 1 representative from Estonian Ministry of Economic Affairs and Communication, Energy Department

- 1 representative of a local government (Tallinn city government), former director of the Tallinn Energy Agency
- 2 social innovation experts (1 from the University of Tartu)
- 2 representatives of the umbrella organization of apartment associations
- 4 TREA experts

A1.3 Italy

Besides the Italian COMETS partners, the Italian NRT is composed of 11 members: 7 CAIs and 4 "external" stakeholders. The table below summarises some of the features of the 7 CAIs.

Table A2. Italian NRT

Name	Year of found-ation /birth	Typology	Role(s) in the energy market	Location / Head-quarters	Yearly energy produc-tion	Members
CEDIS – Consorzio Elettrico di Storo	1904	Cooperative	Generation, Distribution, Retailing	Storo; Autonomous Province of Trento	17 GWh	3,288 members, around 4,500 clients
Energia Positiva	2015	Cooperative	Generation	Nichelino; Metropolitan City of Turin; Piedmont. (national outreach)	6.5 GWh	580 members

ènostra	2013	Cooperative	Generation, Retailing	Milan; Metropolitan City of Milan; Lombardy. (national outreach)	3.0 GWh	7,606 members
Kennedy Energia	2012	Limited liability company	Generation	Inzago; Metropolitan City of Milan; Lombardy	100 MWh	50 members
LUMEN	1992	Ecovillage / Intentional community	Self-consumption	San Pietro in Cerro; Province of Piacenza; Emilia-Romagna	33 MWh	Around 60 resident members
Ötzi Elettricità Mia – Mein Ström	2019	Cooperative	Retailing	Bolzano; Autonomous Province of Bolzano – South Tyrol	No direct generation	750 members / clients
Villaggio Ecologico di Granara	1994	Ecovillage	Self-consumption	Valmozzola, Province of Parma, Emilia-Romagna	32 MWh	Around 50 inhabitants

Description of the four “external” stakeholders of the NRT

- GSE – Gestore Servizi Energetici (translated, Energy Services Managing Authority). A joint-stock company, entirely owned by the Italian Ministry of Economy and Finance. It promotes and incentivises the production of electricity from renewable sources.

- NEMO – Nuova Economia in Montagna (translated, New Economy in the Mountains). A cooperative based in Cuneo (Piedmont) and active in community engagement and regenerative processes in marginal/alpine areas.
- RSE – Ricerca sui Sistemi Energetici (translated, Research on Energy Systems). A joint-stock company, entirely owned by GSE (see above). It aims at innovating and improving the performance of the electricity system from the point of view of economy, safety and environmental compatibility.
- A former professor at the Polytechnic University of Turin, deeply involved in the creation of energy communities in Piedmont, as well as of the first Italian Regional (Piedmont) Law on Energy Communities.

A1.4 Netherlands

The Dutch NRT is composed of 12 participants of which 5 CAI members and 6 non-CAI members all described below:

A1.4.1 CAI Members

Willem Schaap & cooperative Zonnedorpen

Willem has a background in agriculture, and later during professional career branched out to rural development, hospitality, food marketing, environmental equipment, and sustainable solutions. His goal is to connect people for a better world. He is among the initiators of the Zonnedorpen cooperative.

Zonnedorpen is the energy initiative active in the north-east Groningen villages Garsthuizen, Leermens, 't Zandt, Zeerijp and Zijldijk. The initiative started as a spin-off of the activities of the local village interest organization (dorpsbelang). Zonnedorpen is known for its innovative postal code rose (PCR) solar field.

This solar field called Freek Sonneveld is barely visible for passersby. The highest point of the solar park is only one meter above ground level. In combination with a hedge around the solar park, the panels are hidden from view as much as possible. Furthermore, participation in this project does not require an investment and is therefore accessible for everybody in the area regardless of income.

The solar park is far from the only innovative project Zonnedorpen is working on. True to its moto ‘pioneering, sharing and connecting’ Zonnedorpen is simultaneously exploring various sustainability innovations: e-mobility, innovative wind turbines, a sea-salt battery storage system, and a project to become independent of gas involving exploration of a direct current grid fed by more community wind and solar power.

Zonnedorpen does many of these projects in collaboration with partners such as technology developers. It has built a reputation as an open-minded organization of pioneers: Zonnedorpen comes to mind among energy innovators when they want to try something new.

Figure A1. aerial photograph of the "Freek Sonneveld".

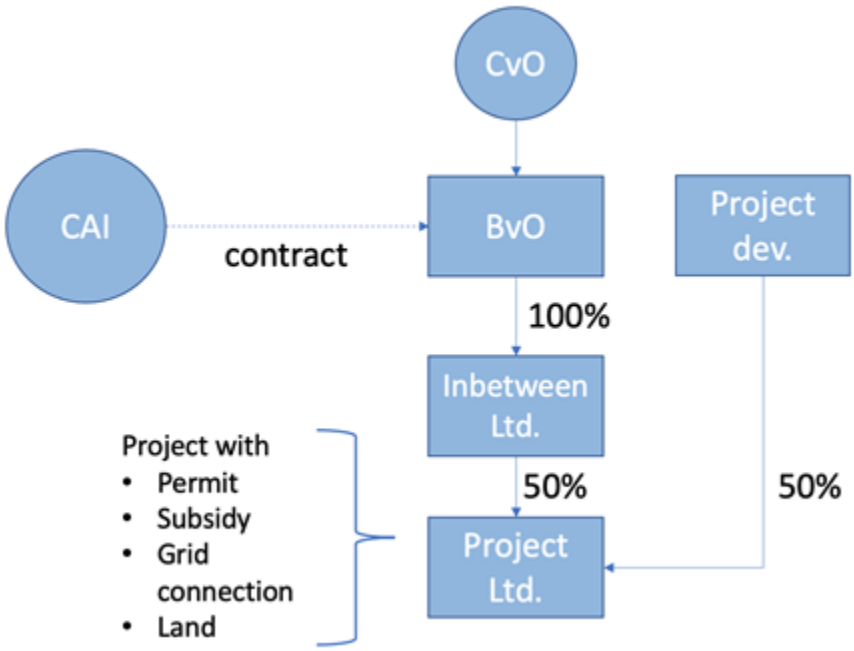
Egbert Ludwig & Bronnen VanOns

Egbert is a freelancer with an interest in realizing and financing sustainable energy projects. Starting off as a mining engineer, he quickly took a turn in his professional career towards customer relationship management and business intelligence. From there he specialized in business development in the financial sector with a focus on fund management and sustainable energy finance. He is currently involved in the local energy movement as an individual and as a professional. He is active as secretary of the cooperative Duurzaam Bedum in his hometown during his free hours. When it comes to his professional life, part of his job is managing the social enterprise Bronnen VanOns as director.

Bronnen VanOns focuses on supporting energy cooperatives in project development, especially when it comes to larger energy projects in collaboration with commercial developers. It can rightfully be called an innovation in the energy sector as it represents one of the latest phases in the professionalization process of local energy initiatives in the north of the Netherlands: the foundation of a project development organization fully dedicated to supporting local energy initiatives. By working with Bronnen VanOns CAIs can overcome hurdles to project development such as knowledge deficits, financing the pre-planning phase and reducing financial risk. Bronnen VanOns does so through pre-financing the project and setting up a separate entity for the project, so their cooperative client is affected when the project fails (see figure 2).

While most of the projects concern co-owned projects, Bronnen VanOns solely represents the cooperative side of such projects. Mostly, Bronnen VanOns gets approached by a commercial project developer who wishes to jointly develop a solar park with a CAI. That project developers approach Bronnen VanONs is in response to a policy goal from the Climate Agreement: in each project should be striven for 50% local ownership so that the energy transition will be supported locally and the distribution of outcomes will be fairer. Despite the lack of consolidation of this goal in legislation, striving for 50% ownership became a standing practice in the north of the Netherlands.

Figure A2. Organisational structure Bronnen VanOns uses for project development. BvO stands for Bronnen VanOns, and CvO for the overarching cooperative Cooperatie VanOns.



Sjon Debie & Windpark Nijmegen – De Betuwe

Sjon is project leader Sustainability at the municipality of Nijmegen, and board member of the cooperative Windpark Nijmegen -De Betuwe (WPN). He considers transparent communication and visibility (aaibaarheid) as keys to success for CAIs. That way people can develop a sense of ownership. Sjon got involved during the early days of the initiative when he was a developer at the municipality of Nijmegen. As developer, he had a conversation about the wind park with an alderman of Nijmegen and the two initiators of the project: a project developer that wanted to build a cooperative wind park and a staff member of the nature and environment federation.

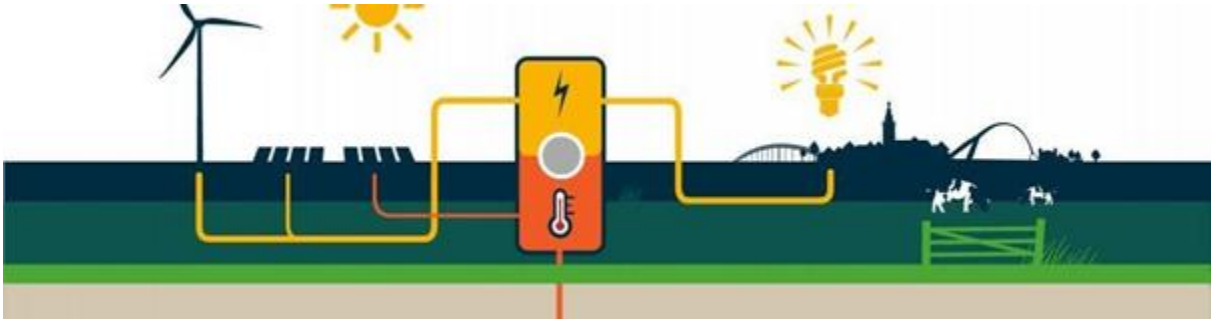
A previous attempt by Eneco to start a wind park at the industrial estate "De Grift" stranded in 2007 after the Council of State rejected the required change of the land use plan. This offered an opportunity to develop a wind park owned and developed by citizens instead of a big energy

company. The municipality showed leadership and courage by almost unanimously voting in favor of the plan in 2014. Hence, it was a relief for the young cooperative that they could live up to the expectations: membership grew steadily to over a thousand and progress kept being made. Their four wind turbines started generating in 2016, and supply energy for 7.100 households.

The wind park is only a start for WPN. A serious gaming session WPN participated in really conveyed the cruciality of integration of various energy sources and grid balancing, and from that moment on the cooperative started developing the concept "energy landscape". In the energy landscape, the goal is to use the available space in the most optimal way for energy provision. The cooperative received an innovation subsidy for this concept from the national government in 2019.

The next step towards the energy landscape will be the development of a solar park of 17.000 panels on 7,5 ha that can annually produce energy for 1.245 households (about 4,4 GWh). This solar park will be sharing the connection with the wind park, which has already been taken into account during the development of the wind park. This is possible because solar and wind are largely complementary: when it is sunny it is mostly less windy and vice versa. After the solar park, storage at times of surplus will be following. The cooperative explores power2gas and power2heat options. There are also options to add more wind turbines.

Figure A3. Energy landscape "De Grift".



While developing these projects, WPN has drastically changed as an organization. From a few initiators and a handful of very invested members, it has now grown into a cooperative with two limited companies (one for the solar park and one for the wind park) and 1800 members. Hence, it is challenging for WPN with the growing pains: more members equals more ideas about the direction in which the cooperative should evolve and more projects equals more responsibility to secure continuity.

Ted Zwietering & Ketelhuis Wilhelmina Gasthuis

Ted has a background in architecture, and has vast experience in urban development and held several management positions in this domain at large Dutch municipalities. Now he has retired, he uses this experience amongst others as chair of energy cooperative Ketelhuis WG. Ted upholds three guiding principles: Beneficial to the neighborhood, sustainable and affordable. He wants the neighborhood to benefit from the energy transition through redesigning the energy system by and

for the residents, he wants the energy solution to be truly sustainable, and lastly, he wants it to be affordable for everybody who lives in the neighborhood and not more expensive than what they pay now.

Ketelhuis WG is located in the Amsterdam neighbourhood Wilhelmina Gasthuis (WG). WG covers approximately 16 hectares, and 2500 living / working units and studios. In total, it houses 25 buildings dating from 3 different centuries.

Here the energy cooperative is working on making a transition from gas to aqua thermal heat pumps, extracting heat from the Jacob van Lennep canal. They received a subsidy from the programme gas free neighborhoods for their plan.

Due to the different energy labels of the buildings, a combination will be made of low temperature and high temperature district heating. It is a conscious choice to approach it this way and not opt for insulation first. The choice means that the properties can be connected right away and participants do not need to commit to insulating their homes. The cooperative plans to stimulate insulation by keeping the tariffs low, and the ultimate goal is to connect as many properties as possible to a 40-degree system (low temperature).

Drawings and specifications for the aqua thermal system will be made until mid-2021, after which the system will be built from 2022 to 2028 and the connection of 800 homes and 600 residential equivalents of utility will be realized. Connection of a building to this extending heat network can be started, if at least 70% of the residents in a building wants to be connected.

Ruud Welling & Houtlaan Minder op de Meter

Ruud worked during his professional career as mining engineer for Shell at various locations around the world, and moved in the direction of renewable solutions after his retirement. He is the founder of the working group “Houtlaan Minder op de Meter”. The Houtlaan is a neighborhood of 136 detached houses in Assen. He established this working group in 2017 to reduce the CO_2 footprint of his community and it now consists of 7 members.

This group is looking into how they can meet the government’s objective of 50% reduction of CO_2 by 2030 in their neighborhood. The plan to do so through a combination of privately owned rooftop solar PV, e-cars, and heat pumps (see Figure A4 for a schematic overview).

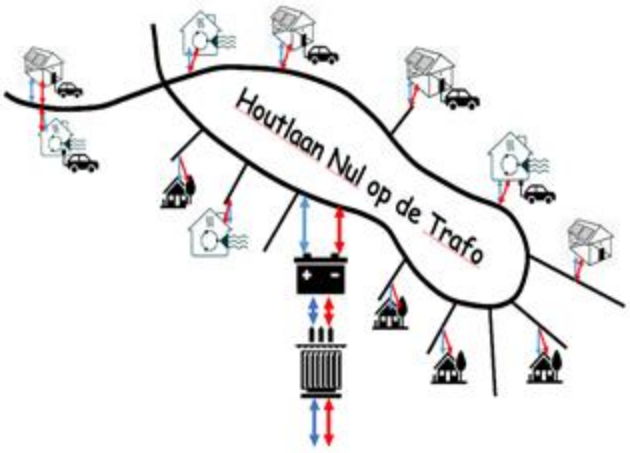


Figure A4: schematic overview of the technologies planned to be used for the Houtlaan Minder op de Meter project and an impression of the Houtlaan neighborhood.

In October 2020, the group received an experimentation grant to work out the details of a grid balancing system including storage as the neighborhood transformer started to have problems managing the load created by the solar panels. In the future, this system should provide day/night as well as seasonal balancing services but its success depends on the introduction of a flexible pricing system for storage.

At the moment, the lack of a follow-up of the experimentation decree is severely hindering the experiment as it heavily depends on similar regulations to allow for peer-to-peer supply. Also, tax regulation double taxing storage is hindering the project. The hope is to overcome these challenges and come up with a system that can be applied in other communities that share a common transformer and power cables.

Table A3 below shows which CAIs work on which themes where knowledge gaps exist.

Table A3. distribution of CAIs over themes.

	Zonnedorpen	**Bronnen VanOns**	**Wind Power Nijmegen**	**Ketelhuis WG**	**MOM Houtlaan**
Grid balancing and congestion	x		x		x
Heating				x	x

Social business models	x	x	x	x	
Market competition		x			
Inclusivity, compensation, participation	x	x	x	x	

A1.4.2 Non-CAI members

Otto Bernsen and Rebecca van Leeuwen (RVO)

Otto is senior consultant at the Netherlands Enterprising Agency (RVO) and works on energy innovation and international collaboration. He has a background in Anthropology.

Rebecca also works at the RVO. She holds a BA Honours degree in Modern European Studies. Rebecca has extensive experience in international sustainability networks aimed at stimulating sharing of knowledge and best practice.

Both have supported various local energy projects through their work, amongst others via the EU Heroes H2020 project. This project aims to strengthen community-owned Photovoltaic (PV) systems by developing viable business models that address the concerns of network operators.

Tineke van der Schoor (Hanze University of Applied Sciences)

Tineke is senior researcher Energy & Built Environment at the Hanze University of Applied Sciences. She focuses her research on local energy initiatives and energy efficiency in monuments. Last year, she obtained her PhD at the Maastricht University.

Earlier in her career, she held various positions in the field of sustainability. For example, she was a member of the delegation to the UNCED Conference on Environment and Development in Rio de Janeiro on behalf of the Dutch NGOs and she organized several dozen debates and conferences on sustainable development for the NCDO. Tineke has also been politically active, including as an alderman in the municipality of Winsum.

Anne Marieke Schwencke (AS-I Search)

Anne Marieke is an energy transition specialist who works freelance as an independent researcher. She has a background in physics and environmental sciences, and has been active in the sustainability sector since the 1990s.

She focuses in particular on the role that citizens can play in the energy market by developing and managing their own energy projects. By annually compiling the Local Energy Monitor for HIER Opgewekt, she closely follows the development of the cooperative energy movement in the Netherlands. However, she also carries out assignments with a broader scope such as the development of a new Monitor for participation in renewable energy development on land on behalf of the ministry Economic Affairs.

In her own city Leiden, where she lives and works, she is involved in two cooperatives: Zon op Leiden and Rijnland Energie. She strongly feels that if something happens with solar or wind in a region, the benefits should be shared as widely as possible.

By working on the energy transition as a researcher and an engaged citizen, she has a perspective from within and knows from experience what is needed if you want to initiate something in your area.

COMETS researchers

Esther van der Waal, Henny van der Windt and Franco Ruzzenenti all work at the department for Integrated Research on Energy, Environment and Society at the University of Groningen. Judith Gerringa is a master student of the Energy and Environmental Sciences Master.

Esther van der Waal is a postdoctoral researcher. She has a background in spatial sciences as well as science and technology studies. Since her master, her work has focused on local energy initiatives. Recently, she defended her PhD thesis on the transformative potential of local energy initiatives as innovators in the energy transition.

Her research interests include socio-technical innovation, social impact analysis, social studies of energy sustainability, local embedding of technology, energy policy, and interactive and participative planning as well as governance.

Henny is associate professor. He studied biology (ecology) at the University of Groningen in the 1970s and obtained his doctorate in 1995 with the dissertation "And then: what does nature still mean in this country? Nature conservation in the Netherlands 1880-1990".

He is specialized in the relationship between sustainability and science. More specifically, his research concerns the relationship between nature conservation and ecology and that between energy technology, local energy initiatives and the energy transition.

Franco is assistant professor. He was born in Brescia, Italy. He graduated in Environmental Economics, and did a PhD in Environmental Chemistry in Siena. His teaching experiences are in Environmental Economics, Network Theory, Energy economics and Energy Auditing, and Energy and Society.

Judith is an Energy and Environmental Sciences master student, and supports the COMETS project as part of her thesis project. She has a background in Biology and Educational sciences.

A1.5 Poland

During the National Research Team kickoff meeting (16th February 2021), members of such organizations were present:

PEC w Końskich - Konecki Klaster Energetyczny

The legal basis for the functioning of the Konecki Energy Cluster is the Act of February 20, 2015, on renewable energy sources. A coordinator represents the energy cluster. The mission of the Cluster is to improve the condition of the environment in the area of the City and Commune of Konskie, including air quality, improve energy security and strengthen the local economy by optimising the use of locally available energy resources, including renewable energy sources, and other pro-efficiency measures.

For now, we have 700 kW from PV. We are planning to install 7 MW from PV. We already have a building permit, but we do not have financing yet. Cogeneration is very important to us. After all, we are a combined heat and power plant. We are waiting for the outcome of the competition from the Norwegian Funds. (quote from the workshop)

Wodociągi Słupsk sp. Z O.O. - Słupski Klaster Bioenergii

Słupski Klaster Bioenergi is one of the leading energy clusters in Poland. It was established in 2017. The initiative was granted a pilot energy cluster of energy by the Polish Ministry of Energy in 2018. The cluster is planning to develop not only a 100 GWh/rok of energy produced from bio-wastes, PV, wind and biomass..

We have an energy cluster. We produce biogas as a by-product of wastewater treatment. We plan to expand by adding more biogas units to heat and illuminate the Słupsk Aquapark. There are plans to build a heat pipeline and electricity cable to connect other cluster members. Ultimately, we will create a bioenergy island in Słupsk - we will be self-sufficient. (quote from the workshop)

Spółdzielnia Mieszkaniowa Przylesie

This Housing Association, initially managed by the Teacher Housing Cooperative, separated from it and in 1990 started operating independently. It consists of nine -11 floor buildings built in the 1960s. In recent years the Przylesie housing association conducted a termomodenitzation of all facilities, consisting of digitalisation of heating processes—replacement of the coal heating system and installing 500 PV panels.

It was a very high cost, but our housing estate is from the 21st century. It was difficult to persuade members of our community to invest in efficiency and renewable energy, but we did it. Now they understand that it was profitable. (quote from the workshop)

DOEKO GROUP

Doeko Group is a founder and coordinator of several energy clusters in Poland. This company helps local authorities and leadero go through all paperwork that concerns establishing the energy cluster. They coordinate clusters: Klaster Energii Korona Północnego Krakowa, Siedlecki Klaster Energii,Nadwiślański Klaster Energii, Klaster Energii Prokopara.

Geotermia Uniejów

Geothermal investments in Uniejów commune began with the drilling of two boreholes in 1990-1991, and in 1999 the company Geotermia Uniejów was established. The main shareholder is the Uniejów Commune (58.8%), while the remaining shares belong to the Provincial Fund for Environmental Protection and Water Management in Łódź. From the very beginning, Geotermia Uniejów was focused on renewable energy sources. Geotermia Uniejów is the first heating plant in Poland that uses only renewable energy sources - geothermal water and biomass. Currently, the total capacity of the heating plant is 7.4 MW - 1.8 MW of which comes from biomass combustion and 3.2 MW from geothermal energy.

Stowarzyszenie na rzecz efektywności im

The energy efficiency association supports the formation of energy cooperatives. Together with the governmental institution, they invest in civic energy. They cooperate with the Chamber of Energy Clusters. Their objective is to convince the government to support the social aspects of the energy sector. The association actively participated in creating the first Polish energy cooperative.

A1.6 Spain

Table A4 below shows the organisations that formally agree to participate in the NRT, 13 people from 10 organisations, of which five CAIs (i.e., 1 start-up and 4 established CAIs). Those CAIs are also the comparative case studies that participated in the benchmarking study. The other members of the NRT are national policymakers, a national energy agency, academics and an association of energy cooperatives.

In addition, one more person was involved in our meetings. A student from DTU was a passive member of the NRT and she could give us feedback, took notes and observed the dynamics.

Table A4. Spanish NRT members and comparative case studies

Institution	Category	Gender	Geographical scope
Ministry of Ecological Transition	Policy maker	Woman	National
Institute for the Diversification and Saving of Energy (IDAE)	Energy Agency	Woman	National
Unión Renovables	Industry Association- Association of RES cooperatives	Man	National
URBEROA	CAI	Woman	Local
Comunidades Energéticas Locales EMASP	CAI	Man	Local
Comunidades Energéticas Locales EMASP	CAI	Man	National
REVIEVAL	CAI	Woman	Local
REVIEVAL	CAI	Man	Local
Ecooo Revolución Solar	CAI	Woman	National
SomMobilitat	CAI	Man	Regional
Universidade da Coruña	University	Man	National
TECNALIA	Research	Woman	European
TECNALIA	Research	Woman	European

Annex 2. Techniques and tools used in the workshops

In this Annex, each of the following paragraphs is dedicated to a country and is divided into 2 parts:

- **Main techniques and tools**, that reports the description of the core methodology adopted in the workshops;
- **Other techniques and tools for engaging and benefiting the comparative case studies**, that reports complementary methods applied to maximise the results.

A2.1 Belgium

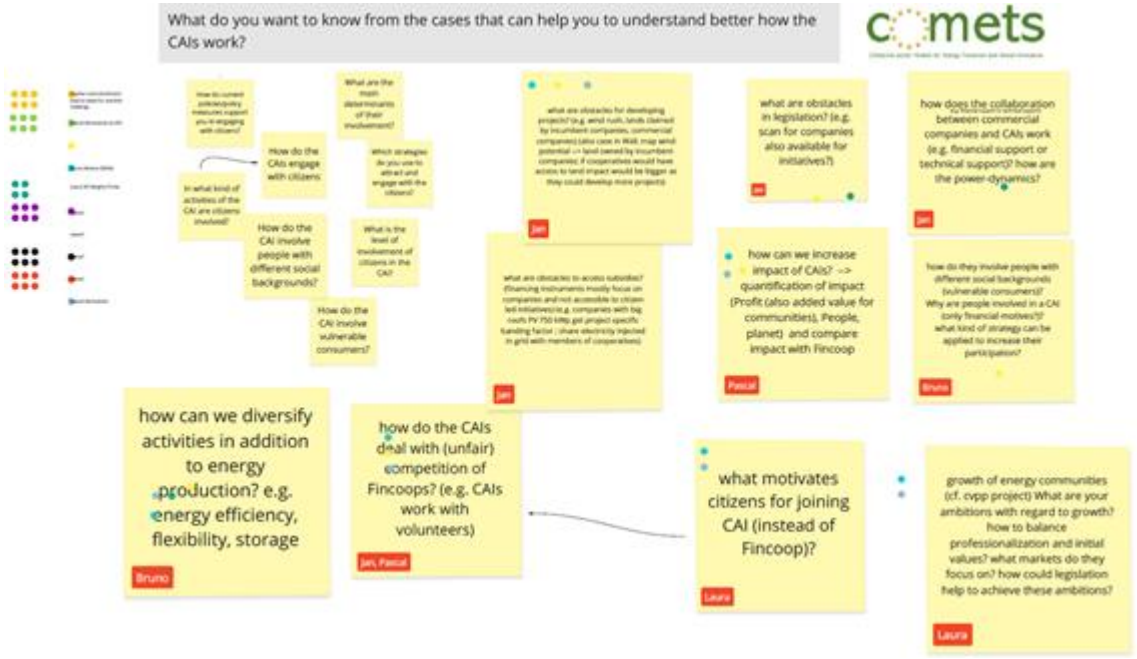
A2.1.1 Main techniques and tools

Three NRT meetings were organised to discuss the benchmarking study, specifically to:

1. define the scope, approach, and outcome of the benchmarking study (14/01/2021),
2. validate the research questions and comparative case studies (04/02/2021),
3. to present and discuss main findings of the benchmarking study (20/04/2021)

Given the COVID-19 context, these meetings were organized online (Zoom or Teams). The duration of these meetings was between 2-3 hours. The meetings were organized during working hours, but we offered the flexibility to organize these meetings outside working hours as the majority of the CAIs that participate in the NRT are voluntary-based. Minutes were shared after each meeting and NRT members were given the opportunity to provide feedback on the report. A COMETS NRT folder was created on the VITO Teams site to share presentations, meeting minutes and other relevant information with the members of the NRT. The members could read, edit and upload documents in the COMETS NRT folder. Miro was used to organise an online brainstorm session in a more interactive way. The tool supported the team in visualizing and structuring the ideas brought to the table by the members of the NRT. The dot voting template was used to prioritize the input provided on the sticky notes.

Figure A5. Example of Miro whiteboard with dot voting (kick-off meeting NRT, 14/01/2021)

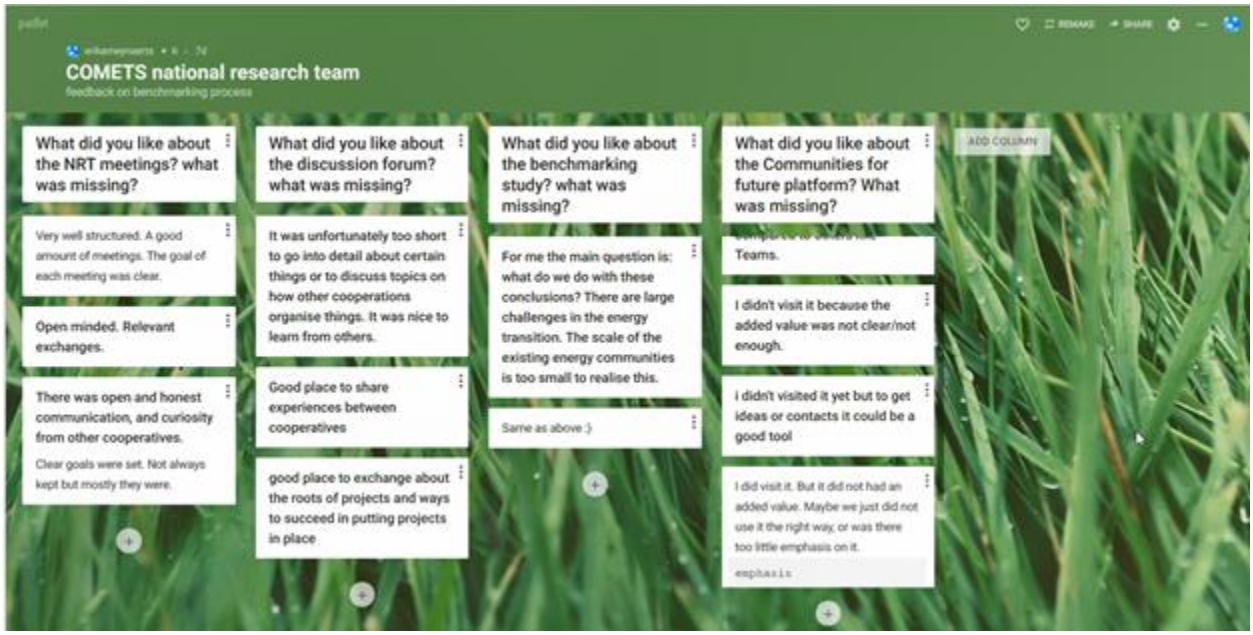


Mentimeter was used for organising online polls to capture the opinion of the members of the NRT about e.g., the relevance of specific meetings, tools or methodologies. The tool offered members the possibility to express their opinion anonymously.

Figure A6. Organising poll with Mentimeter (NRT meeting, dd. 20/04/2021)

Padlet was used for collecting specific reflections of the members of the NRT on e.g., the meetings, tools, methodologies used.

Figure A7. Collecting reflections with Padlet (NRT meeting, dd. 20/04/2021)



A2.1.2 Other techniques and tools for engaging and benefiting the comparative case studies

Due to the COVID-19 restrictions the NRT were not able to organize site visits. Alternatively, online knowledge sharing and networking activities were organised for the members of the NRT. These activities created a forum for the NRT to discuss practical issues and topics that were not selected as part of the benchmarking study.

Each of the CAIs was asked to prepare a PowerPoint presentation or recording in which they presented their initiative. They could choose if they made the presentation in their own language or in English. The following guiding questions were provided to support the CAIs in drafting their presentations:

- Name of your initiative
- Location or geographical scope
- Website
- Contact Name
- Contact Email Address
- Who founded the initiative and who is involved nowadays?
- What motivated you to start with the initiative?
- What inspired you to start with the initiative?
- What obstacles have you encountered?
- Who supported you? And how?
- What have you achieved?
- What is the accomplishment that you are the most proud of?

- What is the most important thing you have learned from your initiative?
- How do you expect your initiative to look like in the future?

The presentations were shared with the members of the NRT through Teams. It was also suggested that the CAIs share their stories with a wider audience through the Communities for the Future Platform.

A discussion forum or interactive "questions and answers" session was organised with the NRT to discuss the development of the CAIs. In preparation of the discussion forum, members were asked to read through the presentations and to provide some questions that they would like to ask the CAIs. The following questions were compiled:

- Why do you focus on solar/wind? Do you have plans to diversify? What would be the (dis)advantages?
- What kind of communication strategy do you apply to attract new members?
- How do you engage with specific target groups e.g., youth, vulnerable consumers?
- How do you reach and engage with specific target groups and citizens in general during COVID times?
- Are you supported by a commercial company and why? How does this cooperation or partnership work?
- What is COCITER? What is the (dis)advantage of such an organization?
- Could you explain the structure of the initiative (namely non-profit organization and energy cooperative)? What are the (dis)advantages?
- How did you develop your shared electric vehicle project? For vehicle management, are you using an existing platform?
- How did you develop your communication and awareness tools for energy savings in schools (Zero Watt?)?

The discussions were transcribed and shared with the NRT through Teams, as a primary data source for the benchmarking study. At the end of the meeting, participants were asked to raise their hands and score on a scale from 0 to 10 how they experienced the discussion forum. The participants gave the discussion forum a score of 9/10 or 10/10.

Figure A8. Appreciation of the discussion forum

It was hoped that the Communities for Future platform could support the NRT in networking and knowledge sharing. A Belgian COMETS group was established to collaborate on the platform and three members of the NRT subscribed to the group. Unfortunately, the group did not make much use of the COMETS group as it was not clear what the added value of this group was compared to e.g., Teams.

A2.2 Estonia

A2.2.1 Main techniques and tools

There were two NRT working group meetings. The members of the working group have been given the opportunity to actively participate in the meetings and express their opinions. Discussions have been initiated on important topics, which have been a very useful input to the final report of the working group's activities. The members of the working group have had the opportunity to actively contribute to the development of research questions and to supplementing the final report.

A2.2.2 Other techniques and tools for engaging and benefiting the comparative case studies

Participating CAIs have had the opportunity to express their thoughts and views during the survey by answering in-depth research questions and reaching relevant stakeholders in the community energy field with their message. In addition, they have had the opportunity to establish contacts with various experts, other communities and participate in shaping the future of energy communities in Estonia.

A2.3 Italy

A2.3.1 Main techniques and tools

Beyond phone and/or email individual contacts with members of the NRT, there have been 6 online plenary meetings that were held through the Webex platform of UNITO.

Table A5. Timeline of Italian NRT

Date	Name	Activities	Duration	Represented NRT members (and participants)
19 January 2021	Launch workshop	Presentation of NRT expected activities; Short presentations of all NRT members; Presentation of Survey results; Discussion (break out rooms) on research questions	2h30m	11 (17)
2 February 2021	2nd meeting	Discussion on, and final selection of, research questions	1h30m	11 (13)
17 March 2021	1st Visit Tour	Dedicated to Kennedy Energia and Villaggio Ecologico di Granara	2h00m	11 (14)
26 March 2021	2nd Visit Tour	Dedicated to Ötzi and LUMEN	1h30m	10 (12)
2 April 2021	3rd Visit Tour	Dedicated to CEDIS, Energia Positiva and ènostra	2h00m	9 (9)
16 April 2021	Closing of the first phase	Discussion on the consolidated report for the Italian comparative case studies	2h30m	8 (10)

All meetings have been video recorded and all participants (to meetings or interviews) were given a privacy information sheet and an informed consent module to be signed and returned to UNITO. The video recording of the three Visit Tours was then made available (in accordance with a non-disclosure agreement) to all members of the NRT, while the other video recordings were just used internally by UNITO and UB.

A2.3.2 Other techniques and tools for engaging and benefiting the comparative case studies

Given that it wasn't possible to make in-person site visits, the chosen format was based on presentations of around 20 minutes each, delivered by CAIs, and aimed at putting in evidence the answers to the six research questions. With an outlook beyond COMETS activities, a formal agreement of collaboration has been signed by UNITO, UB and six members of the NRT to carry out joint activities in the field of the energy transition. At the time of writing (April 2021), the agreement was set to enter into force.

A2.4 Netherlands

A2.4.1 Main techniques and tools

The NRT met 7 times over the course of the benchmarking trajectory. For the first online meeting Google Hangout was used, but after this session it was moved to Blackboard Collaborate as it allowed for polls as well as break-out sessions to pre-discuss questions before plenary discussion. Other tools adopted:

- google docs to share the questions to be discussed and to gather initial answers prior to the meetings;
- google drive to save material and make it accessible to the NRT;
- google form to vote for the questions to be prioritized during the theme sessions;
- ppt presentations of the CAI representatives to share their story about their initiative and best practices during the sessions;
- ppts of the organizers with the structure of the session;
- supplementary interviews to fill in some gaps and get a more structured overview of each initiative's best practices;
- Datumprikker tool to select dates for the sessions;
- weekly emails with the link to the digital platform, google doc, and a session reminder;
- Invoice and consent forms.

A2.4.2 Other techniques and tools for engaging and benefiting the comparative case studies

No other tools or techniques were used in the workshops or to engage the comparative case studies. However, the sessions were recorded and extensive notes were kept to facilitate the compilation of this report.

A2.5 Poland

A2.5.1 Main techniques and tools

The COVID-19 pandemic created a situation that the organisers had to change the initial plans to transform the NRT meetings and workshop into an online event. The first NRT recruitment meeting, as well as the webinar, were organised on Microsoft Teams. The duration of these meetings was around 2 hours. The sessions were scheduled during working hours, with a certain degree of flexibility since most of the participants joined the project voluntarily. The workshop participants and NRT members were invited to join a workshop with the promise of sharing the results of phase 3 (WP3 'Exploring determinants of CAIs development in the energy sector, Task T3.1 'Survey of CAIs') of the COMETS project. Wit Hubert described the survey results. This was a starting point for a discussion on the CAI's situation in Poland. This facilitated the discussion on selecting the entities for interviews and selecting the research questions.

The workshop organisers used Miro online app as an online brainstorm activity. The tool supported the discussion and structuring of the ideas by the NRT members.

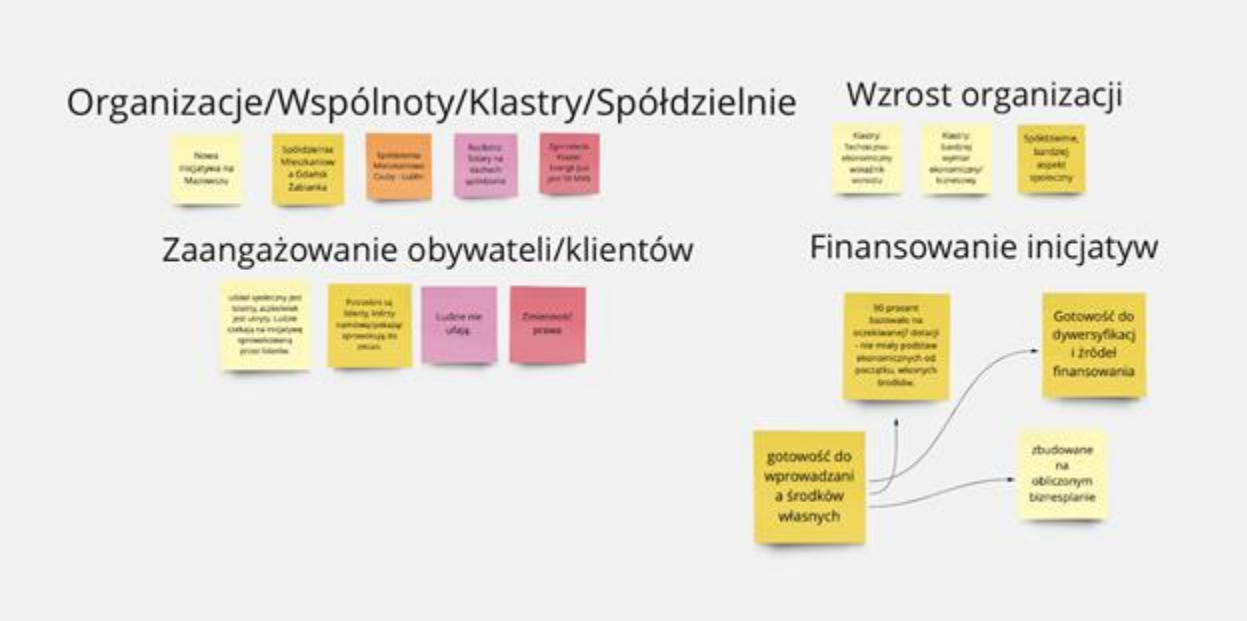


Figure A9. Example of Miro whiteboard (NRT workshop, 16/02/2021)

A2.5.2 Other techniques and tools for engaging and benefiting the comparative case studies

Due to the COVID-19 restrictions, it was impossible to organise visit tours with the NRT that have been substituted by online knowledge sharing and networking activities for the members of the NRT. A forum for the NRT to discuss practical issues and topics with these activities has also been created.

Each of the CAI's was asked to describe their initiative briefly. The most important achievements, the current status quo and their development perspectives. Each of the participants took part in a discussion. One of the main points that facilitated the active discussion was the survey results which lay a common ground for all the participants to engage in the debate and actively participate in the meeting.

A2.6 Spain

A2.6.1 Main techniques and tools

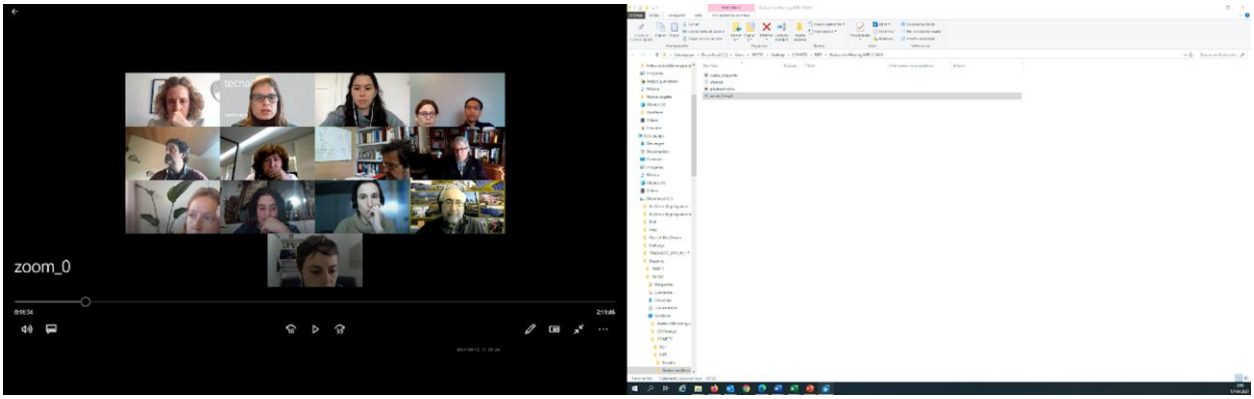
We organized five meetings with the NRT in the frame of the benchmarking study to:

1. present the project, to introduce the NRT and the commitment of its members, to define the scope, approach and outcome of the benchmarking study. The research questions' process was also presented and launched, (20/01/2021);
2. work on the research questions (03/02/2021);
3. validate the research questions and the comparative case studies (02/03/2021);
4. present and discuss the first finding of the benchmarking study and carry out the virtual visit tours (25/03/2021);
5. present and discuss main findings of the benchmarking study, discuss the near future and present the participatory case study process (12/04/2021).

Table A6. Spanish NRT Meetings

Sessions	Date	Main Subject
Kick of meeting	20 January 2021	Presentation
Second meeting	02 February 2021	Research Questions
Third meeting	03 March 2021	National Survey
Fourth meeting	25 March 2021	Virtual Visits
Fifth meeting	12 April 2021	Reflection

Due to the COVID 19 restrictions, these meetings were organized online via Zoom. The duration of these meetings was between 2-3 hours. The meetings were organized during working hours, from 10 to 13 CET. The presentations during the NRT were given in Spanish and the Chatman house rule was activated during the meetings. By means of a brunch delivered to each NRT member every meeting day, we amicably broke the ice and shared a meal during the meeting. We selected the brunches from entrepreneurship companies, with eco label, sustainable packaging and ethic delivery.



Picture A10. Participants during the 5th Meeting of NRT Spain (12/04/2021)

After the meetings the NRT leaders distributed the minutes to all the NRT members and requested feedback. The NRT members that could not attend the meetings were contacted by mail and were asked to complete the same questions that were discussed during the meetings. If the information provided during the meeting was public, the presentations were distributed among the NRT members; confidential information and data were not distributed.

The NRT used the Miro tool to organise the online brainstorm sessions in a more interactive way during meetings 1 and 2. The tool supported visualization, structuring and voting processes. The dot voting template was used to prioritize the input provided on the sticky notes. The questions/ideas were then clustered within the three main domains that arose during the first session.

After that, the clusters of ideas were ranked. (All NRT members gave their feedback to this exercise, see Table 3).

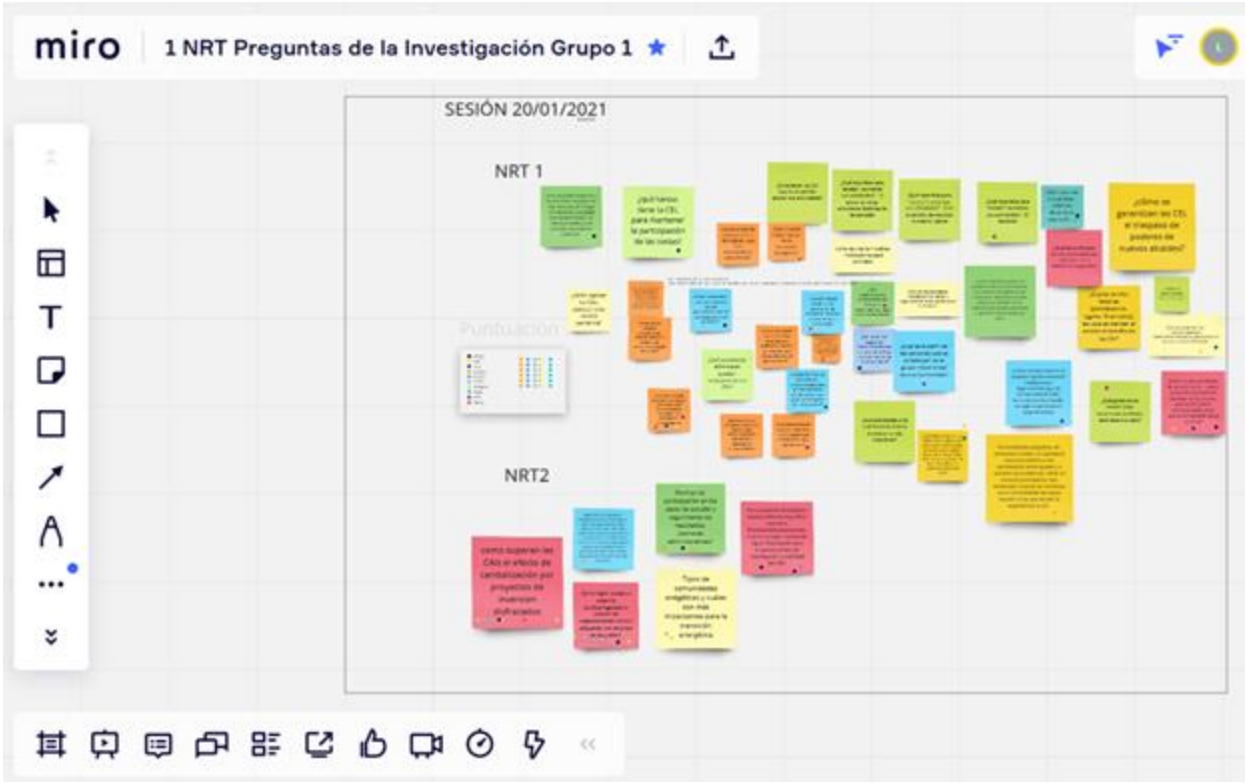


Figure A11. Example of Miro whiteboard with dot voting (KoM NRT Spain, 20/01/2021)

Figure A12. Example of Miro whiteboard with cluster and mapping (NRT Spain, 03/02/2021)

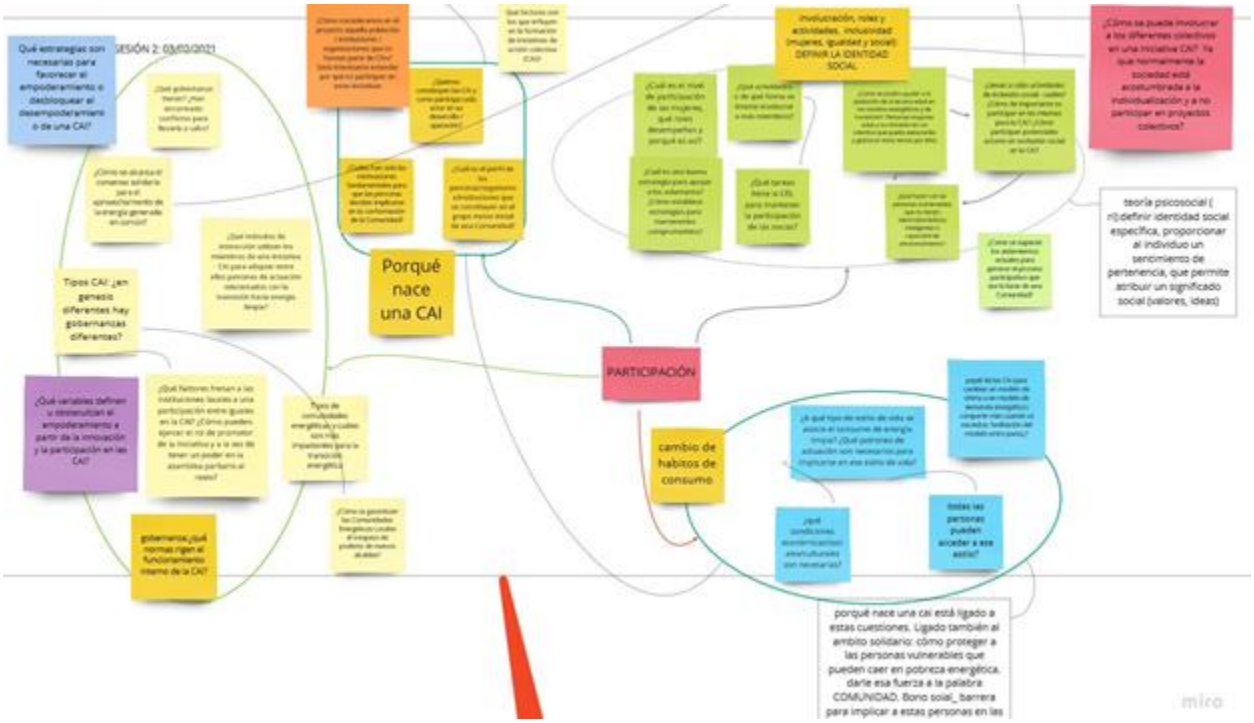


Figure A13. Detailed "Citizen participation" topic, organisation of the sticky notes and links.

A2.6.2 Other techniques and tools for engaging and benefiting the comparative case studies

A2.6.2.1 Communities For Future platform

The Communities For Future platform was presented during the 5th NRT meeting. A live presentation on how to use the platform was conducted, and the NRT members experimented with the possibilities of the platform, how to join or to post a new comment in the forum. The expectation is that this platform will be able to support networking activities of the group, and news sharing within the Spanish COMETS group. 11 members of the NRT joined the group.

A2.6.2.2 Site Visits

Due to the COVID-19 restrictions the organisation of visit tours was not possible, and alternatively Virtual Visit Tours were organized as part of the 4th meeting of the NRT. With this activity we wanted to give the room to discuss practical issues and topics that were not selected as part of the benchmarking study. Moreover, this activity allowed the CAIs to show their activities. to the other members of the NRT. Also, we encouraged the CAIs to share their stories with a wider audience through Communities for the Future platform, and they agreed to do that (25/03/2021).

Consequently, each of the CAIs was asked to prepare a video or a PowerPoint presentation in which they presented their initiative. We provided some guiding questions to support the CAI's in drafting their presentations (following the "get inspired" guidelines from the Communities For the Future platform):

- Name of your initiative
- Location or geographical scope
- Website
- Contact Name
- Contact Email Address
- Energy sector/main activity
- Who founded the initiative and who is involved nowadays?
- What motivated you to start with the initiative?
- What inspired you to start with the initiative?
- What obstacles have you encountered?
- Who supported you? And how?
- What have you achieved?
- What is the accomplishment that you are the most proud of?
- What is the most important thing you have learned from your initiative?
- How do you expect your initiative to look like in the future?

After their presentations, we organised a "questions and answers" session with the NRT to solve the doubts that arose and discuss emerging questions out of the scope of the benchmarking.

We collected the following questions:

- Until recently it was an Ltd. company, what kind of cooperative have they created?
- Regarding Red SANNAS, could they talk more in-depth about this network?
- What are the main challenges besides the regulatory ones?
- Do you have any unsuccessful projects?
- Why did you choose that municipality to implement your project?
- Have you introduced the project to the neighbours? If so, how did they get the initiative?
- Since it is a key agent for the sustainability of the CAI, which is the role of the energy supply company?
- Do they want to replicate the project along Spain?
- What type of banking do they have in mind for funding issues?
- Which is the scale of the neighbourhood? What are the funding sources?
- How did you develop your shared electric vehicle project? For vehicle management, are you using an existing platform?
- Considering the speed of vehicle sharing, how do you gather the information?
- How do you deal and understand those changes? Which mechanisms do they use?

· How do they manage the supply issues?

We took notes from the meetings and wrote the Minutes of the meetings. We used these notes, together with the transcriptions of the interviews, as the primary data source for the benchmarking study. At the end of the 2nd, 4th and 5th meetings we asked the members of the NRT to assess how they perceived the work done. We collected some advice regarding the duration of the meetings, or the high number of the questions included in the benchmarking study, but generally, the work developed, the tools used, and the dynamics proposed were welcomed and appreciated by the participants.

A2.6.2.3 Webinars, forums and thematic talks

Webinars and thematic talks were part of some of the NRT meetings. The themes of these webinars and talks are varied and were selected from the interest shown by the NRT during talks and discussions. The first was a presentation about the results of the COMETS survey in Spain, held during the 3rd NRT meeting (02/03/2021). Next, a webinar about the use of the Communities For Future Platform was held during the 5th NRT meeting.

Annex 3. Research Questions of the NRTs

This Annex covers the creation of the research questions by the 6 NRTs, and is divided into two parts:

- **Processes for Selecting Research Questions**, that reports the main activities implemented to reach consensus among the NRTs' members upon the main topics/questions to be investigated in the case studies
- **Research Questions by Theme**, that reports the results of the above mentioned process and cluster the topics/questions in 8 categories:
    - Citizen Participation and Engagement
    - Organization and Governance
    - Market, Business models and Funding
    - External Actors and Institutions
    - Regulation and policies
    - Growth and Scaling up: Pathways and Perspectives
    - Impact
    - Other

A3.1 Processes for Selecting Research Questions

A3.1.1 Belgium

We had meetings and communications by email with potential members of the NRT in which we discussed, amongst other things, about topics that could be the subject of the benchmarking study. Also, the COMETS survey amongst the Belgian CAIs revealed some interesting topics for the benchmarking study:

- dynamics of creation
- organization and structure
- citizen participation and energy democracy
- professionalization
- financing
- diversification of activities
- social inclusion and empowerment of social groups
- growth

During the KoM of the NRT (dd. 14/01/2021) we organised a break-out session to collect input from the members on interesting questions for the benchmarking study. The questions that came out the break-out sessions can be clustered in following main topics:

- Growth: diversification of activities/portfolio (storage, energy efficiency, flexibility, car sharing…), upscaling of activities, ambitions vs initial values/existing regulatory framework/access to markets/, …
- Power dynamics: competition (for land, for members, for financing, …) with FINcoops and incumbents, impact assessment REScoops vs FINcoops (people, planet, profit), collaboration with commercial companies (e.g. for financial or technical support), (equal) access to resources/knowledge/subsidies/projects
- Collaboration with local authorities: regulatory framework, policy instruments, information sharing, joint projects.
- Citizen participation: motivation of citizens to join CAIs (vs FINcoops), social inclusion (members with different social backgrounds, vulnerable consumers), role of educational system in initiating citizen and collective participation from an early age.

We selected four topics for the benchmarking study in which we could cluster a large part of the questions that were considered relevant by the NRT, namely organisation, citizen's participation, growth and financing. For each of the topics we prepared a set of (main and sub) research

questions. The selected topics and research questions were validated by the members of the NRT during the second meeting of the NRT (dd. 4/02/2021).

A3.1.2 Estonia

The research questions were rather thorough and designed based on the general themes proposed by the COMETS project. The answers to the question contribute to the country-specific comprehensive country-specific description under the respective general topic. At an early stage we also developed more general questions about energy communities more widely, but they were eventually left out because the joint decision was that they were not relevant in a study that needed results for the specific CAIs under survey.

A3.1.3 Italy

During the KoM, the members of the NRT were divided into three simultaneous break out rooms. By listening to the videorecording, and by looking at the notes that were taken, the UNITO team extracted a set of more than 20 questions that were then assembled into 15. The list of 15 questions was then put on an online worksheet and NRT members were asked to vote on them before the 2nd meeting. Each individual (more than one person per NRT member could vote) had five votes available (no multiple votes per person for a single question were allowed), one of which could be a "priority vote". The UNITO team attributed different weights to votes: to "priority" and "normal" votes; when votes were given by more than one person per NRT member; and when someone gave more than the allowed five votes. Then, it ranked the questions according to three different criteria: the sum of weighted votes; the number of NRT members that gave "priority" votes; the number of NRT members that gave a vote of any kind. Four questions, that ranked low on all three rankings, were excluded. Five questions were on the top of all rankings. With the aim of not excluding questions that were given at least one "priority" vote, the remaining six questions were "saved" by creating a sixth main question, and by integrating the others (as a sort of sub-questions) into the six main questions. The results of the selection process were then presented to the NRT, and accepted, during the second workshop.

A3.1.4 Netherlands

During the KoM, 22 potential research questions were identified by NRT members. All members were invited to contribute, not only the CAI members. During the KOM a first rough thematic sort was done together with the participants. After the session, the COMETS researchers refined the sort and concluded on five themes comprising 3-12 questions each: financing (12), regulation (5), relationships with market parties (3), relationships with public parties (5) and organization (6).

This distribution makes clear that financing projects is currently experienced to be the main hurdle for Dutch CAIs, followed by organizational challenges and regulatory issues and challenges in the

relationship with public parties. Of course, this should be nuanced by recognizing some questions are at the intersection of two or more different themes.

After the themes were checked with the NRT and consolidated, the COMETS researchers decided to organize 5 sessions to discuss each of these themes for 2hrs. In each session, 3 questions were to be discussed to facilitate in-depth discussion. To narrow down to 3 questions per theme, a google form was used and participants could pick their top 3 for each category.

A3.1.5 Poland

General questions about the CAIs in the energy sector that frame the major themes of the project were translated and presented to the meeting participants. The general questions from COMETS were used as a frame: (What are CAIs?; How do CAIs work?; How relevant are CAIs to the energy sector?; How can CAIs be supported?; What is the future of CAIs?)

Question participants did not ask about the proposed structure of questions. Therefore, an open-ended question was asked about what aspects of the CAIs' activities might be interesting in a discussion about their foundation and growth.

A3.1.6 Spain

For the preparation of the first working session on the research questions of the benchmarking study, we focused on the general questions posed by the COMETS project (What are CAIs?; How do CAIs work?; How relevant are CAIs to the energy sector?; How can CAIs be supported?; What is the future of CAIs?) and the outcomes of the work conducted in WP3, particularly, the results of the survey among the Spanish CAIs.

The COMETS survey amongst the Spanish CAIs disclosed these topics for the benchmarking study:

- institutional support
- citizen participation and energy democracy
- financing
- networking
- social inclusion and empowerment of social groups.

During the first NRT meeting (20/01/2021) we organised two break-out sessions to collect inputs from the members of the NRT. Once we presented the general COMETS' questions and the relevant issues arising from the survey, we posed the following question to the NRT and compiled their contribution:

> *What do you want to know about case studies that would help you to better understand how CAIs work?*

We explicitly asked them to talk about shared problems among CAIs, without focusing on the specific problems of each of them. We invited them to do that considering a social approach, rather than merely a technical, focusing, for instance, on energy democracy, citizen participation, social inclusion (energy poverty, gender balance, elderly), governance, organizational and financial structure and power dynamics among others.

We expected a lower level of participation by the members of the NRT. Nonetheless too many research questions arose and became impossible to cluster and vote them during the session. The questions that came out from the break-out sessions can be grouped in the following main topics:

- Citizen participation and engagement: questions about motivations of citizens to join CAIs, social inclusion (members with different social backgrounds, vulnerable consumers), women participation and energy poverty alleviation, unsuccessful projects, governance, social identity and internal regulations.
- Impact: questions about impact of the CAIs in Energy transition and role of the CAIs.
- Growth: diversification of activities, upscaling of activities, institutional support, funding, internal decisions and business models.
- Foundation: how the CAIs are founded, first steps, background.
- Market and Ecosystem: competition among CAIs, collaboration with traditional actors in the energy market, activity diversification, the role of peer to peer role trading, networking and relationships.
- Models: types of CAIs, impact at governance and market level.

Due to this high number of questions, we stopped and finished the meeting to work internally in organising and clustering these questions. We selected three topics for the benchmarking study in which we could cluster a large part of the questions that were considered relevant by the NRT: citizen participation and engagement, growth and market and ecosystem. The topic about CAI models was not selected as we considered it out of the scope of the benchmarking. The topics selected offer the flexibility to deal with impact and foundation, as they can be part of either the participation or engagement topic or the market and ecosystem topic.

Finally, we presented the work done in the second NRT meeting for discussion and validation. During this meeting the NRT discussed all the questions, linking and reorganising them into the main topics and clusters, discarding the less interesting ones for the benchmarking study. The lack of time again prevented us from ranking the clusters created and we finalised this task by email communication between the members of the NRT and the COMETS researchers.

Table A7. Clusters Ranked by the NRT (Completed 12/02/2021)

Clusters and topics	Votes

Citizen Participation and Engagement	
Social Identity	270
Governance	255
Lifestyle Changes	175
Foundation of a CAI	130
Growth	
Role of Institutions (drivers / facilitators)	270
Funding	255
Scaling and Growth of CAI (internal dimensions	175
Market and Ecosystem	
Relationships	225
Diversification of Activities	250
Relationship with Traditional Agents of the Energy Market	225

For each of the topics we prepared a set of 6-8 research questions. The selected topics and research questions were validated by the members during the third meeting of the NRT (02/03/2021).

A3.2 Research Questions by Theme

A3.2.1 Citizen Participation and Engagement

A3.2.1.1 Belgium

- In what kind of activities of the CAI are citizens involved?
- What is the level of involvement of citizens in the CAI?
- To what extent are CAIs engaged with specific target groups?
- Which strategies do you use to attract and engage specific target groups?

A3.2.1.2 Estonia

- To what extent do apartment associations identify themselves as energy communities? How important is the production of renewable energy for the members of the community?
- Has the on-site renewable energy production unit in an apartment building been a motivating reason for buying an apartment into this building?

- What motivates people to jointly invest in renewable energy solutions?
- Is overall energy sustainability important for the members of the CAI, what kind of electricity is bought from the grid and why?
- Who are the most motivated people interested in energy community activities? Is it possible to detect any trends? (young / old, women / men, urban / rural, etc.)
- Is the motivation of the residents greater when there is a joint connection with the electricity grid (they can also use self-produced energy in the living area)?

A3.2.1.3 Italy

- What strategies and tools to dialogue with, inform and train citizens and local communities?

A3.2.1.4 Netherlands

- What are examples of successful membership recruitment campaigns for cooperatives? How do they relate to membership costs and revenues / control for individual members?
- How can we deal with resistance from other organized resident groups or factions within a neighborhood / village who do not want to participate?

A3.2.1.5 Poland

- What would make citizens more interested in the energy transition?
- How do you assess citizens' (your customers, inhabitants of your locality, and Poles in general) expectations regarding changes in the energy system?
- How do you assess the citizens' readiness to implement the RES?
- Are these grassroots initiatives? or are leaders of change needed?
- How do you assess the readiness of citizens to invest in RES?

A3.2.1.6 Spain

- What strategies are carried out to involve citizens / other institutions in the CAI?
- Are social inclusion activities carried out? - which ones? How important is it for the CAI to participate in these activities? How can people in exclusion or at risk of social exclusion participate in the CAI?
- Are there women involved in the CAI? What is their level of participation and roles? Why is it so?
- How can the current isolation caused by the pandemic be overcome to maintain the participatory process that is the basis of a Community?

- Is the foundation and development of CAIs linked to a specific lifestyle? Is it linked with a certain purchasing power level? What factors can influence the formation of CAIs?
- Which were the fundamental motivations for people to decide to get involved in shaping the Community?
- If we assume that participation in an associative movement is a differentiating fact that can cause the foundation and development of a CAI, what are the keys that make it different?

A3.2.1.7 Discarded Questions

- How can you make the phenomenon of '' energy cooperative'' better known? (Netherlands)
- How do you ensure that your cooperative is an important representation of the population (including getting more women and young people interested in the cooperative movement)? (Netherlands)
- How do we consider the population / institutions / organizations that do not want to be members of a CAI? It would be interesting to understand why they do not participate in these initiatives. (Spain)
- What is the profile of the people / organizations / institutions that constitute the initial driving force of a Community? (Spain)
- What methods of interaction do members of a CAI initiative use to adopt patterns of action related to the transition to clean energy among themselves? (Spain)
- What is a good strategy to support volunteers? What can they do to keep them engaged? (Spain)
- How could the elderly population be helped in energy and transition changes? (Spain)
- What can they do with (vulnerable) people who do not have smart appliances or storage capacity? (Spain)

A3.2.2 Organization and Governance

A3.2.2.1 Belgium

- How is the initiative organized?
- What are the main principles and values of the initiative?
- What are the main activities of the initiative?

A3.2.2.2 Estonia

- How did the idea to create a joint renewable energy production unit start?
- Did your community decide to invest in a renewable energy production unit mainly to produce energy for its own use?

- Which, if any, energy related questions members have and with what they turn to the board of apartment associations?
- Are energy supply issues on the apartment association board's agenda and how often?
- Are energy supply issues discussed at the general meeting?
- Describe the internal functioning of the CAI's energy system.
- Would you like to change anything in the way it works? What would it be?
- What are the biggest barriers you have to face?
- Do CAIs under survey have enough knowledge and information about renewable energy and renewable electricity? Do energy communities have enough support to acquire knowledge? Who do they ask for advice if necessary?

A3.2.2.3 Italy

- Who is responsible for starting a collective action in the energy field and how this is done?

A3.2.2.4 Poland

- What were the beginnings of this initiative (investment in renewable energy)?
- Who initiated the process?
- What was the original goal? Is it still being realised?
- What are the barriers to starting and developing activities such as your organisation (energy cluster, housing cooperatives, agricultural cooperatives)?

A3.2.2.5 Spain

- How do you deal with governance with different degrees of participation (people who do not contribute economically, who do not participate in activities...)?
- The CAIs, few and large or many and small, which model is the most appropriate one?

A3.2.2.6 Discarded Questions

- Which internal governance model, or how to manage decision-making processes and resources (including profits)? (Italy)
- Who should undertake a collective action in the energy field? And how (in consideration of contextual factors: e.g., standards, funding, interlocutors, member involvement)? (Italy)
- What about the importance of the organizational structure and control, especially in relation to funding by participants? Safeguarding the financial interests, but no greater voice with people who invest more. (Netherlands)

- Project development and exploitation require a great deal of expertise (financial, legal, technical, social) and good people are scarce and / or extremely expensive. As a cooperative movement, how do you organize that good support in project development and exploitation is created - all phases including guidance in the issue of participations, management phase? (Netherlands)
- Vulnerability of the structure, especially in the day-to-day management of the cooperative (for example, administration and communication). Are there any examples of how the structure can be strengthened? And in addition: what is the role of professionalisation in this? Are there specific (ICT) systems that contribute to manageability? (Netherlands)
- What are the factors that influence the formation of collective action initiatives (CAI)? (Spain)
- Who founded the CAIs? How does each actor participate in their development /daily? (Spain)
- What strategies are necessary to favour the empowerment or unlock the disempowerment of an CAI? (Spain)
- What governance do they have? Have you encountered conflicts to carry it out? (Spain)
- How is a solidarity consensus reached for the use of the energy generated in common? (Spain)
- CAI types: are there different types of governance in different genesis? (Spain)

A3.2.3 Growth and Scaling

A3.2.3.1 Belgium

- To what extent is the professionalization a precondition to grow? To what extent is it necessary?
- To what extent do you seek a greater geographical expansion?
- To what extent do you seek to diversify your activities within the energy sector?
- To what extent do you seek to couple other sectors to the energy sector?
- What strategies do you apply for professionalization/diversification/geographical expansion of your activities?

A3.2.3.2 Estonia

- Does the energy community have development or expansion plans? Which ones? How do you plan to finance it?

A3.2.3.3 Netherlands

- What examples do we know of successful scaling-up within regions by cooperating cooperatives (how do they then overcome the "blood type" discussions)?

A3.2.3.4 Poland

- How long has passed between the first idea and the launching of the installation?

A3.2.3.5 Spain

- Do you think it makes sense to scale the activities of the CAI? In what sense? Geographical scope, diversification of activities within the energy sector, expand to other sectors?
- What elements of the CAI (participatory, legal, financial, cultural,) are lost / would be lost when scaling the CAI?
- What would be the necessary means to scale the CAI? (e.g., diversify activities, increase human resources, etc.)
- How sustainable is working with volunteers? What is lost with professionalization? To what extent is professionalization a condition for the growth of the CAI?

A3.2.3.6 Discarded Questions

- How do we make the explosive growth of the cooperative manageable? And what is the impact on the cooperative? (Netherlands)
- Sharing knowledge: how to make projects repeatable? (Netherlands)

A3.2.4 Financial, Business, Funding

A3.2.4.1 Belgium

- How is your initiative financed?
- What is the role of different stakeholders?
- What are the advantages and disadvantages of various modes of financing?

A3.2.4.2 Estonia

- Has the investment to the renewable energy production unit been made with the aim of making profit from the sale of electricity?
- Does the on-site renewable energy production unit (a functioning energy community) in the apartment building facilitate the sale of the apartment and increase the real estate price?
- How can energy communities be helped in the future by financial institutions (Kredex, banks, credit unions, etc.)?

A3.2.4.3 Italy

- What are the economic incentives and business models for the affirmation and subsequent expansion of energy-CAIs?

A3.2.4.4 Netherlands

- What innovative / new financing options can be found in the Netherlands or other participating countries that enable cooperatives to contribute equity capital to larger projects?
- What successful examples are there of combinations of PV and storage and what does that business case look like?
- How can business models involving the cooperative and co-shareholders best be streamlined (in large projects)?

A3.2.4.5 Poland

- What were the first financing mechanisms?
- How do you evaluate the availability of funds for investments in renewable energy for institutions such as yours?
- Is the activity in the field of renewable energy production already profitable?
- If yes, what do you do with the profit?

A3.2.4.6 Spain

- What are the main funding sources for the CAI? What are the problems of relying on this type of financing system?

A3.2.4.7 Discarded Questions

- How can a cooperative take over an existing park in order to achieve 50% (or 100%) local ownership? (Netherlands)
- The pre-financing of new projects requires a lot of money, which the initiatives do not yet have access to, is there a solution? (Netherlands)
- How do you make the transition to an organization from volunteers to partially paid? (Netherlands)
- What about financing by private banks versus various funds? (Netherlands)
- How can a Nul op de Trafo project best be financed (project Houtlaan)? (Netherlands)

A3.2.5 External Actors and Institutions

A3.2.5.1 Belgium

- What role does the local and regional context play in your strategies?

A3.2.5.2 Estonia

- Would your energy community cooperate with a neighboring apartment association or with an energy community if possible?
- How can energy communities be helped in the future by local municipalities?
- How can energy communities be helped in the future by umbrella organizations (e.g., Union of Cooperating Housing Association)?
- How can energy communities be helped in the future by advisory organizations (e.g., TREA)?

A3.2.5.3 Italy

- What is the function of local authorities and other local actors?
- How to dialogue with regulatory entities, energy distributors, etc.?

A3.2.5.4 Netherlands

- What is the force field that the energy cooperatives that want to become active in the heat sector have to deal with? What will be the influence of the Heat Act 2.0 on this?
- How do you, as a collective of residents, obtain a position in the force field of dynamic aggressive markets (competition between sources, small-scale local and large-scale regional)?
- How do you find suitable partners and ensure a directive role as a residents' collective developing a private commission project?

A3.2.5.5 Spain

- What role should institutions play in the formation / development and growth of the CAI? How can they support / favour the development and growth of the CAI?
- Is there any networking with other CAIs and for what activities? Is an ecosystem created? How are the associations that bring together different initiatives established and what role do they play?

- Is there competition between CAIs? To what extent do you feel threatened by competition from other CAIs? From other companies disguised as CAIs? From traditional companies in the energy market?
- What production and / or consumption strategies can differentiate CAIs from other types of market agents?

A3.2.5.6 Discarded Questions

- How can a grid operator contribute to the realization of a zero on the Trafo transformer project? (Netherlands)
- What are the factors that discourage local institutions from participating among equals in CAI? How can they perform the role of promoter of the initiative and at the same time have an equal power in the assembly? (Spain)
- What role can institutions play to facilitate access to legal / regulatory advice? (Spain)
- To what extent are the institutions willing to provide access to data / information? (Spain)

A3.2.6 Legal, Regulatory, and Political

A3.2.6.1 Belgium

- What is the legal form of the initiative?
- How do current policies/policy measures support you in engaging with citizens (e.g. minimum threshold in participation, covenant of mayors, SECAPs)?
- What are the types of subsidies that you can apply to?
- What are the advantages and disadvantages of various subsidies?
- To what extent do you consider public subsidies as a reliable option for your initiative in the short/middle/long run?
- From a policy perspective, to what extent are those subsidies adapted to the needs of the CAIs?

A3.2.6.2 Estonia

- Have the existing national grants and subsidies (investment grants, renewable energy subsidies, etc.) been effective and how?
- Which support the energy communities currently lack?
- How can energy communities be helped in the future by the government (legal framework, support measures)?

A3.2.6.3 Italy

- Which legal form was chosen and why?

A3.2.6.4 Netherlands

- How can we get local politicians (more) interested in the cooperative movement? And how can a productive working relationship with the local government be established? Are there any successful examples of this?
- What legal options do governments have for making their social real estate (roofs, land) available to citizen cooperatives?
- The administrative burden of the PCR scheme is quite bizarre compared to the benefit to individual members. What can be simplified about this and how can the tax authorities, CertiQ, grid operator, etc. collaborate better in this regard?
- Which legal conditions support a more active role and say of consumers in collective heat systems?
- What to do now that there is no longer an experimental exemption for collective self-consumption projects?

A3.2.6.5 Poland

- How do you assess the legal requirements for conducting this type of activity?
- What (laws and regulations) should be changed?

A3.2.6.6 Spain

- To what extent can subsidies help the growth of the CAI? Do they exist? Are these subsidies well adapted to the needs of the CAIs?
- What kind of policies and governance structures are needed to make the transition to clean energy possible and what role do CAIs play in these structures?

A3.2.6.7 Discarded Questions

- How do energy-CAIs orient themselves in the current regulatory framework? (Italy)
- What are the opportunities and difficulties of operating in a not yet fully established regulatory framework? (Italy)
- How do we arrive at paying tax only once when importing and not when storing electricity (double energy tax storage)? (Netherlands)
-
- Which authorities can possibly grant subsidy for Nul op de Trafo? (Netherlands)
- Can the heat pump be offset in the future? (Netherlands)

- What successful examples are there of municipal / provincial support for small initiatives? And where does it go wrong in practice with unsuccessful (absent) government support? (Netherlands)
- What financial instruments could the government make available to energy cooperatives to encourage participation? (Netherlands)
- What legal options do governments have for making their social real estate (roofs, land) available to citizen cooperatives? (Netherlands)
- How do the CELs guarantee the transfer of powers to new mayors? (Spain)
- What kind of advice support can CAIs have to develop their ideas at the institutional level? (Spain)

A3.2.7 Impact

A3.2.7.1 Estonia

- In your opinion, how relevant are CAIs (energy communities) in a larger energy system?
- How do you see the future of joint investments in renewable energy production units in Estonia? (Would there be the potential to become very popular as in western Europe? Could a network develop?)

A3.2.7.2 Italy

- How to evaluate, foresee and communicate CAIs' non-monetary effects?

A3.2.7.3 Discarded Questions

- Can actions related to the energy issue lead to interest on other, or broader, issues? And how? (Italy)
- What role for the 'energy transition' theme in initiatives (of territories and communities) that are not exclusively focused on energy? And, conversely, what role do they play for the energy transition? (Italy)
- What is the role of CAIs to change a supply model to an energy demand model (share more when needed)? Is it needed the facilitation of the peer-to-peer model? (Spain)
- Types of energy communities: which ones are the most impactful for the energy transition? (Spain)
- What effects of spread can we find when we launch a program to stimulate the formation of collective action initiatives? (Spain)

- What is the impact of CAIs on the energy transition? (Spain)

A3.2.8 Other

A3.2.8.1 Estonia

- What is the energy community technology choice?

A2.3.8.2 Spain

- What are the effects of the COVID pandemic on the CAI? How can CAIs sustain or grow in this pandemic situation?

A2.3.8.3 Discarded Questions

- Are there any experiences with district / individual batteries to store excess energy? (Netherlands)
- Is it feasible to have a sustainable growth path based on energy transition at a speed that allows us to meet the established objectives? (e.g., 50% emission reduction in 2030) (Spain)
- What is the role of peer-to-peer trading? (Spain)
- What kind of rebound effect can we find when promoting energy communities or collective action initiatives that go in this direction of change in the energy model? (Spain)

Annex 4. Methodologies

A4.1 Process of choosing methodologies

A4.1.1 Belgium

During the KoM, input was collected from the members for scoping the benchmarking study. Two discussion rounds were organised:

- What are interesting questions for the benchmarking study? (break-out rooms with discussion in 2 groups using MIRO whiteboard and selection of 3 more important questions)
- What information do we need to collect for answering these questions? (plenary discussion with focus on the 6 more important questions or benchmarking study in general)

The results of the KoM were used for drafting the work plan for the benchmarking study which was shared with the NRT and validated during the second meeting of the NRT (dd. 04.02.2021).

A4.1.2 Estonia

The methodology was developed based on:

1. the discussions and guidelines on the topic from the COMETS project;
2. the specifics of the apartment associations that were the object of the research;
3. the input of NRT members and CAIs under study.

The general research topics were presented to the members of the NRT at the KoM held on 27.01.2021, the background was explained and the experts had the opportunity to propose relevant questions under the respective topics. The meeting also included a longer informal discussion, from which a considerable number of questions were collected. TREA then compiled a preliminary list of questions, which was sent to the members of the working group by email for further development.

A4.1.3 Italy

The methodology for answering the six research questions was elaborated by the UNITO team and presented (during the second workshop) to the NRT, which deemed it useful and appropriate. It consisted of carrying out one interview per comparative case study. In turn, comparative case studies were requested to send the UNITO team some materials that were relevant to the six research questions.

A4.1.4 Netherlands

In the preparation phase the reference framework was generated. During the KoM, the NRT identified the research questions and clustered these to structure the benchmarking. Our brainstorming session was aided by a google doc in which all NRT members could add their questions.

The COMETS researchers proposed the main elements of the methodology after discussing amongst themselves and the NRT agreed to it. Main structuring elements were for instance the number of sessions, the length of the sessions, the use of a google doc for gathering suggestions prior to the sessions, the length of the supplementary interviews and the focus of these interviews. We experienced that the interest in co-creation was more so on the level of knowledge development and sharing than on the level of process development. Our observation is that with co-creation you need to find a fine balance between providing room to co-create and providing a productive structure in which this can happen.

More concretely, during the sessions the NRT discussed smaller decisions, such as having a break-out room or not for a particular question. Larger elements of the methodology, e.g., the time for the interview, the google doc, required a more classic approach and the NRT leadership explained their ideas and asked whether the NRT thought they were productive or whether adaptations were needed. No adaptations to the general structure of the sessions were proposed.

A4.1.5 Poland

The members of the NRT did not interfere with the overall methodology of social research. Nevertheless, their opinion and the questions raised influenced the shape of the research tool (see research questions). Two organizations (CAIs) that were not part of the NRT but participated in further qualitative research (IDI) were also reported during the KoM. During the meeting, it was suggested to interview the different types of CAI. The problems faced by, for example, energy clusters are different from those presented by housing communities or municipal units. The sample should be heterogeneous. The participants did not raise any objections to the idea of internet mediated (MS Teams) interviewing.

A4.1.6 Spain

During the KoM and the second meeting of the NRT, Tecnalia collected input from the members for scoping the benchmarking study. Two discussion rounds were organised:

- What are interesting questions for the benchmarking study? (break-out rooms with discussion in 2 groups using MIRO whiteboard (KoM and 2nd meeting), plenary discussion and selection of more important ones (2nd meeting).
- What information do we need to collect for answering these questions? (plenary discussion with focus on the clusters for the benchmarking study in general (2nd meeting).

The results of these two sessions were used for adding to the draft work plan of the benchmarking study, which was shared with the NRT after the second meeting and validated during the third meeting of the NRT (03/02/2021).

A4.2 Specific Methods Used

A4.2.1 Belgium

For each of the research topics (organisation of the CAI, citizen's participation, financing and growth) VITO-EnergyVille researchers drafted a template with a mix of structured and semi-structured questions. For answering some of these questions secondary data was requested from the comparative case studies. Other questions were addressed in an interview with the comparative case studies.

Secondary data (i.e., data collected earlier by someone else) were collected from the comparative case studies by means of a data request. The Beligian NRT made an overview of the secondary data sources that could be relevant in the context of answering the research questions (e.g., annual reports, statutes, metrics, description of processes, organizational chart), and sent a data request to the comparative case studies.

Primary data (i.e., first-hand data gathered by the researcher) were collected by conducting (one-on-one) semi-structured interviews. We drafted an interview protocol that gave an overview of materials & time needed, introduction and closure, main and sub questions. VITO also provided an informed consent to be in line with GDPR and to be signed by the interviewees. The NRT also used the discussion forum as a source of primary data for the discussions that related to the selected topics of citizen's participation, financing and growth.

The secondary data were processed in a table that gives an overview of the key facts and figures per comparative case study. The interviews and discussion forum were transcribed, and in a next step, the answers were consolidated across the different comparative case studies, per theme (citizen's participation, financing and growth) and interview question. The main findings were summarized in the national report and cross-checked with the members of the NRT during an online meeting (dd. 20/04/2021).

A4.2.2 Estonia

In order to answer the questions, comprehensive questionnaires were prepared for the participating CAIs and sent to each one. Most of the questions in the list above were supplemented by specific sub-questions, the aim of which was to open the topic and to explain the content of the question as well as possible. In a thorough introduction interview, the questionnaire background, the procedure of the survey and the next steps were explained to representatives of CAIs (whose representatives are not members of NRT). Next, the questionnaire was sent. All participating communities were offered the opportunity to respond in the form of an online interview, but none chose this option. The time to answer the questionnaire was about 2 weeks.

A4.2.3 Italy

The seven interviews were held from 09.02.2021 to 18.02.2021. They lasted 84 minutes on average (min. 64 m; max. 99 m). In three cases the number of interviewees was two, while in the other four cases there was a single interviewee. Interviews were carried out through UNITO's Webex platform, by two members of the UNITO team, one of them having the role of "main interviewer". Interviews were semi-structured. The interview outline was based on the six research questions (and related sub-questions). All interviews were video recorded (to be used only by the Italian COMETS partners) and transcribed verbatim.

Comparative case studies were asked to send UNITO materials that could help to pre-answering the six research questions. The request was to send these materials at least two to three days before the interview. Examples of suggested materials comprised generic materials (e.g., statute, organisation chart, management reports, financial reports), specific materials (e.g., pictures, video, web links, materials on specific projects) and, more in general, any other materials and documents that the comparative case study deemed to be related to the six research questions.

Based on interview transcriptions and on the materials sent by the comparative case studies, the UNITO team wrote seven case studies reports (min. 6; max. 9 pages). They were typically sent to the respective comparative case study 3-4 days before the Visit Tour dedicated to them, with the request to send back comments, requests of removing and/or adding parts. Once presented in a Visit Tour, the finalized case studies reports were sent to the other members of the NRT, together with the link to the videorecording of the meeting.

A4.2.4 Netherlands

Benchmarking sessions were conducted to identify best practices. Data collection took place through these focus group sessions (conducted online, due to COVID-19). A week before each session, we sent out a google doc with the questions central that week, and asked the NRT members to share their suggestions/ experiences prior to the session. The format of the sessions was roughly: 5 minutes introduction (and reflection on previous session), 15 min presentation the central CAI about its organization and best practices, 15 min Q&A, 3x 25 min for discussion of the questions belonging to the theme of the week, and 5 minutes conclusion of the session. The 25 minutes for discussion were often shared between a break-out session and a plenary discussion to enable all participants to discuss their experiences. Part of the plan was to invite additional guests to meetings where additional expertise was welcome but this opportunity was not used in the end. The NRT had a wide representation of different fields of expertise, so likely that is the reason why. Moreover, also time constraints played a role. As the trajectory was rather condensed, there was little time to invite experts.

Supplementary interviews with the CAIs carried out by the COMETS researchers on Google Hangout (2 COMETS researchers and 1 CAI representative). These interviews took place during the first week of April. Interviews were 2hrs each and aimed to extend profiles of the CAIs in order to contextualize best practices. All interviews were semi-structured and used the questionnaire from annex B as a starting point. This report includes short profiles of the CAIs (section 2) and aggregation of the best practices at the NRT level (section 6), but more extensive profiles with the individual best practice stories will be made available to each CAI for their website. This is part of our impact strategy. For these extensive profiles also secondary data from websites, CAI annual reports, CAI meetings, and news media will be used.

Table A8. Dutch NRT timeline

Session	Date (all in 2021)
KOM	February 10
Relationships with market parties	March 4
Organization	March 10
Financing	March 16
Relationship with public parties	March 24
Regulations	March 31
Lessons learnt session	April 19

We did not extensively modify the methodology. Small changes were made as we progressed, e.g. the NRT members collectively decided on when to use break-out sessions, and provided feedback on the format of the meeting notes (i.e. the suggestion to include a short summary). Due to the tight deadline, we decided to make very extensive meeting notes of each session, which were presented to the NRT members for cross-checking. In that way, we avoided a heavy burden on the NRT members by the end of the trajectory.

A4.2.5 Poland

Within the CAI, efforts were made to recruit an interlocutor who holds a significant position and has long experience. At this stage of the study, the interviewees were rewarded with vouchers for the Empik.com internet store. Each voucher was for PLN 150 gross (about EUR 32).

Interviews were conducted using MS Teams (meeting rooms). With the consent of the speakers, the meetings were recorded (audio recording). Based on the conversation, notes were made and key quotes were written down. Due to the number of interviews (5 interviews, about 90 minutes each), it was decided not to apply the interview coding procedure.

The interviews were carried out using the IDI technique (Individual In-depth Interview), and the NRT managed to obtain intensive individual conversations that explored opinions and perspectives of CAI members. The level of structuring the questions allowed the researcher a certain freedom in asking supplementary questions. In-depth questions were possible. Some of the questions on the list appeared in a different order.

The interviews were conducted on 5-22 April 2021. Due to the pandemic situation, some meetings were postponed.

A4.2.6 Spain

For each of the research topics (citizen participation and engagement, growth and market and ecosystem) Tecnalia researchers drafted an interview template with structured questions. However, other questions were addressed during the interviews with the comparative case studies since they arose during the conversation and were considered important for the benchmarking study or for future research. No secondary data was required for answering the 21 questions of the comparative case studies. Nevertheless, Technalia researchers made an overview of the secondary data sources that could be relevant in the context of the benchmarking study (e.g., annual reports, statutes, description of processes, organizational chart), and send a data request to the comparative case studies (14.04.2021) to complete the overview of key facts and figures of the comparative case studies.

Tecnalia researchers interviewed 10 people from five CAIs, in the first two weeks of March 2021. The people interviewed were actively involved in the CAI, mainly in their management group,

foundational groups or, even, were workers of the CAI. All of interviewees signed an ICF in line with GDPR policy of COMETS. The interviews were recorded and partially transcribed as part of the primary data for the benchmarking study. The discussions from the meetings and the feedback provided by email were also part of this primary data collected.

The Spanish NRT planned focus groups within the CAIs, as part of CB approach, but ultimately discarded this tool as it obtained more than enough information from the interviews. The main findings were summarized in the national report and cross-checked with the members of the NRT during the 5th meeting (12.04.2021).

Annex 5. Reflections

This Annex is divided into 3 parts

- Findings, that reports the main insights emerging from the case studies through the CB approach
- CB process, that reports an overview of the CB in itself and the perception/satisfaction of the participants
- Next steps, that reports the expected future spillover of the activity within the projects and/or in close connection with it.

A5.1 Findings

A5.1.1 Belgium

The benchmarking approach only allows for "one side of the story" namely, the experience and perspective of the comparative case studies with regard to the research questions. We were not able to fully investigate e.g., the relationship with local policy makers (through the use of policy documents, regulation, interviews with policy makers). As such, the NRT could only report recommendations to policy makers based on the barriers that the CAIs reported. Another downside of the benchmarking study is that it focuses on the topics brought up by most comparative case studies which creates a common base to work on, but which inevitably shifts the focus away from other topics. As, for example, the comparative case studies mainly focus on the development of wind turbines and large solar roofs, the findings also focus on these technologies and less on energy-efficiency, heat or electric mobility. Also, some of the findings of the benchmarking study, especially with regard to organisation and financing, are linked to the legal form of the comparative case studies, namely an energy cooperative.

Based on the main findings of the benchmarking study, it was possible to identify some recommendations for the different types of members of the COMETS National Research Team, namely: energy cooperatives and their associations (i.e., REScoop Flanders and Wallonia), policymakers and researchers.

1) Recommendations for energy cooperatives:

- Monitor the impact of your activities (e.g., impact of events on the recruitment of members, CO_2 avoided, impact on the local community). Preferably, such a monitoring procedure (tool) is not developed by each energy cooperative separately. By upscaling the effort, development costs can be reduced and a consistent reporting at national level can be anticipated.
- Create visibility for your initiative and its activities by being present online (e.g., website, Facebook) and by collaborating with local ambassadors (e.g. municipalities, existing members). Not only the content but also the communication channels should be diversified to target the right audience and jargon should be avoided. Keep in mind that technical knowledge and digitalization can be thresholds for participation and engagement.
- A strategic exercise regarding future development is recommended to all energy cooperatives, especially in the emerging context of energy communities.
- Take a proactive approach in creating opportunities by e.g., lobbying, applying for pilot projects, showcasing good practices and setting up networks.
- Enhance networking, partnerships and knowledge creation among CAIs:
    - to explore new business models, (e.g., shared mobility, renovation, energy-efficiency, flexibility services),
    - to enlarge outreach to potential members and project partners,
    - to share knowledge on specific topics and target groups,
    - to pool resources and experts,
    - to get access to RES projects and research projects,
    - to have financing or create financing opportunities.
- Create formal structures (e.g. General Assembly, working groups) as well as informal spaces (e.g. blog, discussion platform) in which members can participate according to their availability and interest. Organize activities for the members to engage them (or keep them engaged), as they are the ambassador of your initiative and the engine of the energy transition.

2) Recommendations for policy makers:

- Take action to enable a smooth processing of the appeal against a permit for a wind turbine to reduce legal and financial uncertainty of wind projects.

- Take into account the added value of citizen participation in the tendering procedures and policy/regulatory frameworks.
- Support R&D projects via subsidies to explore new technologies and business models that can accelerate the energy transition but also support the future development of energy cooperatives (and energy communities in general).
- Facilitate the access to fiscal instruments, such as the tax shelter, as it can support energy cooperatives to attract cooperants during their start-up phase (when no dividend can be turned out).

A5.1.2 Estonia

The information revealed from the survey can be passed on in the future and used in different ways. Firstly, the study revealed the operating models and motivation of existing energy communities. The long-term energy community has now achieved a stability, previously established renewable energy units have begun to generate significant profit, and the last installation of PV panels has already been carried out with own resources, not with support. Compared to other, later CAIs, the awareness of members is higher. Important role in this played the first chairman who was an energy enthusiast and the active and dedicated current board. Communities like this are good examples, these activities can be mapped, and disseminated to others as a good practice. Cooperation and new CAIs between apartment associations, interest about that was clearly expressed, - such an innovative operating model can be developed, some pilot projects implemented and promoted at all levels.

A5.1.3 Italy

The NRT would see positively the use of the results emerged from the CB process as a base for the construction of national and cross-national networks enabling synergies among CAIs, with the aim of exchanging best practices and scaling up initiatives and their impact.

A5.1.4 Netherlands

Furthermore, participating CAIs would like to have a transformative impact through empowering others who would like to do something similar through sharing their best practices. They are open to contact with starting CAIs, so that initiatives that want to do something similar do not need to reinvent the wheel and build on their experiences.

A5.1.5 Spain

NRT dynamics have turned out to be an enriching experience according to the opinion of all members of the NRT. Moreover, they even consider it necessary to perform more interaction activities amongst them to take advantage of the networking potential of this type of activities. CAIs participating in the Spanish NRT asked for carrying out more linking actions in the context of the COMETS project to identify and to benefit from the potential synergies. Creating and participating in networks have appeared to be means for upscaling these initiatives and for developing new opportunities through the exchange of knowledge in terms of business models, technological solutions, financing sources or the involvement of new stakeholders and institutions.

The role of the project as a facilitator that connects existing CAIs while researching was highlighted so it could be considered as an activity to support in the future. Besides the need for extending the networking activities amongst CAIs at national and international levels, three main challenges stood out during the NRT debates that could be tackled by new projects: dissemination, technology and monitoring.

A5.1.5.1 Dissemination

Most of the Spanish CAIs are on an early stage and NRT members stated the need to let the society know about these initiatives, their benefits and impact in social, economic and environmental terms.

In this sense, the role of public institutions is considered key to disseminate the reality of CAIs since there are many potential participants who still do not know about the opportunity these initiatives offer. The collective approach should be promoted, so that any citizen is aware that this model is accessible and is not perceived as something alien. Public institutions could help citizens to understand the benefits CAIs provide.

Public institutions should spread the values behind the CAIs, transmitting that small groups such as communities are able to play a strategic and effective role in the fight against climate change, and implementing sustainable and inclusive values. Sometimes public institutions focus on large-scale infrastructure projects whereas small communities can have a similar effect, but with less negative environmental impact than those large projects. Institutions could contribute to the upscaling of CAIs by disseminating this message. They should boost those communities and create a positive context, so that CAIs become entities at the same level to the rest of the stakeholders.

The communities themselves have their role in spreading the benefits of these initiatives, and the best way is by creating more communities. It would be interesting to promote networks in this sense, to make known and transmit the community culture. Perhaps many people may not feel identified with environmental issues, but they do from the perspective of economic savings. The dissemination activities carried out through those networks could be more effective, as they are closely linked to reality.

A5.1.5.2 Technology

The technological challenge is very relevant. CAIs need to collaborate with each other to empower and grow with technology as a key means to upscale. However, technological innovation often requires high investments that are difficult to make by CAIs. The CAIs can consider joining resources or build alliances to be able to address this challenge. In addition, the role of public institutions could be very relevant in this case both in terms of financing technological innovation projects of CAIs and supporting alternative financing or novel schemes and models so that CAIs could get funding from private investors without going against their governance and participation models.

A5.1.5.3 Monitoring

There is further a need to understand the current situation of these initiatives. Since CAIs are something relatively new being introduced to the Spanish energy market, it is considered interesting to get a snapshot of the CAIs. It is also considered interesting to identify those places that are not covered by the CAIs, where there is no associationism or common values, and this type of initiatives have fewer chances to grow.

In this sense, it would be engaging to delve into the benefits that CAIs offer. Monitoring activities would include the economic savings or jobs created, for example, by CAIs in Spain. Both qualitative and quantitative research could be developed to get arguments to support and promote this model. It would help institutions and society in general to understand the social, economic and environmental benefits CAIs provide.

Therefore, public institutions should lead the assessment and monitoring of CAIs and their role in society. Public institutions can set up evaluation processes, which could serve as a link between the CAI and the institutions. It is important to also assess the replicability of the CAI model.

These processes should be driven by public institutions to promote knowledge transfer across stakeholders participating in these initiatives. Moreover, there could be defined an assessment framework, a toolkit for CAIs themselves to evaluate their activities and their social and economic impact.

The COMETS project will contribute to address some of the aforementioned challenges, particularly:

1- In terms of dissemination and networking, the Communities For Future platform offers a ground where different CAIs can collaborate and exchange knowledge. It fosters the empowerment of people and aims to facilitate collaboration among those involved in community-led action on climate change and sustainability. The members of the Spanish NRT have already tested the Platform and we expect to use it in the next months. Additionally, the aim would be to increase the

participation of other Spanish CAIs in the Platform, as well as fostering their collaboration and knowledge exchange with other European CAIs.

2- The research conducted in COMETS will contribute to fill the existing knowledge gaps by quantifying the European-wide aggregate contribution of CAIs to the energy transition at national level. Different stakeholders can benefit and exploit the outcomes of COMETS so that more information related to the national level can be utilized to have a clearer view on the CAIs' situation and their impact at national level.

3- The members of the NRT and other stakeholders will also benefit from the work to be conducted in WP5 regarding scenarios and roadmaps (see point 6.3 for more information) for spreading CAI models, even after the project is concluded. It will also shed light into some of the challenges mentioned, such as potential alternative financing mechanisms. Stakeholders will also take advantage of the tasks to be carried out in WP5.

A5.2 Consortium Benchmarking Approach

A5.2.1 Belgium

Based on the input we received during the bilateral meetings with the potential NRT members and the KoM, the CB approach seemed to be very welcomed. After finalizing the benchmarking study, we organized a poll in Mentimeter in which the members of the NRT confirmed that they experienced the benchmarking study as relevant to very relevant.

Picture: Poll in Mentimeter - relevance of benchmarking study (NRT meeting, dd. 20/04/2021)

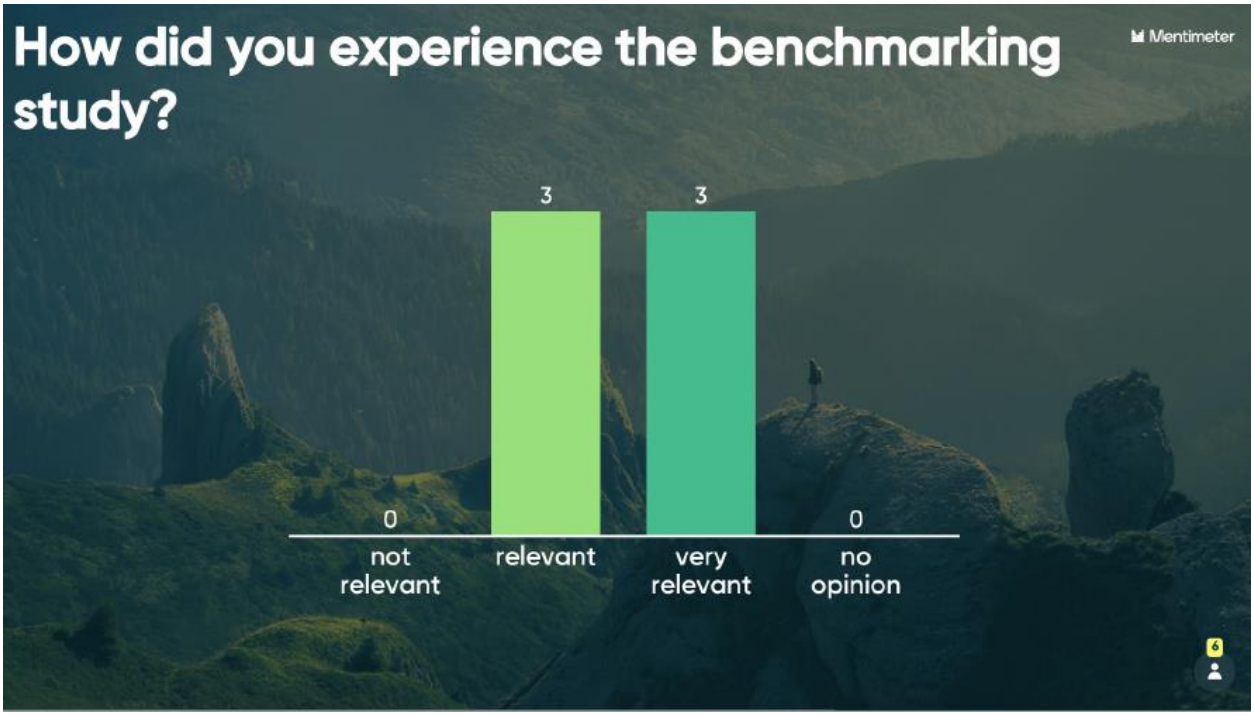


Figure A14. Survey results from Belgian NRT

Some of the reflections we collected from the NRT members in Padlet with regard to the benchmarking study:

- "It gives a profound overview of the mechanisms of existing CAIs".
- "A very good point of view about the functioning and questions of cooperatives. Very nourishing content."
- "It should be good to create a "learning service" for newcomers, based on the findings."
- "What to do with these conclusions? There are large challenges in the energy transition. The scale of the existing energy communities is too small to realise these challenges."

The discussion forum was a space of encounter for the CAIs and gave the opportunity to exchange experiences on topics that were of interest to the CAIs and which could go broader than the scope of the benchmarking study. Based on the rating of the discussion forum by the participants, it was perceived as an interesting activity. In the Mentimeter poll that we organised during the third NRT meeting (dd. 20/04/2021) the CAIs that participated in the discussion forum confirmed that they experienced it as relevant to very relevant.

Picture: Poll in Mentimeter - relevance of discussion forum (NRT meeting, dd. 20/04/2021)

Figure A15. Second survey results from Belgian NRT

There is great willingness amongst the energy cooperatives to work together and share knowledge and expertise. Currently, collaborations and knowledge sharing take place on an ad hoc basis and

on the initiative of an energy cooperative. Especially for start-ups or energy cooperatives in their early stages of development,there is a need to share knowledge and expertise in a more structured and centralized way. Preferably, discussion fora are organized on a regular basis to stimulate and facilitate these collaborations and knowledge sharing. Also, a digital discussion platform can be an alternative for online/physical meetings.

The tools that we used during the NRT meetings (e.g., Padlet, Miro and dot voting, Mentimeter) were very useful to make the online meetings more interactive and to engage the participants in the benchmarking process. These tools also helped for structuring discussions and coming to a consensus.

A5.2.2 Estonia

The activities of the Estonian NRT and the involvement of CAIs and the survey were conducted based on the COMETS CB approach. All the planned stages and activities have been completed.

Unfortunately, due to the COVID situation, it was not possible to conduct visit tours to the CAIs, but the researchers have solved this criticality by introducing more in-depth CAIs at a future Lessons learned seminar.

In preparing the research questions, the NRT used the general themes presented by the consortium (5) and the country-specific approach of the CB gave an opportunity and flexibility to develop more thorough research questions (23) on circumstances that are suitable for Estonia. The research questions were a joint effort - NRT members were able to contribute to the compilation of specific questions and the main cross-cutting issues both during the meetings and in e-mail communication.

Estonia is small and, as a result, it was not practical to develop a very comprehensive and multi-level strategy for involving NRT members. Experts from different fields are generally known, either from previous collaborations or through other channels. It was more important to find out which fields would be most needed to involve and participate in the development of such a new field.

Instead of the 10 members originally planned, Estonia eventually reached 15 experts within the NRT. Specific expertise within the energy communities has not yet been developed and there was a need to involve more targeted expertise from different fields.

A5.2.3 Italy

CB has revealed to be an effective method to collect information on the selected CAIs and to critically discuss them in the light of the research questions raised within the NRT, whose members have been actively involved in every step of this collective process.

Its participatory approach proved to be engaging for the CAIs, which took part to every step of the process with a high level of availability and commitment.

While the preliminary interviews directly involved only the CAIs, the following 'virtual visit tours' allowed not only CAIs to showcase their activities, but it also stimulated critical reflections by all the members of the NRT.

It is noteworthy that when describing themselves during the visit tours, some CAIs (mostly the smallest) within the NRT took advantage of the very same words that the UNITO team used in their case study report, which was made available for a preliminary review to the related CAI, before the circulation among all the NRT's members.

To conclude, the CB has been perceived as a time demanding yet fruitful process, even though the activities were mostly (albeit not exclusively) based on what has happened so far, and only secondarily on what will happen. This may partly depend on the way the consortium benchmark approach was adopted, but also to the evolution of national laws related to the transposition of EU Directive RED II, which is still ongoing.

A5.2.4 Netherlands

The NRT members expressed that they found the CB approach useful to learn about other frontrunning initiatives, and to exchange information and tips during the co-creation process. The trajectory was transformative in a sense knowledge was created and exchanged. Also, networks were extended and some NRT members have been in contact with each other beyond the meetings to continue discussions or explore collaboration.

NRT members gave the feedback that they found it an interesting trajectory and worthwhile their time. The NRT appreciated that the COMETS researchers were upfront about the required commitment and recognized their expertise by not assuming all time could be put in on a voluntary basis. That the process was well-organized also contributed to the positive evaluation.

NRT members appreciated the diversity within the NRT. For a next time, they suggested that the NRT could be extended with an energy lawyer to provide more insight into legal possibilities. Besides this, they liked the combination of CAI members and other local energy experts[11]. This enriched the discussions.

Multiple NRT members shared that they especially valued the CAI presentations & Q&As where the CAIs could further introduce their initiative and share their best practices. This made the best practices all the more concrete and provided further insight into how these initiatives managed to pioneer in the ways they did.

In a post-covid setting, the NRT recommended having the first meeting in person at a central location, and the other meetings online still. With in person meetings it would not be feasible to get participants from all over the country as travel would take up too much time. Even in our relatively

[11]A small reflection on the methodology: the methodology speaks of CAI representatives and experts, but CAI members are as much if not more expert than other members so we adapted the wording to reflect this. We worked with CAI members and other experts.

small country. Participants said they preferred national coverage over a more localized alternative as they were already in contact with local peers. They also liked the diversity of projects included, and said they found this more inspiring than if the NRT would have been focusing on one theme only (such as district heating)

The evaluation of the benchmarking methodology was very positive, and the CB approach helps bridge the gap between knowledge generation and knowledge transfer. However, gathering best practices is only the start and the next step should be to communicate the results more widely so that they reach Dutch CAIs working on similar projects.

A5.2.5 Poland

Reflections on the CB approach are difficult to define unequivocally. NRT members cooperated well to some extent, because it is an opportunity to disseminate their actions. All CAIs studied are under construction and growth, therefore networking is valuable to them. The pandemic situation presented a great difficulty. The lack of face-to-face meetings was a challenge for the trial. Nevertheless, the dynamics of the NRT meetings should be regarded as satisfying.

Participating CAIs were given the opportunity to present their potential and to present their action strategies. The activities would bring better effects if the undertaken activities were carried out between similar types of CAI: energy clusters, municipalities, housing communities, agricultural cooperatives.

The presentation of the results of the quantitative study from WP3 provided a good introduction to the discussion. It was also in line with the principles of deliberation. NRT KoM participants could learn about the sixth spectrum of CAIs functioning in Poland, but also in other consortium countries.

The brainstorming phase had expected results, despite the dominance of some participants. The use of the Miro software tool facilitated the work of the meeting assistant. The tool did not have a large impact on group dynamics and was not used properly for clustering ideas.

In conclusion, the CB approach was useful for establishing the target group of the comparative study. Thanks to it, it was also possible to prepare the research methodology and clarify the set of issues and research questions.

A5.2.6 Spain

The NRT members, through their feedback during the KoM, expressed the convenience of the benchmarking study. After the whole benchmarking study process was finished, they provided their feedback both on the process and on the content of the conclusions, which were deemed very sensible and reliable. All members of the NRT have been absolutely engaged in the process, given a lot of feedback, suggested new ideas and expressed agreement or disagreement with other

comments. We received methodological and theoretical advice from academia, whereas CAIs and public institutions described the field of the benchmarking study and their own concerns.

The complementarity of profiles and the diversity of interests and perspectives of the members of the NRT enriched the benchmarking study process and it fostered the exchange of knowledge and viewpoints. Not all members shared the same opinions but there was always a constructive and enriching debate. It has to be pointed out the importance of having policy makers within the NRT, mainly because they had the opportunity to discuss with CAIs on topics of their interest and have insights on the barriers and difficulties that CAIs encounter when dealing with regulation. They could also appreciate how CAIs contribute to social innovation, social justice and community integrations, topics that are sometimes underestimated or overlooked when analysing the contribution of CAIs to energy transition.

The discussions during NRT meeting were very fruitful, providing a lot of information as a primary source for the benchmarking study. The Chatman house rule used during the NRT meetings allowed members to talk freely without the fear of being expressly cited outside the meetings. This tool not only helped us to build a strong NRT where people knew and trusted each other but also allowed us to spread the knowledge without citing the source. The enriching co-creation process followed and the trust created among the members of the NRT might be the seed for further long-term collaboration among those members.

Moreover, in this virtual world due to de COVID, online platforms and tools were used to engage the NRT members and helped us for presenting and working with the information to obtain results.

Even though it was possible to obtain a lot of information and useful findings using the CB approach, the process was stressful. There are limited opportunities to do in-depth analyses of the main findings or explore new research lines. However, the NRT meetings provided a space where the different actors from very different backgrounds (public institutions, energy organisations, CAIs, research and academia) had the chance to exchange knowledge, express their own concerns, ask questions, resolve doubts and share experiences out of the scope of the benchmarking study.

The virtual visit tours were the activity where CAIs showed their daily activity, they worked hard to record or to introduce an interesting presentation which gained the attention of the other NRT members. Lots of questions explicitly arose from each NRT to the five CAIs.

A5.3 Next Steps

A5.3.1 Belgium

In Belgium, there already exist network organizations for renewable energy cooperatives, namely REScoop Flanders and REScoop Wallonia. Both associations are members of the COMETS NRT and participated in the meetings to provide their feedback on the research questions and findings of the

benchmarking study. The NRT will provide a translation in Dutch and French of the main findings of the benchmarking study for REScoop Flanders and Wallonia to distribute amongst their members.

As most comparative cases are exploring different energy related activities and business models, there are some interesting opportunities for the envisioning exercise in WP5, namely, drafting a roadmap for future development with the participatory case study. Three comparative case studies indicated that they are interested in participating in the next steps of the COMETS project.

It was expected that the Communities for Future platform could support the NRT in networking and knowledge sharing. A Belgian COMETS group was established to collaborate on the platform and three members of the NRT subscribed to the group. It was suggested that the CAIs share their stories with a wider audience through the COMETS supporting platform. Unfortunately, not much use of the platform was made from COMETS group, as it was not clear what the added value of this group was compared to e.g., Teams.

A5.3.2 Italy

All the members of the NRT are interested in being involved in the follow up activities of the project, which is seen as a starting platform where to build or develop a CAI's network, aimed at supporting the development of future joint CAI projects.

For example, LUMEN intends to involve other (energy and non-energy) CAIs and NRT members in its recent initiative aimed at obtaining a formal and legal recognition of "intentional communities", pursuing the goal to enable the actors that can enlisted under this category to work in synergy with the rising renewable energy communities.

Moreover, some case studies intend to ask the Italian universities involved in COMETS to propose their initiative as a case study to be further examined, e.g. by graduate students in their final dissertations, as this could help the CAIs in the process of self-definition and development, as well as gaining further visibility beyond their territory.

A5.3.3 Netherlands

The next step in this process is creating outputs useful for the CAIs. It is useful for the CAIs to create best practice profiles for each individual CAI. For this, RUG researchers will use the input from the benchmarking sessions and the supplementary interviews.

Furthermore, the NRT is exploring other ways to communicate the findings as well. Some suggestions from the NRT are: training webinars, a series of short newspaper articles, marketing a short message in collaboration with a large brand, uploading some of the video material from the sessions to YouTube, writing an article for the newsletter of lobby organisation Energie Samen, and blog posts for the website of national CAI platform Hier Opgewekt.

Also, RUG agreed to organize a follow-up meeting in about a year to see where the participants are at and discuss the progress towards their goals and new developments. Lastly, the engagement will be continued with the participation of Bronnen VanOns to the next work package centred on developing a road map with scenarios for the future of a CAI.

A5.3.4 Poland

Some support for the CAI should be arranged. It is a good idea to return to the idea of face-to-face study visits as the epidemiological situation improves.

All further activities in the COMETS project in terms of Polish CAIs should be dedicated according to their types. Other actions are expected by different types of CAI: energy clusters, municipalities, housing communities, agricultural cooperatives.

A5.3.5 Spain

In the coming months, thematic talks and forums will be organized about relevant/emerging topics out of the scope of the benchmarking study e.g. strategies for citizen engagement or energy poverty and CAIs. These activities are useful for the members of the NRT and strengthen links among them and moreover, bring us the opportunity to learn further.

The expectation is that the Communities For Future platform will be a useful tool for the NRT and the Spanish CAIs. We hope for an increasing use of the forums, new discussions, new networking opportunities, as the platform will continue after the end of the COMETS project.

Regarding next steps within the project, the benchmarking study will support the work of WP5. Next key strategic steps will be carried out in WP5, developing the participative scenario exercise and the accompanying roadmap. The tasks will not only serve as a key strategy tool for sustainable growth of CAIs but will also allow policy makers to better understand the desires and expectations of an organized and engaged civil society with regards to the energy transition. The exercises will provide a glimpse of possible futures, going beyond the pure extrapolation of current trends and results from pre-conceived surveys. By mobilizing strategic thinking and imagination among the CAI participants, COMETS will be able to point to rising challenges for markets, technologies and policies that may otherwise be overlooked. The participatory scenario building is essential in creating a shared vision for the future. COMETS provides an opportunity for people to create a future to aspire to, and then from there, creating a roadmap for how to get there. This creates more momentum and ownership for the transition, because it gives citizens and communities the “why” and the “how” of the transition, rather than simply the “what”. The process of co-creation of these futures and pathways to get them will strengthen the commitment of the stakeholders and the robustness of the results obtained.

Through an integrated methodology that merges experts and stakeholder inputs with the actual engagement of CAI members, a process of scenarios building will be carried out. After having defined plausible and coherent futures in the next step roadmaps will be defined with the engaged CAI to explore the most effective strategies for them to reach their own objectives. Based on these strategies defined at CAIs and local level, experts and stakeholders will be engaged in a specific activity to derive possible pathways for achieving these scenarios by 2050.

This task, namely participatory case study, is an ad-hoc process for the selected CAI, who will be the primary beneficiary of its results. It is a look into the future of the selected CAI, where it is headed and how to reach that destination. Experts and stakeholders will jointly reflect and develop a long-term strategy for the selected CAI. This activity will give voice to the members of the CAI in this reflection on their future development opportunities. Besides, the collaboration and trust dynamics created within the NRT will highly support and enable the contribution of different stakeholders in the scenario and roadmapping exercises.

Research carried out in Task 4.2. has developed a joint understanding of how CAIs work in Spain through the participation of relevant stakeholders in the National Research Team. Main challenges CAIs face in Spain were identified throughout the meetings held. These results will feed the work to be performed in WP5, and in task 5.2. in particular. The common understanding of the Spanish environment of CAIs will underlie the definition of the system helping to identify its elements, which is the starting point of the design of the scenarios task. Considering this the general framework, the COMETS team will launch a study to identify the main variables that will be part of the cross-impact analysis.