D.2.1 Report on KPI and impact of DECIDE pilots

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ABSTRACT

The first part of the report consists of information on the online Maturity and Scalability Tool, which was developed as part of the DECIDE project. The tool was created to help energy initiatives assess the maturity and scalability potential of their initiatives in an easy and fast way. The tool is designed to be user-friendly and accessible to a wide range of stakeholders and create impact beyond the project lifetime. The tool provides a comprehensive overview of the initiative's current status and identifies areas for improvement. It is designed to be flexible and can be adapted to suit the needs of different energy initiatives.

The second chapter of the report provides quantitative KPIs linked to the DECIDE pilot progress, as well as the broader impact DECIDE pilots had on replication or policy developments in their countries. The chapter also includes conclusions on the opportunities and limitations of using the proposed KPIs.

The main findings of the report indicate that the DECIDE project has been successful in developing energy communities and promoting sustainable energy practices since the pilots have demonstrated significant energy savings and CO_2 emissions reduction. The report also highlights the replicability potential of the project, which can be used as a model for other communities to adopt sustainable energy practices. It shows that growth is not always of quantitative but also of qualitative nature. The report is intended for policymakers, energy experts, and other stakeholders interested in promoting sustainable energy practices and developing energy communities, as well as for existing and emerging energy communities that want to better assess their performance and progress as well as identify their strengths and weaknesses.

1. INTRODUCTION AND OVERVIEW

Aim of this report is to assess the impact of the DECIDE pilots and provide guidance for future impact assessments. This was done based on previous work in H2020 COMPILE and related projects. The KPIs aim to assess the impact of the pilots on energy saving but also social parameters in cooperation with WP1 including empowerment of citizens or social cohesion or energy affordability. Data on energy consumption, investments made, consumers/prosumers involved, or the maturity of the energy communities were provided by the pilot leaders.

This first chapter presents social KPIs developed into an online tool. The second chapter provides quantitative KPIs linked to the DECIDE pilot progress as well as the broader impact DECIDE pilots had on replication or policy developments in their counties. This is complemented by conclusions on opportunities and limitation of using the proposed KPIs.

2. THE MATURITY AND SCALABILITY TOOL

INTRODUCTION

There is a need of for energy initiatives to understand and assess the maturity and scalability potential of their initiative in an easy and fast way (Seebauer et al., 2022). To satisfy this need, in the DECIDE project, building on preliminary work done in the COMPILE project (https://main.compile-project.eu/), a tool was created that meet these needs. The tool uses a very small set of questions to allow a fast (and rough) estimation of the maturity and scalability of an energy initiative in eight different categories. For each of these categories it is also possible to answer further questions to not only assess the current maturity and scalability potential of the initiative, but to get deeper insights into the level of development and core strengths and key weaknesses of said initiative. The tool is also build in a way that it can facilitate an exchange between different members of the same initiative about the understanding of key concepts thereby helping to minimize the risk of misconceptions between these members. This tool is meant to be relevant for existing energy initiatives as well as for new emerging once. It was developed in very close collaboration with DECIDE pilots which were involved in every project steps. Thereby they were also given the opportunity to reflect on the performance of their own initiatives in the fields covered by the different KPIs. We therefore hoped to provide learning opportunities exciting the learning experience given by the tool itself.

DEFINITION OF KEY CONCEPTS

Maturity represents the aspirational state that an initiative strives to achieve. In this context, maturity refers to the initiative's ability to withstand unexpected changes in the energy system, displaying resilience and robustness. A mature initiative has the capacity to adapt, learn, and transform while maintaining its essential functions and structure.

This includes responding to both favourable and unfavourable environments, leveraging opportunities and weathering crises to return to stability. By scoring high on the proposed maturity indicators, an initiative becomes better equipped to navigate the fluctuations and challenges within the energy system.

The concept of maturity draws parallels to the notion of "organizational maturity" developed in socio-dynamic methodologies for driving change in organizations (Fauvet, 2004). In this context, maturity reflects an organization's capability to perform amidst a dynamic and evolving environment, encompassing social and environmental factors. Attaining maturity can contribute to the longevity of a community, enabling it to maintain a stable position in the energy system over an extended period.

Scalability is defined as the ability of an energy initiative shown to be efficient on a small scale to be expanded to reach a greater proportion of the eligible population while retaining effectiveness (Milat et al., 2020). A scalable initiative meets an environment open for change, uses connectable technologies, has relationships with various external actors and is organised in a way that allows the admission of new members while simultaneously still fulfilling the needs of the established members.

METHODS AND PROCESS

Building on the work done in WP1 and especially presented in Deliverable 1.1 (Kacperski et al., 2020), an extensive literature review, as well as exchanges with experts in the energy field, was conducted to identify categories of interest and indicators within these categories. The result was a list of potential indicators, grouped in six categories. This list was further developed with experts from energy initiatives and academia in a Delphi-approach guided workshop format (Beiderbeck et al., 2021).

This resulted in a list of 55 indicators grouped into eight categories. In a next step, measures for these 55 indicators were developed by referring back on literature and internal discussions. Furthermore, the indicators best summarizing the category were selected (again by using a Delphi approach where three experts first independent rated the indicators and then discussed the results). Against this background, an online tool was created, tested in an online workshop with energy initiative representatives from various European countries (DECIDE pilots and DECIDERS) and modified accordingly.

IDENTIFICATION OF RELEVANT INDICATORS, CATEGORIES AND MEASURES

There is a profound body of literature identifying various aspects of stemming from research on energy communities as well as on analysis coming from niche-management and grassroots-movements. We identified the following indicators relevant for the assessment of the maturity and scalability of energy initiatives:

- Development of membership/user figures: A collective of named, committed members ensures the persistence of the initiative. Retention of original members ensures knowledge management and a shared organizational identity. Rotation of members ensures that new ideas enter the initiative and that the initiative continuously adapts to a changing energy system. New members need to be integrated into decision making procedures and division of responsibilities (Blumer et al., 2013; Ceschin, 2013; Seyfang & Longhurst, 2016; Susur et al., 2019; Wrede, 2021).
- Diversity of members: Broad membership by gender, age, and other characteristics of social background reduces risk of political protest from socially excluded groups, and ensures support of the initiative by representatives of various social groups. However, high diversity may complicate the development of a shared vision, and may reduce efficiency in everyday operations (Bauwens, 2016; Curtin et al., 2017; Hatzl et al., 2016; Ruggiero et al., 2019).
- Quality of Interaction: Deeper participation leads to stronger commitment of members. Participatory decisions tend to be better, because they have been scrutinised and refined from multiple perspectives. Close interaction ensures transparency and that all members carry decisions (Ceschin, 2013; Curtin et al., 2017; Goedkoop & Devine-Wright, 2016; Hatzl et al., 2016; Seyfang & Longhurst, 2016; Susur et al., 2019; Wrede, 2021).
- Decision Making: Clear decision making procedures lead to transparency and therefore trust in an initiative. As new members join the initiative and the initiative's activities evolve, the procedures currently in place should be re-checked whether they are deemed democratic and inclusive by all members, and whether they fit to the current set of activities (European Commission. Joint Research Centre., 2020; QUEST, 2016; Walker & Devine-Wright, 2008; Wrede, 2021).
- Commitment of Members: After initial excitement and interest, mature initiatives find it increasingly harder to engage their members in regular meetings and decision-making. Many initiatives fail, because they don't find enough volunteers to further develop (Bauwens, 2016; Wrede, 2021).
- Efficacy of interaction: Ensures that volunteer workforce drives the initiative's mission forward and is not squandered in internal squabble. Allows rapid reaction to changes in the energy system (Bauwens, 2016; Curtin et al., 2017; Goedkoop & Devine-Wright, 2016; Wrede, 2021).
- Shared (vision and) mission: A jointly agreed mission ensures cohesion among members. After an orientation phase, areas of business activity are narrowed and specified to roles in the energy system the initiative can fulfil regularly (Bauwens, 2016; Ceschin, 2013; QUEST, 2016; Seyfang et al., 2013; Van Der Schoor & Scholtens, 2015).
- Responsibilities of core actors and fluctuation in group of core actors: Initiatives with a single-leadership structure are at high risk of failure, if the single spokesperson drops out for any reason and other members

are not prepared to step up. Unclear leadership may incur diffusion of responsibility and lack of ownership for failures. A leadership team puts more diverse expertise (e.g. legal, technical, communication specialists) to use for the initiative; this requires clear assignment of responsibilities and strong cohesion among the team members though (Blumer et al., 2013; QUEST, 2016; Ruggiero et al., 2019).

- Diversity of core actors: High diversity provides a differentiated skillset, multiple perspectives and access to networks for the initiative (Bauwens, 2016; Hatzl et al., 2016; Ruggiero et al., 2019).
- Commitment of core actors: Highly committed people are more willing to invest time and resources in order to promote and bring forward the initiative. Key personnel act as ambassadors and frontrunners, spreading their commitment to members (Bauwens, 2016; Goedkoop & Devine-Wright, 2016; Van Der Schoor & Scholtens, 2015).
- Skills of core actors: Internal availability of skills necessary for the management of the initiative reduced dependency on external help and ensures that skills are applied specifically to the initiative's demand. Skills may include negotiation, communication, accounting, engineering, planning, lobbying, legal knowledge, etc. (Goedkoop & Devine-Wright, 2016; Ruggiero et al., 2019; Seyfang et al., 2013).
- Communication of core actors: Regular coordination of targets, actions and problems ensures a smooth functioning of the initiative. Informal and unstructured exchange impedes transparency and causes friction loss if information and decisions are distributed in a partial manner (Bauwens, 2016; Curtin et al., 2017; Seyfang & Longhurst, 2016; Susur et al., 2019).
- Available capital and assets: Assets provide financial security for taking out loans or receiving external funding. In a consolidated business model, upfront investment costs amortize over time (Bauwens, 2016; Curtin et al., 2017; Roby & Dibb, 2019).
- Cash Flow ratio: Positive cash flow provides enough incoming revenues to pay running expenses (based on experts' discussions).
- Return on investment for members of the initiative: Provides an incentive for continued membership and can attract new members (Bauwens, 2016; Curtin et al., 2017; European Commission. Joint Research Centre., 2020).
- Economic stability, creditworthiness and credit status: Ensures that initiative is able to financially react to changes in the system (Curtin et al., 2017; Roby & Dibb, 2019; Seyfang et al., 2013).
- Long term (<3 years) reliance on public funding: Financial aids, subsidy programs, investment grants, tax exemptions and similar provide a niche environment protected by market forces where an initiative may develop at significantly smaller financial risk. As an initiative establishes itself on the market, reliance on public funding should gradually phase out.

- Integration into existing infrastructure: Building an own infrastructure dedicated to the initiative can be very expensive and time-consuming and may incur additional maintenance costs. Leveraging existing physical assets such as grids, power lines and other technical facilities reduces the overall investment volume for providing services (Blumer et al., 2013).
- Members approved financial plan exists: A clear business plan helps to define milestones, supervise the progress and ensure common visions of members (Ceschin, 2013; Roby & Dibb, 2019; Van Der Schoor & Scholtens, 2015).
- Relationship with local authorities: Enables access to expert knowledge, support during critical phases and co-design of the (local) energy system. Announcement and support by authorities may increase public acceptance (Blumer et al., 2013; Hewitt et al., 2019; Seyfang et al., 2013).
- Membership in network organisations: Integration into external networks (such as chambers, associations, civil society organisations) shows willingness to share knowledge and the amount of support that can be mobilised. Membership status refers to formal roles held by the initiative or by key personnel (Roby & Dibb, 2019; Susur et al., 2019; Van Der Schoor & Scholtens, 2015).
- Coping with political and bureaucratic barriers: Bureaucratic barriers can strongly slow down the development of initiatives. Strategies for overcoming barriers include legal procedures as well as informal processes (Blumer et al., 2013; Curtin et al., 2017; Roby & Dibb, 2019).
- Support by local citizens and business communities: Citizens living in the community where the initiative is active are potential members and they may influence local policy-makers to support the initiative (or not) (European Commission. Joint Research Centre., 2020; Radtke, 2016; Ruggiero et al., 2019).
- Number of services provided: diversified portfolio is more robust against adverse, unforeseen market developments as well as changes in the regulations. Multiple services enable an initiative to exert a central role in the energy system (Curtin et al., 2017).
- Risk mitigation plan: Specifying risks and mitigating/contingent actions enables foresight and early action on upcoming threats (based on experts' discussions).
- Defects in regular operation: Repeated malfunctions, particularly in the initial trial phase after introducing new technologies or services, impair the provision of value to members and undermine trust from external actors (based on experts' discussions)
- Maturity of applied technology: A newly developed technology increases the risk of technical difficulties in implementation or even breakdown, makes it difficult to learn from best-practice examples and to convince local communities and politicians (Blumer et al., 2013; Curtin et al., 2017).

- Scope of value proposition: Multiple value propositions (financial gain, social prestige, environmental action, etc.) attract and retain more members with selected interests. Robust if public interest in a particular proposition declines or market demand shifts (Curtin et al., 2017; Walker & Devine-Wright, 2008).
- Growth rate in energy produced and consumed: An agile and competitive initiative maintains or even expands its current market status (based on experts' discussions).
- Proportion of energy produced/consumed over the year and Proportion of annual hours with production/consumption ratio roughly equalling 1: Overreliance on production makes an initiative dependent on feed-in tariffs and energy price volatility. Balance between production and consumption signals self-sufficiency in energy islands (based on experts' discussions).
- Number of employees: Hiring employees indicates the presence of a steady stream of revenues and the dedication to build up organisational economic structures. Employees provide readily available expertise (based on experts' discussions).
- Legal form: Formal contractual capability enables access to market services and facilitates collaboration with external actors (Van Der Schoor & Scholtens, 2015; Walker & Devine-Wright, 2008; Wrede, 2021).
- Support by external experts: Enables access to expert knowledge, support during critical phases and co-design of the (local) energy system. External actors comprise energy utilities and grid operators, local to national governments, environmental NGOs, civil society, etc. (Blumer et al., 2013; Hatzl et al., 2016; Seyfang et al., 2013).
- Capacity building through learning materials: Learning is an important aspect to avoid mistakes. Initiatives who learn from others have a clear advantage (Ceschin, 2013; Seyfang & Longhurst, 2016; Susur et al., 2019).
- Members' feedback mechanisms: Successful development of niche innovations requires reflecting on and incorporating the expectations of members. Feedback may be given orally or in written form, through informal or institutionalized channels; in any case, it should be stated how remarks are received, assessed and acted upon (European Commission. Joint Research Centre., 2020; Walker & Devine-Wright, 2008).
- Knowledge management within core actors and coaching of members by core actors: Learning from each other ensures that skills are built up and experiences enter an initiative procedures. It allows retaining knowledge if key personnel leave the initiative. It also allows taking over others' duties or substituting for other personnel who withdraw temporarily (Curtin et al., 2017; Goedkoop & Devine-Wright, 2016; Roby & Dibb, 2019).
- Representing to others outside of the energy initiative and knowledge transfer to other energy communities: Increases the visibility of the initiative and allows to learn from others (Curtin et al., 2017; Roby & Dibb, 2019; Seyfang et al., 2013).

- Refining the shared vision and mission: Existing members communicate the core values and the mission of the Energy initiative to new members. This encourages existing members to question presuppositions, and allows new members to introduce new perspectives (Bauwens, 2016; Curtin et al., 2017; European Commission. Joint Research Centre., 2020).
- Communication/participation is independent from time and space: When becoming bigger in size, it will not be possible anymore that all members participate in the same amount. However, all members still need to have the feeling that they can participate. So different concepts of participating should be offered (Atutxa et al., 2020).
- Ways how innovation enter the collective action: When growing, initiatives need to ensure to react to changes in the outside world and adapt accordingly (Atutxa et al., 2020).
- Existence of organisations that are used to get access to markets/carry investment costs/carry parts of technical installation: Especially upscaling and replicating will be easier if initiative gets external support and expertise (Atutxa et al., 2020).
- Social targeting: Status of sustainable development, citizens' knowledge and awareness of problems at the place where initiative enrols and sociodemographic background of citizens: A good knowledge of the potential members/users will allow offering fitting solutions and targeted marketing action (Rigo et al., 2020).
- Current region has a history in innovation and/ or a creative milieu: Getting active in a region that is already familiar with innovative and creative business models and companies, might simplify the recruitment of members for innovative and creative initiatives (based on experts' discussions).
- Geo-targeting: How is the local environment build (the characteristics of the local built environment (such as urban form, grids for public utilities, building characteristics, and the ownership structure of buildings): Possibilities for scaling and replicating might be strongly hempered by regional conditions (grid load, conditions of buildings, weather, etc.). Knowing them better helps to unterstand possibilitites and barriers of expansion (based on experts' discussions).
- Advertising strategy: An untargeted advertising strategy cannot be expected to be very successful in acquiring new members/users (Rigo et al., 2020).
- Number of other players with similar products/services: Other players in the field might restrict the own chances of winning new members/users (Rigo et al., 2020).
- Knowledge on legal and technical limits when scaling up are available in CEI or can be acquired: Often expansion might be connected to a number of specific legal and/or technical restrictions (connected for example to the use of the grid or to building laws). Having the possibility to rely on experts who knows these limitations and probably even work around might increase the expanding possibly (Rigo et al., 2020).

- Comparative cost advantage in comparison to standard energy prizes/products: Providing financial advantages can be a relevant lever to increase number of participants/members (Van Doren et al., 2016).
- Product/services generate positive side effects for the members/users: Some products/services might trigger positive side effects. People for example might also become more climate friendly in other areas of their lives, or the product/service provides a social value by bringing together people. That can be an additional motive why people choose the service/product (based on experts' discussions).
- Standardisation potential of products/services: Costs of expansion can be significantly reduced, if product/service needs no adaption to other contexts (based on experts' discussions).
- Cooperation with established players on the market: Very often, potential markets might be occupied by strong players with no chance to avoid them (for example grid operators). The relationship of an initiative with these players might play an important role for the initiative's chances in this market (based on experts' discussions).
- Modularity of (future) additional services/products: A modularity of products/services allows for quick adaption and expansion of product/service and allows easy connection to future and past technologies (based on experts' discussions).
- Tec generation of own products/services in comparison to other market players: Use of the newest available tech generation is a selling advantage towards other market players (based on experts' discussions)

These indicators are grouped into eight categories as indicated in the table in the appendix:

- Commitment of Members and Supporters
- Engagement of Core Team
- Economic Stability
- Political and Societal Backing
- Capability of Technical and Organisational Setup
- Targeted Knowledge Management
- Regional Experience with Innovation
- Cooperative Market Approach

Building on this framework, in the next step, indicators were translated into questions and value characteristics were assigned. As with the steps before, the process followed an iterative Delphi approach, where first suggestions were evaluated by three experts and adapted accordingly. Since the tool aims to be of as much practical relevance as possible it was clear it cannot be expected, that representatives of energy initiatives fill out a questionnaire with over 50 questions on a regular base (or at all). Therefore, in a next step for every category one or more indicators were selected

best suitable in the opinion of the involved experts, to represent the whole category. As in the other process steps, indicators were first assessed for suitability by each expert on his or her own and the results then were compared and discussed until a solution was found, that satisfied all. After identifying all together thirteen indicators as most relevant (marked in the table in the appendix with *), an online tool was created using the tool SoSci Survey (https://www.soscisurvey.de/).

The tool can be accessed by using the following link: https://s2survey.net/decide/

After filling out the first thirteen questions identified as most relevant, respondents get a first assessment of their initiative in the 8 categories (see Figure 1).

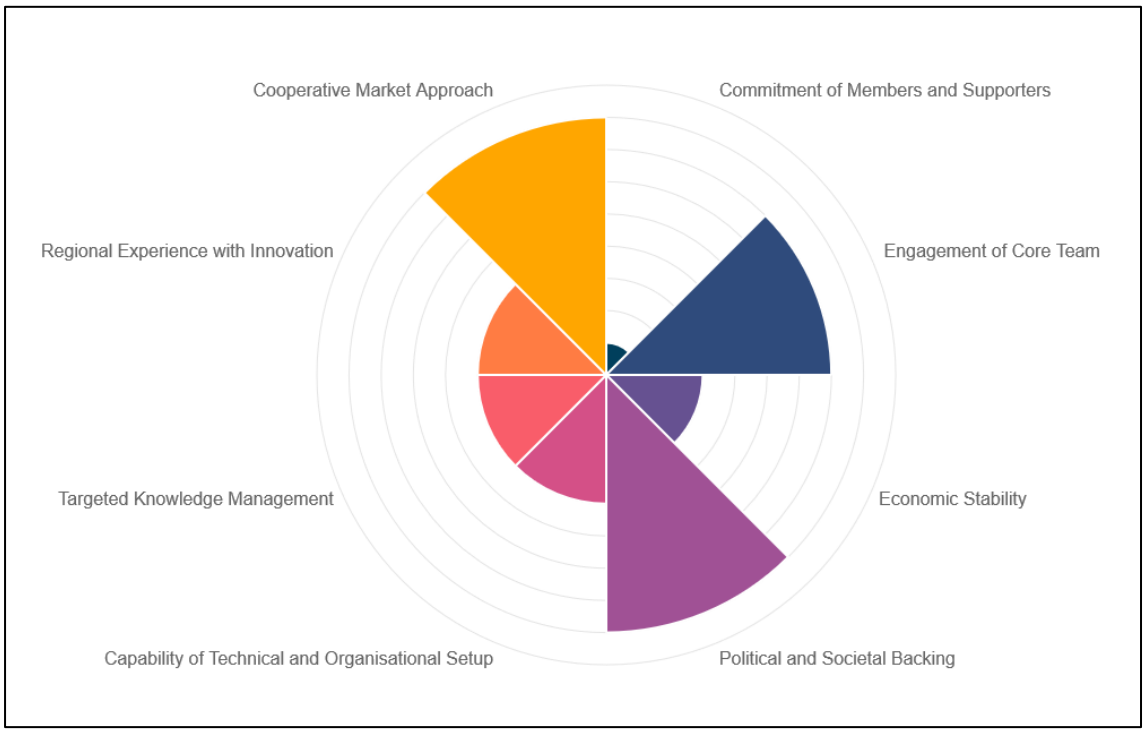

Figure 1: The presentation of the results of the Maturity and Scalability Tool

The bigger the triangles, the stronger is the focus of an initiative on the specific category according to the answers of the respondent. Since this assessment is based on a very small number of questions, respondents have the option to answer additional questions to every category (using all the identified indicators for this category) if they want to by clicking on buttons for the specific category. The presentation of the results then changes accordingly by using the mean value of all responses of the person in the specific category. By clicking on another button, respondents are let to another page, where further information is given why a specific category is relevant for an energy initiative, as well as useful links to other material relevant for the specific topic (from COMPILE but also other projects and organisations).

Furthermore, it might be useful to get a broader idea of a given initiative, to get the opinion not only of one representative, but also of others. To do so, the tool creates a link that the first respondent can forward to others in the initiative (the link thereby is specified in a way that allows to identify all persons responding as belonging to the initiative of the first respondent). If more than one person fills-out the tool for a specific initiative, a second chart appears that indicates the answer of all respondents, as well as the average of all answers (see Figure 2). This allows respondents of the same initiative to discuss results internally and to better understand how the views of different representatives on the initiative differs, which in itself can be an important learning experience for all people engaged.

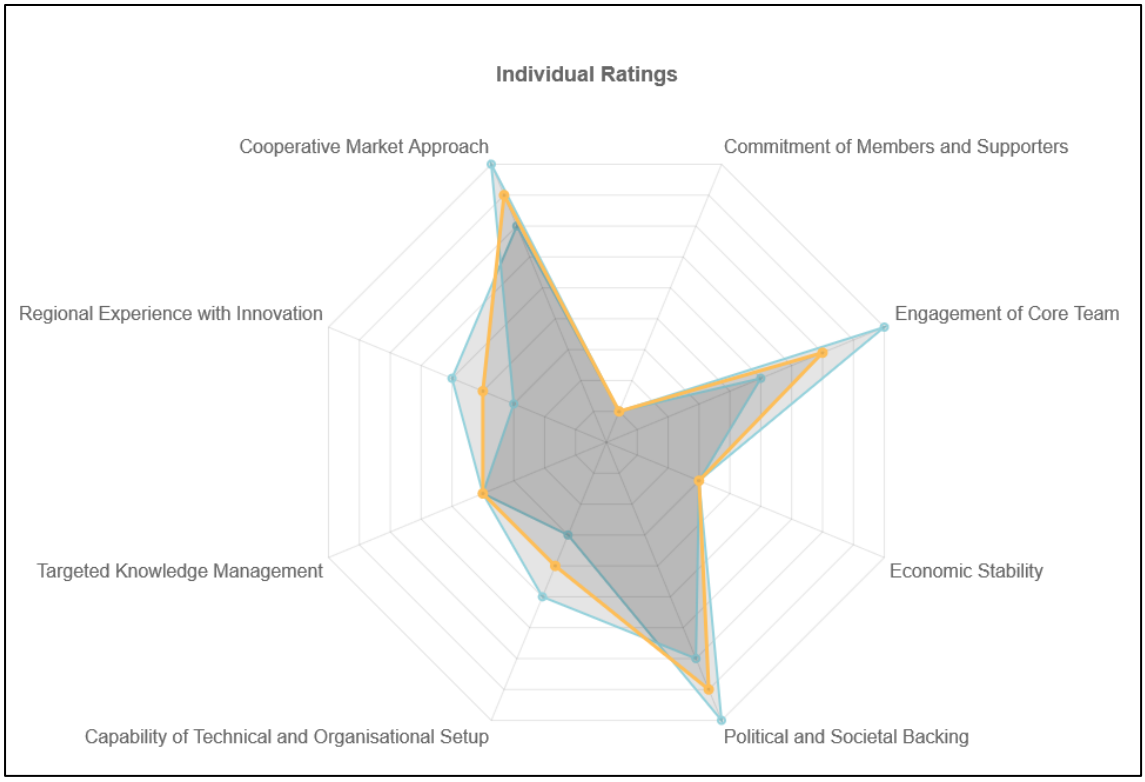

Figure 2: The presentation of the results of the Maturity and Scalability Tool if more than one member of the same initiative fills it out. (The blue lines and dots indicate individual ratings, the yellow lines and dots indicate the average)

This tool was tested in a first workshop setting with the experts from academia and practise represented within DECIDE (pilots, DECIDERS, research partners from other institutes) and adapted accordingly. The final tool then was presented to the interested public in another workshop setting.

The created tool gives energy initiatives an easy and fast option to assess the current position and potential strengths and weaknesses of their initiative in eight categories identified according to literature and experts opinions. The tool thereby is meant as an offer to guide initiatives' representatives towards those topics that might need more attention. The relevance of individual indicators as well as categories thereby may vary in dependence from the form of the

initiative. Some might be more important for specific forms and less relevant for others. However, the thorough creation process, including various feedback loops with experts in every process step should ensure, that the use of the tool is beneficial for nearly every initiative active in the energy sector.

3. QUANTITATIVE AND QUALITATIVE IMPACTS OF DECIDE PILOTS

This chapter presents quantitative KPIs of the DECIDE pilots mainly related to the number of members as well as the wider impacts DECIDE had on replication.

It has to be noted that some DECIDE pilots started operation at the beginning of DECIDE or even before (ENBRO, HIND, OUR, THERM), and can therefore provide more data. For ENBRO, OUR, THERM the increase in number of members is not only attributed to the DECDICE pilots, but to their overall portfolio of activities, that was supported by DECIDE. In the TREA demo the number of members is set by the residents of the targeted apartment associations and will not grow, but consumer will become (partly) prosumers. In the DomX case the growth of members is only caused by DECIDE, while HERON has no members but is supporting an energy community. In HIND the aim is not to increase the numbers of members but the quality and range of services.

Table 1: Change of key indicators during the project duration

Total numbers in January 2022 (increase between May 2020 - January 2022)						
Name of Demo	Number of consumers	Number of prosumers	Number of members	Thereof natural persons	Thereof SME	Energy produced
Our Power	601 (+418)	188 (+188)	503 (+503)	451 (+451)	52 (+52)	6.326 MWh/a
Hindelang	318	56	387	387	13	4.000 MWh/a
ThermoVault	234	0	234	234	0	
TREA Kalda	137 (+137)	0	137 (+137)	137 (+137)	0	1,0-2,5 MWh/a
ENBRO	800 (+800)	800 (+800)	900 (+900)	700 (+700)	220 (+220)	16,9 kWp
HERON	*80 (+70)*	*5 (+5)*	*0*	*80 (+70)*	*0*	*3625 kWh/a*
Domx	120	0		120	0	

Total numbers in May 2023 (increase between January 2022 - May 2023)						
Name of Demo	Number of consumers	Number of prosumers	Number of members	Thereof natural persons	Thereof SME	Energy produced
Our Power	1300 (+699)	187 (-1)	796 (+293)	726 (+275)	70 (+18)	12 GWh/a
Hindelang	310 (-8)	62 (+6)	0	0	13	4.050 MWh/a
ThermoVault	*1600 (+1366)*		*1600 (+1366)*	*1600 (+1366)*	0	
TREA Kalda	*988 (+851)*	*988 (+851)*	*789 (+652)*	*988 (+851)*	*0*	*35,6 MWh/a*
ENBRO	*1544 (+744)*	*1544 (+744)*	*1544 (+744)*	*1387 (+687)*	*157 (-63)*	*3513 MWh*
HERON	*200 (+120)*	*15 (+10)*	*0*	*200 (+120)*	*0*	
Domx	*192 (+72)*			*192 (+72)*		

A few demos have specific KPIs such as flexibility provided, these number can be found in the demo chapters below.

OURPOWER

OurPower started its supply business in August 2019, and customer acquisition is underway, holding currently (May 2023) at 1300 customers and growing slower than planned for divers external reason. Currently OurPower has 800 members aiming to expand to up to 10.000 over the next two three years. Interest and support of small scale power producers are huge – after a long hold because of European energy price crisis and other reasons.

OurPower's portfolio today consists of 270 power plants comprise of all kinds of embedded RES generators from small rooftop solar PV, a small wind farm and several small hydropower plants to biomass plants and some Megawatt-scale PV farms; all together a very healthy diversity of 50% solar PV, 30% small hydro and 20% wind. OurPower addresses two different customer segments: private homeowners with solar PV rooftops and communities of citizens financing solar, wind, and biomass projects.

The OurPower marketplace has been developed in terms of user-friendliness and technical performance, the Producers' Kit and the cockpit on the platform have been improved, to provide better information and services to both consumers and power seller. In response to the energy price crisis the marketplace's pricing scheme had to be refined in

many respects, which was done and discussed in a series of online meetings with members. Software, accounting, and interfaces with technical partners' software had to be developed. DECIDE project partners were involved at many crucial stages to provide support and build trust.

The establishment of a second OurPower regional office, in the Graz region, based on the experiences of the Upper Austrian Office, was much more difficult and time-consuming than expected, both for external reasons (COVID, etc.) and internally (understanding regional differences). However, with the strong support of the DECIDE partners, especially JR, it worked out well.

With the help of DECIDE, OurPower developed three new products:

- Friends & Family tariff: a split pricing to allow the sale of electricity at a special price to selected customers (energy poverty tangent), [test phase, to be launched in summer 2023]
- Option 50-50: a split marketing of electricity partly on P2P terms and partly on wholesale markets for larger generators, [operational since Oct 2022]
- Sonnenweide: a collective financing (crowd investment) scheme for larger PV farms to be repaid through electricity supply. [to be launched in summer 2023]

Testing the maturity and scalability tool on the OurPower demo shows that engagement of the core team is essential. Other strengths are a cooperative market approach, experience with innovation, the capability of technical and organizational setup and political backing. The results are demonstrated in Figure 3:

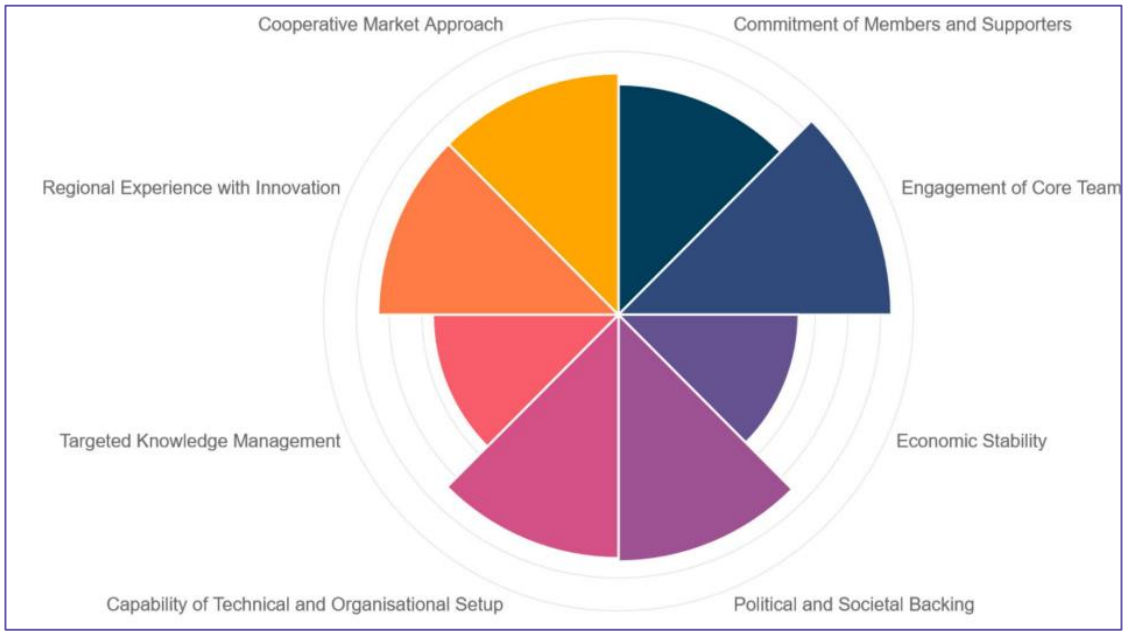

Figure 3: Testing the Maturity and Scalability tool on the OURPOWER demo

TREA

The Estonian pilot significantly helped to accelerate the policy discussion on energy communities in Estonia. Furthermore, there was piloting also through direct line energy sharing in Tartu between the kindergarten (first EC pilot (CEC)) and a multi-apartment building near it. The pilot has been working with the city of Tartu and TalTech university to pilot battery and fast charger solution that is using limited DSO connection power (battery gives need kick to charges faster – probably TREA will be a member of the cooperative that will manage it). Next step would be to add a carport roof, to implement an EC. The sample district from Annelinn (Energy Improvement District - EID) consists of 17 buildings, from which 13 are 5-9 floor apartment buildings with 1468 apartments with surface of 93000 m^2. In the EID area, there is also a shop, a kindergarten, a school and one 2000 m^2 garage. The target was to support apartment buildings through reconstruction, achieve energy efficiency and energy savings, as well as to introduce community energy concepts and benefits - to encourage them to installing PV-panels to compensate electricity usage raise due installing energy consuming ventilation systems etc..

In addition to EID area buildings, TREA worked with buildings outside the area as well as the moving force to reconstruction and making improvements – national reconstruction grant, was postponed several times and due addiction to national renovation grant and waiting for a new round decreased interest to remonstrate. There were 13 other apartment buildings (60000 m^2), TREA discussed with and supported outside the area. Altogether 30 buildings with 167 000 m^2 of floor space.

By the end of project, nine buildings are renovated and in two buildings renovation progress is ongoing, in several buildings planned in next few years with next national reconstruction grant rounds. From these nine renovated buildings two were renovated in the project time. In four buildings improvement is ongoing, one of them is only installing PV.

Baseline annual energy consumption of these buildings was nearly 30 GWh, if counting renovated, buildings with ongoing renovation and buildings who have decided to renovate (1 buildings who have decided to take loan), energy consumption in the area will be bit over 25 GWh annually, meaning about 4,2GWh of energy savings. 45,5 kW of PV-panels are installed and for 65 additional kW installation projects are ongoing - all together 110,5 kWs of PVs. That includes Tartu's first CEC pilot on the rooftop of a kindergarten, as well piloting energy sharing practically between two buildings with direct line.

As Figure 4 shows, the core strength of the TREA demo is the high level of commitment of the core team.

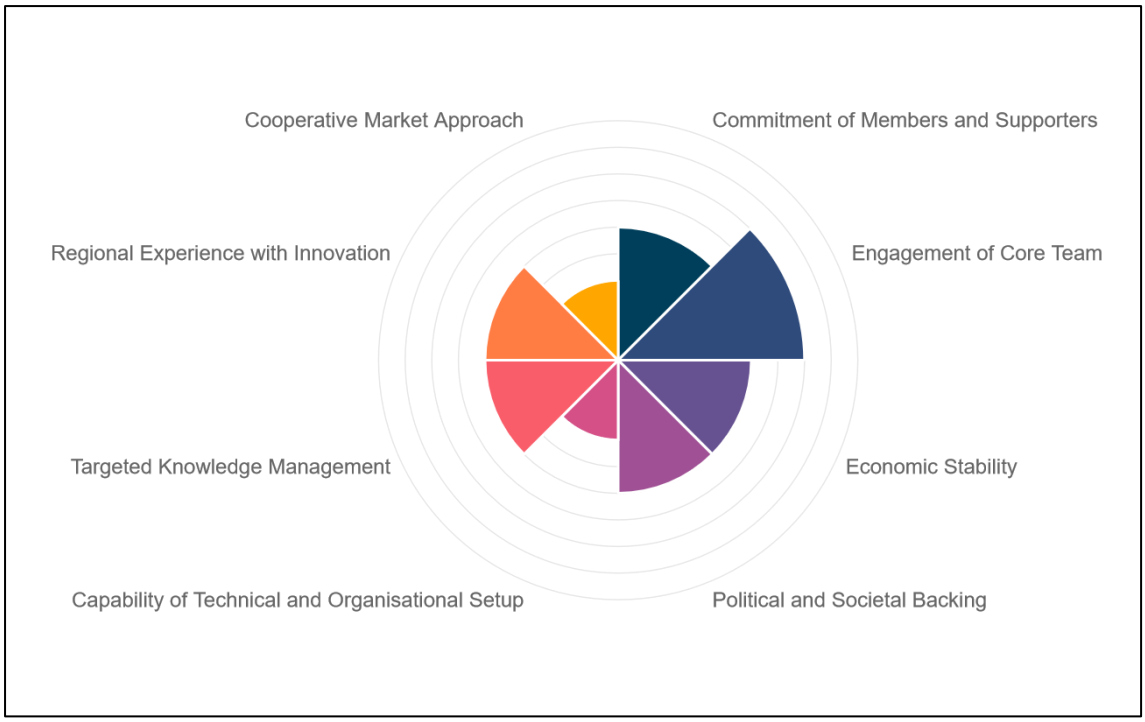

Figure 4: Testing the Maturity and Scalability tool on the TREA demo

HINDELANG

Hindelang (HIND) is a German village in the mountainous, touristic Allgäu region. In 2023, the cooperative Elektrizitätswerke Hindelang e.G. (EWH) celebrated its 100th anniversary. Citizens of Hindelang had founded the cooperative for the electricity supply of their village. Since then, 330 citizens and SMEs (plus municipality) are members of the cooperative, an "energy community" that puts a strong emphasis on sustainable energy production and service towards its clients. EWH generates electricity from local resources, organizes local energy supply to approx. 5.000 inhabitants and operates the grid of Bad Hindelang. While today Hindelang has a close to 100 % RES electricity supply for the village (60 % from local sources), few customers are active in reducing consumption or turning into a RES based heating of their homes and businesses. In Hindelang, they strive for more efficiency in electricity and use the then excess electricity for heat pumps (to heat homes with RES) and to run mobiles for locals and guests.

Throughout DECIDE, the EWH mainly wanted to develop long-term action plan to supply Bad Hindelang with climate friendly energy, i.e. local RE supply for electricity, heat and transport and improve organisational structures to prepare implementation of a carbon free energy supply by 2030. Key results triggered and supported by DECIDE:

- A thesis "Analysis and Strategy for the Future of e-mobility and charging infrastructure" was made, evaluating the need of charging infrastructure in the valley.

- A comprehensive analysis describes the current state of the sectors electric power, heat and mobility and projection for the amount of energy that will be needed in 2030 in all sectors
- Potential sites for electric vehicle charging points have been identified. 10 public and 3 semi-private charging points have been constructed on the identified sites. A showcase Roof-PV project with linkage to charging points and a heat pump has been realized on company grounds.
- Based on a site assessments for wind and plain-field-PV, 8 potential PV-sites have been identified. A discussion with the municipality, the regional/district office and the owners has been started to prepare a community wide consultation.
- The combined living and business park Auwald has been chosen for the development of a district heating grid to be established by or in close cooperation with citizens and enterprise. Throughout DECIDE an information campaign and workshops have been implemented to get citizens' adoption of the plan and motivate to collectively develop and operate the new heat supply in their quarter.
- EWH helped preparing the development of a municipal "Energienutzungsplan", which describes all generation potential in the municipality and shows how it can be used.

Throughout the workshops in DECIDE, EWH strengthened its cooperation with a broad variety of stakeholders:

- Allgäuer Überlandwerk (pebbles project)
- Deutscher Alpenverein (DAV)
- Electric vehicle owners
- Erdgas Schwaben
- Home owners
- Landratsamt Oberallgäu
- Local association "Sonnenwende"
- Local companies (SMEs)
- Municipal council and administration
- National Regulatory Body (BNetzA)
- Regierung Bezirk Schwaben
- Tourism organisation
- Weißachtal-Kraftwerke eG

The "jubilee publication" for the celebration of the 100th anniversary has been use to inform citizens and motivate them to support the EWH strategy. It also outlies that EWH is open to involve citizens even more and support the implementation of all types of collective actions. The anniversary celebration was a good occasion to inform about the DECIDE approaches and achievements.

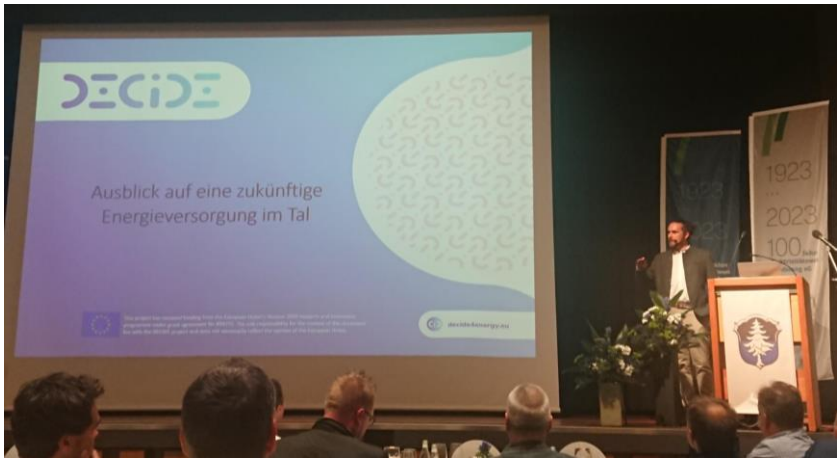

Figure 5: EWH´s anniversary celebration

As Figure 6 shows core strengths of the Hindelang demo are the high engagement of the core team, economic stability and a cooperative market approach. Furthermore, capability of technical and organisational set-up is important.

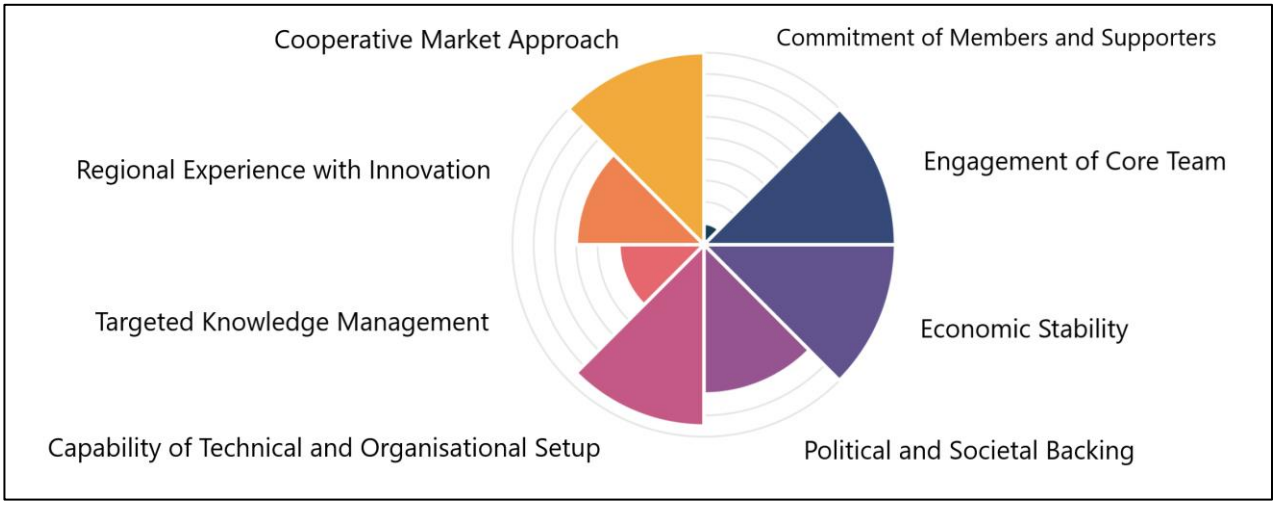

Figure 6: Testing the Maturity and Scalability tool on the Hindelang demo

THERMOVAULT

ThermoVault is a Belgian start-up that offers an innovative solution for the control and regulation of electric boilers, accumulators (storage heaters) and heat pumps. By installing a small device on these appliances, ThermoVault can transform them into energy-efficient storage devices that can adapt to changing electricity prices and grid conditions. ThermoVault's vision is to enable all electricity consumers to contribute to the global energy transition using the appliances they already own and use.

ThermoVault's role in DECIDE was to provide its expertise on smart energy management systems and to demonstrate its solution in real-life settings. ThermoVault collaborated with other partners such as universities and research institutes, to test different scenarios of energy community formation and operation. By participating in DECIDE, ThermoVault increased its impact on the European energy transition and to learn from other innovative actors in the field. ThermoVault also gained valuable insights into consumer behaviour, preferences and needs regarding energy consumption and production. ThermoVault believes that DECIDE helped create more awareness, trust and acceptance among consumers towards smart energy solutions that can benefit both them and society.

The project aimed to expand the use of the ThermoVault solution, a retrofit kit that enables households to connect their devices to a smart energy network. The initial target was to increase the number of connected families from 87 to 400 by the end of the project. However, due to the high demand and the challenging energy conditions in the area, the project exceeded its expectations and achieved a remarkable result of engaging over 1.600 households. Engaged households have at least one device using the ThermoVault solution.

The growth was realised by actively involving social housing companies to engage in the proposed update of their buildings in order to lower the costs for their tenants. By retrofitting old devices with the ThermoVault kits, the social housing companies were able to reduce energy consumption (375MWh) and carbon footprint (57 ton) significantly. More importantly, they could pass on the euro savings to their tenants, who benefited from lower utility bills and improved comfort conditions.

ThermoVault's controllers reduced the steered appliances' energy consumption by an average of 20% in water heating and 10% in space heating. This results in €82k in energy cost savings for the tenants and 57 ton CO_2 reduction each year. These annual savings are constant and repeat on an annual basis for the lifetime of the devices. On top of the savings in energy, the controlled assets are used to help balance the electricity transmission grid (Elia) via FCR (Frequency containment reserve - detailed explanation of this service can be found below) through the national balancing market. Such service leads to additional CO_2 savings, which come from not using CO_2-intensive fast-reacting gas-fueled power plants. These emission reductions are on top of the reduced emission linked to improved energy efficiency. The societal financial benefit of increasing the liquidity by increasing the available volume in the energy markets (FCR, aFRR, …) needs be taken into account as well.

Next to these realised savings, additional learnings in the field of social sciences were made. Both process and communication updates regarding how the tenants were approached were made and rigorously tested with a randomised test and control audience. These changes are currently used as leverage for future planned installations. These installations started in Belgium but are currently being deployed in France, Italy and Spain.

ThermoVault started the project with an existing customer base of 87 families in the cities of Antwerp and Genk. The commitment was made to scale the project throughout DECIDE to 400 connected families enjoying automated and

carefree energy savings. In reality, ThermoVault realised projects on a much larger scale, increasing the number of connected families to 1.600. Large projects in Gent, Antwerp, Halle, Tienen, ... were realised in 2022 and all are related to the specific needs of social housing companies. Energy prices soared in 2022 driving social landlords to relieve a part of the pain for their vulnerable tenants.

For all of these households, the electric storage water heater was equipped with the ThermoVault device. In addition, 25% of these homes are heated by electric storage space heaters. The electric heaters were also equipped with ThermoVault energy savings devices relieving a lot of the pressure from increased energy costs.

ThermoVault's controllers reduced the appliances' energy consumption by an average of 20% in water heating and 10% in space heating, resulting in a potential €82k[1] total yearly savings and 57 ton CO_2[2] yearly reduction.

Also the water and space heaters equipped with ThermoVault's solution can participate in electricity market by providing network balancing services. The electricity transmission grid operator is responsible for maintaining a delicate balance between the supply (production) and demand (consumption) of the high-voltage power grid. This is why Elia, Belgian TSO, asks for specific energy services, where large producers (traditionally fossil fuel power plants) can increase or decrease their production. The Frequency Containment Reserve (FCR), also known as the primary reserve, can be considered a first line of response. Within 5 seconds, the first response (increase or decrease in requested capacity) should occur in the event of network problems, lasting on average only a few minutes.

With the installation of ThermoVault devices and by aggregating the devices, we can provide reliable FCR services to the network operator at a commercial level. ThermoVault is among the first companies in Belgium to provide these services in the residential sector, thus contributing to an extremely beneficial resource for the stability of the national electricity system, making it possible to achieve the energy transition at an affordable cost.

The primary reserve is typically mainly supplied by fast-reacting gas-fired power plants. In contrast, the reserve provided by ThermoVault in the form of instantaneous electricity demand reduction, allows aggregated electricity devices from households to replace these plants in their grid balancing function. This in itself is a monumental transition in the way electricity markets and system operates. For example, a reduction in demand of 1 MW to balance the network avoids an increase in production from a gas-fired plant of 1 MW. If this 1 MW of reserve is made available all year round, this can avoid the emission of approximately 490 kg of CO_2. After deploying the ThermoVault solution, the CO_2 emissions are reduced by around 23 additional tonnes per year thanks to this primary reserve (FCR).

ThermoVault offers its product in a B2B2C configuration. In this configuration, the social landlords are the decision maker for purchasing the devices. It is expected from ThermoVault to get these devices installed in the households of

[1] https://www.creg.be/nl/consumenten/prijzen-en-tarieven/sociaal-tarief

[2] Greenhouse gas emission intensity of electricity generation — European Environment Agency (europa.eu)

the tenants. A marketing/communication process has been set up to convince these end-users to open their door and engage in the process of energy transition. This is a challenge, leading to significant fallout and a reduced saving potential. Together with the University of Mannheim and University of Seeburg randomised A/B tests were set up to improve this communication and increase acceptance rates.

A number of specific messages were tested:

- Social norm
- Trust
- Collective efficacy

The letters based on social norm have proven to increase the results the most. The same test was repeated on a different target group proving the earlier findings. Based on the same methodologies, ThermoVault continues to test end-user messages to increase adoption rates.

The commercial activities of ThermoVault continue with a focus on Belgium but entering the French, Italian and Spanish markets in the near future.

Overall the ThermoVault pilot site was a significant success, achieving 20% average energy savings and developing a demand response portfolio. The success of the project was due to a range of innovative technologies and approaches, as well as the project's collaboration with the University of Mannheim's social science division to improve adoption rates. By expanding the use of these technologies to additional social housing sites and leveraging insights from the DECIDE project, we can make a significant impact on reducing energy consumption and carbon emissions.

HERON

HERON is a Group of companies engaging in the production, supply and trading of electricity and natural gas. HERON Group, is one of the few vertically integrated undertakings in the sector, having been the first private Group to operate in the Greek liberalized electricity market. HERON provides substantial support to Greece’s security of supply, its plants using state-of-the-art technology and operating in line with market needs. On the supply side, HERON is the largest independent electricity retailer owning an ever increasing household customer portfolio together with a historical legacy of an extended B2B clientele. In addition, HERON supplies Natural Gas to more than 15k retail clients, having identified strong growth potential and synergies between its electricity and NG supply business interests.

In addition, recently HERON integrated Optimus Energy S.A, a 2017 established company that constitutes the first energy asset management company in Greece that provides physical and financial optimization of renewable energy assets operating in the electricity market.

HERON's commitment in Sustainability and Innovation is highlighted through the company's innovative products, which aim to make RES power accessible to the wider public and promote consumption during periods in which the Grid is dominated by RES, with EN.A (ENergy Autonomy - https://www.heron.gr/en/ena/), an innovative financial net-metering product being the most widely accepted by the public. EN.A. has been integrated in HERON's customer app myHERON, giving the customers participating in HERON's EN.A the chance to see their savings based on their participation in EN.A asset. The following figure (Figure 7) shows a screenshot of the customer app:

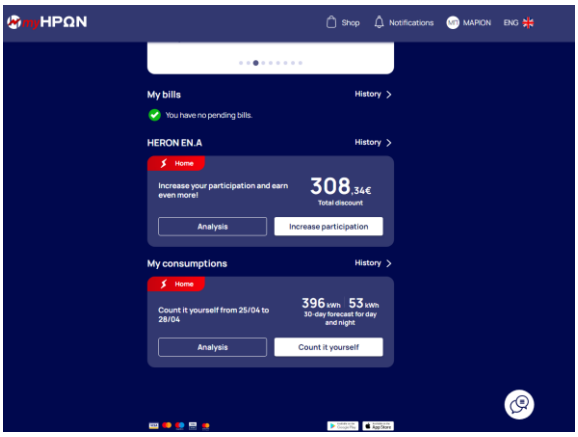

Figure 7: HERON's customer app

Furthermore, HERON supports a vibrant innovation culture furtherly demonstrated by a dedicated R&D department that supports the group in related activities and is directly involved with eight H2020 Projects (InterConnect, iFLEX, BIGG, DigiBUILD, I-NERGY, InEExS, DEDALUS, DECIDE) and one National research project, focusing on smart home automation, demand response, energy metering and e-mobility.

HERON's dedicated R&D Department, via the continuous expansion of its pilots and the widening of the team's scientific interests, focuses on the development and testing of prototypes, the collaboration with European Companies, Universities and start-ups to foster innovation and market launch concepts and on the involvement in business-driven technological innovation in support of company's core business models. The team's actions include the digital automation tools development, the management and implementation of European and National co-funded Programmes via the participation in several consortia, the technical implementation and support of pilot applications within each Programme, the continuous development of partnerships with Greek and European companies and educational institutions and submission of new proposals as well as non-stop link to primary research via supervision of dissertations/practical work.

The effort of HERON's R&D is summed up in HERON Smart Metering Platform (Figure 8), a unique tool that allows subscribed customers to access in real-time their consumption, identify their most consuming appliances and activities and receive recommendations on how to shift their consumption during periods of high shares of renewables. End-

users participating specifically in the DECIDE pilot (both residential users and Energy Community members) are able to use the platform for accessing own real-time and historical data and become aware of their own electricity consumption as well as on the potential savings by exploiting the generation of a self-owned 500 kW PV plant at any time.

Figure 8: Heron's Smart Home Pilot

A specific pilot case study, Living Yard (1 & 2) has been examined as DECIDE pilot and a new upgraded version of HERON's platform has been developed. Living Yard (1 & 2) comprises Short & Medium-term complexes of serviced apartments for digital nomads. The pilot consists of two historical buildings in Chalkida, with fully equipped rooms, co –working spaces, common rooms and common facilities. All buildings have geothermic heat pumps installed for both heating and cooling as well as smart meters for real-time monitoring of energy consumption of both the apartments and the common rooms and facilities, whereas future plans include the participation of Living Yard (1 & 2) in HERON's EN.A. Figure 9 shows a screenshot of the upgraded platform:

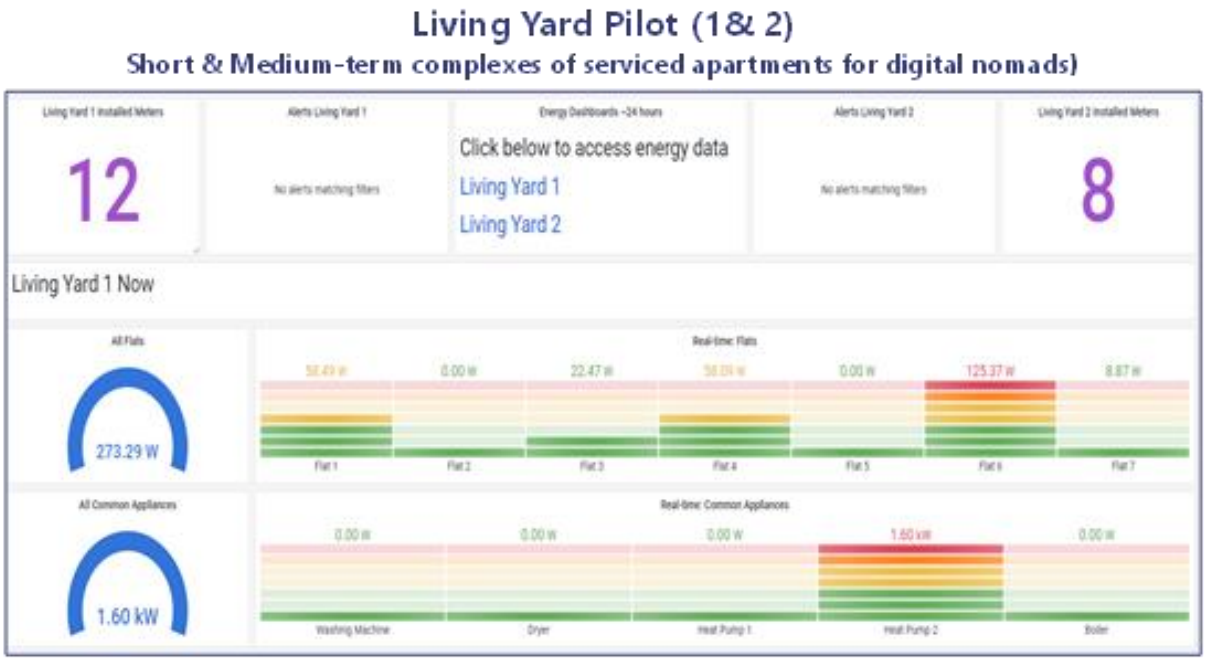

Figure 9: Heron's Living Yard Pilot

As can be seen in the diagram (Figure 10), the commitment of the core team is rated as most important at Heron.

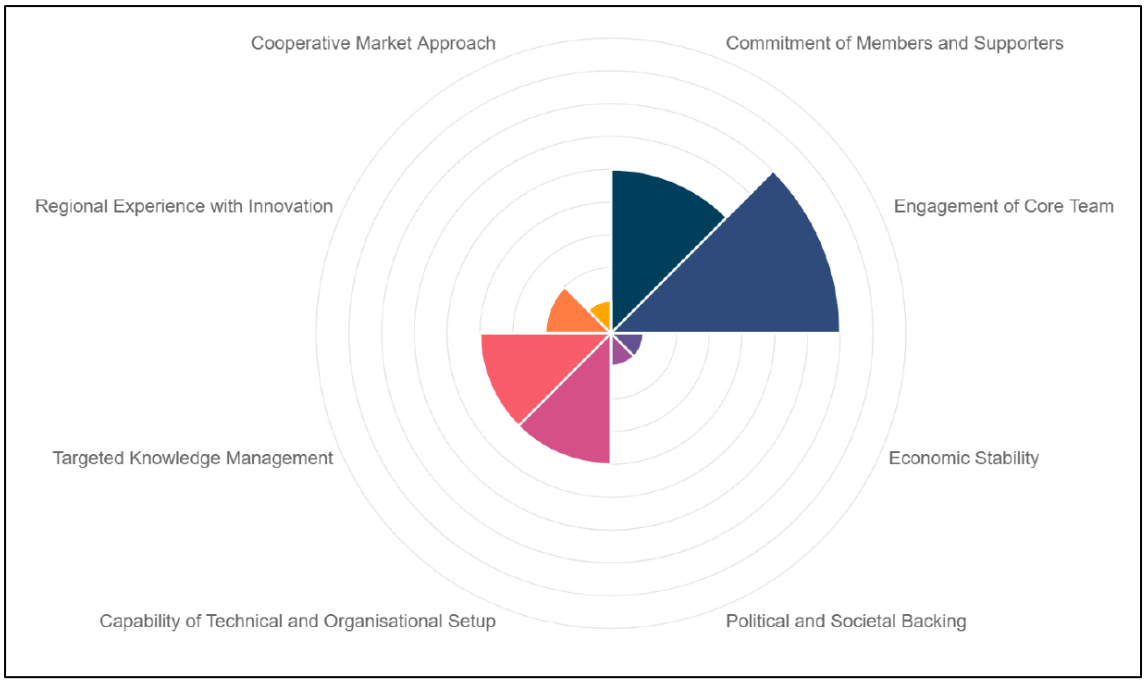

Figure 10: Testing the Maturity and Scalability tool on the HERON demo

DOMX

DOMX is an innovative start-up company established in Thessaloniki, Greece in 2019. The company develops integrated software and hardware systems, delivering cost-effective and universal solutions for upgrading legacy building systems. The company's core product is a unique retrofit solution that enables the smart management of legacy heating systems, especially natural gas boilers. The system brings several advantages to end consumers, including:

- reduced energy consumption
- smart and remote control
- improved climate comfort
- improved understanding of consumption and CO_2 emissions

Through DECIDE, 50 residential pilot consumers of HERON's portfolio have upgraded their natural gas boilers with the DOMX smart heating controller and experienced the advantages offered by smart heating products and relevant services. The pilot consumers were engaged across five Greek cities (Athens, Thessaloniki, Volos, Larisa, Trikala). Through the analysis of pilot collected data, DOMX verified the average achieved energy savings (32%) and climate comfort (91%), which results have been communicated to pilot participants through the DOMX smartphone application and dashboard (see screenshots of the application in Figure 11).

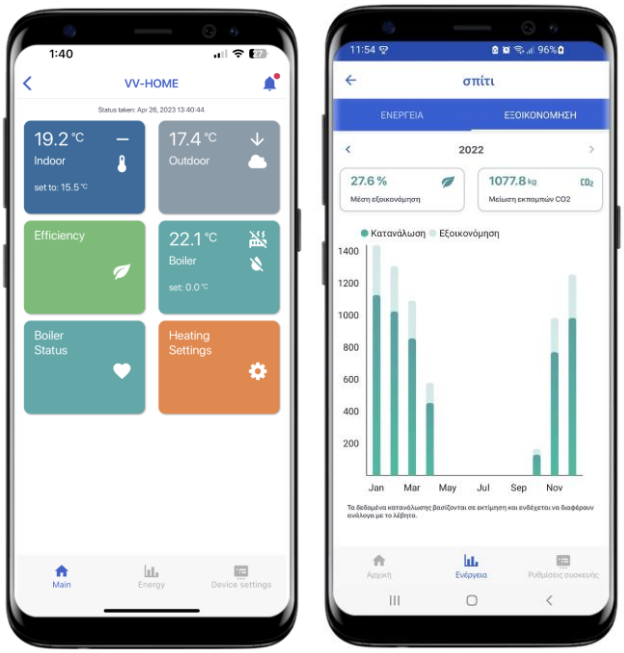

Figure 11: DOMX smartphone application and dashboard for detailed consumption analysis for end consumers

The DECIDE pilot of DOMX significantly matured over the project's duration. Extensive surveys that approached both pilot users and targeted consumer groups, enabled an in-depth understanding of the key drivers (energy savings, smart control, environmental impact, etc.) that can motivate end consumers to adopt smart heating services. In addition, the design and testing of several prototypes and the collection of feedback improved the applicability of the hardware solution across a wide range of heating systems and vendors. The same process was also applied for improving certain features of the app that are relevant to each user group, including the visualization of energy savings for the end users. The latest version of the app includes the delivery of advice through push notifications on reducing the heating costs and improving the living comfort.

The organization of multiple stakeholder workshops, assisted in identifying the key business and technological barriers and the needs of the HVAC installation and maintenance sector. The gathered feedback highlighted the need of installers for new tools that can aid in managing the device installation process, resulting in the development of the DOMX technician dashboard (See Figure 12). In addition, through the gathered data, DOMX managed to analyse the segmentation and group dynamics as well as to define a more focused marketing strategy able to attract both end consumers and business partnerships. DOMX has already managed to set up new collaborations among the approached business partners and aims at upscaling towards a substantial client base across different cities of Greece.

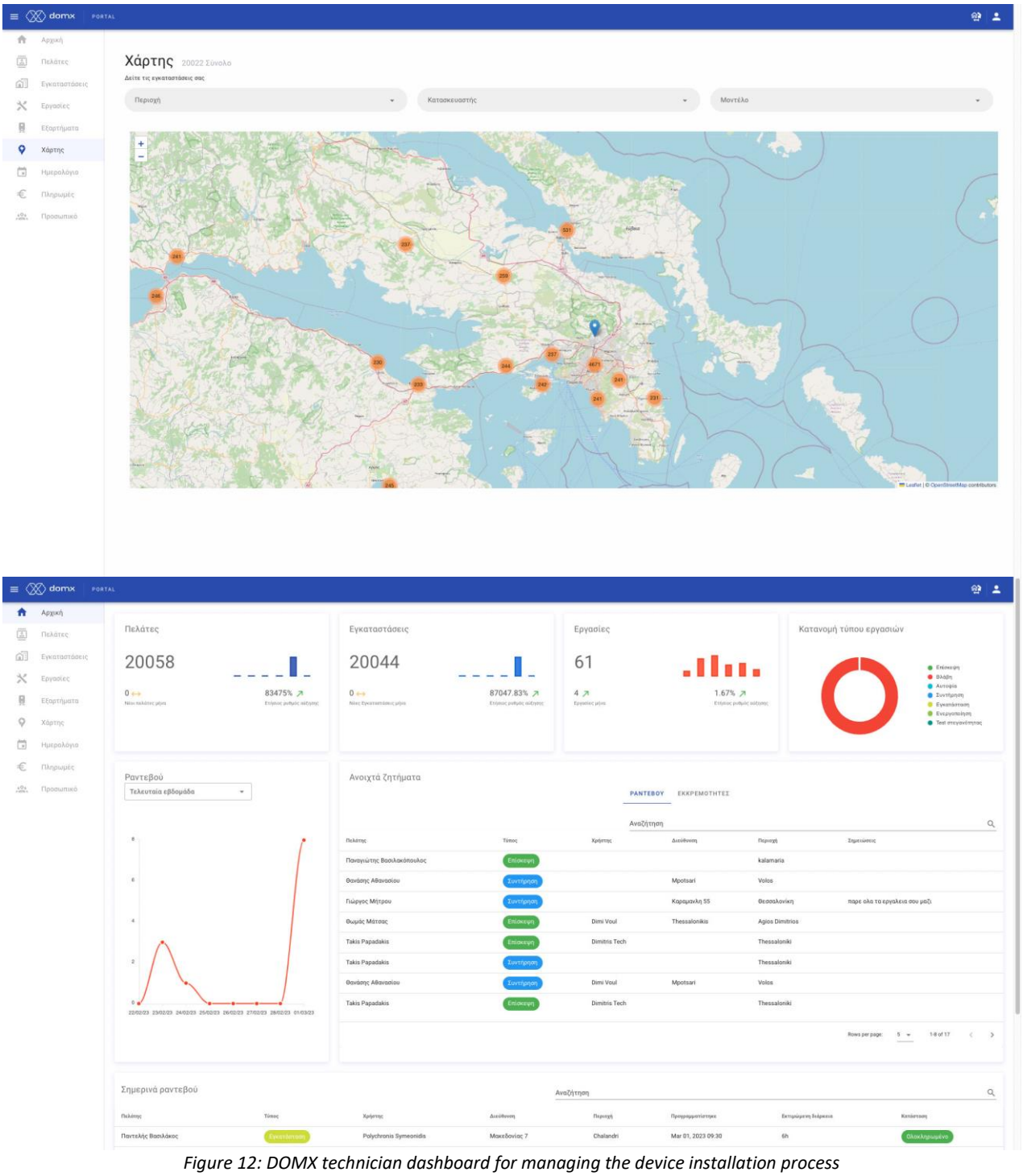

Figure 12: DOMX technician dashboard for managing the device installation process

DOMX is also heavily focused on transforming their existing solution to support for the management of electrical heatpumps, for enabling centralized monitoring and control of connected appliances for both the electricity and nat-

ural gas energy vectors. Through the collaboration with CLUBE, the application of a relevant solution for district heating systems was also investigated. A new collaboration is under development between DOMX, CLUBE and a district heating company that is active in Western Macedonia.

As Figure 13 shows core strengths of the DOMX demo are economic stability and targeted knowledge management.

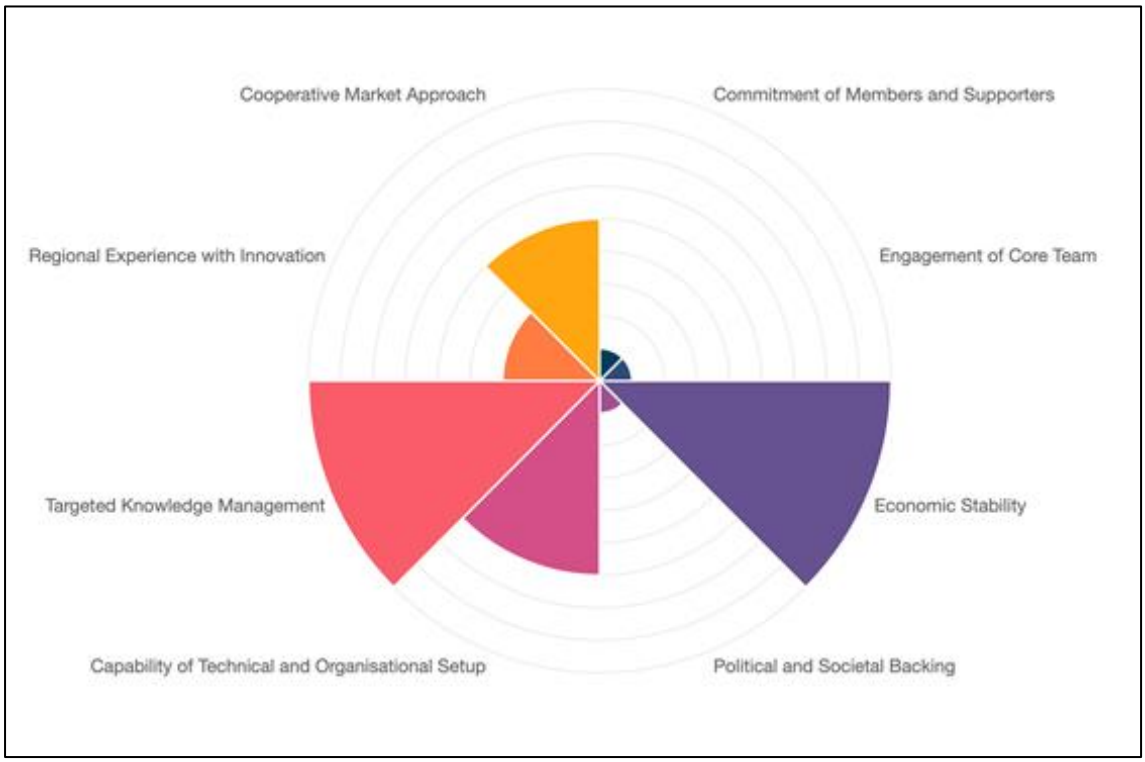

Figure 13: Testing the Maturity and Scalability tool on the DOMX demo

ENBRO

ENBRO is an energy broker, active in Belgium, Germany, France, Poland and Austria.

The services provided focus on resilience of the customer in terms of energy budget and in terms of climate impact from energy consumed.

In advent of regulations for energy communities, Enbro has engaged in several collective actions that allowed us to introduce two very specific pilots in the DECIDE project.

- ASTER focusses on the development of residential solar systems on the rooftop of 165.000 tenants of 70 housing corporations focusing on affordable living.
  In this project, several business models have been developed to follow the changes in regulations. In the advent of the financial close, the project was able to change regulation which lead to the opportunity to bundle energy injected in one hand, regardless the fact that each installation was linked to a private residential grid connection.
  During the DECIDE project, ASTER reached financial close and is currently rolling out solar systems across

Flanders.
Pending critical size to be in place, ASTER is developing an approach to energy sharing to ensure benefits of solar on the rooftops are shared with all tenants (regardless if they have a solar rooftop or not) which will lead to probably the biggest energy community in Europe.
The development of this community approach has had a very big impact on the design of each solar system to maximize power per rooftop, as all energy can be self-consumed or shared given the large volume of off-takers.

- Fluctus.net originated from a project with 19 municipalities that wanted to put solar on their rooftops, and include the notion of cooperative crowdfunding to share the financial rewards with the citizens.
  With the advent of regulation on energy communities the sharing of financial rewards has been extend to sharing energy, which has lead in turn to an approach to maximize the design towards more solar per roof-top. Today 93 municipalities have joined forces in this idea into a legal entity SUNFIN whereas the approach of energy sharing will lead to up to 100 solar systems per municipality to be sharing energy.
  Over time, with better sharing protocols from the GRD of suppliers, we will see this limit of 100 go higher, while real time allocation of energy will provide stakeholders to maximize individual and collective benefits from sharing by real time controls and changes in behavior.

Testing the maturity and scalability tool on the ENBRO demo shows that economic stability is most important. This is followed in second place by the engagement of the core team, targeted knowledge management and political and societal backing. The results are demonstrated in Figure 14.

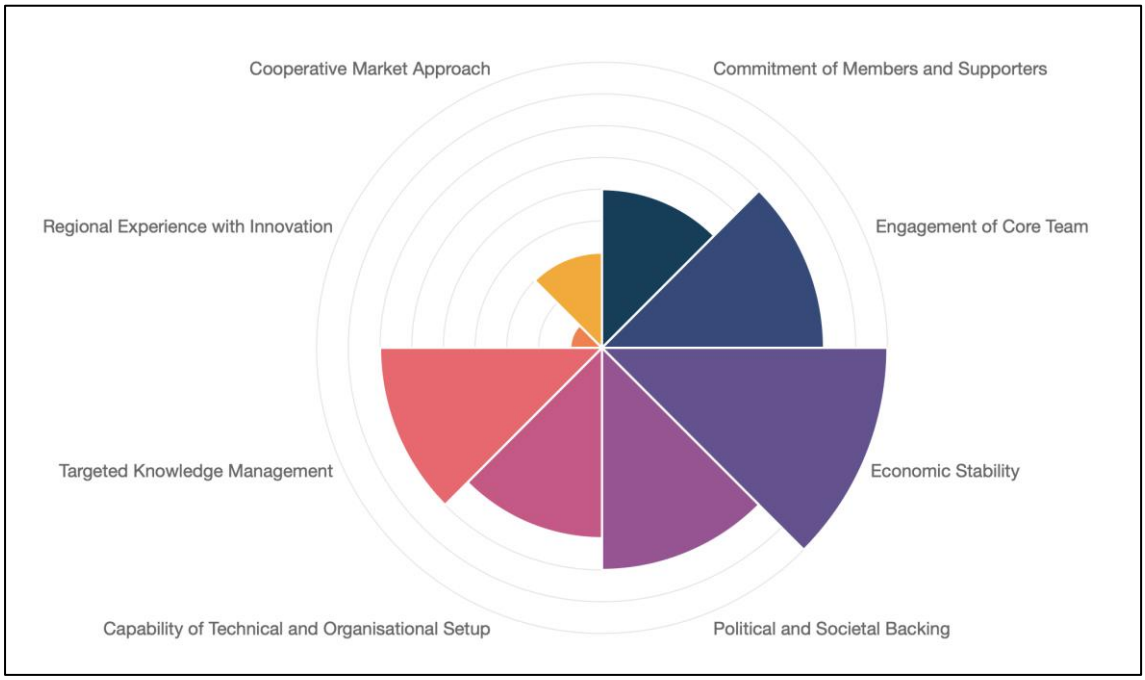

Figure 14: Testing the Maturity and Scalability tool on the ENBRO demo

4. OVERALL RECOMMENDATIONS AND CONCLUSIONS

This report showed options but also complexities in measuring growth and replication of energy communities and collective actions. Not all initiatives have the intention to grow or replicate, yet they want to mature in relation to be resilient against external influences. The developed indicator set aims to provide an overall picture on strengths and possible options to further mature, although given the heterogeneity of initiatives, no final performance judgements are being made.

More generally, the report highlights the importance of developing energy communities and promoting sustainable energy practices. The DECIDE project has demonstrated that energy communities can be successful in achieving significant energy savings and reducing CO_2 emissions, although various efforts are still needed to achieve this goal. Secondly, the report emphasizes the importance of using KPIs to measure the performance and the impact of energy initiatives. The DECIDE project has developed tools to easily assess such KPIs and identify strengths and weaknesses as well as areas for improvement. The report recommends that energy initiatives use the DECIDE KPI tool or adopt similar KPIs to measure their performance and impact and identify areas for improvement.

Thirdly, the report highlights the replicability potential of the DECIDE project. The project has demonstrated that sustainable energy practices can be successfully implemented in different communities and replicated in other regions. The report recommends that policymakers and other stakeholders support the replication of successful energy initiatives and promote knowledge sharing between different communities.

Finally, the report acknowledges the challenges faced during the implementation of the pilots and the need for ongoing support and collaboration between stakeholders. The report recommends that policymakers and other stakeholders continue to support the development of energy communities and promote sustainable energy practices through ongoing collaboration and knowledge sharing.

Overall, the report provides valuable insights into the development of KPI tools and the impact of the DECIDE project and its contribution to developing sustainable energy communities.

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APPENDIX: LIST OF INDICATORS

Category	Indicator	Assessment				
		Lower End	2	Mid	4	Higher End
Commitment of Members and Supporters	**Development of membership**	High fluctuation; erratic recruitment of new members.	Medium fluctuation; erratic recruitment of new members.	High fluctuation but strategic recruitment, low fluctuation but erratic recruitment.	Medium low fluctuation, strategic recruitment of new members.	Low fluctuation; strategic recruitment of new customers/users.
	Number of customers/users who are not members (if relevant)	High fluctuation; erratic recruitment of new members.	Medium fluctuation; erratic recruitment of new members.	High fluctuation but strategic recruitment, low fluctuation but erratic recruitment.	Medium low fluctuation, strategic recruitment of new members.	Low fluctuation; strategic recruitment of new customers/users.
	Diversity of members	Low diversity among members in terms of sociodemographic characteristics (age, gender, education, income, job position).	Medium-low diversity among members in terms of sociodemographic characteristics (age, gender,	High diversity in some aspects (e.g. age, gender), low diversity in other aspects (e.g. education).	Medium high diversity among members in terms of sociodemographic characteristics (age, gender,	High diversity among members in terms of sociodemographic characteristics (age, gender, education, income, job position).

			education, income, job position).		education, income, job position).	
	Quality of interaction	Low interaction frequency with members, decisions are usually not explained to the members.	Medium-low interaction frequency with members, decisions are sometimes explained, but not on a regular base.	Medium interaction frequency with members, decisions are sometimes explained, but no discussion.	High interaction frequency with members, decisions are explained and discussed most of the time.	High interaction frequency with members, decisions are always explained and discussed and feedback influences decisions.
	Decision making	There is no definition of decision processes.	There is a definition, but it is not used.	The decision process is defined but it is about a widely non-transparent decision making.	The decision process is defined, but not well known by members.	There are transparent and well understood decision making rules in place.

	Commitment of members*	Only a few members participate actively in regular meetings.	Only a minority of members participates actively in regular meetings.	The majority of members participates actively in regular meetings.	At least three-quarters of members participates actively in regular meetings.	Almost all members participate actively in regular meetings.
	Efficacy of interaction	There are only drawn-out debates using technical/legal terminology.	There are mostly drawn-out debates using technical/legal terminology.	There are sometimes drawn out debates but easily accessible language.	There are relevant debates easily accessible language, but not streamlined with decision making.	The debates are streamlined with decision-making using easily accessible language.
	Shared (vision and) mission	There are varying expectations to objectives of imitative by members.	The vision is shared by the majority of the members, no clearly stated mission.	There is a joint vision but no clearly stated mission of initiative.	There is a joint vision and clearly stated mission, but mission is not shared by all members.	The vision as well as the mission is widely shared among the members.
Engagement of Core Team	**Responsibilities of core actors**	No clear responsibilities at all.	Voluntary staff with some defined responsibilities,	Voluntary staff with clear responsibilities.	Professional as well as voluntary	Professional staff in clearly defined management structure.

			but most things are not clearly divided.		staff, responsibilities are clear.	
	Fluctuation in group of core actors	High fluctuation; erratic recruitment of new members.	Medium-high fluctuation.	Medium fluctuation.	Medium-low fluctuation.	Nearly no fluctuation.
	Diversity of core actors	Low diversity among core team in terms of socio-demographic characteristics (age, gender, education, income, job position).	Medium-low diversity among core team in terms of socio-demographic characteristics (age, gender, education, income, job position).	High diversity in some aspects (e.g. age, gender), low diversity in other aspects (e.g. education).	Medium-high diversity among the core team in terms of socio-demographic characteristics (age, gender, education, income, job position).	High diversity among the core team in terms of sociodemographic characteristics (age, gender, education, income, job position).
	Commitment of core actors*	Low workforce availability, sporadic presence at meetings.	Limited workforce availability, sporadic presence at meetings.	High workforce availability, but little presence at meetings and limited will to take over tasks.	Limited workforce availability, but regular presence at meetings and	High workforce availability, all key personnel present at all meetings and professional take-over of

					committed to take over tasks.	tasks, low fluctuation in the team.
	Skills of core actors	The core team commands a limited skillset, expertise needs to be acquired from outside of the initiative for everyday operation.	The core team commands a rather limited skillset, expertise needs to be acquired from outside of the initiative on a regular base.	The key personnel command a good skillset, nevertheless, some expertise needs to be acquired from outside.	The key personnel command a good skillset, nevertheless, some expertise needs to be acquired for special tasks.	Key personnel have skills that are in line with the initiative's activities, so no external expertise is required.
	Communication of core actors	Nearly no communication with each other.	Infrequent and informal communication.	Either infrequent but institutionalized communication or frequent informal communication.	Regular and institutionalized communication.	The entire team exchanges information on a daily basis, and institutionalised meetings are held every week.
Economic Stability	**Available capital and assets**	Very few, one-sided assets.	Few, one-sided assets.	Few, but diversified assets.	Many, diversified assets.	A lot, diversified assets.

	Operating Cash flow ratio	<0,5 or I don't know	0,5-0,9	Around 1	1,1-1,5	>1,5
	Return on investment for members of the initiative	Underperforms most other (green) investment schemes on the market.	Underperforms around 50 percent of other (green) investment schemes on the market.	Similar to other (green) investment schemes.	Overperforms around 50 percent of other (green) investment schemes on the market.	Overperforms other (green) investment schemes on the market.
	Economic stability	The financial resources are almost exhausted.	Enough reserves for short-term operations are available, but in the long-term new financial resources are needed.	Enough reserves for short to medium-term operations are available, but in the long-term new financial resources are needed.	Enough reserves for medium term operations are available, but in the long-term new financial resources are needed.	The initiative is long-term operational without any additional financial resources.
	Creditworthiness	Rating C	Rating CCC	Rating BB	Rating BBB	Rating AAA

	Debt ratio	Debt level >80%.	Debt level between 60% and 80%.	Debt level around 50%.	Debt level between 30% and 40%.	Debt level <30%.
	Reliance on public funding*	Critically dependent on public funding in all operations.	Critically dependent on public funding in some operations.	Can maintain operations without funding, but to extend operations, funding is needed.	Can maintain operations without funding, but to extend operations, small amounts of additional funding is needed.	Only targeted utilization of public funding for specific tasks, not critical for the persistence of the initiative.
	Business Plan	No approved financial or business plan.	Only estimation of costs.	Estimation of costs and income for upcoming year.	Approved business plan with costs, income and earnings for 2 to 3 years.	Approved business plan with costs, income and earnings for more than 3 years.
Political and socieatal Backing	**Relationship with local authorities***	No interaction at all.	Sporadic interaction, authorities not very responsive if needed.	Occasional interaction, authorities easy to reach and responsive.	Regular interaction, authorities very responsive when needed.	Regular bidirectional and supportive interaction.

	Networking and Cooperation	Unaware of external networks.	Aware of networks but not (yet) associated.	Formally integrated and active in 1 network.	Formally integrated and active in 2 networks.	Formally integrated and active in 3 or more networks.
	Coping with political and bureaucratic barriers	Unaware of or overstrained by barriers.	Barriers are identified and the team is working on developing an idea to overcome them.	Barriers are identified and there is a general idea of how to overcome them, but not yet a clear plan.	Barriers are identified, strategies for accepting or overcoming them are worked out but are not yet established.	Barriers are identified, established strategies for accepting or overcoming them.
	Support by local citzerns and business community	Oppositional	Moderatly oppositional	Neutral	Passively supportive	Actively supportive
Capability of Technical and Organisational Setup	**Number of services provided**	1 service	2 services	3 services	4 services	5 or more services
	Risk mitgation plan*	Potential risks are not identified.	Only some very prevalent risks are identified.	Potential risk identified and mitigation envisioned.	Potential risk identified and concrete mitigation measures in place.	Dedicated risk mitigation plan approved by members and supporters.

	Defects in regular operation*	Frequent downtimes.	Occasional downtimes.	Downtimes happen, but it is uncommon.	Downtimes are very rare.	(Almost) no unplanned downtimes.
	Maturity of applied technology	The technology is new and rarely used by other initiatives.	The technology is new, but there exist some other initiatives who also use it.	The technology is proven, but not yet succesfully used by other initiatives.	The technology is proven, and successfully used by isolated other initiatives.	The technology is proven, and successfully used by many other initiatives.
	Growth rate in energy produced/consumed	Strongly Shrinking	Moderatly shrinking	Stagnating	Moderatly growing	Fast growing
	Number of employees	No employees	One or two employees, hired sporadic only for special purposes	One or two employees hired regular for special purposes	Two or three employees hired for daily businesses	Four or more employees hired for daily businesses
	Self-Sufficiency 1: Proportion of energy produced/consumed over the year*	Consumption exceeds production by factor >5.	Consumption exceeds production by factor 3 to 5.	Consumption exceeds production by factor 1-3.	Production equals or exceeds consumption by factor 1-3.	Production exceeds consumption by factor > 3.
	Self-Sufficiency 2: Proportion of annual hours with	Production/consumption ratio close to 1 in <1.000 h.	Production/consumption ratio	Production/consumption ratio close to 1 in 2.001 to 4.000h.	Production/consumption ratio	Production/consumption ratio close to 1 in more than 6.000h.

	production/consumption ratio roughly equaling 1*		close to 1 in 1.001 to 2.000h.		close to 1 in 4.001 to 6.000h.	
	Legal form	Not institutionalised, no contracts	Informal network with memorandum of understanding	Formal network with contractual memorandum of commitment	Registered association	Registered business organisation
	Support by external experts	There are areas without internal expertise, but no external expert available for cover.	External experts are available but difficult to reach.	External experts are available for all areas not covered by internal experts.	Apart from special tasks, all areas are covered by internal experts.	All areas are covered by internal experts.
Targeted Knowledge Management	**Capacity building through learning materials**	There are no handbooks, guides or tools used.	Only a restricted number of handbooks, tools, and guides available, which are rarely used.	A broad variety of handbooks, tools and guides are available but rarely used.	A restricted number of handbooks, tools and guides are available, used on a regular basis.	Handbooks, guides or tools are integrated in regular operations.
	Members feedback mechanisms*	No feedback mechanism in place.	Only informal feedback mechanisms in place.	Established feedback mechanisms but feedback not incorporated in decisions.	Well accepted feedback mechanisms but feedback not strongly	Well accepted feedback mechanisms, feedback regularly used by core

					incorporated in decisions.	team to improve the initiative.
	Knowledge management within core actors*	No or very rare knowledge exchange.	Only informal knowledge exchange.	Regular knowledge exchange in meetings.	Regular knowledge exchange in meetings and a knowledge repository.	Formal knowledge repository and processes to increase and convey knowledge.
	Coaching of members by core actors	No coaching activitites	Sporadic coaching activitites with a minority of members	Sporadic coaching activitites with most members	Regular coaching with minority of members	Regular coaching of most members
	Transfer to other energy communities	"Lone wolf“ attitude	Sporadic exchange of knowledge with a small number of initiatives (<10)	Sporadic exchange of knowledge with big number of initiatives (10 or more)	Regular exchange of knowledge with small number of initiatives (<10)	Regular exchange of knowledge with big number of initiatives (more than 10)

	Refining the shared vision and mission	The initiatives mission and vision has never changed.	The initiative's mission and vision is rarely adapted.	The initiative's vision and mission is adapted at neuralgic time points.	The energy initiatives mission is regularly adapted.	The energy initiatives mission is regularly adapted.
Regional experience with Innovation	**Ways how innovations enter the collective action**	New ideas come solely from the core team.	New ideas come mainly from the core team.	New ideas come from the core team and the members.	New ideas come from the core team, members and external partners from science or politics or economy.	New ideas come from the core team, members and external partners from science and politics and economy.
	Organizations exist which are used to get access to markets/carry investment costs/carry parts of technical installation*	No support by external organisations	Rarely support by external organisations.	External organizations support either market access OR carry investments OR carry parts of the technical installations	External organisations support at least two of the three named aspects.	External organisations support market access AND carry investments AND carry parts of the technical installations.
	Social targeting: Culture of sustainable development, and their knowledge and awareness of problems at the place where case enrols	No knowledge about the conditions at the target region	Limited knowledge about the conditions acquired through	Some unsystematic knowledge acquired through contacts to for the region important stakeholders.	Broad knowledge acquired through the organisation of public events.	Systematic knowledge acquired through (market) research.

			contacts to inhabitants.			
	Current region has a history in innovation and/ or a creative milieu*	Region very conservative, no organizations supporting innovation and creativity.	Region open for innovation, no organizations supporting innovation and creativity.	Some innovation and creativity in the region, but no formal institutions driving it.	Formal institution(s) exist driving innovation in the region, but not very active.	Formal institution(s) exist driving innovation in the region, diverse activities in the field of energy innovation.
	Geo-targeting: How is the local environment build?	No knowledge about the conditions at the target region	Limited knowledge about the conditions acquired through contacts to inhabitants.	Some unsystematic knowledge acquired through contacts to for the region important stakeholders.	Broad knowledge acquired through the organisation of public events.	Systematic knowledge acquired through (market) research.
	Advertising strategy					
	Number of other players with similar products/services	Many very active other players	A relevant numbers of active other players	A limited number of active players	A limited number of passive players	No other players

	Knowledge on legal and technical limits when scaling up are available in CEI or can be acquired	No knowledge is available.	The initiative has some general ideas about it, but nothing concrete.	The initiative has identified some concrete limits, others remain vague.	The initiative has identified most concrete limits and has an idea how to handle them.	The initiative has identified most concrete limits and has a concrete plan how to handle them.
Cooperative Market Approach	**Comparative cost advantage in comparison to standard energy prizes/products**	Product/services are more expensive than comparable competing products/services	The product/services are a little more expensive than comparable competing products/services.	The product/services are similar expensive than comparable competing products/services.	The product/services are little cheaper than the comparable competing products/services.	The product/services are much cheaper than the comparable competing products/services.
	Product/services generate positive side effects for the members/users	Only monetary effects	Typical member can name 1 non-monetary effect	Typical member can name 2 non-monetary effects	Typical member can name 3 non-monetary effects	Typical member can name 4 or more non-monetary effects
	Standardisation potential of products/services	The product/service needs to be adapted in all environments.	The product/service needs to be adapted in most environments.	The product/service needs adaption only if the new environment is remarkable different from original environment.	The product/service needs adaption only if new environment is very different	The product/service is a one size fits all solution.

					from original environment.	
	Cooperation with established players on the market*	Market players with strong power in active opposition to your initiative.	Market players with strong power neutral towards your initiative.	Cooperation talks with existing market players.	Initiative cooperating occasionally with existing market players.	Initiative regularly cooperating with strong players in the energy market.
	Modularity of (future) additional services/products	The combination of product/services with other products/services is impossible.	The combination of product/services with other products/services is only possible with high expenditures.	The combination of product/services with other products/services is possible with medium-high expenditures.	The combination of product/services with other products/services is possible with low expenditures.	The products or services can be combined as desired and are open for further add ons and combineable with older technologies without additional expenditures.
	Tech generation of own products/services in comparison to other market players	The tech generation is much older than of other market players.	The tech generation is considerable older than of other market players.	The tech generation is similar old for most market players.	The tech generation is considerable newer than of other market players.	The tech generation is much newer than of other market players.

* Questions marked with * are considered best suited to summarize the respective category

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PARTNERS

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