INTERACT

Integration of Innovative Technologies of Positive Energy Districts into a Holistic Architecture

D2.3 Key success factors and requirements for INTERACT Energy Communities

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Executive Summary

This deliverable D2.3 “Key success factors and requirements for INTERACT Energy Communities” is the third and last one of WP2 – Assessing and Evaluation of existing successful PED-approaches. It draws on the information gained through the work done not only in this work package but in general during the first year of the project INTERACT to list and describe in a structured way key success factors for the establishment as well as viable operation of INTERACT Energy Communities.

While we focus in Chapter 1 on the purpose and structure of the document, we also describe the methodology chosen for the selection and analysis of the key success factors and requirements, which contains an analysis of the state-of-the-art in energy community meta evaluations, insights from stakeholder interviews and insights from the building of our competence map based on evaluating successful PED approaches in Austria, the Czech Republic and Sweden.

Chapter 2 is dedicated to the definitions and theoretical framework of the deliverable on hand. We define for the purpose of our research project “success”, “project success” and “success factors”, give a diagram of the different aspects of project success for energy communities, and focus on the specific definition of INTERACT Energy Communities and the definition of its success.

Within Chapter 3 we summarize in a condensed way the lessons learned in relation to success factors from the previous three tasks of WP2, selection and assessment of existing and ongoing energy community projects, establishing a competence network in the field of positive energy communities and characterization of stakeholder needs and motivation of the two demo-sites of the INTERACT project.

All of the information given above leads to the core of the deliverable, Chapter 4, where we show and comment the key success factors for INTERACT EC´s in a structured way. We divide between internal and external factors and present them in 6 identified categories that represent a combination of social, economic, technical, and governance factors.

- Internal: I. Technology, II. Organization, III. Motivation.
- External: IV. Sociocultural environment, V. Regulation and VI. Funding

As additional information we show the relevance of the identified factors for starting up an INTERACT EC´s as well as for running an already established community.

The following Chapter 5 gives more details about the requirements of INTERACT EC´s, whereas they can be only preliminary at the current stage of the research project, with more than half of it still to come. We follow the same structure as used in Chapter 4, and add in the target groups which are capable of fulfilling the requirements stated.

In the concluding Chapter 6 we sum up the insights from the deliverable on hand and add our outlook and expectation for future work and research for this specific topic.

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List of Abbreviations and Acronyms

DSO	Distribution System Operator
EV	Electric Vehicle
HW	Hardware
INTERACT EC	INTERACT Energy Community
ICT	Information and Communication Technology
PED	Positive Energy District
PEN	Positive Energy Neighborhood
PV	Photovoltaic
UK	United Kingdom
SW	Software
WP	Work Package

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1 Introduction

1.1 Purpose of the document

The document provides a reader with a structured view of factors that can contribute to the successful establishment and further viable existence of an INTERACT Energy Community. Based on literature review and the learnings from PED best practices (see deliverable D2.1 - Competence Map) as well as stakeholder interviews with the two project demo-sites (see deliverable D2.2 - Stakeholder Needs Evaluation), we establish success factors, which we group into more generalized categories and then summarize the main preliminary requirements for the successful establishment of INTERACT Energy Communities as well as for their successful operation.

In this document we do not prioritize the different success factor categories but rather organize them into a comprehensive structure. The applied structured view and recommendations may help stakeholders of prospect INTERACT Energy Communities with the orientation in the complexity of various features that may not be neglected in the process of INTERACT Energy Community formation and operation.

1.2 Relation to other project activities

The document is one of three deliverables of WP2 and is closely related to its previous deliverables. The outcome should serve as a preliminary analysis for deliverables of WP6 – creation of the roadmap for the implementation of INTERACT Energy Communities, and also feeds into the WP4 – design of the organization of the INTERACT Energy Communities.

1.3 Structure of the document

After the introduction into the deliverable of Chapter 1 we focus in Chapter 2 on the theoretical framework and state-of-the-art perception of success factors in relation to energy communities in general and to the INTERACT Energy Community specifically.

Within Chapter 3 we describe in a condensed form the gathered success factors during the assessing and evaluation of existing successful PED-approaches as well as during the characterization of stakeholder needs and motivation in the two demo-sites Großschönau in Austria and Fyllinge in Sweden.

Within Chapter 4 we bring the success factors into a unified structure, sorting them to a.) Technology, b.) Organization, c.) Motivation, d.) Sociocultural environment, e.) Regulation and f.) Funding; and describing their importance for individual projects (as Internal factors) and for projects in specific geographical area (as External factors) both during the start-up process of the INTERACT Energy Community as well as during the operation of an INTERACT Energy Community.

In Chapter 5 we outline preliminary requirements identified to set-up and operate an INTERACT Energy Community. Chapter 6 sums up the deliverable, and Chapter 7 shows references and sources used for the work.

1.4 Methodology

The identification of a comprehensive definition of "success" in application to INTERACT Energy Community was conducted in an iterative process applying methods like literature review, experts' consultation, interviews throughout various WP2 activities resulting in an extraction and structured view on success and its contributing factors. Basis for any definition of success factors requires a definition, on what we (as project consortium) mean by success and success to the energy community.

We operate with the definition of INTERACT Energy Community as it stands at the time of writing this deliverable. The definition of INTERACT Energy Community might be further fine-tuned and will be finalized within the deliverable D.6.1 (WP6) - Roadmap for the implementation of the designed INTERACT Energy Community in general and for the specific local perspectives.

The process of building a structured view on key success factors and requirements for INTERACT Energy Communities is done in three stages:

1. **Collection of success factors and requirements**

A broad view on success factors was collected in a long list of success factors and requirements, as a result of synthesizing data from four main sources of information:

a. literature review - searching for success factors in relevance to energy communities,
b. existing PED approaches review in selected countries (Austria, Sweden, and the Czech Republic) that was carried out for the Deliverable D.2.1,
c. factors, motivation and needs gathered during the stakeholder's interviews for pilot regions in Großschönau and Fyllinge that was carried out for the Deliverable D.2.2,
d. expert discussions of INTERACT team members.

The chosen approach of collecting all identified factors in a long list, even though similar topics seem to be already included, ensures that specifics in relation to the context of collection as well as application is not lost and a more differentiated picture can be drawn from sources describing similar factors. Additionally, categorizing and finding terms that encompass various similar factors once the complete picture is established is more sound and concise.

We combine both energy community and PED-related success factor research as we focus on INTERACT Energy Communities that we see as one key building block for the establishment of PEDs and PENs.

The outcomes of stakeholder interviews done in Großschönau and Fyllinge are described in detail in Deliverable D2.2 The analysis of focus regions cannot lead to an identification of success factors as such, since their "success" cannot be measured yet in the current stage of planning. Nevertheless, complementing the results from stakeholder mapping with the long list of success factors as well as the requirements for establishing and operating an energy community bring additional valuable insights.

2. **Categorizations of success factors**

In a second step we sorted the complete list of key success factors derived according to the methods above into a structured scheme. The chosen structure is a combination of previous approaches found in the existing literature:

- Internal x External factors (e.g., Luangchosiri N., et al., 2021).
- Factors related to Implementation stage x Operational stage (e.g., Haggett, C. et al 2013).
- Division into six fields of a factor according to the content of the application (technology, organization, motivation, sociocultural environment, regulation and funding) (e.g., Ruggiero S. et al. (2019) with similar categorization).

3. **Reduction of long list**

Finally, the sorted and structured complete list of key success factors was condensed and reduced. Factors with similar meaning, yet different words have been identified and doublets deleted. Also, similar factors were joined together by choosing a description that is both more general, yet does not lose its specifics. Thereby, a final, shorter list of key success factors was created.

In a last step, without changing the developed short list of key success factors, a reflection and analysis in regard to potential application for the creation of energy communities within the INTERACT project sites has been done.

2 Introduction to Success Factors

2.1 General View on Success, Project Success, and Success Factors

In the most generalized form, "success" can be defined as *the correct or desired result of an attempt* (Miriam Webster Dictionary, 2021) or the act of *the achieving of the results wanted or hoped for* (Cambridge Dictionary, 2021).

In relation to evaluation of "project success" researcher focus on projects success criteria and definition of success factors that are increasing the likelihood of meeting the project's success. There is no consensus among researchers of what constitutes projects success (Frefer et al., 2018) and there is only limited agreement among academic authors on the factors that influence project success (Fortune et al., 2005).

Fortune et al. (2005) provides with comprehensive literature surveys on topic of various success factors for the project success. In analysis of 63 academic studies the three most cited factors are:

- *the importance of a project receiving support from senior management;*
- *having clear and realistic objectives; and*
- *producing an efficient plan.*

However, although 81% of the publications include at least one of these three factors, only 17% cite all three. Other frequently cited factors that appeared in more than 25% of the analyzed publications in above mentioned analysis were: *good communication, User/client involvement, Skilled/suitably qualified/sufficient staff/team, Effective change management, Competent project manager, Strong business case/ sound basis for project, Sufficient/well allocated resources, good leadership.*

Above mentioned success factors can also have important relevance in context of energy communities. We will see in next section that as an addition to these general success factors there are new areas related to technology and community issues.

2.2 Success factors within energy community/PED projects

Thanks to the huge interest all around the world to increase the local share of produced energy and to improve the local infrastructure with green and renewable energy, different comparisons and effectivity studies have already taken place.

There are many approaches towards evaluating success factors in relation with energy communities and more recently also with PED projects. They focus either on the factors that help to emerge the energy communities itself or on factors that can contribute to the long-term viability of the energy communities. In many studies both of these approaches are combined.

E.g., Ruggiero et al. (2019) defines four vast categories of factors 1) contextual factors, 2) energy policy, 3) project related factors and 4) actors' characteristics and role while analysing projects in Baltic Sea Region. Luangchosiri et al. (2021) are describing the path to success for 26 different community renewable energy projects in Thailand and divide them into internal

(e.g. community participation) and external factors (e.g., financial support). Seyfang, Park and Smith (2013) are describing an empirical analysis of community energy projects in the UK. Madriz-Vargas, Bruce and Watt (2015) are describing the stages of implementation projects in developing countries with factors to be watched closely during each implementation stage.

Most commonly cited success factors are combinations of social, economic, technical, and governance factors. We will elaborate on the factor division in next sections.

2.3 Success factors to INTERACT communities

2.3.1 Current definition of INTERACT Energy Community

First, we have to define the exact meaning of an INTERACT Energy Community, which can then be followed by defining its success. The current definition of an INTERACT Energy Community (Figure 1) is based on the existing definition of a renewable energy community according to the European Renewable Energy Directive (2018/2001/EU) with additions specific to the *LINK*-based holistic architecture (Ilo et al., 2019). The definition might be still slightly adapted during the further course of the INTERACT project.

'INTERACT Energy Community' means a legal entity:

(a) which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity;

(b) where the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities;

(c) the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits;

(d) which establishes and operates local markets in harmony with the grids and other markets to enable the active participation of the shareholders or members on energy issues.

Figure 1 - Definition of INTERACT Energy Community

2.3.2 Different levels of Success approach

For discussion on the meaning of success in relation to INTERACT Energy Communities we applied a multilevel approach presented by Bannermann (2008) with the added focus on INTERACT Energy Communities (Figure 2). Success for a project like INTERACT can be measured from several different points of view:

- From a project view: whether INTERACT as a research project by itself was successful: did we achieve the planned results in the planned timeframe, with the planned resources? →The Project-related Level of Success.

- From a product/service view: whether the main outcome of the INTERACT project – the roadmap for the creation of holistic energy communities – was successful: is it complete, understandable, helpful, and enabling the readers to either create energy communities themselves, adapt the ones they already run, or promote the needed changes in order to make it happen? →The Product-related Level of Succes.
- From a business view: whether INTERACT as a research project was creating the intended impact: did we trigger the interchange of knowledge in the competence network? did we foster the creation of Positive Energy Districts and holistic Energy Communities working in harmony with the grid? →The Business-related level of Success.
- From a strategic view: whether the proposed solution of INTERACT – the holistic approach to energy communities in order to work as part of the grid integrated into the complete architecture – is being successful. →The broader Strategic level of Success.

Within this document we want to focus on the Organizational Benefits, meaning the factors which are impacting the success of implementing and replicating the specific INTERACT Energy Community as a building block of positive energy districts.

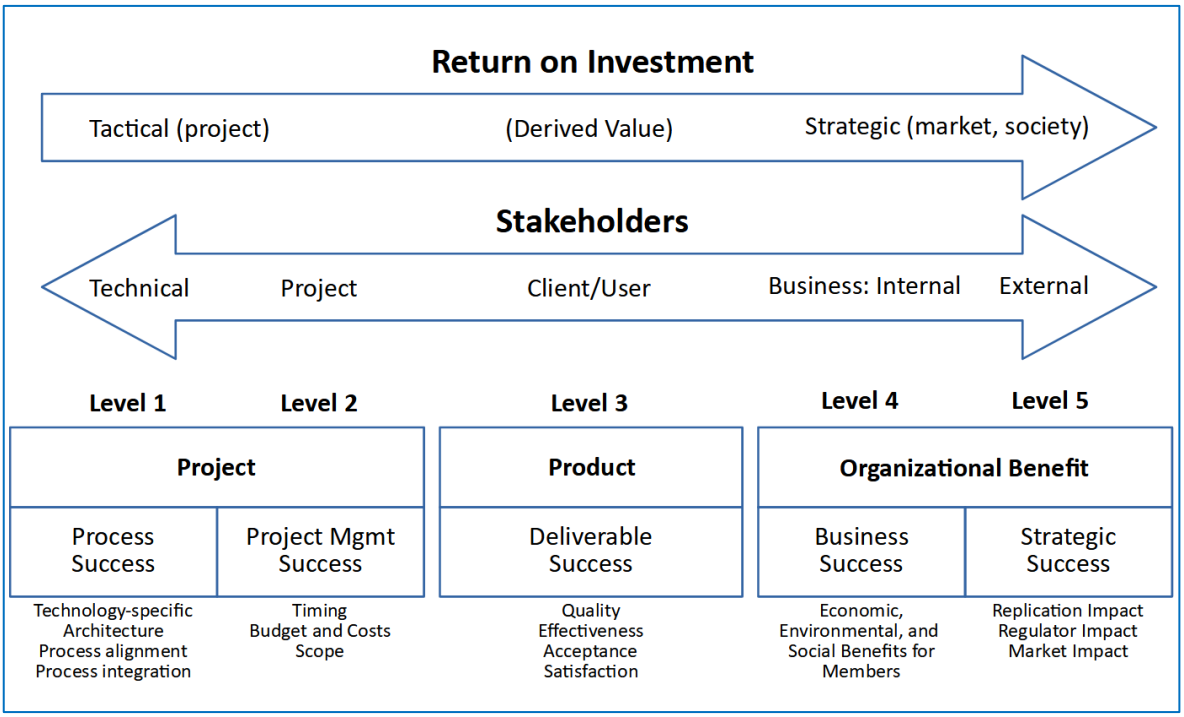

Figure 2: Multilevel framework for defining project success based on Bannerman (2008) and applied on INTERACT Energy Communities

Our resulting definition of success of an INTERACT Energy Community contains the following elements (Figure 3):

An **accepted** and **viable** energy community which

operates in harmony with the grid,
optimizes the use of local energy resources,
creates flourishing local markets,
brings environmental, economic and social benefits for its members, and
fosters energy transition towards carbon neutrality.

Figure 3 - Definition of Succsess of an INTERACT Energy Community

Based on the definition, we can deduct the following three major sub-targets regarding the design of the energy communities:

I. Accepted in the local community.
II. Viable, meaning that it was implemented and is functioning in a stable way.
III. Operating in harmony with the grid, which is requiring integration into the grid, and communication with the other actors within the grid. This shall happen ideally in a way that is not just shutting down energy production when the grid is in a state outside of required tolerances.

And of course, the further positive impacts, which the above-mentioned community design triggers, both on the individual level for members with economic, environmental and social benefits, as well as on the wider level for the community/society with impacts on the market design, on the optimal usage of resources, and on the resulting reduction of CO_2 emissions.

3 Lesson learnt from stakeholder analysis and PED approaches review

As described in Section 1.4. (Methodology), next to success factors based on literature review all the found and extracted information throughout the INTERACT project fed into the longlist of key success factors established. These come mainly from the interviews and analysis taken place in the demo sites of the INTERACT project, as well as from the interviews and analysis done while building up the competence network and analyzing different competencies of existing PED/PEN-approaches.

3.1 Großschönau, Austria

Großschönau has a long tradition as a pioneer in different ways of finding a path towards more ecological and sustainable living. Großschönau has different already established organizations to inform about new ideas and initiatives, and to invite the local citizens to join such initiatives. The municipality is a rather small, rural municipality, where personal contact with the different citizens is given. Therefore, personal discussion and word of mouth are a very important and critical factors for successful project implementation.

With regards to identifying factors contributing to the success of the municipality in the field of sustainability and energy efficiency in Großschönau, it becomes apparent that many different aspects in relation to a community organization, a leading role and competencies are available and widespread within the community. The following aspects contribute:

- Social cohesion: The long experience of the community in energy related projects and their shared vision for the community.
- Municipality representatives and organizations receive a high level of trust, fostered through the long communal experience of setting goals for ambitious projects and their successful implementation.
- Leading role: Motivated leader with a functional role that enables to work and dedicate to the cause, capacities within the municipality and sufficient decision-making power
- An existing highly skilled and experienced professional organization that serves both as an opinion leader and offers experienced professionals.
- Availability of capacity building and knowledge building.
- Relevant basis studies, simulations and analysis supporting decision and proofing local relevance and advantages.
- Well-established network towards neighbouring communities, relevant infrastructure providers and public administrative institutions.
- Regional strategy and sustainability goals established.
- High level of awareness and information among inhabitants, high level of involvement.
- High level of social control through closed community, informal background.
- Comparably low cultural diversity, close proximity of locations enables easy, direct and informal exchange of information.

3.2 Fyllinge, Sweden

Fyllinge, part of the city of Halmstad, is a greenfield real estate development project with a focus on innovative energy technology solutions involving local production of heat and electricity in form of hybrid solar panels and geothermal heating. Currently, the legislative framework for the creation of an energy community is missing.

During the stakeholder interview the focus was given to the municipality and DSO. The municipality and the DSO are in many aspects the same stakeholder in this, since the DSO is fully owned by the municipality. Although they do have slightly different formulations of the benefits of an energy community. The Municipality sees energy communities as a way to further develop housing areas with a minimum expansion of grid capacity and the DSO has its main focus on maintaining grid stability when adding new development projects.

A driver that is shared between DSO, municipality and real estate developer is the possibility to communicate that a developing area is using state-of-the-art technology to reduce climate impact and allow for more locally generated power in a developing area. These are generally accepted and positively received benefits, which shall increase the overall value of the city developing project.

3.3 European PED approaches

From the perspective of PED approaches analysed in D.2.1 there were several success factors added to the long list, worth mentioning:

In relation to the Austrian projects:

- Engagement of the users and feedback of actual behavior is necessary to reach the planned efficiency in reality.
- A motivated and ambitious leader of the project is needed to constantly move forward, especially when there are mainly non-monetary benefits for the participants.
- Start simple and easy to move forward and set the first steps.
- Clear definitions and calculations ease internal and external communication.

In relation to the Swedish projects:

- Success factors in future realization projects will be the willingness of the quarter developers to accept longer payback times for their investment and put additional effort into the planning and innovation process.
- Strong cooperation and close work between experts from various fields are necessary.
- High level of complexity of the process, therefore suggested to start in a simple, limited approach and expand stepwise.
- Engage with stakeholders every step of the way and reaffirm a common understanding of the project objectives.
- Reserve resources for competence building, knowledge exchange and be sure of the process.

- Strong commitment towards CO_2 targets, the union of cities/ municipalities that together aim to reach the goal, followed up by a regular exchange of knowledge.
- Engagement of the future users concerning energy consumption and technology usage as well as a long-term monitoring process are key to reach the planned efficiency in reality.

In relation to the Czech projects

- Dedicated professional is needed to move projects forwards.
- Support of local authority is crucial.

4 INTERACT Key Success factors

Based on the literature reviews, as well as the inputs from the stakeholder analysis in pilot regions and the analyzed European PED approaches, we are sorting the success factors into broader categories. Our aim is not to prioritize them but to offer a possible check list that may serve for future stakeholders with intention to establish an energy community or even and INTERACT Energy Community.

In Chapter 2 we have suggested a multilayer approach of project success definition (Figure 2). In this document we are focusing on the Organizational Benefits (Level 4 and 5) of the project, which are representing the factors impacting the success of implementing and replicating the specific INTERACT Energy Community as a building block of positive energy districts.

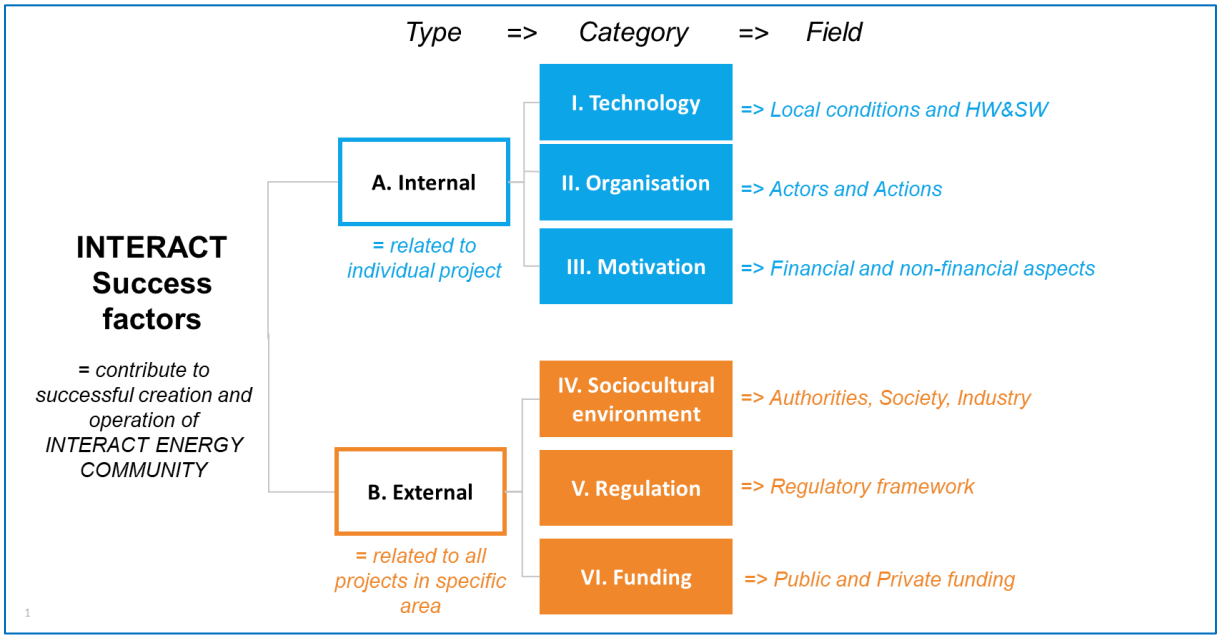

Figure 4: Structure of the Key Success Factors of INTERACT EC´s

Our approach to structure the key success factors of the long-list into a resulting short list is depicted in Figure 4. We first devide the factors into two main types:

a. Internal factors that have impact on individual projects.
b. External factors that influence the energy community projects in certain geographical area, e.g., region, state, country.

We then suggest a classification into six wider categories that represent a combinations of social, economic, technical, and governance factors.

- For Internal factors: I. Technology, II. Organization, III. Motivation.
- For External factors: IV. Sociocultural environment, V. Regulation and VI. Funding

In the last step we highlight the relevance of the different key success factors in different stages of project development:

A. During Planning

Aspects to be thought about before and during the start-up of the energy community, in order to have a fitting and suitable design in line with local needs and possibilities.

B. During Operation

Aspects to be thought about during the operation of the energy community, in order to have smooth, fair, secure and simple processes, a long lifetime as well as positive development of the newly established organization.

In the following subchapters we will describe the details of each of the six categories.

4.1 Internal Success Factors related to Technology

Table 1: INTERACT success factors: Technology

Field	Success factor	Feature	Relevance Planning	Relevance Operation
Local conditions	Renewable energy production systems (PV, wind, etc.) and flexibility enhancers (storage, etc.) frequently installed and available			
	Potential to install further innovative energy systems (PV, EV charging, energy storage,…)			
HW&SW	Automated measurement	Prerequisite for INTERACT EC		
	Modernisation of distribution grid and customer plants	Prerequisite for INTERACT EC, enabling automation of the power system operation processes and scalability of solution in consideration of the holistic approach		
	Suitable ICT structure for system optimization and availability of relevant data	Preserving data privacy by minimizing data exchanges between different stakeholders		
	Standardized ICT solutions for communities: Data/cost sharing tools	Standardized solution, transparent rules, easy administration		

Table 1 describes two fields of success factors related to technology issues. Within the field “Local conditions” the contributing factors for a successful EC are rather straightforward: the more potential is available and/or possible, the more likely is beneficial and functioning operations.

With respect to HW & SW, this field with its factors is very important in the context of the creation and successful operation of an INTERACT Energy Community. To establish an energy

community that is operating in harmony with the grid and is possible to operate on local energy markets there has to be attained an advanced level of applied innovative energy systems and the ICT structure – both on the level of individual customer plants and on the level of the distribution grid.

For allocation of both energy flows and cost/revenues among community members there will be needed automated measurement. This enables control of the allocation of the energy flows. Furthermore, appropriate ICT structure is needed to manage the allocation of energy flows among the members and into the distribution grid. An important feature of the ICT structure for INTERACT Energy Community is the importance of data privacy by minimizing data exchanges between different stakeholders. All of this is achieved by following the principles and guidelines of the holistic *LINK* architecture (Ilo et al., 2019).

Within INTERACT project we will elaborate in more detail on the needed ICT structure with specific communication guidelines between the actors within the electricity community in Deliverable D3.3.

4.2 Internal Success Factors related to Organisation

Table 2 encompasses a broad range of different success factors. We have divided them into two main fields: Actors and Actions.

The importance of a motivated leader was frequently mentioned during our research. For example, Haggett, C. et al. (2013) states that some members of a community can be instrumental in harnessing the enthusiasm of communities, and starting projects or moving them forward. Similarly, it was also mentioned as an important point during stakeholder discussions in Großschönau stakeholder mapping.

There can be differences among greenfield projects and established neighborhoods in the role of a motivated leader. In greenfield projects, the project initiator can be a real estate developer with strong mainly profit-driven motivation to go forward (advanced standards of living => better profit for the developer). This type of leader later stays outside of the energy community. Nevertheless, membership in the energy community can be another selling argument apart from advanced standards of living. On the other hand, in an existing neighborhood with more diversified stakeholders involved in the process, there is a more urgent need for a leader in the sense of one who focuses on finding the consensus in the decision-making process among community members and building credibility into an energy community project during the planning phase. A motivated and ambitious leader of the project is needed to constantly move forward, especially when there are mainly non-monetary benefits for the participants (see also below section 4.3.).

The presence of the municipality as an energy community member can also be another element that can contribute to building credibility in an energy community in the eyes of its future members. This was mentioned during PED approaches mapping in Swedish cases and also during the Großschönau stakeholder mapping (D2.2). Austria pilot region Großschönau is a good example of an active approach of the municipality with the mayor of Großschönau playing the important role of the above-mentioned leader in the potential energy community

Table 2: INTERACT success factors: Organisation

Field	Success factor	Feature	Relevance Planning	Relevance Operation
Actors	Leader	Motivated, with a focus on raising the stakeholder trust		
	Community stakeholders	Willing to cooperate		
	Pre-existing community	With social cohesion and community identity		
	Municipality	Acting as a member or external supporter		
	Diversified expert team			
	Dedicated project officer with time and expertise			
	Local market operator	Facilitating the organisation and exchange of information		
Actions	Cooperation between technology suppliers, funders, real estate developers, DSO			
	Clear stakeholder communication strategy	Simplicity, transparency, and fairness of internal rules and communication, clear goals from the beginning		
	Systematic planning with experts from all related sectors			
	Learning from other community energy projects			
	Engaging (future) community members into energy consumption optimization and innovative energy system usage			

A focus on a community-building function was also mentioned during our stakeholder mapping in Großschönau (D2.2) as an important role within the community members to be filled. These can be for example the motivation of members, taking care of needs in the process, estabilishing roles models for the community and/or a good communication strategy. A clear stakeholder communication strategy with the focus on building trust among future community members can prevent a number of conflicts.

4.3 Internal Success Factors related to Motivation

Table 3 describes financial and non-financial aspects of motivation. Financial aspects are of course necessary motivation drivers for the successful creation and operation of the energy community. However, as the potential financial benefits of cost reduction may be unclear in the planning phase, the non-financial aspects play a necessary part in the process.

E.g., Haggett et al. (2013) in the analysis of real energy community projects in Scotland found out that projects primarily motivated by autonomy or environmental factors have a relatively higher likelihood of success than those projects where financial motivations are prioritized.

Another financial aspect of motivation can be a change of paradigm of economic success evaluation, e.g., during our PED-approaches mapping for Deliverable D2.1 there was also noted that success factors in future realization projects will be the willingness of the quarter developers to accept longer payback times for their investment and put additional effort into the planning and innovation process (e.g. in Zukunftsquartier 2.0 project in Vienna).

Among non-financial aspects of motivation there can be mentioned also "added services" for the members, with various possible examples such as bulk purchases of services, enhanced analytics of energy flows or access to information and know-how.

More into the topic of possible values that are closely related to motivational issues the energy community can have for its members will be discussed in Deliverable D.4.1.

Table 3: INTERACT success factors: Motivation

Field	Success factor	Relevance Planning	Relevance Operation
Financial aspects	Cost reduction (& revenue creation)		
	Acceptance of longer payback		
Non-financial aspects	Environmental benefits		
	Social cohesion		
	Added services		
	Energy independence / autonomy		

4.4 External Success Factors related to Sociocultural environment

Table 4: INTERACT success factors: Sociocultural environment

Field	Success factor	Relevance Planning	Relevance Operation
Authorities	Local council support (formal & informal) and knowledge		
	Fit to local/regional/federal strategic targets		
Society	Tradition of social enterprises / cooperatives		
	Environmental awareness, high public acceptance for climate action		
	Interest of real estate developers, architects and planners, relevant city administration departments		
Industry	Network support/knowledge sharing among energy communities		

Apart from internal factors that are related to specific energy communities we also want to address the success factors that form the appropriate environment for the creation and

proper operation of energy communities (Table 4). These external factors are not influenceable by the potential energy community members and/or energy community project managers. They are of relevance for policymakers that want to remove the barriers of entry and support the creation of new energy market players.

From a sociocultural point of view in several interviews both with PED-approaches in Austria, Sweden and the Czech Republic as well as within the stakeholder interviews in Austria and Sweden the support of the different levels of authorities was mentioned as a very important role. Even when laws and regulations are set, authorities have a lot of leverage to support and speed up any given project which fits to their own strategies and goals for their work.

Regarding society public awareness and trendiness of environmental topics and climate action is on a rather high level. Movements like Fridays for Future and strategic plans like the European Union's Green Deal or United Nations net-zero commitments can be seen as examples. All of this helps creating a successful own community sharing similar goals.

And finally, energy communities can be seen as a small but rising industry section of itself, where having available a knowledge sharing network and support in between the industry helps with best practice and support.

4.5 External Success Factors related to Regulation

Table 5: INTERACT success factors: Regulation

Field	Success factor	Relevance Planning	Relevance Operation
Regulatory framework	Regulatory framework for energy communities in place		
	Access to energy and flexibility market		

The regulatory framework is a necessary success factor, as well as a prerequisite (Table 5). Among the analyzed countries only Austria has fully implemented the energy community regulation (completed in summer 2021) at the time of writing this document. In the Czech Republic and Sweden, there are currently legislative proposals existing, but the suitable regulatory framework is not given yet.

In WP5 there we will focus on the agenda of the regulatory framework in more detail, showing differences between the countries as well as critical points in regards to the technical necessities of an energy community working in harmony with the grid.

4.6 External Success Factors related to Funding

Availability of public and private funding is important mainly in the planning and development phase. During operations, a prerequisite of a successful INTERACT EC is its viability, meaning that it will sustain itself (**Chyba! Chybný odkaz na záložku.**).

Table 6: INTERACT success factors: Funding

Field	Success factor Feature	Relevance Planning	Relevance Operation
Public	Availability of public funding		
Private	Accessible private investors funding		

In line with the establishment of the regulatory framework, also public funding activities specifically dedicated to the support of stating the first energy communities have been created in Austria and are likely to be created also in Sweden and the Czech Republic.

International funding programs for research and knowhow creation in this area are available already for some time. In many cases, such public funding enabled the creation of a position of a dedicated project officer that can push the project development forward

5 Requirements for INTERACT Energy Communities

In Chapter 4 we described in a structured way key success factors that can influence the process of planning & development and the operation of INTERACT Energy Communities. We take this analysis of success factors as a starting point for pointing out some requirements for INTERACT Energy Communities.

Below we summarize the main preliminary remarks to each of the defined categories of key success factors. Internal requirements are addressing project developers and potential members of INTERACT Energy Communities (Table 7) whereas external requirements address policy makers and facilitators of INTERACT Energy Communities (Table 8).

It should be noted, that this preliminary version on requirements will be further elaborated during the coming months in deliverables in WP3 (requirements for technology issues), WP4 and WP5 (requirements for organizational issues) and will be finally part of the main deliverable in WP6 (D.6.1 - Roadmap for the implementation of the designed INTERACT Energy Community in general and for the specific local perspectives).

Table 7: Preliminary internal requirements for INTERACT Energy Communities

Category of Success factor	Addressing INTERACT EC project developers / potential members
Technology	For the implementation of INTERACT Energy Communities, there are some technical prerequisites that have to be fulfilled, such as : • Modernized customer plants. • Modernized distribution grid. Standardized ICT communication tools among community members. These can contribute to cost efficiency in implementation of the solution.
Organisation	There are four types of members such as producers, consumers, prosumers, and members with storage facilities. The prerequisite for establishing the energy community is to have at least two members of different types sharing electricity locally. However, the minimum viable size is not easy to define. The key for successful project development is to focus on: • Transparency of rules and trust-building of (future) community members. • Communication and cooperation with various (external) stakeholders (e.g. local distribution companies, municipality, real estate developer, technology providers, other energy communities).
Motivation	The prerequisite for establishing an energy community is to have motivated future community members. The requirement is reaching social cohesion, environmental and economic benefits, and increase of energy independence.

Table 8: Preliminary external requirements for INTERACT Energy Communities

Category of Success factor	Addressing policy makers and facilitators of INTERACT EC´s
Sociocultural environment	The possible benefits of energy communities have to be discussed on both national and local level with relevant stakeholders such as distribution companies, real estate developers, architects and urban planners and city development departments.
Regulation	The prerequisite for establishing an energy community is to have a supportive regulatory framework that defines the rights and obligations of all relevant stakeholders. The requirement is having established institutions to implement the regulation and provide a supportive function for potential energy communities.
Funding	In the initial phase of energy community market development existence of public funding is crucial for the preparatory analysis of pilot energy communities and for establishing scalable solutions (both technical and organizational) that can be replicated.

6 Conclusions

The objective of this deliverable was to present a structured view of key factors that can contribute to the successful establishment and further viable existence of an INTERACT Energy Community.

The identification of a comprehensive definition of “success” in application to INTERACT Energy Community was conducted in an iterative process applying methods like literature review, experts’ consultation, interviews throughout various WP2 activities resulting in extraction and structured view on success and its contributing factors.

We have suggested a division into six wider categories that represent a combination of social, economic, technical, and governance factors.

- For Internal factors: I. Technology, II. Organization, III. Motivation.
- For External factors: IV. Sociocultural environment, V. Regulation and VI. Funding

We describe their importance for individual projects (as Internal factors) and for projects in a specific geographical area (as External factors) both during the start-up process of the INTERACT Energy Community as well as during the operation of an INTERACT Energy Community.

Each category is then divided into various fields with specific success factors that can influence the process of planning and/or operation of INTERACT Energy Community.

Applying the established structure of key success factors and requirements to a specific project, e.g to the two demo sites of the INTERACT project indicates their potential in reaching success within their planned implementation and operation of the energy community: The more factors being fulfilled / existent already, the more likely a successful implementation and operation will be. Moreover, it gives an indication of factors and requirements that need further attention during the planning and implementation stage.

We have suggested preliminary requirements for INTERACT Energy Communities that will be further elaborated during the coming months in deliverables in WP4 and WP5 and will be finally part of the main deliverable in WP6 (D.6.1 - Roadmap for the implementation of the designed INTERACT Energy Community in general and for the specific local perspectives).

Thanks to the fact, that energy communities are emerging in greater numbers due to the changes in European law nationalized by the countries at the moment, more detailed analysis on key success factors and requirements to its functioning can be performed soon with more real-life data to draw from. The same goes for INTERACT Energy Communities, where we hope that the benefits coming from the holistic system architecture will lead to several pioneering communities based on its principles and therefore provide the needed data to further deepen the research and results of this deliverable.

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