This Project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement N. 957752

Smart integRation Of local energy sources and innovative storage for flexiBle, secure and cost-efficIent eNergy Supply ON industrialized islands

D5.4 – Interim report on social impact and acceptance

Lead partner: NORCE

Project Contractual Details

Project Title	Smart integration of local energy sources and innovative storage for flexible, secure and cost-efficient energy supply on industrialized islands
Project Acronym	ROBINSON
Grant Agreement No.	957752
Project Start Date	01-10-2020
Project End Date	30-09-2024
Duration	48 months
Website	www.robinson-h2020.eu

Deliverable Details

Number	D5.4		
Title	Interim report on social impact and acceptance		
Work Package	WP5		
Dissemination level[1]	PU		
Due date (M)	M29	**Submission date (M)**	M31
Deliverable responsible	Søren Djørup (NORCE)		
Contributing Author(s)	Søren Djørup (NORCE), Ingvild Firman Fjellså (NORCE)		
Reviewer(s)			
Final review and quality approval			

Document History

Version	Date	Name	Comments[2]
1.0	23.04.2023	Søren Djørup	Final version for evaluation
1.1	11.05.2023	Søren Djørup	Updated version after internal review process.

[1] Dissemination level: **PU** = Public, PP = Restricted to other programme participants (including the JU), **RE** = Restricted to a group specified by the consortium (including the JU), **CO** = Confidential, only for members of the consortium (including the JU)
[2] Creation, modification, final version for evaluation, revised version following evaluation, final

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

Executive summary

This paper is a midway status of observations done by T5.3 in the Robinson innovation and research project on Eigerøy. The paper finds that Robinson has been a spark for local development, collaboration, and development at Eigerøy. The impulse for this development has been the Robinson project, while the development on the site is heavily driven by local project partners. These participating actors were all established institutions prior to the Robinson project. Nonetheless, Robinson as an event have had an impact by bringing inspiration and aspiring collaboration and self-confidence locally.

Reviewing the initial Robinson concept, solutions which do not formulate local value propositions seem to struggle in the implementation. These value propositions must appeal to local interests by helping create local development, navigate volatile energy markets or address environmental concerns. Answering more than one of these local priorities seems to be a necessary condition for social acceptance.

Concerning the governance of decentralised integrated energy systems, trust and coordination appears as two key terms. The system concept has relatively many sub-parts and coordinating the implementation of these individual parts, while addressing all technical and organisational concerns, appears to have some degree of complexity. This points towards the need for a dedicated entity or person who have the resources and mandate to coordinate the implementation on a day-to-day basis. The investigations also point to the importance of having a locally trusted party in the front when engaging with potential stakeholders outside the consortium.

In sum, the midterm evaluation identifies fruitful learnings regarding local impact, drivers for local energy innovation, and the organisational requirements associated with the implementation of decentralised and integrated energy systems.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

Table of content

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

List of figures

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

List of tables

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

1 Introduction

This paper is an interim report from T5.3 in the Robinson project funded by the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement N. 957752.

The work in this task focus on investigating social barriers and impacts related to the demonstration project on Eigerøy. The work is carried out through involvement of different stakeholders relevant to the Robinson demonstration project.. The objective is to understand the concerns and interests of local stakeholders and evaluate the impact of the project activities.

All of the installations on Eigerøy are planned to be placed in the industrial harbour area of Kaupanes. The physical characteristics of the demonstration project means that only a relatively small pool of actors is involved or affected. The involved and/or affected actors are all organisations such as commercial companies or public institutions. The Robinson project does not have a significant direct impact or involvement of private citizens. The technologies are in general small scale and not expected to come with externalities in the form of smell, noise, or significant visual impact. An exception is the small-scale wind turbines which could have a minor visual impact in an already industrialised landscape.

The report primarily focusses on the interest of stakeholders who are directly involved in parts of the project, or actors who chose not to be involved.

In the following, the paper will describe methods and research design in chapter 2. This includes the mapping of relevant stakeholders, the themes and questions addressed in consultations of the stakeholders, and a description of the process of collecting information.

In chapter 3, the findings are analysed and described. The results are derived from consultation with stakeholders as described in chapter 2. On this basis, the paper identifies a range of observations. These observations are formulated into five learnings that sums up the interim findings. These reported interim findings will be followed and critically evaluated through the rest of the project life.

Hence, this report is a midway interim report which sum up observations from the first part of the project life (D5.4). A final report will be authored in the end phase of the project, summing up and concluding on the findings from the entire project life (D5.5).

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

2 Method and research design

As a fundamental methodological approach, the analysis takes point of departure in experiences and views held by stakeholders. This section describes the overall approach to the mapping of stakeholders and interests and how it is its applied to case of Eigerøy.

It is of interest to investigate how actors assess the overall energy situation and whether they have specific objectives and concerns regarding energy consumption and supply. From this, the coherence among project partners interests and project objectives can be observed. Further, it may also provide a basis for investigating the link between overall EC policy objectives and agendas among local actors. Included in this, learnings about how overall project objectives are translated by actors to fit own needs and interests.

The mapping of plans and interests are carried in two stages. This report is summing up the observations of the first round of consultations. In the end of the project, another round of consultations is planned to be carried out to evaluate which experiences and learnings the actors have picked-up during the entire project life.

The purpose is to investigate the interests and plans among key stakeholders and, on this basis, identify implementation challenges and drivers. At the end of the task life, the task will seek to formulate suggestions for organisational/regulatory proposals to be included in the final deliverable (D5.5). The final deliverable will also include relevant perspectives and learnings from the follower projects on Orkney and Crete.

2.1 Conceptual approach for identification and categorisation of stakeholders

As an initial step, the technical concept of the project is reviewed to clarify who is involved or affected and which role each stakeholder has in the system. Then, to help systematise the mapping of stakeholders, we apply a 3-dimensional framework where we each stakeholder is located. The framework includes the following three main categories and subcategories:

1. Ownership
    - Private
    - Public
    - Other
2. Geographical location/extension
    - Local
    - Regional
    - National

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

- International

3. Role in the energy system
    - Supplier
    - Consumer
    - Other

The framework entails a presumption that ownership structures of different technologies or institutions matters. Ownership structures may have an influence on interests, knowledge and objectives. Likewise it may influence the ability and mandate to handle matters with some degrees of public aspects. Hence, the framework includes the categories of private and public ownership, as well as the category of "other" which catch other or hybrid ownership models.

The framework also prioritise information of the geographical location of actors. Locality may often impact the local acceptance of various activities related to energy systems. Four different categories are included from "local" to "international".

Finally, the framework place the stakeholders according to their role in the energy system. Energy sector actors that are directly involved in the supply and demand of energy are supplemented by the category "other". This could be actors that are affected by externalities from the installations such as noise, smell, or visual impact as well as loss of access to any kind of non-market resources used by the project. Most relevant for the Robinson project, the category also includes actors that either have a regulatory role or are involved in the project for purposes beyond exchange of energy in narrow sense. This could include actors such as municipalities, NGO's, and other organisations which have an interest in the project for purposes or objectives which goes beyond the exchange of energy *per se*. These objectives could include, for instance, local economic development, environmental concerns, employment, etc. It could also include landowners, technology developers, resource providers, etc.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

2.2 Identification and categorisation of stakeholders at Eigerøy

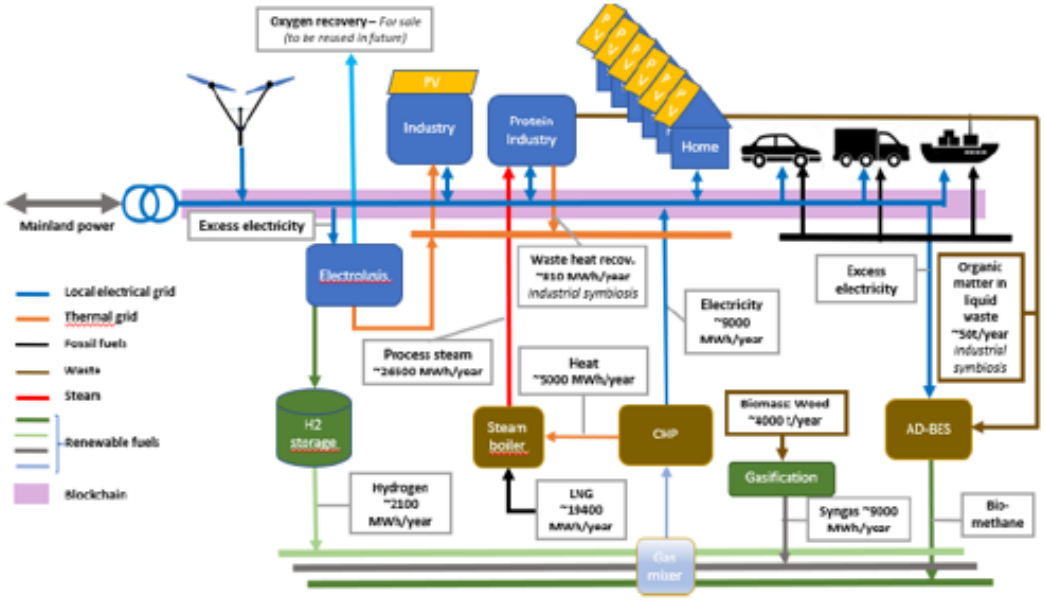

Figure 1. The Robinson concept at Eigerøy as conceived by the project proposal.

Prima Protein is a key actor as they are the main consumer of energy in the demonstration case and provides the organic waste resources for the AD-BES unit. Prima is also the provider of waste heat resources illustrated in the concept figure. However, the utilisation of waste heat is not going to be realised on Eigerøy due to lack of agreement with potentials consumers. For this reason, and others, neighbouring industries was also contacted as potential stakeholders that chose not to participate in the project consortium. Among the contacted industries, only **Aker Solutions** were positive to participate in the analysis.

ROBINSON Deliverable 1.1 highlights plans for developing further industries at Eigerøy. In order to include these potential industries in an overall energy planning for Eigerøy it would be relevant to gain lessons from ROBINSON. A case study of the reasons for the lack of waste heat utilisation may also have interests beyond ROBINSON in light of e.g. the ambitions of European Energy Efficiency Directive where waste heat utilisation has a high priority. Thus, case studies of ground level barriers for the realisation of these ambitions have a wider interest.

Dalene Energi is included as owner of the local and regional grid and owner/operator of the electrolyser.

Energy Innovation and Egersund Næring og Havn are both involved in the project but neither as consumer nor supplier. **Energy Innovation** is a local public-private owned entity with regional and international ownership. The company can be described as kind of innovative organisation which have initiated the Egersund Energy Hub which describes itself as “a center for renewable energy, green technology and digitalization”, and is a centre for education, training and certification within these areas. Energy Innovation have been active in earlier pre-studies of the energy supply at Eigerøy and was also one of the initiating parties when gathering the Robinson consortium.

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author’s views and the European Union is not liable for any use that may be made of the information contained therein.

Egersund Næring og Havn (ENH) is a municipally owned company which manages and regulates the harbour area at Eigerøy. ENH has a role in the project as being responsible for preparing the harbour area for industrial development through plans and regulation for the harbour area.

It was investigated if the plans for electrification of **fishing vessels** in the harbour were concrete enough to include them as well. However, it was not possible to establish contact with the relevant fishing vessels.

RES-T is included as supplier of the small-scale wind turbine concept. The wind turbine is relatively small-scale and the concept is targeting a behind-the-meter business case.

The Eigerøy project seems to be characterised by technologies that do not directly affect nearby citizens to a large degree. No significant externalities have been observed or was expected from the technical solutions at prior to the consultation. However, the wind turbine did turn out to be challenging to implement and have not been realised in the project so far. This challenge will be addressed later in the analysis.

In Table 1, the different actors included in the consultations on Eigerøy are mapped using the aforementioned framework. In the research, more actors than represented in the table have been contacted but only the ones included in the table agreed to participate.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

Table 1. Stakeholders which were included in the first round of consultations. Blue=Project participants, Grey=Not a project partner

	Local	Regional	National	International
Private				
1 Supplying	Dalane Energi	Dalane Energi Biomass provider		RES-T
2 Consuming	Prima Protein Aker Solutions			
3 Other				
Public				
1 Supplying				
2 Consuming				
3 Other	Egernsund Næring og Havn			
Third/other sector				
1 Supplying				
2 Consuming				
3 Other	Energy Innovation			

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

2.2 Themes and questions in the consultations

For mapping the interests and plans of the stakeholders, consultations with representatives for each stakeholder organisation have been conducted to map understandings of their energy situation in general and the Robinson project in particular. This also includes perspectives on what kind of "choice awareness" they hold when dealing with questions of energy supply.

Thus, firstly, the consultations will focus on which concerns and objectives stakeholders have around energy supply, if any, and the background and context of these concerns.

Second, which technical solutions they support to address these concerns and objectives, and how they view the technical installations as "problem solvers".

Third, it is mapped which organisational/institutional issues they may see as key barriers or elements of support and which organisational or regulatory initiatives may suggest or promote to advance their technical solutions. The third element can serve both as empirical case study for mapping regulatory barriers to the technological change inherent in Robinson as well as help understand the connection between the technological basis and policy interest of the stakeholders.

Before the consultations, a framework was developed with guiding themes and questions which formed the basis of the talks. The questions for each theme were adapted to the role in the energy system, taking point of departure in the categorisation presented in Table 1.

The framework for themes and questions applied consultations is shown in Table 2 on page 17. .

2.3 Research process

The main source for information were consultations with the actors. The consultations with the actors were carried out during a period from autumn 2021 to summer 2022. Further, additional information were gathered in informal talks during project related meetings and observations of discussion within the consortium. The latter source was used to provide understanding of context for the observer.

When the consultations were carried out, the themes and questions were sent to the consulted stakeholders in advance. However, they were not instructed to read or answer the themes beforehand.

The consultations were carried out as a semi-structured conversation. The pre-defined themes and structure of questions guided the talks, but responders where not restricted to only address the pre-defined themes during the conversations.

The length of the consultations varied between the conversations. The consultations with the more central and engaged stakeholders typically had the longest timespan while consultations of actors with a minor role and/or engagement were shorter. The shortest consultations lasted about 30 minutes whereas most consultations went more in-depth and lasted 60-90 minutes.

Consultations were held in person or online. During in-person consultations, notes were written down by the researcher. In the online consultations, recordings were done when permission from

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

participants were given. As background data for the analysis, summarised of the stakeholder perceptions were written by the researchers. These background data have been archived but are not disclosed in their entirety in this public report. However, explicit reference to each stakeholder consultation is used when pertinent to support the claims in the analysis.

2.3.1 The role of the researcher as an observer

The role of the researcher in the work carried out in T5.3 is to observe rather than engage or influence. In defining the themes for the consultations, the observer does influence the themes of the talks. This predefined selection of themes was based on previous research and experiences from working with energy transition issues.

However, it is not the role of the researcher to create acceptance, engagement nor impact of the Robinson project. Therefore, the expressed perceptions from the consulted stakeholders were not challenged when conflicting with the interest of the Robinson project. Rather, they were investigated by follow-up questions. In short, the objective of the research is not to create project acceptance or impact; it is to create learning about the determinants for project acceptance and impacts. When such determinants can be identified, they can be described and cumulated for the purpose of generating general learnings for energy transition policies.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

	Suppliers	Consumers	Other mediators
Energy Concerns and Objectives	Which energy sources do you currently extract/operate/supply?	What is your current energy supply solution?	
	What are your concerns regarding the general development in the energy system?	Is energy supply an important concern? • Why/why not? • Important themes; costs, environment, security of supply or other?	Is energy systems an important concern? • Why/why not? • Important themes; costs, environment, security of supply or other?
	What are the visions/objectives for energy initiatives? Why this vision/objective? Which problems and challenges forms the background?	What are the visions/objectives for energy initiatives? Why this vision/objective? Which problems and challenges forms the background?	What are the visions/objectives for energy initiatives? Why this vision/objective? Which problems and challenges forms the background?
Energy Technology Strategies	What are their technical proposals? • Energy efficiency measures • Wind/sun • Electrification • Biomass • Waste Why this technical focus? Were alternatives considered? How do these technical solutions fulfil the objectives?	What are their technical proposals? • Energy efficiency measures • Wind/sun • Electrification • Biomass • Waste Why this technical focus? Were alternatives considered? How do these technical solutions fulfil the objectives?	What are their technical proposals? • Energy efficiency measures • Wind/sun • Electrification • Biomass • Waste Why this technical focus? Were alternatives considered? How do these technical solutions fulfil the objectives?
Barriers and Supporting Elements	What do they see as barriers and supporting elements? • Costs (market/nonmarket)	What do they see as barriers and supporting elements? • Costs (market/nonmarket)	What do they see as barriers and supporting elements? • Costs (market/nonmarket)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

	• Rules • Coordination • Collaboration • Uncertainty • Knowledge/competences	• Rules • Coordination • Collaboration • Uncertainty • Knowledge/competences	• Rules • Coordination • Collaboration • Uncertainty • Knowledge/competences
Policies and Implementation	Which initiatives do they suggest for implementation? • Any initiatives to correct barriers above • Any initiatives to take further advantage of supporting elements	Which initiatives do they suggest for implementation? • Any initiatives to correct barriers above • Any initiatives to take further advantage of supporting elements	Which initiatives do they suggest for implementation? • Any initiatives to correct barriers above • Any initiatives to take further advantage of supporting elements
ROBINSON specifics	How do they see the Robinson project in context of objectives and interests? How "important" is this project?	How do they see the Robinson project in context of objectives and interests? How "important" is this project?	How do they see the Robinson project in context of objectives and interests? How "important" is this project?
	What potentials do you see in ROBINSON?	What potentials do you see in ROBINSON?	What potentials do you see in ROBINSON?
	What do you hope to achieve through ROBINSON? What would make this project participation a success?	What do you hope to achieve through ROBINSON? What would make this project participation a success?	What do you hope to achieve through ROBINSON? What would make this project participation a success?

Table 2. Questions for consultation for suppliers, consumers, and other mediators, respectively.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

3 Observations and findings

In this section, the information collected through the consultations and project activity is analysed. The analysis identifies five thematical learnings from the first phase of the Robinson project derived from the talks with stakeholders. Being an interim report, the thematical learnings can be considered preliminary.

The five learning themes are the following:

1) Local drivers for energy innovation at Eigerøy.
2) Innovative projects capacity to create trust and security of supply.
3) Organisation of innovative integrated energy systems.
4) Acceptance of specific technologies.
5) Local impacts of the project.

The findings are all highly related to organisation and actors. This includes the interests and objectives of stakeholders,how these may fit individual technologies, and the value they provide and for whom. The findings also include interesting observations of the coordination challenges that might come with integrated energy systems.

The findings in this interim report does not uncover any systematic barriers in policy and regulation, contrary to what was expected beforehand. Still, some of the traits in the findings centred around local motivations and system organisation may be a source of policy learnings. These potential policy learnings are not formulated in this interim report. The final report in the end phase of the project is expected to cover the question of identified policy learnings.

The five learnings derived from the first phase of the project is described on the following five pages.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

Lesson 1: Local drivers for energy innovation

The drivers for the local energy innovation activities cannot be ascribed to any single concern or interest. Rather, different drivers are merging.

The organisation Energy Innovation is highly motivated by environmental concerns, both globally and locally, and is further motivated by creating local and regional development.

Creating good conditions for local development is also the mandate for Egersund Næring og Havn's participation in the project.

Prima Protein also express a wish for using local resources when possible, although this is not the primary goal for the commercial company They also see sustainability as a potential competitive edge in the industry. Further, volatile energy markets means that the company is open for considering alternatives to the current use of fossil gas which is shipped to the factory from outside the local area.

As the main local energy supplier, Dalane Energi is partly motivated by a wish to contribute to local development in the region. Dalane Energi is heavily bound to its geographical region. First, all of its energy plants are located in the region. Second, Dalane Energi wishes to contribute to regional and local development, also in a long-term perspective where the fossil oil & gas industry is expected to decline in activity and employment.

As an energy supplier, Dalane Energi is more conscious around technological strategies in the energy market than some of the other local stakeholders. Dalane is currently operating and owning a fleet of renewable energy plants, mainly hydropower and wind power. Dalane has an interest in learning about new options for flexibility since they have a shortage of storage capacity in their hydropower fleet. The Robinson project is therefore an opportunity to build new competences and gain experience. For example, Dalane Energi has an interest in gaining experience with the electrolysers. They are considering this technology to be a way to add more flexibility to their renewable energy portfolio. A capability which is expected to become more important in more volatile energy markets. In general, they also see innovative activities as a source for creating "interesting jobs" which may attract higher educated people to the region.

In short, the local drivers for energy innovation can be summarised in the following priorities:

- Create local development and using local resources.
- Navigate in volatile and changing energy markets.
- Address environmental concerns.

To some extent these three different local drivers have come together in a local alliance in the Robinson project.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

Lesson 2: The capacity to deliver energy – and to deliver trust

For the energy consumers at the location, there is a common pool of themes and priorities between the consulted industries.

Common to the industry parties is that they express no specific interest in the particular technological solutions that the Robinson concept put forward. Rather, it is the energy services that a given technological solution can deliver which counts. They express a priority around security of supply as important for their businesses. Environmental concerns are also mentioned. Prima Protein have an interest in utilising the waste from production processes. For Prima Protein in particular, the energy cost is a huge concern since energy is a major production factor. For Aker, which did not join the Robinson project, security of supply seems to be a main concern.

Aker mentions their priority of having a trusted institution or actor to take responsibility of the energy supply; an actor which have a trusted capacity to deliver. In this context, the Robinson project as consortium of several (unknown) technologies and partners may be a factor of concern. Both Prima and Aker, as professional energy consumers, express concerns about the perceived complexity and uncertainty around the Robinson project as a concept. These concerns include both the project's capacity to deliver an operational solution during a relevant time frame, as well as concerns around the operation of the system after project life. Prima, as a central consumer of the Robinson system, highlights that they do not have the expertise inhouse to run a complex energy solution.

In general, there seem to be an adverse attitude towards complexity and uncertainty among the consulted consumers. Hence, research and innovation projects may want to make sure they answer those concerns from the first contact. They should address have inherently complex innovation projects can be formulated and organised as simple and reliable solutions for the customer – also after project life. One strategy could be to have local actors involved who is trusted and able to guarantee security of supply.

Several of the consulted actors across different categories points to Dalane Energi as having a central role in implementing technical solutions as they are an established and locally trusted institution.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

Lesson 3: The organisation of integrated energy systems

In previous literature, it has been highlighted that integrated energy systems are expected to require higher levels of coordination and these systems are also observed to pose some regulatory challenges[3]. However, this literature has not been seen to be directly transferable to the Robinson project. The literature often addresses integrated energy systems at national or international level. There, the different elements of the system are more geographically dispersed, involving many different actors. In comparison, the decentralised concept proposed in Robinson involves a relatively small pool of affected stakeholders, located within a smaller geographical area.

Still, the coordination challenges of the system development have been highlighted by some of the consulted stakeholders. As such, this also provide a new learning outcome from the project.

Consisting of several different components, the Robinson concept is conceived as complex to implement with several different sub-suppliers. Being a consortium of partners, the responsibilities for various components and agreement are spread between several actors. The project has no dedicated coordinator 'on the ground' who follows up on all these connections on a day-to-day basis (as opposed to the general coordination at project level and the scientific coordination which serve different needs).

Similarly, concerns among energy consumers about who will operate the system when the project ends points in the somewhat same direction. Likewise, we could also add the priority from one potential consumer to have a single, trusted party to be the energy supplier. Talking to one of the sub-suppliers, their doubts about what they were supposed to deliver or not also points towards some degrees of uncertainty and coordination complexity.

In summary, no party have signalled lack of trust in other partners or suppliers, and there is no critique of the project management. But there are many observations which indicate that the decentralised integrated energy systems require higher levels of coordination.

For transforming the Robinson research and innovation project into a replicable concept, easy to implement, there seem to be a need for a dedicated person or institution that have the responsibility for coordinating all decisions, contracts, and contacts.

In national systems these responsibilities are typically spread between many different parties as well. But the coordination of these parties can be secured through national plans and regulation. For the small-scale decentralised concept of Robinson, new locally based organisational entities must be developed. This point is not dissimilar to a point put forward by RES-T in the consultation. Approaching the subject from a commercial perspective, RES-T highlighted the need of creating a "one-stop-shop". This role can potentially be taken by an existing, trusted energy supplier, a local governmental entity, or by the creation of a new type of organisation.

From the organisational perspective, the main theme for general replication is the question around a) how to ensure coordination of complex systems and b) how to create trust in the concept from potential energy consumers.

[3] Among others, Hvelplund & Djørup (2017). Multilevel policies for radical transition: Governance for a 100% renewable energy system. Environment and Planning C: Politics and Space. 2017, Vol. 35(7) 1218–1241.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

Lesson 4: Acceptance of single technologies and propositions of local value

At the current stage of the project, it has not been possible to find a solution for implementing the small-scale wind turbine. In general, the consultations do not indicate that the local stakeholders have been very preoccupied by the wind turbine question. This could be due to the relatively small amount of energy it delivers. On the other hand, there has not been observed any explicit negative attitude towards the turbine.

We can assess the wind turbine in perspective of the three local drivers identified in Lesson 1:

- As a renewable energy source, it does tick the box of addressing environmental concerns.
- It does not fully address concerns about navigating volatile energy markets as it is not price competitive, except when placed behind the meter.
- It does utilise a local resource (wind) but it does not create local development. The wind turbine supplier is not local, and while it may reduce energy bills for the consumer behind the meter, it does not create value for any other actors. On the contrary, the financial benefit for the owner behind the meter is created by opting out from the common grid costs.

At this stage, one could speculate whether the small-scale wind turbine concept included in Robinson fall a bit between two chairs. As a behind-the-meter technology it has a relatively high spatial and visual impact, compared to, for example, photovoltaics. But as a wind turbine, it is not big enough to achieve the competitiveness which creates surplus value – as opposed to the general case of wind power.

On the other hand, wind turbines should in theory have a more suitable production profile compared to fx photovoltaics, given the climate at Eigerøy. It is also observed that agricultural organisations in the region report rising interests among farmers to install small-scale wind turbines.[4]

In general, one could suspect that the wind turbine proposition still lacks to formulate and document what value it provides to the local stakeholders. By the time of writing this interim status, the value proposition does not seem fully clear. The development in this question will be followed during the remaining project life.

The potential fall-out of wind power from the concept at Eigerøy implies that that project no longer includes a fluctuating renewable energy source. This could be viewed as a shortcoming of the concept since decentralised, integrated energy systems in general gain its relevance by utilising renewable energy.

[4] Source: NRK "Spår hundrevis av vindmøller på gårdene". URL: https://www.nrk.no/rogaland/bondelagsleder-vil-ha-mange-gardsvindmoller-pa-jaeren-1.16263414

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

Lesson 5: The impact of the Robinson project – the project as a spark

The impact of the Robinson project on Eigerøy goes beyond the project itself.

The Robinson project is a project with a mix of local and international actors with varying degrees of local attachment to the community on Eigerøy. A research and innovation project like Robinson usually consists of an initial vision of what should be installed, which activities to be carried out and an implementation plan associated with that. The project proposal will then describe what to be delivered by whom and when. The project consortium would be contractually obliged to deliver these activities and the progress would be monitored.

When looking at the Robinson project as described in the proposal, the early review indicates some deviations from the envisioned project. For example, the district heating grid was envisioned in the initial concept, then cancelled due to lack of interests in the very early phase of the project life. Similarly, the implementation of the wind turbine has met difficulties, as addressed earlier.

However, when we assess the impact in this paper, we try to assess the impact in a broader perspective. When talking to participating partners in Robinson, some of them would highlight activities, initiatives and new partnerships that strictly speaking is not a part of the Robinson project as it was described in the project proposal. They may more be classified as spin-offs from the Robinson activity. Still, from a social science perspective, this is to be considered as an impact of the project.

First of all, several of the consulted parties mentioned that the collaboration locally has increased since the start of the Robinson project. As such, the Robinson project has been a driver for local collaboration that spin off energy innovation – disregarding whether those individual activities were included and financed by the Robinson project proposal or not.

Second, several parties highlight that they have experienced that Robinson has been a driver for promoting Eigerøy and Egersund; in particular for the actors who are involved in the energy initiatives. This has been a platform for attracting new partners for new energy innovation projects.

In general, already midterm in the project, it can be concluded that the Robinson project has been a driver for local energy innovation – also stimulating initiatives beyond the project itself. The key driving forces for this innovative activity seems to be a merging of different local interests, increased local collaboration, and what may be described as an increase in local self-confidence and ambition. As such, the initiation of the Robinson project has served as a spark for local energy innovation and energy transition. That said, being 2-3 years into the process, it is too early to evaluate the long-term impacts of this development.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

4 Summary, status, and next steps

This paper analyses and describes main learnings around implementation and impact which have been identified so far in the Robinson project.

The paper describes the methodology which were developed prior to the empirical investigations. The applied framework is deemed to be largely relevant, and the consultations of the stakeholders have been fruitful. The consultations include fewer actors than initially conceived. This were mainly due to lack of interest to participate from some actors outside the project consortium. Or, difficulties in establishing contact.

Referring to the predefined categorisation of stakeholders, the geographical location of actors has so far proven to be important for engagement and impact. The established local energy supplier has been an important actor as a locally trusted actor. Likewise, local actors that are engaged in energy innovation but neither have a role as supplier, distributer or consumer are playing a central role as well. Their concern for coupling energy innovation with a general local and regional development seems to be a strong driver for implementing new energy technologies.

This concern also leads to the observation that energy technologies are more likely to gain acceptance if they can demonstrate value for others than the single customer. This observation could be important going forward in the project.

The consulted energy consumers have a clear expectation of value when engaging in new technologies. Hence, technical complexities and inventions with longer-term promises are themselves not sufficient. The technologies should be able to deliver concrete value. However, this value provision may be broader than just narrow financial considerations.

Finally, the integrated energy concept conceived by Robinson seems to require high levels of coordination. An integrated system consisting of many different parts and partners means that responsibilities are dispersed, for example the responsibilities for procurement of hardware and resources, etc. When looking beyond Robinson, a general learning seems to be that decentralised and integrated energy systems require a local manager or planner ‘on the ground’ with the mandate and competence to coordinate all the parts of the system.

Finally, it is interesting to observe that the event of the Robinson project itself has been a driver of local inspiration, collaboration, and engagement in sustainable energy innovation. The project has both sparked increased activity between local actors as well as attracted new partners from outside the local area. As such, the Robinson project have already had an impact - disregarding to what extent it will achieve its predefined technical installations.

Next steps

As mentioned in the introduction, this interim report will be followed by a final report at the end phase of the project. First, the final report is expected to follow and verify/falsify the findings presented in this paper. Second, the research approach will be evaluated taking into consideration the findings in the interim report. New questions and themes for consultations are likely to arise on

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author’s views and the European Union is not liable for any use that may be made of the information contained therein.

this basis. Third, a second round of consultations will be carried out to cover events and experiences during the second half of the project life. Consulted actors are also expected to have a better position to evaluate the project in its entirety when it approaches its finalisation.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752. This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.