User-Centred Energy Systems

Impact assessment of case studies

Assessing the impacts of public engagement in energy infrastructure projects

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Diana Süsser, Ira Shefer, Shima Ebrahimi, Samuele Livraghi, Nathália Fernandes, Marco Peretto, Esther Hardi, Andrzej Ceglarz

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Abbreviations

Name	Abbreviation
Carbon, Capture, Usage and Storage	CCUS
Environmental Impact Assessments	EIA
European Union	EU
Institute for European Energy and Climate Policy	IEECP
Non-Governmental Organizations	NGOs
Photovoltaic	PV
Renewables Grid Initiative	RGI
Shapinsay Development Trust	SDT
Transmission System Operators	TSOs
United Kingdom	UK
United States of America	USA

Executive summary

While there is a widespread agreement that public engagement is crucial for a sustainable and just energy transition, the quality of the engagement matters. Recent research demonstrates that the quality of participatory planning is crucial for the acceptability and support of energy technologies and infrastructures, as well as the legitimacy of transition processes. For this reason, a stronger understanding of the impact of public engagement in energy infrastructure development cases can help improve future outcomes.

This research assesses 98 cases of public engagement in energy infrastructure projects. The case studies mainly focus on renewable energy production (e.g., wind and solar) and electricity grids, as these technologies are both widely available and central to decarbonizing energy systems. In addition, 6 cases integrate energy production, distribution or storage, and 6 “exploration” case studies on hydrogen production, storage, and carbon capture, usage and storage were selected. As part of the study, the research team developed and applied a novel framework to assess the impact of public engagement in energy infrastructure projects.

This study finds that public engagement can positively impact the project development process and its outcomes. Nine impact criteria have been defined in the impact assessment framework:

- Inclusiveness
- Timing of engagement
- Ownership
- Information exchange & learning/clarity and transparency of the engagement process
- Trust
- Local/regional added value
- Project development time
- Costs
- Influence on project’s final shape and operations.

Based on the analysis, eight recommendations for effective stakeholder engagement are made.

Stakeholder engagement processes should:

1. Be inclusive while engaging the public and consider outreach to hard-to-reach groups where appropriate.
2. Engage the public early and continuously in the process. Engagement can even start before the planning phase with pre-dialogues.
3. Enable the public to become co-owners of the process by involving them in the decision-making.
4. Establish a clear and transparent engagement processes where information is shared openly.
5. Build trust in and between different stakeholders by establishing inclusive, transparent and equitable processes.

6. Consider creating local and regional added value not only during the construction phase but also in the long-term, for example via employment opportunities, or community funds.
7. Have a defined budget for stakeholder engagement, as costs for stakeholder engagement can reduce potential costs related to project opposition and delays.
8. Explain how the results of the engagement processes have influenced the final design and operation of the projects.

1 Introduction

While there is a widespread agreement that public engagement is crucial for a sustainable and just energy transition, the quality of engagement matters. Recent research demonstrates that the quality of participatory planning is crucial for the acceptability and support of different energy technologies and infrastructures [1], [2], [3] and can increase the legitimacy of transition processes [4]. Therefore, a better understanding of the impact of public participation in energy infrastructure development cases can help to improve such processes and their outcomes in a field in which research has often focused on single case studies in specific regions [5], [6]. Although some systematic research on public engagement in energy transitions has recently been carried out, engagement efforts across cases have not yet been sufficiently studied. For example, the study by Stober et al. [7], provides a qualitative analysis of participatory energy planning. The authors found a variation in the quality of engagement approaches and lessons to be learned from them. Another study by Schroeter et al. [8] tested the overall value of public participation, using a framework to evaluate different participation formats and participation quality. Even so, more research is needed to better understand the value of public participation in projects related to electricity grids and renewable energy development, and the impact on affected citizens and communities hosting and participating in this infrastructure.

1.1 Objective and guiding questions

This report fills an evidence gap by providing a framework for the assessment of public engagement on energy infrastructure projects including wind energy, solar energy and electricity grids. The framework is novel for two key reasons: first, it draws on a wide range of real-world examples combined with existing literature, and second, it offers insights into both projects' and communities' experiences of engagement.

This framework is used to identify critical success factors and key potential challenges for infrastructure projects. Overall, the report provides evidence from international case studies on which approaches to public engagement are effective and less effective, and under what circumstances.

The guiding questions are:

i. To what extent have different case studies of public engagement in energy infrastructure been inclusive and led to equitable energy infrastructure development?
ii. When and why have infrastructure projects failed or their costs and/or duration increased due to a lack of a meaningful public engagement?
iii. What approaches to public engagement have been effective in achieving acceptance of energy infrastructure projects and fair and inclusive decision-making on energy infrastructure?

2 Methodology

The aim of the report is to carry out an impact assessment of public engagement in specific energy infrastructure projects (henceforward referred as “case studies”), evaluated through process-based and outcome-based dimensions, and consider the impact on both the projects and communities. The study comprised of three main steps: (1) the selection of 98 case studies, starting with the countries participating in the Task, as well as cases identified during the literature review and expert interviews, (2) the development of an impact assessment framework for the case studies, (3) applying the impact assessment of public participation to the selected case studies.

2.1 Case study selection

The study sought a variety of cases from the participating member countries and cases from other country contexts. The selected case studies may vary from country to country. They were identified through expert interviews, desk research and advice from country representatives. The cases represent either good practice or unsuccessful examples of public participation, to compile lessons learned.

2.1.1 Criteria for the case study selection

Four high-level selection criteria were defined. The case studies should:

1. Deal with the development of energy infrastructure, namely renewable energy production, or electricity transmission or distribution, or associated technologies, such as energy storage or green hydrogen;
2. Present a good or best practice example, OR present a case with high public opposition / an unsuccessful case;
3. Come from different geographical contexts (in Europe and beyond; including rural and urban environments); at least four cases from each task participating country were studied;
4. Be well documented, specifically how the public has been engaged in the energy infrastructure project.

2.1.2 Case study overview

The study includes an assessment of 98 case studies from 25 different countries: Australia, Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Honduras, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Saudi Arabia, Spain, South Korea, Sweden, Switzerland, Turkey, the United Kingdom and the United States of America.

The assessment includes different energy infrastructure projects. Although the focus is on energy production technologies and electricity distribution and transmission, six cases have been examined where infrastructure has been linked to other infrastructure developments, such as energy storage, green hydrogen and carbon, capture, usage and storage (CCUS). Additionally, another six cases integrated energy production, distribution, or storage.

Selected cases

Energy production:

- Onshore wind energy: 20 cases
- Offshore wind energy: 11 cases
- Onshore and offshore: 2 cases
- Solar energy: 17 cases
- Geothermal energy: 1 case
- Hydro energy: 1 case
- Tidal energy: 1 case
- Biomass: 1 case

Energy transmission and distribution:

- Electricity grids: 27 cases
- Renewable heating grids: 5 cases

Energy storage:

- Battery energy storage: 2 cases
- Green hydrogen storage: 3 cases

CCUS:

- 1 case

Integrated energy systems: 6 cases

2.2 Impact assessment framework

When assessing public engagement, it is critical to define which characteristics should be considered and what the appropriate criteria are for their examination. **Table 1** presents the impact assessment framework, including a summary of the selected criteria. Impact assessment considers two dimensions:

1. The process of participation (did public engagement change who was involved and who had a say? Did participation change the way the project was implemented?);
2. The results of participation (did public participation change the outcome, such as the design, of the project? Did it change the way benefits and burdens are shared with the community?), conceptually following Walker and Devine-Wright [9].

In addition, the study distinguishes between the impact of public engagement practices on energy infrastructure projects and on the communities involved in these projects. The assessment framework is based on nine indicators.

Table 1: Impact assessment framework.

	Indicators	Indicators' explanation	Impact on project	Impact on community
Process	Inclusiveness	Who are the engaged stakeholder groups? Efforts invested (continuum?)		
	Timing of engagement	When are stakeholders enabled to provide / fulfil their potential of participation / contribution the most		
	Ownership	The extent to which actors are being engaged in the participation process (based on levels of participation)		
	Information exchange & learning / clarity and transparency of the engagement process	Accessibility and clarity of information. Availability of common information basis		
	Trust	Institutional trust (stakeholders' trust in institutions) Community / social trust (stakeholders' trust among each other Individual trust (trust among individuals that comprise stakeholders' groups		
Outcome	Local / regional value added	Financial participation / ownership Local benefits (e.g., money to the community / nature-based solutions)		
	Project development time	Timespan between initiation and operation (plans versus real-time, considering engagement efforts) Delays / no delays / extent of delays		
	Costs	Participation costs versus additional costs resulting from bad engagement)		
	Influence on project's final shape & operations	Changes in the amount, size, siting, technology choice / improvements, and design of the RES / infrastructure compared to initial plans.		

The following subsections provide more details on the framework development and the criteria.

2.2.1 Framework development

The study applied an inductive approach for the framework development, summarized by the following steps:

I. The research team performed an initial review of 61 public engagement cases, mostly in electricity grid projects. This included data sets from past and present projects that one of the Task partners, Renewables Grid Initiative (RGI) is involved in.

II. The team selected 13 of 61 cases to extract suitable criteria for the development of the assessment framework.

III. The team identified common themes across the 13 practices, which built the foundation of the assessment criteria.

IV. The team reviewed previous literature with the aim of identifying existing criteria for assessing the impacts of public engagement. Findings from the Task's previous publication (D2 – Drivers and Barriers of Public Engagement in Energy Infrastructure) provided valuable input to this review.

V. The extracted themes were compared and challenged with the criteria identified in the literature, and then synthesized into the assessment framework.

The following subsection elaborates briefly on the selection of practices for the initial review and on the review of existing research.

Selection and analysis of good practice cases

The initial review of public engagement in energy infrastructure cases included 61 documented best practices related to electricity grid development projects between the years 2012 and 2021, from available RGI datasets[1]. A well-documented wind energy project case was also added to the review. The initial focus related to screening mostly of the electricity grid cases was driven be the availability of data concerning stakeholders' engagement and the availability of sufficient details for analysis purposes (in other words, well-documented cases) as the selection of cases related to other technologies was still ongoing at the time of developing the impact assessment framework (see: Milestone 2 – Framework for the case study assessment).

The initial screening phase resulted in 13 practices (12 from grids, 1 from wind) that form the foundation of the criteria. The list of cases used to develop the assessment criteria is provided in the **ANNEX 1: List of cases studies used for the framework development**.

Literature review

Several existing evaluation criteria were identified in the literature review. For example, Schroeter et al. (2016) developed 3 criteria with 8 sub-categories for assessing the impact of stakeholders' engagement: *Inclusiveness* (number of stakeholder groups represented and equal contribution), *information exchange and learning* (incl. transparency), and *influence on the political decision* (effectiveness and efficiency, shared understanding of the results impact) (see **Table 2**).

[1] For more details see: RGI database available at https://renewables-grid.eu/activities/best-practices/database.html?L= (24 October 2023).

Table 2: Evaluation criteria developed by Schroeter et al. (2006, pp.8-9).

Main Characteristics	**Sub Criteria**
Inclusiveness	• Platform for communication and negotiation • Equal contribution
Information exchange and learning	• Exchange of knowledge • Common base of information • Transparency • Common understanding of the process
Influence on political decisions	• Effectiveness / Efficiency • Shared understanding of impacts of results

Additionally, Stober et al. (2021) assessed the quality of participatory planning from 25 projects in 12 European countries. They used three analytical dimensions: the *rationale* – what is the motivation for organizing participation, *inclusiveness* – which stakeholders or the public are engaged and when, and *participation level* – the power given to participants as part of the process.

2.2.2 Criteria for the impact assessment

Based on the synthesis between the case study review and literature review, nine final criteria were selected and defined for the impact assessment framework. It is important to note that the criteria are not independent of each other but are integrated. In the following each criterion is described in more detail:

1. *Inclusiveness*: Inclusiveness answers the question of *who* engages and receives the opportunity to engage. This refers to the type of actors involved in the decision-making process by sector (such as private, non-governmental / civil-society, public) and the governance level (local, regional, national).
2. *Timing of engagement:* Timing answers the question of *when* stakeholders should be engaged to maximize their input or the benefits from their input. Engagement processes are complex and include a broad array of stakeholders, and consequently project resources are typically not sufficient to keep all stakeholders engaged throughout the entire decision-making process. Therefore, the time in which certain types of stakeholders can be exposed to data and information and the time to provide their input should be taken into consideration.
3. *Ownership:* Ownership answers the question of *to what extent* stakeholders have power to participate and to what extent the actors are being engaged in the participation process. It refers to the sentiment stakeholders have toward the project. In this context, ownership is not necessarily a legal one, but rather the willingness to extend personal and communal responsibility to shape a project and address its challenges.

4. *Information exchange and learning, as well as clarity and transparency of engagement process:* Information exchange answers the question of *how and to what extent* knowledge is being shared and exchanged. The availability of information, its clarity to all types of stakeholders, and the ways to approach it and understand it are fundamental to create common ground for discussion, exchange of information and ideas, and for providing inputs.
5. *Trust:* Trust answers the question of *to what extent* stakeholders have confidence in the benefits of the engagement process and other stakeholders towards their own interests. Creating trust means that stakeholders have confidence in other stakeholders' actions and decisions to serve (or at least not harm) them. Trust is needed between stakeholders, between institutions and stakeholders, and between individuals among different social or community groups.
6. *Local / regional value added:* Infrastructure projects can create local and regional added value. Benefits are addressed here in their broader sense, ranging from the community taking part in financial compensation plans it deserves, to other benefits including social interests (e.g., enhancing education) and nature-based solutions that serve the community.
7. *Project development time:* Project development time answers the question of *to what extent* the project is delayed due to existing / planned engagement processes. Deviations between the planned timeframe and real-time of large-scale project development are almost unavoidable. Engagement processes can add to potential deviations. They can also contribute to avoiding potential delays, but for analysis and measurement purposes, this element has not been taken into account.
8. *Costs:* Costs answers the question of *how much* engagement is worth in the context of the benefits it can bring to stakeholders? Project development is costly, and deviations of timelines and expenses are likely to occur. Engagement processes add costs as project promoters need to invest monetary resources and time to fill in gaps of knowledge, provide and process information, and include a broad array of stakeholders and opinions into the decision-making process. On the other hand, a meaningful engagement process can reduce potential costs stemming from the opposition, delays and litigation.
9. *Influence on project's shape and operations:* Influence answers the questions of *whether* and *how* engagement processes have changed the final form of the project compared to its initial plans and goals. The engagement process provides different contributions and suggestions over time, especially when the broad spectrum of interests and needs of those involved is considered. Influence is therefore related to the elements described among other criteria, such as the power to engage, available knowledge, capacity, and time.

2.3 Analysis of the impact

The team analyzed each case study according to the nine criteria and considered the impacts on both the project and the community. The assessment used complementary qualitative and quantitative methods to combat some challenges of data availability. For example, the *number* of hearings in a public consultation of renewable energy or grid

projects might be well documented and quantitatively assessed, but it is harder to assess the *effectiveness* of such hearings.

Sources of information for the assessment were publicly available project websites, project development news, and reports. At least three different information sources were considered for each case study. In addition, project coordinators or stakeholder engagement teams were contacted directly via email to obtain additional information on public engagement for specific projects. Information resources in English and, where appropriate, in other languages were reviewed, taking advantage of the diverse language skills of the research team. Furthermore, some information was also drawn from interviews (conducted in the framework of D2) and conservations with respective organizations, as well as two informal conversations with one hydrogen and one CCUS case study.

Once researchers completed the analysis of the 98 cases, they performed a cross-comparison between the cases, considering different types of energy infrastructure and whether it was a good or unsuccessful case example. The results are presented in the Results section.

3 Results

The assessment of 98 cases has shown that public engagement in energy infrastructure impacted the process and outcomes of energy infrastructure projects to varying degrees.

3.1 Indicators and approaches of inclusive and equitable energy infrastructure developments

Inclusiveness

In general, the more stakeholders that are involved, the more inclusive the project will be. In all cases analyzed, various stakeholders were involved in project development, although citizens and communities are not always explicitly mentioned. A few cases explicitly mention marginalized groups, such as Indigenous people, as being relevant to engage. For example, a “Notice by the Yellow Pine Solar Project” based in the USA specifically refers to the consideration of Native American tribal concerns[2]. The “Updated Statement of Community Consultation” of wind offshore farms in East Anglia and in Scotland aims to engage "hard-to-reach", such as people with disabilities, people with limited internet access [11].

In addition to involving different stakeholder groups, inclusiveness can be further applied when considering fairness and the language used to communicate about the project. For example, during the Mid-Antrin transmission line upgrade in Ireland, SONI and Involve made efforts to be inclusive when involving affected local communities. While specialist stakeholders formed a community forum, randomly selected citizens were involved in a sounding board to provide a more effective and fairer representation of community priorities[3].

Involving students in schools can help raise awareness and understanding of the need for renewable energy and grid projects in communities. The Spanish TSO developed a computer game for high school students and teachers, which provide information on the need for renewable energy and supporting electricity grids. The game was used by, at least, 8300 students (Project EntreREDes[4]). In the neighboring Portugal, the TSO incorporated educational activities for more than 1000 children regarding green corridors for grids as part of a bigger engagement plan, which included training of landowners to take part in managing vegetation along the grids’ corridors (Case 8 in the Appendix). This engagement should increase community cohesion, self-sufficiency, and community cooperation.

Timing of engagement

Early stakeholder engagement can enable a smoother project progression and reduced resistance. Some projects outline clear consultation processes over time. Engagement in the planning phase was common throughout case studies, and this is often seen as the main consultation phase. However, good practice cases maintained more continuous public

[2] https://www.federalregister.gov/documents/2018/06/01/2018-10961/notice-of-intent-to-prepare-an-environmental-impact-statement-and-a-notice-of-segregation-for-the
[3] https://www.involve.org.uk/our-work/our-projects/how-can-local-communities-help-choose-best-route-electricity-grid
[4] https://www.redeia.com/es/sostenibilidad/comunidades/innovacion-social/entreredes

engagement from early stages. The earlier the engagement begins, the greater the chance of avoiding delays and restrictions.

Some case studies, particularly in network development, engaged the public before the official planning and permitting process began. This resulted in greater engagement and acceptability of the projects. A good example is presented by the “Close to the citizen, close to home, on an equal footing” informal dialogue for a new transmission line in Germany, which held a citizen’s dialogue before the actual planning dialogue (see Box below).

Transmission line: “Close to the citizen, close to home, on an equal footing“ dialogue

From 2012 to 2014, the government of the German state of Schleswig-Holstein, the TSO TenneT and the local districts of Dithmarschen and Nordfriesland initiated an informal dialogue for a new electricity transmission line. Corridor options and technology alternatives were discussed with local citizens, municipalities, and associations prior to the approval phase of the project and as a kind of substitute for the formal regional planning procedure (see **Figure 1**). The dialogue led to strong cooperation and the results were taken into account in the planning phase. The practice has inspired other projects in Germany and beyond.

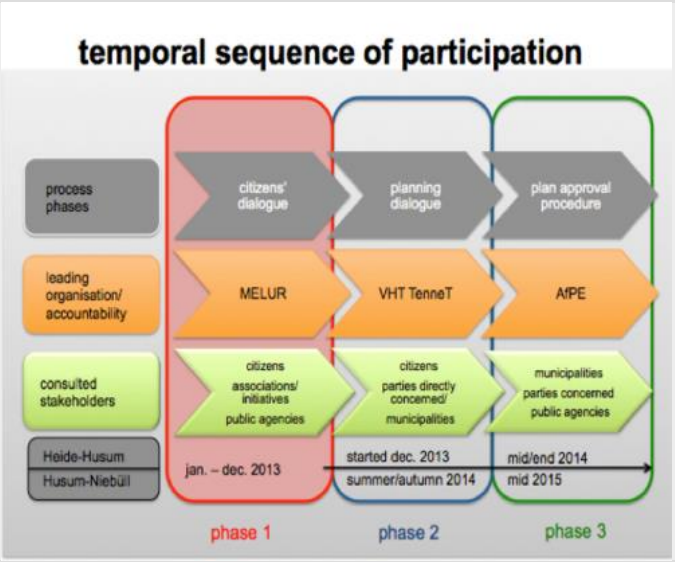

Figure 1: Participation timeline for a new transmission line in Northern Germany.

Some of the cases had the specific aim of integrating local community needs and values in the development and implementation phases of the projects. In addition, other projects looked for strategic partnerships to gain public support before the start of the project, such as the Bruzaholm Wind Park’s collaboration with Volvo in Sweden (see Box page 17).

Bruzaholm Wind Park
The construction of Bruzoholm[5] started in 2023 and is developed by Vattenfall. Consultations started in 2015 with the project planning and included the local administration, the municipality, the citizens of Eksjö, local businesses and landowners. One strategic partnership was the power purchase agreement with local employer Volvo before the project was built. Citizens are kept informed about the development through a website and a newsletter, and can request further information via SMS and e-mail. An information meeting for citizens was held before the start of construction (05/2023) and citizens were invited to the start of the construction (08/2023). Compensation payments were made during construction via the “Support for Local Development“ (SLU) fund.

Ownership

Project ownership can foster a positive relationship to the project and ongoing community support. Most case studies remain at the level of public information and consultation rather than empowerment[6]. However, providing a sense of agency to communities is a strong incentive to engage in projects. Co-design processes can contribute to stronger relationships among community members and between the community and other stakeholders – and as a result, lay the groundwork for future projects.

In some of the cases studied, specific measures were taken to involve communities in the process, such as the collective route planning and the establishment of community forums. An example of such a forum is the Celtic Interconnector Community Forum, which was established in the context of the interconnector cable between Ireland and France.

> “The Celtic Interconnector Community Forum brings together people and organizations from across the project area so that stakeholder and community views can be discussed, understood and properly considered prior to and during project delivery. This community forum will create the opportunity for dialogue between stakeholders with diverse and direct interest in the project and the EirGrid project team.”[7]

Elected representative institutions can also be a format of empowerment, as is the case of the case study of the Shapinsay Development Trust (SDT) in Scotland, the United Kingdom. With a state-like authority, the SDT is comprised of citizens’ representatives, and convenes

[5] https://group.vattenfall.com/se/var-verksamhet/vindprojekt/bruzaholm/projektnyheter

[6] Information: one-way communication and dissemination of information to increase awareness and understanding of issues.
Consultation: two-way flow of communication in which views, attitudes, and knowledge are gathered.
Empowerment: two-way community-led engagement, where the public itself can co-design and shape the project process, its objectives, scope and outcomes.

[7] https://www.eirgrid.ie/celticinterconnector#Community%20Forum

political interests to generate social benefits for the local community. The additional income from wind farms allowed citizens to politically organize themselves, empowering locals.

> "The distribution of income from the turbine for the public enables the charity to act as a governing organization as it is capable of adding to, replacing, and shaping expenditures and policies enacted by the local government. Especially important for the SDT's [Shapinsay Development Trust] legitimacy as a governing organization is its appeal to bring self-sufficiency to the island." [12]

Another example of empowerment is the Barrio Solar[8] project in Spain, where residents and businesses can become part of the energy-sharing community. In the development process, citizens can find out how to access this service, and in the production process itself, both the producers and their neighbors can benefit from this program, while the energy provider (EDP) retains ownership of the solar panels.

Higher ownership of the process comes with higher engagement during its development and operation. Energy cooperatives are increasingly recognized as a way to empower citizens active participation in and contribution to the energy transition. One example is the Betuwewind energy cooperative[9] in West Betuwe in the Netherlands, where people can own and benefit from the project. Similar, the Grift -Nijmegen Solar Park[10] represents a case of 100% local ownership, where the members took the original initiative and also contribute by making decisions for the innovative new plans for a sustainable energy landscape. Ownership also enables communities to pursue their own targets. An example is the community-owned Large-Scale Solar and Energy Storage Project in the USA:

> "As a community-owned agency, we strive to not only meet the state-mandated emissions reductions goals, but also the more aggressive carbon reduction goals set by our communities," said Girish Balachandran, Silicon Valley Clean Energy Chief Executive Officer.[11]

Information exchange and learning, clarity and transparency of engagement process

Diverse forms of public engagement are present across case studies, including community consultation events, local meetings and workshops, citizen dialogues, door-to-door calls, interviews, surveys and newsletters. For example, the Galway Wind Park provided both project newsletters and the Sustainability Impact Report in English and Gaeilge,

[8] https://www.edp.pt/bairro-solar/
[9] https://www.betuwewind.nl/
[10] https://www.zonneparkdegrift.nl/zonnepark/
[11] https://svcleanenergy.org/news/central-coast-community-energy-and-silicon-valley-clean-energy-announce-commissioning-of-new-large-scale-solar-and-energy-storage-project/

acknowledging the local and cultural anchoring of the project[12]. The use of different information channels, including social media and print media, has been critical to the studied cases to reach a diverse audience.

Providing information can enable exchange and learning on different topics. For example, the SENSIBLE[13] demonstration project aimed at integrating electro-chemical, electro-mechanical and thermal storage technologies as well as micro-generation (combined heat and power, heat pumps) and renewable energy sources (photovoltaics) into electricity and energy networks as well as homes and buildings in three different demonstration sites in Portugal, the UK and Germany. Interestingly, each of the three demonstration sites placed different emphasis on public engagement, with the highest level of community engagement in Nottingham, UK, according to available project documentation.

> "In addition to events that enabled project progress reporting, other events that aimed to showcase the workings and potential benefits of energy storage were held to engage with Meadows community members. These events did not just target those who had signed up for the project but also targeted those who did not receive energy storage equipment and the younger school going members of the community." (SENSIBLE project, [13])

Accessibility and clarity of information allow communities to understand project benefits, enhancing their support and minimizing resistance. For the Isabella onshore wind project[14], the developer extended the engagement period to engage more community members and better explain the intended community benefits:

> "To achieve this level of transparency with Isabella, Apex made the strategic decision to delay a key application for a Special Land Use Permit, extending the chance for community members to engage with us directly."[13]

Transparency over the outcomes of the consultation processes, as well as documentation and feedback provision to the community, are crucial. In reality, the results of consultation processes are not often well documented.

Trust

Institutional and individual trust improves community relations and can lead to both community actions in favour of the project and reduced friction during development. Generally, trust is not explicitly mentioned in the case studies, and where it is mentioned, it

[12] https://www.sserenewables.com/onshore-wind/ireland/galway-wind-park/
[13] https://www.edp.com/en/innovation/edp-new/sensible
[14] https://www.apexcleanenergy.com/insight/building-community-in-michigan/

often lacks justification for how it was created. The good practice cases show that trust can be gained, for example, through early engagement, transparent processes, as well as by making both data and language accessible. In the case of electricity transmission grids, trust was a principle put into practice while developing EirGrid's engagement strategy, which added citizens into the center of the projects, allowing them to feed into all steps of a project development and harvest benefits after implementation. Early engagement, transparency and inclusiveness were strategically used to build trust with the general public[15].

Despite its subjective character, there seem to be different levels of trust depending on the entity. The Barrio Solar[16] showed a high trust among the community members, but also towards recognized businesses as such EDP and ECODES, which are project partners. The case of the Samson Solar Energy Centre in the USA suggested that more women in leadership roles can increase trust in the project[17]. For the H2-Wyhlen hydrogen, a survey and interviews of citizens revealed that trust differs among actors. The highest level of trust was found between the community member themselves [14], but, according to a representative survey, trust in the managing company increased due to significantly improved communication in recent years [15].

Local / regional value added

Many energy infrastructure case studies put a strong emphasis on creating jobs, supporting businesses, or supporting local community groups. Local benefits can contribute to the project's long-term sustainability by positively affecting the standard of living and economic stability of the community.

Regional investments and community funds and trusts are common practice, such as the "Support for Local Development" fund in the Bruzaholm wind farm in Sweden, which sees the municipality of Eksjö as an opportunity for community transformation[18]. Another example is the Galway wind energy project in Ireland (see Box on page 21):

> "The Galway Wind Park Community Fund launched in 2018 and is the largest annual fund of its kind in the country [Ireland]. The overall Fund, which totals €400,000-plus per annum, is paid annually in contributions to local groups and individuals via its Local Fund, Major Projects Fund, and Scholarship Fund. So far around €2.4 million has been allocated to groups around the wind park."[19]

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[15] https://renewables-grid.eu/publications/newsletters/5-questions-for-rosemary-steen.html
[16] https://www.edp.pt/bairro-solar/
[17] https://invenergy.com/news/power-lines/celebrating-the-women-behind-the-samson-solar-energy-center
[18] https://eksjo.se/arkiv/nyhetsarkiv/eksjo-kommun/2023-08-30-forsta-spadtag-for-vattenfalls-vindkraftpark
[19] https://www.sserenewables.com/onshore-wind/ireland/galway-wind-park/

Onshore wind: Galway Wind Park
Galway Wind Farm is jointly owned by SSE Renewables and Greencoat Renewables and has been operational since 2017. It is Ireland's largest onshore wind farm with 58 wind turbines generating 174 MW. According to the developers, there has been early and ongoing community and resident engagement, frequent communication, and active demonstration of benefits [16], although the detailed engagement process and timeline are not publicly available. In 2017, consultations for the community fund took place, following the launch of the Galway Wind Park Community Fund in 2018. In addition, much emphasis was placed during project development on reducing negative impacts, including visual impacts, and capitalizing on positive benefits, including environmental education. Local supply chains and employment of local workers were of high importance [16].

Another example of good practice in Ireland is EirGrid, which has developed a Community Benefit Fund to compensate local communities closest to new electricity transmission infrastructure, by: (a) supporting local good causes, (b) helping communities transform their area and (c) providing the opportunity to each community to become or remain a sustainable energy community."[20] [17].

Another approach related to local/regional added value creation is to pay a fixed amount of money for each installation, or each kilowatt of renewable energy produced. For example, in the German Federal State of Brandenburg the municipalities Freiwalde und Waldow-Brand profit from their six wind turbines: they receive 60,000 euros through the "wind euro"[21] – a concept where the local authority receives a lump sum of 10,000 euros per wind turbine per year[22]. In Switzerland, the tax on the use of hydropower to generate energy is known as the water rate[23] (*Wasserzins*) and is an important component of public budgets in communes.

Furthermore, many projects considered the employment of local workers and the creation of jobs. To inspire young people to working in the energy field, some developers collaborated with "education providers to support the development of skills for the future of green energy", as for example stated by the Dogger Bank wind farm project in England, the UK[24].

> "Almost 3,500 jobs were sustained during the construction phase [of East Anglia ONE], which began in 2017, while 100 long-term skilled jobs have been created at the operations and maintenance base in Lowestoft [Scotland]."[25]

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[20] https://www.eirgrid.ie/community/engaging-public#Community%20Benefit%20Fund
[21] https://www.windenergie-freiwalde.de/
[22] https://bravors.brandenburg.de/gesetze/bbgwindabgg
[23] https://www.bfe.admin.ch/bfe/en/home/supply/renewable-energy/hydropower/water-usage-levy.html
[24] https://doggerbank.com/about/community/
[25] https://www.scottishpowerrenewables.com/pages/east_anglia_one.aspx

Nature-related local benefits (such as nature protection) are less common indicators than social and economic benefits. One example is the SuedLink grid project, where new corridors were proposed to reduce negative environmental impacts[26].

Project development time

The clear and transparent communication of a project timeline is important to communities. No significant delays were found for most of the best practice projects analyzed.

Costs

Comparatively small investments in stakeholder engagement can save time and potentially costly expenditures later, for example in managing conflicts and legal proceedings. The actual costs of public engagement are often unclear, and information is missing from publicly available datasets.

One outstanding case in that regard is the grid project Han Herred-Thy-Mors-Sall (HTMS, Denmark) that provides an interesting insight into balancing engagement efforts against costs. In this project, the TSO formed groups of landowners to work together on planning the grid route. External consultants were brought in to assist landowners with understanding and arranging technicalities related to land use and water management. According to some of those involved in the project, the engagement project, at large, was considered a success but it required high investments (finance, time, workforce) from the promoter, which affected its considerations to apply similar methods in later projects[27].

The use of compensation mechanisms can increase project acceptance, and mechanisms designed with the community have an even greater impact. This is clearly visible in the EirGrid's community fund.

Influence on project's final shape and operation

Public input and environmental considerations can influence the final design and operating decisions of a project so that it effectively meets local needs and respects the socio-environmental context. Only a few of the cases reviewed clearly document how stakeholder input changed the project design. A good example is the East Anglia ONE North and TWO wind farms, as a presentation by SCOTTISHPOWER on "Developing our plans" states that "information gathered to date has helped to refine onshore development area further" and outlines specific updates [18] (see further details in Box on page 23).

Another example of a good practice is the Celtic Interconnector project. The results of one stage of the consultation process led to feedback being taken into account in the next stage. For example, concerns raised in the consultation on alternative routes (step 3) were considered in assessments in step 4, which sought to define the exact route [19].

The creation of Amprion's Green Area Concept in grid infrastructure (Germany) provides another example of influencing the shape and design of a project. In a process that lasted less than a year and that involved a broad array of local stakeholders, such as local communities and NGOs, stakeholders discussed 17 alternative sites of a sub-station through

[26] http://www.bestgrid.eu/pilot-projects/project-c-suedlink/tennet-continues-public-dialogue.html
[27] Source of information: RGI's Best Grid documents and informal communication with the TSO.

joint-developed criteria. Then, local citizens voted for the final proposal (site location). It resulted in lower infrastructure than what was originally planned by the TSO, as well as additional noise and nature protection measures than those initially planned.[28]

East Anglia ONE North and TWO

The East Anglia TWO project is owned by ScottishPower Renewables. Alongside East Anglia ONE North, it will be the last of the four East Anglia projects to be developed. Anyone who felt directly or indirectly impacted could comment on the project, and it total, over 2,000 responses were received [18]. Over 42 public events were held during the consultation period, with the specific aim to engage also the “hard to reach”. The different phases of the consultation process have been described and made available [20]. Project documents transparently describe how the suggested actions from the consultation process were taken into account. These included a reduction in the onshore development area (see **Figure 2**), a 60% reduction in construction component sites and the removal of one, changes to the distance/gap between ONE and TWO, and the establishment of wildlife corridors and footpaths [18].

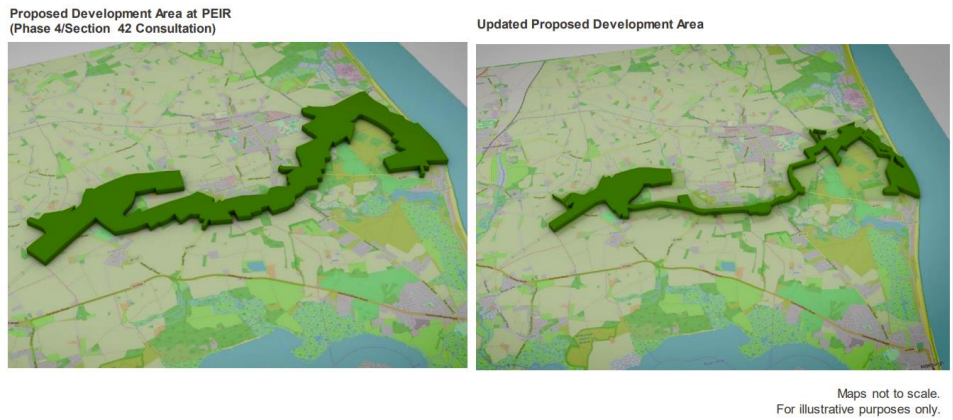

Figure 2: Proposed Development Site. Source: SCOTTISHPOWER RENEWABLES, 2019

3.2 Indications for unsuccessful projects

Inclusiveness

Little or late involvement can lead to mistrust between residents and project promoters as well as local and regional authorities, with a negative impact on community cohesion. For example, the Iberdrola solar plant in Portugal was criticized by NGOs and local communities for the lack of inclusiveness of the entire population and transparency in the planning process[29]. Similar, in case of the Çeşme Wind Energy Project in Turkey, the developer stated to have proactively invited community members and NGOs to consultation process,

[28] https://renewables-grid.eu/activities/best-practices/database.html?detail=202&cHash=90baad128a260d4f86198b655573ffa3
[29] https://www.portugalresident.com/government-accused-of-railroading-communities-with-mega-solar-parks/

which the latter denied [21], while the significant concerns were raised about the exclusion of certain stakeholders, particularly landowners and local citizens[30].

Timing of engagement

Late public involvement reduces the chances of success. Unsuccessful cases or cases with large protests also showed that decisions were sometimes made without citizen consultation to avoid opposition. However, avoidance of engagement often results in potential conflicts at later stages of the project. An example is provided by the BE-TO project in Croatia (see Box below).

> **Biomass plant: BE-TO project**
> The idea for the BE-TO project[31] in Croatia dates back to 2009 or earlier, when the mayor at the time submitted a project proposal for a biomass heating plant to apply for EU funding. The proposal already included a fixed decision about the fuel and the location. There was no resistance at the time of proposal. What started as a protest against the location of the plant turned into a protest against the plant as a whole. Engagement was only planned in reaction to the protests. Concerns about the impact of biomass plants on the recreational value of the community and the landscape were not addressed. The city council supported the opposition to the plant, and the project was stopped in 2012.

The ConsenCUS[32] project on CCUS is also an interesting case where public involvement differs between demonstration sites. While in Greece stakeholder consultations took place, even information videos were created and local sponsorships were provided, in Denmark the industrial partners were reluctant to talk to the public about the project.

Ownership

Providing information alone is not enough for effective public engagement, as residents can feel a lack of ownership and control over the outcomes, what increases the risk for project failure.

For example, the Princess Ariane Wind Farm[33] (formerly Wieringermeer Wind Farm) in the Netherlands used a top-down development approach from the national level due to the scale of the project. There was a lack of information and transparency in the planning stages, which led to strong opposition throughout the period, followed by legal action even after the wind farm became operational. The residents' sense of justice was not taken into account, and the interests of the developers and local authorities were prioritized at the expense of the residents.

Information exchange and learning, clarity and transparency of engagement process

Limited information and lack of transparency in the engagement process hinder public engagement and project acceptability. Several cases did not provide any contact information

[30] https://www.business-humanrights.org/en/latest-news/local-community-raises-concerns-around-wind-energy-project-in-turkey-incl-company-responses/
[31] https://www.energetika-net.com/obnovljivi-izvori/velika-gorica-zaustavila-projekt-be-to-14038, https://www.obnovljivi.com/reakcije/1134-sto-se-dogadja-sa-be-to-velika-gorica
[32] https://consencus.eu/
[33] https://windparkwieringermeer.nl/

where citizens could receive further information on the project development and their engagement opportunities. For example, the analysis of the Alentejo Mega-Solar Park in Portugal found that information about the consultation was poorly disseminated, and a public hearing was only scheduled just before the end of the participation period, which people perceived as too late[34].

In the case of Baixas-Santa Llogaia, an electricity transmission project between France and Spain, opposition to the project grew very high to the point that the engagement process and the planning process stopped. Several groups of stakeholders and especially local communities opposed the initial planning due to lack of clear and sufficient explanations and information regarding the rationales for the need of the project, the planned route and its environmental implications. The project and engagement process were re-started with mediation of the European Union and replacing some of the teams working with local communities [22].

Trust

Without the community trust in the governing authority, or developer, the project is likely to face decisive opposition. The case studies reveal that a lack of trust is often directly linked to a lack of transparency in the process, a lack of clear and accessible information about the planned project, as well as a lack of community support for the project. Some projects facing opposition also faced a division within the community.

The Princess Ariane onshore wind park[35] is a prime example of how the lack of trust can lead to a failure of a project. A series of actions such as initial top-down approach which ignored local communities' concerns, the lack of information and little transparency resulted in little to no trust in the authorities' sincere intentions with this project. The lack of trust led to the project reaching the court. Similarly, the Iberdrola solar plant showed a trust deficit between the developer and local stakeholders, leading to a lack of community support and increased social conflict[36]. A lack of trust towards the companies, due to past bad experiences, was also found in the case of the ConsenCUS project[37].

Local / regional value added

The controversial projects that were reviewed provided limited benefits to local communities. In the case of the Alentejo Mega-Solar Park, few permanent jobs were created, while job losses were expected due to negative impacts on tourism. Furthermore, the landowners that benefit from the project do not live in the area[38], and the involvement of foreign investors led to skepticism from the public[39]. Concerns about environmental impacts, which are not always offset by financial benefits, were also common.

[34] https://www.dw.com/de/portugal-protest-gegen-photovoltaik/a-59734694
[35] https://powerplants.vattenfall.com/prinses-ariane/
[36] https://www.portugalresident.com/government-accused-of-railroading-communities-with-mega-solar-parks/
[37] Information is based on a conversation with the project.
[38] https://www.dw.com/de/portugal-protest-gegen-photovoltaik/a-59734694
[39] https://www.dw.com/de/portugal-protest-gegen-photovoltaik/a-59734694

Project development time

Public opposition can increase the project development time. For example, the SuedLink grid project in Germany has experienced delays of at least 3 to 4 years from the original deadline, which resulted in higher costs[40]. The COVID-19 pandemic contributed to delays as public engagement events required for the approval process were delayed, and service providers and construction companies were restricted[24].

Costs

Local conflicts and protests over proposed energy infrastructure projects – and the resulting delays – can lead to higher project costs, including costs for mediation, litigation and alterations to address community concerns. The Saint-Brieux Offshore Wind Park is an example of this (see Box below).

> **Saint-Brieuc Offshore Wind Park**
>
> Saint-Brieuc[41] is a 496 MW offshore wind project in the bay of Saint-Brieuc, France. Since it was awarded in 2012, the project has faced strong opposition, particularly from the fishing industry due to fears of the project threatening their livelihoods, but also from environmental groups and local politicians. In 2019, a group of local fishermen took the matter to the European Court of Justice, but lost the case in 2022. France's highest administrative court also gave the project the green light in 2020[42]. During the construction, compensation measures for the fishers were established. Commissioning has been delayed until 2024. The project has also been criticized for not adding value to the local economy. As a result, the community may bear the cost of missed opportunities for local development.

Limitations on dedicated resources for public engagement and compensation mechanisms can also challenge project implementation. In the case of the Beauly-Denny high-voltage upgrade, the Office of Gas and Electricity Markets (Ofgem), the UK regulator of the gas and electricity markets, set a framework based on transmission levies that put pressure on transmission system operators to minimize costs and only allow justifiable expenditure. As a result, project promoters felt that their options for engagement were limited and that their budgets did not allow for compensatory measures. As a result, the public struggled to feel that their concerns were being heard and that the whole process was a façade [23].

Influence on project's final shape & operations

In many of the cases reviewed, there was no information on how the consultation processes influenced the project outcomes. This was also the case for projects that were implemented on time, which could either mean that information was provided through other channels or that other indicators, such as local benefits, were more relevant to affected communities.

At the same time, it may also point to another option which was reflected in only several cases: the lack of interest in engaging and in the project at large by local communities. For example, in the Bertikow-Pasewalk grid project in North-eastern Germany, the TSO, local

[40] https://www.bayern-innovativ.de/en/page/delays-in-the-construction-of-the-suedlink-route
[41] https://www.iberdrola.com/about-us/what-we-do/offshore-wind-energy/saint-brieuc-offshore-wind-farm
[42] https://www.windpowermonthly.com/article/1701779/french-courts-give-saint-brieuc-green-light

NGOs and local authorities were involved in information events, round tables and even organized tours to the planned sites of the project; but nevertheless low response was recorded by local communities along the planned route of the grid.[43] In other words, residents were given the opportunity to influence the infrastructure's shape and impacts on their communities but the majority did not take advantage of this opportunity.

In some other cases, residents' concerns were not accounted for, and interests of developers and local authorities were prioritised at the expense of residents (such as Princess Ariane Wind Park in the Netherlands). In the case of Noordoostpolder wind project in the Netherlands, despite multiple consultations, many citizens felt their concerns were not adequately addressed or reflected in the final project design [24].

3.3 Differences between energy infrastructures

Onshore versus offshore wind. Public engagement seems to be more common and more developed for onshore wind than for offshore wind. New actors should be engaged in the development of offshore wind, including fishery, shipping industry and military, which puts additional challenges to project developers and requires that new engagement capacities are build.

Renewables versus grids. The analyzed cases show a higher level of process transparency and better public documentation of consultations and their outcomes for grid infrastructure projects than for renewable energy projects. This includes documentation of how the consultation processes had influenced the final design and operation of the projects, for example, different cases showed that alternative siting routes and technological choices have been made.

Green hydrogen. The four cases of green hydrogen were all research or demonstration projects. For three of four cases, no information could be found on how the public was engaged in the project implementation. One interesting is presented by the "Reallabor H2-Wyhlen" (see Box below), although even here the public engagement remained behind original expectations. Uncertainty about the usability and viability of green hydrogen, and its uncertain legal position, brings many uncertainties about potential benefits.

> **Green hydrogen: Reallabor H2-Wyhlen**
> The "Reallabor H2-Wyhlen"[44] was started in 2021. It is funded by the German Ministry of Economics and has the goal of demonstrating the economic feasibility of green hydrogen. One of the project's partners is Dialogik gGmbH, a company specializing in participation and social technology research. In 2022, the company conducted a survey to assess attitudes toward green hydrogen and interviews to determine perceptions of green hydrogen in the community of Grenzach-Wyhlen [14], [15]. The studies clearly showed that there is a desire for a medium intensity of commitment, an open and transparent information policy, including information on risks, and that despite improved communication in recent years, there are still concerns among the population. Perhaps as a result of the survey and interviews, a Citizen Dialogue was held in April 2023 to receive constructive feedback for further planning.

[43] https://www.bestgrid.eu/uploads/media/D8.2_Guidelines__22Public_Participation_and_Transparency_22.pdf
[44] https://www.energiedienst.de/kraftwerke/wasserstoff/reallabor-h2-wyhlen

Country context. There are differences not only between energy infrastructures, but also between different country contexts. The quality and depth of engagement varies from country to country, and there is much to be learned from different contexts.

4 Conclusions and recommendations

The review of different cases related to public involvement in energy infrastructure showed that public engagement can have a positive impact on the project development process and its outcomes. Nine criteria were defined in the assessment framework to examine the impact: Inclusiveness, timing of engagement, ownership, information sharing and learning / clarity and transparency of the engagement process, trust, local / regional added value, project development time, cost, and influence on the final design and operation of the project. All nine criteria were found to be relevant to infrastructure projects.

Different factors can enable inclusive and equitable infrastructure project developments. On the process dimension, inclusive engagement can promote tailored and needs-driven project design and enable the participation of communities and citizens. Early and ongoing engagement has had positive impacts, enabling collaborative planning and leading to increased community support for proposed project developments. Good public engagement processes empowered communities to take an active role in project development, for example, by helping to plan project design or management of local benefits. Transparent and clear processes allow the public to understand the proposed project, its impacts, and benefits. The use of a variety of information channels, at different points in time, is essential to reach a broad spectrum of society. Above all, the outlined factors contribute to building trust in and between different actors.

In the results dimension, good practice projects placed great emphasis on the creation of local and regional value, including employment of local workers, compensation measures and community funds. The costs of stakeholder engagement versus the costs of non-engagement were difficult to assess; however, it can be expected that the costs of engagement will be cheaper than the potential later costs of litigation, conflict mediation, and resulting project delays. Good practice projects were mostly developed on time, while opposition can be a factor in delayed project completion. Some of the case studies clearly showed how the public engagement process influenced the final shape of the projects, often resulting in better outcomes for the community, such as reduced impacts on the landscape, different project locations, or even the use of different technologies.

The main limitation of the research was the availability of information. Not all projects publicly report on stakeholder engagement and its outcomes. In particular, there are data gaps on the cost, timing, and impact of public engagement on the final design and operation of the projects. In some cases, up-to-date information was not available.

Based on the analysis of collected practices, the following 8 recommendations can be made for stakeholder engagement in energy infrastructure projects. Stakeholder engagement processes should:

1. Be inclusive while engaging the public and consider outreach to hard-to-reach groups where appropriate.
2. Involve the public early and continuously in the process. Engagement can begin even before the planning phase with pre-dialogues with local communities. However, it is important to understand and take into account the capacities and resources of the

public available for engagement, depending on the context and situation on the ground, in order to choose the right timing for engagement.

3. Enable the public to become co-owners of the process by involving them in decision making. The more participants feel they own the process, the more they (are likely to) feel responsible and empowered to participate in projects.
4. Establish clear and transparent engagement processes where information is shared openly. The availability and clarity of information for all types of stakeholders is critical to creating common ground for discussion, sharing, and providing input. This is critical because different stakeholders provide and consume knowledge in different ways, for different purposes, and at different times.
5. Build trust in and between different stakeholders by establishing inclusive, transparent and equitable processes.
6. Consider creating local and regional added value not only during the construction phase but also in the long-term, for example through employment opportunities or community funds. Engagement processes should aim to maximize the benefits and fulfill the interests of the public involved (or to be involved) in projects.
7. Have a defined budget, as the cost of stakeholder engagement can reduce the potential cost of project opposition. Developers should weigh their investment in early-stage engagement against the potential costs of avoiding or limiting engagement.
8. Explain how the results of the engagement processes have influenced the final design and operation of the projects. The engagement process should provide opportunities for the public to make various contributions and suggestions over time that may change the final form of the project compared to its initial plans and goals.

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ANNEX 1: List of cases studies used for the framework development

Case 1: Implementation of a Comprehensive Green-Area-Concept (Germany, grid, 2018)

The project was part of dialogue-driven participation and planning process between a TSO (Ampiron) and citizens in the project's site. Participation process resulted in improved relationships between Amprion, local communities and other stakeholders such as environmental non-governmental organizations (ENGOs) and (subnational) governmental bodies. Stakeholders were engaged along the design, implementation, and construction phases of the project. The process took 8 months from start to reaching an agreement on the project's outcomes.

Case 2: Compactline (Germany, grid, 2018)

The TSO (50Herz) engaged stakeholders' groups in a new design for grid-pylons through interviews, workshops and a study on public acceptance. Some of the methods used were visualisation of the suggested design. The project reported of high rate of approval to the outcomes.

Case 3: District energy efficient retrofitting (Spain, CARTIF, 2018)

The project applied a holistic approach to modernize and retrofit district heating system, in collaboration with local businesses and district-residents.

Case 4: EirGrid Community Support Fund (Ireland, grid, 2016)

The TSO (EirGrid) developed together with communities and NGOs in areas affected by new grids development a financial compensation mechanism. The project reported to have high level of transparency, built trust, and increased public acceptance to the new projects.

Case 5: SuedLink public participation (Germany, grid, 2017)

This project presented various formats of public engagement, such as an online platform, landowner forums, information forums, targeted formats for specific groups such as landowners in specific stages of the process, high transparency, and an early engagement process. Close to 4000 comments received during the process.

Case 6: Regulation on the Cost Benefit Analysis (CBA) (Italy, regulator, 2017)

A consultations process, including workshops, to improve CBA for new grid projects, that resulted in national regulation. The outcome demonstrated a useful tool to ensure transparency, provide future (development) scenarios, and comparable benefits for the

public. Stakeholders' engagement process included the TSO (Terna), DSOs, research centre, and utilities.

Case 7: Close to the citizen, close to home, on an equal footing (Germany, grid, 2016)

An informal dialogue process between the TSO and citizens, local authorities and local associations toward a new grid project, which substituted formal procedures. The dialogue addressed alternative corridors and technologies before permission phase. The process engaged over 2000 participants and received 400 inputs contributions, resulted in positive acceptance of the project: an agreed and transparent schedule of planning, approval and construction phases of the project. Engagement took place in early stages of the project.

Case 8: Management of Green Corridors in Portugal (Portugal, grid, 2010)

Raising awareness actions for vegetation management in grid corridors. 1000 children took part in educational activities, and NGOs and public national bodies received professional training with landowners close to the corridors.

Case 9: Your Grid, Your View, Your Tomorrow (Ireland, grid 2016)

Ongoing public engagement initiative to collect opinions and to share information regarding grids to consultation procedures with various types of stakeholders. To date, over 60,000 people were reached to through various mechanisms, such as launching an online platform, campaigning, and bilateral meetings and group-meetings with local residents.

Case 10: ALEGrO project (Germany, grid, 2016)

Engaging the public before and after the time set by formal (legal) requirements. The process included the gathering of feedback in the planning phase and developing alternative routing according to the feedback. The process included an online platform to allocate alternative routing, 6 public-dialogue events and 6 more exclusively for governmental (public) authorities, newsletters, and bulk e-mails. The project resulted in increased acceptance on the expense of a shorter project development time, and eneded with no civic protest against it.

Case 11: Han Herred-Thy-Mors-Salling project (Denmark, grid, 2016)

Early engagement of residents from the project's near-by neighbourhoods and landowners before and during the initiation of the project. The process included targeted meetings with landowners, it reported of high involvement of stakeholders, and resulted in changing the initial route of the grid to an alternative route.

Case 12: EntreREDes – educational games for schools on renewables and grids (Spain, RES & grids, 2018)

An on-going educational platform for raising awareness and providing information on RES and grids, with over 8300 students used it in 2018.

Case 13 (Negative example): Prinses Ariane “Wieringermeer” Wind Park (Netherlands, RES wind, 2010-2020)

The project was stirred by the national level in a top-down approach because of the large scale of the project. The process, which involved a local authority as well, was lacking in several respects: For example, providing stakeholders information only in the planning phase and lack of transparency. The process resulted in strong opposition throughout the planning and operation phases and ended up in court. It was reported that justice concerns of residents were not accounted for, and interests of developers and the local authority overridden residents’ interests.

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FURTHER INFORMATION

Contact:

Dr Diana Süsser at diana@ieecp.org

Dr Andrzej Ceglarz at andrzej@renewables-grid.eu

Dr Ira Shefer at ira@renewables-grid.eu