



# Annex 1

Acceptance of grid infrastructure evidence review

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# Contents

|                                                            |   |
|------------------------------------------------------------|---|
| Background                                                 | 2 |
| Acceptance of grid infrastructure evidence review          | 3 |
| 1. The social acceptance of grid infrastructure            | 3 |
| 2. Looking beyond Not in My Backyard (NIMBY)               | 3 |
| 3. The role of place attachment                            | 5 |
| 4. The role of fairness (process, participation and trust) | 6 |
| 5. The role of community benefits                          | 7 |
| 6. Shared ownership and grid acceptance                    | 9 |

# Background

Matchmaker is a SIF funded discovery project as part of Round 5.

This document is an annex to the [Final Report](#) and summarises the evidence review undertaken to inform Matchmaker's response to SIF Challenge 4 (Consumer-Centric Grid Expansion).

The review explored what existing research says about public support for grid infrastructure, the factors that shape acceptance or opposition, and whether shared ownership (where communities own a stake in developer-owned renewable energy projects) help respond to these factors. It should be read alongside the high-level findings presented in the final report, in the as-is mapping section.

This annex was authored by Regen to support the SIF Matchmaker Discovery final report, delivered by National Grid Electricity Distribution in partnership with Regen and TPXimpact.

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## Acceptance of grid infrastructure evidence review

This literature review was undertaken to inform Matchmaker's response to SIF Challenge 4, which focuses on improving public support for, and reducing opposition to, new energy infrastructure. Specifically, it sought to understand whether shared ownership could play a role in improving public acceptance of grid infrastructure. We found limited direct evidence linking shared ownership to grid infrastructure. Therefore, the review first examines what the wider social acceptance literature says about public responses to grid development, including the role of trust, fairness, participation, place attachment and local benefit. It then compares these findings with evidence from shared ownership, community benefits and local energy governance to assess whether shared ownership could help respond to some of the factors that shape acceptance, and where further testing is needed.

### 1. The social acceptance of grid infrastructure

Public support for renewable energy, decarbonisation and grid expansion in principle does not always translate into acceptance of specific infrastructure proposed near where people live. This distinction between national-level support and local acceptance is a recurring theme in the social acceptance literature.

Illustrating the challenge of concerns being raised once projects are proposed within a local area, in Germany Bertsch et al. (2016)<sup>1</sup> found high levels of support for both renewable energy development and grid expansion when transmission infrastructure was presented as necessary to support the transition to a renewable energy system. However, support declined when transmission infrastructure was considered at the local scale, particularly in relation to overhead transmission lines and proximity to residential areas. Similarly, Aas et al. (2014)<sup>2</sup>, in a comparative survey of respondents in Norway, Sweden and the United Kingdom, found that acceptance of transmission infrastructure varied across national contexts, but that acceptance in principle was generally higher than acceptance of projects located close to where people lived.

These studies show that broad support for the energy transition does not necessarily translate into acceptance of specific local transmission projects. They establish that local concern is a recurring theme in grid infrastructure research, particularly where new infrastructure is proposed close to where people live. The next section considers why this concern should not be dismissed as simple local resistance to development.

### 2. Looking beyond Not in My Backyard (NIMBY)

A consistent theme in the social acceptance literature is that local opposition should not be dismissed as simple resistance to development. Earlier accounts often framed opposition through the concept of "Not in My Backyard" (NIMBY), implying that resistance mainly reflected self-interest or an unwillingness to host infrastructure locally. More recent

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<sup>1</sup> Bertsch, V., Hall, M., Weinhardt, C. and Fichtner, W., 2016. Public acceptance and preferences related to renewable energy and grid expansion policy: Empirical insights for Germany. *Energy*, 114, pp.465-477. <https://doi.org/10.1016/j.energy.2016.08.022>

<sup>2</sup> Aas, Ø., Devine-Wright, P., Tangeland, T., Batel, S. and Ruud, A., 2014. Public beliefs about high-voltage powerlines in Norway, Sweden and the United Kingdom: A comparative survey. *Energy Research & Social Science*, 2, pp.30-37. <https://doi.org/10.1016/j.erss.2014.04.012>

research challenges this framing, showing that public responses are often shaped by concerns about fairness, legitimacy, local impacts and whether communities have meaningful opportunities to influence decisions.

Komendantova and Battaglini (2016)<sup>3</sup> argue that public responses cannot be adequately understood through either NIMBY or traditional Decide-Announce-Defend (DAD) approaches whereby opposition groups react to oppose decisions announced by developers. Drawing on German transmission projects, they distinguish between public acceptance and social acceptance and emphasise the importance of participation, dialogue and stakeholder engagement. Their findings suggest that acceptance is closely linked to opportunities for meaningful involvement in decision-making processes rather than simply the provision of information.

Similarly, Galvin's (2018)<sup>4</sup> study of opposition to the Suedlink transmission project in Germany found that some of the strongest opponents were themselves supporters of renewable energy and active participants in the Energiewende (German energy transition). Opposition reflected concerns about landscape impacts, local economic interests, regional energy autonomy and competing visions of future energy systems. Galvin argues that local actors often possess valuable knowledge and legitimate concerns that can contribute positively to infrastructure planning processes. Rather than treating opposition as irrational or obstructionist, Galvin suggests that greater participation and earlier engagement could improve both planning processes and project outcomes.

Batel et al. (2013)<sup>5</sup> similarly argue that public responses to low-carbon energy infrastructure are often connected to broader questions of governance, legitimacy and fairness. Opposition may therefore reflect concerns regarding the processes through which energy transitions are governed rather than resistance to infrastructure itself.

Other transmission studies in the United States reinforce this more nuanced understanding of local opposition. Cain and Nelson (2013)<sup>6</sup> found that opposition to high-voltage transmission lines was influenced by perceived risks, property concerns, trust and perceptions of fairness as well as wider community-level opposition. Nelson et al. (2018)<sup>7</sup> subsequently demonstrated that proximity remained an important factor shaping opposition, particularly where local social networks facilitated the mobilisation of resistance.

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<sup>3</sup> Komendantova, N. and Battaglini, A., 2016. Beyond Decide-Announce-Defend (DAD) and Not-in-My-Backyard (NIMBY) models? Addressing the social and public acceptance of electric transmission lines in Germany. *Energy research & social science*, 22, pp.224-231. <https://doi.org/10.1016/j.erss.2016.10.001>

<sup>4</sup> Galvin, R., 2018. Trouble at the end of the line: Local activism and social acceptance in low-carbon electricity transmission in Lower Franconia, Germany. *Energy Research & Social Science*, 38, pp.114-126. <https://doi.org/10.1016/j.erss.2018.01.022>

<sup>5</sup> Batel, S., Devine-Wright, P., & Tangeland, T. (2013). Social acceptance of low carbon energy and associated infrastructures: A critical discussion. *Energy Policy*, 58, 1–5. <https://doi.org/10.1016/j.enpol.2013.03.018>

<sup>6</sup> Cain, N.L. and Nelson, H.T., 2013. What drives opposition to high-voltage transmission lines?. *Land use policy*, 33, pp.204-213. <https://doi.org/10.1016/j.landusepol.2013.01.003>

<sup>7</sup> Nelson, H.T., Swanson, B. and Cain, N.L., 2018. Close and connected: the effects of proximity and social ties on citizen opposition to electricity transmission lines. *Environment and Behavior*, 50(5), pp.567-59. <https://doi.org/10.1177/001391651770859>

A consistent theme throughout this literature is that public concern should not be dismissed as simple opposition to renewable energy or grid infrastructure. It often reflects legitimate questions about local impacts, fairness, trust and decision-making. This strengthens the case for more meaningful community involvement in grid infrastructure, while recognising that involvement needs to be substantive rather than limited to consultation after key decisions have already been made.

This literature reframes local opposition as a response shaped by legitimate concerns about impacts, fairness, trust and decision-making. The following sections explore these recurring themes in more detail, beginning with place attachment and the importance of local context.

### 3. The role of place attachment

Place attachment is a recurring theme in grid infrastructure research because power lines can affect landscapes and places that hold meaning for local communities. This literature shows that people do not judge projects only by their technical need or physical design, but also by how they may change the places that matter to them. This literature reinforces the importance of local discussion and involvement in grid infrastructure development.

Pasqualetti (2011)<sup>8</sup> argued that energy landscapes frequently become contested because infrastructure alters both physical environments and the symbolic meanings attached to them. Building on this perspective, Devine-Wright's (2013)<sup>9</sup> demonstrated that opposition to a proposed high-voltage power line in South West England was strongly associated with place attachment as well as project-related factors such as trust and perceived fairness. Importantly, the study challenged simplistic assumptions that opposition is determined solely by geographical proximity. Instead, residents opposed infrastructure where it was perceived as threatening valued place meanings, identities and relationships.

Recent work by Peacock and Devine-Wright (2026)<sup>10</sup> further develops this perspective. Their work on power line conflicts in Sweden highlights how disputes over transmission infrastructure are shaped by spatially embedded power relations, competing visions of future energy systems and tensions between national decarbonisation objectives and local place-based identities.

**This literature shows that responses to grid infrastructure projects are shaped not only by what is built, but by where it is built and how people understand its impact on places they value. Local context and place attachment, therefore, need to be taken seriously in grid development. This underlines the importance of involving communities early enough so that local knowledge, meanings and priorities can inform decision-making.**

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<sup>8</sup> Pasqualetti, M. J. (2011). Social barriers to renewable energy landscapes. *Geographical Review*, 101(2), 201–223. <https://doi.org/10.1111/j.1931-0846.2011.00087.x>

<sup>9</sup> Devine-Wright, P. (2013). Explaining “NIMBY” objections to a power line: The role of personal, place attachment and project-related factors. *Environment and Behavior*, 45(6), 761–781. <https://doi.org/10.1177/001391651244043>

<sup>10</sup> Peacock, A. and Devine-Wright, P., 2026. For, against, or on the fence? Developing a critical-spatial approach to social acceptance to examine conflict over a power line in Sweden. *Energy Research & Social Science*, 135, p.104654. <https://doi.org/10.1016/j.erss.2026.104654>

## 4. The role of fairness (process, participation and trust)

A growing body of research has examined how participation, fair decision-making processes and trust shape public responses to grid infrastructure. Across this literature, acceptance is understood not simply as a response to project outcomes, but also as a response to whether people feel decisions are made openly, fairly and with meaningful opportunities to be involved.

Knudsen et al. (2015)<sup>11</sup>, examining transmission projects in Norway and the United Kingdom, found that local residents frequently perceived opportunities for engagement as inadequate and procedurally unjust. Across all four case studies examined, participants reported insufficient information, limited influence over decisions and a lack of meaningful involvement in planning processes. The authors conclude that improving opportunities for engagement represents a significant challenge for future grid development.

Mueller (2020)<sup>12</sup> further highlights the importance of procedural fairness. The study found that fair processes help build trust in project actors, and that this trust shapes how people perceive the risks and benefits of grid expansion. In turn, these perceptions influence attitudes towards grid development.

Research on participatory planning has similarly highlighted the potential value of greater stakeholder involvement. Späth and Scolobig (2017)<sup>13</sup>, examining grid planning practices in France and Norway, found that stakeholder empowerment often remained limited and rarely extended beyond consultation. Nevertheless, they identified increasing efforts to involve stakeholders earlier in planning processes and argued that higher levels of empowerment may improve planning outcomes and stakeholder relationships. Similarly, in their work investigating public engagement practices within the Irish transmission system, Revez et al. (2026)<sup>14</sup> emphasise the need to translate participation principles into practical engagement approaches capable of responding to rapid energy system change while accounting for local contexts and socio-cultural differences.

A recent Government Office for Science roundtable makes the same point in relation to grid infrastructure.<sup>15</sup> It found that early, transparent engagement is needed to build trust, avoid delays and make projects more locally appropriate and fair. This reinforces the

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<sup>11</sup> Knudsen, J.K., Wold, L.C., Aas, Ø., Haug, J.J.K., Batel, S., Devine-Wright, P., Qvenild, M. and Jacobsen, G.B., 2015. Local perceptions of opportunities for engagement and procedural justice in electricity transmission grid projects in Norway and the UK. *Land use policy*, 48, pp.299-308. <https://hdl.handle.net/10871/17659>

<sup>12</sup> Mueller, C.E., 2020. Examining the inter-relationships between procedural fairness, trust in actors, risk expectations, perceived benefits, and attitudes towards power grid expansion projects. *Energy Policy*, 141, p.111465. <https://doi.org/10.1016/j.enpol.2020.111465>

<sup>13</sup> Späth, L. and Scolobig, A., 2017. Stakeholder empowerment through participatory planning practices: The case of electricity transmission lines in France and Norway. *Energy research & social science*, 23, pp.189-198. <https://doi.org/10.1016/j.erss.2016.10.002>

<sup>14</sup> Alexandra Revez, Evan Boyle, Aoife Deane, Michelle Walsh, Avril Wilson & Brian Ó. Gallachóir (2026) Public engagement practice for electricity grid system change, *Journal of Environmental Policy & Planning*, 28(2), pp. 268-286. <https://doi.org/10.1080/1523908X.2025.2553020>

<sup>15</sup> UK government (2025). Public engagement on grid infrastructure. <https://www.gov.uk/government/publications/public-engagement-on-grid-infrastructure/public-engagement-on-grid-infrastructure>

procedural justice literature by showing that fairness is not a barrier to faster delivery, but a condition for it.

UK government and industry-commissioned research on public attitudes to grid infrastructure reinforces the practical importance of trust, transparency and clear information. Research by the Department for Energy Security and Net Zero (DESNZ) found that the acceptability of new electricity transmission infrastructure was generally high across groups, and that messages focused on jobs and climate change produced small increases in national-level support.<sup>16</sup> However, people wanted more information about bill impacts, local benefits and where new infrastructure would be built. Similarly, Ofgem's consumer research, although not focused on grid infrastructure specifically, highlights the wider importance of trust, transparency and fairness.<sup>17</sup> Participants linked rising bills to distrust and frustration and wanted clearer information about how energy costs are calculated and communicated.

Within energy infrastructure development, trust has also been identified as a key factor shaping social acceptance. Cotton and Devine-Wright (2011)<sup>18</sup>, examined perspectives on electricity transmission line development in the United Kingdom and identified competing discourses concerning the future of energy infrastructure. Their findings suggest that public responses are influenced not only by local project characteristics but also by wider beliefs regarding energy policy, governance and the institutions responsible for delivering energy transitions. Trust, therefore, operates across multiple scales, encompassing both local experiences of infrastructure development and broader confidence in national energy policy and governance arrangements.

This literature demonstrates that social acceptance of grid infrastructure is shaped by more than physical impacts alone. While visual effects, proximity and perceived risks remain important, studies consistently highlight the influence of trust, procedural fairness, local participation and wider confidence in the energy system. **This suggests that public acceptance depends not only on what infrastructure is delivered, but also on how decisions are made, how information is shared and whether communities feel they have been treated fairly.**

## 5. The role of community benefits

Community benefits have become an increasingly important part of UK policy discussions on electricity transmission infrastructure. While benefit-sharing mechanisms are more established in parts of the renewable generation sector, approaches for transmission infrastructure have historically been less consistent. The UK government has recognised this and is developing a more consistent approach to community benefits for electricity transmission infrastructure, including community funds and direct household benefits.

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<sup>16</sup> Verian UK (2025). Public attitudes to network infrastructure: an online experiment testing rationales for building new network infrastructure. <https://assets.publishing.service.gov.uk/media/6880e11ff47abf78ca1d3560/network-infrastructure-report.pdf>

<sup>17</sup> Ofgem (2025). Energy consumer outcomes: research. <https://www.ofgem.gov.uk/research/energy-consumer-outcomes-research>

<sup>18</sup> Cotton, M. and Devine-Wright, P., 2011. Discourses of energy infrastructure development: a Q-method study of electricity transmission line siting in the UK. *Environment and planning A*, 43(4), pp.942-960. <https://doi.org/10.1068/a43401>

DESNZ-commissioned research on community benefits for electricity transmission infrastructure highlights the importance of how community benefits are designed and how local people are involved.<sup>19</sup> Communities affected by proposed transmission projects wanted benefits to be meaningful, transparent and locally shaped. The research found support for both community funds and more direct household benefits, but also showed that benefits are unlikely to build acceptance if people do not trust the process or feel they have had little influence.

This policy development aligns with wider academic literature on transmission infrastructure, which has increasingly examined how the costs and benefits of grid development are distributed. Cain and Nelson (2013) identified distributive considerations as an important factor shaping public responses to transmission line proposals. Tobiasson and Jamasb (2016)<sup>20</sup>, propose that compensation mechanisms, benefit-sharing arrangements and alternative property-rights structures for electricity grid infrastructure may help identify outcomes that are more socially acceptable to affected communities. Their argument is particularly relevant to emerging discussions about how communities might have a more substantive role in infrastructure development. It suggests that benefit-sharing arrangements may need to go beyond compensation alone if they are to respond to concerns about fairness, influence and local value.

Meanwhile, Boyle et al. (2026)<sup>21</sup> found that efforts to enhance public engagement and involvement in benefits mechanisms through the use of community forums revealed both opportunities and areas for improvement, including the need for community capacity building. While not directly examining ownership, the study demonstrates growing interest in governance approaches that move beyond traditional consultation towards more active forms of public involvement.

Evidence from Germany adds an important note of caution. One study found that hypothetical compensation for host communities had no bearing on local acceptance of transmission infrastructure, while personal financial incentives were found to have a potentially negative effect.<sup>22</sup> This suggests that benefits are unlikely to build acceptance simply because they are offered; their design, perceived fairness and relationship to local decision-making matter.

**Overall, the evidence suggests that community benefits are unlikely to build acceptance simply because they are offered. Their value depends on whether they are perceived as fair, meaningful, transparent and locally shaped. This raises a wider question about whether communities should have a more substantive role in**

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<sup>19</sup> UK government (2024). Community benefits for electricity transmission network infrastructure. <https://www.gov.uk/government/publications/community-benefits-for-electricity-transmission-network-infrastructure>

<sup>20</sup> Tobiasson, W. and Jamasb, T., 2016. The solution that might have been: resolving social conflict in deliberations about future electricity grid development. *Energy Research & Social Science*, 17, pp.94-101. <https://doi.org/10.1016/j.erss.2016.04.018>

<sup>21</sup> Boyle, E., Revez, A., Carr, D., Reid, C.I., Deane, A. and Gallachóir, B.Ó., 2026. Community benefit funds for energy infrastructure: Paving the way for public engagement and sustainable development?. *Energy Policy*, 208, p.114873. <https://doi.org/10.1016/j.enpol.2025.114873>

<sup>22</sup> Simora, M., Frondel, M. and Vance, C., 2020. Do financial incentives increase the acceptance of power lines? Evidence from Germany. *Regional Science and Urban Economics*, 85, p.103575. <https://doi.org/10.1016/j.regsciurbeco.2020.103575>

**the governance and value of energy infrastructure.** The next section considers whether shared ownership could provide one possible response.

## **6. Shared ownership and grid acceptance**

There is limited direct evidence on whether shared ownership can improve public acceptance of grid infrastructure. The Matchmaker project can help address this evidence gap by exploring whether the benefits associated with shared ownership in other energy contexts could also apply to grid infrastructure. This section, therefore, looks to adjacent evidence from across the energy system to assess whether ownership-based approaches align with the factors identified in the wider grid acceptance literature: fairness, participation, trust, local benefit and community influence.

A Scottish study by Hogan et al. (2022)<sup>23</sup> found that residents living near community and shared ownership wind projects were more accepting of those projects than residents living near a privately owned project with a standard community benefit fund. The community and shared ownership projects were also perceived as involving communities more fairly, sharing benefits more equitably and having lower impacts. Further analysis by Hogan (2024)<sup>24</sup> found that, for the shared ownership project, perceptions of fair involvement, fair benefit-sharing and lower impacts were directly associated with local acceptance. This suggests that ownership structures may influence acceptance when they change how communities experience involvement, benefit-sharing and project impacts. Although the evidence does not directly relate to grid infrastructure, it points to the potential positive impact that shared ownership can have on public attitudes.

Research on community battery storage further illustrates these points. In a recent review of community battery storage systems, Al-Hanahi et al. (2025)<sup>25</sup> examined ownership models, regulatory frameworks and community engagement across a range of pilot projects and demonstration schemes. The authors identify cooperative ownership models as one possible mechanism for improving both social acceptance and economic viability. However, they also highlight significant challenges relating to regulation, financial viability, tariff structures and equitable access. Importantly, the paper does not provide evidence that shared ownership guarantees acceptance; rather, it suggests that ownership arrangements are one component within a broader set of social, institutional and policy factors shaping infrastructure outcomes.

Further insights can be drawn from literature on community-owned grids, microgrids and local energy governance. Hall et al. (2019)<sup>26</sup> argue that electricity networks can be conceptualised as a form of commons rather than purely financial assets. Examining

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<sup>23</sup> Hogan, J. L., Warren, C. R., Simpson, M., & McCauley, D. (2022). What makes local energy projects acceptable? Probing the connection between ownership structures and community acceptance. *Energy Policy*, 171, 113257. <https://doi.org/10.1016/j.enpol.2022.113257>

<sup>24</sup> Hogan, J. L. (2024). Why does community ownership foster greater acceptance of renewable projects? Investigating energy justice explanations. *Local Environment*, 29(9), 1221–1243. <https://doi.org/10.1080/13549839.2024.2360716>

<sup>25</sup> Al-Hanahi, B., Mudiyansele, N. and Aziz, A., 2025. Shared power, shared future: Navigating technology, ownership, and equity in community battery storage. *Energy Research & Social Science*, 127, p.104200. <https://doi.org/10.1016/j.erss.2025.104200>

<sup>26</sup> Hall, S., Jonas, A.E., Shepherd, S. and Wadud, Z., 2019. The smart grid as commons: Exploring alternatives to infrastructure financialisation. *Urban Studies*, 56(7), pp.1386-1403. <https://doi.org/10.1177/0042098018784146>

alternatives to infrastructure financialisation, they suggest that collective ownership and governance arrangements may provide opportunities for greater democratic control over energy infrastructures. Similarly, Gui et al. (2017)<sup>27</sup> explore community microgrids as locally governed energy systems that enable communities to participate more directly in infrastructure ownership and management. Their analysis highlights the potential for local ownership structures to align energy infrastructure more closely with community priorities and local development objectives.

Research on electricity distribution ownership also provides useful insights, Łapniewska (2019)<sup>28</sup> examined efforts to establish cooperative governance arrangements for electricity infrastructure in Berlin. The study illustrates how debates over ownership often extend beyond questions of economic efficiency and encompass broader concerns regarding democratic participation, accountability and control over essential infrastructure.

**These studies point in a similar direction. Ownership and more active community roles can affect how people relate to energy infrastructure, particularly by changing how decisions are made, how benefits are shared and how local priorities are reflected. However, most of the evidence comes from renewable generation, community batteries and microgrids rather than distribution and transmission networks, and some is drawn from non-UK contexts with different policy, regulatory and industry structures. Shared ownership should therefore be treated as a promising but untested proposition in the grid context, requiring further design, piloting and evaluation.**

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<sup>27</sup> Gui, E.M., Diesendorf, M. and MacGill, I., 2017. Distributed energy infrastructure paradigm: Community microgrids in a new institutional economics context. *Renewable and Sustainable Energy Reviews*, 72, pp.1355-1365. <https://doi.org/10.1016/j.rser.2016.10.047>

<sup>28</sup> Łapniewska, Z., 2019. Cooperatives governing energy infrastructure: A case study of Berlin's grid. *Journal of Co-operative Organization and Management*, 7(2), p.100094. <https://doi.org/10.1016/j.jcom.2019.100094>

