Department for
Energy Security
& Net Zero

Analytical Annex

Accompanies the Community Benefits and Shared Ownership for Low Carbon Energy Infrastructure Working Paper

Introduction

This annex summarises the evidence and analysis underpinning the working paper on mandatory community benefits. The first section describes the rationale for intervention and is followed by a summary of the evidence on the potential impacts of community benefits and a Theory of Change for this policy intervention. In the last two sections, analysis on the potential scope and size of the fund is presented.

Rationale for intervention

Communities that host energy infrastructure are a critical stakeholder in delivering cheaper, cleaner, secure energy which delivers a positive externality for wider society. In the absence of government intervention, these external benefits are unlikely to be considered by those in local communities which are hosting energy infrastructure and who may incur its associated costs, leading to under provision of infrastructure. Government intervention is required to internalise this external benefit and ensure communities can gain from hosting energy infrastructure that delivers a national need.

Although delays to energy infrastructure deployment can often be caused by local opposition, these communities that host energy infrastructure are a critical support in delivering cheaper, cleaner, secure energy. According to data from DESNZ's Public Attitudes Tracker[1], in summer 2024, only three per cent of respondents opposed the use of renewable energy. Although a very small group of people oppose the use of renewable energy, a larger group – 13% for onshore wind, and 9% for solar farms – would be unhappy about this infrastructure being constructed in their local area.

Further, one of the main causes of delays in the planning process currently reported by policy teams across MHCLG, Defra and DESNZ are objections from local action groups, for example on the grounds of visual impact, damage to the natural environment and use of agricultural land. Another main cause of delay is lengthy judicial review processes, as many decisions are challenged and whilst most claims are unsuccessful, the time taken by the courts to reach the decision, and hear further appeals in higher courts, can be years, leading to uncertainty and delays for the developer. Data shows that over half – 58% – of all decisions on major infrastructure were taken to court and on average, each legal challenge takes around a year and a half to be resolved[2]. Analysis on projects under the NSIP process, suggests pre-application and legal challenges have the longest timelines.

Developers invest significant time into community engagement in pre-application to try and mitigate future delays and average timelines for statutory pre-application (from inception meeting to submission of an application) have increased from 20 months in 2018 to 28 months in 2021[3]. Further, the National Infrastructure Commission's report on the NSIP regime

[1] https://assets.publishing.service.gov.uk/media/671a181a593bb124be9c13db/DESNZ_PAT_Summer_2024_Crosstabulations.xlsx (Accessed November 2024)
[2] https://www.gov.uk/government/news/prime-minister-clears-path-to-get-britain-building (Accessed March 2025)
[3] https://www.gov.uk/government/publications/planning-and-infrastructure-bill-impact-assessment (Accessed May 2025)

highlighted that the pre-application period for Sizewell C was double that compared to Hinkley Point C – seven years compared to three[4].

NESO's Clean Power 2030 report, published November 2024[5], identifies planning, consenting and communities as a critical enabler of CP30. NESO state that those **communities hosting energy infrastructure should feel tangible benefit** from their critical role their areas play in building a clean, secure and low-cost electricity system. Community benefits alone will not resolve all these issues and are just one planning reform policy being taken forward by the government. Other reforms, for example, the introduction of measures in the Planning and Infrastructure Bill, and the Banner review, are also designed to speed up planning and consenting processes.

Evidence on the impacts of community benefits

There is international precedent for community benefits and statutory conditions are imposed by some authorities. For example, in both Massachusetts (USA) and Ireland, community benefits are a legal requirement for offshore wind development and in Denmark, there is a legal requirement that communities affected by offshore wind developments should be offered a 20% stake in the development. There are no current mandatory or legislative frameworks in the UK to support community benefits, but voluntary guidance does exist, for example, Scotland's Good Practice Principles[6], and recently published guidance on electricity transmission infrastructure[7].

Community benefits can be provided by developers to nearby communities (usually geographically allocated) or through Community Energy Groups (projects that are either partly or wholly owned by a not-for-profit organisation). There is a general consensus in the academic literature that community benefits schemes can enhance support for local infrastructure projects. Van Wijk et al. (2021)[8] found that community benefits can enhance the acceptability of renewable energy projects and community acceptance can be achieved through different models including community benefits and joint ownership schemes. Other models include reduced energy tariffs, apprenticeships and skills training, and non-monetary benefits.

The level of perceived benefit differs between communities (Soerio & Dias, 2020)[9] due to differing contextual, geographical, social and economic needs of the locality. However, case studies of existing community benefit uses have demonstrated improved social cohesion,

[4] https://nic.org.uk/studies-reports/infrastructure-planning-system/delivering-net-zero-climate-resilience-growth/ (Accessed March 2025)
[5] https://www.neso.energy/publications/clean-power-2030 (Accessed November 2024)
[6] Scottish Government (2019) Scottish Government Good Practice Principles for Shared Ownership of Onshore Renewable Energy Developments (Accessed: March 2025)
[7] https://www.gov.uk/government/publications/electricity-transmission-network-infrastructure-community-funds/community-funds-for-transmission-infrastructure-accessible-webpage (Accessed March 2025)
[8] van Wijk, J., Fischhendler, I., Rosen, G., & Herman, L. (2021). Penny wise or pound foolish? Compensation schemes and the attainment of community acceptance in renewable energy. Energy Research & Social Science, 81, 102260.
[9] Soeiro, S. and Ferreira Dias, M. (2020) 'Renewable energy community and the European energy market: main motivations', *Heliyon*, 6(7), p. e04511. Available at: https://doi.org/10.1016/j.heliyon.2020.e04511.

economic savings (Brummer, 2018)[10], the ability to purchase assets and deliver long-term security for communities (Butler & Docherty, 2012, Lacey-Barnacle, 2023)[11,12], active participation and trust building (Devine-Wright & Sherry- Brennan, 2019[13]; Ryder et al 2023)[14] and knowledge building (Brummer, 2018)[15]. The latter three aspects were all highlighted as conditional to early and sustained engagement focused on trust-building and community cohesion. Without these factors, social research has observed communities perceive approaches to be instrumental and tokenistic (Ryder et al, 2023)[14].

Three survey studies with large representative samples found that acceptance for hypothetical energy infrastructure near participant's homes were higher when people were told they would receive some form of community benefit[16,17,18]. Research funded by the Department also found that stakeholders generally perceived community benefit funds positively for communities impacted by onshore wind developments, particularly where communities have control of how funds are spent and where long-term community impacts are pursued[19]. Knauf (2022) also[20] explored the impact of community benefits on acceptance of onshore wind projects. The author found that financial benefits can increase community acceptance of local wind energy projects. The motivation of individuals who already endorse wind energy is not diminished by providing community benefits; therefore, policy makers should not be concerned about losing the support of individuals with intrinsic enthusiasm for wind energy. The author additionally found that benefits can be important in persuading communities who have weak preferences for local projects but may have limited impact on persuading opponents. Similarly, recent social research funded by the Department[21] on community benefits for electricity transmission network infrastructure indicated that community benefit schemes proved to be effective drivers of acceptability for infrastructure projects. However, this impact was more pronounced among those who initially accepted the projects.

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[10] Brummer, V. (2018) 'Community energy – benefits and barriers: A comparative literature review of Community Energy in the UK, Germany and the USA, the benefits it provides for society and the barriers it faces', *Renewable and Sustainable Energy Reviews*, 94, pp. 187–196. Available at: https://doi.org/10.1016/j.rser.2018.06.013.

[11] Butler and Docherty (2012) *Securing the benefits of wind power in Scotland*. Docherty Consulting.

[12] Lacey-Barnacle, M., Smith, A. and Foxon, T.J. (2023) 'Community wealth building in an age of just transitions: Exploring civil society approaches to net zero and future research synergies', *Energy Policy*, 172, p. 113277. Available at: https://doi.org/10.1016/j.enpol.2022.113277.

[13] Devine-Wright, P. and Sherry-Brennan, F. (2019) 'Where do you draw the line? Legitimacy and fairness in constructing community benefit fund boundaries for energy infrastructure projects', *Energy Research & Social Science*, 54, pp. 166–175. Available at: https://doi.org/10.1016/j.erss.2019.04.002.

[14] Ryder, S. et al. (2023) 'Do the ends justify the means? Problematizing social acceptance and instrumentally-driven community engagement in proposed energy projects', Socio-Ecological Practice Research, 5(2), pp. 189–204. Available at: https://doi.org/10.1007/s42532-023-00148-8 (Accessed: November 2024)

[15] Brummer, V. (2018) 'Community energy – benefits and barriers: A comparative literature review of Community Energy in the UK, Germany and the USA, the benefits it provides for society and the barriers it faces', *Renewable and Sustainable Energy Reviews*, 94, pp. 187–196. Available at: https://doi.org/10.1016/j.rser.2018.06.013.

[16] Marie Hyland and Valentin Bertsch, 2017, The role of community compensation mechanisms in reducing resistance to energy infrastructure development, https://www.econstor.eu/handle/10419/174292 (Accessed: November 2024)

[17] Cohen et al., 2016, An Empirical Analysis of Local Opposition to New Transmission Lines Across the EU-27, https://www.iaee.org/en/publications/ejarticle.aspx?id=2777 (Accessed: November 2024)

[18] Walker et al., 2014, 'Community benefits, framing and the social acceptance of offshore wind farms: An experimental study in England', https://www.sciencedirect.com/science/article/abs/pii/S2214629614000814

[19] Centre for Sustainable Energy (2021) Community Engagement and Benefits for Onshore Wind in England

[20] Knauf, J. (2022). Can't buy me acceptance? Financial benefits for wind energy projects in Germany. Energy Policy, 165, 112924.

[21] https://www.gov.uk/government/publications/community-benefits-for-electricity-transmission-network-infrastructure

Boomsma et al (2020)[22] considered the impact of community benefits in the context of CCUS. The authors found that community benefits are more likely to be accepted by communities if the form of benefit aligns with local needs and concerns and if they are embedded in public engagement strategies (like education, consultation, deliberation). The authors found that 'institutionalizing' community benefits with a flexible approach with community engagement, may contribute to fostering stronger trust relationships and addressing any negative perceptions associated with community benefits, such as concerns about bribery.

Van den Berg and Tempels (2022)[23] reviewed the role of community benefits in acceptance for solar farms. It was determined that the acceptance of solar farm developments by the community improves when the benefits provided to the community surpass the perceived negative externalities associated with the development. The authors found that community benefits increase acceptability if the community feels like they meet the needs of the community. The research additionally found three factors that affect community acceptance of solar farms: (1) the developer's motives and interest in providing benefits, (2) the location's history and context affecting expected negative impacts, (3) the level of community involvement in determining benefits.

One study (Walker, 2014) explored whether voluntary or legally mandated schemes were more effective in increasing acceptance of a hypothetical offshore wind farm[24]. Participants who were told that the community benefit was a policy requirement and legally mandated showed increased support for the windfarm. The research suggested that the effect may be due to legal requirements increasing perceptions of fairness which in turn promote acceptance. Key stakeholders and energy-specific not-for-profit organisations have also supported mandating community benefits for renewable energy infrastructure[25].

In summary:

- There is a general consensus that community benefits schemes can enhance support for local energy infrastructure
- Community benefits are more likely to be accepted if it aligns with local needs and is embedded in public engagement strategies
- Acceptance improves when community benefits surpass perceived negative externalities. Factors affecting acceptance include the developer's motives, the location's history, and the level of community involvement
- Community benefits are important for persuading communities with weak preferences but may have limited impact on opponents
- Portraying community benefits as a policy requirement can increase support

Therefore, in order to realise the theory of change presented below, the scheme design will need to use evidence from existing research, presented in this section, and more detailed research and analysis into the impacts of specific levels of benefit on communities. In particular we need to explore (a) whether the design of the scheme can effectively impact people who oppose projects and (b) how this policy can complement other planning reforms proposed.

[22] Boomsma, C., Ter Mors, E., Jack, C., Broecks, K., Buzoianu, C., Cismaru, D. M., & Werker, J. (2020). Community compensation in the context of Carbon Capture and Storage: Current debates and practices. International Journal of Greenhouse Gas Control, 101, 103128.
[23] van den Berg, K., & Tempels, B. (2022). The role of community benefits in community acceptance of multifunctional solar farms in the Netherlands. Land Use Policy, 122, 106344.
[24] Walker et al., 2014, 'Community benefits, framing and the social acceptance of offshore wind farms: An experimental study in England', https://www.sciencedirect.com/science/article/abs/pii/S2214629614000814
[25] Regen , Community Energy England, Citizens Advice - 2023 Consultation Responses (Accessed: March 2025)

Theory of change

Figure 1: Theory of Change

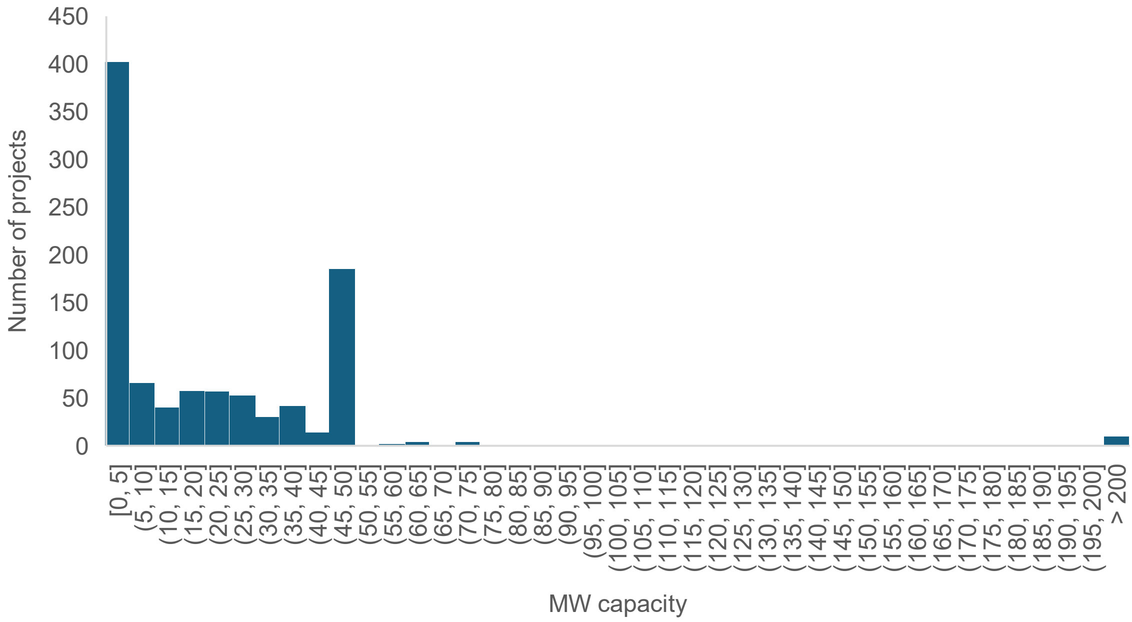
Size of projects in scope

We will likely include a minimum threshold to exclude smaller-scale projects from the scheme, as discussed in the working paper. This will reduce the impact on smaller projects, although we will need to explore potential distortions created by a cliff-edge. We can also consider whether additional thresholds for different technologies are necessary, as the impact of a project of the same capacity but a different technology (onshore wind vs solar, for example) may differ. Further, we should consider the project economics of different technologies, and whether technologies at all scales can finance community benefits.

The following analysis shows the distribution of the capacities of solar, onshore wind and offshore wind projects currently in the planning system, awaiting construction or under construction[26] to understand what different minimum thresholds could mean in practice.

These three technologies have been considered for this initial analysis as significant scale-up of these techs is required for CP30. However, the exact scope of the scheme is still to be determined – as discussed in the working paper. Additional analysis on other potential technologies will be completed as the scheme design is developed further.

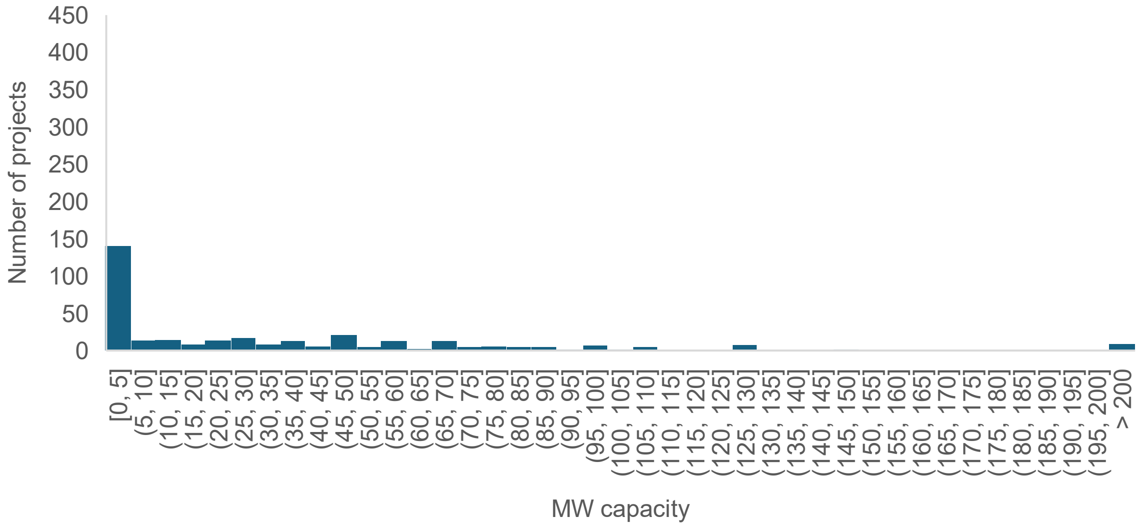
Number of solar projects per capacity interval[27]



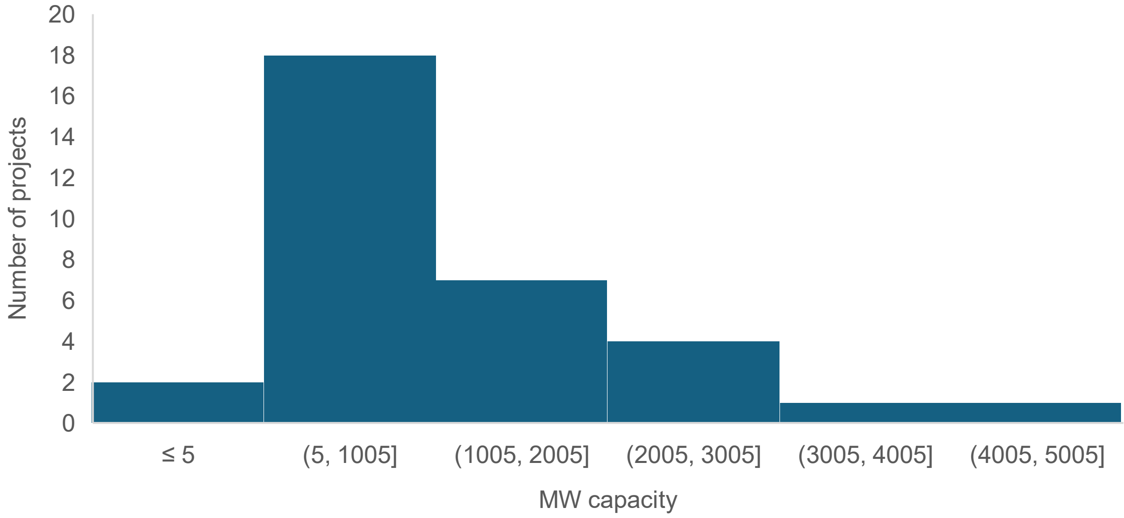
Lots of solar projects fall in the 45-50 bucket as many solar projects are 49.9MW so they can be consented through the quicker town and country planning act (TCPA) route rather than the Nationally Significant Infrastructure Project (NSIP) route. The threshold for NSIP solar projects has now changed to 100MW so we are unlikely to see this peak in the future and the size of solar projects are expected to increase.

[26] The cut of data we have used for this is the REPD from October 2024. Projects in the pre-application stage of the NSIP regime have not been considered here.
[27] In this figure, solar projects exclude roof-mounted projects. This is not an explicit decision but these projects have been excluded as roof-mounted solar projects are usually smaller and are likely to be exempt from providing community benefits.

Number of onshore wind projects per capacity interval



Number of offshore wind projects per capacity interval[28]



Note this chart is presented on a different scale to solar and onshore wind as offshore wind projects are much larger

Solar projects 5MW or less make up around 40% of all solar projects but only account for 2% of the total capacity of solar projects in the planning system. Similarly for onshore wind 38% of all onshore wind projects are less than 5MW but these only account for around 1% of the capacity. For offshore wind, only 2 projects are less than 5MW.

These have been calculated using data from the REPD which includes projects we consider as currently progressing through the planning system. This should therefore be representative of the size of projects that we expect to be built in the next few years.

[28] Here offshore wind includes both floating and fixed projects from the REPD database.

Size of fund comparison

The working paper presents two possible fund contribution options, where developers pay an annual amount into a community fund, based on either installed capacity (£/MW) or generation output (£/MWh). Funding methods, thresholds and levels will be determined through engagement with stakeholders – including this working paper – and will be set out in the enabling legislation. We need to consider both project finances and the impact of the size of the fund on community acceptability to decide an appropriate level of benefit. In this analysis, we have presented illustrative examples on the scale of community benefit funds for different sized solar, onshore wind and offshore wind projects.

This analysis can help us understand the appropriate level of benefit for different technologies. We can also start to explore how larger community benefit funds can be managed as some of the figures presented in the tables below, for larger-scale offshore wind developments particularly, could be very large for communities to administrate and distribute.

The following breakdowns are presented in the tables below. Tables 1 and 2 represent Option 1 in the working paper, where the level of benefit is calculated on capacity basis (per MW) while the latter tables represent Option 2 in the working paper, where level of benefit is calculated on a generation basis (per MWh). Small, medium and large is the lower, median and upper quartile of the size of developments. These have been calculated using a cut of data from the REPD which is projects we consider as currently progressing through the planning system, with developments below 5MW excluded. This should therefore be more representative of the size of projects that we expect to be built in the next few years and that would be required to provide community benefits.

In this analysis and consistent with the working paper, the level of benefit increases in line with inflation. For this analysis, we have assumed the operational lifetime is 35 years for solar, 25 for onshore wind and 30 for offshore wind[29].

Please note the following figures are for illustrative purposes only. Determining the level of benefit will be based on responses provided through the Working Paper, research on the impacts to communities and the planning process, analysis on project economics and evaluation of existing schemes. There may be a case for setting different requirements depending on technology type to take into account differences in funding routes and deployment requirements (including nascent technology including floating offshore wind).

The Working Paper is additionally seeking views on how to best consider infrastructure with very large capacity and/or operating lifetimes. Approaches to consider may include the use of regional funds, an introduction of a cap on funding, or a limit or cap on the duration over which funds are payable. We welcome views on this within the Working Paper.

[29] Source: Technical and cost assumptions https://assets.publishing.service.gov.uk/media/6555cb6d046ed4000d8b99bb/annex-a-additional-estimates-and-key-assumptions.xlsx (Accessed March 2025)

Table 1: Illustrative size of fund for solar, onshore wind and offshore wind projects at £5,000 per MW across all technologies

Here, developers paying £5,000 per MW, which is the recommended amount for onshore wind developers[30].

	Size of development (MW)[31]	£'000s, rounded to the nearest ten thousand, 2024 prices, lifetime costs undiscounted	
		Size of fund per development in year 1	Size of fund per development over lifetime
Solar	18	£90	£2,970
	30	£150	£4,990
	50	£250	£8,230
Onshore wind	25	£120	£3,090
	48	£240	£6,000
	76	£380	£9,530
Offshore wind	250	£1,250	£37,500
	841	£4,210	£126,150
	1500	£7,500	£225,000

Table 2: Illustrative size of fund for solar, onshore wind and offshore wind projects at £1,000 per MW across all technologies

Here is an alternative option where developers pay £1,000 per MW. This is more ambitious than the amount proposed by some solar farm developers in their consultations with local communities and provides a lower range for onshore and offshore wind to aid comparison.

	Size of development (MW)	£'000s, rounded to the nearest ten thousand, 2024 prices, lifetime costs undiscounted	
		Size of fund per development in year 1	Size of fund per development over lifetime
Solar	18	£20	£590
	30	£30	£1,000
	50	£50	£1,650
Onshore wind	25	£20	£620
	48	£50	£1,200
	76	£80	£1,910
Offshore wind	250	£250	£7,500
	841	£840	£25,230
	1500	£1,500	£45,000

[30] https://commonslibrary.parliament.uk/research-briefings/cdp-2024-0127/

[31] Here, and in the other tables, the range of development sizes is Q1, the median and Q3 of the different technologies. For this, we have used the same cut of data from the REPD - projects in planning, awaiting construction or under construction.

Table 3: Illustrative size of fund for solar, onshore and offshore at £2/MWh across all technologies[32]

In this example we assume that developers pay £2 per MWh. This is slightly higher than the amount mandated by the Irish community benefits scheme which is €2/MWh[33].

	Size of development (MW)	£'000s, rounded to the nearest ten thousand, 2024 prices, lifetime costs undiscounted	
		Size of fund per development in year 1	Size of fund per development over lifetime
Solar	18	£30	£1,060
	30	£50	£1,780
	50	£90	£2,930
Onshore wind	25	£110	£2,670
	48	£210	£5,180
	76	£330	£8,230
Offshore wind	250	£1,730	£51,960
	841	£5,830	£174,780
	1500	£10,390	£311,730

Table 4: Illustrative size of fund for solar, onshore and offshore at £1/MWh across all technologies

Here we assume that developers pay £1 per MWh. This amount represents the lower bound of the potential cost range based on an Irish scheme priced at 2 euros/MWh[34]. This conversion provides a conservative estimate, accounting for exchange rate variations.

	Size of development (MW)	£'000s, rounded to the nearest ten thousand, 2024 prices, lifetime costs undiscounted	
		Size of fund per development in year 1	Size of fund per development over lifetime
Solar	18	£20	£530
	30	£30	£890
	50	£40	£1,460
Onshore wind	25	£60	£1,340
	48	£110	£2,590
	76	£170	£4,120
Offshore wind[35]	250	£870	£25,980
	841	£2,920	£87,390
	1500	£5,200	£155,870

[32] For Tables 3 and 4, we have used load factor figures from DUKES 6.3 https://www.gov.uk/government/statistics/renewable-sources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes (Accessed May 2025).
[33] https://www.gov.ie/en/publication/5f12f-community-projects-and-benefit-funds-ress/ (Accessed March 2024)
[34] https://assets.gov.ie/140382/b5198da9-c6c7-4af2-bbb5-2b8e3c0d2468.pdf (Accessed March 2025)
[35] For offshore wind, we have used load factor assumptions for offshore wind as a whole (row 8 in table 6.3), rather than considering fixed and floating separately.

Analytical Annex Questions

1. **Do you agree with the rationale for intervention? Are there any points we have missed?**

2. **Do you agree with the impacts that have been identified? If not, explain why with supporting evidence.**

3. **Do you think there are other impacts that have not been identified? If yes, what other impacts are there that have not been included? Please provide supporting evidence.**

4. **Please provide any data and evidence on whether this policy is likely to reduce delays to energy infrastructure build and how long by.**

5. **Are there any groups you expect would be uniquely impacted by these proposals, such as small and micro businesses or people from protected characteristics? If yes, which groups do you expect would be uniquely impacted? Please provide supporting evidence.**

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