Final stage impact assessment

Title:	**Amendments to ESQCR 2002 and PSSR 1994 to enable the supply and use of plug-in microgenerators (plug-in solar)**
Type of measure:	Secondary legislation
Department or agency:	Department for Energy Security and Net Zero
IA number:	DESNZ024(F)-26-CP30
RPC reference number:	Not applicable
Contact for enquiries:	CleanPower2030@energysecurity.gov.uk
Date:	16/07/2026

1. Summary of proposal

1. This Impact Assessment (IA) assesses a statutory instrument to amend the Plugs and Sockets etc. (Safety) Regulations 1994 and Electricity Safety, Quality and Continuity Regulations 2002 to enable the lawful supply and use of qualifying plug-in microgenerators (initially plug-in solar PV without storage batteries) connected via a standard mains plug and socket, conditional on compliance with a designated interim product safety specification.

2. Strategic case for proposed regulation

2.1 Problem under consideration

2. Solar energy is now one of the cheapest forms of electricity generation, following rapid falls in the cost of photovoltaics globally: between January 2010 and January 2024 the price of solar PV modules sold in Europe fell by an average of 97%.[1] Solar can also be deployed relatively quickly, particularly for rooftop installations.[2]

[1] International Renewable Energy Agency (2025) 'Renewable Power Generation Costs in 2024' (viewed on 12 June 2026).
[2] Department for Energy Security and Net Zero (2025) 'Solar roadmap: United Kingdom powered by solar' (viewed on 12 June 2026).

3. Recent technological and market developments have created plug-in solar PV products with simpler installation requirements and less reliance on professional installation and its associated cost. Plug-in solar devices are currently available from around £400 - £600 or less for an 800W system in Europe, excluding any installation or other ancillary costs. This is equivalent to a price of around £500 - £750 per kW, though there may be some additional costs for installers that will vary depending on circumstance. In comparison, the median installation cost per installed kW for small-scale (≤4kW) solar installations in Great Britain was £1,595 in 2025/26.[3] Plug-in solar may offer a lower-entry-cost pathway into solar generation, especially for those without access to suitable roofs or without the resources to fund a full rooftop installation.

4. These products are increasingly benefiting consumers in other European countries and beyond, with policies updating to respond to this new market.[4] In Great Britain and Northern Ireland, however, existing legislative requirements for electrical installations and plugs reference British Standards that are designed around fixed installations and do not accommodate plug-in generation via standard plugs and sockets. In practice, this blocks a lawful route to supply and use for plug-in solar in parallel with the distribution network.

5. The Government's aim to deliver Clean Power by 2030 reflects the need for a secure and affordable energy supply and to limit our contribution to the damaging effects of climate change. Renewable energy sources can provide cheap power and protect consumers from the impact of volatile international fossil fuel prices. The impact of the recent conflict in the Middle East highlights the urgency of taking advantage of this.

6. The Clean Power Action Plan (2024) called for the rapid acceleration of solar deployment to 45-47GW by 2030, from a current estimated capacity of 22GW, with scope to exceed the 47GW pathway subject to system need.[5] It noted the potential of additional rooftop solar to further boost deployment, contributing to these system goals whilst offering individual consumers energy bill savings and better control of their energy use. Plug-in solar offers an opportunity to extend the benefits of small-scale solar power to a wider set of households and circumstances, at low unit costs.

2.2 Rationale for government intervention

7. Technological change has created new products which could benefit consumers, contribute to decarbonisation and reduce households and businesses' exposure to fossil fuel prices, but regulatory reform would be needed to enable legal uptake of them.

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[3] Department for Energy Security and Net Zero official statistics (2026) 'Solar photovoltaic (PV) cost data', Solar PV cost data: TIC basis (viewed on 12 June 2026).
[4] SolarPower Europe (2025) 'Plug-In Solar PV' (viewed on 12 June 2026).
[5] Department for Energy Security and Net Zero (2024) 'Clean Power 2030 Action Plan: A new era of clean electricity'; Department for Energy Security and Net Zero official statistics (2026) 'Solar photovoltaics deployment' (viewed on 12 June 2026).

8. Enabling wide uptake of plug-in solar in the absence of clear, nationally-recognised product specifications would, however, mean that consumers, regulators and government bodies would lack assurance that only safe and compliant products are being made available. This creates a rationale for the introduction of new product specifications, beginning with an interim specification, alongside such de-regulatory reform.

3. SMART objectives for intervention

9. The objectives of this intervention are to:

    - De-regulate to enable legal supply and consumer use of qualifying low-power plug-in microgenerators.
    - Maintain or improve safety outcomes through product-based requirements, beginning with an interim specification but moving to formal standards/British Standards updates.
    - Enable growth in the plug-in solar market in the UK, allowing consumers, businesses and society to benefit from reduced energy costs and a reduction in carbon emissions.

4. Description of proposed intervention and explanation of the logical change process whereby this achieves SMART objectives

4.1 Initial Intervention

10. The initial intervention entails:

    - Amending ESQCR to create a narrow exemption/clarification from aspects of BS 7671 compliance that are incompatible with qualifying consumer plug-in products, conditional on compliance with a designated interim product safety standard.
    - Amending PSSR to create a narrow exception enabling compliant plug-in microgenerators fitted with BS 1363 plugs to be supplied and used for power generation (without amending BS 1363 itself).
    - Publishing an interim product specification, providing information on what would constitute a safe product that benefit consumers.
    - Supporting amendments to the Engineering Recommendation G98 in Great Britain, led by the Energy Networks Association (ENA), to accommodate

compliant plug-in solar and establish associated registration and installation notification arrangements

- Supporting the publication of consumer guidance to inform the public about how to optimally use plug-in solar devices and understand the permissions that may be required.

4.2 Process of change

11. The initial intervention is intended to lead to the following steps to enable growth in the UK plug-in solar market and generate anticipated benefits:

    i. Manufacturers respond to regulations and interim product specification to develop plug-in solar systems which would be safe and effective for consumers and compliant with the General Product Safety Regulations for retail sale.

    ii. Working with manufacturers, importers and retailers, establish supply chains to deliver a retail offering for consumers.

    iii. Awareness among businesses and consumers builds and they research options for plug-in solar installations: considering products, set-up arrangements, energy supply tariff implications (including whether they already have or wish to seek an export tariff where possible) and permissions required for installation.

    iv. Those who decide to install plug-in solar do so:

        - In some cases, only following a successful application for planning permissions.

        - In some cases, having gained permission from a landlord or freeholder, depending on circumstances.

        - In some cases, with professional help, for instance where they desire a mounting arrangement that needs minor works, or where they need minor electrical work such as installation of an external socket.

    v. Consumers' use of their solar panels, for instance their orientation, tilt, times of day of being plugged in, how fair their power demand matches solar generation, will determine the output of their panels, savings made and impact on the wider energy system including greenhouse gas emissions savings. Some may already have an export tariff, in which case they may receive payment for unused power, but others may seek to obtain one (which would be contingent on registering their devices with their Distribution Network Operator) depending on developments in the retail energy market.

4.3 Policy dependencies

12. Whilst this Impact Assessment considers potential impacts across the whole of the UK, as proposed reforms to PSSR will affect Northern Ireland, in practice plug-in solar would only be legally permitted for use in Northern Ireland if the Electricity Safety, Quality and Continuity Regulations (Northern Ireland) 2012 are also reformed, and this is a matter for the Northern Ireland Executive.

13. Whilst plug-in solar panels will be treated legally as a consumer product, certain uses of them, e.g. where they are permanently attached to the exterior of a building, including walls, balconies, or similar structures, would constitute a material development of a property and be subject to planning controls. Under current legislation, such an installation will be legally possible without applying for planning permission if it meets the requirements of existing permitted development rights for microgeneration solar PV.[6] In other cases, a consumer would need to apply for planning permission, which is likely to involve fees and administrative burdens that may be high relative to the capital cost of plug-in solar panels and the potential energy bill savings. This would likely significantly limit uptake.

14. Government is considering whether additional permitted development rights for houses are required. Such changes could make it easier for householders to install plug-in solar panels without needing to apply for planning permission. This IA therefore provides analytical findings for a scenario in which PDRs are not amended. In alternative scenarios also presented, it is assumed that PDRs are reformed as such in England but, as planning policy is a devolved matter, not elsewhere in the UK[7]. No changes to PDRs are assumed for flats.

15. Visibility of small-scale generation assets is important for electricity network operators' ability to plan and manage local and national networks in a cost-effective way whilst maintaining security of electricity supply. For instance, it will support decisions regarding the procurement of reactive power services as plug-in solar and other distributed generation, including that from rooftop solar, affect voltage control requirements. Therefore the Department has worked with the Energy Networks Association (ENA), network operators and Ofgem to establish a consumer installation registration platform, providing network operators with visibility of plug-in solar deployment.

16. The impacts of plug-in solar and future take up will also depend upon UK and global energy markets, determining retail prices and the incentives for installation. Energy market policies may also play a role, in particular:

    - Tariff structures will determine the value to consumers of reducing their network electricity demand at the points in time (predominantly sunny

[6] The Town and Country Planning (General Permitted Development) (England) Order 2015
[7] Permitted development rights may be more likely to already accommodate many approaches to using plug-in solar in Northern Ireland relative to Great Britain. The Planning (General Permitted Development) Order (Northern Ireland) 2015

daytimes and disproportionately during the summer) at which plug-in solar panels are expected to be generating. They will also affect the extent to which installation of small-scale renewables reduces consumers' liability for fixed network costs as well as reducing the variable costs in the system – affecting individual incentives to install and wider system effects. Ofgem are currently reviewing cost allocation arrangements.[8]

- The Government is exploring ways to ensure that low-income households can benefit from plug-in solar devices and have earmarked up to £25 million with a view to piloting support for plug-in panels in partnership with local authorities and mayors. The costs and impacts of this policy are not considered in this Impact Assessment.

5. Summary of long-list and alternatives

17. Given a clear set of regulatory barriers to overcome to enable legal use of plug-in solar panels in mains-connected properties for the first time in the UK, a single main regulatory reform option was considered. Details of choices made in implementation of this are given in the following section.

6. Description of shortlisted policy options carried forward

18. The preferred option described above aims to strike the right balance between mitigating electrical, building and fire safety risks and enabling wide uptake of plug-in solar without excessive administrative burden for those choosing to install it. Leaving aside options regarding the introduction of extended Permitted Development Rights in the planning system which will also affect the scale and nature of deployment (which are separate to the proposals considered by this IA), the main aspects where alternative approaches have been considered concern the detail of the interim product specification. Key choices made there include:

    - Permitting deployment of one compliant plug-in solar device per circuit with a maximum rated output of 800 W per device, subject to corresponding changes to the Engineering Recommendation G98 in Great Britain.

    - Restricting deployment on certain higher risk external surfaces and building types including combustible cladding systems and buildings subject to safety remediation.

    - Permitting connection without a dedicated external socket, subject to requirements for safe cable routing and installation

[8] Energy system cost allocation and recovery review | Ofgem

- Setting minimum fire performance requirements for PV modules, balancing safety against impacts on cost, weight and product availability
- Excluding battery storage systems from the initial deployment, reflecting the additional safety and technical considerations associated with domestic battery
- Supporting consumer self-installation through requirements for circuit identification, consumer unit checks and appropriate consumer safety guidance, while advising consumers to seek professional advice where necessary
- Requiring products to be type tested and registered before being placed on the market
- Introducing simple consumer registration requirements supported by digital tools to provide network operators with visibility of deployment

19. Alternative approaches were considered for each of these areas. The preferred option was selected on the basis that it provides proportionate and evidence-based measures to mitigate identified risks while supporting consumer uptake and maximising the benefits of plug-in solar. Further detail on the requirements, conditions and mitigations associated with these measures is set out in the interim product specification.

7. Regulatory scorecard for preferred option

20. Central figures provided in the tables below are based on a scenario where there are additional permitted development rights (PDRs) for houses in England to make it easier for householders to install plug-in solar without need for a planning application in more cases, which Government is considering. Ranges reflect two alternative scenarios: one with no reform of PDRs and more limited uptake, and one with additional PDRs in place and more optimistic assumptions on consumer savings and costs. Results also incorporate impacts estimated for Northern Ireland, but in practice plug-in solar would only be legally permitted for use in Northern Ireland if the Electricity Safety, Quality and Continuity Regulations (Northern Ireland) 2012 are also reformed, and this is a matter for the Northern Ireland Executive.

21. Unless otherwise stated, all values are expressed in 2026 prices, in present value terms with a 2026/27 base year over a 15-year appraisal period. As described in the Evidence Base, the scenarios modelled account only for the costs of take up that occurs over the first 5 years following policy introduction, tracing the impacts of associated installed panels thereafter, to provide a fair assessment of costs and benefits from enabling plug-in solar installations which carry up-front capital costs and an assumed 10-year initial product lifespan.

Part A: Overall and stakeholder impacts

(1) Overall impacts on total welfare		Directional rating Note: Below are examples only
Description of overall expected impact	This reform enables a new, relatively low-cost, opportunity to reduce electricity purchases from the electricity network, creating energy bill savings for those installing plug-in solar. It supports an expansion in renewable energy generation capacity and potentially a reduction in the power sector's contribution to greenhouse gas emissions. Indirect power system impacts are uncertain and depend on levels of take-up: this reduction in network electricity demand may reduce wholesale prices and reduce wider infrastructure investment requirements, benefitting other consumers and businesses. However, it may also redistribute the burden of fixed network costs to others, depending on future tariff arrangements. The balance of impacts depends on developments in storage and demand flexibility to make use of plug-in solar-generated power at the times it is available. Growth in distributed energy generation creates new requirements for network operability interventions and the net impacts on distribution investment requirements are mixed.	**Positive** **Based on all impacts (incl. non-monetised)**
Monetised impacts	Total £79.7m Net Present Social Value (£36.6m to £355.8m) Equivalised annual net social value (15 years): £6.7m (£3.1m to £29.8m) Capital costs for plug-in solar installers: £630.8m Other installation costs: £89.6m Administrative costs for installers (including fees) related to the planning system: (£22.4m) Administrative costs from requirement to register plug-in solar devices: (£10.4m) Energy system cost savings from reduced network demand: £738.8m Reduced greenhouse gas emissions: £91.5m Air quality savings impacts: £2.8m	**Positive** **Based on likely £NPSV**
Non-monetised impacts	The policy change is deregulatory and provides new opportunities for those choosing to install plug-in solar to reduce their retail electricity costs. As some of this cost currently funds fixed network costs, there may be indirect, negative impacts on other consumers which depend on future tariff structures.	**Uncertain**

	However, additional renewables capacity may also reduce wholesale electricity market costs, reducing bills for other consumers. If the policy leads to an overall increase in small-scale renewables deployment, the decrease in network electricity demand that needs to be met, and changes in export patterns, may affect investment requirements of Transmission Owners and Distribution Network Operators both positively and negatively in different places. However, this can also lead to the need for additional measures for them and the National Energy System Operator to ensure system operability, for instance voltage control, so net impacts are uncertain. Consumers will in some cases need to seek permission from their landlord, freeholder or property management organisation, potentially creating administrative costs. It is expected that these will be minor and form part of routine property management. Non-installing households may perceive some loss in amenity if neighbours installing plug-in solar has any negative visual impact.	
Any significant or adverse distributional impacts?	Uptake of small scale solar by consumers, which reduces their network demand could result in others paying higher electricity prices to ensure that the fixed costs of maintaining the power system can be recovered; if plug-in solar take up were to be disproportionately among higher-income households. However, this depends on future tariff arrangements, and plug-in solar may widen access to bill-saving technology.	**Uncertain**

(2) Expected impacts on businesses		
Description of overall business impact	This reform enables a new, relatively low-cost, opportunity to reduce electricity purchases from the electricity network, creating direct installation costs, administrative costs and later benefits from retail energy bill savings for those choosing to take this up. We anticipate that businesses will represent a small proportion of uptake. Indirect power system impacts are uncertain and depend on levels of take-up: this reduction in network electricity demand may reduce wholesale prices and reduce wider infrastructure investment requirements, benefitting non-installing businesses. However, it may also redistribute the burden of fixed network costs away from those with plug-in solar to other customers, including businesses, depending on future tariff arrangements.	**Uncertain**
Monetised impacts	Total £15.3m NPV (net benefits) (£7.0m to £29.8m)	**Positive**

	Equivalised annual direct impacts for business (2026 prices and 2026/27 base year): £1.3m (£2.5m to £0.6m) Capital costs for plug-in solar installers: £31.5m Other installation costs: £4.5m Administrative costs for installers (including fees) related to the planning system:(£1.1m) Administrative costs from requirement to register plug-in solar devices: (£0.5m) Direct retail electricity cost saving for installers: £52.9m No pass through deducted from these figures – in practice businesses are likely to only incur these costs where they expect to make savings from it, which would also stand to benefit their customers.	
Non-monetised impacts	Set-up costs for plug-in solar suppliers: in response to the new retail opportunity enabled by reform (so not a regulatory cost as such), manufacturers will need to respond to regulations and interim product specification to develop plug-in solar systems which would be safe and effective for consumers and compliant with the General Product Safety Regulations for retail sale. Working with manufacturers, importers and retailers will need to establish supply chains to deliver a retail offering for consumers. Indirect electricity system cost impacts affecting non-installing businesses include benefits from reduced wholesale prices and costs from the redistribution of the burden of fixed network costs, depending on future tariff structures. Electricity network costs: if the policy leads to an overall increase in small-scale renewables deployment, the decrease in network electricity demand that needs to be met, and changes in export patterns, may affect investment requirements of Transmission Owners and Distribution Network Operators positively and negatively in different places. It can also lead to the need for additional measures for them and the National Energy System Operator to ensure system operability. It is expected that development of such impacts will be taken into account in economic regulatory decisions to ensure allowed revenues are appropriate. Consumers will in some cases need to seek permission from their landlord, freeholder or property management organisation, potentially creating administrative costs. It is expected that these will be minor and form part of routine property management.	**Uncertain**
Any significant or adverse distributional impacts?	Given the capacity of plug-in solar panels which will permitted, might be expected that this new opportunity to reduce network electricity demand will disproportionately benefit small businesses and charities: larger energy consumers may be more likely to opt for larger rooftop solar installations already	**Neutral**

	permitted, and tend to face lower retail electricity costs. Take-up patterns are highly uncertain, however. Overall impacts are expected to be modest given scale of take-up projected here.	

(3) Expected impacts on households		
Description of overall household impact	This reform enables a new, relatively low-cost, opportunity to reduce electricity purchases from the electricity network, creating direct installation costs, administrative costs and later benefits from retail energy bill savings for those choosing to take this up. We anticipate that businesses will represent a small proportion of uptake. Indirect power system impacts are uncertain and depend on levels of take-up: this reduction in network electricity demand may reduce wholesale prices and reduce wider infrastructure investment requirements, benefitting non-installing businesses. However, it may also redistribute the burden of fixed network costs away from those with plug-in solar to other customers, including businesses, depending on future tariff arrangements.	**Positive**
Monetised impacts	Total £289.9m NPV (£132.9m to £566.5m) Equivalised annual direct impacts for households (2026 prices and 2026/27 base year): £24.3m (£47.5m to £11.1m) Capital costs for plug-in solar installers: £599.3m Other installation costs: £85.2m Administrative costs for installers (including planning fees) related to the planning system:(£21.3m) Planning application fees (transfer from installers to planning authorities to cover administration costs. Administrative costs from requirement to register plug-in solar devices: (£9.9m) Direct retail electricity cost saving for installers: £1005.6m	**Positive** **Based on likely household £NPV**
Non-monetised impacts	Indirect electricity system cost impacts affecting non-installing businesses include benefits from reduced wholesale prices and potential costs from the redistribution of the burden of fixed network costs, depending on future tariff structures. However, wider power system impacts, which may affect the prices paid for electricity by all consumers positively or negatively, are uncertain. Households may derive non-financial benefits from choosing to install plug-in solar, including gaining greater protection from the impacts of electricity and fossil fuel price uncertainty	**Uncertain**

	and meeting a desire to reduce their contribution to climate change. It may form part of a decision to adopt wider low-carbon technologies, improving the financial benefits of switching from petrol cars to electric vehicles, for instance. Non-installing households may perceive some loss in amenity if neighbours installing plug-in solar has any negative visual impact.	
Any significant or adverse distributional impacts?	Uptake of small scale solar by consumers, which reduces their network demand could result in others paying higher electricity prices to ensure that the fixed costs of maintaining the power system can be recovered; if plug-in solar take up were to be disproportionately among higher-income households, this could be detrimental to inequality in disposable income. However, this depends on future tariff arrangements, and on the other hand plug-in solar may widen access to bill-saving technology with lower up-front costs. The consumer benefits of plug-in solar are expected to be strongest for those living in regions of relatively high solar irradiance, including the east and south of England. Overall impacts are expected to be modest given scale of take-up projected here.	**Neutral**

Part B: Impacts on wider government priorities

Category	Description of impact	Directional rating
Business environment: **Does the measure impact on the ease of doing business in the UK?**	This reform enables a new, relatively low-cost, opportunity to reduce electricity purchases from the electricity network, creating energy bill savings which will accrue to some businesses depending on take-up. Whole power system impacts, which may affect wider generation investment decisions and the price of electricity faced by other businesses, are uncertain. Net impacts are uncertain, but at likely levels of take-up are not expected to have a substantial impact on the ease of doing businesses in the UK.	**Neutral**
International Considerations: **Does the measure support international trade and investment?**	No material impact.	**Neutral**

Natural capital and Decarbonisation: **Does the measure support commitments to improve the environment and decarbonise?**	The policy is expected to lead to an increase in renewable generation capacity, although impacts on wider capacity investment are uncertain. This would support a reduction in power system greenhouse gas emissions.	**Supports**

8. Monitoring and evaluation of preferred option

22. As described above, the Department has worked with the Electricity Networks Association (ENA), its members and Ofgem as part of the G98 working group to establish a simple consumer registration process for plug-in solar. Under this approach, compliant products will be required to be registered on the ENA G98 Type test Register before placed on the market and linked to the customer installation notification process. It is also intending to introduce a simple consumer-facing digital notification process to support compliance with registration requirements while minimising administrative burden on consumers. This will primarily give network operators visibility over the deployment of plug-in solar in their area for the purposes of operational decision-making, but the Department will work with them to develop plans for using such data where appropriate for monitoring of overall policy effects and registration rates.

23. The Department will further consider further evidence gathering to understand consumer and business impacts and deployment, incorporating where possible all of retail, consumer feedback and power system data. It will also work with NESO, Ofgem and Distribution Network Operators to ensure any future impacts on the electricity transmission and distribution networks are well understood and monitored.[9]

9. Minimising administrative and compliance costs for preferred option

- Plug-in solar is intended to be a consumer product that offers advantages in ease of installation and use. However, it is important that consumers and suppliers adhere to the requirements of the interim product specification. To ensure this can be done with minimal burden, we are aiming for consumer guidance to be easily accessible through a QR code directing to a document online.

24. Unless consumers choose to install in a way which requires additional electrical works which may be in scope of building regulations (e.g. installation of a new external socket), or an application for planning permission, it is expected that there

[9] As an example, NESO's 2026 Summer Outlook report assessed the impact of growth in embedded (distribution network-connected) renewable generation on system operability needs. NESO (2026), 'Summer outlook'.

will be few additional administrative requirements for taking up the new options of using plug-in solar panels.

25. Doing so will, however, require registration of product use with Distribution Network Operators in Great Britain. This is expected to be a simple process which taking around 5 to 10 minutes to complete. Within 28 days of installation, consumers would complete a short online form, which will be clearly signposted within the consumer guidance, providing their name, email address and installation address. The system would use the address information to pull the relevant MPAN and consumers would then select their device from a drop-down list of eligible products drawn from the ENA Type Test Register.

Declaration

Department:

Department for Energy Security and Net Zero

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Minister:

Minister McCluskey

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed: 

Date: 16/07/26

Evidence base

Plug-in solar uptake scenarios

Methodology

1. There is significant uncertainty regarding the likely level of uptake of plug-in solar in the UK, as a product that will be new to our market and has only been established relatively recently in other countries which have different energy market and regulatory contexts, and different compositions of housing stock. In this IA, analyses of costs and benefits rely on two alternative scenarios which are derived from a combination of market data from Germany and judgements about the potential implications of the UK's specific context. Many more scenarios are plausible but, on the basis that the volume of generation capacity installed over the medium term may be modest relative to the size of the overall power system and so most of the quantified marginal impacts are expected to arise in proportion to take-up, the analysis focuses on these two for a proportionate comparison of costs and benefits.

2. Whilst this Impact Assessment considers potential impacts across the whole of the UK, as proposed reforms to PSSR will affect Northern Ireland, in practice plug-in solar would only be legally permitted for use in Northern Ireland if the Electricity Safety, Quality and Continuity Regulations (Northern Ireland) 2012 are also reformed, and this is a matter for the Northern Ireland Executive.

3. To provide a fair comparison of costs, which for plug-in solar mainly comprise up-front costs and capital spending for installers, with benefits which accrue over a longer period, here we assess the implications of 5 years of cumulative installations in terms of costs and benefits over an appraisal period of 15 years. This reflects that the lifespan of a plug-in solar device may be around 10 years long before at least the inverter may need to be replaced[10]. It is expected that consumers will continue to purchase plug-in solar devices beyond this but projections for this have not been developed for this IA in the absence of market data from a longer period post-full deregulation in international examples or an assessment of how this will interact with other small-scale renewables including rooftop solar longer-term.

4. Modelling assumptions for this IA rely on comparison to Germany where, since 2019, plug-in solar PV systems have been legal to install for both domestic and non-domestic customers and from where there is evidence on take-up. Germany's success in deploying solar PV has been attributed to a combination of step-by-step regulatory easing and greater market incentives:
   - Following the introduction of an earlier technical and regulatory framework for small plug-in PV devices, which led to very small levels of take-up, the first major regulatory change was the introduction of a zero VAT rate from 1st January 2023 for

[10] Hoymiles (2024) 'Hoymiles Microinverter Reliability Explained: Our Extensive Warranty that Covers Your PV Lifecycle' (viewed 15th July 2026)

eligible photovoltaic systems installed on or near residential buildings, including balcony systems, coinciding with the impacts of global increases in energy prices beginning the previous year and the cost of panels falling.

- A May 2024 reform package, commonly referred to as 'Solarpaket I,' which increased power limits from 600W – 800W by amending the legal framework for plug-in solar and was accompanied by simplification of the registration process.[11] In this context, systems are registered in the Marktstammdatenregister (MaStR) – Germany's official register of electricity and gas market data, operated by Bundesnetzagentur (Federal Network Agency).[12]
- A further federal reform in October 2024 reduced legal barriers for tenants and apartment owners by amending tenancy and condominium law so that the installation of plug-in solar devices was treated as a privileged structural modification, thereby narrowing the grounds on which landlords or owners' associations could refuse consent.[13]
- After tenancy/property-rights reform, Germany's focus shifted to technical standardisation which took effect in December 2025, defining plug-in solar as a standardised consumer product, followed by an additional reform (effective from 1 March 2026) which clarified the simplified grid-connection route for the 800 VA category.[14]

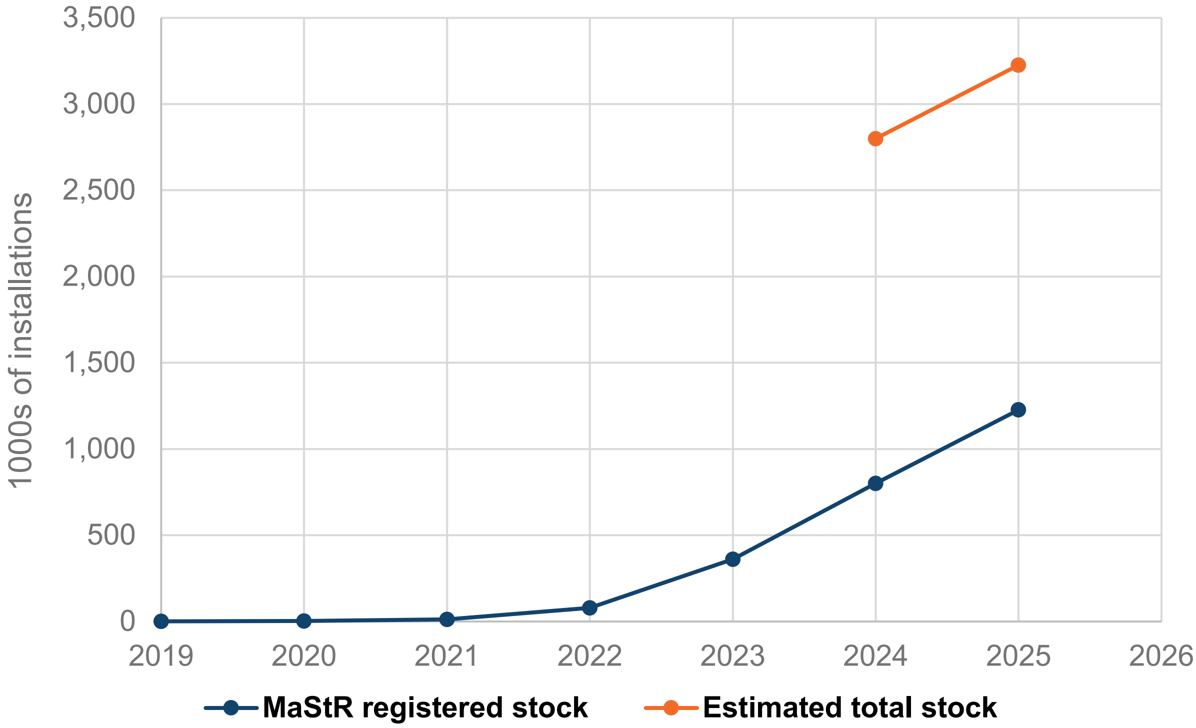
5. The Department has drawn in particular on two German sources for evidence on plug-in solar uptake. The first is MaStR 2025, published in January 2026 by Bundesverband Steckersolar e.V. (BVSS), the trade association for plug-in solar in Germany; that report analyses entries in Germany's Core Energy Market Data Register (MaStR).[15] The second is Steckersolargeräte ('Plug-in solar devices'), a research report published in August 2025 by Umweltbundesamt (UBA), the German Environment Agency.[16]

6. Analysis of MaStR registrations suggests that German registered plug-in solar stock rose from around 0.9% of households at the end of 2023 to around 3% by the end of 2025, implying that the registered market roughly tripled over that period. UBA estimates that the actual market may already have been materially larger, with just under 3 million plug-in solar devices in operation by the end of 2024 compared with around 0.8 million registered (see Figure 1 below), implying household penetration may already have been

[11] Taylor Wessing (2024) 'Solar package I – Changes at a glance' (viewed on 12 June 2026).
[12] The Federal Network Agency (Bundesnetzagentur or BNetzA) is the German regulatory office responsible for overseeing electricity, gas, telecommunications, post and railway markets.
[13] Bundesgesetzblatt (2024) 'Act on the Approval of Virtual Homeowners' Meetings, to Facilitate the Use of Plug-in Solar Devices and on the Transferability of Limited Personal Easements for Renewable Energy Plants' (viewed on 12 June 2026).
[14] Bundesverband Solarwirtschaft (2025) 'DIN/VDE: world's first standard for plug-in solar devices' (viewed on 12 June 2026); PV Magazine (2026) 'New German rule allows larger plug-in PV without electrician' (viewed on 12 June 2026).
[15] Bundesverband Steckersolar e.V. (2026) 'MaStR 2025: Auswertung des Marktstammdatenregisters' (viewed on 12 June 2026).
[16] Umweltbundesamt (2025) 'Steckersolargeräte: Statistische Untersuchungen zu Anzahl, installierter Leistung und Selbstverbrauch', Texte 91/2025. Study by Tobias Kelm and Daniel Stauch (Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg, ZSW) (viewed on 12 June 2026).

around 7–8% by 2024–2025.

Figure 1: German data on plug-in installs, registered vs unregistered stock estimates

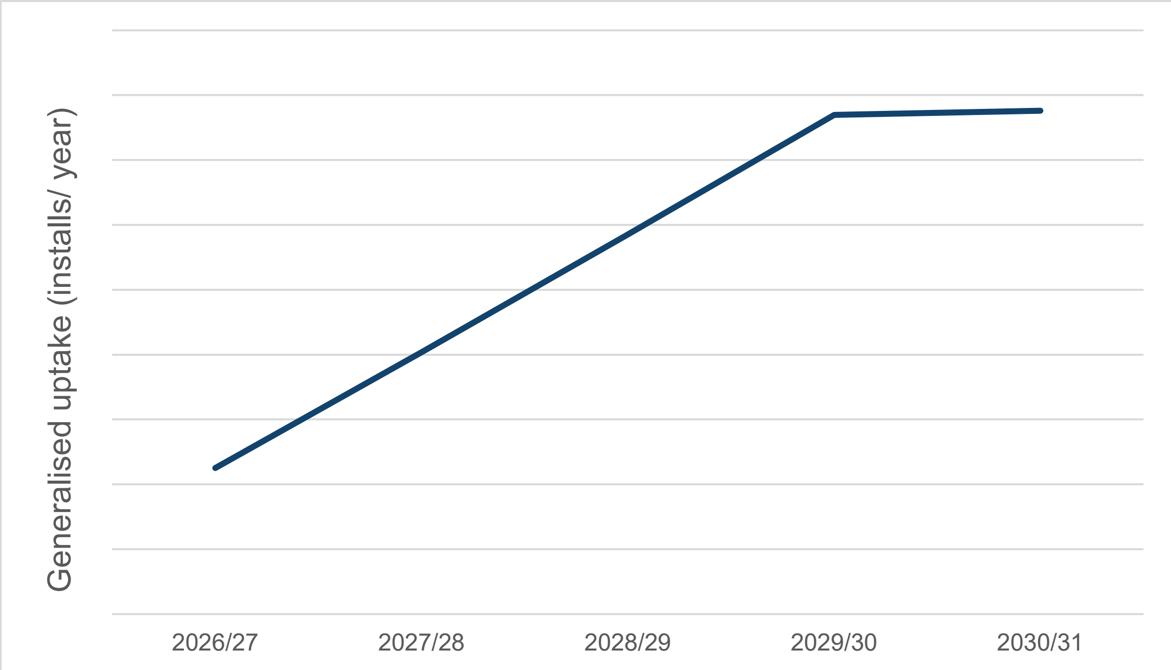


Sources: Steckersolargeräte, MaStR 2025.

7. Scenarios for potential annual uptake in the UK are derived using Germany's registration data as a benchmark, observing that annual uptake reached a peak rate (so far) of 10.7 installations per 1000 households in 2024. On the basis that we anticipate that the initial regulation of plug-in solar in the UK will provide more clarity over permitted devices and a simpler registration system than was present for the first years of Germany's market development, we assume a linear increase in uptake rates from a level around 30% of the peak rate until a peak rate is achieved in the 4th year following initial de-regulation, followed by a levelling off for the final uptake period in year 5.

8. This provides the generalized annual uptake trend illustrated in Figure 2, which broadly assumes a similar acceleration in uptake to a peak rate to that seen in Germany between 2021 and 2025, but with a higher relative starting point (initial uptake rate 30% of the peak rate). This is an uncertain assumption,but reflects the fact that existing international experience with plug-in solar products, and its introduction in the UK at a time of already-elevated electricity prices, may mean a faster initial deployment.

Figure 2 - Generalised Uptake Curve (plug-in solar PV installs per annum across UK)



9. In benchmarking to Germany's uptake rates, we also account for their true uptake rate being less than that implied by data on registered balcony solar installations. Whilst the evidence presented above suggested total installations might be 3 or more times total registered units, we apply an uplift to Germany's uptake rates of only 2, to take a conservative approach given plans to have a single, clear route to registration and an aim to minimise non-visible installations.

10. Our model for take-up breaks all four UK nations' population of dwellings into categories by tenure (e.g. rented or owner-occupied, presence of a lease, and private vs social rented sector) and by property type (e.g. house, flat 18m or below, or a flat above 18m high). For each category, depending on policy scenario, a factor is applied to determine its peak uptake rate relative to Germany's national peak take-up rate. This allows the impact of changing between policy scenarios to vary across different types of dwelling, with the overall impact reflective of the stock of such dwellings in each nation. The general uptake trend over time is then applied in proportion, anchored to this peak rate reached in Year 4 of the period.

11. Tables 1 and 2 show the factors assumed to apply for each property type under two policy settings. In all cases, these depend heavily on subjective judgement and are intended to account broadly for a variety of circumstances that may limit short-term take-up relative to Germany including the UK's lower average levels of solar irradiation, which will generally reduce the net benefits of small-scale solar installation – Germany's

average Global Horizontal Irradiation has been estimated to be 15% greater than the UK's.[17]

12. In the first policy scenario, no reforms to permitted development rights are assumed. Here, current planning rules apply, meaning that arrangements of plug-in solar panels that do not meet the requirements of existing permitted development rights (PDR) cannot be deemed as having planning permission without a successful application to the relevant planning authority. Planning application fees (£272 and £548 for houses and flats respectively in England) and the time required to complete applications would be expected to significantly affect the individual financial case for installing plug-in solar. Whilst some consumers may choose to apply for planning permission in practice, for modelling costs and benefits, we assume that uptake will be limited to setups that either fit with existing PDRs or are sufficiently non-permanent to fall outside of planning system requirements. Even in those cases, requirements to gain landlord or freeholder permission to install, which have been reformed in Germany) will still apply in the UK when these reforms are implemented, and requirements of the interim product specification may be more difficult to meet in flats – particularly those in high-rise settings. As such, relative take-up is higher in houses than in flats, and take up in flats above 18m high is assumed to be zero. Permitted development rights may be more likely to already accommodate many approaches to using plug-in solar in Northern Ireland relative to Great Britain, so the approach used here may under-estimate potential take-up there somewhat.

13. In the second policy scenario, the impact of the additional permitted development rights for houses the Government is considering are taken into account using subjective judgement on the potential impact on take-up. These changes could make it easier to install plug-in solar without needing to apply for planning permission in a wider set of arrangements, in houses specifically. A higher relative take-up rate is therefore applied in houses, but with a greater percentage point increase for owner-occupied houses than for others because this reform will not affect the other frictions described above that may still limit take-up. No change to permitted development rights is assumed for flats.

Table 1 - Relative peak annual uptake for UK, relative to Germany, by dwelling type and ownership status (enabling legislation only scenario)

Dwelling vs ownership	Owner occupied - freehold	Owner occupied – leasehold	Private rented - freehold	Private rented – leasehold	Social rented (combined)
House	30%	20%	20%	20%	20%
Flat <18m	20%	15%	15%	15%	15%
Flat >18m	0%	0%	0%	0%	0%

[17] ESMAP (2020) 'Global Photovoltaic Power Potential by Country'. Washington DC: World Bank. Accessed 13/07/2026. Comparison of Average theoretical potential (GHI) between Germany and UK country factsheets.

Table 2 - Relative peak annual uptake for UK, relative to Germany, by dwelling type and ownership status (enabling legislation & PDR reform scenario)

Dwelling vs ownership	Owner occupied - freehold	Owner occupied – leasehold	Private rented - freehold	Private rented – leasehold	Social rented (combined)
House	80%	60%	50%	40%	50%
Flat <18m	20%	15%	15%	15%	15%
Flat >18m	0%	0%	0%	0%	0%

14. As the composition of dwellings differ across UK nations, we also weight these uptake factors by the proportion of dwellings in the respective categories in producing UK-wide take-up rates. The tables below indicate the modelling estimates for dwelling composition across the UK and Germany, broken down by property and ownership type. As breakdowns across these categories do not exist fully across one single dataset, various datasets and assumptions have been reconciled, sometimes with a slightly different basis year, to arrive at these percentages.

15. To determine the absolute number of plug-in solar PV installations each year, uptake rates, which have been determined yearly for each UK country, are applied to each country's yearly-projected household figures. This results in absolute yearly installs by nation, which is then amalgamated to give total yearly UK installs. Household stock projections for England, Wales, and Scotland have been taken from the most recently available accredited, official sources that project household numbers. England household projection modelling has used 2022-based ONS data[18], Wales has used 2022-based StatsWales data[19] and stock projections for Scotland have used 2022-based National Records of Scotland (NRS) data[20]. For each of these sources, household projection numbers have been determined using a set of assumptions about population size and composition.

16. Housing stock projections for Northern Ireland (NI) required separate treatment due to a lack of recent household projections data, with the latest official projections data[21] using set of 2016-based assumptions. To account for this, a simple methodology was developed to forecast NI housing stock. This methodology combines a recent (2026) publication on annual NI housing stock statistics[22] and an implied yearly household increase derived from the NI 'Housing Supply Strategy Target'[23].

[18] Office for National Statistics (2025) 'Household projections: 2022-based'.
[19] StatsWales (2025) 'household projections for Wales: 2022-based'.
[20] National Records of Scotland (2025) 'Household Projections for Scotland (2022-based)'.
[21] Northern Ireland Statistics and Research Agency (2018) 'Northern Ireland Household Projections (2016 based)'.
[22] Northern Ireland Department of Finance (2026) 'Annual housing stock statistics'.
[23] Northern Ireland Executive (2024) 'Housing Supply Strategy A Home for Everyone'.

Table 3 - Estimated dwelling type composition across UK used for analysis, estimates derived using various datasets and assumptions[24]

Dwelling vs ownership	Owner occupied - freehold	Owner occupied - leasehold	Private rented - freehold	Private rented - leasehold	Social rented (combined)	Total
House	**53%**	**4%**	**9%**	**1%**	**9%**	**76%**
Flat (total)	**2%**	**6%**	**3%**	**6%**	**8%**	**24%**
Flat <18m	2%	5%	3%	5%	8%	22%
Flat >18m	0%	1%	0%	1%	1%	2%
Total	**55%**	**9%**	**12%**	**7%**	**17%**	**100%**

17. Our uptake and appraisal modelling considers three main scenarios:
    i. Scenario 1: No PDR reform, central economic impacts
    ii. Scenario 2 (Central): PDR reform, economic impacts scenario 1
    iii. Scenario 3: PDR reform, economic impacts scenario 2

18. Scenario 1 assumes no PDR reform has taken place and therefore sees lower plug-in PV installation uptake in the modelling when compared with Scenarios 2 and 3 which assume an equivalent degree of PDR reform (hence same uptake). The policy/ costing assumptions across the three scenarios vary across some quantities resulting in different economic impacts; this is summarised by the table below.

Table 4 - Varying Policy/ Cost Assumptions across three modelling scenarios

Assumption	Scenario 1	Scenario 2 (Central)	Scenario 3
Policy Setting	No PDR Reform in UK	PDR Reform (in England)	PDR Reform (in England)
Device Cost	£500	£500	£450

[24] Ministry of Housing, Communities & Local Government (2025) 'Leasehold dwellings, 2023 to 2024'.
Department for Levelling Up, Housing & Communities (2022) 'English Housing Survey 2021 to 2022'.
House of Commons Library (2025) 'Leasehold housing in England: Statistics'.
Welsh Government (2023) 'Housing in Wales'.
Welsh Government (2021) 'Research into the sale and use of leaseholds in Wales'.
Welsh Government (2025) 'Dwelling stock estimates: as at 31 March 2024'.
Welsh Government (2026) 'Dwelling stock estimates by tenure and local authority area'.
Scottish Government (2024) 'Stock by Tenure - Housing Statistics 2024: Key Trends Summary'.
National Records of Scotland (2025) 'Households and Dwellings in Scotland, 2024'.
Scottish Government (2020) 'High Rise Inventory 2020: Summary Report'.
Northern Ireland Department of Finance (2026) 'Annual Housing stock statistics'.
Northern Ireland Executive (2024) 'Housing Supply Strategy',

kWh produced for system LRVC	442	442	559
kWh consumed for retail savings	350	350	428

19. The propensity for uptake is assumed to be higher in scenarios two and three. Uptake figures across scenarios two and three are the same but a separate set of monetisation assumptions have been applied to account for sensitivities relating to cost/benefit analysis (see below). The table below sets out the key assumptions for each scenario related to uptake modelling and trajectory shape.

20. In all cases it is assumed that most installations occur in domestic settings, on the basis that businesses seeking to significantly reduce their energy bills may be more likely to seek larger, rooftop solar installation, though there is limited evidence on which to base this assumption.

Table 5 – Take up assumptions applying in all scenarios

Assumption/ Setting	Quantity/ Value	Note(s)
Peak Rate Uplift Factor	x2	An uptake inflating factor to account for the significant number of estimated unregistered installs in Germany
Start Year Uptake Rate	30%	Determines the uptake rate in the first year of installs (proportion of peak uptake rate)
Years to Achieve Peak Uptake	3	Number of years model assumes before peak uptake (rate) is reached
Domestic Share of Installs	95%	Proportion of installs belonging to domestic customers.

Take-up projection results

21. The following figures depict estimated levels of installations and capacity deployed across these scenarios, on the assumption that all installations comprise plug-in solar panels with total AC rated output of 800W. For simplicity, each household is assumed to install a single plug-in solar device. While the interim product specification permits one device per household power circuit, actual deployment of multiple devices within a single property is uncertain and has not been modelled. As uptake assumptions are assumed to be the same across scenarios two and three, plots relating to numbers of installs (and derived quantities such as installed MW capacity) overlap. These scenarios are subject to a high degree of uncertainty and do not reflect government ambitions; their purpose here is to provide a basis for assessing costs and benefits of enabling plug-in solar, most of which vary in proportion to overall take up as modelled here.

22. This suggests annual installations rising to 154,000 in 2029/30 without reform to PDRs in Scenario 1 and 336,000 in Scenarios 2 and 3 with reform to PDRs for houses only. By

the end of 2030/31, 552,000 plug-in solar devices are installed in Scenario 1 (amounting to around 440MW in capacity), rising to 1.204m in Scenarios 2 and 3 (around 960MW). These represent highly stylised scenarios, with take-up artificially curtailed after 5 years for appraisal purposes, and should not be interpreted as robust forecasts or targets for longer term outcomes – both costs and benefits for the later part of the appraisal period will likely be understated, assuming that take-up continues.

Figure 3 – Plug-in Solar PV install per annum projection across scenarios

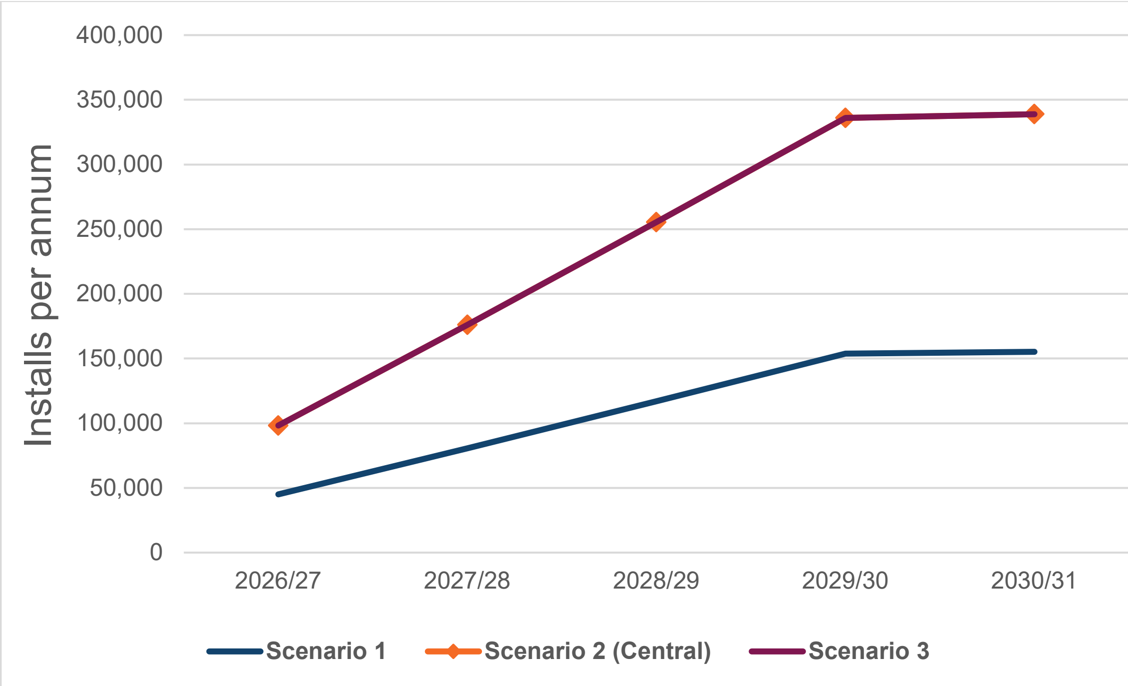


Figure 4 - Plug-in Solar PV cumulative install projection across scenarios

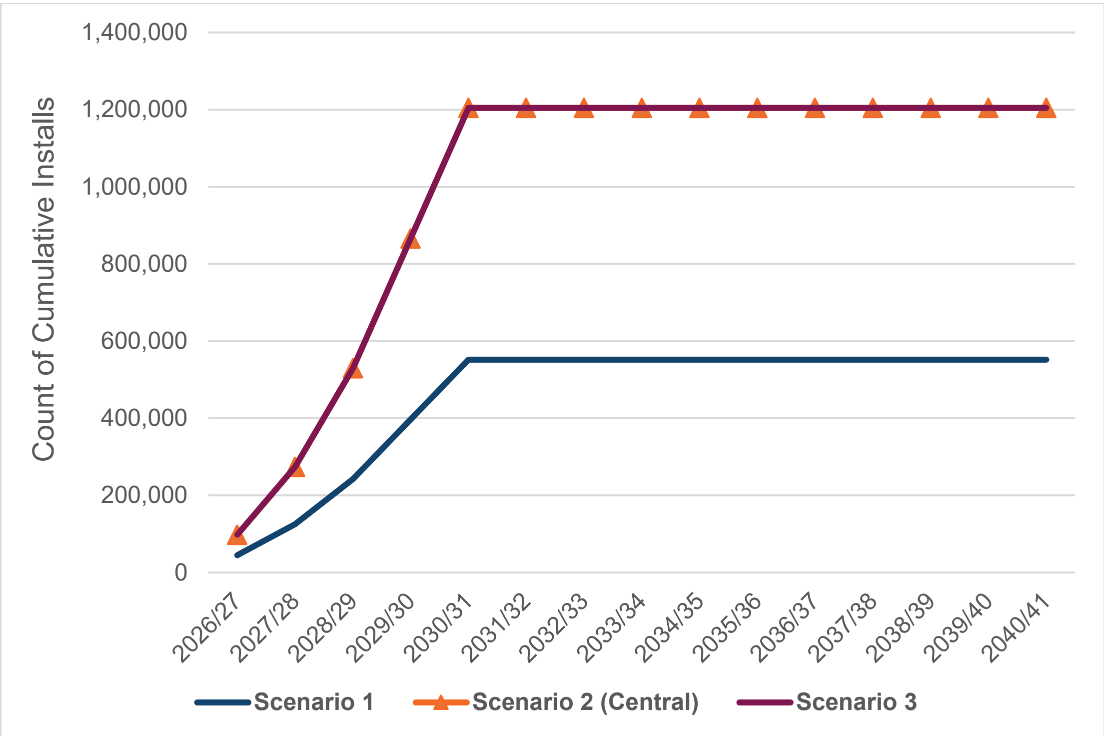
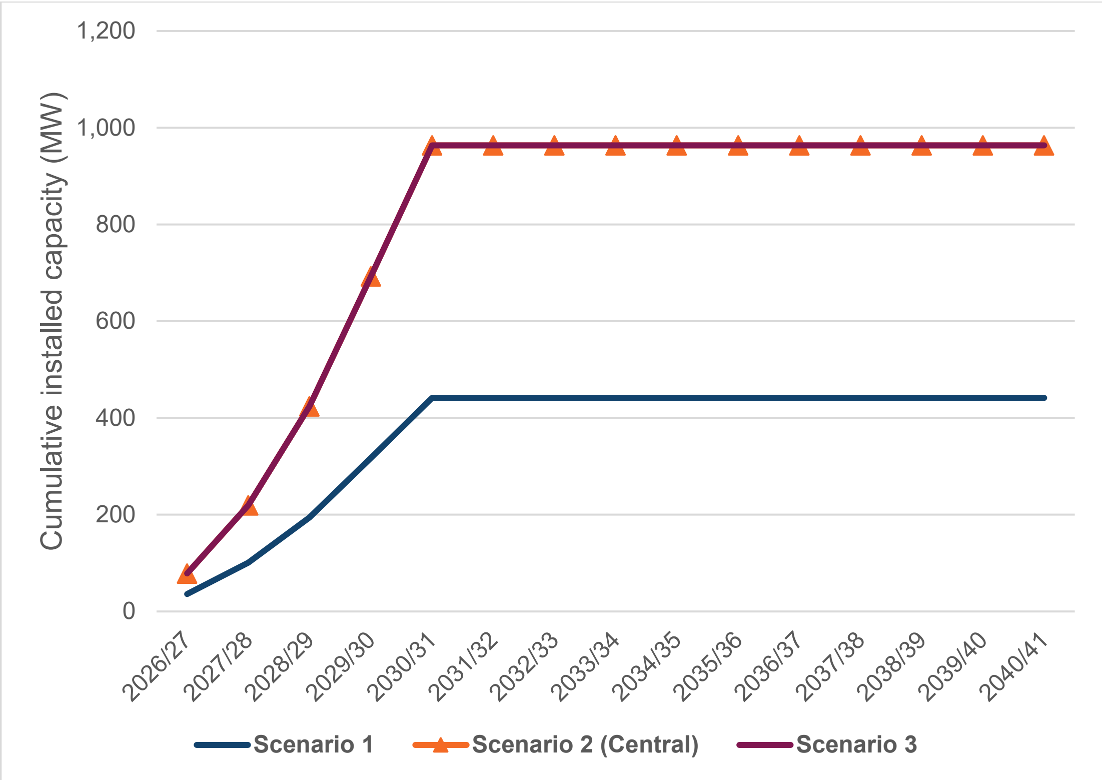


Figure 5 - Cumulative installed capacity (MW) across scenarios



Methodology for monetisation of costs

23. This section summarises the categories of costs monetised in this IA and details data and assumptions drawn upon. This includes: capital costs of plug-in solar devices, consumer time spent installing equipment, financial costs of professional help and administration costs for installers associated with the planning system and registration of installations.

Capital and installation costs

24. Based on products currently on sale internationally, and reflecting the requirements of the interim product specification, it is anticipated that many devices, including required cables and a microinverter in addition to equipment for siting or mounting will initially be available for around £400 to £600. It is likely that consumers will have options outside of this price range, however. For modelling purposes we assume the mean capital cost is £500 in 2026/27 in Scenarios 1 and 2. In a more optimistic Scenario 3, we assume a cost of £450. In all cases, the unit cost is assumed to increase in line with OBR forecasts for general inflation in the short term and the Bank of England 2% forecast thereafter[25]. In all cases, it is assumed that after 10 years consumers would need to replace their inverter, at a cost of £100 in 2026/27 prices, to extend the lifespan of their device[26]. This is a conservative timeline assumption for modelling purposes, but in

[25] HM Treasury (2026) 'GDP deflators at market prices, and money GDP'.
[26] The nominal cost is assumed to increase in line with the GDP deflator.

practice it is anticipated that integrated microinverter and solar panel devices will last for longer.

25. Consumers will need to decide on the most appropriate siting, mounting arrangement and package of panels, inverters and accessories for their property. Reflecting the evidence on consumer savings presented below, this will need to consider the location of the property, likely shading, orientation, and how electricity is typically used in the home or business. The overall costs of installation will vary depending on these choices and on whether the installer requires any professional assistance:

   - It is assumed that those installing without professional assistance will spend 1 hour doing so, with this time valued in economic terms at around £20 per hour in 2026/27.[27]
   - It is assumed that 15% of households will choose to seek practical support for mounting or siting at a cost of £150 in 2026/27[28], for instance where installation conditions are less straightforward or consumers are less comfortable affixing panels themselves.
   - 20% are assumed to require minor support from an electrician, for example to fit an outdoor wall socket or similar socket-related adaptation, at a cost of £200 in 2026/27.[29]

26. These assumptions rely heavily on subjective judgement. Following feedback received on the Analytical Annex published alongside the consultation, the proportion requiring minor electrician support assumed here is greater than the 15% proposed in that document, in part because establishing whether existing circuits can safely accommodate plug-in solar without further upgrades will sometimes require assistance.

27. However, here we do not model costs and benefits on the basis of consumers paying for more significant electrical works such as replacing a consumer unit. This is not because we expect that plug-in solar can be safely installed in all homes given the current condition of electrical circuits, but because analysis for this IA highlights that such a need would significantly undermine the financial case for installers. It is likely that some consumers will indeed decide to carry out more significant and costly upgrades, but we assume that in the majority of cases this will be motivated by a combination of plug-in solar and other aims for improving their property including reducing electrical safety risks, the benefits of which we do not capture here

28. The table below gives the assumptions used in the main scenarios of this analysis for these cost components.

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[27] Office for National Statistics (2025) '[Measure of employee earnings, using data from the Annual Survey for Hours and Earnings](#)' (viewed 14th July 2026). Uses referenced labour market wage data to proxy the opportunity cost of consumer time. This assumption is based on an estimate of median hourly earnings (excluding overtime) £19.67 for full-time employees in April 2025 from the Annual Survey of Hours and Earnings, uplifted over time for OBR estimates/forecasts of average earnings inflation.

[28] Uplifted for forecast average earnings growth, as above.

[29] Uplifted for forecast average earnings growth, as above.

Table 6 – Cost considerations and assumptions used across main modelling scenarios

Cost Consideration	Cost Assumption in 2026/27
Plug-in solar device (average)	£500 (Scenarios 1 & 2), £450 (Scenario 3)
Self-install time	1 hour
Expected professional support for mounting / siting (non-electrical)	15% of cases, at a cost of £150 in 2026/27
Expected minor electrical works / socket adaptation proportion	20% of cases, at a cost of £200 in 2026/27
Expected larger electrical works proportion	0% of cases
Cost of replacing inverter (after 10 years)	£100 cost in 2026/27

Planning system-related administrative costs

29. As described above, we do not assume here that consumers will choose to install plug-in solar via an application for planning permission. However, they will need to consult national and local policy and guidance to ensure that their approach to using plug-in solar is compliant with the terms of permitted development rights and any local exemptions to them. We assume that each installing consumer will spend 1 hour doing so, with this time valued in economic terms at around £20 per hour in 2026/27.[30]

Plug-in solar panel registration costs

30. Under the current Engineering Recommendation (EREC) G98, consumers installing micro-generation devices rated at 16 amps or less are required to have this notified to the relevant Distribution Network Operator (DNO) within 28 days of commissioning the system[31]. G98 is being amended to require and enable registration of plug-in solar devices to ensure visibility in support of network management. This process is being designed by network operators and the Energy Networks Association to minimise the associated burden for consumers, but here we assume fulfilling this obligation will require 30 minutes of installers' time, valued as above.

Methodology for monetisation of benefits

31. The following describes the methodology used for valuing changes in network demand caused by the adoption of plug-in solar, both in terms of direct financial benefits to installers and overall electricity system effects.

[30] Office for National Statistics (2025) 'Measure of employee earnings, using data from the Annual Survey for Hours and Earnings' (viewed 14th July 2026) Uses referenced labour market wage data to proxy the opportunity cost of consumer time. This assumption is based on an estimate of median hourly earnings (excluding overtime) £19.67 for full-time employees in April 2025 from the Annual Survey of Hours and Earnings, uplifted over time for OBR estimates/forecasts of average earnings inflation.
[31] Energy Networks Association 'Distributed Generation Connection Guides: G98 for Single Premises Summary' PDF: 355KB. Accessed 14/07/2026.

Direct energy bill savings

32. The main aim of this policy is to provide opportunities for consumers to take more control of their energy use, reduce their exposure to international fossil fuel prices, and reduce their electricity costs. Solar generation potential is highly variable across time – with summer and middle-of day generation relatively strong – and weather conditions. The savings available to installers of plug-in solar will therefore depend on a range of individual and wider factors, including:

    - Tariffs and export arrangements: the value of a reduction on power demanded from the grid depends on the unit rate applicable at that point in time. This will depend on wider energy market conditions and government/Ofgem energy bill policies but also the specific tariff arrangements of the consumer, including whether they have a smart tariff with unit rates that vary across or within days. Under the Smart Export Guarantee (SEG), rooftop solar consumers can be paid for surplus electricity fed back to the network, but this requires a meter capable of providing half-hourly export readings and installation certified through the microgeneration certification scheme (MCS) or an equivalent. This is likely not to apply in the first instance for many plug-in solar installers.
    - Consumption patterns: the ability to take full advantage of a given volume of solar generation depends on whether the consumer is using an equivalent amount of electricity at that time (enabling 'self-consumption' of power generated), and those with higher levels of consumption better aligned with generation patterns will stand to save more. Consumer-led flexibility – shifting demand patterns to coincide with availability of low-cost power – and using domestic storage will therefore enhance the benefits of plug-in solar.
    - Installation arrangements: the size and specification of panels installed will affect the power generated for a given level of solar irradiance, but property location, orientation (e.g. South- or North-facing), angle of panels and the presence of any shading or obstruction are also important determinants of power generated.

33. To illustrate this variation, the table below presents indicative annual plug-in solar generation and bill savings under two installation arrangements. The estimates are derived in three steps. First, annual electricity generation is estimated using the Government's Standard Assessment Procedure for Energy Rating of Dwellings and assumptions on system size, irradiance, orientation and shading.[32] Second, a self-consumption rate is applied to estimate the proportion of generated electricity that is consumed on site rather than surplus to household demand at the time of generation using MCS guidance.[33] Third, the resulting volume of on-site consumption is valued using the applicable retail electricity unit rate.

[32] BRE (2026) 'Standard Assessment Procedure SAP10' (viewed on 11 June 2026)
[33] MCS (2022) 'Solar PV Self-Consumption: A method to determine the electrical self-consumption of domestic solar PV installations with and without storage' (viewed on 11 June 2026).

34. In these illustrative examples, both cases reflect a household of Great Britain average annual electricity[34] with a 'home all day' occupancy pattern,[35] with 800W panels, a property of average UK global solar irradiance and solar declination and no/very little shading. Demand is assumed constant across scenarios, and no domestic storage is assumed. Savings are calculated only from electricity consumed on site, so the estimates exclude any value from exported electricity. These avoided electricity purchases are valued in the table below using Ofgem's energy price cap per unit for 1 July to 30 September 2026 for Great Britain; savings in Northern Ireland may differ.[36] For the purposes of this table, the self-consumption rate means the proportion of total plug-in solar electricity generation that is consumed on-site.

Table 7 - Electricity bill savings by plug-in solar installation arrangement

Panel setup scenario	Self-consumption rate	Annual kWh consumed from plug-in solar	Value of annual saving	Maximum potential kWh output from plug-in solar
A. 30° tilt & South orientation	62%	428	~£110	690
B. 90° tilt & East/West orientation	72%	272	~£70	378

Source: DESNZ analysis.

35. This shows that the angle and orientation of panel mounting make a significant difference to potential savings, with a 30° tilt of panels tending to be significantly better for generation at UK latitudes compared with vertical installation, and south-facing panels offering greater benefits. It also highlights that the extent to which plug-in solar can save money in the absence of an export tariff is limited by the amount of demand present at the time of generation: scenario A has a higher level of potential generation than scenario B but the proportion actually consumable and generating savings is lower as a result.

36. The overall impacts of plug-in solar for consumer savings will therefore depend on the extent to which take-up is concentrated among those with more or less optimal installation arrangements, and how far it coincides with households/businesses for whom consumption patterns align well with generation in the absence of domestic storage. It can be expected that those who stand to benefit most may be more likely to install plug-in solar, but this depends on awareness and understanding of these factors.

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[34] 3323kWh, based on 2024 Great Britain mean consumption per domestic meter from Department for Energy Security and Net Zero official statistics (2025) 'Regional and local authority electricity consumption statistics' (viewed on 12 June 2026).
[35] Defined in MCS guidance as where "The domestic property is generally occupied by at least one occupant between 9:00am to 5:00pm on weekdays".
[36] Ofgem (2026) 'Energy price cap unit rates and standing charges' (viewed on 11 June 2026).

These estimates will not provide an accurate picture of longer-term savings if tariff arrangements and energy prices change in future.

37. These two illustrative scenarios provide the basis for estimates of consumer benefits in this IA. For scenario S1 and our central (S2) scenario referred to above, it is assumed that the volume of power self-consumed is equal to the midpoint of that in examples A and B here: 350kWh per year. For scenario S3, with more optimistic assumptions on impacts per case, the higher consumption figure from example A of 428kWh is used. On the assumption that consumers will generally be less likely install plug-in solar where they are unable to generate much power with it, or where they have relatively high costs, an alternative downside scenario is not used here.

38. The associated direct savings for consumers in aggregate are estimated using the published Green Book supplementary guidance values for retail electricity prices[37]. In our main scenarios the 'Central' values are incorporated. For both household installers and business users, the domestic retail prices are used in this analysis. This is on the uncertain assumption that non-domestic installers may disproportionately be small businesses or charities with low consumption levels, who may be more likely to face retail prices similar to those of domestic consumers than the often discounted rates for bulk-buying large organisations.[38]

Energy system impacts

39. The direct bill savings described above are estimated on the basis of electricity generated and consumed on site, valued by the retail prices faced by the consumer. However, as for all forms of distributed generation, some individual savings reflect fixed system costs that still need to be recovered even if network electricity demand falls. These interactions will depend upon the outcome of Ofgem's Energy System Cost Allocation and Recovery Review.[39]

40. Therefore, for overall social impacts (the NPSV), this analysis uses Green Book guidance to monetise the estimated changes in network electricity consumption in each year using the published projections for the long-run variable cost (LRVC) of energy supply[40]. These values are more appropriate than (higher) retail costs for assessing the system-wide impacts of policies that lead to sustained but marginal changes in the consumption of electricity, and reflect variable transmission and distribution costs, fuel

[37] Department for Energy Security and Net Zero (2023) 'Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal'. For simplicity, the same prices are applied across all UK homes modelled, but in practice Northern Ireland consumers would face different prices. Given relative price levels it is not expected that this would greatly affect results.
[38] The relationship between firm size and energy prices is highlighted in Department for Energy Security and Net Zero (2026) 'Quarterly Energy Prices: June 2026'.
[39] Ofgem (2025) 'Energy system cost allocation and recovery review' (viewed on 12 June 2026).
[40] Department for Energy Security and Net Zero (2023) 'Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal'

and operating costs, and some government policy costs[41]. Central values from the published guidance are used here for each year of estimated impact.

41. Similarly, carbon and air quality cost impacts are derived using the emissions factors per kWh of saved electricity consumption published with the same guidance. These assume a change in demand that is constant throughout the day and year and uses modelling of the marginal plant (what energy source(s) we expect to increase or decrease when there are changes to energy demand or supply) to estimate the potential change in emissions relative to a baseline which represents a Net Zero consistent power sector[42]. Estimated emissions reductions are converted into monetary benefits here using carbon values and air quality cost impact values published with the same guidance. The latter are discounted by 1.5% in PVs as they reflect health benefits for which a different discount rate is applied under Green Book guidance.[43]

42. These LRVC values and emissions factors are combined with estimates of household power generated derived from the same two scenarios as above. For system benefits including exported power, we additionally assume that half of the non-consumed potential power is available to the grid despite in many cases this not being associated with export payments for consumers, giving 442kWh per case for Scenarios 1 and 2, and 559kWh for 3.

43. This analysis does not assume any rebound effects, whereby consumers respond to a reduction in the marginal cost of electricity by increasing consumption of it. What may happen in practice is uncertain. If this were to occur via an increase in overall energy consumption, it may reduce the net impact on energy system costs and emissions estimated here. However, it is also possible that this could involve consumers choosing to swap electricity-consuming products (e.g. electric vehicles) for fossil fuel-reliant technologies, with positive impacts on emissions.

NPSV: monetised and non-monetised costs and benefits

Monetised impacts

44. The tables below summarise the Net Present Values (NPVs) and equivalised annual figures for total social impacts across the chosen scenarios, broken down by monetised costs and benefits. The total Net Present Social Value is estimated at £79.7m over the 15-year appraisal period, varying between £36.6m with lower take up and £355.8m with higher take-up and more favourable cost and benefit per unit assumptions, revealing the substantial uncertainty over scale of impacts.

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[41] These values are closer than retail prices to being a proxy for variable costs, but still retain some cost elements that are fixed, including Renewables Obligation costs. They will also be more appropriate for later years in the appraisal period because some of their cost components, including network management and investment costs, are less variable in the short term.
[42] Department for Energy Security and Net Zero (2023) '[Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal]'
[43] For simplicity, the per-kWh impacts are assumed to be the same across the UK, whereas in practice the marginal emissions and cost impacts relevant to use of plug-in solar by consumers served by the Single Electricity Market in Ireland may differ.

45. The bulk of costs are associated with capital expenditure on plug-in devices. Electricity system savings comprise the majority of social benefits but carbon savings are also significant, with a central value of £91.5m.

Table 8 - Total Social Costs and Benefits (with cumulative install numbers) by Scenario: Monetised NPV components (2026/27 prices, 2026/27 base year)

NPV Quantity	1	2 (central)	3
Total NPSV	**£36.6m**	**£79.7m**	**£355.8m**
Total: PDR compliance check time cost	£10.2m	£22.4m	£22.4m
Total: G98 applicant time & research	£4.7m	£10.4m	£10.4m
Total: private capex	£289.1m	£630.8m	£575.6m
Total: labour install costs	£20.4m	£44.4m	£44.4m
Total: electrical works costs	£20.7m	£45.2m	£45.2m
Total electricity system savings (LRVC)	£338.5m	£738.8m	£934.5m
Business: electricity savings (LRVC)	£13.6m	£29.7m	£37.6m
Domestic: electricity savings (LRVC)	£324.9m	£709.0m	£896.9m
Carbon Savings	£41.9m	£91.5m	£115.7m
Air quality cost savings	£1.3m	£2.8m	£3.6m
Cumulative Total Installs (nearest 1,000)	552,000	1,204,000	1,204,000

Table 9 - Total Social Costs and Benefits by scenario: Monetised Equivalent Annual components (2026/27 prices, 2026/27 base year)

Equivalised Annual Quantity	1	2 (central)	3
Equivalised Annual Net Social Value NPSV	**£3.1m**	**£6.7m**	**£29.8m**
Total: PDR compliance check time cost	£0.8m	£1.9m	£1.9m
Total: G98 applicant time & research	£0.4m	£0.8m	£0.8m
Total: private capex	£24.2m	£52.9m	£48.3m
Total: labour install costs	£1.7m	£3.7m	£3.7m
Total: electrical works costs	£1.8m	£3.8m	£3.8m
Total electricity system savings (LRVC)	£28.4m	£62.0m	£78.4m
Business: electricity savings (LRVC)	£1.1m	£2.5m	£3.2m
Domestic: electricity savings (LRVC)	£27.3m	£59.5m	£75.2m
Carbon savings	£3.5m	£7.7m	£9.7m
Air quality cost savings	£0.1m	£0.2m	£0.3m

Non-monetised impacts

46. Consumers will in some cases need to seek permission from their landlord, freeholder or property management organisation, potentially creating administrative costs. It is expected that these will be minor and form part of routine property management alongside permissions being sought for use of other consumer goods.

47. Non-installing households may perceive some loss in amenity if neighbours installing plug-in solar has any negative visual impact, but it is expected that this will be mitigated by the restrictions contained in the current permitted development rights for rooftop

solar, or those which will be proposed for a reformed permitted development right to further enable plug-in solar.

48. As a consumer product, these reforms do not create new roles or responsibilities, so impacts for public bodies are expected to be modest.

Costs and benefits to business results

Monetised impacts

49. The tables below summarise the Net Present Values (NPVs) and equivalised annual figures for direct business impacts for installers. This shows modest total costs and savings relative to those for households, who are assumed to comprise the majority of installers. Capital costs make up the majority of relevant costs, and the reform is expected to produce direct net benefits overall.

Table 10 - Business Direct Costs & Benefits (with cumulative install numbers) by scenario: Monetised NPV components (2026/27 prices, 2026/27 base year)

NPV Quantity	1	2 (central)	3
Total NPV	**£7.0m**	**£15.3m**	**£29.8m**
Business: PDR compliance check time cost	£0.5m	£1.1m	£1.1m
Business: G98 applicant time & research	£0.2m	£0.5m	£0.5m
Business: private capex	£14.5m	£31.5m	£28.8m
Business: labour install costs	£1.0m	£2.2m	£2.2m
Business: electrical works costs	£1.0m	£2.3m	£2.3m
Business: retail savings	£24.3m	£52.9m	£64.7m
Cumulative Business Installs (nearest 1,000)	26,000	60,000	60,000

Table 11 - Business Direct Costs & Benefits by scenario: Monetised Equivalent Annual components (2026/27 prices, 2026/27 base year)

Equivalised Annual Quantity	1	2 (central)	3
Equivalised Annual Direct Impacts for Business	**£0.6m**	**£1.3m**	**£2.5m**
Business: PDR compliance check time cost	£0.0m	£0.1m	£0.1m
Business: G98 applicant time & research	£0.0m	£0.0m	£0.0m
Business: private capex	£1.2m	£2.6m	£2.4m
Business: labour install costs	£0.1m	£0.2m	£0.2m
Business: electrical works costs	£0.1m	£0.2m	£0.2m
Business: retail savings	£2.0m	£4.4m	£5.4m

Non-monetised impacts

50. Consumers will in some cases need to seek permission from their landlord, freeholder or property management organisation, potentially creating administrative costs. It is

expected that these will be minor and form part of routine property management alongside permissions being sought for use of other consumer goods.

Impact on small and micro businesses

51. It might be expected that small and micro businesses will disproportionately benefit from the opportunity to install plug-in solar, which offers small generation potential but low capital costs and may therefore be appealing to those with modest energy requirements as a more simple way of saving energy costs than other alternatives. This is uncertain, however. The new G98 registration system is being designed to be as user-friendly as possible, to minimise any administrative burdens for those businesses choosing to take up plug-in solar.

Costs and benefits to households results

Monetised impacts

52. The tables below summarise the direct Net Present Values (NPVs) and equivalised annual figures for direct business impacts for installers. This shows much higher total costs and savings relative to those for businesses, as domestic consumers are assumed to comprise the majority of installers. Capital costs make up the majority of relevant costs, and the reform is estimated to produce direct net benefits overall of £289.9m in the central scenario.

Table 12 – Household Direct Costs & Benefits (with cumulative install numbers) by scenario: Monetised NPV components (2026/27 prices, 2026/27 base year)

NPV Quantity	1	2	3
Total NPV	**£132.9m**	**£289.9m**	**£566.5m**
Domestic: PDR compliance check time cost	£9.7m	£21.3m	£21.3m
Domestic: G98 applicant time & research	£4.5m	£9.9m	£9.9m
Domestic: private capex	£274.6m	£599.3m	£546.8m
Domestic: labour install costs	£19.4m	£42.2m	£42.2m
Domestic: electrical works costs	£19.7m	£42.9m	£42.9m
Domestic: retail savings	£460.8m	£1005.6m	£1229.7m
Cumulative Household Installs (nearest 1,000)	524,000	1,144,000	1,144,000

Table 13 - Household Direct Costs & Benefits by scenario: Monetised Equivalent Annual components (2026/27 prices, 2026/27 base year)

Equivalised Annual Quantity	1	2	3
Equivalised Annual Direct Impacts for Households	**£11.1m**	**£24.3m**	**£47.5m**
Domestic: PDR compliance check time cost	£0.8m	£1.8m	£1.8m
Domestic: G98 applicant time & research	£0.4m	£0.8m	£0.8m
Domestic: private capex	£23.0m	£50.3m	£45.9m
Domestic: labour install costs	£1.6m	£3.5m	£3.5m
Domestic: electrical works costs	£1.7m	£3.6m	£3.6m
Domestic: retail savings	£38.7m	£84.4m	£103.2m

Non-monetised impacts

53. Non-installing households may perceive some loss in amenity if neighbours installing plug-in solar has any negative visual impact, but this is highly uncertain.

Environment: Natural capital impact and decarbonisation

54. Total energy emissions (kWh) saved across the three scenarios varied substantially, owing to modelling differences across policy assumptions (PDR reform vs. no PDR reform) and costing assumptions (kWh produced for LRVC and kWh consumed for retail savings). The modelling expects 142,000,000 kWh saved in total across scenario one, with 310,000,000 kWh and 392,000,000 kWh saved in Scenarios two and three respectively.

55. The high variation in emissions savings (kWh) resulted in substantial differences in monetised carbon savings. Scenario one saw NPV carbon savings of £41.9m, whilst scenarios two and three showed NPV carbon savings of £91.5m and £115.7m respectively, more than a 2x increase for both when compared with scenario one.

56. As was the case with carbon savings, there was also high (percentage-wise variation) in air quality cost savings, although these translated into much smaller absolute NPV figures. In scenario one, the modelling showed that total air quality NPV savings were £1.3m. Scenarios two and three saw total air quality NPV savings of £2.8m and £3.6m respectively.

Wider impacts

Power system impacts

57. As noted above, the consumer benefits estimates for installers are unlikely to equate precisely to the net economic or consumer savings across the power system (including those not installing) in the round or over the long term because some of those savings reflect contributions to fixed network and policy costs that still need to be paid for.

58. On the other hand, additional renewable capacity and the co-location of generation capacity with demand can reduce the volume of power that the transmission network

needs to provide and the impact of network constraints in providing it. At times when this reduces the need for generation from plants with substantial variable generation costs, for instance gas plants, that can reduce wholesale prices to the benefit of other consumers.

59. More widely, power system impacts of a substantial uptake of plug-in solar will depend on further considerations:

- It is possible that it can provide a gateway to accessing the benefits of larger, rooftop installations. Enabling a cheaper form of electricity may also further incentivise the adoption on heat pumps and electric vehicles, providing further environmental benefits and potentially reducing unit electricity prices for other households by making fuller use of network assets. It is, however, also possible that some consumers will opt for this instead of larger solar installations, reducing the net impact on capacity.
- If plug-in solar has a material effect on network demand and wholesale prices, it could potentially influence longer term energy capital investment, potentially displacing grid-scale capacity investment with further cost savings. However, at the likely scale of take-up and given plug-in solar's generation profile is unlikely to closely match peak network demand, such impacts may be unlikely in the near-term.
- Reduced network demand can also influence investment and reinforcement needs for transmission and distribution networks, with lower power needing to be transferred and potentially generate savings on connections expenditure. However, impacts on impacts on uptake of other low carbon technologies and bi-directional power flows caused by exports from small scale solar can create alternative investment needs, particularly in areas of the network that are already net exporting where additional generation may increase reinforcement needs.
- As for other forms of distributed generation, such changes in network demand patterns can also influence system operability needs. For example:
    - Low transmission network demand reduces availability of 'downward margin', leaving less flexible generation on the system that can be managed to ensure grid balance in the face of unexpected changes in demand or supply;
    - It increases the need for replacement of the system inertia otherwise provided by synchronous transmission connected capacity; and

- It can create high voltages and 'reactive power spill'[44] at the interface between distribution and transmission networks[45].

These implications can be better addressed with well-functioning, flexible electricity markets and the introduction of planned system reforms to increase demand flexibility; improve asset visibility and balancing mechanism effectiveness; and incentivise uptake of flexible assets such as batteries.[46] In Great Britain, Ofgem have identified a need for Distribution Network Operators to improve voltage control capabilities on their network, in part to respond to increasing output from Distributed Energy Resources (DERs).[47]

60. The maximum permitted power from plug-in solar device will be limited to 800W and it is expected that most of the electricity will be self-consumed within the home. Considering also the scale of potential uptake illustrated in this IA, such wider impacts may therefore remain modest overall in the medium-term.

61. The planned amendments to the G98 network registration system for micro-generation connections to support plug-in solar in Great Britain is intended to ensure visibility of uptake and help network planning and operations. Plug-in installers will, in many cases, need to register their panels to gain potential access to export tariffs, as without an MCS-accredited installation of domestic solar consumers are not entitled to the Smart Export Guarantee in Great Britain.

62. As part of the G98 amended registration process planned for Great Britain, manufacturers are required to demonstrate grid frequency following and cut-out limits, which will mitigate potential effects on grid stability. The low maximum output power (800W) will mean that most of the generated power is expected to be utilised within the property with modest power available for export, limiting wider effects on grid capacity. Furthermore, the inverters operate with power factors close to 1 and so do not adversely affect the reactive power balance of the network.

Impact on public bodies

63. As a consumer product, these reforms do not create new roles or responsibilities, so impacts for public bodies are expected to be modest.

[44] Reactive power spill occurs when high voltages on distribution networks propagate onto the transmission system. It is mainly driven by changes in embedded demand, as declining inductive load reduces local MVAr absorption. With demand becoming more power-electronic (e.g. relying on inverters to produce power for use by the grid, as opposed to conventional electromechanical synchronous generation), the network absorbs less reactive power, increasing the likelihood of spill. High embedded generation output can intensify this, as power-electronic generation typically operates near unity power factor and provides little natural reactive absorption.

[45] NESO (2026) 'System Conditions March 2026' (viewed on 12 June 2026). T. Kërçi, M. Hurtado, S. Tweed, M. Val Escudero, E. Kennedy and F. Milano, 'Emerging Challenges of Integrating Solar PV in the Ireland and Northern Ireland Power Systems', 2024 IEEE Power & Energy Society General Meeting (PESGM), Seattle, WA, USA, 2024, pp. 1-5.

[46] NESO (2026) 'Operability Strategy Report 2026' (viewed on 12 June 2026); Department for Energy Security and Net Zero (2026) 'Reformed National Pricing (RNP): delivery plan' (viewed on 12 June 2026).

[47] Ofgem (2025) 'Sector Specific Methodology Consultation' (viewed on 15 June 2026).

Risks and assumptions

Energy market conditions and solar generation patterns

64. The estimated consumer savings, energy system cost impacts and emissions impacts presented in this IA are based on projections for average unit prices and long-run marginal costs/emissions impacts, rather than wholesale prices and power market conditions specific to the points in time when solar panels will be disproportionately generating. Domestic solar currently tends to generate mostly at times of relatively high system-wide renewable generation and imports, and away from demand peaks.[48] That means that the system-level benefits, and those that would accrue to a consumer with a wholesale-market reflective smart tariff, may be lower than the savings estimated here. Growing penetration of grid-scale renewables, particularly solar generation, may further widen such gaps in future.

65. This may be offset by any increases in demand that coincide more with solar generation profiles. It will also be possible for some plug-in solar users to adjust the orientation and tilt of panels to best suit solar irradiance at different times of year. The relationship between individual savings and system-wide savings will change with developments in tariff arrangements, consumer-led flexibility and storage, which can help enhance the benefits of distributed solar generation for reducing peak demand needs.

66. In addition, future electricity prices are uncertain and this will affect the energy system and direct consumer benefits that can be expected.

Uncertain consumer choices and behaviour

67. Comparisons of NPVs between Scenarios 2 and 3 above highlight the importance of up-front capital costs in determine the overall economic impacts. There, capital costs were reduced by £50 in Scenario 3, reducing overall costs by £55m. A higher proportion of installers requiring professional assistance would, on the other hand, significantly raise costs, and there is a lack of evidence over both the likely needs for households to request this, or how far such a need would affect decisions on whether or not to install in the first place.

68. As discussed above, solar generation and energy system impacts can be sensitive to both weather conditions and individual set up arrangements, with the energy system savings varying by £196m between Scenarios 2 and 3 due to different assumptions over this. The extent to which household take up will be sensitive to individual potential generation will likely affect total impacts; this is uncertain and, as highlighted in consultation responses, will depend upon the availability of information to support consumer choices. Whether or not the policy leads to rebound effects represents an additional uncertainty. Overall, the impact on energy costs for many consumers will be modest, but were there to be rebound effects these may reduce energy cost and emissions effects even where the direct consumer welfare impacts remain similar.

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[48] NESO (2025) 'Summer Outlook' (viewed on 12 June 2026).