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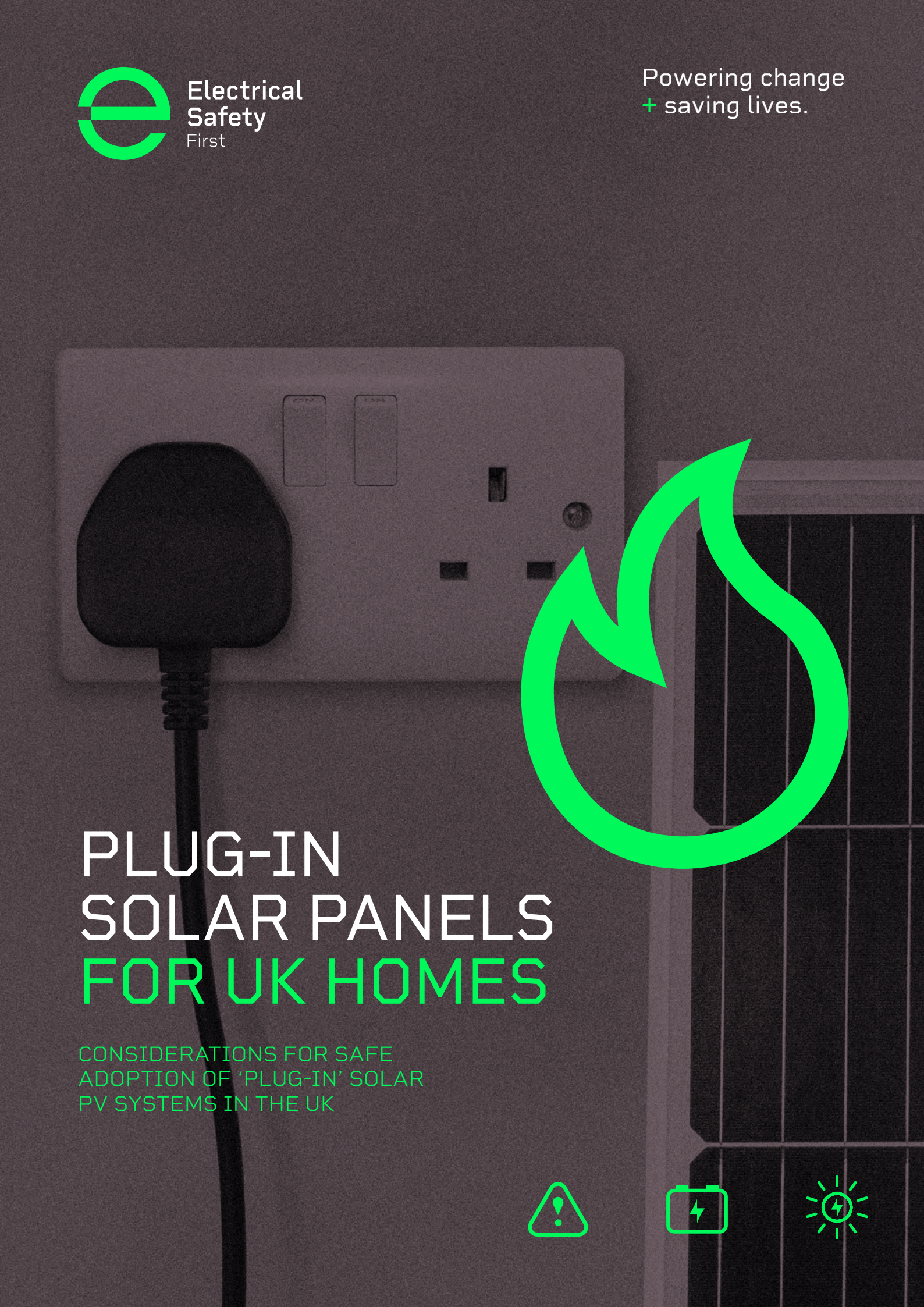

PLUG-IN SOLAR PANELS FOR UK HOMES

CONSIDERATIONS FOR SAFE ADOPTION OF 'PLUG-IN' SOLAR PV SYSTEMS IN THE UK

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Electrical Safety First

ABOUT ELECTRICAL SAFETY FIRST

Electrical Safety First is a campaigning charity that aims to reduce deaths and injuries caused by electricity in UK homes. We do this by working closely with Government, the electrical industry, manufacturers, retailers and consumer safety organisations to improve safety regulation and standards. We run media and digital campaigns to share advice and guidance with consumers that will help them to stay safe in their homes.

Powering change + saving lives.

EXECUTIVE SUMMARY

Plug-in solar PV systems offer UK households a simple and cost-effective way to generate electricity by connecting small-scale solar panels directly to standard socket-outlets.

This presents a clear opportunity to reduce energy bills and support decarbonisation goals. However, it introduces significant electrical safety risks that must be addressed before widespread adoption.

The primary risks associated with plug-in PV stem from potential electrical hazards, and these can be amplified by consumer behaviour and misuse.

KEY RISKS AND CHALLENGES

ELECTRICAL SAFETY CONCERNS:

- Uncontrolled current injection can overload circuits, creating a risk of overheating and fire.
- Plug-in PV systems may interfere with Residual Current Devices (RCDs), leading to nuisance tripping or failure to detect dangerous faults.
- Overcurrent protection is not coordinated, risking delayed fault clearance and damage to circuit breakers.
- BS 1363 plugs are not designed for power generation connections, increasing misuse risks.

CONSUMER BEHAVIOUR:

- Multiple units may be connected via extension leads, exacerbating overload risks.
- Non-professional installations raise concerns about mounting safety and compliance.

INTERNATIONAL COMPARISON

- **Germany** has successfully enabled plug-in PV systems by enforcing strict power limits, standardised inverter compliance, dedicated connectors, mandatory registration, and professional oversight.
- Although **Germany** now permits the use of standard plug and socket systems, its domestic electrical installations differ significantly from those in **the UK**.
- **The UK** currently lacks clear legal status for plug-in PV systems and there is no dedicated British or international standard.
- The absence of standards limits the ability to control product safety and increases the risk of unsafe and non-compliant devices entering the market.

PROPOSED SOLUTIONS FOR SAFE ADOPTION

To address these concerns and enable the safe adoption of plug-in PV systems in the UK, Electrical Safety First proposes several options.

DEDICATED FINAL CIRCUIT AND FIXED CONNECTION:

Mandate installation via a dedicated circuit with suitable protections and a permanent connection.

DEDICATED CIRCUIT WITH SPECIFIC PLUG & SOCKET-OUTLET:

Allow the use of purpose-designed connectors (e.g., BS IEC 63578-1) for generation equipment to prevent misuse and improve safety protections.

CONNECTION VIA STANDARD SOCKET-OUTLETS:

If permitted, this should only follow mandatory professional assessment and certification of the existing electrical installation to ensure it is safe and adequate for the addition of plug-in PV. An update to BS 1363-1 to allow generator connections is also needed.

POLICY AND STANDARDS RECOMMENDATIONS

- Develop a British Standard for plug-in PV systems to ensure product safety and compliance.
- Define a clear legal route for ≤800 W systems with simplified registration and robust enforcement.
- Publish clear consumer guidance and ensure professional inspection of installations.

CONCLUSION

Plug-in solar PV systems can help reduce energy costs and support the UK's sustainability goals but safe deployment depends on rigorous safety standards, coordinated protection measures, professional oversight, and clear regulatory frameworks.

Without these safeguards there is a risk of harm to consumers and the wider public.

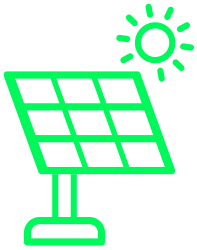
It is recognised that government departments and stakeholders are currently undertaking technical analysis and research on the role of plug-in solar PV in the UK.

This report is intended to support that process by ensuring all electrical safety considerations are fully understood and addressed before any rollout of these systems on the UK market.

POLICY AND STANDARDS RECOMMENDATIONS FOR THE UK REGARDING PLUG-IN PV SYSTEMS

Priority Area	Recommendations
Connection method	Mandate fixed connection via a dedicated circuit as the sole method of connection; or include plug and socket-outlet type such as *DIN VDE V 0628-1 VDE V 0628-1 or BS IEC 63578-1, G98 compliance (as amended) & power limit,* in plug-in PV kit specification.
If connection via a BS 1363 plug and socket-outlet arrangement is permitted	BS 1363-1 will need to be updated as it does not permit the connection of electrical power generators to socket-outlets. Existing electrical installation should be inspected, verified and certified to ensure that the circuit cabling intended for the connection, meets the required criteria. The inspection should ascertain the suitability of all upstream protective devices, including their ability to handle bidirectional current flow.
Development of a British Standard for plug-in PV systems.	Development of a British Standard to ensure that plug-in solar PV products sold and used in the UK are safe and comply with EREC G98 requirements. This can be verified as such by manufacturers, distributors and Trading Standards.
Create a clear legal route for ≤800 W PV systems	Define low-power PV under a new simplified G98 annex or DSO/ENA guidance.
Enforce registration of all generation	Simplify G98 process for <=800 W with automatic online registration when energised.
Enforcement	Ensure robust enforcement by trading standards and OPSS in monitoring these systems sold in the UK, including via online marketplaces.
Publish clear guidance	From IET, DBT, DESNZ, DSOs, CPS operators and consumer safety bodies, for consumers, landlords, and installers.

1.0 INTRODUCTION



Plug-in solar PV systems (also known as balcony solar PV systems PIPV) enable householders to connect small-scale generation directly to a standard 13 A socket-outlet (BS 1363) on an existing circuit. While appealing in simplicity, this method of connection may introduce serious electrical safety considerations.

The government first indicated an intent to explore opportunities for 'plug-in solar PV' in the UK, in the policy paper: *Solar roadmap: United Kingdom powered by solar*. (June 2025).

The government has since announced that:

> *'the government is driving forward with the rollout of "plug-in" solar panels (low-cost panels that families can put on their balconies or outdoor space) to be available in shops within months and save people money on their bills. (24th March 2026).'* (source)

Any future adoption of such systems will need to consider alignment with existing electrical safety frameworks.

The connection of a generation set by means of a plug and socket-outlet is now not specifically precluded in BS 7671, following the release of Amendment 4 (BS 7671:2018+A4:2026), and the removal of Regulation 551.7.2 (ii):

> *'A generating set shall not be connected by means of a plug and socket-outlet'*

However, electrical installations within many homes and buildings in the UK are not designed for the addition of a generation set, such as plug-in solar PV, which can compromise existing protective safety devices and wiring systems.

Additionally, BS 1363-1, the product standard for 13 A plugs, does not permit their use for the connection of electrical generation equipment, reinforcing that socket-outlets are intended for loads rather than sources of supply.

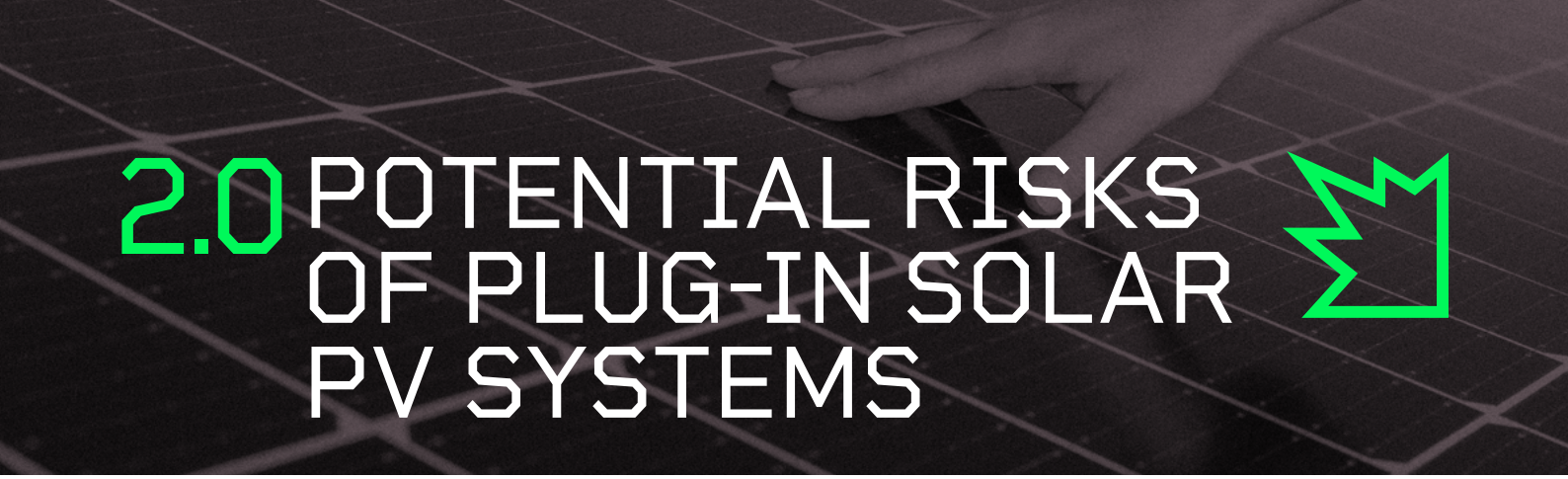
Plug-in PV systems are already available in the UK through a number of online retailers, some of whom promote the systems as being legal and compliant through connection via a Fused Connection Unit (FCU). These are being listed as an easy option for home-builders to comply with the requirements of *Building Regulations Approved Document Part L, Conservation of fuel and power, Volume 1: Dwellings, 2021* edition incorporating 2023 amendments.

Electrical Safety First welcomes the ongoing technical assessment and standards development work currently being undertaken by the Government, standards bodies and industry stakeholders. This report is intended to support that process by identifying areas requiring further consideration before widespread rollout.

This report explores potential safety issues and concerns, as well as presenting several solutions, to aid the safe adoption of these systems in the UK.

Note: this report does not consider mechanical/structural considerations in depth, which will also need to be explored.

> "WHILE APPEALING IN SIMPLICITY, THIS METHOD OF CONNECTION MAY INTRODUCE **SERIOUS ELECTRICAL SAFETY CONSIDERATIONS.**"



2.0 POTENTIAL RISKS OF PLUG-IN SOLAR PV SYSTEMS

2.1 UNCONTROLLED CURRENT INJECTION INTO FINAL CIRCUITS

Plug-in solar PV systems add an additional source of supply to an existing circuit, which may be either a radial or ring final circuit. This could cause several issues:

ISSUE: RING FINAL CIRCUIT IMBALANCE

- A ring final circuit is designed to facilitate the outward flow of current from the consumer unit, ensuring efficient distribution and parallel sharing of connected loads throughout the ring final circuit;
- A plug-in PV source can inject AC current at any point within the ring final circuit, causing current to flow toward the consumer unit through either or both sections of cable;
- This can overload one section of the ring final circuit if the accumulative currents drawn from the consumer unit and the PV generation combine unfavourably;
- The addition of a plug-in solar PV system could create a problem for a correctly installed ring final circuit, as an even distribution of the load current around the ring is unlikely to be achievable.

CONSEQUENCE:

- Potential localised overheating or fire risk in cables if one section of the ring final circuit carries excessive current over time, resulting in cable damage without the circuit-breaker sensing the excessive load current and operating.

2.2 INTERACTION WITH RCDs

A Residual Current Device (RCD) is sensitive to the balance of current flowing in line and neutral conductors. Injection of AC current from the PV system can interfere with this in an existing circuit.

ISSUE: NUISANCE TRIPPING OR FAILURE TO TRIP

- In normal use, an RCD sees equal current flowing in line and neutral conductors.
- If a PV inverter is injecting additional AC current into the circuit, especially if the inverter has any DC leakage or residual current, it can:
  - cause false/nuisance tripping due to imbalances;
  - damage an RCD intended for unidirectional current flow;
  - mask a real earth fault, if the leakage current from the PV inverter cancels out fault current.

ISSUE: DC LEAKAGE SATURATING RCDS

- Plug-in solar PV inverters can produce residual DC leakage current;
- Type-AC RCDs (common in older installations) are not designed to operate in the presence of residual DC current. DC current can saturate the magnetic core, preventing them from operating correctly - even for AC earth faults;
- Type B RCDs are required for installations involving inverter-fed supplies unless there is at least simple separation.

2.3 OVERCURRENT PROTECTION NOT COORDINATED

Final circuits are typically protected against overcurrent by a Circuit Breaker (CB) or Residual Current Breaker with Overcurrent (RCBO) device.

ISSUE: FAULT CURRENT FROM MULTIPLE SOURCES

- In the event of a short-circuit or fault, the PV inverter may continue to feed current into the fault. It is essential that the inverter employs anti-islanding measures achieving the requirements of EREC G98.
- Circuit design arrangements have originally accounted for one source of fault current. The additional fault contribution from the PV inverter can:
  - increase the current beyond the designed rating and use of the cables;
  - impact disconnection times, delaying fault clearance.
- A significant number of existing CB/RCBOs are typically rated for unidirectional current flow.

  Reverse feeding may:
  - affect operating characteristics (especially the magnetic trip element);
  - exceed the CB's rated breaking capacity during faults due to combined grid and inverter fault currents;
  - cause long-term wear to contacts and arc chutes that are not designed for reverse flow.

2.4 BS 1363 13 A PLUGS AND SOCKET-OUTLETS

The UK has a safe and robust plug and socket-outlet arrangement, covered by the BS 1363 suite of standards and governed by the The Plugs and Sockets etc. (Safety) Regulations 1994, exceeding the requirements of most other nations.

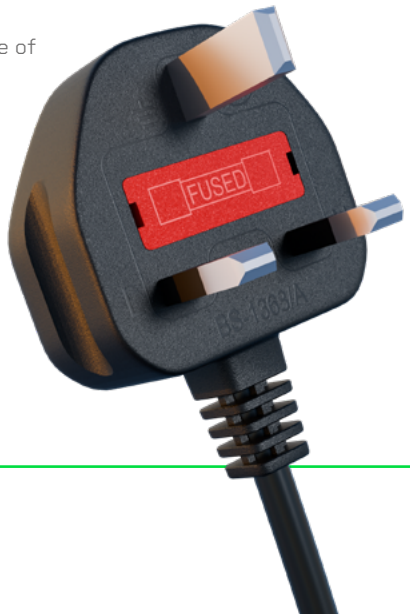
Within this suite, plugs are specifically designed and tested to '*BS 1363-1 Rewirable and non-rewirable 13 A fused plugs. Specification*', to ensure that they are safe for foreseeable use.

BS 1363-1, SECTION 5 - GENERAL, STATES:

> *'Plugs shall be so designed and constructed that in normal use their performance is reliable and minimizes the risk of danger to the user or to the surroundings. Such plugs shall be capable of meeting all the relevant requirements and tests specified in this part of BS 1363.* ***Plugs shall not be used for the connection of electrical power generators to socket-outlets.****'*

Therefore, plugs designed and manufactured to BS 1363-1 are not designed, nor tested, for the connection of electrical power generation.

Figure 01: Example of a 1363 plug.



> "BS 1363-1 PLUGS SHALL NOT BE USED FOR THE CONNECTION OF **ELECTRICAL POWER GENERATORS** TO SOCKET-OUTLETS."

2.5 CONSUMER BEHAVIOUR AND INTERACTION

CONNECTION VIA MULTIPLUG EXTENSION LEADS

A connection via a standard BS 1363 plug and socket-outlet arrangement provides no method of preventing multiple units being plugged into a multiplug extension lead (Figure 02), which could lead to additional risk of current and thermal overload and potential fire risk.

Figure 02: Example of a multiplug extension lead.

MULTIPLE SOLAR PV

Allowing connection via a BS 1363 plug and socket-arrangement could encourage users to connect multiple solar PV systems to their installation, either via multiple extension leads or simply at different points throughout the property. This may exacerbate issues highlighted in the previous sections of this report and breach agreed generation limits.

MOUNTING RISKS

As stated in the introduction, methods of fixing plug-in PV systems are not considered in depth within this report, but due to the weight and size of these products, careful consideration should be made when permitting these to be installed by non-professionals - particularly when installed at height, including the risk of wind-loading, snow-loading and unsecured mountings.

> “ DUE TO THE **WEIGHT AND SIZE OF THESE PRODUCTS**, CAREFUL CONSIDERATION SHOULD BE MADE WHEN PERMITTING THESE TO BE INSTALLED BY **NON-PROFESSIONALS**. ”

3.0 HOW GERMANY HAS PERMITTED PLUG-IN PV SYSTEMS

The success of plug-in PV system adoption throughout Germany, has led to discussions on how their methodology may enable the safe roll out in the UK.

It is important to recognise that whilst most European countries adopt aspects of IEC 60364 suite of standards for their versions of the electrical regulations, some countries have differing Earthing systems, Special National Conditions (SNC) and different common circuit configurations, with ring final circuits being a case in point.

German wiring systems are typically designed with Type A RCDs, a 1.5 mm² 16A rated radial circuit, typically protected by a 16 A overcurrent protective device, serving one or more 10A / 16A socket-outlets. However, 2.5 mm² is increasingly being used for higher loads and longer circuits.

3.1 POWER LIMITATIONS

Previously, in Germany, plug-in PV systems were limited to 600 W inverter output under Section 5.5.3 of VDE-AR-N 4105:2018 11. Since May 2024, however, the Renewable Energy Sources Act (EEG) has explicitly recognised PIPV systems, permitting inverter outputs of up to 800 W with a total connected PV generator capacity of up to 2 kWp (Section 8 (5a) EEG 2023).

3.2 STANDARDISED INVERTER COMPLIANCE

Microinverters on German plug-in PV systems must comply with **VDE-AR-N 4105**, ensuring:

- anti-islanding protection;
- adequate frequency and voltage response;
- automatic disconnection on grid failure.

3.3 CONNECTIONS

The preliminary standard DIN VDE V 0100-551-1 (VDE V 0100-551-1) published in May 2018 allowed Germany to integrate plug-in PV systems into existing final circuits.

This required PIPV systems to be either permanently connected or connected using dedicated power connectors that meet the requirements of, for example, DIN VDE V 0628-1 (VDE V 0628-1). The function of these is to:

- prevent user reversed polarity (not an issue with BS 1363 plug and socket-outlets);
- ensure safety is maintained when unplugging under load;
- encourage a safe permanent connection by a professional, or a safe plug-in connection for the user.

However, a new German pre-standard, DIN VDE V 0126-95 (VDE V 0126-95), published in December 2025, specifies the safety requirements and tests for plug in solar devices for mains parallel operation. It also permits connectors according to DIN VDE 0620-2-1 (Schuko®-type plugs) where the following applies:

- additional functions for limiting touch current and energy to safe values within the device, and/or;
- mechanical solution for meeting the minimum requirements (such as protective covers or protective enclosures), and/or;
- electromechanical solution preventing contact with live pins.

It is important to remember, however, that many of the PIPV systems currently available pre-date DIN VDE V 0126-95 (VDE V 0126-95), meaning there are currently very few fully standard-compliant PIPV systems on the market.

3.4 REGISTRATION REQUIREMENTS

Systems must be registered with:

- the Federal Market Registry (Marktstammdatenregister);
- the local grid operator (though some exemptions apply under current simplification rules).

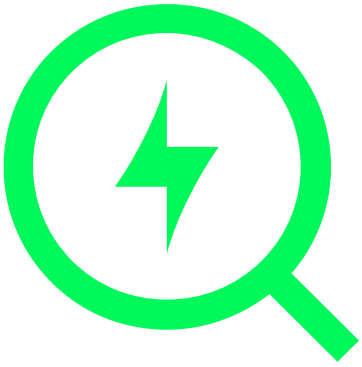
Contradictory requirements are being resolved through (VDE-AR-N 4105). If payments are required by the owner, registration with the grid operator will be required.

3.5 GUIDANCE FROM NATIONAL BODIES

Until recently the VDE (Association for Electrical, Electronic & Information Technologies) published the following guidance:

> *'First, a qualified electrician should check whether the cable and fuse for the feed-in in an existing electrical circuit are sufficiently dimensioned to protect the circuit from overload and fire. The qualified electrician may need to replace the existing fuse with a smaller one and install a special power socket. If the plug-in generator can be connected via an existing, special power socket (e.g., according to Vornom DIN VDE V 0628-1 (VDE V 0628-1)), the plug-in solar device can also be operated by laypersons.'*

Key differences between UK and German policy, standards and requirements are shown on page 12.



COMPARISON OF PLUG-IN (BALCONY) PV POLICY AND STANDARDS - GERMANY AND THE UK

Category	Germany	UK	Comments / Implications
OVERALL LEGAL STATUS	Permitted under clear rules.	Not explicitly permitted, remains evolving and subject to existing product, installation and standards requirements.	UK lacks defined legal status, risking unsafe DIY installations.
POWER OUTPUT LIMIT	800W	No official limit (but G98 applies ≤16 A).	EREC G98 has a limitation category for <800W generation but this only relates to Overfrequency and Active Power output requirements.
INVERTER COMPLIANCE	Mandatory VDE-AR-N 4105 certified.	Mandatory G98, but rarely followed for plug-in kits.	Independent testing has identified non-conformity with EREC-G98 in some devices.
CONNECTION METHOD	DIN VDE V 0100-551-1, and Schuko now permitted.	BS 1363 plug proposed, Some units being marketed for connection via a Fused Connection Unit (FCU).	No verification of suitability of existing circuit and upstream protections. The requirements of BS 7671 Regulation 551.7 should be taken into account. BS IEC 63578-1 or similar should be considered. Connection currently precluded in BS 1363-1.
ELECTRICAL INSTALLATION STANDARD	**DIN VDE 0100-551-1** (permits injection into final circuits under conditions).	**BS 7671** no longer prohibits connection via a plug and socket-outlet.	BS 7671 Regulation 551.7 requirements should still be taken into account.
PROTECTION DEVICES (RCD/MCB)	Existing circuits and protections should be checked/approved by a professional.	Not assessed for plug-in installation of generation equipment.	Installations may violate BS 7671 Regulations 411.3.2, 433.1 and 530.3.201 (ADS, overload and bidirectional capability).
REGISTRATION REQUIREMENTS	**Mandatory:** Federal Market Registry and often local DSO.	Mandatory under **G98**, (not enforced for DIY).	UK plug-in users may not be aware of registration or G98 process. A simplified/automatic registration process could be created.
GRID ANTI-ISLANDING PROTECTION	Enforced via inverter certification.	Required under EREC-G98, but may be inadequate in practice.	UK risk: islanding during outage if inverter continues operation. EREC-G98 non-compliance found with certain units tested.
OVERSIGHT/ CONSUMER GUIDANCE	Clear guidance from VDE, **DSOs, consumer agencies.**	Limited or unclear guidance from BEIS/OFGEM/DSOs/ others.	UK lacks consumer education and technical standards for safe DIY PV.
ENFORCEMENT	Structured through registry, grid operator coordination.	No enforcement for DIY plug-in systems.	Regulatory gap allows widespread non-compliance in UK homes.
TENANT AND APARTMENT USE	Supported via simplified systems.	Not supported – tenant installations legally and practically problematic.	Germany's policies encourage inclusion of renters; UK policies do not cover this.

4.0 PROPOSED SOLUTIONS FOR THE SAFE ADOPTION OF PLUG-IN SOLAR PV IN THE UK

A plug-in solar PV system bypasses the usual procedures of ensuring occupant and building safety when installing a PV system, due to:

- No verification or testing under BS 7671 of:
  - suitability of circuit for additional power supplies;
  - adequate disconnection time;
  - protection coordination;
  - suitability of RCD / CB type.

Where a plug-in PV system is used, this can affect the characteristics of the protective devices currently installed, potentially removing the safety aspects these provide, which presents a risk of safety to occupants.

Chapter 55 of BS 7671 applies to generating equipment intended to form part of the fixed installation. Although plug-in PV systems are presented as portable equipment, their operation involves generating electrical energy in parallel with the supply and directly influencing the behaviour of the installation, including circuit loading, protective device operation, and fault conditions. **As such, their functional impact aligns with that of generation forming part of the installation, and the requirements of Regulation 551.7.1 and 551.7.2 would therefore be applicable.**

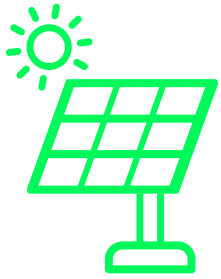
Whilst relating to additions and alterations of an installation, Regulation 132.16 also emphasises the importance of ensuring that the rating and condition of the existing equipment is adequate for the altered circumstance.

Electrical Safety First proposes the following options to allow for safer adoption of these devices:

4.1 DEDICATED FINAL CIRCUIT AND FIXED CONNECTION

The safest route for permitting these in the UK is through mandating **a dedicated final circuit, as currently required for fixed solar PV systems**, designed accordingly, with suitable upstream protections, a means of isolation and a permanent connection of the solar PV system. As per the requirements of Regulation 551.7.2, correct design would ensure that suitable protection exists against thermal effects, overcurrent, and that the correct type of RCD is provided.

(Note: As mentioned in section 1, systems are being marketed in the UK for connection via a Fused Connection Unit (FCU), aimed as an easy way to achieve compliance with Building Regulations Approved Document Part L Volume 1- Dwellings (England) and the equivalent document in Wales. Such arrangements should be assessed against Regulation 551.7.2.1, as they might not satisfy requirements for a dedicated circuit and appropriate upstream connection without specific design).



4.2 DEDICATED FINAL CIRCUIT AND SPECIFIC PLUG & SOCKET-OUTLET

An alternative, safe route is to mandate a dedicated final circuit but also permitting the use of a **specific plug and socket-outlet** for generation equipment, such as DIN VDE V 0628-1 VDE V 0628-1 or BS IEC 63578-1 *'Prosumer plugs and prosumer inlets for household and similar purposes'* (under-development).

Mandating an alternative type of plug and socket-outlet arrangement would ensure that the generation unit cannot be plugged into any available socket and mitigate against misuse - such as connecting multiple units in a multi-plug extension lead.

BS 7671 previously prohibited the use of a plug and socket-outlet for generation. Following the release of Amendment 4 (BS 7671:2018+A4:2026), this is now not specifically implied, due to the removal of Regulation 551.7.2 (ii) which had stated:

> *'A generation set shall not be connected to a final circuit by means of a plug and socket-outlet.'*

However, Table 55.1 (within Regulation 553.1.3) would require updating to recognise BS IEC 63578-1 or similar.

4.3 CONNECTION VIA A BS 1363 PLUG AND SOCKET-OUTLET IN AN EXISTING DISTRIBUTION CIRCUIT

If the connection of plug-in PV systems via a standard BS 1363 plug and socket outlet in an existing final circuit is permitted, then the following should be considered:

- Mandatory professional assessment (inspection and testing) of an existing installation and the intended circuit that a plug-in system would be connected into, prior to installation, ensuring that:
  - protective devices (CBs, RCDs etc) are suitably rated and capable of bidirectional power flow;
  - the circuits assessed as being robust and capable of any increased current flow in either cable section of a ring final circuit.
- In addition, BS 1363-1 would need to be amended.

5.0 CONSIDERATIONS IN ADDITION TO BS 7671

5.1 DNO NOTIFICATION

Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002, Regulation 22: (2) (c) states:

'the person installing the source of energy ensures that the distributor is advised of the intention to use the source of energy in parallel with the network before, or at the time of, commissioning the source.'

There is a misconception that ENA EREC-G98 does not apply for generation below 800W, however, only certain aspects are not applicable. These are listed in ENA EREC-G98 Appendix 1 as:

- 9.3 (limited Frequency Sensitive Mode-Overfrequency); and
- 9.4.2 and 9.4.3 (constant Active Power output).

All installed generation **must** be notified to the relevant DNO regardless of capacity as well as conformity to the relevant type tests to ensure that it operates safely and is compatible with the electricity network.

For plug-in solar systems, this could potentially be simplified, through online self-registration, or through automatic registration of the device, i.e. requiring the user to register and provide information (e.g. via a QR code) prior to the device being energised.

5.2 INVERTER SAFETY AND STANDARD COMPLIANCE

For plug-in PV systems connected via a BS 1363 plug and socket-outlet to be used safely, it is essential that when the system is disconnected from the socket-outlet, the inverter output voltage and current collapses within a specified time period to ensure no risk to life, via access to plug pins.

This would likely be based on recommendations in BS EN 61140:2016 and BS IEC 60479-1:2018.

Note: Under EREC G98 Issue 2 (10th March 2025) the permissible 'trip time' following loss of mains is 0.5s.

Other methods of protection could be employed, such as retractable non-conductive sheathing on the exposed pins. An example is the Schuko solution from Seplugs (Germany), with the SEP solar connector.

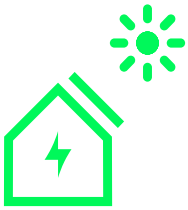
Ultimately, a British Standard for plug-in PV systems should be developed to enable compliance and safety to be verified by manufacturers, distributors, Trading Standards and the consumer.

5.3 ENFORCEMENT

To ensure that plug-in PV systems are safe for sale and for use in the UK, it is imperative that an international or British Standard be developed. In the absence of this, it will prove difficult for the Office for Product and Safety Standards (OPSS) and Trading Standards bodies - including port and border controls - to verify conformity of these devices.

5.4 HIGHER-RISK BUILDINGS (HRBs)

Additional consideration will be required for plug-in PV systems to be installed on HRBs (>18m in height, or 7 storeys containing at least 2 residential units). Currently this is relies on the judgement and permission of the Principle Accountable Person (PAP).



6.0 CONCLUSION

Permitting the use of small-scale solar PV systems could assist the UK in decarbonisation of its energy supply, as well as helping reduce energy costs for consumers. However, this must not come at the expense of safety.

Electrical Safety First has significant concerns that a rush to permit the general sale of plug-in PV systems prematurely, before all the risks have been considered, could be at a detriment to public safety.

Due to the potential risks and consequences, Electrical Safety First believes that the addition of plug-in solar PV systems should be subject to the same requirements as fixed generation, particularly the requirements within Regulation 551.7.

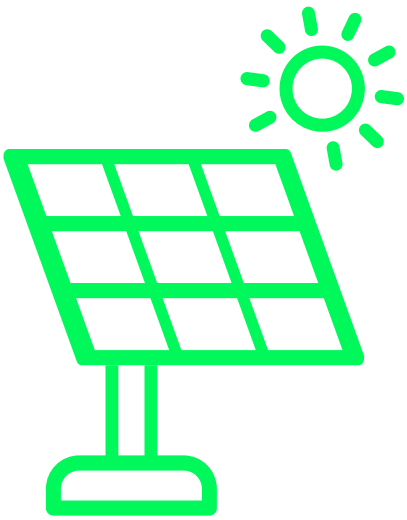
The safest method for connection still remains via a dedicated final circuit and fixed connection. A plug and socket-outlet arrangement on a dedicated circuit utilising BS IEC 63578-1 (or similar), would be viable, providing user flexibility whilst retaining safeguards.

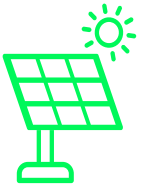
Should plug-in PV systems be permitted for connecting to existing circuits via a BS 1363 plug and socket-outlet - then prior to connection - it is crucial that the installation is inspected, verified and certified, to ensure that the wiring system and upstream protective devices meet the required safety criteria.

Several options and considerations have been put forward within this report. These are highlighted in the 'Policy and Standards Recommendations for the UK' table (page 5). Additionally, policy and standards comparisons between the UK and Germany are presented in the 'Comparison of Plug-in (Balcony) PV Policy and Standards - Germany and the UK' table (page 12). These should help frame the issues and complexities needing to be addressed to enable a safe role out of plug-in PV systems in the UK.

Careful monitoring of any incidences regarding these systems in the UK and beyond will be needed to clarify and evidence any risks being identified.

Consumer guidance will also need to be provided to give clarity on safe installation and use, along with recommendations for ensuring that existing wiring systems and protective devices are inspected by a skilled and qualified electrician, registered with an electrical competent person scheme, to ensure that it is suitable for the addition of these generation sets.





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