Plug in Solar Working Group Options Report

DOC-031126-IMH

30th September 2026

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Publication Notice and Disclaimer

This report was prepared by the Plug-In Solar Working Group in response to a request from the Minister for Climate, Energy and the Environment to assess the technical, safety, standards, regulatory and implementation considerations associated with facilitating plug-in solar technologies in Ireland. The report was submitted to the Department of Climate, Energy and the Environment on October 1st, 2026, and reflects the information, evidence, stakeholder views and international developments available to the Working Group at that time.

The report represents the collective work of the Plug-In Solar Working Group and should not be interpreted as a policy document of ESB Networks, CRU, NSAI or DCEE. Nor should it be interpreted as ESB Networks providing guidance, approval or assurance in relation to electrical installations or activities within customer premises. Responsibility for product safety, electrical-installation standards and other behind-the-meter matters rests with the relevant competent authorities and applicable legal and standards frameworks.

The report is being published to provide transparency on the work undertaken by the Working Group and the options and recommendations provided to Government. Publication should not be interpreted as confirmation that plug-in solar devices are currently approved for unrestricted plug-and-play connection in Ireland, nor as confirmation that all recommendations contained in the report have been adopted or implemented.

Contents

Executive Summary	4
Acronyms List	9
1. Introduction	11
2. Developments in the UK	15
3. Legislative Review	20
4. Developments in Europe	24
5. Product Standards and Product Specification Introduction	28
6. ESB Networks Requirements for Plug-in Technologies	34
7. Safety Considerations	39
8. Installation Options Analysis	46
9. I.S. 10101 Wiring Rules Considerations	57
10. Consideration of Plug-in Battery Storage Systems	59
11. Recommendations	61
Appendix A: Working Group Timeline Activities	67
Appendix B: Plug In Generation Safety Assessment for Ireland	68
Appendix C: I.S. 10101 TC2 Plug In Solar Observations	77

Executive Summary

Executive Summary

In May 2026, the Minister for Climate, Energy and the Environment requested ESB Networks to work with other relevant bodies, including the NSAI, CRU and Safe Electric, to prioritise and accelerate the development of standards to permit the safe use of plug-in solar systems in Ireland. In response, ESB Networks established and chaired the Plug-In Solar Working Group comprising representatives from DCEE, ESB Networks, CRU, NSAI, Safe Electric and other stakeholders. A Steering Group comprising senior representatives in DCEE, ESB Networks and NSAI was also established to give direction and review the progress of the working group.

The Working Group's remit was to identify and assess the technical, standards, safety, regulatory and implementation considerations associated with facilitating plug-in solar technologies of up to 800 W (AC) in Ireland for domestic customers and to provide recommendations/options for consideration by Government.

Key Findings

The Working Group found that there are no significant barriers preventing the connection of plug-in solar devices to the electricity distribution network in Ireland. ESB Networks supports the safe and proportionate deployment of compliant plug-in solar systems, provided that network visibility is maintained through a simple customer registration process and devices comply with the relevant network requirements. Work to facilitate this registration process and update the relevant network standards to enable plug-in-solar is ongoing and will be completed shortly.

The Working Group also noted that the introduction of plug-in solar has implications that extend beyond network considerations, and identified the need for coordinated action across a number of areas including:

- Product standards and specifications.
- Electrical safety.
- Customer guidance and education.
- Registration arrangements.
- Legislative responsibilities.
- Building regulation and fire safety considerations.

The Group concluded that product compliance and network compliance are separate but complementary requirements. Product safety requirements should be addressed through an appropriate product specification or standard, while network-related requirements should continue to be addressed through ESB Networks' Low Carbon Technology Register and registration arrangements.

Installation Pathways

Four potential installation pathways were assessed.

- **Option 1A – Dedicated Circuit with Dedicated Non-Standard Socket:** Installation of a dedicated circuit by a Registered Electrical Contractor (REC), terminating with a plug and socket that would have a non-standard design.
- **Option 1B – Dedicated Circuit with Standard Socket:** Installation of a dedicated circuit by a Registered Electrical Contractor (REC), terminating in a standard socket outlet.

- **Option 2 – Designated Existing Circuit with REC Assessment:** Assessment and approval of an existing circuit by a Registered Electrical Contractor (REC) before connection of the plug-in **solar device.**
- **Option 3 – Plug-and-Play (UK Position):** Customer connection of a compliant plug-in solar device without prior electrical assessment, supported by product compliance, registration and customer guidance.

The Working Group concluded that Option 1A and Option 2 are not the preferred solutions for Ireland and should not be developed further at this stage. The Steering Group subsequently recommended Option 3 (Plug-and-Play) as the preferred approach to facilitate plug-in solar in Ireland.

Under Option 1B, a Registered Electrical Contractor (REC) would be required to install, inspect, test and certify a dedicated circuit for plug-in solar. This option should be held as a fallback pending the outcome of a safety assessment.

Option 3 would allow customers to connect compliant plug-in solar devices directly to suitable existing socket outlets without prior REC involvement. This approach most closely aligns with the customer proposition emerging in Great Britain and other European markets and would provide the greatest accessibility to renewable energy technologies.

The Working Group concluded that Option 3 should be supported by an Ireland-specific safety assessment, and the establishment of appropriate product requirements, customer guidance, registration requirements and supporting safeguards.

Product Standards and Specifications

Four pathways for establishing product requirements were assessed:

1. Irish Standard Specification (I.S.)
2. Standard Recommendation (S.R.)
3. SWiFT (Specification Written in Fast Track)
4. Recognition or acceptance of products demonstrated to comply with the UK Interim Product Specification (IPS)

The Working Group agreed that options 3 and 4 above offer the most expedient pathways for developing product requirements, with the Steering Group favouring the NSAI SWiFT specification as the preferred Phase 1 pathway for establishing product requirements in Ireland. They also noted that pathway 4 should be considered as a fall back in the event that the SWiFT process cannot be delivered within the required timeframe.

The SWiFT process provides an accelerated route to defining the product requirements applicable to plug-in solar devices entering the Irish market. The Working Group recommends that this work be informed by the findings of the Ireland-specific safety assessment referenced above and should draw upon the technical content of the UK Interim Product Specification and other relevant international requirements.

The Steering Group also identified the development of a formal Irish Standard Specification as the longer-term Phase 2 objective.

Irish Safety Assessment

The Working Group considers the safety assessment to be the most critical next step in the process of introducing plug-in solar. A safety assessment carried out in the UK prior to the introduction of plug-in solar there provides a useful evidence base, however stakeholders concluded that additional work is required to fully assess representative Irish electrical installations, housing stock and customer-use scenarios.The Steering Group endorsed the progression of a comprehensive Irish safety assessment which will examine:

- Modern and legacy domestic installations.
- Electrical protection systems.
- Customer behaviour and foreseeable misuse scenarios.
- Multiple-device deployment.
- Fire safety and mounting considerations.

The assessment will provide the evidence base required to determine whether Option 3 (plug-and-play) is appropriate in an Irish context and will identify the safeguards required for implementation.

Legislative Review

The Working Group recommends that a legislative review is undertaken in parallel with the Safety Assessment to examine relevant legislation and regulatory frameworks to ensure alignment with the recommended pathway for introducing plug-in solar.

Recommended Strategic Direction

The Working Group recommends that Ireland adopt a phased approach to developing the standards necessary to introduce plug-in-solar:

Phase 1

- Commission an Irish Safety Assessment.
- Finalise ESB Networks' registration arrangements and microgeneration standards.
- Undertake a legislative review to ensure alignment with existing legal framework.
- Commence the development of the NSAI SWiFT specification.
- Identify any Irish-specific measures required to support recognition of UK IPS-compliant products.

Phase 2

- Determine the conditions required to implement Option 3, Plug and Play, taking into account the findings of the Safety Assessment, SWiFT development process and Legislative Review.
- Develop clear customer guidance and supporting implementation arrangements.

Phase 3

- Implement Option 3 as the preferred consumer-led plug-and-play framework.

Phase 4

- Development of a formal Irish Standard Specification as the longer-term standards pathway.

The Working Group considers that this approach provides a practical, proportionate and evidence-led route to enabling plug-in solar in Ireland while maintaining appropriate safety standards and supporting broader access to renewable energy technologies.

Plug-in battery technologies were also considered by the Working Group. However, the international product, safety and regulatory framework for these technologies is less developed than for plug-in solar. The Working Group therefore recommends that the immediate programme remain focused on plug-in solar, with plug-in batteries included as a separately assessed element of the Irish Safety Assessment provided this would not delay the core assessment.

Acronyms List

Acronym	Description
BESS	Battery Energy Storage System
BSI	British Standards Institution
CCPC	Competition and Consumer Protection Commission
CEG	Clean Export Guarantee
CENELEC	European Committee for Electrotechnical Standardization
CMS	Central Market System
CRU	Commission for Regulation of Utilities
DCEE	Department of Climate, Energy and the Environment
DESNZ	Department for Energy Security and Net Zero
DETE	Department of Enterprise, Trade and Employment
DNO	Distribution Network Operator
DSO	Distribution System Operator
ENA	Energy Networks Association
ESB	Electricity Supply Board
ESF	Electrical Safety First
ESQCR	Electricity Safety, Quality and Continuity Regulations
HD	Harmonisation Document
IEC	International Electrotechnical Commission
IET	Institution of Engineering and Technology
IPS	Interim Product Specification
I.S.	Irish Standard
LCT	Low Carbon Technology
MCB	Miniature Circuit Breaker
MEC	Maximum Export Capacity
MPRN	Meter Point Reference Number
NSAI	National Standards Authority of Ireland
PCB	Printed Circuit Board
PSSR	Plugs and Sockets etc. Safety Regulations
PV	Photovoltaic

Acronyms List

Acronym	Description
RCD	Residual Current Device
RCBO	Residual Current Circuit Breaker with Overcurrent Protection
REC	Registered Electrical Contractor
RED III	Revised Renewable Energy Directive
S.R.	Standard Recommendation
SEAI	Sustainable Energy Authority of Ireland
SWiFT	Specification Written in Fast Track
TC2	NSAI Electrotechnical Committee Technical Committee 2
TSO	Transmission System Operator
VDE	Verband der Elektrotechnik Elektronik Informationstechnik

1. Introduction

1. Introduction

The transition to a low-carbon energy system is driving increased adoption of distributed renewable generation technologies across Europe. In recent years, plug-in solar photovoltaic (PV) systems—sometimes referred to as balcony solar, plug-and-play solar or micro-generation devices—have emerged as a rapidly growing segment of the residential renewable energy market. These systems typically comprise one or more solar modules connected through a microinverter and are designed to be connected to a domestic electrical installation using a standard plug and socket. Increasingly, similar plug-in battery energy storage systems are also becoming available, either as standalone products or integrated with plug-in solar solutions.

The rapid growth of plug-in technologies across Europe, particularly in Germany, has demonstrated significant consumer interest in affordable and accessible renewable energy solutions. Several European countries have already introduced regulatory and technical frameworks to facilitate these technologies. In July 2026, the United Kingdom concluded its consultation process and published a Government Response, Interim Product Specification (IPS) and supporting electrical safety study, establishing a pathway for the deployment of compliant plug-in solar technologies. These developments are occurring against a wider backdrop of European policy initiatives seeking to reduce barriers to small-scale renewable energy generation and increase citizen participation in the energy transition.

In a letter to Nicholas Tarrant, Managing Director of ESB Networks on 5 May 2026, Minister Darragh O'Brien TD, Minister for Climate, Energy and the Environment requested that ESB Networks would work with relevant stakeholders to prioritise and accelerate the development of standards to permit the safe use of plug-in solar in Ireland. In response, ESB Networks initiated engagement with relevant stakeholders, including the National Standards Authority of Ireland (NSAI), the Commission for Regulation of Utilities (CRU), Safe Electric and the Department of Climate, Energy and the Environment (DCEE), and subsequently established a dedicated cross-stakeholder Working Group.

The purpose of this Options Report is to summarise the activities and findings of the Working Group to date, including the review of international developments, assessment of electrical safety considerations, examination of existing standards and regulations, evaluation of registration and compliance arrangements, and assessment of potential implementation pathways. The report is intended to provide an overview of progress to date and set out a range of options to enable 'plug-in' solar to be deployed in Ireland for domestic customers, along with associated implementation pathways. An analysis of the benefits and drawbacks of each option is also outlined in this report.

1.1 Working Group Participation

The core membership of the Working Group included:

- **ESB Networks** – Responsible for chairing, meeting documentation, report writing and coordinating the Working Group, assessing network impacts, developing registration requirements and reviewing distribution system standards.
- **National Standards Authority of Ireland (NSAI)** – Provided expertise on electrical installation standards, international standards developments and product standardisation requirements. Input was supported by representatives from NSAI Electro Technical Committee – Technical Committee 2 (TC2) [1].
- **Department of Climate, Energy and the Environment (DCEE)** – Provided policy oversight and ensured alignment with Government objectives regarding electrification, renewable energy and decarbonisation.
- C**ommission for Regulation of Utilities (CRU)** – Participated in the assessment process, contributing views on regulatory, electrical safety and smart metering considerations.
- **Safe Electric Ireland** – Contributed expertise on electrical installation practices, Registered Electrical Contractor (REC) requirements and customer safety considerations.
- **Competition and Consumer Protection Commission (CCPC)** – Provided guidance regarding product compliance, importer and distributor obligations, market surveillance and consumer protection matters.
- **Sustainable Energy Authority Ireland (SEAI)** – Brought into the working group for the 4th workshop onwards by invitation from ESB Networks following the need for a central location for consumer guidance information.

The Working Group reports to a Steering Group comprising senior representatives from DCEE, ESB Networks and NSAI. The Steering Group provides strategic oversight of the programme and considers the findings and recommendations arising from the Working Group. Throughout the assessment, direction from the Steering Group was sought on key matters including standards-development pathways, installation options, governance arrangements and recommendations relating to the proposed Irish Safety Assessment and other enabling actions required to facilitate plug-in solar in Ireland.

In addition to the participants who were directly involved, the Working Group engaged with a range of external reference sources and organisations including the Energy Networks Association (ENA), Electrical Safety First, Solar Power Europe and standards organisations in the United Kingdom and Germany to better understand emerging international approaches to plug-in technologies.

The combination of network, standards, policy, regulatory and safety expertise provided the Working Group with a broad evidence base to assess the opportunities and challenges associated with facilitating plug-in solar and battery technologies in Ireland.

The Transmission System Operator (TSO) for Ireland, EirGrid, was also formally briefed through the Joint System Operator Programme on the establishment of the Plug-In Solar Working Group, its objectives and the scope of the assessment being undertaken.

1 Electrotechnical Standards | NSAI

1.2 Working Group Timelines and Activities

The Working Group met seven times between May and September. A timeline of milestones and developments in the work of the Working Group is in Appendix A: Working Group Timeline Activities.

Collectively, these activities enabled the Working Group to progress from an initial ministerial request to a detailed assessment of international experience, electrical safety considerations, standards implications, registration requirements and implementation options for plug-in solar and plug-in battery technologies in Ireland.

1.3 Joint Oireachtas Committee

On 15 July 2026, the Joint Committee on Climate, Environment and Energy invited the Department of Climate, Energy and the Environment (DCEE) and ESB Networks to attend dedicated sessions[1] to discuss the introduction of plug-in solar technologies in Ireland. The discussion highlighted broad political support for enabling plug-in solar, particularly for apartment dwellers, tenants and households seeking to reduce energy costs. DCEE outlined the potential role of plug-in solar in supporting energy affordability, renewable energy deployment and energy security, while noting the significant growth of the technology in Germany and other European markets.

DCEE officials described the establishment of the Plug-In Solar Working Group and outlined the key areas under assessment, including legislative and regulatory considerations, product standards and specifications, registration arrangements, and network visibility requirements. The Committee was advised that international developments, including those in the United Kingdom and Germany, were being closely monitored and that a report with recommendations was expected to be submitted to the Minister in September 2026.

ESB Networks outlined its support for the safe and proportionate introduction of plug-in solar technologies and reiterated the importance of maintaining network integrity, power quality and visibility of connected devices. While ESB Networks has responsibility for network-related considerations, it emphasised that many of the remaining issues identified by the Working Group, including product standards and specifications, consumer product safety, electrical installation standards, building regulations and broader policy decisions, fall outside its direct remit and require input from Government departments, regulators, standards bodies and other stakeholders. ESB Networks also described the work underway to assess potential implementation pathways and the modifications that may be required to existing connection and registration arrangements.

Committee members questioned both DCEE and ESB Networks on implementation timelines, safety considerations and the pace of progress relative to other European jurisdictions. While acknowledging the desire to accelerate deployment, both organisations emphasised that safety, standards development, network impacts and consumer protection considerations must be addressed before implementation. The engagement demonstrated strong support for the introduction of plug-in solar in Ireland, while recognising the need for an evidence-based framework underpinned by appropriate standards, product requirements and registration arrangements.

1 Joint Committee on Climate, Environment and Energy debate - Wednesday, 15 Jul 2026

2. Developments in the UK

2. Developments in the UK

The United Kingdom is one of the most relevant comparator jurisdictions for Ireland in assessing plug-in solar technologies. Similarities in domestic electrical installations, consumer behaviour, market structure and product availability make developments in Great Britain particularly important to the Irish assessment. Throughout the Working Group's activities, the review focused on UK policy developments, Energy Networks Association (ENA) activities, emerging standards work and the associated public consultation process undertaken by the Department for Energy Security and Net Zero (DESNZ). The Working Group also considered the implications for Ireland of plug-in solar devices being available for purchase and use in Great Britain from the end of August 2026.

2.1 Policy Direction

A formal Government consultation was launched by DESNZ in June 2026 seeking views on the safe introduction of plug-in solar technologies. The consultation examined technical requirements, safety considerations, registration arrangements and standards requirements necessary to support implementation.

The publication of the UK Government Response[1] in July 2026 provides a clear insight into the policy direction being adopted within the UK in relation to plug-in solar technologies. The UK Government concluded that plug-in solar should be facilitated through a framework centred on compliant products, registration requirements, consumer guidance and targeted legislative changes, rather than waiting for the completion of more comprehensive standards-development processes. On 17 July, the UK Government laid a Statutory Instrument[2] before Parliament with the intention that plug in solar will be effective on 27 August 2026. Northern Ireland is expected to follow the UK's approach in the coming months pending some legislative and regulatory amendments.

A key feature of the UK approach is its recognition that plug-in solar products are already available to consumers and that the absence of a formal framework does not prevent their purchase or use. The UK Government therefore decided that a structured framework incorporating product requirements, registration processes and safety controls would provide stronger oversight than allowing the market to develop without oversight.

Plug-in solar products could not be legally sold or used in the UK because of constraints arising from existing legislation and standards, including restrictions associated with the Plugs and Sockets etc. (Safety) Regulations 1994 (PSSR), the Electricity Safety, Quality and Continuity Regulations (ESQCR) and the interaction of those regulations with existing British Standards. The UK Government therefore needed a formal mechanism to define the specific product requirements that would allow plug-in solar products to be legally placed on the market and connected to domestic installations.

The use of an Interim Product Specification (IPS) as a transitional measure is a central feature of the UK approach. It indicates a preference to progress deployment through product requirements, registration and consumer guidance while longer-term standards and regulatory arrangements continue to evolve.

1 Plug-in Solar: government response

2 The Plugs and Sockets etc. (Safety) Regulations 1994 and Electricity Safety, Quality and Continuity Regulations 2002 (Amendment) Regulations 2026

The UK policy direction places significant emphasis on customer responsibility. Customers are expected to use approved products, follow installation guidance, register qualifying devices and operate equipment in accordance with the conditions set out within the product specification.

The UK developments provide a useful example of how product specifications, registration arrangements, legislative amendments and customer guidance can be combined to accelerate the introduction of plug-in solar technologies.

2.2 Energy Networks Association Position

The Working Group reviewed updates provided through ESB Networks' engagement with the Energy Networks Association (ENA) and UK Distribution Network Operators (DNOs). These discussions indicate broad support among network operators for the introduction of plug-in solar technologies, provided suitable technical standards and safety controls are established, and network visibility is maintained. ENA advised that it has identified a clear pathway to accommodate plug-in solar on public electricity networks and does not consider upstream network impacts to be a significant barrier to implementation.

ENA's position closely mirrors the emerging position of ESB Networks. UK network operators have consistently highlighted that the main challenges do not relate to the public electricity network itself, but to customer-side electrical installations, product safety requirements and installation standards. Standards bodies, regulators, manufacturers, government departments and electrical safety organisations therefore all have a role in developing an appropriate framework.

ENA progressed amendments to Engineering Recommendation G98 to facilitate plug-in solar technologies, with Ofgem (Great Britain's Energy Regulator) approving the relevant changes in August 2026 [1]. However, DNOs have repeatedly noted that revisions to network standards alone are insufficient and must be accompanied by an appropriate product standard and customer-side safety framework.

2.3 Emerging UK Framework

The UK approach is based on several core principles. First, plug-in solar systems are expected to be limited to a maximum inverter output of 800 W, broadly aligning with European developments and the threshold referenced in European legislative initiatives. Second, the UK favours notification rather than a traditional connection application process. Customers would notify the installation of a qualifying device through an ENA Type Test Register and simplified registration arrangements, providing visibility to network operators while minimising administrative burden.

The UK is also progressing approved-device arrangements via ENA Connect Direct. Only compliant products certified against the relevant standards would be eligible for connection through the simplified process. The Working Group also reviewed the potential use of QR-code scanning to simplify product verification and improve the quality of registration information.

Another notable feature of the UK approach is the separation of consumer-facing functions from network operator functions. ENA indicated that DNOs do not wish to become the primary customer interface for plug-in solar enquiries. Instead, a Government-led or consumer-facing organisation such as Energy Saving Trust will provide information, guidance and support[2] (i.e. SEAI in the Irish Context), while DNOs focus on technical registration and compliance activities. This division of responsibilities may provide useful lessons for the development of an Irish framework. The UK is also solely focusing on the introduction of plug-in solar devices at this stage. Plug-in battery devices are not part of this emerging framework.

1 Ofgem decision to Approve DCRP/MP/26/02: Proposed Amendment to facilitate Plug-in Microgeneration

2 Plug-in solar panels: Checks to make before you buy - Energy Saving Trust

2.4 Safety Debate and Industry Concerns

While the UK Government and ENA have expressed support for enabling plug-in solar systems, and the legislative framework has been amended to allow plug-in solar devices in Great Britain from 27 August, significant debate continues regarding the safety framework required to support implementation.

Although there was broad support for increasing access to renewable energy technologies, a number of industry organisations raised concerns about the suitability of existing domestic electrical installations, particularly older properties with ageing wiring systems and legacy protection devices.

Electrical Safety First (ESF), the Institution of Engineering and Technology (IET) and industry certification bodies issued a joint statement highlighting concerns about how plug-in generation could interact with existing protection devices such as Residual Current Devices (RCDs), particularly where older installations may not have been designed to accommodate bidirectional power flows.

Prior to the joint statement from the IET, DESNZ commissioned an independent electrical safety study[1] to assess the operation of plug-in solar systems connected to representative UK domestic electrical installations. The study concluded that compliant plug-in solar systems operating within defined limits could be connected safely to representative UK installations, provided that appropriate product controls, anti-islanding protection, registration arrangements and customer guidance were in place. However, the study also recognised that product standards alone could not address every potential risk and that factors such as installation condition, customer behaviour and product compliance remained important considerations.

The publication of the safety study did not completely resolve the debate. Questions continued to be raised regarding customer behaviour, the applicability of the study findings to the diversity of housing stock, the implications of large-scale deployment and whether representative laboratory testing could fully reflect the wide range of electrical installations currently in service.

The UK Government acknowledged many of these concerns within its response and strengthened the Interim Product Specification through additional requirements relating to residual DC leakage current, product compliance declarations, consumer guidance, product traceability and fire safety considerations. However, some stakeholders remained concerned. In an updated statement published on 30 July 2026, the IET welcomed the strengthened specification but reiterated concerns regarding reliance on consumer decision-making, the suitability of older electrical installations and the lack of evidence relating to the deployment of multiple plug-in solar devices within the same premises[2].

Figure 1:
UK consultation documents issued over June & July 2026



1 RAF013/2526 Plug-in PV Systems in the United Kingdom

2 Updated statement: IET warns Government's plug-in solar panels plans still leave consumers exposed to electrical safety risks

2.5 Relevance to Ireland

For Ireland, the UK experience provides valuable technical evidence and demonstrates a possible pathway based on product compliance, registration arrangements, consumer guidance and targeted legislative measures.

The UK approach also reinforces principles already identified by the Working Group, including visibility of connected generation, approved-device arrangements, clear customer guidance and proportionate registration.

However, the Working Group recognised that the UK framework cannot be adopted directly in Ireland without further consideration. Ireland operates within a different regulatory and standards environment, including I.S. 10101, the Safe Electric certification framework and existing microgeneration connection arrangements administered by ESB Networks. The detailed wiring-rules considerations are addressed in Section 9.

The discussions undertaken by the Working Group identified similar safety concerns to those raised in the IET joint statement in the Irish context. While the UK safety assessment provides a valuable evidence base, it was undertaken in the context of representative UK installations and regulatory arrangements. The Working Group therefore recommends a dedicated Irish safety assessment should be carried out, as described in Section 7.6, Safety Assessment, to consider Irish-specific installation conditions, housing stock, protection arrangements and customer-use scenarios.

3. Legislative Review

3. Legislative Review

The Working Group did not undertake a detailed review of existing legislation as part of its evaluation of plug-in solar. The Working Group recommends that DCEE consider commissioning a legislative review as part of the next phase of work. The review should comprise of an examination of existing legislation, technical requirements, product standards, product specifications and regulatory frameworks to identify any amendments required to support the introduction of plug-in solar technologies in Ireland under each of the Options put forward by the Working Group.

The Working Group highlighted some pieces of legislation that may be relevant:

- **Safety, Health and Welfare at Work Regulations (S.I. No. 299 of 2007)**: These Regulations establish requirements relating to the safe use of electrical equipment and electrical installations in places of work and place duties on employers and other duty holders to prevent danger arising from electricity.
- **Electricity Regulation Act 1999**: including any provisions relating to the operation of generation equipment connected to the electricity system.
- **National Standards Authority of Ireland Act 1996**, including the role of standards, product specifications and conformity assessment within any future framework.
- **Residential Tenancies legislation**, landlord and tenant rights, and permissions required within rented accommodation.
- **Electrical certification and contractor obligations**, including the roles and responsibilities of Registered Electrical Contractors where installations are modified, inspected or certified.
- **Consumer Protection legislation**, including obligations relating to the sale, marketing and use of plug-in solar products, customer information and product claims.
- **Building Regulations,** the Legislative Review should consider whether the installation, mounting, location or use of plug-in solar devices gives rise to requirements under the Building Regulations[1] or Building Control Regulations. The review should include Part A: Structure, Part B: Fire Safety and Part P: Electrical Installations.

3.1 Regulatory and Policy Considerations

The revised Renewable Energy Directive (RED III) supports greater consumer participation in renewable energy generation and seeks to reduce unnecessary barriers to small-scale renewable technologies. The policy direction emerging across Europe increasingly recognises the role of plug-in solar systems in supporting decarbonisation and energy self-consumption, with many Member States introducing simplified frameworks for systems up to 800 W.

The Working Group noted that RED III creates a strong policy signal that barriers to small-scale renewable generation should be minimised where this can be achieved without compromising safety. This was one of the factors underpinning the conclusion that a "do nothing" approach is unlikely to be sustainable in the longer term.

1 Building Regulations

3.2 CRU Position

The CRU advised the Working Group that it had identified no direct regulatory barrier preventing the use of plug-in solar technologies in Ireland. CRU also confirmed that plug-in solar systems do not currently fall within the definition of Restricted Electrical Works.

However, the CRU noted that this does not remove the requirement to comply with applicable electrical standards. Where a Registered Electrical Contractor is involved, installations must continue to comply with I.S. 10101 and other relevant standards. The detailed implications of I.S. 10101 are addressed in Section 9.

The Working Group concluded that the principal challenges associated with plug-in solar are not regulatory in nature. Rather, they relate to electrical safety, standards development, product compliance and implementation design. Consequently, the focus of the Working Group has been on identifying a safe and practical framework for accommodating the technology, rather than addressing regulatory barriers.

Safety representatives from the CRU also provided clarification regarding the responsibilities of Registered Electrical Contractors (RECs) in circumstances where an electrical installation is subsequently altered, modified or utilised by a homeowner in a manner different from that for which it was originally designed, assessed or certified. The CRU confirmed that a REC can only be liable for the work they certify. This may comprise the entire installation or may be limited to a specific element, such as an additional circuit. Where an issue arises within the work undertaken and certified by the REC, for example a loose connection resulting in a fire, the REC may be found liable.

A REC is not responsible or liable for all fixed wiring in an installation based on the fact that they were the last registered contractor on site. On the subject of plug-in solar, if a homeowner purchases and connects a plug-in solar unit, and the device malfunctions or causes a safety incident by virtue of its design, no liability would attach to the REC solely because the REC had previously undertaken work at the premises.

3.3 Building Regulations

The deployment of plug-in solar technologies may give rise to considerations under building regulations and associated building safety requirements. This is particularly relevant where solar panels are mounted on balconies, external walls, façades, apartment buildings, terraces or other building structures rather than being placed in a free-standing ground-mounted arrangement.

The experience in both Germany and the United Kingdom has highlighted that plug-in solar technologies cannot be viewed solely as electrical products. The physical installation of solar panels introduces considerations relating to structural integrity, mounting systems, wind loading, weather exposure, fire safety and the potential impact on escape routes and building façades. These issues may be particularly relevant for apartments, multi-unit developments and rented accommodation, where ownership and responsibility for external building fabric may differ from responsibility for the electrical installation.

The UK Government has also commenced wider engagement on associated matters including planning, building regulations and tenancy considerations, recognising that these issues extend beyond traditional electrical safety requirements. At present, the Working Group has not undertaken a detailed assessment of Irish building regulations or the extent to which they may impact the deployment of plug-in solar technologies.

The Working Group recommends that DCEE engage with the Department of Housing and other relevant stakeholders to determine whether any building regulation or planning considerations need to be addressed as part of a future plug-in solar framework.

While building regulations are unlikely to be the primary barrier to the introduction of plug-in solar, early engagement on these matters will help ensure that any future framework is comprehensive, safe and capable of supporting deployment across a broad range of housing types.

3.4 Fire Safety

The Working Group recognises that fire safety should be considered as part of any future plug-in solar framework. At present, there has been no specific assessment of plug-in solar technologies within the context of Irish fire safety requirements. Consequently, the Working Group considers that further engagement with relevant fire safety stakeholders would be beneficial to determine whether any additional guidance or controls may be required.

The Working Group recommends that relevant fire safety authorities and subject matter experts be consulted during the development of any Irish framework, that customer guidance clearly identifies suitable and unsuitable installation locations, and that particular consideration be given to maintaining access to escape routes, avoiding unsafe cable routing practices and ensuring compliance with manufacturer installation requirements. Fire safety considerations should also form part of any future Irish safety assessment.

4. Developments in Europe

4. Developments in Europe

The Working Group reviewed plug-in solar and plug-in battery developments across Europe to understand how other jurisdictions have approached safety, standards, registration and customer adoption. The review showed that plug-in solar technologies have moved beyond pilot deployment and are now an established part of the residential renewable energy landscape in several European countries. While implementation approaches vary, common themes include an 800 W inverter threshold, simplified registration processes, increasing reliance on product standards and customer awareness.

4.1 Germany

Germany is widely recognised as the leading European market for plug-in solar technologies and was the principal reference jurisdiction considered by the Working Group. Commercial plug-in solar products have been available in Germany for over a decade and the market has expanded significantly in recent years. Official registration data indicates that more than 780,000 plug-in solar systems had been registered by the end of 2024, while some independent studies estimate that the actual number of systems connected to the German grid may be between 1.5 million and 4 million[1] due to historically low registration rates.

The German market has experienced particularly strong growth since 2023, supported by falling equipment costs, simplified registration processes and increasing public awareness of the technology. During 2024 alone, approximately 435,000 new plug-in solar systems were registered, making plug-in solar one of the fastest-growing segments of the German solar market.

Germany has also played a leading role in the development of technical product specifications for plug-in solar systems. Significant work has been undertaken through the VDE (Verband der Elektrotechnik Elektronik Informationstechnik) to develop dedicated product requirements for plug-in generators. The emerging VDE standards framework has become an important reference point for both UK and Irish discussions and is increasingly influencing wider European developments.

A notable feature of the German approach is its emphasis on registration and product compliance rather than traditional connection approvals. Registration has been simplified through an online process, reducing customer barriers while preserving network-operator visibility. This reflects a broader policy objective of encouraging participation in renewable energy generation while maintaining oversight of connected devices.

The German experience also provides valuable insights regarding customer behaviour. Studies reviewed by the Working Group indicate that plug-in solar systems are predominantly self-consumption technologies. In addition to solar generation, Germany is increasingly seeing the deployment of small-scale battery systems designed specifically for use with plug-in solar installations. Demand for battery systems below 5 kWh has grown rapidly, and German standards bodies are now extending their work to incorporate plug-in storage technologies.

1 Plug in Solar PV - SolarPower Europe

Differences Between Germany and Ireland/Great Britain

While Germany provides the most mature and relevant European example of plug-in solar deployment, the Working Group noted that the German framework cannot be adopted wholesale in Ireland. When initially considered in Germany, the use of a dedicated balcony solar socket (a singular socket on a separate circuit) specifically for a plug-in solar device was considered necessary. German domestic circuits are predominantly based on a radial final circuit supplying a singular room. Domestic installations in Great Britain include extensive use of larger multi-room ring-final circuits, and Ireland contains a mixture of multi-room ring and radial circuits under different historical standards and wiring practices. As a result, the behaviour of circuit protection devices, current distribution and reverse power flows may differ from those considered when the German framework was originally developed.

During the Working Group assessment, TC2 highlighted that safety findings from Germany cannot simply be assumed to apply directly to Irish installations without further technical assessment. This distinction was also recognised by DESNZ, which commissioned extensive UK-specific testing of radial circuits, ring-final circuits, protective devices, sockets and reverse power-flow scenarios rather than relying solely on German experience. The Working Group therefore concluded that Germany provides an important benchmark and source of learning, but that any Irish framework must be assessed against Irish electrical installations, housing stock, protection arrangements and safety requirements rather than being directly transposed from the German model.

4.2 Belgium

Belgium is one of the more recent European jurisdictions to formally facilitate plug-in solar technologies. Its approach combines product certification requirements with a relatively straightforward customer connection process. Under the Synergrid framework, manufacturers must obtain certification for qualifying plug-in devices before they can be marketed and connected. Once approved, customers can connect certified products using standard socket arrangements without the same inspection requirements that apply to traditional rooftop solar installations.

The Belgian model is relevant because it demonstrates how product standards and manufacturer obligations can operate as primary safety controls, reducing reliance on complex installation processes while maintaining network visibility and customer protection. Belgium also includes both plug-in solar and plug-in battery technologies within a common framework. It should be noted that Belgian domestic installations are generally based on radial circuits, rather than the ring-main arrangements commonly used in Ireland.

4.3 Austria

Austria has adopted a simplified notification approach for plug-in solar systems operating below 800 W. Customers are generally required to notify the distribution network operator, but the overall process is designed to minimise administrative burden. Austria has also supported deployment through broader renewable energy incentives and favourable taxation arrangements. Like Germany, Austria treats plug-in solar as a low-capacity technology intended primarily for self-consumption rather than significant electricity export.

The Austrian experience demonstrates that simplified registration processes can coexist with appropriate safety controls, provided device certification requirements and customer guidance arrangements are clearly defined.

4.4 France

France has adopted a more cautious approach in certain areas, particularly regarding electricity export. Plug-in solar systems are generally permitted for self-consumption purposes, but additional requirements may apply where customers wish to export electricity to the network. In some circumstances a dedicated process or professional certification may be required before export is permitted. France has also developed guidance documentation addressing safe installation practices and consumer responsibilities.

The French approach highlights an important distinction observed across Europe: while plug-in solar systems are generally viewed as small-scale consumer technologies, network export is often treated separately and may require additional compliance measures.

4.5 Lithuania, Sweden and Hungary

Several smaller European jurisdictions such as Lithuania have adopted relatively simple registration or notification frameworks. These countries generally permit qualifying systems up to 800 W and place significant emphasis on product compliance and customer self-installation.

Unlike Germany and the UK, which have introduced dedicated frameworks for plug-in solar, Sweden and Hungary have adopted a more precautionary approach, citing concerns relating to electrical safety, installation standards and the suitability of existing regulatory frameworks.

Key Lessons for Ireland

The European review identified several consistent themes relevant to the Irish assessment:

- **An 800 W inverter limit is the predominant European threshold** for plug-in solar technologies.
- **Registration or notification requirements are common across most jurisdictions**, although these processes are typically designed to be simple and customer friendly.
- **Product certification and standards compliance are increasingly used as primary safety controls**, reducing reliance on complex network approvals.
- **Plug-in systems are primarily self-consumption technologies**, with generally limited exports to the electricity network.
- **Battery integration is becoming more common**, with several jurisdictions now incorporating plug-in storage technologies into their regulatory frameworks.
- **Germany remains the leading reference jurisdiction**, providing valuable lessons regarding registration, standards development, customer behaviour and market growth. However, this is with a compliance on registration rate that could be below 20% (see 4.1).

Overall, the European experience demonstrates that plug-in solar technologies can be accommodated within structured arrangements that balance customer accessibility, safety, product compliance and network visibility. Although approaches vary, the evidence reviewed by the Working Group points toward simplified customer processes supported by robust technical standards and registration arrangements. Differences in domestic socket and circuit arrangements across jurisdictions also reinforce the need to assess how plug-in technologies would interact with Irish installations.

5. Product Standards and Product Specification Introduction

5. Product Standards and Product Specification Introduction

A recurring theme throughout the Working Group's assessment has been the need to distinguish between product requirements, network-facing device compliance and customer registration. These are related, but they serve different purposes within any future plug-in solar framework.

This section considers the product requirements and conformity evidence necessary to determine which plug-in solar devices may qualify for use under the proposed Irish framework. These requirements may be established through an Irish standard or specification, or through recognition of products demonstrated to comply with an appropriate existing specification such as the UK IPS. The separate ESB Networks requirements for device registration, LCT validation and customer notification are addressed in Section 6.

The publication of the UK Government Response and Interim Product Specification (IPS) reinforced this distinction. The UK IPS was introduced as an interim product requirement to support deployment while longer-term standards arrangements continue to evolve under the Institution of Engineering and Technology (IET) and British Standards Institution (BSI).

The Working Group identified that an agreed product-requirements framework would be required regardless of the installation pathway selected. Alternatively, the framework could negate the requirement of a separate Irish product specification, provided that suitable conformity evidence can be recognised and any Irish-specific controls can be applied. It is worth noting that product compliance confirms the device requirements, but not the suitability of deploying the device in an individual Irish electrical installation.

Following discussions with NSAI senior standards management, three potential NSAI standards-development pathways were identified, together with a fourth policy pathway based on recognition or acceptance of products demonstrated to comply with the UK IPS.

1. **Irish Standard Specification (I.S.)**
2. **Standard Recommendation (S.R.)**
3. **SWiFT (Specification Written in Fast Track)**
4. **Recognition or acceptance of products demonstrated to comply with the UK Interim Product Specification (IPS)**

5.1 Purpose of a Product Specification or Standard

A product specification or standard would:

- Define minimum product safety requirements.
- Specify plug and socket arrangements.
- Define mitigation measures to reduce risk of electric shock.
- Define inverter and interface requirements.
- Address environmental and mechanical considerations.
- Support market surveillance and product compliance.
- Provide confidence to customers, installers, distributors, regulators and network operators.

It would also provide a common reference point for manufacturers seeking approval to connect products within Ireland.

5.2 Potential Pathways for Standard Development

Several approaches could be used to introduce a product specification or product standard in Ireland.

Standards Pathway 1 – Irish Standard Specification (I.S.)

An Irish Standard Specification (I.S.) is a formal national standard developed and published by NSAI in accordance with the National Standards Authority of Ireland Act 1996.

Development of an I.S. follows the full standards-development process, including stakeholder engagement, committee review, national consultation and formal approvals. This provides the highest degree of governance and consensus but also represents the longest delivery timeline. A request for an I.S. needs to be approved by NSAI management, the Department of Enterprise, Trade and Employment (DETE) and the NSAI board.

Advantages

- Formal Irish standard.
- Strong stakeholder engagement and consensus process.
- Highest level of governance and transparency.

Challenges

- Significant resource requirements.
- Specialist expertise required.
- Reliant on availability of volunteer expertise.
- Multi-year development timeline (1.5-3 years).
- May result in requirements that differ from larger UK and European markets.

Timelines

- 18–36 months following project approval.
- Publication approximately Q2–Q3 2028.

Given the relatively small size of the Irish market, manufacturers may be unlikely to develop products specifically for a uniquely Irish standard. As a result, any product specification or standard that differs significantly from established international or neighbouring market requirements could present challenges for market adoption, product availability and manufacturer participation.

Standards Pathway 2 – Standard Recommendation (S.R.)

A Standard Recommendation (S.R.) is a specification produced by NSAI that does not require approval from DETE but does undergo a public consultation process. A standard recommendation is not required to be issued under the NSAI seal, it is optional. A Standard Recommendation also does not have the status of an Irish Standard Specification.

Although the governance arrangements differ slightly from a full Irish Standard, the development steps remain broadly similar. The developed S.R. would act as the required specification while longer-term Irish standards arrangements are being considered.

Advantages

- Produced through NSAI processes.
- Public consultation included.
- Reduced administrative burden.

Challenges

- Similar delivery timeline to an Irish Standard Specification.
- Requires committee formation and technical expertise.
- Does not provide a significant acceleration compared with an I.S.

Standards Pathway 3 – SWiFT (Specification Written in Fast Track)

A SWiFT is a documented agreement developed through an NSAI workshop process based on stakeholder consensus. Unlike an Irish Standard Specification or Standard Recommendation, a SWiFT does not undergo public consultation and is specifically intended to provide an accelerated route for documenting technical requirements. The developed SWiFT would act as the required specification while longer-term Irish standards arrangements are being considered.

Advantages

- Fastest formal NSAI pathway.
- Facilitates rapid stakeholder consensus.
- Can provide an interim framework while longer-term standards are developed.
- Gives Ireland complete control over technical requirements.
- Can draw substantially on the technical requirements and evidence contained in the UK IPS.

Challenges

- No public consultation process.
- Does not have the status of an Irish Standard Specification.
- Requires appropriate technical expertise and stakeholder participation.
- Divergence from the UK IPS could create additional certification requirements and potentially reduce product availability.
- Development of the SWiFT may be completed once the Irish Safety Assessment outputs become available to the technical experts.

Indicative Timeline:

- Approximately three months following project approval.
- Earliest publication potentially in Q1 2027 but is interdependent on the output of the Irish Safety Assessment.

Standards Pathway 4: Recognition or acceptance of products demonstrated to comply with the UK Interim Product Specification

Under this approach, Ireland would recognise or accept products demonstrated to comply with the UK Interim Product Specification as an interim product-requirements pathway, while longer-term Irish standards arrangements are being considered.

Advantages

- Access to an already developed specification.
- Avoids duplicating testing already undertaken for the neighbouring market.
- Reduces manufacturer conformity-assessment and documentation costs.
- Increases the likelihood that manufacturers will supply Ireland.
- Supports common products across Ireland, Great Britain and potentially Northern Ireland, subject to the applicable legislative arrangements.
- Reduces the risk of divergence during the interim period.
- Provides access to an established product traceability and compliance evidence base.
- Allows Irish resources to focus on installation safety, customer behaviour and implementation controls.

Challenges

- Ireland would have limited control over future amendments to the UK IPS.
- A process would be required to monitor new IPS versions and determine whether recognition continues automatically or requires review.
- The IPS includes UK-specific legislative, plug, network and standards references.
- Acceptance of UK conformity evidence would require a defined competent authority or decision-maker.
- Product compliance would not demonstrate the suitability of an individual Irish electrical installation.
- A route would be required for suspending or removing products where safety concerns arise.
- The legal status of recognised IPS compliance in Ireland would need to be clarified.

5.3. Working Group Position

The Working Group recognises that an agreed product-requirements framework will be required, regardless of the installation option selected. NSAI also noted the following points:

- NSAI does not currently have in place a committee of suitably qualified experts that can be drawn on to develop a standard. The above timelines are on the assumption that the formation of a committee is straightforward.
- While the UK IPS could be used as a basis, there would still be considerable work in verifying the requirements of that deliverable and their relevance to Ireland, ensuring where the UK document makes references to UK-only provisions (e.g. G98) and legislation, that either equivalent Irish provision exists and are applicable, or where omitted it does not diminish the effectiveness of the document.
- NSAI has received guidance from its own experts and statements from experts in the United Kingdom on the risks associated with the use of plug-in solar PV on existing final circuits. NSAI also noted that as of July 2026 that there has been no study or research undertaken in Ireland on the use of plug-in solar PV in Irish electrical installations to date.

- Delivery of a product specification from NSAI would be contingent on it including strong disclaimers that conformity with the document does not guarantee the safety of the electrical installation and that serious risk of electrocution, fire, injury etc exist.
- Standards/specifications are non-statutory by themselves. The UK IPS is referenced in a statutory instrument and on that basis, it becomes enforceable that systems placed on the UK market must be in accordance with the IPS. In Ireland the publication of a product specification would need to be supported by appropriate references to it, such as the ESB Networks Low Carbon Technology Register[1], or a statutory instrument.

Preferred Pathway

The Working Group identified Pathway 3 (SWiFT) and 4 (Recognition or acceptance of products demonstrated to comply with the UK Interim Product Specification) as the most expedient ways of developing a product standard framework. Following consideration of the available pathways, the Steering Group agreed that Pathway 3: SWiFT specification should be progressed as the preferred Phase 1 product-specification pathway, providing an accelerated route to establishing product requirements for the Irish market. The Steering Group further agreed that the development of a formal Irish Standard Specification should be considered as the longer-term Phase 2 objective, informed by operational experience, the findings of the Irish Safety Assessment and evolving international standards activity.

The Working Group recommends that DCEE and NSAI commence preparations for the development of a SWiFT specification, informed by the findings of the Irish Safety Assessment and, where appropriate, drawing upon the technical content of the UK Interim Product Specification and other relevant international requirements.

Fallback Pathway

The Working Group also advised that Pathway 4, recognition or acceptance of products compliant with the UK Interim Product Specification (IPS) should be further assessed as an alternative or fallback pathway for developing product requirements for Ireland during Phase 1.

The fallback pathway should be activated only where it becomes evident that the SWiFT cannot be completed within the required programme timeframe, cannot establish a practicable product conformity route, would result in requirements that materially restrict manufacturer participation or product availability, or would otherwise prevent delivery of the intended plug-in solar framework. Any decision to activate Pathway 4 should be made by the Steering Group, informed by advice from DCEE, NSAI and the Working Group.

The Working Group agreed that the findings of the Irish Safety Assessment and Legislative Review should inform any Irish-specific requirements, safeguards or implementation measures necessary to support the acceptance of UK IPS-compliant products in Ireland.

Long Term Solution

The Working Group recommends that planning for a longer-term Irish Standard pathway (Pathway 1) should continue in parallel with the SWiFT process to support the establishment of an enduring product standards framework for plug-in solar technologies in Ireland, informed by operational experience, evolving international standards activity and the outcomes of the Irish implementation programme.

1 Low Carbon Technology (LCT) register | ESB Networks

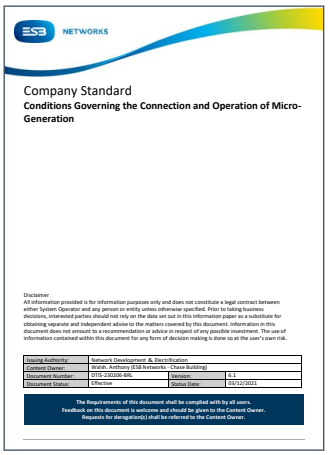
6. ESB Networks Requirements for Plug-in Technologies

6. ESB Networks Requirements for Plug-in Technologies

In parallel with the Working Group's assessment of product standards and wider safety considerations, ESB Networks has identified the network-facing requirements needed to support plug-in solar and plug-in battery technologies. This section focuses on the role and remit of ESB Networks in facilitating the introduction of plug-in solar, namely: updating microgeneration connection requirements, maintaining visibility of connected devices, validating devices through the LCT Register and developing a simple customer registration process.

It is important to note that ESB Networks is not responsible for technical and safety standards for electrical equipment or wiring standards within customers' premises (i.e. behind the meter). Its remit extends to the technical and safety requirements for the distribution network up to the meter.

6.1 Micro Generation Standards Update


ESB NETWORKS

Company Standard

Conditions Governing the Connection and Operation of Micro-Generation

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Issuing Authority:	Network Development & Electrification		
Content Owner:	Walsh, Anthony (ESB Networks - Chase Building)		
Document Number:	DTS-230206-BRL	Version:	8.1
Document Status:	Effective	Status Date:	03/12/2021

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Feedback on this document is welcome and should be given to the Content Owner.
Requests for deragation(s) shall be referred to the Content Owner.

ESB Networks has initiated a review of its existing Microgeneration Standard – **Conditions Governing the Connection and Operation of Micro Generation**[1] to determine the amendments required to accommodate plug-in solar and plug-in battery technologies. The review has been categorised as a major document revision, and a dedicated ESB Networks resource has been assigned as content owner for the update. The intention is to prioritise plug-in solar requirements within the current standards review programme in line with the Working Group's objective of accelerating a pathway for implementation.

The revised standard will need to address issues arising from plug-in technologies, including:

- Eligibility requirements for qualifying plug-in devices.
- Maximum permitted devices, inverter ratings and associated technical thresholds.
- Interface protection and anti-islanding requirements.
- Registration and notification obligations.
- Approved device requirements.
- Customer responsibilities and compliance obligations.
- Interaction with existing microgeneration installations.

The standard revision will also consider developments from the United Kingdom through ESB Networks' membership of the Energy Networks Association (ENA), and from European standards bodies, to align the Irish framework with international good practice and avoid unique national requirements where possible.

The revision of the standard was initiated in June 2026 and it is anticipated that the updated version will be published in October, subject to approval.

1 Conditions Governing the Connection and Operation of Micro-Generation

6.2 Device Compliance and the Low Carbon Technology (LCT) Register

Internationally, a growing number of jurisdictions rely on approved product lists or compliant device registers to ensure that only equipment meeting the appropriate technical requirements is connected to customer premises.

ESB Networks proposes that any simplified plug-in solar process should be supported by a compliant device register through the existing Low Carbon Technology (LCT) Register[1]. The LCT Register would operate as a network-facing control, validating that eligible devices meet the relevant connection and interface requirements before they are selected within the customer registration process. Product safety and product-standard requirements are addressed separately in Section 5.

The proposed LCT approach would support:

- Verification of compliant devices prior to registration.
- Improved customer confidence in products purchased.
- Enhanced visibility of technologies connected to the distribution network.
- Reduced risk from non-compliant or counterfeit products.
- Future automation of registration and compliance validation processes.

This mirrors the principle used in the UK framework, where compliant products are linked to registration arrangements. In Ireland, the LCT Register would provide the ESB Networks mechanism for approved-device validation, while the customer registration process described in Section 6.3 would provide installation-level visibility.

6.3 Registration Process

The Working Group identified customer registration as one of the most important implementation requirements. While Section 6.2 addresses approved-device validation through the LCT Register, this section focuses on the customer-facing process for notifying ESB Networks that a qualifying plug-in device has been installed at a specific premises.

ESB Networks has developed a proposal for a simplified digital registration process that would allow customers to register plug-in solar and plug-in battery technologies directly with ESB Networks. The process would be customer-led, completed online prior to energisation, and linked to the approved-device arrangements maintained through the LCT Register.

The process would capture information such as:

- Customer Name.
- MPRN.
- Address.
- Contact details.
- Device reference and model.
- Rated output.
- Confirmation of any existing microgeneration installation.
- Declaration of compliance with applicable requirements.

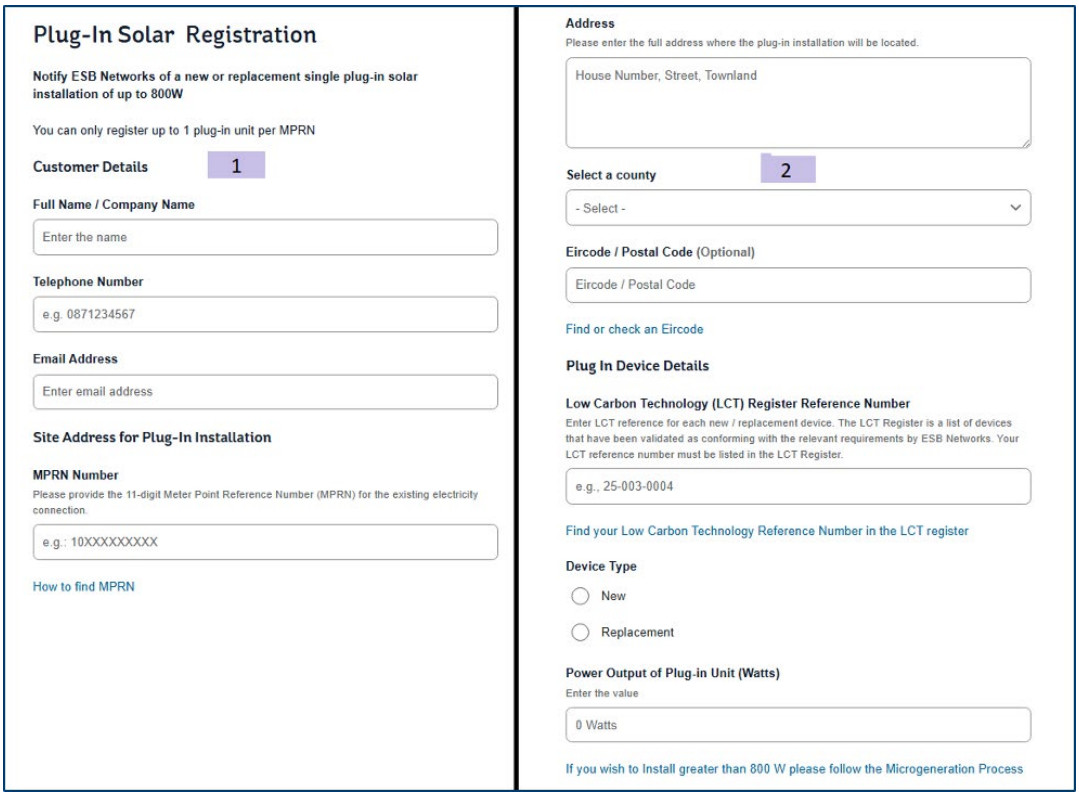
1 Low Carbon Technology (LCT) register | ESB Networks

The objectives of registration are to:

- Maintain visibility of connected generation technologies and where they are located on the network.
- Support the safe operation and management of the distribution network by providing visibility of connected generation and enabling appropriate operational, planning and fault response activities.
- Improve network planning and asset management.
- Facilitate climate action and technology reporting.
- Allocate customers a Maximum Export Capacity (MEC) to enable payment for exported electricity under the existing Clean Export Guarantee (CEG)[1] arrangements.
- Support future policy development and market evolution.

The Working Group concluded that registration should be mandatory but straightforward, with minimal customer burden. This approach balances ease of adoption with the need for network visibility, approved-device validation and future reporting.

Figure 2: ESB Networks registration webform



Together, the ESB Networks microgeneration standards update, LCT Register and customer registration process provide the network-facing implementation layer for plug-in technologies. These arrangements should be read alongside the product-standard pathway described in Section 5 and the safety assessment considerations described in Section 7.6.

1 Clean_Export_Guarantee-Enduring_Arrangements_to_Remunerate_Customers_for_Microgenerati.pdf

6.4 Export Tariff Considerations

CRU's decision CRU202454 [1] sets out the regulatory policy surrounding the remuneration for exported electricity from microgeneration. Of particular relevance to eligibility is the criterion that a renewables self-consumer:

> **"must have installed a suitable generator and have fully completed the appropriate application process via ESBN (e.g. NC6/NC7/NC8/NC5) such that their account has the final MEC registered on the Central Market System (CMS)"**

The overarching principle is that customers with microgeneration who formally notify ESB Networks of their installation are eligible for remuneration via the CEG mechanism, subject to meeting all other criteria. Plug-in solar installations are already eligible within the scope of the existing regulatory framework.

The Working Group considered whether plug-in solar technologies should be eligible for export remuneration under a simplified registration framework. Analysis presented to the Working Group indicated that plug-in solar systems are predominantly self-consumption technologies[2], with varying self-consumption rates depending on location and usage patterns[3]. This is in line with the original CRU consultation paper on the interim CEG (CRU21117) which stated that:

> **"Electricity customers who install renewable generation on their own site or premises for the primary purpose of meeting some, or all, of their own electricity demand, may have surplus electricity which exceeds their demand and is exported to the electricity network from time to time".**

The Working Group noted that the primary financial benefit for customers arises from reducing imported electricity consumption rather than receiving export payments. However, given the existing regulatory arrangements that are in place for export remuneration, exports from customers with plug-in solar should not be unfairly discriminated against by denying them payment for their export but rather be treated in line with other types of microgeneration. Furthermore, as outlined above, the Working Group identified registration as one of the most important requirements for the successful introduction of plug-in technologies. Putting in place arrangements for paying customers for exports is central to incentivising customers to register plug-in devices.

ESB Networks is currently exploring an appropriate and practical pathway for this incentive to be developed while maintaining customer simplicity. ESB Networks is committed to putting in place a mechanism to ensure that plug-in customers who register their device with ESB Networks through any new registration process will receive payments for exports, in line with existing market arrangements. This work will continue until an export remuneration capability will be accommodated for plug in solar technologies.

Accordingly, the Working Group considers that the immediate priority should be the development of a safe and practical framework for the introduction of plug-in solar technologies, including standards development, product compliance and customer registration. Export remuneration accommodated via registration will be developed in parallel to ensure that existing market arrangements to remunerate customers for their export can apply for plug-in solar customers commencing as soon as plug-in solar becomes permitted in Ireland.

1 Clean Export Guarantee - Enduring Arrangements to Remunerate Customers for Microgeneration Exports | CRU.ie

2 Plug-In Solar PV - SolarPower Europe

3 Steckersolargeräte

7. Safety Considerations

7. Safety Considerations

Safety has been a central theme throughout the Working Group's assessment and has consistently been identified by NSAI, Technical Committee 2 (TC2), the CRU and other stakeholders as a primary consideration in determining how plug-in solar and plug-in battery technologies may be safely accommodated in Ireland. The Working Group has carefully considered the concerns raised internationally, including those highlighted by the Institution of Engineering and Technology (IET), and other organisations, and recognises that many of the same risks and challenges may also be relevant to Irish installations. These include considerations relating to legacy housing stock, customer behaviour, electrical protection systems, multiple device deployment and the suitability of existing installations for embedded generation and are discussed in this section.

At the same time, the Working Group recognises that plug-in solar technologies are now becoming widely available across Europe and are increasingly accessible to Irish consumers due to the legalisation of Plug in Solar in the UK. Experience from other jurisdictions, such as Germany, suggests that a highly restrictive or prohibitive approach is unlikely to prevent customers from acquiring and using such technologies. Instead, it may increase the likelihood of unregistered devices being installed without appropriate guidance, product oversight or visibility to ESB Networks. The Working Group therefore considers that the objective should be to develop a framework that promotes safe deployment rather than attempting to eliminate every conceivable risk scenario.

The Working Group acknowledges that it is neither practical nor proportionate to develop mitigation measures for every niche or highly unlikely installation scenario before introducing the technology. Instead, the focus has been on identifying the most credible risks, understanding the circumstances in which they may arise and developing practical controls, guidance and safeguards to reduce those risks to an acceptable level.

The Working Group accepts that there will be some electrical installations where the connection of a plug-in solar device may not be appropriate. Consequently, a key element of any future framework will be ensuring that customers have access to clear information and guidance to help identify when additional advice, assessment or intervention may be required. This approach is intended to support informed consumer decision-making while recognising the diverse nature of the Irish housing stock.

Accordingly, the Working Group has sought to identify practical solutions through the assessment of installation options described in Section 8, the development of an approved-device framework, the registration of compliant products as described in Section 6.1, and other appropriate safeguards. The Working Group remains committed to a solution-focused approach that balances customer benefits, safety considerations and practical implementation requirements, recognising that while no framework can completely eliminate risk, an appropriate combination of product compliance, customer guidance, registration and safety controls can support the safe adoption of plug-in solar technologies in Ireland.

7.1 Compatibility with Existing Electrical Installations

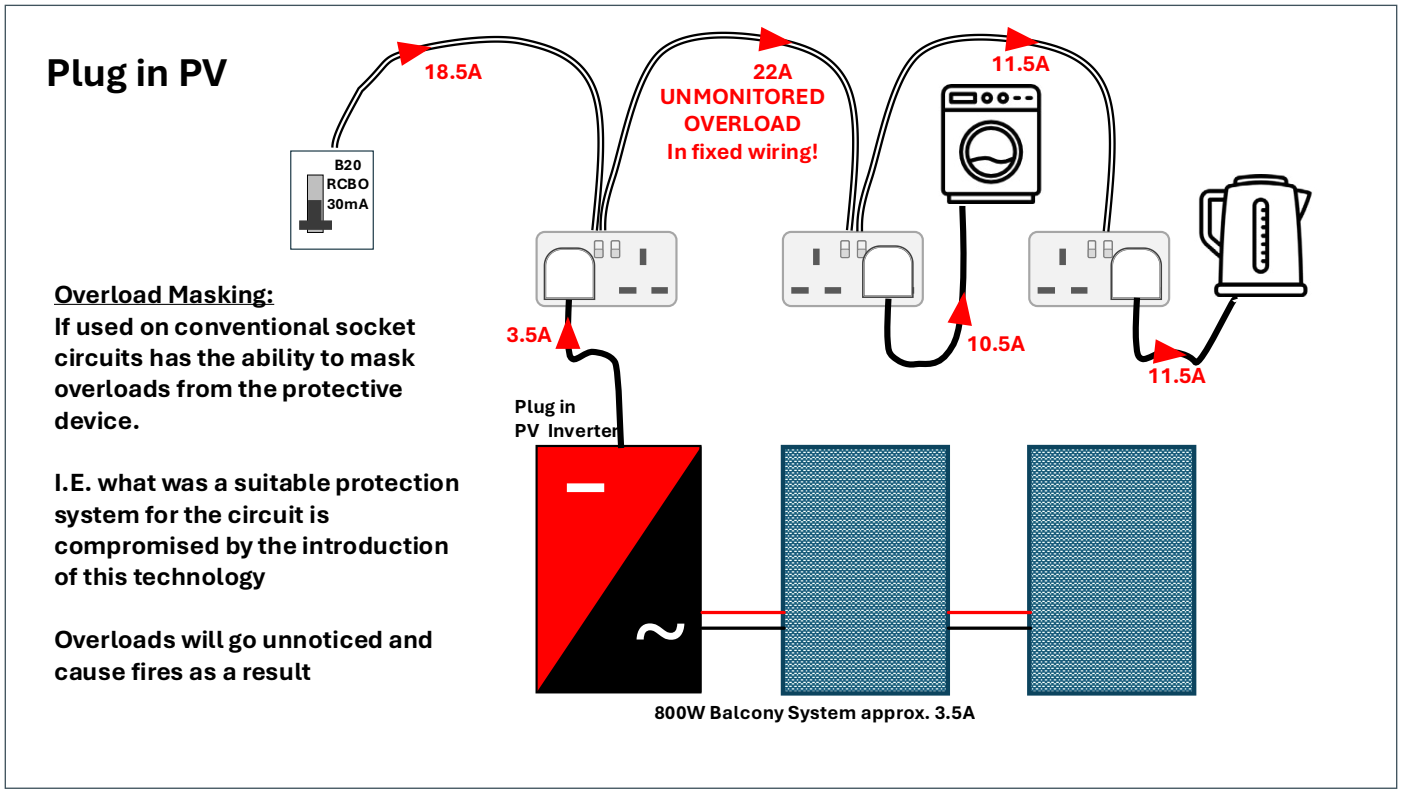
A key concern raised by NSAI and TC2 is the suitability of existing domestic wiring systems for plug-in generation. Unlike conventional electricity-consuming devices, plug-in solar systems introduce electricity into the installation and can change how current flows through circuits and protective devices. Existing installations may vary significantly in age, condition, protection arrangements and loading characteristics, creating uncertainty about the suitability of a universal plug-and-play approach.

TC2 highlighted that product certification can provide assurance about the device itself but does not confirm that the electrical installation into which it is connected is suitable for generation equipment. Particular concern was expressed about older installations, unknown circuit loading conditions and existing protection arrangements.

7.2 Thermal Overload and Circuit Loading

One of the most frequently discussed concerns was thermal overload within final circuits. TC2 highlighted scenarios where plug-in solar generation could mask existing electrical loads and result in circuit currents differing from those anticipated when the circuit was originally designed. In some circumstances this could cause overheating of conductors, accessories or connections, particularly where circuits are already heavily loaded.

Figure 3: Ring Circuit Thermal Overload Scenario

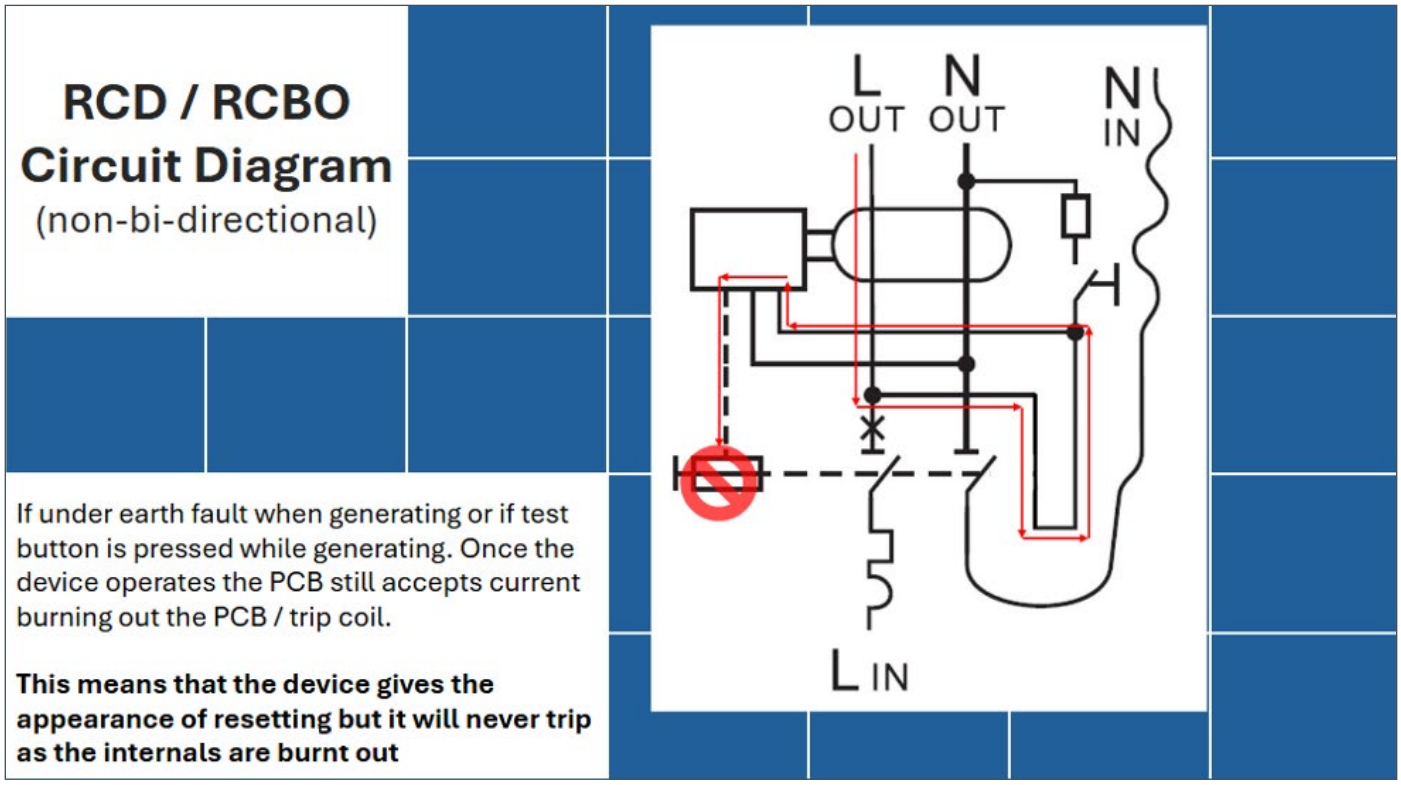


Although the extent of this risk remains the subject of international debate, both TC2 and UK safety organisations treated thermal loading and overload masking as important issues requiring careful consideration. Electrical Safety First raised similar concerns in the United Kingdom and identified overload and fire risks as primary challenges associated with unrestricted plug-in generation.

7.3 Protection Devices and Reverse Power Flow

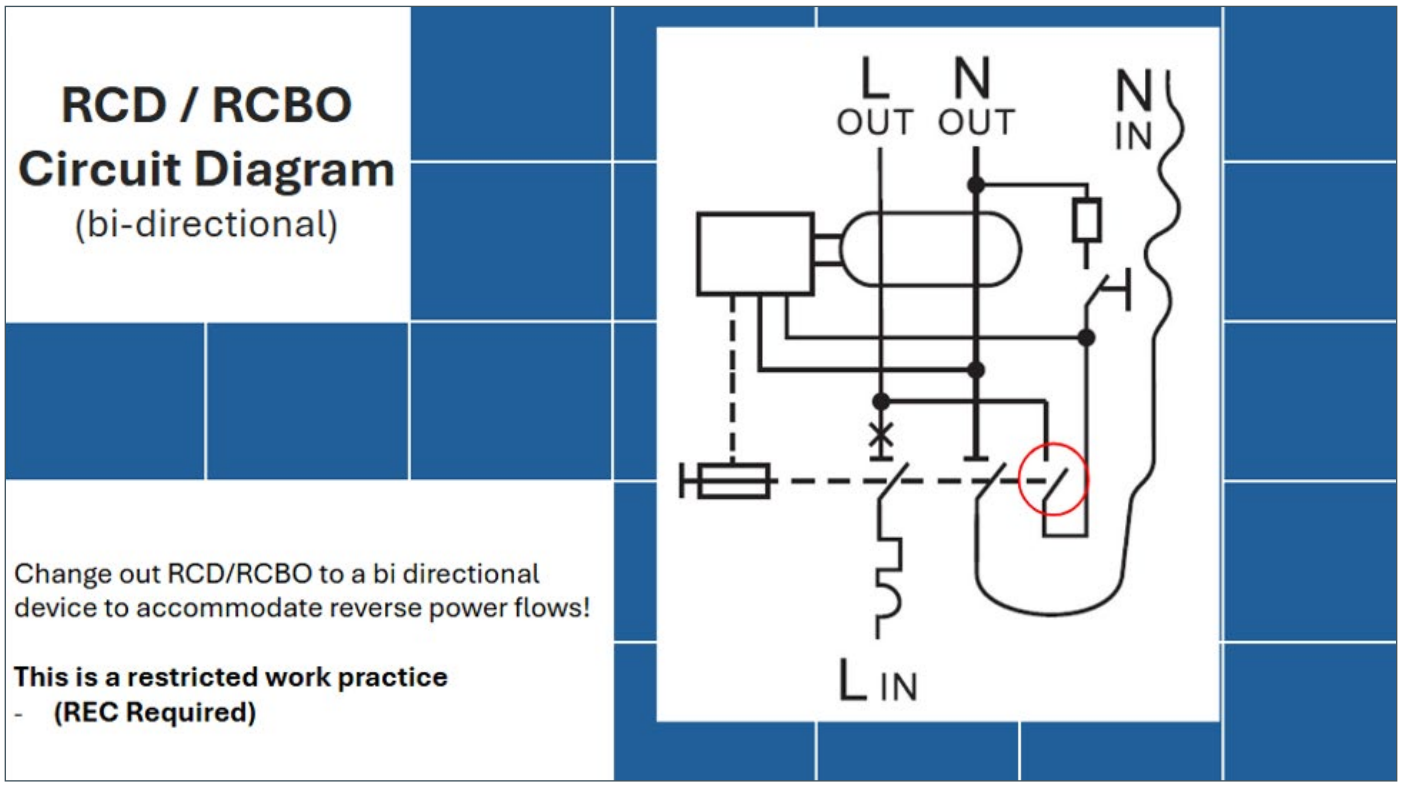
A further area of concern relates to the operation of protective devices under reverse power flow conditions. Discussions during workshops highlighted the possibility that some residual current devices (RCDs), residual current circuit breaker with overcurrent protection devices (RCBOs) or other protective equipment may not have been designed with embedded generation connected through final circuits in mind. The figures below model protection setup in an electrical installation on a printed circuit board (PCB).

Figure 4: Protection Schematic (Non Bi-Directional)



TC2 noted concerns regarding whether protective devices would continue to operate as intended following certain fault conditions involving reverse power flow. Particular attention was given to protection coordination, fault current contribution and the growing international discussion regarding bi-directional protection devices. These issues continue to be considered within evolving international standards activities and reinforce the importance of standards development prior to large-scale deployment.

Figure 5: Protection Schematic (Bi-Directional)



7.4 Extension Leads, Adaptors and Consumer Misuse

Several stakeholders observed that the behaviour of end users represents a significant factor in the safety assessment. Even where a product complies fully with applicable standards, risks may arise if customers use extension leads, multi-way adaptors or unsuitable socket outlets, or connect multiple devices in a manner not anticipated by the manufacturer.

The Working Group also considered concerns regarding the installation of multiple plug-in devices within a single property. International experience demonstrates that customers may seek to maximise generation capacity by installing additional units, potentially increasing risks associated with circuit loading, export management and product misuse. In line with the ENA's position, the UK framework permits one plug-in solar unit per premises.

ESB Networks will specify that only one unit per MPRN will be allowed, detailed in the revised microgeneration standard and communicated via the plug in registration process. The UK Government Response issued by DESNZ appears to contradict the ENA's position as it alludes to the possibility of one unit per circuit. There is a risk that customers may misinterpret or ignore these restrictions which may be partially mitigated by clear customer guidance information.

7.5 CRU and Regulatory Perspective

The CRU advised the Working Group that plug-in solar technologies do not currently fall within the category of restricted electrical works and that no direct regulatory prohibition preventing their use had been identified within the current legislative framework. However, CRU also highlighted that any Registered Electrical Contractor involved in the installation of such equipment must continue to comply with applicable national standards and wiring rules.

This distinction became important during the assessment, as it showed that the principal challenge is not necessarily regulation, but standards compatibility, customer safety and implementation design.

7.6 Safety Assessment

While no stakeholder identified a direct regulatory barrier preventing the introduction of plug-in solar and plug-in battery technologies, all parties agreed that safety must remain the primary consideration. This section brings together the key safety considerations identified by the Working Group and explains why a dedicated Irish safety assessment is recommended before finalising any implementation framework.

The Working Group reviewed the electrical safety study commissioned by the UK Department for Energy Security and Net Zero (DESNZ). The study provides a valuable evidence base on compliant plug-in solar products and representative UK domestic electrical installations and informed the UK's decision to proceed with a plug-in solar framework. However, it was undertaken in the context of UK electrical installations, standards and regulatory arrangements and cannot be directly transposed into Ireland without further assessment.

The Working Group therefore considers that an Ireland-specific safety assessment should be undertaken to provide an evidence-based understanding of how plug-in solar technologies interact with Irish domestic electrical installations. The assessment should address Irish housing stock, protection arrangements, legacy installations, customer-use scenarios and the circumstances in which professional electrical advice or intervention may be required.

The objective of the assessment would not be to duplicate the UK study, but to build on it by testing the relevance of its findings against Irish-specific conditions and identifying any additional safeguards required for safe and proportionate deployment in Ireland.

Safety Study Objectives

The assessment should:

- Evaluate the suitability of plug-in solar technologies for use within representative Irish domestic electrical installations.
- Assess safety risks associated with both compliant products and existing electrical installations.
- Identify any Irish-specific considerations not addressed by the UK study.
- Support the development of customer guidance and educational material.
- Inform future standards, product-specification and policy decisions.
- Identify circumstances where engagement with a Registered Electrical Contractor (REC) should be recommended or required.
- Provide an independent evidence base for future implementation decisions.

Proposed Safety Study Deliverables

- Technical Safety Report.
- Irish Housing and Installation Assessment.
- Risk Register.
- REC Decision Framework.
- Customer Guidance Package.
- Customer Suitability Assessment Framework (Green / Amber / Red categorisation approach).
- Future Policy and Standards Recommendations.

An Irish safety assessment would provide Government, regulators, standards bodies and network operators with an independent evidence base to support future decisions. It would also help ensure that any future plug-in solar framework is proportionate, evidence-led and appropriate for Irish electrical installations, taking account of the I.S. 10101 considerations outlined in Section 9 while supporting the safe adoption of new renewable energy technologies.

The Steering Group reviewed and endorsed the proposal for an Ireland-specific safety assessment, recognising that the findings will play a critical role in informing future decisions on installation pathways, product requirements, customer guidance and the overall implementation framework for plug-in solar in Ireland.

8. Installation Options Analysis

8. Installation Options Analysis

A key objective of the Working Group was to identify a practical pathway for introducing plug-in solar and plug-in battery technologies in Ireland while balancing safety, customer accessibility, standards compliance and implementation complexity. While there was broad support for facilitating these technologies, stakeholders recognised that a range of approaches could be adopted, each with differing implications for customers, standards and electrical safety.

To support a structured assessment, the Working Group developed a weighted evaluation framework to compare potential implementation pathways. The assessment considered:

- Safety risk.
- Standards and regulatory impacts.
- Customer accessibility.
- Customer cost.
- Complexity of implementation.
- Level of controls required.
- Delivery timelines.

The assessment was informed by evidence gathered throughout the project, including European experience, UK developments, Irish wiring rules, safety assessments, regulatory considerations and operational requirements identified by ESB Networks. The Working Group also recognised that plug-in solar products are already available to consumers and that any solution must be both practical and deliverable. The working group explored the options of an outright ban (which they have done in Sweden and Hungary[1]) which is unlikely to be acceptable by the Government or the general public. The option of being passive and simply allowing the technology to creep in without any controls was also rejected.

Four potential implementation pathways were subsequently developed and assessed. These ranged from dedicated installation arrangements requiring electrical contractor involvement through to a consumer-led plug-and-play model. Each option sought to address the same fundamental challenge: how to facilitate a consumer-connectable generation product while ensuring the safe operation of both the public low-voltage network and the customer's electrical installation.

The four options assessed were:

- **Option 1A – Dedicated Circuit with Dedicated Socket:**
  A dedicated circuit installed by a Registered Electrical Contractor (REC), incorporating a dedicated socket arrangement specifically intended for plug-in generation.
- **Option 1B – Dedicated Circuit with Standard Socket:**
  A dedicated circuit installed by a Registered Electrical Contractor (REC), utilising a standard socket outlet while maintaining dedicated protection and installation requirements.
- **Option 2 – Designated Existing Circuit with REC Assessment:**
  An existing circuit within the property is assessed by a Registered Electrical Contractor (REC) and advised as suitable for connection of a plug-in solar device without the need for a new dedicated circuit.
- **Option 3 – Plug-and-Play:**
  A consumer-led approach allowing connection of a qualifying plug-in solar device without prior electrical assessment, relying primarily on product standards, customer guidance and registration requirements.

1 Solar_Power_Europe_Plug_in_Solar_PV_Briefing_Paper_20250312_V02_6dbb591d88.pdf

The following sections summarise each option considered by the Working Group, including the advantages, disadvantages, risks and implementation requirements associated with each approach.

8.1 Option 1A – Dedicated Circuit with Dedicated Socket

Option 1A represents the most controlled of the four implementation pathways assessed by the Working Group. Under this approach, a dedicated electrical circuit would be installed by a Registered Electrical Contractor (REC) specifically for the connection of a plug-in solar or plug-in battery device. The circuit would incorporate a dedicated socket or connection arrangement intended solely for the connection of approved plug-in generation equipment. The customer would not be capable of misuse by connecting to an existing general-purpose socket circuit. It is envisioned that plug and socket would have a non-standard design, these are manufactured to existing standards but are uncommon and used where interchangeability with general sockets can cause problems (e.g., Uninterruptible Power Supply, Isolated Power Supply, IT supplies etc).

Figure 6: Representation of a Non-Standard Plug and Socket



Figure 7: Option 1A Dedicated Circuit With a Non-Standard Plug and Socket



This option is broadly aligned with traditional electrical installation principles and reflects the preference expressed by a number of electrical safety stakeholders that generation equipment should be separated from normal domestic socket circuits. It also aligns most closely with the existing requirements contained within I.S. 10101 regarding dedicated connections for generating equipment.

Advantages

- Provides a high degree of certainty regarding circuit suitability and installation quality.
- Ensures that the circuit has been specifically designed and installed to accommodate generation equipment.
- Minimises concerns relating to circuit loading, reverse power flow and existing installation condition.
- Aligns closely with existing wiring-rule principles and established electrical installation practices.
- Provides a clear boundary between plug-in generation equipment and conventional domestic appliances.
- Prevents customers from connecting the device into another socket.
- Requires no amendment to Wiring Rules 10101.

Disadvantages

- Represents the highest level of intervention and customer effort of all options considered.
- Requires engagement of a Registered Electrical Contractor before installation can occur.
- Requires installation of a new dedicated circuit and dedicated socket infrastructure.
- Significantly increases the total cost to the customer relative to the cost of the plug-in device itself.
- May reduce the attractiveness of plug-in solar as a simple and accessible consumer technology.

Risks

- Additional installation costs may discourage customer participation and reduce technology uptake.
- Customers may seek to bypass the formal process by purchasing products directly from international suppliers and installing them without following the approved pathway.
- The approach may be viewed as inconsistent with the simplified frameworks being introduced in parts of Europe and under consideration in the United Kingdom.
- Dedicated socket arrangements could create product compatibility challenges if not aligned with developing European and UK standards.

Implementation Requirements

Implementation of Option 1A would require:

- Installation of a dedicated circuit by a Registered Electrical Contractor.
- Installation of a dedicated socket or approved connection arrangement for plug-in generation.
- Development of a product standard for a dedicated socket and plug.

Indicative Delivery Considerations

While Option 1A offers a highly controlled and technically robust solution, it introduces additional installation requirements and customer costs that differ significantly from the consumer-led plug-in solar model that has emerged in Germany and is emerging in the UK.

The development of a dedicated Irish product standard would represent a significant undertaking for NSAI, requiring specialist technical expertise, stakeholder engagement, standards committee activities and industry consultation. Given the relatively small size of the Irish market compared to the wider European and UK markets, it is unlikely that manufacturers would develop products with non-standard plugs to meet a unique Irish standard. Therefore, it is likely this option is unviable.

Timelines

The NSAI has indicated that development of an Irish Standard Specification or Standard Recommendation is likely to take approximately 18-36 months following project approval. However, having regard to the approach adopted in the UK, the Working Group concluded that this option is unlikely to be viable, as manufacturers are unlikely to develop a product specifically for the Irish market.

Whilst this was the initial approach taken in Germany; they have since altered to allow standard sockets.

8.2 Option 1B – Dedicated Circuit with Standard Socket

Option 1B requires the installation of a dedicated circuit by a Registered Electrical Contractor (REC), specifically for the connection of a plug-in solar or plug-in battery device. Unlike Option 1A, the dedicated circuit terminates in a standard socket outlet rather than a dedicated plug-in generation socket. The plug-in device would therefore connect using a conventional socket arrangement, while still benefiting from a dedicated circuit and dedicated protection.

Figure 8: Option 1B Dedicated Circuit with a Standard Socket



This option sought to retain many of the safety benefits associated with a dedicated circuit while avoiding the complexity and potential market restrictions associated with introducing a new dedicated socket standard. During the Working Group assessment, this option was viewed as providing a practical balance between safety, customer familiarity and ease of implementation.

Advantages

- Provides a dedicated circuit specifically designed to accommodate generation equipment.
- Retains the involvement of a Registered Electrical Contractor, providing a high degree of confidence regarding installation suitability and compliance.
- Avoids many of the uncertainties associated with existing domestic circuits and legacy wiring installations.
- Uses standard socket technology that is already readily available and familiar to customers and contractors.
- Avoids the need to introduce a new dedicated socket standard or product ecosystem.
- Aligns more closely with existing installation practices than a pure plug-and-play approach.
- Potentially a dedicated circuit may already exist in the home electrical installation in some cases.
- Potentially could avoid an update of the Wiring Rules I.S. 10101 as this is not a final circuit.

Disadvantages

- Requires a Registered Electrical Contractor to undertake installation works before the device can be connected.
- By avoiding the update of the wiring rules, the REC can install the dedicated circuit but is not responsible for plugging in the device as this is not defined as controlled works.
- Results in additional customer costs associated with electrical works and certification.
- May reduce some of the simplicity and convenience that consumers associate with plug-in solar products.

Risks

- Customers may perceive the requirement for electrical works as inconsistent with the "plug-in" nature of the technology.
- The additional installation cost may reduce customer adoption compared with simpler approaches being considered elsewhere in Europe.
- A risk arises if the plug-in solar device is connected elsewhere on the installation, bypassing the safety assumptions on which the dedicated circuit approach is based.
- If future international standards move towards a simpler consumer-led model, the approach may ultimately prove more restrictive than necessary.

Implementation Requirements

Implementation of Option 1B would require:

- Installation of a dedicated circuit by a Registered Electrical Contractor (REC).
- Provision of a standard socket outlet connected solely to that dedicated circuit.
- Inspection and testing of the installation following completion of the electrical works.
- Development of guidance and certification requirements for Registered Electrical Contractors.
- Alignment with any future amendments to wiring standards and product standards.

Indicative Delivery Considerations

Option 1B was considered by the Working Group to provide a favourable balance between safety, practicality and deliverability. While it does introduce additional customer cost through the requirement for a dedicated circuit, it avoids many of the standards and safety concerns associated with connecting generation directly to existing domestic circuits. The use of a standard socket also reduces complexity when compared with introducing a dedicated socket type or connection standard.

Timelines: Reliant on completion of the Irish Safety Assessment, Legislative Review and Product Standard Development

The actions to revise standards, registration and compliance lists on the ESB Networks side sits in a ready position awaiting Government approval to proceed with Plug in Solar. Engagements with REC's and guidance material for homeowners can be created and issued within a number of months.

8.3 Option 2 – Designated Existing Circuit with REC Assessment

Option 2 allows a plug-in solar device to be connected to an existing circuit within a customer's installation, provided that the circuit has first been assessed and deemed suitable by a Registered Electrical Contractor (REC). Unlike Options 1A and 1B, no new dedicated circuit may be required. Instead, a competent person would inspect the existing installation, identify a suitable designated circuit and confirm that it is capable of safely accommodating the plug-in generation device. Following the assessment, the customer would be permitted to connect the device to the designated socket outlet on that circuit.

If a suitable circuit is not found the REC would need to then amend an existing circuit to make it viable for this intended use case. This may mean removing sockets from the circuit to make it dedicated, the use of bidirectional protection devices, derating MCBs and undertaking other necessary modifications.

Figure 9: Option 2 Designated Socket (Rec Involvement)



This option was developed as a compromise between the highly controlled dedicated-circuit options and a fully consumer-led plug-and-play model. It sought to reduce customer costs by avoiding the need for a new circuit while retaining professional oversight of the existing electrical installation.

Advantages

- Avoids the need to install a new dedicated circuit, reducing the amount of electrical work required.
- Retains professional assessment by a Registered Electrical Contractor, providing confidence regarding the suitability of the installation.
- Allows use of existing electrical infrastructure where it can be demonstrated to be suitable.
- Reduces customer costs compared to options requiring installation of a dedicated circuit.
- Provides greater flexibility than dedicated-circuit solutions while maintaining formal oversight.

Disadvantages

- Requires revision of the Wiring Rules as this is plugging in generation into a final circuit as detailed in Section 9.
- Requires an inspection and assessment by a Registered Electrical Contractor before connection of the device.
- Relies on professional judgement regarding the suitability of existing circuits and loading conditions.
- May lead to inconsistent outcomes depending on the condition and configuration of individual installations.
- Provides less certainty than a newly installed dedicated circuit.
- May be difficult for customers to identify or consistently use the designated socket after the assessment has been completed.
- As this is generation being installed onto a final circuit, this will likely require an update of the wiring rules.

Risks

- The designated circuit may subsequently be used differently from the assumptions made during the original assessment.
- Future changes in customer behaviour or electrical loading could alter the suitability of the assessed circuit.
- There is potential for customers to relocate the device to another socket within the property that has not been assessed.
- Additional guidance and oversight may be required to ensure continued compliance with the original assessment.

Implementation Requirements

Implementation of Option 2 would require:

- Assessment of an existing circuit by a Registered Electrical Contractor (REC).
- Identification and designation of a suitable socket outlet or circuit for connection of the device.
- Inspection and testing of the installation to confirm compliance and suitability.
- Development of assessment criteria and guidance for Registered Electrical Contractors.
- Customer guidance to ensure the device remains connected to the approved location within the installation.

Indicative Delivery Considerations

Option 2 was viewed by the Working Group as an attempt to balance safety and affordability by leveraging the existing electrical installation while retaining professional oversight. It avoids the cost and disruption associated with installing a new dedicated circuit while still addressing many of the concerns associated with unrestricted connection to existing socket outlets. However, it places significant reliance on the assessment process and on customers continuing to operate the device in accordance with the conditions of that assessment as well as the need to revise the wiring rules.

Timelines: Reliant on completion of the Irish Safety Assessment, Legislative Review and Product Standard Development

The actions to revise standards, registration and compliance lists on the ESB Networks side sits in a ready position awaiting the approval from Government to proceed with Plug in solar. Engagements with RECs and guidance material for homeowners can be created and issued within a number of months.

8.4 Option 3 – Plug-and-Play

Option 3 represents the least restrictive of the implementation pathways considered by the Working Group. Under this approach, a compliant plug-in solar or plug-in battery device could be connected by the customer directly to an existing socket outlet without the need for prior inspection by a Registered Electrical Contractor (REC) or the installation of a dedicated circuit.

The approach relies primarily on products complying with the applicable Irish product-requirements framework, expected in the first instance to be established through the NSAI SWiFT, together with ESB Networks' network requirements, approved-device arrangements, customer guidance, registration requirements and customer-use controls.

This approach is the one most closely aligned with the approach adopted by the UK Government.

Figure 10: Option 3 Plug and Play



This option is also aligned with the consumer proposition associated with plug-in solar and reflects the direction of travel being explored in Germany and through the ongoing UK consultation process. It offers customers the simplest pathway to participation, while placing greater emphasis on product design, standards compliance and customer behaviour.

This option was developed as a compromise between the highly controlled dedicated-circuit options and a fully consumer-led plug-and-play model. It sought to reduce customer costs by avoiding the need for a new circuit while retaining professional oversight of the existing electrical installation.

Advantages

- Provides the simplest and most accessible customer experience.
- Minimises customer costs by avoiding the need for electrical installation works or pre-connection inspections.
- Closely aligns with the core consumer proposition of plug-in solar technology.
- Reduces barriers to participation for renters, apartment dwellers and customers unable to install conventional rooftop solar.
- Facilitates rapid deployment once an appropriate regulatory and standards framework is in place.

Disadvantages

- Relies heavily on product standards, customer guidance and customer compliance.
- Provides no formal assessment of the suitability of the existing electrical installation prior to connection.
- May be more dependent on customer understanding of installation limitations and operating requirements.
- Provides less certainty regarding the condition of the circuit to which the device is connected.
- Places greater responsibility on the consumer.

Risks

- Customer use of extension leads, adaptors or unsuitable socket outlets may reduce the effectiveness of the intended safety controls.
- Multiple devices connected within a single property could result in operation outside the assumptions underpinning the simplified framework.
- Older or poorly maintained installations may not align with the conditions assumed by product standards or customer guidance.
- Effective market surveillance would be required to minimise the risk of non-compliant products entering the market.
- The implementation of these devices in this way may have implications for electrical certification, insurance coverage or liability arrangements, which should be examined through a Legislative Review.

Implementation Requirements

Implementation of Option 3 would require:

- Development and implementation of the NSAI SWiFT as the preferred Phase 1 product specification, including arrangements for demonstrating product conformity.
- Clear customer guidance covering suitable installations, prohibited accessories and operating limitations.
- Appropriate controls regarding the number of qualifying devices permitted within a dwelling.
- Effective product compliance, market surveillance and enforcement arrangements.
- Further consideration of how this approach interacts with existing Irish wiring standards and regulatory requirements.

Indicative Delivery Considerations

Option 3 offers the greatest degree of customer accessibility and aligns most closely with the concept of plug-in solar as a consumer product. However, it relies on a mature standards framework, effective product controls and a high degree of customer compliance. The Working Group noted that many of the discussions in the United Kingdom are focused on defining the conditions under which such a model can operate safely, including product standards, limits on device ratings, customer guidance and registration requirements.

Timelines: Reliant on completion of the Irish Safety Assessment, Legislative Review and Product Standard Development

The actions to revise standards, registration and compliance lists on the ESB Networks side sits in a ready position awaiting Government approval to proceed with Plug in solar. Engagements with REC's and guidance material for homeowners can be created and issued in parallel with legislative review and the commissioning of the Irish Safety Assessment.

8.5 Working Group Position

Following assessment of the four installation pathways, the Working Group concluded that Option 1A and Option 2 are unlikely to provide an appropriate long-term implementation pathway for plug-in solar technologies in Ireland. Accordingly, the Working Group determined that the Irish Safety Assessment should focus primarily on Option 1B and Option 3, as these represent the two most viable pathways for further consideration.

This position was subsequently reviewed by the Steering Group, which recognised Option 3 as the intended long-term outcome for plug-in solar deployment in Ireland.

9. I.S. 10101 Wiring Rules Considerations

9. I.S. 10101 Wiring Rules Considerations

A key element of the Working Group's assessment was the review of existing Irish electrical installation standards and their applicability to plug-in solar and plug-in battery technologies. NSAI, supported by Technical Committee 2 (TC2), undertook a detailed review of the relevant provisions within I.S. 10101:2020 – National Rules for Electrical Installations and considered these alongside ongoing international standards developments.

The introduction of generation onto an existing final circuit may give rise to a number of considerations, including:

- The suitability of existing fault protection arrangements.
- The operation and suitability of residual current devices (RCDs) and other protective devices.
- The impact of bidirectional power flows on circuits originally designed to supply loads only.
- The adequacy of conductor sizing where operating currents may differ from the original design assumptions.
- The interaction of generation equipment with existing electrical equipment and protection systems.
- The condition and suitability of older electrical installations that may have been installed to previous wiring standards or modified over time.

The review also identified a number of specific provisions relating to microgeneration installations. In particular, Clause 551.7.2 states that a generating set operating in parallel with another source of supply "shall not be connected to a final circuit by means of a plug and socket". In addition, Clause 551 contains requirements relating to dedicated connection arrangements, dedicated protection devices and the connection of generation equipment through suitably designed circuits.

The review also considered emerging international standards activity. Ongoing IEC and CENELEC work relating to low-voltage generation equipment continues to favour controlled connection arrangements, including permanent connections, installation couplers and dedicated connection systems rather than unrestricted connection through conventional socket outlets. TC2 therefore advised that any future Irish framework should be developed in close alignment with emerging European and international standards and supported by appropriate safety assessment evidence, rather than adopting a unique national approach in isolation.

Fixed Wiring Explanation

Fixed wiring in a domestic setting is a regulated work activity. This technology has the potential to invalidate an existing certified installation unintentionally, primarily because it may place a circuit into an unintended use for which it was never adequately designed for.

However, fixed wiring standards apply to the regulated profession, the Registered Electrical Contractor, and not necessarily to the homeowner or occupier. What remains unclear is the impact these technologies may have on historical housing stock, where older standards and the natural ageing of installations have not been considered in any safety assessment, either in Ireland or in the UK.

At present, there is no intention to recertify fixed wiring installations in order to adopt plug-in technologies. Doing so may require remedial works by a REC to ensure the intended use aligns with existing Irish, European and international standards to which Ireland is committed.

10. Consideration of Plug-in Battery Storage Systems

10. Consideration of Plug-in Battery Storage Systems

While the initial focus of the Working Group was on plug-in solar technologies, the scope was subsequently expanded to include plug-in battery energy storage systems (BESS). This reflects developments in European markets, where manufacturers are increasingly offering integrated plug-in solar and battery solutions designed to maximise self-consumption of renewable energy.

Plug-in batteries can increase the value of plug-in solar by storing excess generation for use later in the day, reducing reliance on imported electricity and improving overall self-consumption. As battery technologies become more affordable and widely available, they are expected to play an increasingly important role in residential energy systems.

However, battery systems introduce additional technical considerations. Unlike solar PV, which only generates when sunlight is available, batteries can both import and export electricity at any time. This creates additional considerations relating to charging behaviour, inverter operation, export capability, protection systems and interaction with existing electrical installations.

The Working Group noted that standards and regulatory frameworks for plug-in batteries are less mature than those currently emerging for plug-in solar. Germany is increasingly considering plug-in battery systems, whereas the United Kingdom has explicitly excluded batteries from the current framework pending further assessment.

Additionally, the UK IPS provides the basis for PV, whereas if Ireland were to also include plug-in batteries this would need to be assessed from first principles.

Although a separate options analysis was not conducted for plug-in batteries, the Working Group concluded that the same core principles identified for plug-in solar, including product compliance, registration, customer guidance and standards alignment, should also apply to future battery deployments. Accordingly, plug-in battery storage should remain within the scope of future policy, standards and registration developments arising from this work likely as a secondary phase.

To avoid duplication of effort, the Working Group recommends that plug-in batteries be included within the Safety Assessment described in Section 7.6, provided that their inclusion does not compromise the assessment's completion date.

11. Recommendations

11. Recommendations

Based on the assessment undertaken, the Working Group considers that a pathway exists to facilitate the safe introduction of plug-in solar technologies in Ireland. International experience demonstrates that plug-in solar can be accommodated through a coordinated framework combining product requirements, network compliance, customer registration, clear guidance and proportionate safety controls.

The Working Group assessed four installation options and four potential product standards and specification pathways. Following consideration of the report's emerging findings, the Steering Group provided direction on the preferred installation outcome, the product requirements pathway and the progression of the proposed Irish Safety Assessment.

The Steering Group's preferred approach is Option 3, a consumer-led plug-and-play pathway, which would allow a customer to connect a compliant plug-in solar device to a suitable existing socket without prior involvement of a Registered Electrical Contractor. This pathway most closely reflects the intended consumer proposition, supports wider access to renewable generation and aligns with the direction adopted in Great Britain and other European markets.

However, Option 3 should not be implemented until the necessary evidence, product requirements, legislative clarity and customer safeguards are in place. The Working Group therefore recommends that the following actions be progressed, with a number of workstreams undertaken in parallel.

1. Commission an Irish Safety Assessment

The Steering Group endorsed the progression of an independent Irish Safety Assessment. DCEE should proceed with commissioning the assessment to determine the conditions under which plug-in solar can be safely accommodated.

The assessment should apply the objectives and deliverables set out in Section 7.6. It should identify the conditions, controls and mitigations required to support a consumer-led connection pathway. The Safety Assessment is a critical dependency for the implementation of Option 3 and should be progressed without awaiting completion of all other workstreams.

2. Develop a SWiFT Product Specification

The Steering Group supported Standards Pathway 3, development of an NSAI SWiFT, as the preferred Phase 1 product requirements pathway. DCEE and NSAI should commence preparations for the development of the SWiFT. The SWiFT should establish the minimum product safety, performance and compliance requirements applicable to plug-in solar devices intended for the Irish market.

The Safety Assessment and SWiFT development should proceed in parallel where practical. A structured process should be established to ensure that relevant safety findings can be incorporated into the SWiFT before publication. The UK IPS should be reviewed as part of this work to support the development of the SWiFT and to maintain readiness to activate Pathway 4 if required.

The SWiFT should operate as the Phase 1 product specification while planning continues for the development of a formal Irish Standard as the longer-term Phase 2 outcome. The longer-term standard should take account of operational experience, emerging European and international requirements and evidence gathered following market introduction.

The Working Group will assess **Pathway 4, recognition or acceptance of products demonstrated to comply with the UK Interim Product Specification** in parallel. The Irish Safety Assessment and the legislative review should also identify any supplementary Irish requirements, guidance or controls necessary to support the introduction of plug-in solar in Ireland via this pathway.

3. Commission a Legislative Review

The Working Group did not undertake a detailed review of existing legislation as part of its evaluation of plug-in solar. The Working Group recommends a legislative review is carried out as part of the next phase of work. The review should comprise of an examination of existing legislation, technical requirements, product standards, product specifications and regulatory frameworks to identify any amendments required to support the introduction of plug-in solar technologies in Ireland under each of the Options put forward by the Working Group.

4. Progress Option 3 as the Intended Installation Pathway

The Steering Group identified Option 3, plug-and-play, as the intended installation outcome. Under this pathway, customers would be permitted to connect a qualifying plug-in solar device without a prior electrical assessment, provided that:

- The device complies with the recognised product-requirements framework.
- The device meets ESB Networks' network requirements.
- The device is included on the appropriate compliant-device register.
- The customer completes the required registration process.
- The installation satisfies the customer suitability criteria.
- The customer follows the manufacturer's instructions and published Irish guidance.

If the Safety Assessment identifies material risks that cannot be adequately controlled through product requirements, registration and customer guidance, Option 1B: Dedicated Circuit – Standard Socket should remain available as an interim, restricted or fallback pathway.

5. Finalise the ESB Networks Registration Process

ESB Networks should finalise the simplified customer registration process for plug-in solar. The process should be proportionate and easy to complete as international experience suggests that complex processes can contribute to low levels of customer compliance.

6. Develop Coordinated Customer Guidance

A single, coordinated customer guidance package should be developed and published before market opening. The guidance should use plain language, photographs, illustrations and decision trees. A green, amber and red customer suitability framework should be used to help customers identify whether they may proceed, should seek professional advice or should not connect a device until an identified issue has been addressed.

DCEE should determine the appropriate organisation to own, publish and maintain the central customer guidance, with consistent supporting information provided by ESB Networks, NSAI, CRU, Safe Electric, SEAI, retailers and manufacturers.

7. Enable Export Remuneration

Registered plug-in solar customers should be treated consistently with other eligible microgeneration customers in relation to payment for exported electricity. ESB Networks should continue progressing the system and market changes necessary to register the customer's Maximum Export Capacity.

8. Engage Building, Planning and Fire-Safety Stakeholders

DCEE should continue engagement with the Department of Housing and other relevant stakeholders to identify any building regulation, planning, tenancy, structural or fire-safety considerations associated with plug-in solar.

9. Retain Plug-In Batteries as a Future Phase

The immediate programme should remain focused on plug-in solar. Plug-in battery technologies should be treated as a future enhancement because the international product, safety and regulatory evidence is less mature.

Plug-in batteries should be included as an optional or separately assessed element of the Irish Safety Assessment and legislative review where this does not delay or compromise completion of the core plug-in solar assessment.

10. Governance and Programme Ownership

The Working Group recommends that governance of the programme be reviewed following submission of the Options Report and that DCEE assumes responsibility for the next phase of programme oversight.

While ESB Networks has facilitated the Plug-In Solar Working Group to date and has progressed the workstreams within its remit, many of the remaining actions required to facilitate plug-in solar relate to policy decisions, standards development, safety assessment, legislative review, consumer protection, building regulations and the overall implementation framework. These activities extend beyond the remit of ESB Networks as Distribution System Operator and require leadership from Government and other competent authorities.

It is recommended that DCEE establish and oversee the governance arrangements for the next phase of work, supported by ESB Networks, NSAI, CRU, Safe Electric, SEAI and other relevant stakeholders as required. The Working Group should continue to meet regularly until plug-in solar is made available in Ireland with regular updates to the Steering Group.

Recommended Strategic Direction

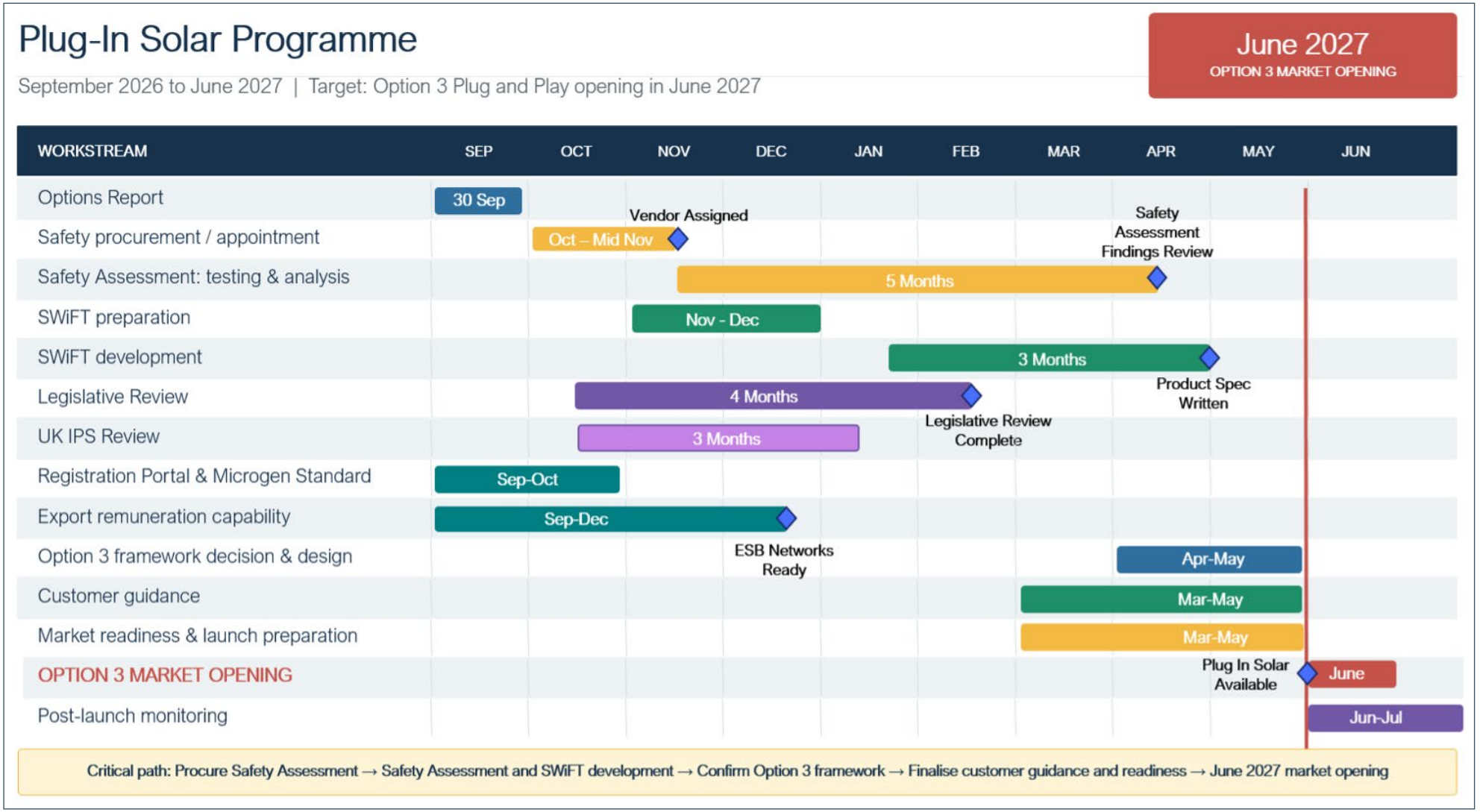
The Working Group's recommended approach, supported by the Steering Group, can be summarised as follows:

1. Progress Option 3 as the preferred pathway for accelerating the standards necessary to deploy plug-in solar in Ireland.
2. Commission an Irish Safety Assessment and Legislative Review.
3. Commence development of an NSAI SWiFT as the Phase 1 product specification.
4. Use the findings of the Safety Assessment and Legislative Review to inform the SWiFT and determine the conditions, safeguards and implementation measures required to support Option 3, Plug and Play.
5. Progress Pathway 4 during Phase 1 in parallel with the SWiFT process (i.e. recognition or acceptance of products demonstrated to comply with the UK IPS) as a fallback if the SWiFT cannot provide a timely or practicable route to market. This should be done via the Working Group.
6. Progress the Legislative Review, registration arrangements and customer guidance in parallel.
7. Develop a formal Irish Standard as the longer-term Phase 2 product standards pathway.

Figure 11 Plug-In Solar Implementation Programme details a proposed sequence of the programme to introduce this technology highlighting that much of this direction can be carried out in parallel.

Subject to satisfactory completion of these actions, the Working Group considers that Ireland can establish a safe, proportionate and scalable framework that enables customers to access plug-in solar as a consumer-led renewable energy technology in the accelerated timeframe outlined below.

Figure 11: Plug In Solar Implementation Programme



Appendix

Appendix A: Working Group Timeline Activities

- **5 May 2026** – The Minister formally requested that ESB Networks assess how plug-in solar technologies could be safely facilitated in Ireland and identify an appropriate implementation pathway.
- **15 May 2026** – ESB Networks issued formal engagement letters to key stakeholders, including NSAI, CRU and Safe Energy Ireland, seeking participation in a coordinated cross-sector assessment of plug-in solar and battery technologies.
- **21 May 2026** – ESB Networks formally responded to the Minister outlining an initial position, including support for plug-in solar and battery systems up to 800 W, the requirement for customer registration to provide network visibility, the development of approved device arrangements and the need for stakeholder collaboration.
- **28 May 2026** – An initial meeting of relevant stakeholders took place and a draft Terms of Reference was circulated to establish the scope, objectives and governance structure of the Working Group.
- **9 June 2026** – The first in-person workshop was held in Newbridge. The Working Group reviewed European developments, emerging UK proposals, safety considerations, registration concepts and standards-related issues. Presentations were delivered by ESB Networks, NSAI, CRU, Safe Electric and NSAI Technical Committee 2 representatives.
- **12 June 2026** – Version 3.0 of the Working Group Terms of Reference was circulated for comment, formally defining the objectives, responsibilities, governance structure and deliverables for the project.
- **25 June 2026** – The second in-person workshop was held in Newbridge. The meeting focused on UK developments, TC2 standards observations, registration proposals and a structured assessment of potential implementation pathways through a formal options analysis process.
- **23 July 2026** – The third workshop was convened to review the UK Government Response, the Final Interim Product Specification and the UK electrical safety study. The Working Group considered the implications of these developments for Ireland and justification for an Ireland electrical safety study building on the UK.
- **31 July** – ESB Networks formal update to Minister Darragh O'Brien on the progress of the group and the pending report.
- **5 August 2026** – This workshop focused on the agreement on the safety study, the pathway options for standard development as well as an overview of the Option reports and registration webform.
- **27 August 2026** – The group discussed export remuneration, registration arrangements, legislative considerations, customer communications, grants and incentives, and reviewed updates to the Plug-In Solar Options Report ahead of its submission to DCEE.
- **11 September** – The group discussed the emerging preferred options to bring to the Steering Group.
- **14 September** – The Steering Group reviewed and endorsed progression of the Irish Safety Assessment, and reaffirmed Option 3 (plug-and-play) as the intended long-term implementation outcome for Ireland.
- **24 September** – The Working Group reviewed the challenges associated with developing an Irish-specific product specification and agreed to recommend Pathway 4, recognition or acceptance of products demonstrated to comply with the UK IPS, as a fallback Phase 1 product requirements pathway, subject to the Irish Safety Assessment, legislative Review and Steering Group consideration.

Appendix B: Plug In Generation Safety Assessment for Ireland

1. Background

The Department of Climate, Energy and the Environment (DCEE), supported by the Plug-in Solar Working Group, seeks to commission an independent safety assessment of plug-in solar and battery technologies incoming to the Irish market.

The assessment should build upon the work undertaken by DESNZ and Arceio in the United Kingdom while considering Irish-specific electrical installations, standards, regulatory arrangements and customer-use scenarios. The objective is not to repeat the UK study, but to identify any additional risks, mitigations and requirements relevant to Ireland.

The study should provide an evidence base to inform future policy, standards development, customer guidance and implementation frameworks for plug-in solar technologies in Ireland.

To avoid duplication of work, plug-in battery technology should also be part of this study.

2. Objectives

The successful bidder shall:

- Assess the potential safety implications of plug-in generation technologies connected to representative Irish domestic electrical installations.
- Identify any safety-related responsibilities and obligations that may arise for customers, Registered Electrical Contractors and other stakeholders under potential implementation pathways.
- Identify and evaluate electrical, fire, customer-use and product-related risks.
- Assess whether additional safety measures may be required in Ireland beyond those identified within the UK framework and EU jurisdictions (Malta e.g.).
- Assessment of the suitability of existing international product specifications and standards, including the UK IPS and German VDE framework, with recommendations on the Irish product-acceptance framework and any supplementary Irish requirements or controls.
- Identify circumstances where engagement with a Registered Electrical Contractor (REC) should be recommended or required.
- Develop a customer-focused safety guidance package, using photographs, illustrations, traffic-light-style system and real-world examples to clearly communicate potential risks, safe operating practices and situations where professional electrical advice should be sought.
- Provide evidence-based recommendations to DCEE, CRU, NSAI and ESB Networks.

3. Scope of Assessment

The study shall assess both product safety and installation safety:

Product Safety

The purpose of the Product Safety Assessment is to determine whether plug-in generation products intended for the Irish market can operate safely when connected to domestic electrical installations and whether additional Irish-specific requirements may be necessary.

The assessment should identify any product characteristics, testing requirements or compliance measures that may be required to support a future Irish framework, while maintaining alignment with emerging UK, German and wider European developments wherever practical.

Assessment should include:

- Assessment of representative commercially available products likely to be marketed in Ireland such as:
  - Plug-in solar products compliant with the UK Interim Product Specification.
  - Products based on the German DIN VDE approach.
- Products intended for connection via standard domestic socket outlets.
- Anti-islanding functionality.
- Live-pin protection.
- Residual DC current behaviour.
- Electromagnetic compatibility.
- Product fault conditions.

Installation Safety

The purpose of the Installation Safety Assessment is to evaluate how plug-in solar technologies interact with representative Irish domestic electrical installations, including modern and legacy wiring systems, protection devices, socket circuits and consumer units. The assessment should consider the diversity of Ireland's housing stock and electrical installations, recognising that installation standards, equipment age and previous alterations may vary significantly between properties. Assessment should consider retrofit measures, extensions and uncertified electrical modifications commonly encountered within Irish housing stock.

Particular attention should be given to the suitability of existing circuits, the operation of protection devices under reverse power-flow conditions, the interaction with other low-carbon technologies and the potential impact of customer behaviour on overall safety outcomes.

Assessment should include:

- Representative Irish domestic electrical installations.
- Customer-side wiring arrangements.
- Final circuits.
- Socket outlet circuits.
- Protection devices.
- Consumer units.
- Existing low-carbon technologies.

The study should recognise that many of the risks identified internationally relate not only to the product itself but also to the installation into which the product is connected.

4. Irish Installation Types to be Assessed

The Irish assessment should consider a broad range of dwelling types, installation ages, wiring arrangements and protection systems that may be encountered in practice.

The study will help establish where plug-in solar technologies can be deployed safely, identify higher-risk installation characteristics and determine where additional guidance, inspection or intervention by a Registered Electrical Contractor (REC) may be appropriate.

The assessment shall include representative examples of:

Housing Types

- Detached dwellings.
- Terraced dwellings.
- Apartments.
- Modular Homes

Installation Ages

- Pre-ET101 (2008) installations.
- ET101 installations.
- I.S. 10101 compliant installations.
- Recently constructed dwellings.

5. Electrical Safety Assessment

The assessment shall consider:

Circuit Loading

- Normal operating conditions.
- High load scenarios.
- Reverse power-flow conditions.
- Simultaneous use with household appliances.
- One-device-per-premises assumptions.
- One-device-per-circuit assumptions.
- Multiple-device aggregation scenario

Protection Devices

- RCDs.
- RCBOs.
- MCBs.
- Older protection arrangements.
- Legacy consumer units.

Socket Circuits

- Radial circuits.
- Ring-final circuits (where applicable).
- Outdoor socket arrangements.
- Shared socket circuits.

Fault Conditions

- Product failures.
- Wiring faults.
- Loss of mains.
- Earth faults.
- Open-neutral faults.

Figure 12: Ring Circuit Thermal Overload Scenario

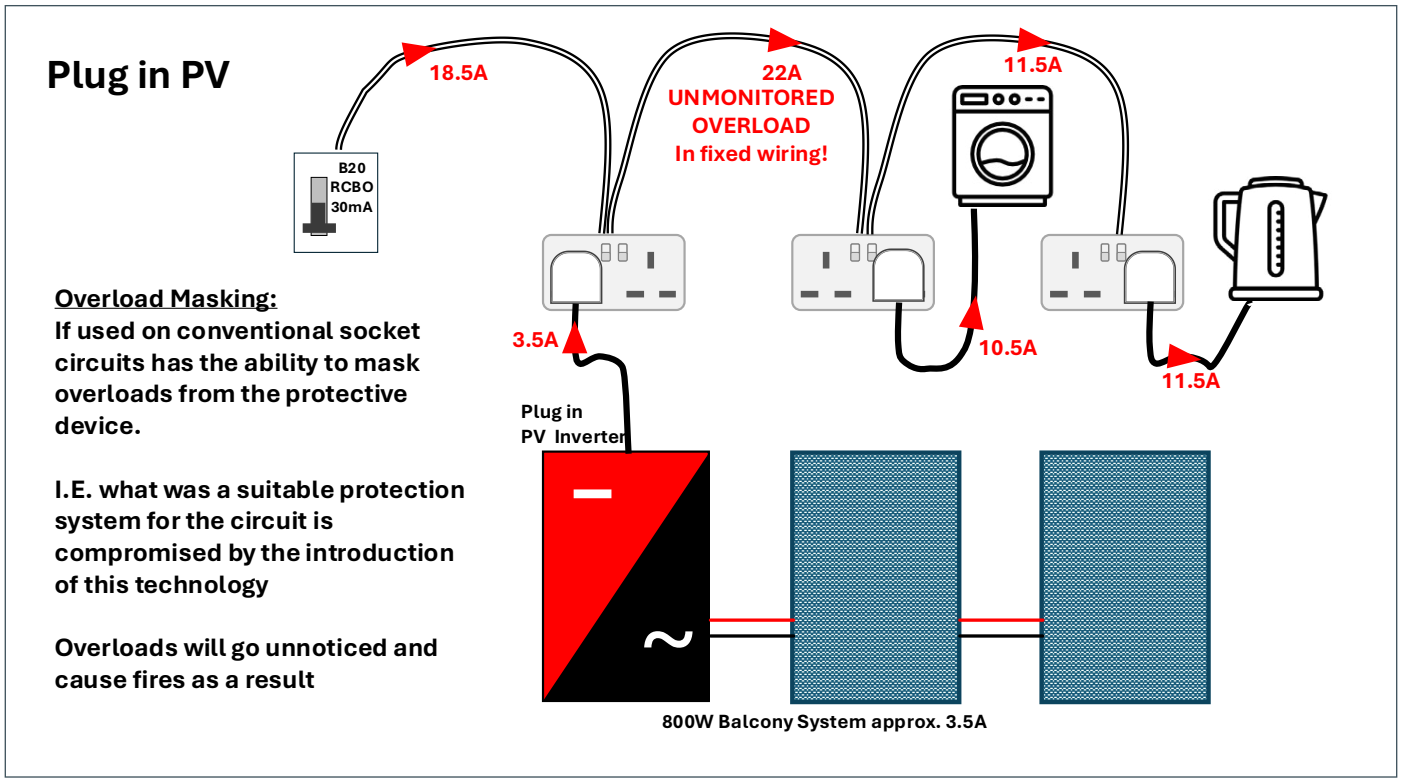


Figure 13: Protection Schematic (Non Bi-Directional)

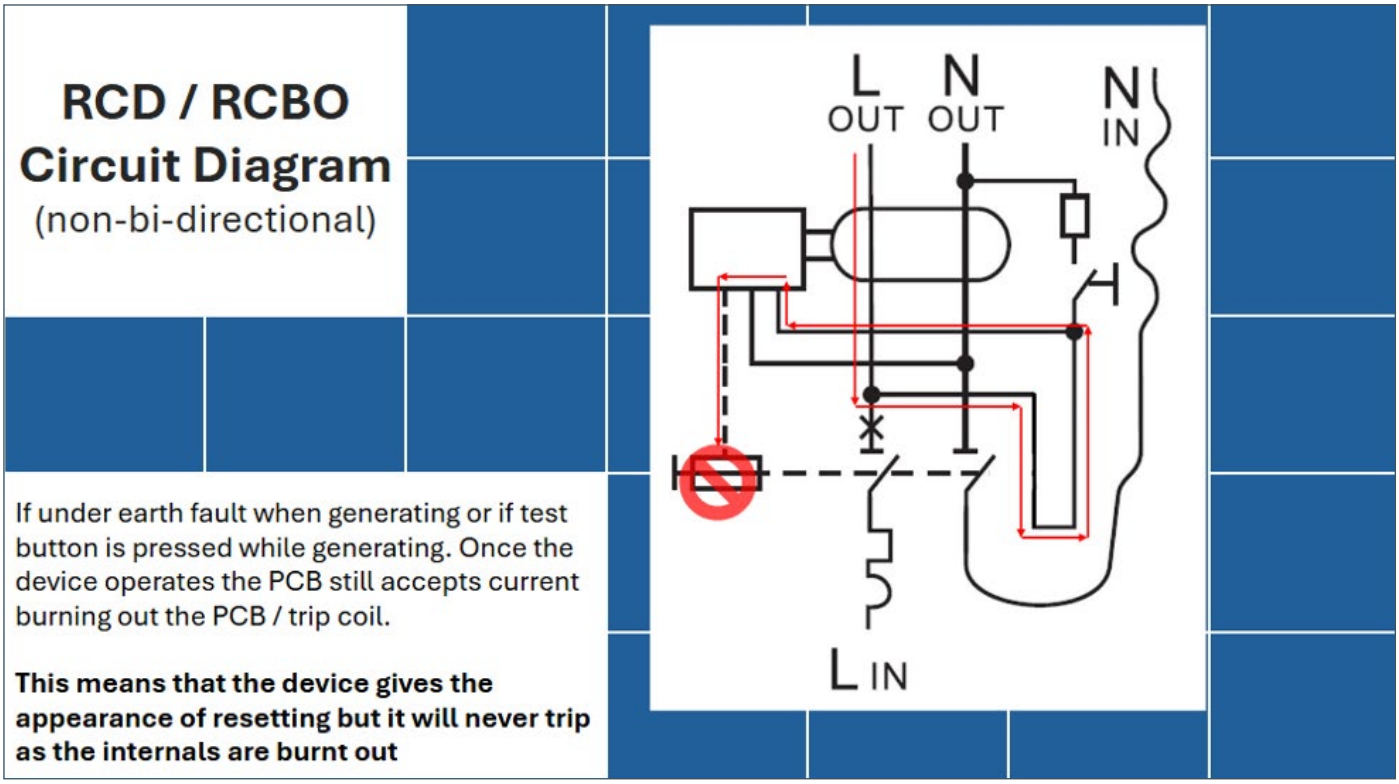
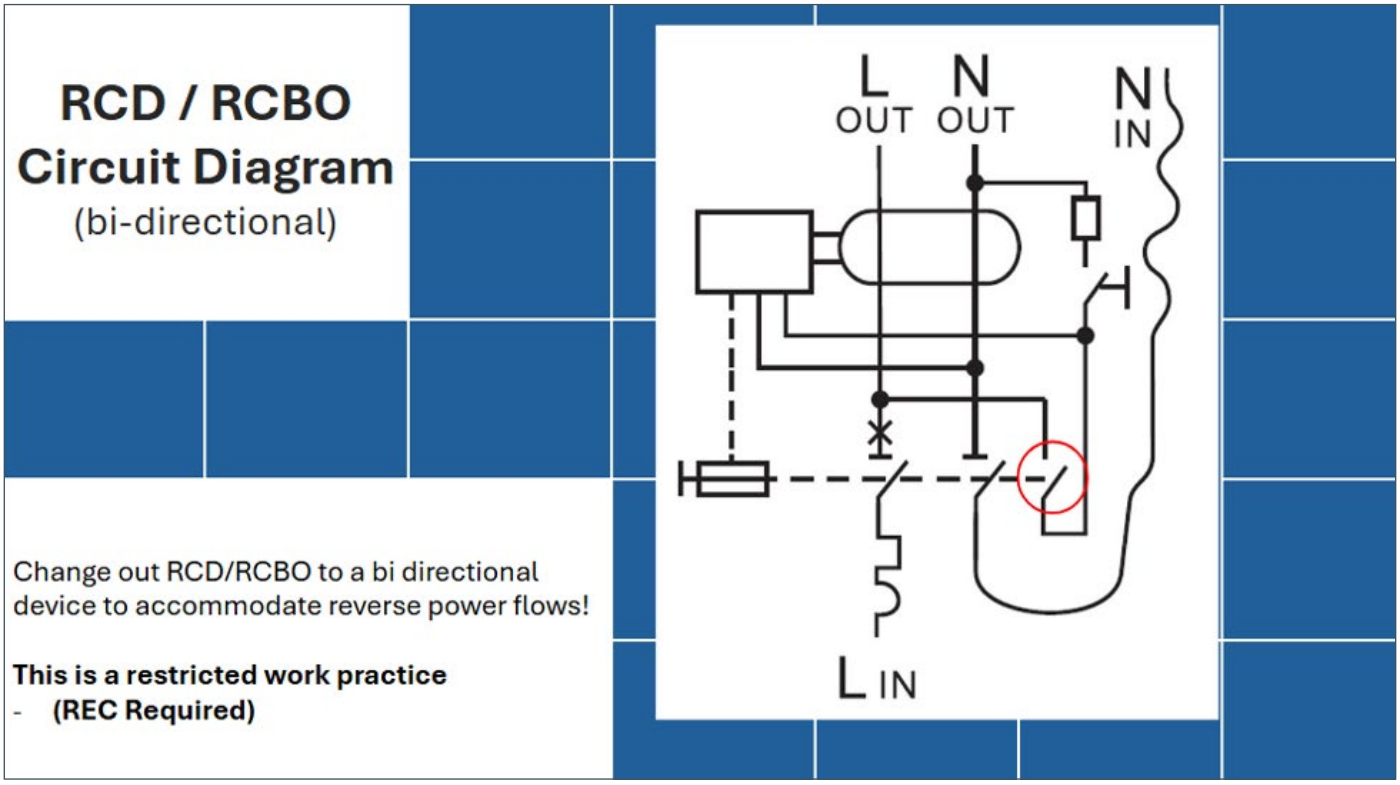


Figure 14: Protection Schematic, Bidirectional



6. Customer Behaviour and Misuse Scenarios

The assessment shall explicitly explain the risks of potential customer behaviour, including:

- Use of extension leads.
- Use of cable reels.
- Use of multi-way adaptors.
- Use of travel adaptors.
- Connection to damaged sockets.
- Multiple devices connected within the same premises.
- Relocation of devices between sockets.
- Operation in unsuitable locations.
- Installation contrary to manufacturer instructions.

The assessment should identify the likelihood and consequences of each scenario and propose mitigation measures where appropriate.

7. Fire Safety Assessment

The study shall consider:

- Balcony installations.
- External wall mounting.
- Roof terrace installations.
- Escape route considerations.
- PV cable routing.
- Product overheating.
- Connection accessories.
- Apartment developments.
- Interaction with Irish fire safety guidance.

The successful bidder should engage with relevant fire safety stakeholders where appropriate.

8. Registered Electrical Contractor (REC) Assessment

A specific output of the study shall be to identify circumstances where involvement of a Registered Electrical Contractor would be advisable or necessary.

The study should identify:

Scenarios Suitable for Consumer Self-Installation

Examples:

- Modern compliant installations.
- Approved products.
- Suitable protection arrangements.

Scenarios Requiring REC Assessment

Examples:

- Unknown installation condition.
- Legacy consumer units.
- Absence of modern residual-current protection.
- Evidence of previous alterations.
- Complex electrical installations.

Scenarios Requiring Electrical Works

Examples:

- Additional protection devices.
- New circuits.
- Consumer-unit modifications.
- Installation upgrades.

9. Customer Guidance Requirements

The successful bidder shall develop a draft customer guidance framework including:

- Development of a consumer self-assessment Ready Reckoner or similar to assist customers in determining whether their installation may be suitable for plug-in solar deployment.
- Suitable installation environments.
- Prohibited accessories.
- Warning notices.
- Product selection guidance.
- Registration requirements.
- Maintenance recommendations.
- When to contact an REC.

10. Visual Outputs

A key deliverable shall be a customer-focused visual guidance pack.

The consultant shall produce:

Photographic Examples

Showing:

- Suitable installations.
- Unsuitable installations.
- Acceptable socket arrangements.
- Damaged installations.
- Common hazards.

Risk Illustrations

Showing:

- Traffic Light Assessment Framework
  - Green: Suitable for self-installation.
  - Amber: Seek REC advice.
  - Red: REC assessment or electrical works required.
- Incorrect use of extension leads.
- Incorrect use of adaptors.
- Damaged plug/socket conditions.
- Multiple-device scenarios.
- Fire safety risks.
- Outdoor installation examples.

Decision Trees

Providing simple customer pathways such as:

- "Can I install this product myself?"
- "Should I contact a Registered Electrical Contractor?"
- "Is my installation suitable?"
- These visual materials should be capable of direct use by ESB Networks, SEAI, Safe Electric and Government communications teams.

11. Stakeholder Engagement

The successful bidder should engage with relevant stakeholders including:

- Safe Electric.
- Registered Electrical Contractors.
- CRU.
- Fire safety stakeholders.
- Other relevant subject matter experts.

Stakeholder engagement will help ensure that the assessment reflects practical installation experience, regulatory requirements, standards development activities and operational considerations relevant to Ireland. The engagement process should also support the validation of findings and the development of proportionate recommendations for future implementation.

12. Deliverables

The successful bidder shall provide:

1. Detailed Technical Report.
2. Executive Summary.
3. Irish Installation Assessment Matrix.
4. Customer Guidance Pack.
5. Customer Suitability Assessment Framework (Green / Amber / Red categorisation approach).
6. Visual Risk Catalogue (photographic and diagrammatic).
7. Recommendations for future standards, policy and registration arrangements.

13. Desired Outcome

The study should provide an independent evidence base enabling stakeholders to determine:

- How plug-in solar can be safely accommodated in Ireland.
- What product controls are required.
- What customer guidance is required.
- When REC involvement is necessary.
- What measures are required to recognise UK IPS-compliant products and whether supplementary Irish standards, regulatory provisions or implementation controls are necessary.
- What implementation pathway is most appropriate for Ireland.

The final report should be suitable for publication and capable of supporting future policy, standards and regulatory decisions.

Appendix C: I.S. 10101 TC2 Plug In Solar Observations

Clause	Rule	HD or Homegrown	Next edition
133.4	**Prevention of harmful effects** All electrical equipment shall be selected so that it will not cause harmful effects on other equipment or impair the supply during normal service including switching operations. In this context, the factors which can have an influence include, examples are included in Clause 33.	HD 60364-1: 2008	Published IEC 60364-1:2025 HD still at draft. **1.5.3.4 Prevention of harmful effects** Electrical equipment shall be selected so that it will not cause harmful effects on other equipment or impair the power supply during normal service including switching operations. In this context, the factors which can have an influence include, for example: • power factor; • inrush current; • asymmetrical load; • harmonics; • transient overvoltages generated by equipment in the installation; • electromagnetic interference (EMI).

Clause	Rule	HD or Homegrown	Next edition
551.7.1	Where a generating set is used as an additional source of supply in parallel with another source, protection against thermal effects in accordance with Part 42 and protection against over current in accordance with Part 43 shall remain effective in all situations. Except where an uninterruptible power supply is provided to supply specific items of current using equipment within the final circuit to which it is connected, such a generating set shall be installed on the supply side of all the protective devices for the final circuits of the installation.	HD 60364-5-551:2010 (Based on IEC 60364-5-55:2001)	Requirements for low voltage generating sets moving to IEC 60364-7-751:202X Low-voltage electrical installations - Part 7-751: Requirements for special installations or locations - Low voltage generating sets. Still at draft in IEC and CENELEC. Requirement: **751.512.1.1.101** Where a generating set is intended to operate in parallel with another source of supply, adverse effects to that source and to the installation, shall be avoided, considering, for example: • power factor; • voltage fluctuations; • frequency fluctuations; • loss of supply; • harmonic distortion; • load imbalance; • contribution to fault current from multiple sources; • load switching effects, such as starting and synchronizing ; • circulating currents. **751.550.101 Installations where a generating set is intended to operate as an 254 additional source of supply in parallel with another source** 751.550.101.1 A generating set shall not be connected to a final circuit. 751.550.101.2 The connection of the generating set to the electrical installation shall be made by one of the following methods: • permanently connected equipment, or • installation couplers according to IEC 61535, or • a dedicated coupling system which is not compatible with any configurations belonging to national systems based on IEC 60884-1 or IEC 60320 or IEC 60309-2 used for other 262 applications and which maintains a degree of protection of at least IP2X or IPXXB in all 263 coupling modes.

Clause	Rule	HD or Homegrown	Next edition
551.7.2	A generating set used as an additional source of supply in parallel with another source shall be installed: • On the supply side of all the protective devices for the final circuits of the installation, or • On the load side of all the protective devices for a final circuit of the installation, but in this case all the following additional requirement shall be fulfilled: i. the conductors of the final circuit shall meet the following requirement in Formula (551.2): Iz ≥ In + Ig (551.2) where I z is the current-carrying capacity of the final circuit conductors; I n is the rated current of the protective device of the final circuit; I g is the rated output current of the generating set; and ii. a generating set shall not be connected to a final circuit by means of a plug and socket; and iii. a residual current device providing protection of the final circuit in accordance with Clause 411 or Clause 415 shall disconnect all live conductors including the neutral conductor; and iv. the line and neutral conductors of the final circuit and of the generating set shall not be connected to earth downstream of the protective device of the final circuit.	HD 60364-5-551:2010	See above.

Clause	Rule	HD or Homegrown	Next edition
551.7.4	Where a generating set is intended to run in parallel with the system for distribution of electricity to the public, means of automatic switching shall be provided to disconnect the generating set from the system for distribution of electricity to the public in the event of loss of that supply or deviation of the voltage or frequency at the supply terminals from values declared for normal supply. The type of protection and the sensitivity and operating times depend upon the protection of the system for DSO Networks and the number of generating sets connected and shall be agreed by the DSO.	HD 60364-5-551:2010	**751.1.9.2.1.2.102** Where a low voltage generating set is intended to operate in parallel with, or as a switched alternative to, a distribution network external to the installation, the distribution system operator (DSO) may specify particular requirements .
551.9.2	The means for the connection of a micro-generator shall comply with I.S. EN 50438, having all necessary ancillary equipment not already provided in the installation.	Homegrown	N/A
551.9.3	In the installation, a dedicated outlet shall be provided for the connection of the microgenerator. The outlet shall be provided with the following: a) An RCD, having a residual operating current not exceeding !100 mA ", that disconnects all live conductors of the dedicated outlet. The RCD shall be Type A or Type B, depending on the nature of the DC components in the system. b) An overcurrent protective device complying with the I.S. EN 50438 series.	Homegrown	N/A
551.9.4	Before connecting the micro-generator to an existing installation, the installation shall be inspected and tested in accordance with Chapter 6.	Homegrown	N/A

Clause	Rule	HD or Homegrown	Next edition
712.514.101	For the safety of persons, warning shall be given indicating the presence of a photovoltaic installation e.g. to maintenance personnel, inspectors, public distribution network operators, emergency aid services. A sign, such as shown in Figure 712.514.101, shall be fixed: • at the origin of the electrical installation; • at the metering position, if remote from the origin; • at the consumer unit or distribution board to which the supply from the inverter is connected.	HD 60364-7-712:2016	IEC 60364-7-712:2025 HD still at draft **712.514.101 Safety marking** **712.514.101.1** Except for PV power generation plants, for reasons of safety of the various operators (maintenance personnel, inspectors, public distribution network operators, emergency aid services, etc.), a sign indicating the presence of a photovoltaic installation on a building shall be fixed: • at the origin of the electrical installation; and • at the metering position, if remote from the origin; and • at the consumer unit or distribution board to which the supply from the PCE is connected. An example of such a sign is given in Figure 14.
712.530.3.1.101	Where an RCD is used for protection of the PV a.c. supply circuit, the RCD shall be of type B according to I.S. EN 62423 or I.S. EN 60947-2, unless: • the inverter provides at least simple separation between the a.c. side and the d.c. side; or • the installation provides at least simple separation between the inverter and the RCD by means of separate windings of a transformer; or • the inverter does not require a type B RCD as stated by the manufacturer of the inverter.	HD 60364-7-712:2016	IEC 60364-7-712:2025 HD still at draft
712.6.101	I.S. EN 62446 gives additional requirements for system documentation, commissioning tests and inspection.	HD 60364-7-712:2016	

