

The UK's electrical safety experts

Future Homes in Northern Ireland

Electrical Safety in the Net Zero Home





About Electrical Safety First

Electrical Safety First is the campaigning UK charity dedicated to preventing deaths, injuries, and fires, caused by electricity. We are recognised by government and industry as the leading consumer protection and technical authority on electrical safety.



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Executive Summary

Electricity powers our lives and fuels the Northern Ireland economy. It illuminates our homes, keeps us warm, cools us down, and powers our appliances, computers, and machinery. As we strive for a low-carbon future and net zero emissions by 2050, electricity will become even more important. But amidst our growing reliance on electricity, one crucial aspect is often overlooked: electrical safety.

To reach net zero by 2050, Northern Ireland must prioritise electrifying its carbon-intensive sectors, specifically heating and transport. In this report, we uncover the key risks that accompany our increasing use of electricity and emerging home technologies. We shed light on the potential dangers faced by individuals and families, highlighting the critical importance of a smooth and safe transition to net zero. Our recommendations are vital in safeguarding lives and paving the way towards a sustainable, low carbon future.

The draft Housing Supply Strategy by the Department for Communities (DfC) highlights the need to urgently build and retrofit homes to achieve the 2050 net zero target. Net zero homes will feature heat pumps and solar technologies to meet heating and hot water needs, with surplus electricity stored in home batteries or used for EV charging, whilst easing pressure on the grid. However, these advances bring new challenges to our homes' power systems.



Insufficient data hampers our understanding of Northern Ireland's housing readiness for the low-carbon transition.

Retrofitting existing homes poses specific problems. Over 60% of Northern Ireland's homes are older properties¹ with outdated electrical installations, posing safety risks. Retrofit funding should include provisions for necessary remedial work to overcome financial barriers hindering the adoption of new technologies.

To ensure consumer protection, electrical safety must be integrated into policymaking across all tenures. We advocate for mandatory electrical safety checks, which should be in place for private renters during 2023, following Assembly approval.² Financial support must be easily accessible for individuals facing financial constraints, enabling them to access crucial electrical safety services without compromising their ability to decarbonise their homes.

Insufficient data hampers our understanding of Northern Ireland's housing readiness for the low-carbon transition. The Housing Executive could enhance future House Condition Surveys by including comprehensive data on domestic electrical installations, wiring condition, and any load capacity limitations. The Department for Health and Northern Ireland Fire and Rescue Service should also consider publishing fire data on dwelling age, tenure and emerging home technologies to address electrical risks and evaluate readiness for the energy transition.

Strategic documents, including the Climate Change Committee's recommendations³ and the draft Housing Supply Strategy, often overlook electrical safety. Proper installation of low carbon technologies necessitates qualified and competent professionals to ensure safety and correct operation. Poorly installed solar PV system installations can cause electrical faults and fire hazards.⁴ Incorrectly installed domestic battery storage systems, used with renewable energy sources, also pose risks such as fires and electric shocks.



To reach net zero by 2050, Northern Ireland must prioritise electrifying its carbon-intensive sectors, specifically heating and transport.

Building efficiency measures must prioritise electrical safety during both new construction and retrofitting. When insulation is installed around or near electrical cables or equipment, precautions must be taken to minimise the risk of overheating and consequential risk of fire.⁵

Electrical professionals can provide a whole-building approach to safety, installing a range of electrical technologies to improve efficiency and reduce energy costs. Upskilling the current workforce and providing apprenticeships in energy efficient and low carbon technologies are therefore essential.

Despite the home of the future becoming increasingly reliant on electricity, evidence suggests a looming shortage of trained competent registered electricians. It is estimated that an additional 12,500-15,000 electricians will be required in the UK by 2024,⁶ with 91% of employers in Northern Ireland expecting increased demand for skilled workers.⁷



Despite the home of the future becoming increasingly reliant on electricity, evidence suggests a looming shortage of registered electricians.

Northern Ireland is aligning with Westminster and also with Republic of Ireland policy to phase out the sale of new petrol and diesel vehicles by 2030. However, the current EV charging infrastructure in Northern Ireland is inadequate, with only 345 public EV chargers available, despite 3,779 EVs registered in 2021. This scarcity leads drivers to resort to dangerous practices like 'daisy-chaining', where multiple extension leads are plugged into each other to cover longer distances, posing risks of electric shock and fire.

Dedicated EV home charging points with built-in safety features are essential because they connect directly to the electrical installation on their own circuit, allowing for separate safety monitoring. Electricians installing EV charge points need to have the necessary upskill training to ensure they are correctly installed.



Consumer awareness and understanding of low carbon technologies remain low, and we must bridge this knowledge gap.

A survey conducted by the Northern Ireland Assembly's Infrastructure Committee revealed that 92% of respondents consider the lack of available charging points as the biggest challenge for EV adoption in Northern Ireland. Additionally, convenient access to chargers is challenging for residents living in flats or apartments without parking space, which constitute a third of the housing stock in Northern Ireland.

Consumer awareness and understanding of low carbon technologies remain low, and we must bridge this knowledge gap. Energy advice organisations should promote information campaigns on net zero home technologies while emphasising electrical safety.

At Electrical Safety First, our mission is to prevent deaths, injuries, and damage caused by electricity. In this report, we offer practical recommendations to key stakeholders, emphasising the paramount importance of safety as we electrify our future.

Summary of Recommendations

Housing

The Department for Communities must take electrical safety into consideration when drafting the final Housing Supply Strategy.

The Northern Ireland Housing Executive should enhance future House Condition Surveys to gather comprehensive data on electrical installations and load capacity constraints.

The Department for Communities should implement a common housing standard for electrical safety in Northern Ireland, mandating five-yearly checks for all rented homes and introducing regular inspection and testing for owner-occupied properties.

The Department for the Economy and energy suppliers should establish free services including electrical safety checks to support vulnerable consumers as we become more reliant on electricity.

The Department for the Economy should ensure that any funding made available for low carbon home technologies has a portion reserved for associated remedial and/or ancillary works, such as rewiring, or the installation of a new consumer unit (i.e., fuse box).

The Department for Health and Northern Ireland Fire and Rescue Service should collect and publish more data on electrical house fires, including property age, tenure and emerging home technologies such as lithium-ion powered products and solar PVs, to inform effective policy development and strengthen risk reduction strategies.

Electric Vehicles (EVs)

To prevent unsafe charging practices and avoid geographical disparities, the Department for Infrastructure, local authorities, and industry should work together on a coordinated mapping effort to ensure there is sufficient EV charging infrastructure.

The Department for Communities should consider measures to ensure those living in rented accommodation have clear routes for installing EV charging infrastructure, such as changes to standard tenancy agreements and housing standards.

The Department for Infrastructure should consider incentives for low-income households to install charging infrastructure at home and to encourage the use of installers authorised by the Office for Zero Emission Vehicles.

Growing the installer base

The Department for the Economy should introduce a clear and consistent policy framework for the green skills agenda to provide industry with long-term certainty of demand, and to encourage investment in upskilling, including grants and/or tax incentives.

Education providers should offer training courses to upskill professionals. Apprenticeship standards should include energy efficiency/low carbon content. Government funding, both current and additional, can support this initiative.

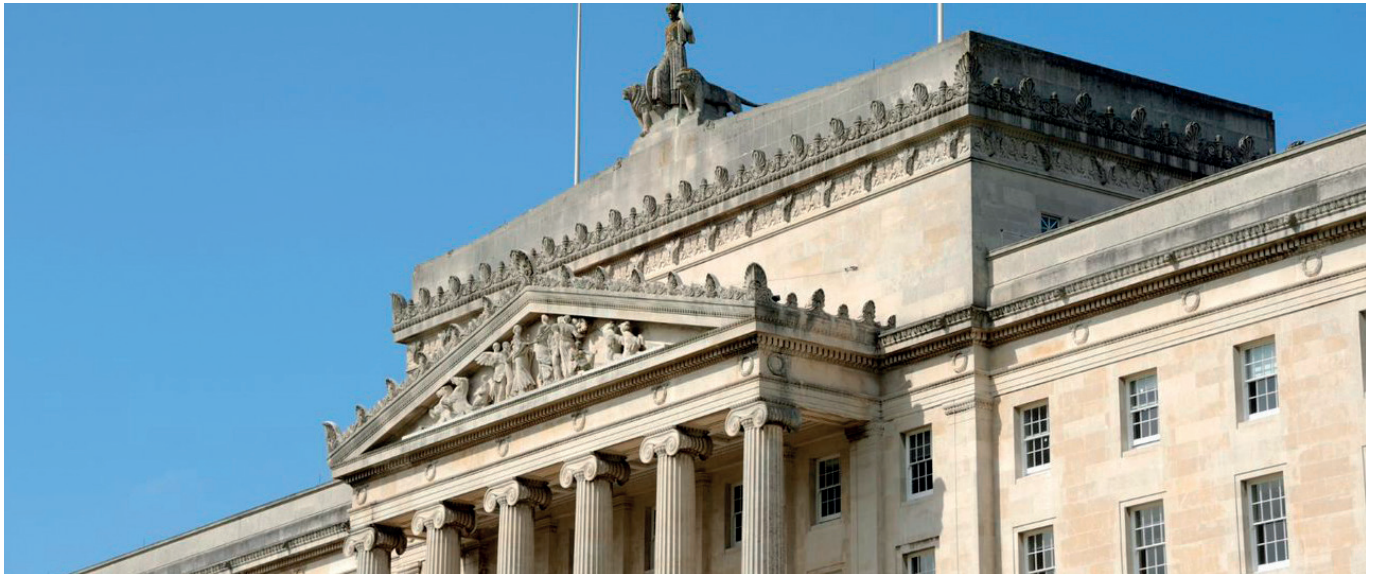
The Northern Ireland Executive should increase its promotion of registered electricians and raise awareness of where consumers can find them.

Consumer Education

Information campaigns about net zero home technologies from energy advice organisations should include links and guidance on electrical safety and help for consumers to find qualified and competent installers in their region.

Glossary

BEIS	Department for Business, Energy & Industrial Strategy was replaced by Department for Energy Security and Net Zero, Department for Science, Innovation and Technology, and Department for Business and Trade
BEVs	Battery Electric Vehicles (BEVs)
BRE	Building Research Establishment Ltd
CCC	Climate Change Committee
Competent Person/Competent Person Scheme	Schemes introduced by Government to allow installers to self-certify their work, instead of it needing building regulation approval
DAERA	Department of Agriculture, Environment and Rural Affairs
DfC	Department for Communities
DEFRA	Department for Environment, Food and Rural Affairs
DoI	Department for Infrastructure
EICR	Electrical Installation Condition Report
EPC	Energy Performance Certificates
EVANI	Electric Vehicle Association Northern Ireland
EVs	Electric Vehicles
HPA	Heat Pump Association
IEA	International Energy Agency
IET	The Institution of Engineering and Technology
NIFRS	Northern Ireland Fire and Rescue Service
NSC	National Solar Centre
MCS	Microgeneration Certification Scheme (MCS)
OCN NI	Open College Network Northern Ireland
OPSS	Office for Product Safety and Standards
OZEV	Office for Zero Emission Vehicles
PRS	Private Rented Sector
SEUPB	Special EU Programmes Body
TESP	Electro-technical Skills Partnership
ULEVs	Ultra Low Emissions Vehicles



01 Our homes must change to meet net zero

Ensuring that existing homes, as well as those built for the future, are low carbon, resilient, and fit for a changing climate, is an imperative. So, it is important that any domestic retrofitting or upgrade does not create unexpected or additional risks for consumer safety.

In 2022, the Climate Change Act (Northern Ireland) was passed, which commits to reaching net zero by 2050.⁸ Currently, the reduction of greenhouse gas emissions in Northern Ireland is significantly less than the rest of the UK. For example, in 2020, England reduced emissions by 53%, Scotland by 51%, and Wales by 40%. In Northern Ireland, emissions were reduced by just 23.9% in the same period.⁹

This disparity puts extra pressure on Northern Ireland. If it wants to achieve its net zero objective by 2050, it will have to rely on consumers making considerable changes to their homes and the way that they use energy. Under the Climate Change Committee's (CCC's) Net Zero Balanced Pathway, over half of the UK's emissions needing to be cut to reach our target, must come from households and businesses adopting low carbon solutions. In Northern Ireland, nearly 14% of emissions in 2020 came from the residential sector.

Emissions by Sector

Figure 3: Greenhouse gas emissions by sector (%)⁸
Northern Ireland, 2020

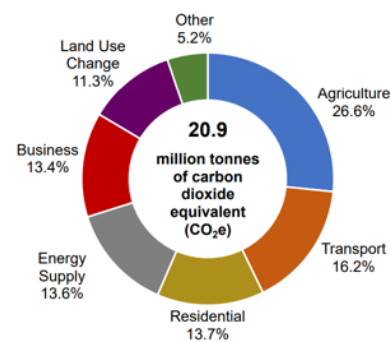


Table 1a: Greenhouse gas emissions by sector, change in MtCO₂e
Northern Ireland; Base year, 2019, 2020

Sector	Base year	2019	2020	MtCO ₂ e	
				Change base year to 2020	Change 2019 to 2020
Agriculture	5.3	5.6	5.6	0.3	0.0
Business	3.9	2.7	2.8	-1.1	0.1
Energy Supply	5.3	2.8	2.8	-2.5	0.1
Industrial Process	0.8	0.2	0.2	-0.5	0.0
Land Use Change	2.8	2.4	2.4	-0.5	0.0
Public	0.4	0.1	0.1	-0.3	0.0
Residential	3.7	3.0	2.9	-0.8	-0.1
Transport	3.4	4.3	3.4	-0.1	-0.9
Waste Management	1.8	0.7	0.7	-1.1	0.0

Figure 1: Greenhouse gas emissions by sector (%)
in Northern Ireland, 2020¹⁰

1.1 Northern Ireland's Draft Housing Supply Strategy

The Department for Communities' (DfC) draft *Housing Supply Strategy*¹¹ published by the Department for Communities (DfC) emphasises the need to build new homes and retrofit Northern Ireland's existing housing stock to meet the 2050 target. It sets out several commitments and interventions related to decarbonising Northern Ireland's housing stock, which are detailed below.

The strategy proposes key actions for decarbonisation and transition to carbon neutrality in the housing sector. They include reducing carbon emissions from new and existing homes, engaging with consumers throughout the transition, and supporting initiatives for energy efficiency and affordability. The document also discusses how increased funding would enable housing associations to build energy-efficient homes that exceed building regulations requirements, benefiting tenants and avoiding costly retrofits. The consultation stage of the strategy, which was completed in February 2022, will require Executive approval before it can be implemented.

1.2 The Policy Gap

Electrical Safety First welcomes the draft *Housing Supply Strategy* and its recognition of the impact energy transition will have on the everyday lives of people living in Northern Ireland. However, the strategy fails to mention electrical safety and its critical importance in the move to net zero. It also fails to refer to other crucial elements of decarbonisation, including the increased need for appropriately skilled electricians, new safety standards, upskilling, and training.

Nor do other, related, strategic documents produced by the Northern Ireland Executive – including *The Energy Strategy*, *The Path to Net Zero*, and *the Green Growth Strategy* – reference electrical safety. Yet it is imperative the final *Housing Supply Strategy* and the wider policy agenda places electrical safety at the core of the route to net zero.

Recommendation

The Department for Communities must take electrical safety into consideration when drafting the final *Housing Supply Strategy*.

The draft *Housing Supply Strategy* has proposed a target of building 100,000 new homes in Northern Ireland in the next 15 years.¹² To align with net zero ambitions, these homes must be built to high energy efficiency standards, with low-carbon heating and, where possible, a home electric vehicle (EV) charger installation – and housing developers must consider the impact of climate change on electrical safety. While the potential for electrical fires and hazards is higher in existing buildings, we must also minimise risk in new builds.

Retrofitting existing buildings is a major challenge that requires a holistic approach. It involves considering consumer behaviour and raising awareness about new electric-powered technologies. Unfortunately, consumer understanding of low-carbon technologies is currently limited; this lack of awareness hinders their adoption. Efforts are needed to close this knowledge gap.



The draft Housing Supply Strategy fails to mention electrical safety and its critical importance in the move to net zero.



02 Electrical safety in the future home

A net-zero-ready, future-proofed home is likely to consist of highly insulated building fabric and incorporate many technologies and solutions that are not commonplace in Northern Ireland today. As previously noted, features may include low-carbon heating, on-site renewable electricity generation and energy-efficient building services, such as improved ventilation and lighting.¹³ Many households will also want – where possible – on-site charging for their EVs.

Here, we outline some of the key technologies that are likely to play an important role within the home of the future – and we note that additional research is required to fully assess their potential risk. We have also highlighted how engagement with key stakeholders and consumers – to ensure effective policy development and preparedness for change – will be critical to a successful transition.

2.1 Heat pumps



A heat pump is electrical equipment featuring an efficient heating system that extracts heat from one source and transfers it to another, like a fridge or an air conditioning unit. Heat from the air or ground is absorbed into a fluid which then passes through a heat exchanger into the heat pump. This raises the temperature and transfers the heat to water.

The 2019 report published by the Climate Change Committee (CCC), *Reducing Emissions in Northern Ireland*, stated that “significant emissions savings” could be made in Northern Ireland by replacing conventional oil boilers with heat pumps.¹⁴ Yet the Northern Ireland Executive currently has no targets in place for installing heat pumps in its housing stock.

Although *The Energy Strategy* pointed to heat pumps as a potential solution for decarbonising heat, it stated that the sector is in its early stages in Northern Ireland.¹⁵ Nevertheless, there are moves to make it easier for households to install renewable technologies. The Department for Infrastructure recently introduced changes to permitted development rights to make it possible for heat pumps to be installed without the need for planning permission. The changes take effect in July 2023.¹⁶

As it establishes heat pump targets, we urge the Northern Ireland Executive to place safety considerations front and centre of any policy. To support safe market growth, it is important to address the need for more qualified and competent heating engineers and the role of electricians to ensure that heat pumps are correctly installed.

More than 95% of heat pumps sold in the UK use electricity as the main energy source. Electrical safety is therefore an essential aspect of operating and maintaining them. The Microgeneration Certification Scheme, which certifies microgeneration installations for renewable electricity technologies, such as solar PV, biomass, wind, heat pumps and heat products, considers that the installation and maintenance of heat pumps present a relatively low safety risk. However, it also flags a range of potential risks in relation to electrical safety.¹⁷



As it establishes heat pump targets, we urge the Northern Ireland Executive to place safety considerations front and centre of any policy.

“Electrical supplies: care should be taken with any appliance that utilises electricity in any way and should only be installed and serviced by a competent electrician.”

“...installers should also be familiar with all relevant health and safety legal requirements and information... [on topics including] general electrical safety.”

Source MCS (2020). Domestic Heat Pumps: A Best Practice Guide¹⁸

In the same way that traditional gas boilers require regular servicing, heat pumps must be maintained by an appropriately skilled certified installer or heating engineer.¹⁹ Currently, various mechanisms are in place to ensure the safety of fossil fuel heating systems and the protection of consumers, including the following.

- Boiler repairs must be undertaken by a Gas Safe Engineer, as it is illegal for someone who is not adequately trained to attempt to repair or replace a boiler.²⁰
- Under the *Gas Safety (Installation and Use) Regulations Northern Ireland 2004 Act*, landlords have a duty to arrange for a Gas Safe registered engineer to conduct checks and undertake maintenance of all pipework, appliances, and flues. Landlords are also required to arrange for an annual gas safety check every 12 months.²¹

At present, there are far more stringent requirements for domestic gas safety checks than those concerned with electricity, despite the fact that electricity causes more fires than gas in Northern Ireland’s homes. In 2018/19, electricity was responsible for 58% of domestic fires in Northern Ireland.²²

The future shift to electrified heating must be accompanied by rigorous standards for low carbon heat installations. Regular checks of electrical installations and connected equipment are essential, as they deteriorate with age and use. These checks can determine if they are in a safe, satisfactory condition, and operating correctly.

2.2 Solar PV



Solar photovoltaic panels, also referred to as solar PV, provide on-site, low carbon electricity generation, which can be used by the household or exported to the grid. Equipping homes with solar PV, battery storage and smart controls, will address the increased demand for electricity as a low carbon option – and will be an important part of Northern Ireland’s journey towards net zero.²³

The current low incidence of solar PV fires in Northern Ireland is due to their limited number and slow installation rate.²⁴ It will not remain so. Solar PV installation is expected to increase significantly, with incentives like the VAT reduction playing a key role. In a recent Housing Executive survey of their tenants, respondents said that they were saving money because of the solar panels on their property.²⁵

However, if PV systems are poorly installed, minor electrical faults can become a major hazard.²⁶ Solar panel systems cannot, for example, be switched off easily, or at all, and most have no automatic fire detection system, so a fire can rapidly take hold and spread before it is discovered. This may be exacerbated by the design of some panels, which can also make it more difficult to reach the fire with water.²⁷ Such issues illustrate the importance of ensuring high quality installations and conducting regular checks and maintenance – a fact highlighted in a recent investigation.

A study conducted by the UK’s Building Research Establishment Ltd (BRE), National Solar Centre (NSC)

and BRE Global Fire Safety Group, investigated 80 potential PV fire-related incidents. The research sample included domestic and non-domestic buildings throughout the UK, as well as solar farms. Researchers found that 58 incidents were believed to have been caused by PV, of which 22 were deemed to be “serious fires”.²⁸ They also noted that poor installation was one of the primary causes of these PV fires. Ensuring the competence of installers requires regular assessment and continuous professional development or upskilling to keep up with new research and innovations in the market.²⁹

In 2018, according to the Department for the Economy (DfE), Northern Ireland had 23,919 Solar PV sites generating electricity.³⁰ Increased use of solar PV globally has helped reduce their cost; the International Energy Agency (IEA) predicts that growth in EVs and heat pumps will further strengthen the financial case for Solar PV. It also foresees the cost of solar power costs reducing by between 15% and 35%, between 2020 and 2024.³¹ The market may not need long-term government support and will continue to grow. But, to do so safely, preparation by key stakeholders is also essential.

Effective guidance and education, for example, can help to prepare the Northern Ireland Fire and Rescue Service for this specific type of electrical fire and minimise risk when controlling its spread.

2.3 Battery storage

With the growing market penetration of renewable sources of electricity, such as wind and solar, energy generation is likely to become more variable and intermittent than today. Consequently, it will become increasingly important to balance services and system flexibility. Battery storage will play a critical role in storing surplus energy when it is not required, and in releasing it when renewable generation cannot match demand.³² There are, however, inevitable safety issues that must be considered. Lithium-ion batteries, which will be commonly used, can cause significant fires.

There are also concerns around domestic battery storage systems. Some households may, for example, combine battery storage with Solar PV, so that electricity generated during the day, when solar irradiance is high but demand is low, can be stored and used in the evening, when domestic use is

typically higher. A UK Government study on the safety risks associated with domestic battery storage systems found that fires or explosions can be caused by electrical misuse, as well as poor installation, manufacture, or design.³³ Other electrical risks may arise through environmental conditions, such as damp and moisture corroding and short-circuiting the system. It is essential that both installers and consumers understand these risks and the need for regular installation inspections.

Electrical Safety First recommends that any electrical installation work is undertaken by a registered electrician or enterprise with the necessary competence: for example, a member of an accredited registration scheme, operated by a recognised certification body. The Institution of Engineering and Technology (IET) has also produced a Code of Practice for Electrical Energy Storage Systems, to help practitioners to safely and effectively commission, specify, design, install and maintain these systems.³⁴ This code of practice could provide the basis for a regulatory framework to support this policy area.

2.4 Building fabric efficiency measures

Improving the fabric efficiency of buildings across Northern Ireland is an important step on the route towards net zero, but installing insulation can also present an electrical safety risk. It is important that installations are undertaken by appropriately skilled certified installers and that relevant sectors work together to ensure homes can be retrofitted safely.

Unlike other parts of the UK, Northern Ireland does not have a specific Heat in Buildings Strategy. By comparison, Scotland's strategy lays out the proposal for a strengthened regulatory framework, through which all homes should achieve a higher energy efficiency rating. The aim is for as many homes as possible to have an energy performance certificate (EPC) in Band C by 2030, with all homes reaching at least this standard by 2033. Specifically, it aims for households in fuel poverty to be EPC Band C by 2030 and Band B by 2040.³⁵

Northern Ireland's Energy Strategy

The Energy Strategy: The Path to Net Zero Energy for Northern Ireland, which was published in January 2022, considers the need to retrofit around 50,000 buildings each year – approximately three times the current level.³⁶ It also states the Executive's intention to establish retrofitting standards, including the use of EPCs, and notes the need for quality assurance and financial support.

Fabric efficiency measures can interact dangerously with electrical installations and appliances. When building fabric insulation is applied where electrical cables are present, it must be installed in a way that minimises contact between it and the electrical installation. Insulation materials typically have low thermal conductivity, to reduce heat loss, but this can lead to the overheating of cables and electrical equipment. Additionally, certain insulating materials can cause the plasticiser contained within the PVC cables of an installation to migrate, creating cable degradation and, in a worst-case scenario, fire.³⁷

Regulations have been developed to reduce or limit overheating from fabric efficiency measures, to prevent damage to the cable, insulation, or connected accessories.^{38,39} Caution is needed when cables are surrounded by thermal insulation, or cables are routed in a thermally insulated wall, or above a thermally insulated building.

Insulation over or around light fittings can also create a risk of overheating and fire, and poorly installed downlighters increase these risks. Downlighters and any associated transformers must not be covered by thermal insulation.

Energy efficiency installers must be educated on the electrical safety risks associated with loft and wall insulation, and more needs to be done. The Open College Network NI Level 2 qualification in Retrofit Skills for Building Fabric and Services gives installers the necessary information to undertake domestic retrofits, including external insulation. However, the course overview includes no specific mention of electrical safety hazards.⁴⁰

There is also a concern that, with insulation material readily available via DIY outlets, consumers will seek to install energy efficiency improvements themselves, unaware of the safety implications – and, probably, the legal requirements.

2.5 Electric Vehicles (EVs)

In line with UK policy, the Northern Ireland Executive will phase out the sale of new petrol and diesel vans and cars by 2030.

Inevitably, as EVs become more popular there will be increased demand for chargers at home and in public places. An investigation by Electrical Safety First in 2019 suggested that, without sufficient and easy access to EV chargers, people will charge their vehicles unsafely. It found, for example, that 74% of those interviewed claimed that a lack of accessible public charging points led them to use domestic multi-socket extension leads – not suitable for outdoor use – to charge from the mains in their home.⁴¹

Current context

In a survey by the Northern Ireland Assembly's Infrastructure Committee, 92% of respondents indicated that the biggest challenge of EV adoption in Northern Ireland was the lack of available charging points.⁴² If the sale of EVs is to increase, then the need for both domestic and publicly available charging points will continue to grow.

In 2021, 3,779 EVs were registered in Northern Ireland.⁴³ Yet according to the Electric Vehicles Association of Northern Ireland (EVANI), there are only 345 public EV chargers available. The UK Government's Department for Transport figures shows Northern Ireland has the lowest number of publicly charging devices across the UK, with only 18 charging devices per 100,000 people.⁴⁴

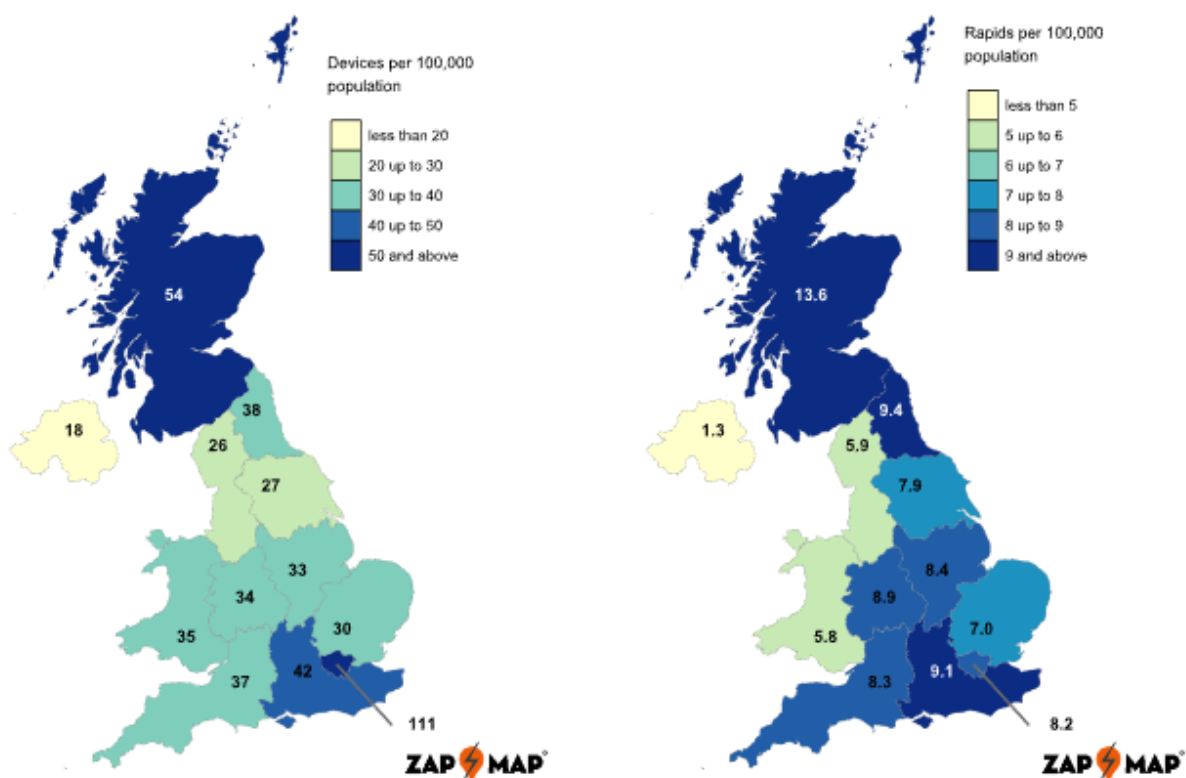


Figure 2 - Maps 1 and 2: Total and rapid public charging devices per 100,000 of population by UK region 1 April 2022.⁴⁵

There have been some attempts to reduce this disparity. The Department for Infrastructure (DfI) has made £455,371 of match funding available to the FASTER project, managed by the Special EU Programmes Body (SEUPB). This project will see the installation of 73 charging points across Northern Ireland, the Republic of Ireland and the West coast of Scotland by May 2023.⁴⁶

The DfI has also made around £350,000 of match funding available to local councils applying to the On-Street Residential Charge Scheme. A consortium led by Derry and Strabane Council was awarded £1,348,370 from the Office for Zero Emissions Vehicles (OZEV), with £500,000 of this coming from match funding from the DfI.⁴⁷ OZEV has also made grants available in the UK for installing EV charge points. Previously open to all households, it has recently been restricted to those who own flats or live in rented properties.

Additionally, as part of its Levelling Up agenda, the UK Government provided Irish energy company ESB with £3.27 million, to improve and expand Northern Ireland's EV charging network.⁴⁸ Local start-up Weev has also invested £20m to install 1,500 chargers in Northern Ireland by 2024.⁴⁹

This funding, and the work of the DfI's EV Infrastructure Taskforce, are to be welcomed. However, further expansion of Northern Ireland's charging infrastructure, to encourage EV take-up and ensure that drivers do not resort to unsafe charging, is essential.

Recommendation

To prevent unsafe charging practices and avoid geographical disparities, the Department for Infrastructure, local authorities, and industry should work together on a coordinated mapping effort to ensure there is sufficient EV charging infrastructure.

Electrical Safety First's research indicates that an inadequate public EV charging infrastructure results in drivers taking risks, by opting for dangerous charging methods at home. Some of the hazardous charging practices people may adopt if they cannot access a charging point are outlined below.⁵⁰

Examples of dangerous EV charging practices

Using standard domestic extension leads to charge vehicles outside. Wet conditions and contact with the ground mean that the risk of injury or death from electric shock is much greater outside, compared to using electrical equipment indoors.

Daisy-chaining extension leads together.

This dramatically increases the risks of socket overload and electric shock and can also place excessive physical strain upon both socket and extension lead. This practice also leads to extension leads, intended for temporary supply of power, rapidly becoming permanent.

Allowing extension leads to cross pavements.

In urban areas particularly, the sight of charging cables crossing pavements has become common, despite it being against the law, and creating an additional hazard for pedestrians. Any accidental stress on these leads can also damage the cable, plug and socket – increasing the risk of electric shock and fire.



74% of those interviewed claimed that a lack of accessible public charging points led them to use domestic multi-socket extension leads - not suitable for outdoor use - to charge from the mains in their home.

In its 2023 annual consumer survey, Electrical Safety First asked a sample of Northern Ireland's EV and hybrid drivers about any EV charging issues that concerned them.⁵¹

- Almost 46% found that being unable to access a charger, either because it was already in use, or broken, was a concern.
- 24% cited the expense of using public EV chargers – a greater level of dissatisfaction than the rest of the UK.
- Approximately 17% claimed accessibility of location was an issue.
- Only 9% had no concerns regarding EV charging availability.

Dedicated home charging points have built-in safety features and most home chargers – which are rated at 7 kW – are wired directly to the fixed electrical installation on its own circuit. This safety enhancement also allows for separate monitoring from other electrical loads.⁵²

OZEV provides a list of authorised installers and, as of May 2021, there were 4,482 home charge installers in the UK.⁵³ There were no specific figures available regarding the number of approved installers in Northern Ireland. However, installers are only required to be registered to complete installations when government grants are provided. In other words, EV charge points installers do not have to be OZEV-registered.

To maximise safety and minimise electrical risks, it is crucial to engage a qualified and competent installer, such as a registered electrician, when installing EV chargers. These high-powered devices are commonly situated outdoors and are exposed to elements like dampness and rain. Consequently, protective measures are essential to reduce risk.

With the recent restriction of the OZEV grant, the potential that consumers might use non-certified installers has become a growing concern, particularly as we are in the midst of a cost-of-living crisis. If uncertified installers are employed, the risk of unsafe installations rises significantly.



Access to EV charging infrastructure is particularly problematic for some, particularly those living in rural areas, tenants reliant on landlord permission to install a home EV charger, and those living in flats or apartments without designated parking spaces.

Access to EV charging infrastructure is particularly problematic for some, particularly those living in rural areas, tenants reliant on landlord permission to install a home EV charger, and those living in flats or apartments without designated parking spaces. Approximately one-third of Northern Ireland's housing stock consists of terraced houses or flats.⁵⁴

There is a clear – and growing – need for both domestic EV charge points, where possible, and an expanded public infrastructure, to ensure that everyone, regardless of location or tenure, can charge their EV safely and responsibly.

Recommendations

The Department for Infrastructure should consider incentives for low-income households to install charging infrastructure at home and to encourage the use of Office for Zero Emission Vehicles authorised installers.

The Department for Communities should consider measures to ensure those living in rented accommodation have clear routes for installing EV charging infrastructure, such as changes to standard tenancy agreements and housing standards.



03 Housing

Ageing housing stock has inherent safety risks and presents a major challenge to our net zero ambitions. Inevitably, the integrity of an installation will degrade over time, and many older homes will have outdated electrical installations, some unchecked for years. 60% of Northern Ireland's homes were built before 1980 and are classified as older properties.⁵⁵

The DfE estimates that 70% of buildings in use in 2010 will still be occupied in 2050.⁵⁶ Older properties with older electrical installations may not be able to cope with future electrical demand and requirements – including a combination of a heat pump, EV charging and solar PV – risking electrical fires or outages, particularly if installations are not maintained by qualified and competent professionals.

The 2016 *Northern Ireland House Condition Report* states: “Electrical hazards made up 2,000 of the category 1 hazards ordered to repair in 2016.”⁵⁷ This was based on an inspection by a surveyor for 24,630 homes, or 3.2% of the total stock.⁵⁸

3.1 The need for comprehensive data

National housing surveys, such as the Northern Ireland House Condition Survey, offer a snapshot of existing building stock, but do not assess whether homes are equipped for the future. Given the urgent need to achieve net-zero ambitions, an updated evaluation is now more important than ever, to understand the condition, age, and capacity of electrical installations in Northern Ireland's homes.

The current Northern Ireland House Condition Survey fails to capture key data related to electrical safety and the integration of low carbon technologies. Consequently, it remains unclear how many homes meet minimum electrical safety standards, and whether capacity limitations might hinder the adoption of low carbon technologies. Improved data collection is necessary to address these knowledge gaps, to ensure a safe and sustainable future for Northern Ireland's homes.

Incorporating specific questions on the condition of electrical wiring and capacity, as part of national housing surveys, is essential for several interrelated reasons. Firstly, it allows for improved targeting of resources. Secondly, it helps us understand how prepared the sector is for the energy transition. Thirdly, it would help raise industry awareness of the need to consider the safety and effectiveness of an electrical installation within wider renovation or remedial work.

Additional housing data critical to a net-zero transition – and current electrical safety concerns – could also be obtained from Northern Ireland’s Fire and Rescue Service. Currently, their reporting system does not record property age and tenure. Yet they are key factors in mitigating existing electrical fire risks in a targeted way and evaluating readiness for the transition to low-carbon energy.⁵⁹

Recommendations

The Northern Ireland Housing Executive should enhance future House Condition Surveys to gather comprehensive data on electrical installations and load capacity constraints.

The Department for Health and Northern Ireland Fire and Rescue Service should collect and publish more data on electrical house fires, including property age, tenure and emerging home technologies such as lithium-ion powered products and solar PVs, to inform effective policy development and strengthen risk reduction strategies.

3.2 The Importance of cross-tenure electrical safety checks

Regular five-yearly checks of electrical installations, by registered electricians, would support the decarbonisation of the housing stock and help ensure that homes are safe.

In Northern Ireland, a requirement for electrical safety checks in the private rented sector (PRS) is included in the Private Tenancies Act 2022.⁶⁰ Regulatory details, including their frequency, are currently being developed, and are subject to Assembly approval before coming into force.

Electrical Safety First believes that everyone, regardless of tenure, should be protected from electrical risk. We believe that the social rented sector (SRS) should be legally required to adopt the same measures as the PRS. And the owner-occupied sector, the largest housing tenure in Northern Ireland, is in fact the least protected. To encourage electrical safety checks by homeowners, we propose using “trigger points” – such as when a property is bought or sold – and mandating an Electrical Installation Condition Report (EICR) at that point. A buyer would then know the condition of the electrical installation at the time of purchase. Equally, an EICR could become a condition of lending for new mortgages.

Electrical fires cause 58% of house fires in Northern Ireland – and fire does not discriminate. So, we are particularly concerned about electrical safety in mixed tenure buildings, where fire might more easily spread from one household to another.

As our reliance on electricity increases, it would be logical – and equitable – to establish a cross-tenure standard for electrical safety in Northern Ireland. Such a framework would also help to develop a more comprehensive understanding of retrofit preparedness in Northern Ireland’s housing stock.

Recommendation

The Department for Communities should implement a common housing standard for electrical safety in Northern Ireland, mandating five-yearly checks for all rented homes and introducing regular inspection and testing for owner-occupied properties.



As homes are decarbonised and we increasingly rely on electricity, parity between electrical and gas safety, including consumer support and protection, is essential.

Protecting those most at risk

Energy suppliers in Northern Ireland belong to a Customer Care Register. Gas services providers can offer customers who meet certain criteria and qualify to be on this register a free gas safety check, or boiler service. At the time of writing, no energy company offers an equivalent electrical safety check.

Electricity causes more fires in UK homes than gas. As homes are decarbonised and we increasingly rely on electricity, parity between electrical and gas safety, including consumer support and protection, is essential.

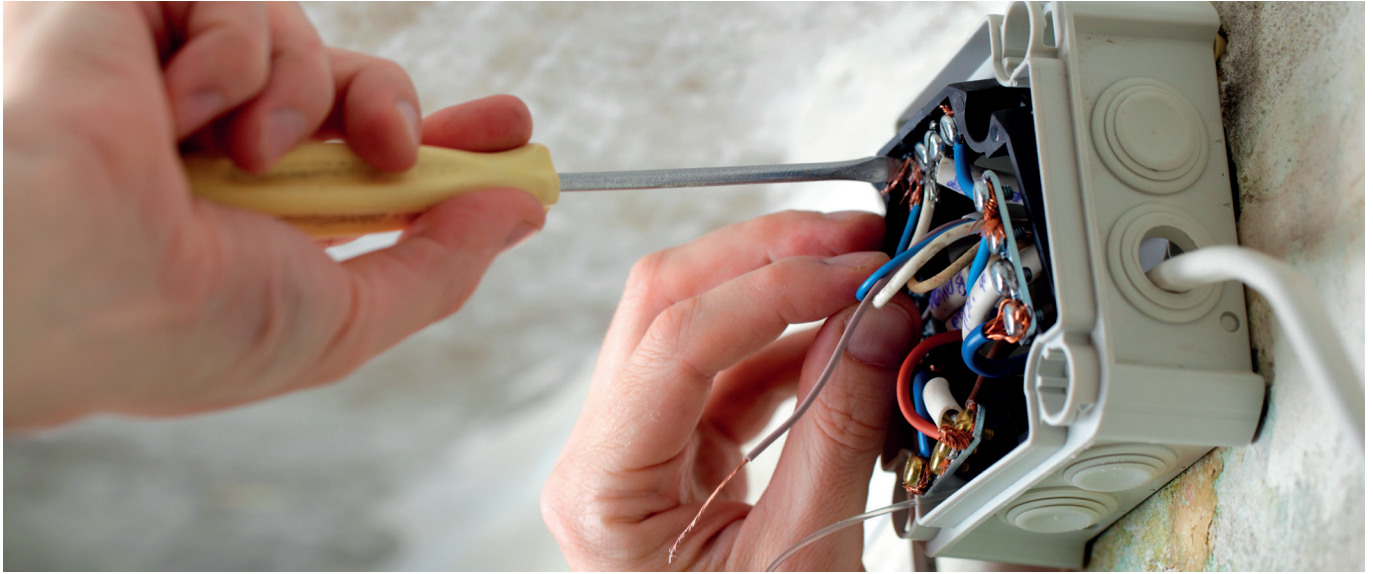
Recommendation

The Department for the Economy and energy suppliers should establish free services including electrical safety checks to support vulnerable consumers as we become more reliant on electricity.

Northern Ireland's Energy Strategy discusses the financial support that may be required for retrofitting and energy efficiency measures, particularly for the most vulnerable.⁶¹ Electrical Safety First believes that financial support for retrofits must allow for safety improvements to be made, alongside any work needed to support the adoption of low carbon solutions. Without this support, some consumers will try to minimise compliance costs – either by using unregistered or rogue contractors, or even by undertaking the work themselves.

Recommendation

The Department for the Economy should ensure that any funding made available for low carbon home technologies has a portion reserved for associated remedial and/or ancillary works, such as rewiring, or the installation of a new consumer unit (i.e., as a fuse box).



04 Clearing the route to net zero

4.1 The Skills Gap

Despite the home of the future becoming increasingly reliant on electricity, evidence suggests a looming shortage of qualified and competent electricians. A labour market report by the Electro-technical Skills Partnership (TESP) estimates that an additional 12,500-15,000 electricians will be required in the UK by 2024.⁶² It suggests that, even if an additional 5,000 new apprentices qualified by the end of 2023 – a 33% increase from 2019 – there would still be a significant shortfall in registered electricians in the UK.⁶³

TESP's report also found 91% of employers in Northern Ireland expected an increase in the demand for skilled workers, with 73% expecting a similar requirement for semi-skilled workers.⁶⁴ Research by Ulster University's Centre for Sustainable Technologies suggests that, in the next thirty years, future job creation in Northern Ireland – through retrofitting schemes alone – could "provide up to 350,000 jobs annually."⁶⁵

Ulster University's research also highlighted issues that could contribute to a skills shortage in Northern Ireland, including a potential reduction in the

workforce because of Brexit, and a 'skills flight' to other countries, because of limited training opportunities.⁶⁶ Evidence clearly shows the urgent need to invest in, and grow, the number of registered electricians, and other appropriately skilled installers, with the skills and competencies required for new low carbon technologies – now.

4.2 Growing the installer base

Apprenticeships will be crucial to expanding the skilled workforce that Northern Ireland will need to make homes electrically safe in the future. Yet there are no apprenticeship opportunities in energy efficiency, or low carbon technologies, currently available in Northern Ireland.

Employers in Northern Ireland, in common with the rest of the UK, pay an Apprenticeship Levy if their annual tax bill exceeds £3 million. In England, the levy directly funds apprenticeships. In other parts of the UK, businesses can claim back the levy cost, or receive some direct benefit from the payment. However, neither of these options are available in Northern Ireland.⁶⁷

This inconsistency has arisen because the Apprenticeship Levy falls under taxation – one of Westminster’s reserved powers – while the policy for apprenticeships is devolved. There is no obligation for alignment on this issue, as funds generated from the scheme are returned via the Barnett Consequential, not earmarked for specific items. Unfortunately, this situation has a negative impact on apprenticeships in Northern Ireland. Businesses have no incentive to employ them, and valuable apprenticeship funding is not being used for its intended purpose.

The lack of skilled installers can be addressed by optimising existing training mechanisms. The DfE must prioritise investment in Northern Ireland’s apprenticeships programme – and expand it to offer apprenticeships within the renewable energy sector.

The DfE’s own data shows the existing interest in electrotechnical training. In October 2021, there were 1,796 electrotechnical apprentices, placing it in the top three most popular apprenticeships in Northern Ireland. There seems little doubt that further development of electrotechnical apprenticeships, supported by political action and financial support, would be well received.⁶⁸

Young people can also be encouraged to consider a career in the low carbon and electro-technical industries, if benefits and opportunities are promoted and barriers are removed – particularly the lack of suitable training. Some will also be attracted to working in a sustainable industry that is helping to address climate change. Research shows that 78% of people want to play a part in reaching the net zero goal, and 57% want to work for an organisation that helps us get there.⁶⁹

According to TESP’s report, most employers in Northern Ireland believe the transition to low carbon and emerging technologies is moving slowly, with many waiting for other businesses to take the lead.⁷⁰ A lack of information on, or awareness of the technologies, and reliance on others in the supply chain, are the main reasons cited. The CCC has also noted that, in the UK, “the chopping and changing of Government policy has inhibited skills development in critical areas”.

Without the certainty of fixed policy, and in the absence of regulation, monitoring, and enforcement, obtaining essential business investment will be

problematic. A lack of investment could also create significant safety concerns: inexperienced, unqualified and incompetent individuals could enter the field to meet increasing demand. The Northern Ireland Executive should provide a clear road map to net zero with detailed policies for residential properties, to encourage businesses to invest and act.

The shortfall in registered electricians and other skilled installers – combined with a need to upskill the current workforce in low carbon solutions – could lead to consumers employing unregulated or unqualified individuals. There is also a risk that, if a consumer cannot find a suitably qualified installer, or the cost of work is considered too high, they may undertake electrical work themselves. Loft insulation, for example, is readily available from trade and building supply stores and there are limited barriers to discourage consumers from undertaking DIY.

Recommendation

The Department for the Economy should introduce a clear and consistent policy framework for the green skills agenda to provide industry with long-term certainty of demand and encourage investment in upskilling, including grants and/or tax incentives.

4.3 Developing a skilled and competent workforce

Simply growing the number of installers and electricians is not enough. Tradespeople involved in the transition to net zero must be able to access training to upskill. They must also become ‘cross-skilled’, understanding the complexities of how different emerging technologies work together. Domestic electricians can expand their skill set and provide a whole-building approach to safety approach, installing a range of electrical technologies to improve efficiency and reduce energy costs.

While specific training courses have been developed to enhance the skills of installers, concerns persist regarding competency, which is evaluated through

regular assessments. Currently, there are several upskilling courses available in Northern Ireland in the area of renewable energy. The 'Skill Up' flexible skills programme – funded jointly by the DfE, the Department of Finance (DoF), and the Northern Ireland Office – offers free, short courses delivered by local Further Education and Higher Education providers.⁷¹

Areas included in the Skill Up programme are:

- hydrogen energy systems and zero carbon engineering, at Queen's University Belfast;
- green technology and hydrogen safety, at Ulster University; and
- heat pump certification, at South Regional College.

There is a clear opportunity for these courses to cover electrical safety and its importance. There is equally an opportunity to provide a wider range of electrotechnical upskill courses to support the future transition of skills in Northern Ireland.

Northern Ireland Skills Strategy

The Northern Ireland Skills Strategy, *Skills for a 10X Economy*, was published in March 2022, and covers the next eight years, up to 2030.

The strategy acknowledges the challenges of achieving the 2050 net zero target. It emphasises the need for new skills in greener sectors, such as construction, energy, and transport. It also highlights the importance of strategic planning, and collaboration with relevant organizations, to develop and establish these necessary skills.⁷²



In a recent survey, almost 70% of electricians indicated that they felt lacking in the necessary skills and knowledge to install EV equipment confidently.

Recommendation 24 of the Skills Strategy for Northern Ireland:

“The Department for the Economy’s Energy Strategy discusses the substantial and underpinning role of skills development in delivering on our commitment to a net zero carbon future and our vision for a 10x economy recognises low and zero carbon technologies as a key opportunity in Northern Ireland. It is imperative that work begins immediately to fully understand the short-, medium- and long-term requirements of our education and training sectors that will enable us to maximise the economic opportunities from the global drive to tackle climate change, deliver a just transition for individuals across our society and to meet our carbon reduction commitments.”⁷³

This recommendation is welcome, as it recognises that this skills shortage is urgent. The short-, medium-, and long-term requirements of education and training sectors in Northern Ireland must be developed.

The current competency gap is evidenced by several studies. In a recent, UK-wide survey, almost 70% of electricians indicated that they felt lacking in the necessary skills and knowledge to install EV equipment confidently. Barriers to upskilling in EV technology included lack of time (76%), and the high associated cost (46%).⁷⁴

Similarly, a BEIS study found 29% of UK heating engineers who had installed a heat pump in the past 12 months had not received dedicated heat pump training.⁷⁵ BEIS also asked installers in England and Wales what they considered barriers to upskill for low-carbon technologies. The top three mentioned were proximity to retirement (35%), lack of consumer demand (25%), and lack of time (15%).⁷⁶ TESP have also highlighted concerns that Northern Ireland has a lack of training opportunities, and that training courses often fail to meet the needs of employers.



Potential Initiatives to Increase the Uptake of Heat Pump Training and Upskilling Activities in England and Wales.

Installer research indicates that a range of initiatives to increase upskilling are popular.

- **88%** of surveyed installers support the idea of extending the law so that a register applies to all heating system installers and installations, not just gas.
- **86%** of surveyed installers support the idea of 'low carbon training schemes which are only accredited if they are delivered to an agreed standard'.
- **83%** of installers support the idea of 'subsidised costs for low carbon training /voucher schemes to retrain'.

Other popular measures included mandatory low carbon modules in all heating/plumbing qualifications and a requirement upon installers to complete training in low carbon heating to register with key trade organisations within the sector.

Source: BEIS (2021) Heating Systems in off Gas Grid Areas: Installers' Experiences and Attitudes Towards Low Carbon Heating

Certified installers play an important role in future-proofing homes and minimising risk. The barriers to training and upskilling faced by electricians and heating engineers must be addressed to ensure high quality, safe, installations. It is also important that other trades working in the home retrofit sector understand the electrical safety risks associated with poor quality installations.

Advice and guidance

Installers are often seen as the most important source of advice and guidance for consumers. A BEIS survey discovered 79% of people changing their heating system found their heating engineer a helpful source of advice.⁷⁷

There is also a need for a comprehensive review of Northern Ireland's Building Regulations, to assess building stock readiness for a low carbon future. Currently, UK Government schemes require installers to meet minimum standards, and register with certification schemes like Trustmark, PAS 2030, and MCS. However, there is a lack of certification requirements for work undertaken without a

government grant, which places self-funded consumers at risk. Proper regulatory oversight and enforcement are key. Consumer education and redress mechanisms must be established to ensure consumer protection, and mandatory requirements for competency and consistent quality of installation should be considered.

Recommendations

Education providers should offer training courses to upskill professionals. Apprenticeship standards should include energy efficiency/low carbon content. Government funding, both current and additional, can support this initiative.

The Northern Ireland Executive should increase its promotion of registered electricians and raise awareness of where consumers can find them.

05 Consumer Education



5.1 Low carbon technologies and electrical safety

Consumers need to be at the heart of the transition to net zero, and government must not underestimate the challenge this presents.

Electrical risks in the home are affected by the way consumers use electrical products, where – and who – they purchase them from, and who they choose to install them. So, consumer education for a low carbon economy, with a host of new and emerging technologies, is fundamental. Research indicates very low levels of awareness of certain technologies, such as heat pumps (see figure 5). Knowledge and understanding of the benefits of low carbon technologies is also low. A BEIS report found 21% of heating engineers surveyed saw lack of awareness, knowledge and understanding among consumers, as a barrier to heat pump deployment.⁷⁸

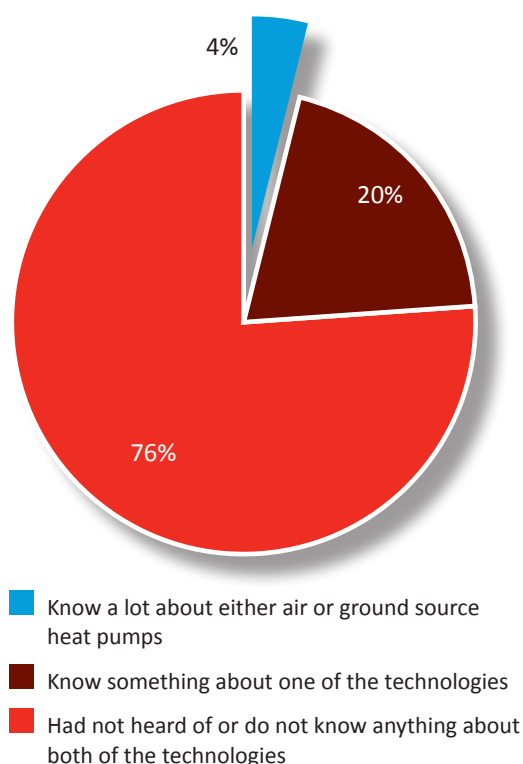


Figure 5: Consumer Awareness of Heat Pumps. Data From: BEIS.

The importance of consumer engagement and information campaigns to build awareness of the key technologies in the future home should not be underestimated. Without such initiatives, consumers unaware of the best installations for their home, and how to maintain them. As a result, the mainstreaming of low-carbon and related technologies will be obstructed, and the safety risk increased.

Recommendation

Energy advice organisations should ensure that information campaigns around net zero home technologies include links and guidance on electrical safety and help for consumers to find qualified and competent installers in their region.



...consumer education for a low carbon economy, with a host of new and emerging technologies, is fundamental.

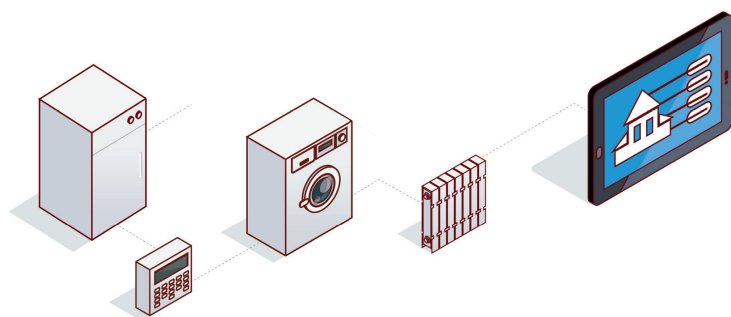


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