Agenda Item	5
Report No	HC/04/26

The Highland Council

Committee: **Highland Council**

Date: **26 March 2026**

Report Title: **Climate Change, Energy and Community Resilience**

Report By: **Assistant Chief Executive - Place**

1 Purpose/Executive Summary

1.1 Climate change is already affecting the Highlands

Climate change is already affecting communities, infrastructure and public services across the Highlands and these impacts are expected to intensify over coming decades. This will place increasing pressure on Council assets, infrastructure and service delivery. Storm damage alone in Highland has cost the Council £895k to the end of quarter 3 2025/26.

Economic modelling suggests that unmanaged climate risks could reduce regional GDP by around 1.5% annually by the 2050s, increasing to over 3% by the 2080s, while flood-related damages could rise from approximately £1m per year today to more than £20m by the 2050s.

At the same time, the Highlands play a central role in Scotland's transition to a low-carbon energy system. The region generates substantially more renewable electricity than it consumes and hosts nationally significant energy infrastructure. Despite this, many communities continue to experience high energy costs, constrained electricity networks and significant levels of fuel poverty.

Climate mitigation reduces greenhouse gas emissions and supports the transition to low-carbon energy systems, while climate adaptation prepares communities and infrastructure for impacts that are already unavoidable.

Without a coordinated approach, there is a risk that infrastructure investment, housing improvement and energy system development across the Highlands will progress in a fragmented way, limiting the benefits for local communities and increasing long-term costs and pressures on public services.

This report sets out a coordinated approach to climate and energy resilience across three interconnected areas:-

- climate adaptation;

- climate mitigation and energy transition; and
- cross-cutting foundations, including housing, natural systems and community infrastructure

Together, these areas provide a framework for aligning climate action, infrastructure planning and investment activity across the Council.

The report highlights the scale of the challenges facing the Highlands, including high levels of fuel poverty, the need for large-scale housing retrofit and increasing pressure on infrastructure from climate impacts. It also identifies the opportunities associated with the region's role in the national energy system and the transition to a low-carbon economy.

A coordinated approach will support better alignment of housing improvement, energy infrastructure, environmental management and economic development. It will also help ensure that the Highlands are well positioned to benefit from national investment linked to the energy transition.

The report therefore seeks to support a more coordinated, place-based approach to climate and energy activity across the Council, strengthening long-term resilience, supporting sustainable economic development and improving outcomes for communities.

1.2 Strategic Alignment

The approach outlined in this report aligns with and supports delivery across a number of established Council strategies, statutory frameworks and corporate programmes.

1.3 A Framework for Climate and Energy Resilience

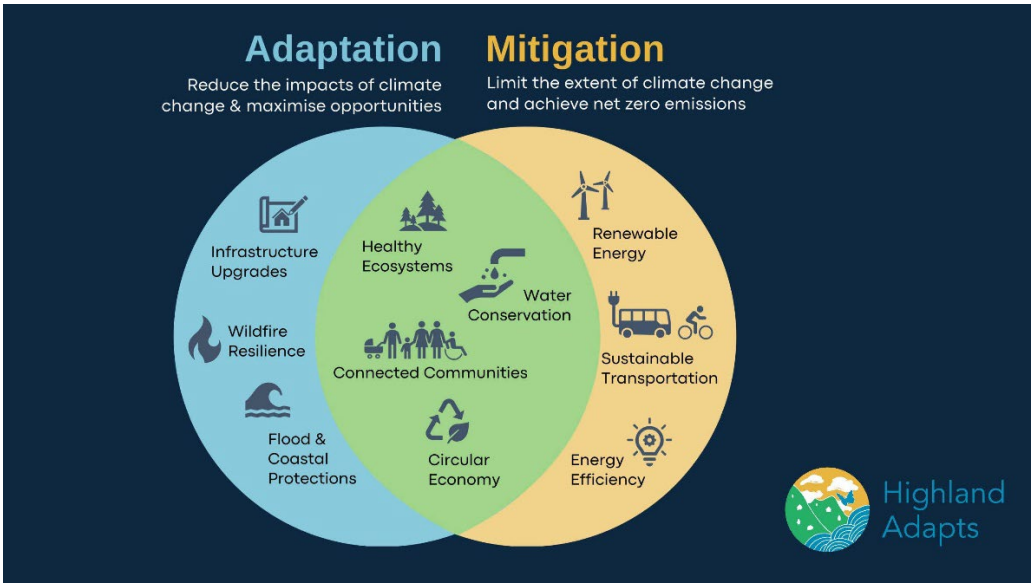

Image supplied by Highland Adapts

Climate Adaptation	Climate Mitigation and Energy Transition	Cross-Cutting Strategies
Highland Climate Change Adaptation Strategy and Action Plan	Highland Council's Net Zero Strategy	Our Future Highland Delivery Plan
Highland Climate Change Risk and Opportunity Assessment (HCCROA)	Highland Council's Local Heat and Energy Efficiency Strategy (LHEES) and Delivery Plan	Future Operating Model – Designing a Council for the Future
Highlands Adapts	Local Transport Strategy	Highland Investment Plan
Regional Coastal Change Adaptation Plan	Sustainable Transport Approach	Invest Highland
Flood Risk Management Plans		Social Value Charter
		Ecology Strategy
		Tree Management: Trees, Woodland & forestry Strategy
		Green Space Strategy *(forthcoming)*

2 Recommendations

2.1 Members are asked to:-

i. **Agree** the strategic context and direction set out in this report, recognising the increasing climate risks facing Highland communities and infrastructure and the Highlands' central role in Scotland's transition to a low-carbon energy system;
ii. **Agree** Embedding the voice of young people within the Council's approach to climate change, energy and community resilience, recognising the long-term impact of these decisions on future generations, and to develop mechanisms to ensure that youth perspectives are reflected in policy development, investment planning and programme delivery.
iii. **Agree** strengthened coordination across Council services, supported by the Council's Climate Change and Energy Team, to enable a place-based approach to climate change, energy and resilience within infrastructure planning, housing programmes and long-term asset management;
iv. **Agree** the continued development of coordinated investment pipelines across climate adaptation, renewable energy, housing retrofit and infrastructure

resilience, including the incorporation of climate resilience schemes within the developing Invest Highland infrastructure prospectus;

v. **Agree** continued strategic engagement with government, regulators, network operators, renewable energy developers and investment partners to ensure the interests of Highland communities are reflected in national energy system reform and infrastructure planning;

vi. **Agree** that further work be undertaken to develop proposals for a sustainable long-term delivery model to support the Council's climate change, energy and resilience programme outlined in this report, recognising that effective delivery will require sustained organisational capacity and programme coordination aligned with long-term programme delivery rather than short-term project funding cycles, with any proposals brought back to Council for future consideration; and

vii. **Agree** that, in May 2026, the Council writes to the Scottish Government seeking clarity on the future funding model for flood protection schemes and engineered flood defence infrastructure, recognising the increasing climate risks facing Highland communities, including the 29 communities currently identified as being at risk from coastal erosion.

3 Implications

3.1 **Resource** - There is currently no dedicated budget for the coordinated delivery of climate change, energy and resilience activity across the Council.

Many climate adaptation measures, including large-scale flood protection infrastructure, currently have no dedicated funding allocation and will require future national investment and partnership solutions.

At present, activity and the costs associated with climate and weather-related impacts are largely managed within existing service budgets. The Council's Medium-Term Financial Plan recognises climate and weather-related events as a growing financial risk, with the Reserves Strategy, including the minimum 3% General Fund reserve level, providing contingency for such pressures.

The programme-led approach outlined in this report is intended to strengthen coordination across existing activity, helping to reduce long-term financial risk while improving the Council's ability to secure external funding and investment.

3.2 **Legal** - The Council has several requirements in respect of reporting against its climate change obligations, in addition to being required to directly support Scotland's target to end its contribution to climate change no later than 2045.

3.3 **Risk** - Climate change, energy system transition and infrastructure resilience present increasing strategic risks for the Council. Strengthening coordination across climate, energy and infrastructure planning supports improved long-term risk management and financial resilience as in **Appendix 2**.

3.4 **Health and Safety (risks arising from changes to plant, equipment, process, or people)** – There are no direct health and safety implications arising from this report

3.5 **Gaelic** - There are no direct Gaelic implications arising from this report.

4 Impacts

4.1 In Highland, all policies, strategies or service changes are subject to an integrated screening for impact for Equalities, Poverty and Human Rights, Children's Rights and Wellbeing, Climate Change, Islands and Mainland Rural Communities, and Data Protection. Where identified as required, a full impact assessment will be undertaken.

4.2 Considering impacts is a core part of the decision-making process and needs to inform the decision-making process. When taking any decision, Members must give due regard to the findings of any assessment.

4.3 Integrated Impact Assessment - Summary

4.3.1 An Integrated Impact Assessment screening has been undertaken on 11 March 2026. The conclusions have been subject to the relevant Manager Review and Approval.

4.3.2 The Screening process has concluded the following impacts as set out in 4.3.3 and **Appendix 1**. Members are asked to consider the summary in **Appendix 1** to support the decision-making process

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4.3.3 Impact Assessment Area

Impact Assessment Area	Conclusion of Screening/Full Impact Assessment
Equality	Protected characteristics – no impact
Socio-economic	Positive impact
Human Rights	No impact
Children's Rights and Wellbeing	Positive
Island and Mainland Rural	Significant differences
Climate Change	Positive impact
Data Rights	No impact

5 Three Areas of Climate and Energy Resilience

5.1 A Unique Regional Context

The Highlands are already experiencing the impacts of climate change while also playing a central role in the transition to a low-carbon energy system.

Communities and infrastructure across the region are increasingly affected by flooding, coastal change and more frequent severe weather events. These impacts are expected to intensify over coming decades, increasing pressure on infrastructure networks, public services and local communities.

At the same time, the Highlands host nationally significant renewable energy generation and electricity transmission infrastructure and already generate

substantially more renewable electricity than is consumed locally. This places the region at the centre of Scotland's transition to a low-carbon energy system.

Despite this role, many Highland communities continue to experience high electricity costs, constrained electricity networks and significant levels of fuel poverty. This reflects a wider imbalance where the Highlands host infrastructure critical to national decarbonisation while many of the costs and constraints associated with the energy system are experienced locally.

Understanding and responding to this context is therefore central to strengthening the long-term resilience, sustainability and economic wellbeing of Highland communities.

5.2 A Connected Climate and Energy Challenge

Climate change and the energy transition are closely interconnected challenges. Reducing greenhouse gas emissions is essential to limit the scale of future climate change, while adaptation measures are required to prepare communities and infrastructure for impacts that are already unavoidable.

Many of the actions required across the Highlands contribute to both objectives. Improving the energy efficiency of homes, strengthening infrastructure resilience and restoring natural systems can reduce emissions while also improving communities' ability to respond to climate impacts.

Given the scale of the Highlands and the interconnected nature of infrastructure, housing and environmental systems, strengthening coordination across these areas will be increasingly important in ensuring that climate action supports both environmental objectives and long-term regional resilience.

5.3 Three Areas of Climate and Energy Resilience

Within the Highlands these challenges can be considered across three interconnected areas:-

Climate Adaptation
Preparing communities, infrastructure and services for climate impacts such as flooding, coastal change and severe weather.

Climate Mitigation and Energy Transition
Supporting renewable energy development and the transition to low-carbon energy systems while ensuring that Highland communities benefit from the region's role in national energy infrastructure.

Cross-Cutting Foundations
Strengthening housing, natural systems and community infrastructure that support both climate mitigation and climate adaptation.

These areas are closely interconnected. Actions in one area frequently influence outcomes in the others, and increasingly they should be considered together as part of a coordinated approach to long-term resilience, sustainability and economic development across the Highlands.
The following sections of this report consider each of these areas in turn.

6 Climate Adaptation

6.1 Climate Risks in the Highlands

Climate change is increasingly recognised as one of the most significant long-term risks facing societies and economies worldwide. International assessments, including the **World Economic Forum Global Risks Report**, identify environmental and climate-related risks such as extreme weather and earth-system change as among the most severe global threats. Many of these risks have already shifted from anticipation to experience as climate impacts become more frequent and severe.

Climate projections from the **UK Met Office** indicate that the UK will experience warmer, wetter winters, hotter and drier summers, and more frequent extreme weather events over the coming decades. These trends are already being experienced across the Highlands, where communities and infrastructure are increasingly exposed to flooding, coastal change and severe weather events.

The Highlands have particular characteristics that increase vulnerability to climate impacts. The region has the longest coastline in Scotland, a dispersed population and a number of strategic transport and infrastructure corridors that are critical to regional connectivity. Disruption affecting one part of these networks can quickly affect communities and services across wider areas as in **Appendix 3**

6.2 Understanding Climate Risk

Highland Council has developed a strong evidence base to understand the climate risks affecting the region. **The Highland Climate Change Risk and Opportunity Assessment (HCCROA),** developed by Highland Adapts, provides a comprehensive assessment of climate impacts and identifies priority areas where resilience planning is required.

This is supported by the **Highland Climate Change Adaptation Strategy and Action Plan**, which sets out the Council's approach to strengthening resilience across communities, infrastructure and natural systems.

The evidence also highlights the wider impacts climate change can have on communities and public services. Extreme weather events, flooding and changing climate conditions can increase risks to public health, particularly for vulnerable residents, and may place additional pressure on health and social care services. Strengthening climate resilience therefore also supports the long-term sustainability of local services.

Highland Council also works with public bodies, communities and organisations through **Highlands Adapts**, a regional partnership supporting coordinated climate adaptation planning across the Highlands.

Further work is being developed through the **Climate Risk Action Plan**, alongside planning frameworks including the **Regional Coastal Change Adaptation Plan** and **Flood Risk Management Plans**, which help identify locations and assets most vulnerable to climate impacts.

6.3 Infrastructure and Community Resilience

Infrastructure networks across the Highlands are closely interconnected. Transport systems, electricity networks, digital communications, water supply and emergency services all rely on a relatively small number of strategic corridors and assets.

Climate-related disruption affecting one part of these systems can therefore have wider consequences across communities and services. Severe weather events in recent years have demonstrated how damage to power lines, communications infrastructure or transport routes can affect heating, connectivity, access to services and business continuity, particularly in remote and rural communities.

Strengthening the resilience of infrastructure networks and improving coordination between infrastructure planning, land management and community resilience planning will therefore be increasingly important.

6.4 The Role of Natural Systems

Natural systems play a critical role in protecting Highland communities and infrastructure from climate impacts.

Woodlands, peatlands, wetlands and coastal habitats help regulate water, reduce flood risk, stabilise soils and buffer the effects of storms and coastal change. However, these systems are increasingly under pressure from climate change, including:

- More intense rainfall and flooding
- Periods of drought
- Storm damage
- The spread of invasive species

As these pressures increase, the ability of natural systems to provide protection is reduced, increasing reliance on built infrastructure and raising long-term costs.

6.5 Strengthening Climate Resilience

While a range of strategies and plans are now in place to improve understanding of climate risks. Many adaptation measures, including large-scale flood protection infrastructure and resilience investment, will require significant long-term funding and coordination, highlighting the need to align climate resilience with wider infrastructure investment programmes.

Developing approaches that integrate infrastructure planning, environmental management and community resilience will be essential in supporting the long-term sustainability of Highland communities.

7 Climate Mitigation and Energy Transition

7.1 A nationally significant energy region

The Highlands host significant renewable energy resources, including onshore wind, hydroelectric power and emerging opportunities in marine energy.

National energy policy anticipates significant further growth in renewable generation, electricity networks and supporting infrastructure over the coming decades. This expansion will have important implications for infrastructure, land use, economic development and communities across the Highlands.

Ensuring that this development delivers wider social and economic benefit for Highland communities will remain an important part of the Council's approach, including supporting mechanisms that enable investment, skills development and community benefit linked to energy infrastructure.

At the same time, the UK energy system is undergoing the most significant structural reform in several decades. Changes to national policy, regulatory frameworks and infrastructure planning are reshaping how electricity generation, transmission networks and local energy systems are planned and delivered.

The Highlands sit at the centre of one of the largest infrastructure transitions in modern economic history, presenting a major opportunity to attract investment, support regional economic growth and retain greater value locally if approached strategically as in **Appendix 4**.

7.2 National Energy System Reform

A number of national reforms are currently reshaping the way the energy system is planned and delivered across Great Britain.

These include the development of the **Strategic Spatial Energy Plan (SSEP) by the National Energy System Operator (NESO),** the introduction **of Regional Energy Strategic Plans (RESPs)**, ongoing reforms to electricity network regulation through **Ofgem**, and the establishment of **GB Energy and the Local Power Plan**.

Together these reforms are intended to move the electricity system away from a project-by-project approach towards a more coordinated system of national and regional energy planning.

For regions such as the Highlands, these changes are particularly significant. Decisions taken at national level about infrastructure planning, network charging structures and generation deployment will directly influence the pace of renewable energy development, electricity network investment and wider economic opportunities linked to the energy transition.

7.3 Grid Constraints and Infrastructure Capacity

Electricity network capacity remains one of the most significant constraints affecting energy system development across the Highlands.

Transmission limitations already restrict the ability of renewable generation to export electricity from the region. In some cases this results in renewable electricity generation being curtailed because the network cannot accommodate the power being produced.

These constraints affect not only renewable energy projects but also wider aspects of the energy transition, including the electrification of heating, the development of electric vehicle infrastructure and the ability of new developments to connect to the electricity network.

Addressing these issues will require continued investment in electricity transmission infrastructure alongside improved coordination between national infrastructure planning and regional development priorities.

7.4 Developing Local Energy Infrastructure

Alongside large-scale renewable generation, there is growing interest in developing more localised energy infrastructure that can support community resilience and enable greater local use of renewable electricity.

Highland Council is already developing a pipeline of energy infrastructure projects aligned with the region's energy transition. These include renewable generation projects, battery energy storage systems, heat networks and emerging opportunities in hydrogen and other low-carbon technologies.

Examples from the Council's current project pipeline include solar generation developments, wind projects, heat network proposals and integrated energy infrastructure linked to new development and regeneration projects.

Together these initiatives represent a growing portfolio of infrastructure projects capable of attracting investment, supporting local energy resilience and contributing to the wider transition to low-carbon energy systems.

7.5 A Place-Based Energy Approach

The scale and geography of the Highlands mean that a single national model for energy infrastructure may not fully reflect regional circumstances.

A place-based approach to energy planning provides an opportunity to align renewable generation, electricity infrastructure, local energy demand and community priorities more effectively. Such an approach can integrate renewable generation, energy storage, heat networks, flexible demand and housing retrofit programmes within a coordinated regional energy system.

Developing place-based energy systems can help reduce pressure on the national transmission network while enabling communities and local economies to benefit more directly from the energy transition.

Strengthening coordination between national infrastructure planning, regional investment strategies and local energy projects will therefore be important in ensuring that the energy transition delivers lasting economic and community benefits for the Highlands.

8 Cross-Cutting Foundations for Climate and Energy Resilience

8.1 Communities, Housing and Energy Demand

While climate adaptation and the energy transition are often considered separately, many of the actions that support long-term resilience span both areas. Housing quality, energy use, infrastructure capacity and community wellbeing are closely interconnected across the Highlands.

Fuel poverty remains a major challenge across the region:-

- **47% of households experience fuel poverty, compared with 24% across Scotland**; and
- **33% experience extreme fuel poverty, compared with 12% nationally**

Evidence from the Changeworks report *A Perfect Storm* highlights the depth of the challenge in rural areas, where the **average fuel poverty gap is more than double the national average**, meaning significantly greater investment is required to lift households out of fuel poverty.

Housing characteristics across the Highlands contribute to these pressures:-

- **64.3% of homes rely on off-gas heating systems**; and
- **Electricity costs three to four times more per unit of energy than mains gas**

Combined with the colder and wetter Highland climate, this results in structurally higher heating demand and energy costs for many households.

Poorly insulated homes require more energy to maintain comfortable temperatures, and many households respond by rationing energy use and underheating their homes. This can increase the risk of respiratory and cardiovascular illness and place additional pressure on health and social care services.

Improving the energy performance of homes is therefore essential not only for reducing emissions but also for improving affordability, protecting health and strengthening community resilience.

8.2 Housing Retrofit and Energy Efficiency

The scale of the retrofit challenge across the Highlands is substantial.

It is estimated that at least **80% of homes that will be occupied in 2050 already exist today,** highlighting the importance of improving the energy performance of existing homes through long-term retrofit programmes.

Housing across remote and rural areas typically has lower average energy efficiency ratings than the Scottish average. This reflects the higher proportion of older housing stock, solid wall construction and non-traditional building types that are more difficult and costly to retrofit.

Many homes therefore require significant upgrades to insulation, heating systems and building fabric in order to meet future energy performance standards and support the transition to low-carbon heating.

Without improvements to building fabric performance, the transition to low-carbon heating technologies becomes more difficult and more expensive to deliver. A fabric-first approach, focusing on insulation and heat-loss reduction before installing new heating systems, is therefore essential.

Reducing heat demand through improved building performance can also help reduce peak electricity demand, easing pressure on electricity networks that are already constrained across parts of the Highlands.

Highland Council has already delivered a range of domestic retrofit programmes across the region, **leveraging over £69 million of investment** since 2014 to improve the energy efficiency of homes and reduce household energy costs.

However, the overall scale of the challenge remains significantly greater than current delivery rates. Achieving the improvements required to address fuel poverty, improve housing quality and support the energy transition will require sustained long-term investment and coordinated delivery programmes as in **Appendix 5**.

8.3 **Natural Systems and Environmental Resilience**

Natural systems form a core part of the Highlands' long-term approach to climate and energy resilience.

Investment in peatland restoration, woodland creation, wetlands and coastal habitats can:

- Reduce flood risk and manage water flows
- Stabilise soils and protect infrastructure
- Support carbon sequestration
- Enhance biodiversity and ecosystem health

These systems provide cost-effective, long-term resilience by reducing pressure on engineered infrastructure and lowering future adaptation costs.

The Council's **Ecology Strategy, Tree Management Strategy** and emerging **Green Space Strategy** provide a framework for protecting and enhancing these assets. A coordinated approach to natural capital will be essential to ensure that environmental management, infrastructure planning and climate investment are aligned.

8.4 **A Coordinated Approach to Resilience**

The challenges facing the Highlands in relation to climate change, the energy transition and community resilience are closely interconnected. Housing improvement, energy infrastructure planning, environmental management and economic development all influence the region's ability to respond effectively.

The scale and longevity of the housing stock make improving the energy performance of existing homes particularly important in supporting long-term resilience and the transition to low-carbon heating.

Programmes such as the **Highland Investment Plan**, **Invest Highland** and the Council's wider infrastructure initiatives provide opportunities to align housing

improvement, energy infrastructure development and environmental resilience within a coordinated regional investment approach.

Strengthening coordination across these areas will help ensure that action on climate change also supports the long-term sustainability, resilience and wellbeing of Highland communities.

9. Strategic Approach

9.1 A Coordinated Council Response

The challenges outlined in the previous sections demonstrate that climate change, the energy transition and community resilience are closely interconnected issues that cannot be addressed through isolated programmes or individual services**.**

Managing these risks effectively requires a coordinated approach that aligns climate mitigation, climate adaptation and wider infrastructure planning across the Council's services and investment programmes.

Highland Council already delivers a wide range of activity across these areas, including housing retrofit programmes, renewable energy projects, flood risk management schemes, environmental management initiatives and infrastructure investment through the **Highland Investment Plan.**

Addressing the interconnected challenges of climate resilience, housing quality and fuel poverty will also require continued collaboration with partners across the health and social care system. Housing conditions and energy affordability are closely linked to public health outcomes, and strengthening coordination between housing, energy and health services can help reduce long-term pressures on public services while improving community wellbeing.

9.2 Youth Engagement and Future Generations

Ensuring that young people are represented in discussions on climate action and resilience planning is important given the long-term impacts these issues will have on future generations.

Engagement with young people across the Highlands highlights the importance they place on climate education, sustainable community action and the development of skills that support participation in the transition to a low-carbon economy. Priorities raised also include safer active travel routes within communities and improved recycling facilities in schools.

These perspectives reinforce the importance of embedding climate awareness, sustainable behaviours and green skills within education and community development.

Supporting opportunities for young people to contribute to climate and energy initiatives can help strengthen community resilience while enabling the next generation to play an active role in shaping the Highlands' transition.

9.3 Developing Coordinated Investment Pipelines

A key priority will be the continued development of coordinated investment pipelines across climate mitigation, climate adaptation and supporting infrastructure.

Investment pipelines help identify projects capable of attracting public and private investment while providing greater clarity for national agencies, investors and delivery partners regarding future infrastructure requirements.
Examples of areas where coordinated pipelines are emerging include:-

- **renewable energy infrastructure**;
- **housing retrofit and heat decarbonisation;**
- **flood protection and climate resilience schemes;**
- **energy networks and local energy systems; and**
- **natural capital and environmental restoration projects**

Developing these pipelines will help ensure that projects across the Highlands are positioned to access future funding opportunities and national infrastructure programmes while strengthening the regions' ability to attract public and private investment.

9.4 Strengthening Place-Based Delivery

Given the geographic scale and diversity of communities across the Highlands, a place-based approach to climate and energy planning will be increasingly important.

Place-based approaches enable energy infrastructure, housing improvement programmes, environmental management and economic development initiatives to be planned together at a local or regional level.

This approach aligns with emerging national frameworks including **NESO's Regional Energy Strategic Planning processes**, which aim to coordinate regional energy infrastructure planning, and **GB Energy's Local Power Plan**, which is intended to expand local and community energy generation and increase local participation in the energy system.

For regions such as the Highlands, these frameworks provide opportunities to better align national energy system development with regional infrastructure priorities, community needs and long-term investment opportunities.

9.5 Working with National Partners

Many of the issues affecting the Highlands, including energy market design, electricity network investment and climate funding programmes are determined at national level.

Continued engagement with national partners will therefore be essential to ensure that the interests of Highland communities are reflected in future policy development and infrastructure planning.

This includes engagement with organisations such as:-

- The Scottish Government;
- The UK Government;
- Ofgem;

- The National Energy System Operator;
- GB Energy;
- Electricity network operators; and
- Regional and community partners

Through this engagement, the Council will continue to advocate for policies and investment frameworks that recognise the Highlands' role in the national energy system while ensuring that local communities benefit from the transition.

The Council's **Social Value Charter** will form an integral part of this approach, providing a clear framework for engaging with developers, infrastructure providers and investment partners. This includes setting expectations around local employment, supply chain opportunities, community benefit and long-term regional investment.

Embedding social value within infrastructure and energy development will help ensure that the Highlands not only host nationally significant infrastructure but also realise the economic and community benefits associated with the transition to a low-carbon energy system.

10 Delivery, Coordination and Monitoring

10.1 Coordinating Climate and Energy Activity

Highland Council already delivers a wide range of activity relating to climate mitigation, climate adaptation and the energy transition across multiple services. These activities include housing retrofit programmes, renewable energy projects, flood risk management schemes, environmental management initiatives and infrastructure investment.

The challenges outlined in this report demonstrate the importance of maintaining strong coordination between these activities.

Strengthening coordination across services will therefore be essential to ensure that climate, energy and resilience considerations are consistently reflected in policy development, capital investment planning and service delivery.

10.2 Role of the Climate Change and Energy Team

The Council's Climate Change and Energy Team plays an important role in supporting coordination across the organisation and advancing the Council's response to climate change, the energy transition and community resilience.

The team has supported delivery of a wide range of programmes addressing fuel poverty, housing retrofit and energy efficiency across the region. Through these initiatives Highland Council has secured significant external investment and improved the energy performance of homes, helping to reduce household energy costs and support vulnerable communities.

The team also supports the development of renewable energy projects, engagement with national energy system reform and delivery of the Council's **Local Heat and Energy Efficiency Strategy.**

Building on this work, further opportunities are emerging through national programmes such as community energy initiatives and **GB Energy's Local Power Plan**, alongside the development of more place-based energy approaches.

Aligning these opportunities with wider infrastructure planning and regional investment initiatives, including the **Highland Investment Plan**, will help support coordinated delivery across housing, energy infrastructure and economic development priorities, while positioning the Highlands to benefit from emerging national investment in energy infrastructure and low-carbon development.

Given the scale and complexity of the challenges outlined in this report, maintaining sufficient organisational capacity to coordinate climate, energy and resilience activity will be important to ensure the Council can respond effectively to emerging national policy, funding opportunities and infrastructure developments.

10.3 Digital Connectivity and System Resilience

In May 2025, a Digital Connectivity report was presented to the Council highlighting the risks associated with the rollout of fibre infrastructure and the transition from legacy systems, and the potential implications for resilience in Highland communities The report identifies a growing interdependency between telecommunications, energy systems and community resilience.
This reinforces the need for a coordinated, place-based approach to infrastructure planning across energy, digital and wider services to ensure long-term resilience.

10.4 Monitoring and Reporting

Monitoring progress will be essential to ensure that actions taken across the Council contribute to long-term climate and energy resilience.

A range of data sources are already used to track progress across different aspects of climate and energy activity, including emissions monitoring, energy benchmarking across the Council estate, housing energy performance data, infrastructure development indicators and environmental monitoring.

Progress is reported through established governance arrangements, including committee reporting and programme monitoring processes.

Continued monitoring will help ensure the Council can track progress, identify emerging risks and adapt delivery approaches in response to evolving national policy, infrastructure development and investment opportunities.

10.5 Future Development

Climate change, energy systems and national policy frameworks continue to evolve rapidly. Further work will therefore continue across the Council to develop the approaches outlined in this report.

This will include continued engagement with national partners, further development of infrastructure and investment pipelines, and the integration of climate and energy considerations within wider infrastructure planning and service delivery.

These activities will also help ensure that the Highlands are well positioned to benefit from national investment associated with the transition to a low-carbon energy system.

Any future proposals relating to programme development, investment opportunities or resource requirements will be brought forward to Members through the appropriate governance arrangements.

For the Highlands, the question is therefore not whether change will occur, but whether the region shapes that transition in a way that strengthens local communities or simply accommodates infrastructure decisions taken elsewhere.

Designation:	Assistant Chief Executive - Place
Date:	5 March 2026
Author:	Neil Osborne, Climate and Energy Manager Fiona Daschofsky, Net Zero Programme Manager Isla MacMillan, Energy Efficient Homes Programme Manager Teresa Ratnam, Investment & Innovation Programme Manager Ronnie MacDonald, Energy Manager Stuart Miller, Funding/Salix Manager
Background Papers:	None
Appendices:	Appendix 1 – Integrated Impact Assessment Appendix 2 – Highland Climate Change Risk & Opportunity Assessment Appendix 3 – Climate Adaptation Appendix 4 – Climate Mitigation & Energy Transition Appendix 5 - Fuel Poverty, Retrofit and Building Efficiency

Integrated Impact Assessment

About proposal

What does this proposal relate to? Policy, Strategy, Redesign or change to existing service

Proposal name: Climate Change, Energy and Community Resilience Strategic Paper

High level summary of the proposal: This Strategic Paper sets out the case for the Council to adopt a fully embedded, long-term, programme-led approach to climate change, energy and resilience. The paper outlines that climate change, rising energy costs, and infrastructure constraints are creating significant financial, operational and strategic pressures for the Council, and these pressures are expected to intensify.

Who may be affected by the proposal? Highland Council residents and staff

Start date of proposal:

End date of proposal: 26/03/2026

Does this proposal result in a change or impact to one or more Council service? Yes

Which Council services are impacted by this proposal? Corporate, People, Place

Does this relate to an existing proposal? No

Author details

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Service: Place

Responsible officer details

Name: Paul Reid

Job title: Chief Officer

Email address: Paul.Reid1@highland.gov.uk

Sign off date: 2026-03-12

Evidence and consultation

What sources have you used to gather information relating to this proposal? National or local data, National or local research

Are there any gaps or missing information in the available sources selected above? No

Have any stakeholders been involved in the development of the proposal?No

Provide justification for stakeholders not being engaged: Due to time constraints associated with the preparation of this strategic proposal, stakeholders have not yet been formally involved in its development.
However, the proposal establishes a strategic framework rather than a detailed delivery programme. As initiatives and projects progress, appropriate consultation and engagement will take place with relevant stakeholders as part of a place-based approach to delivery.
This will include engagement with:
• local communities
• community organisations
• industry and energy developers
• regional partners
• public sector organisations
• national agencies
This approach will ensure that the interests of Highland communities are reflected in the development and implementation of specific initiatives arising from the proposal.

In addition to involving stakeholders, have there been any other formal consultations?No

Will there need to be any further formal consultation undertaken prior to proposal implementation? Yes

How will you carry out these additional formal consultations and in what timescales?While formal consultation has not been required during the development of this strategic proposal, a number of initiatives arising from the proposal will require consultation during implementation.
For example:
• housing retrofit programmes
• infrastructure developments
• planning and energy system developments
Where required, consultation will be undertaken on a case-by-case basis in accordance with statutory requirements and Council procedures.

Equalities, poverty and human rights

Protected characteristics

Bearing in mind the articles of the Human Rights Act, select what impact the proposal will have on the following protected characteristics:

Sex:

Age:

Disability:

Religion or belief:

Race:

Sexual orientation:

Gender reassignment:

Pregnancy and maternity:

Marriage and civil partnership:

Protected characteristics impact details:

Vulnerable groups

Select what impact the proposal will have on the following vulnerable groups:

Unemployed:

Lone parent families:

Young children:

Older people:

Homeless:

Looked after children:

Low-income households (in-work poverty):

Vulnerable groups impact details:

Human rights

Select what impact the proposal will have on the below human rights:

Article 8: Respect for private and family life, home, and correspondence:

Article 9: Freedom of thought, belief and religion:

Article 10: Freedom of expression:

Article 11: Freedom of assembly and association:

Article 12: Right to marry and start a family:

Article 14: Protection from discrimination:

Article 1, Protocol 1: Right to peaceful enjoyment of property:

Article 2, Protocol 1: Right to education:

Article 3, Protocol 1: Right to participate in free elections:

Human rights impact details:

Children's rights and wellbeing

What likely impact will the proposal have on children and young people?

Impact

Select whether the proposal will have positive or negative impact on the following children's rights articles:

Article 3 - best interests of the child:

Article 12 - respect for the views of the child:

Article 23 - children with a disability:

Article 27 - adequate standard of living:

Article 28 - right to education:

Article 29 - goals of education:

Article 31 - leisure, play and culture:

Children's rights impact details:

Will the proposal impact any other UNCRC articles not listed above?

Data protection

Lawfulness, fairness, and transparency

Why will you need to process personal data as part of this proposal?

Will the data subjects be aware that we are using their data for this purpose?

Purpose limitation

Will the data be used for purposes other than what is set out in the proposal?

Will data be shared with other services or organisations?

Data minimisation

Will you process personal data as part of this proposal?

Accuracy

How will you ensure data is kept up-to-date and accurate?

How will you monitor the quality of the data?

Storage limitation

How long will the personal data be kept for?

Is this included in the Council's retention schedule?

Does the IT system you use apply the retention appropriately?

Integrity and confidentiality

Will you utilise the Council's existing systems to process data?

Will data be held in the service provider's cloud?

Provide details of how you will control access to the data:

How will you ensure that staff are aware of their responsibilities?

Accountability

Is there an up to date privacy notice available on the Highland Council website?

Do you have policies and procedures for staff to follow?

What information will you provide to data subjects about how their data will be used?

Risks

Have any risks been identified in relation to personal data?

Island and mainland rural communities

What are the impacts on island and mainland rural communities? The proposal is expected to have a range of positive impacts on island and mainland rural communities across the Highlands. Improvements in housing energy efficiency and reductions in fuel poverty will improve living conditions for households and contribute to improved health, wellbeing and affordability. The proposal also seeks to ensure that the economic benefits associated with renewable energy development are more closely aligned with local priorities and community needs. Strengthening community resilience to climate impacts will help mitigate the social and economic effects of extreme weather events and other climate-related risks.

There are also potential negative impacts associated with aspects of the proposal. The development of energy infrastructure may have environmental and landscape impacts in some island and rural mainland communities and may affect certain areas disproportionately depending

on location. These impacts will continue to be managed through existing planning processes and environmental assessment frameworks, including National Planning Framework 4 (NPF4) and other regulatory requirements.

To mitigate potential negative impacts and address regional variation, the proposal supports a place-based approach to climate change, energy and resilience planning. This approach recognises the specific challenges faced by island and rural mainland communities and seeks to ensure that local circumstances are reflected in the development of infrastructure and investment decisions. Through improved coordination between infrastructure planning, housing retrofit programmes and energy system development, the proposal aims to ensure that the opportunities associated with the energy transition are distributed more equitably across the region.

In addition, challenges associated with delivering projects in remote and island locations, including higher construction, logistics and supply chain costs, are partly mitigated through Scottish Government funding uplifts. However, these measures do not always fully reflect the additional costs associated with delivery in the Highland region.

Will the delivery of the proposal vary between impacted communities?Yes

Provide details of what the different delivery methods will be: The impacts and benefits associated with initiatives arising from this proposal may not be distributed equally across all parts of the Highlands.
Island and rural mainland locations may experience additional challenges related to:
• limited grid capacity and connectivity
• logistical constraints and supply chain challenges
• skills and labour availability
• increased construction and delivery costs
• higher energy costs
• infrastructure constraints.
To address these issues, the proposal supports a place-based approach to climate change, energy and resilience, ensuring that the specific challenges faced by island and rural communities are recognised and addressed. Through this approach, infrastructure planning, housing retrofit programmes and energy system development will be coordinated to ensure that opportunities associated with the energy transition are shared more widely across the region and that particular communities are not unduly disadvantaged.

Climate change

The climate change full impact assessment does not currently sit within our digital tool. The climate change content is accessible either as an appendix to this document, or can be found on the Impact Assessment Register.

APPENDIX 2

Number	Title	Current level of risk (2025)	Future level of risk (2050s/2080s)	Urgency	Priority for regional collaboration?
B1	Risks to buildings from heat and fire	Medium	Medium	Yes	Yes
B2	Risks to buildings from flooding	High	High	Yes	Yes
B3	Risks to buildings from coastal change	Medium	High	Yes	Yes
B4	Risks to buildings from high wind, rain penetration, storms, freeze thaw, subsidence, damp	High	High	Yes	Yes
B5	Risks to cultural heritage built environment	Medium	High	Yes	Yes
B6	Risks to facilities and outdoor spaces delivering public services, excluding health and social care	Medium	High	Yes	Yes
E1	Risks to Highland economic performance and stability	High	High	Yes	Yes
E2	Risks to physical assets of Highland businesses	High	High	Yes	Yes
E3	Risks to Highland supply chains and resource inputs	High	High	Yes	Yes
E4	Risks to productivity and availability of labour	Medium	Medium	No	No
E5	Risks to public finances	High	High	Yes	Yes
E6	Risks to household finances	High	High	Yes	Yes
E7	Opportunities for Highland businesses	Medium	Medium	No	No

E8	Opportunities for household finances	Low	Medium	No	No
E9	Risks and opportunities for population movement	Medium	High	Yes	Yes
E10	Risks to viability of settlements	Medium	High	Yes	Yes
E11	Risks to cultural activities	Low	Medium	No	No
E12	Risks to households and businesses from limited access to finance and insurance	High	High	Yes	Yes
H1	Risks to people from heat	Medium	Medium	No	No
H2	Risks to people from extreme weather, excluding heat	High	High	Yes	Yes
H3	Risks to people from changes in indoor and outdoor air and environmental quality (humidity, temperature, smoke, toxins)	Medium	Medium	Yes	Yes
H4	Risks to people from reduced water availability and quality	Low	High	Yes	Yes
H5	Risks to people from climate-sensitive and vector-borne diseases	Medium	High	Yes	Yes
H6	Risks to food safety and nutrition	Medium	High	Yes	Yes
H7	Risks to health and social care delivery	High	High	Yes	Yes
H8	Risks to mental health and wellbeing	High	High	Yes	Yes
H9	Opportunities for health and wellbeing	Medium	High	Yes	Yes

I1	Risks of cascading failures for interdependent infrastructure networks	High	High	Yes	Yes
I2	Risks to electricity generation, transmission, and distribution	High	High	Yes	Yes
I3	Risks to fuel supply systems	High	High	Yes	Yes
I4	Risks to road transport systems and active travel	High	High	Yes	Yes
I5	Risks to rail transport systems	High	High	Yes	Yes
I6	Risks to aviation transport systems	Low	Medium	No	No
I7	Risks to water-based transport systems	Medium	High	Yes	Yes
I8	Risks to digital and communication systems	Medium	Medium	Yes	Yes
I9	Risks to water supply and wastewater systems	Medium	High	Yes	Yes
I10	Risks to waste management systems, excluding wastewater systems	Low	Medium	No	No
N1	Risks to terrestrial ecosystems	Medium	High	Yes	Yes
N2	Risks to coastal ecosystems	High	High	Yes	Yes
N3	Risks to freshwater ecosystems	High	High	Yes	Yes
N4	Risks to marine ecosystems	Medium	High	Yes	Yes

N5	Risks to soil ecosystems	Medium	High	Yes	Yes
N6	Risks to natural carbon stores and sequestration	Medium	High	Yes	Yes
N7	Opportunities for species and ecosystems	Medium	Medium	No	No
N8	Risks to natural heritage and landscape character	Medium	Medium	Yes	Yes
N9	Risks to agriculture	Medium	High	Yes	Yes
N10	Risks to fisheries and aquaculture	High	High	Yes	Yes
N11	Risks to forestry	Medium	Medium	Yes	Yes
N12	Opportunities for agriculture, fisheries, aquaculture, and forestry	Low	Medium	Yes	Yes
N13	Risks to food security	Medium	Medium	Yes	Yes

Appendix 3 – Climate Adaptation in the Highlands

The Highlands have the longest coastline in Scotland and a high number of communities located in areas exposed to coastal erosion, flooding and sea level rise.

The Council's Coastal Change Adaptation Plan identifies 29 communities at heightened risk, where climate impacts are already affecting infrastructure, property and long-term viability.

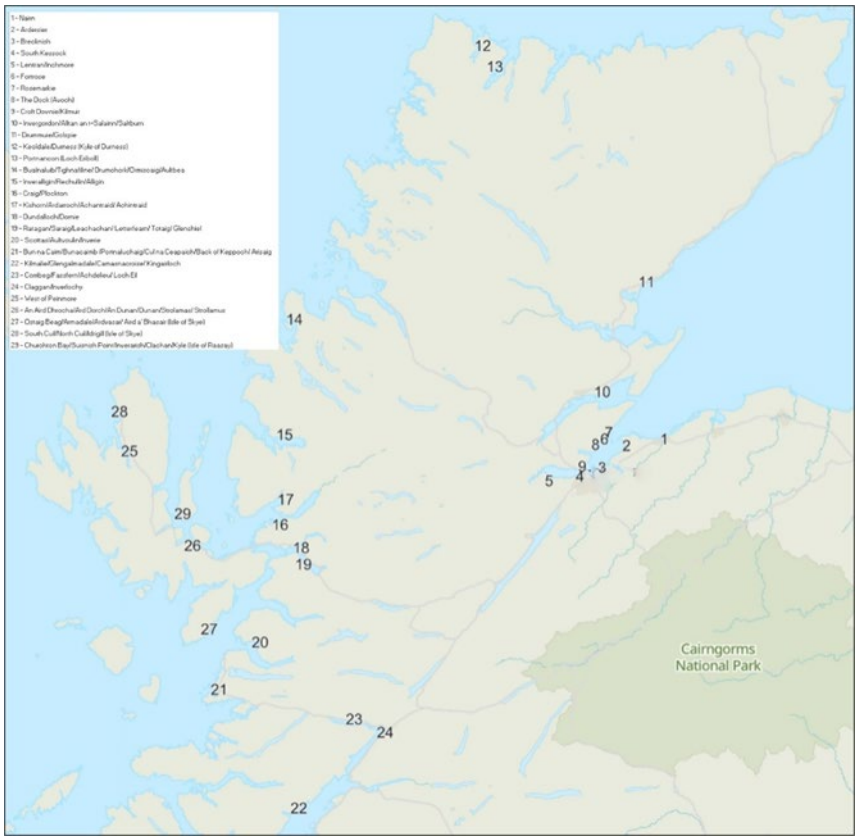
High Risk Locations
Nairn
Invergordon/Alltan an t-Salainn/Saltburn
An Aird Dhrocha/Ard Dorch/An Dunan/Dunan/Strolamas/ Strollamus
Fortrose
Ratagan/Saraig/Leachachan/ Letterfearn/ Totaig/ Glenshiel
Scottas/Aultvoulin/Inverie
Bun na Caim/Bunacaimb/ Portnaluchaig/Cul na Ceapaich/ Back of Keppoch/ Arisaig
Brecknish
Rosemarkie
Drummuie/Golspie
Dundalloch/Dornie
Kishorn/Ardarroch/Achantraid/ Achintraid
Inveralligin/Rechullin/Alligin
Corribeg/Fassfern/Achdelieu/ Loch Eil
Ostaig Beag/Armadale/Ardvasar/ Aird a' Bhasair (Isle of Skye)
South Kessock
Croft Downie/Kilmuir
Portnancon (Loch Eriboll)
Keoldale/Durness (Kyle of Durness)
Bualnaluib/Tighnafiline/ Drumchork/Ormiscaig/Aultbea
Craig/Plockton
Claggan/Inverlochy
Kilmalie/Glengalmadale/Camasnacroise/ Kingairloch
Churchton Bay/Suisnish Point/Inverarish/Clachan/Kyle (Isle of Raasay)
South Cuil/North Cuil/Idrigill (Isle of Skye)
West of Peinmore
Ardersier
The Dock (Avoch)
Lentran/Inchmore

These risks are expected to increase over coming decades as sea levels rise and storm intensity increases.

Impacts include:

- Loss of land and property
- Damage to transport infrastructure
- Increased flood risk and insurance pressures
- Disruption to essential services and community connectivity

For these communities, climate change is not a future risk — it is already affecting long-term resilience and viability.



These communities illustrate the scale of place-based climate risk across the Highlands and reinforce the need for sustained investment in flood protection, coastal resilience and long-term adaptation planning.

Climate Observations and Projections

Over the last few decades Scotland has experienced a warming trend, shifting rainfall patterns and rising sea levels.

Scotland's **10 warmest years** on record have all occurred since 1997. The average temperature in the last decade (2014-2023) was **1.02°C warmer** than the 1961-1990 average, and the warmest year on record was **2022.**

There has been an **increase in rainfall** over Scotland in the past few decades (with an increasing proportion of rainfall coming from heavy rainfall events). The annual average rainfall in the last decade (2014-2023) was **10% wetter** than the 1961-1990 average, with winters **29% wetter.**

Mean **sea level** around the UK has risen by approximately **18.5cm** from the start of the 20th century and the **rate of sea level rise has increased over the last 30 years, and continues to accelerate.**

The changes in climate we are already experiencing are projected to continue and intensify:

Key Climate Risks Affecting Highland Communities

Climate risks affecting Highland communities are increasing in frequency and severity. The most significant risks are:

Flooding and Rainfall

- Annual flood damages are currently estimated at £11–12 million, rising to over £20 million by the 2050s
- Around 4,600 homes and 2,700 non-residential properties are currently at risk
- Exposure is projected to increase by 30–50% by the 2080s

Coastal Change and Sea Level Rise

- Sea levels are projected to rise by 21–39 cm by the 2050s
- Increased coastal erosion, overtopping and flooding affecting settlements and infrastructure
- Growing pressure on coastal roads, defences and low-lying communities

Severe Weather Events

- Storm events have caused widespread disruption, including over 43,000 households losing power during peak periods
- Increasing damage to transport networks, power infrastructure and communications systems
- More frequent disruption to communities and public services

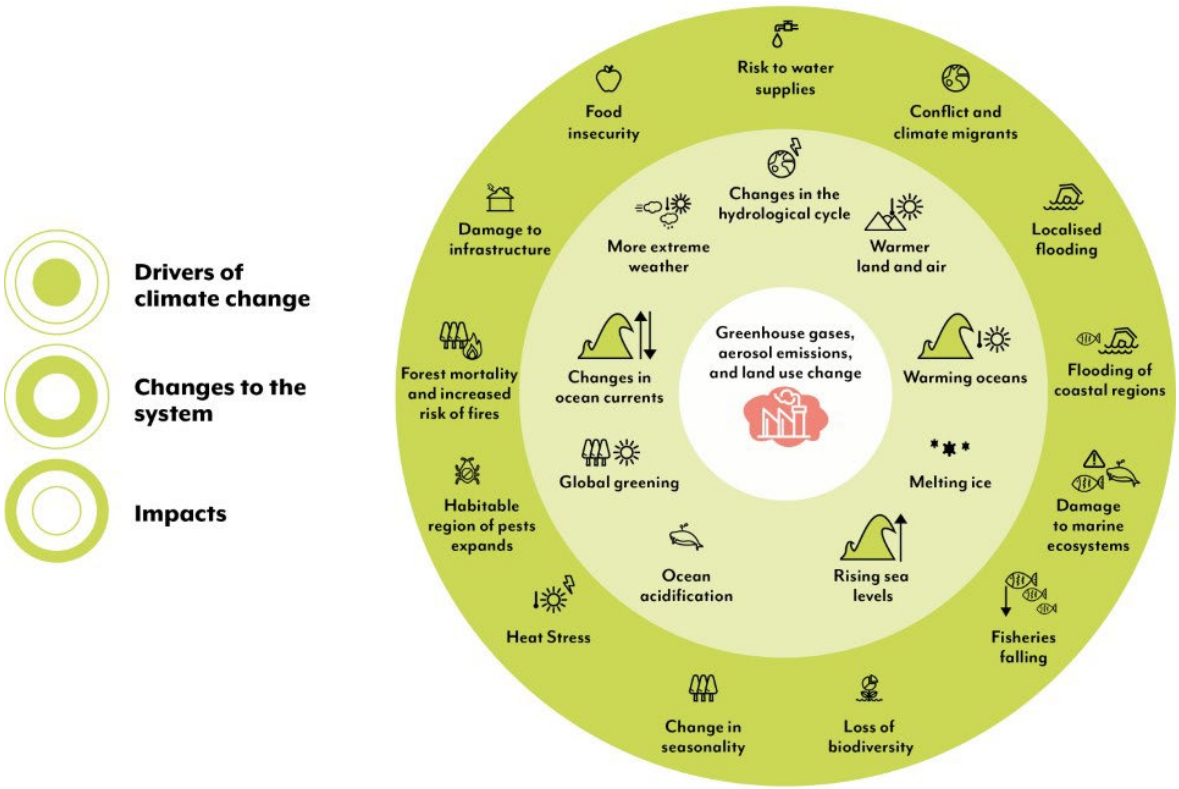
Drought and Water Stress

- Drought events are projected to increase significantly by 2040
- Increased pressure on water supplies, agriculture and natural systems
- Risks to private water supplies and ecological resilience

Wildfire Risk

- Increasing risk across peatland, moorland and forestry areas
- Potential impacts on carbon stores, biodiversity and infrastructure
- Greater likelihood of large-scale events affecting land, transport routes and communities

Figure 1: Diagram of The Impacts of Climate Change



Infrastructure and Service Exposure

Climate risks directly affect infrastructure, service delivery and community resilience across the Highlands.

Transport and Connectivity

- The Council maintains approximately 6,785 km of road network, much of which is exposed to flooding, erosion and landslip risk
- Rail corridors, particularly coastal sections, are vulnerable to erosion and disruption
- Disruption to transport networks affects emergency response, healthcare access, supply chains and economic activity

Energy and Digital Infrastructure

- Severe weather events have resulted in prolonged power outages affecting thousands of households
- Damage to power lines, substations and telecommunications infrastructure impacts heating, connectivity and service delivery
- Remote and rural communities are particularly vulnerable to extended outages

Water Supply and Wastewater

- Over 2,500 private water supplies, serving more than 10,000 residents, are vulnerable to drought, flooding and contamination
- Increased pressure on drainage and wastewater systems, with rising risk of sewer flooding
- Implications for public health, environmental quality and service demand

Interconnected System Risks

Infrastructure systems across transport, energy, water and communications are closely interconnected.

Disruption in one system can quickly affect others, leading to wider impacts on:

- Emergency services and healthcare access
- Education and public services
- Supply chains and local businesses
- Daily community functioning

Recent storm events have demonstrated how quickly localised disruption can escalate into wider system impacts, particularly in rural and remote areas where alternative routes and backup systems are limited.

Natural Systems and Environmental Resilience

Natural systems play a critical role in reducing climate risk across the Highlands.

They support:

- Flood regulation and water storage
- Coastal protection and erosion control
- Soil stabilisation and landslip reduction
- Carbon storage and climate mitigation

Climate change is placing increasing pressure on these systems through:

- Peatland degradation and soil erosion
- Increased intensity of rainfall and storm events
- Expansion of invasive non-native species
- Changes in water availability and ecosystem function

Protecting and restoring natural systems is essential to:

- Reduce long-term infrastructure costs
- Strengthen resilience to flooding, drought and coastal impacts
- Support biodiversity and key economic sectors
- Maintain essential ecosystem services for communities

Financial and Strategic Implications

Climate impacts are already creating direct and increasing costs for the Highlands.

- **Flood damages alone are projected to rise from £11–12 million annually to over £20 million by the 2050s**
- **Infrastructure damage, service disruption and emergency response costs are expected to increase**
- **Without planned investment, costs will continue to be met through reactive repair and recovery**

Planned investment in adaptation and resilience should therefore be understood as cost avoidance, reducing long-term financial pressure while improving the resilience of communities, infrastructure and public services.

Appendix 4

Climate Mitigation and Energy Transition

1. The Highland Energy System Context

The Highlands play a central role in the UK's transition to a low-carbon energy system.

The region:

- Hosts nationally significant renewable energy infrastructure
- Generates substantially more renewable electricity than it consumes
- Acts as a major exporter of electricity to other parts of the UK

Despite this, communities and public services continue to experience:

- High and volatile energy costs
- Constrained electricity network capacity
- Delays in connecting new developments and infrastructure

This reflects a structural imbalance where the Highlands host nationally important infrastructure while many of the costs and constraints of the energy system are experienced locally.

Electricity networks and energy infrastructure are therefore core economic infrastructure for the region, directly affecting:

- The cost of operating public services
- Housing decarbonisation
- The viability of new development
- Regional economic competitiveness

2. National Energy System Reform

The UK energy system is undergoing significant structural reform.

Key programmes include:

- Strategic Spatial Energy Planning led by the National Energy System Operator
- Regional Energy Strategic Plans
- Electricity network charging reform under Ofgem
- The creation of GB Energy and the Local Power Plan

These reforms are shifting the system away from project-by-project delivery towards coordinated national and regional infrastructure planning.

For the Highlands, these changes will directly influence:

- Where infrastructure is developed
- How quickly projects can connect
- The cost of electricity for households and services
- The ability to attract investment

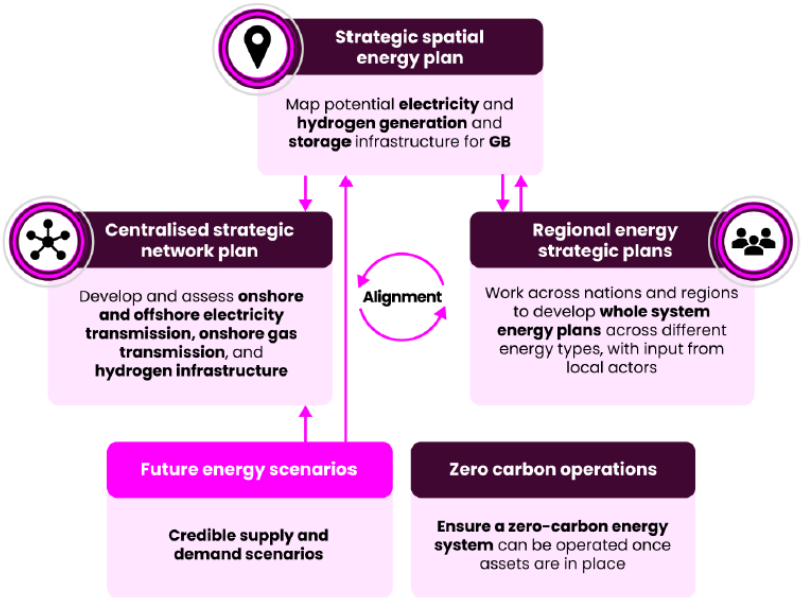


Figure 1 – National Energy System Reform Framework

3. Regulation and System Planning

Ofgem

Ofgem regulates electricity markets, network operators and charging structures.

Its decisions directly affect:

- Electricity costs for households and public services
- The economics of renewable energy projects
- The pace of grid reinforcement

Current debates on locational charging are particularly important. Without reform, energy-producing regions such as the Highlands risk continuing to face higher costs despite hosting national infrastructure.

National Energy System Operator (NESO)

NESO is responsible for planning and operating the electricity system across Great Britain.

Its role includes:

- Long-term infrastructure planning
- System balancing and coordination
- Development of national planning frameworks

NESO's Strategic Spatial Energy Plan (SSEP) will determine the geographic distribution of future energy infrastructure.

Strategic Spatial Energy Planning (SSEP)

The SSEP will shape where key infrastructure is located, including:

- Renewable generation
- Energy storage
- Hydrogen production
- Transmission infrastructure

This will influence infrastructure investment and sequencing over coming decades.

For the Highlands:

- The region contains some of the UK's strongest renewable resources
- It plays a critical role in national decarbonisation

However, there is a risk that infrastructure is prioritised closer to major demand centres unless the strategic importance of northern renewable regions is fully recognised.

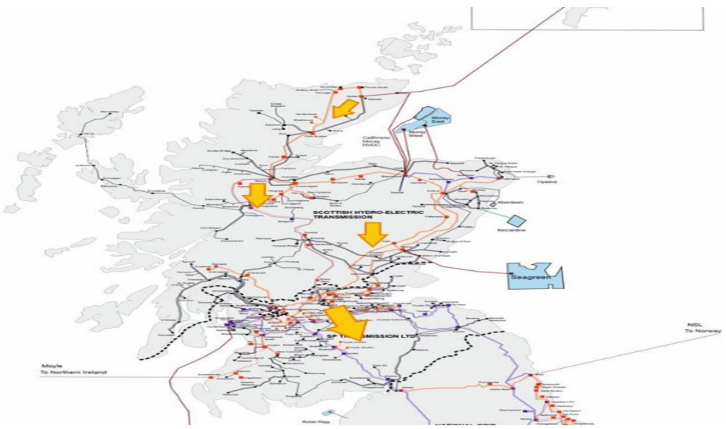


Figure 2 – Highlands position in the UK energy system

Regional Energy Strategic Plans (RESP)

RESPs will translate national planning into regional infrastructure strategies.

They will identify:

- Transmission priorities
- Opportunities for storage and flexibility
- Locations for new generation
- Alignment between supply and demand

Early proposals suggest Scotland may be treated as a single region, which risks reducing visibility of the Highlands as a distinct energy system.

Engagement in RESP development will be essential to ensure:

- Grid investment reflects Highland generation capacity
- Infrastructure supports local development
- Economic opportunities are realised locally

GB Energy and the Local Power Plan

GB Energy and the Local Power Plan aim to support:

- Community energy projects
- Local renewable generation
- Energy storage and flexibility
- Place-based energy systems

This presents an opportunity for the Highlands to:

- Develop locally integrated energy systems
- Align generation with local demand
- Retain more economic value within the region

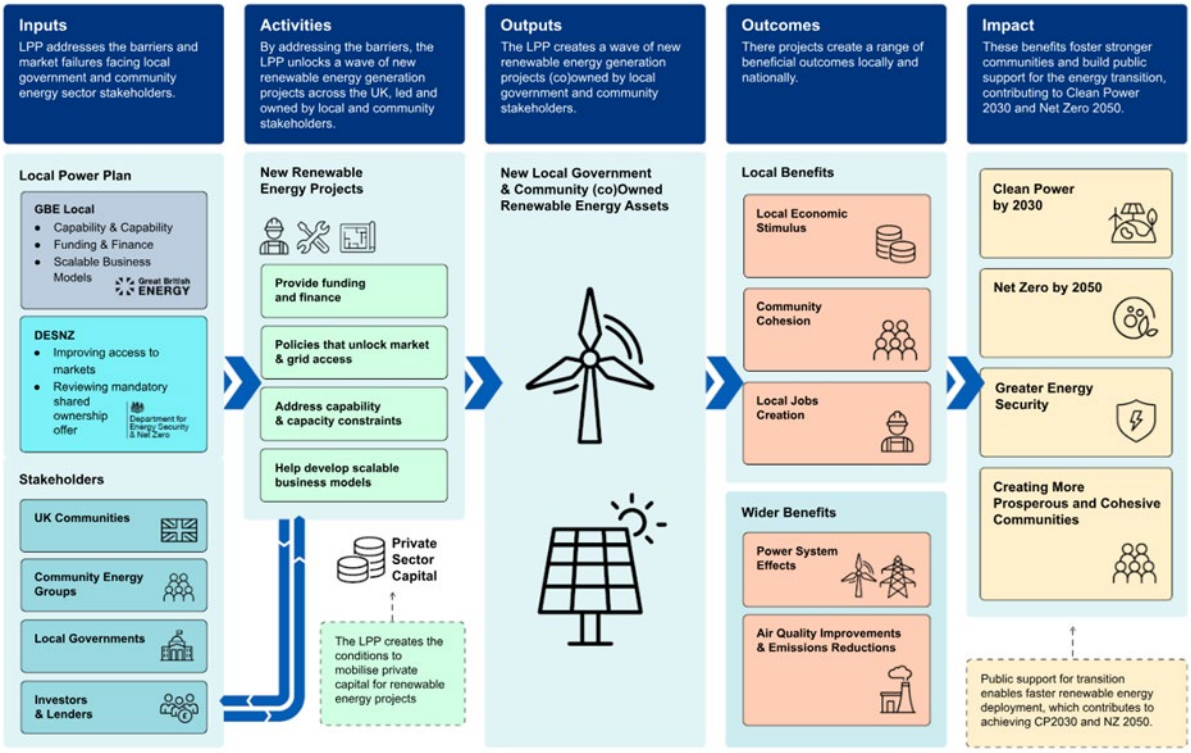


Figure 3 – Local Power Plans – outcomes and impacts

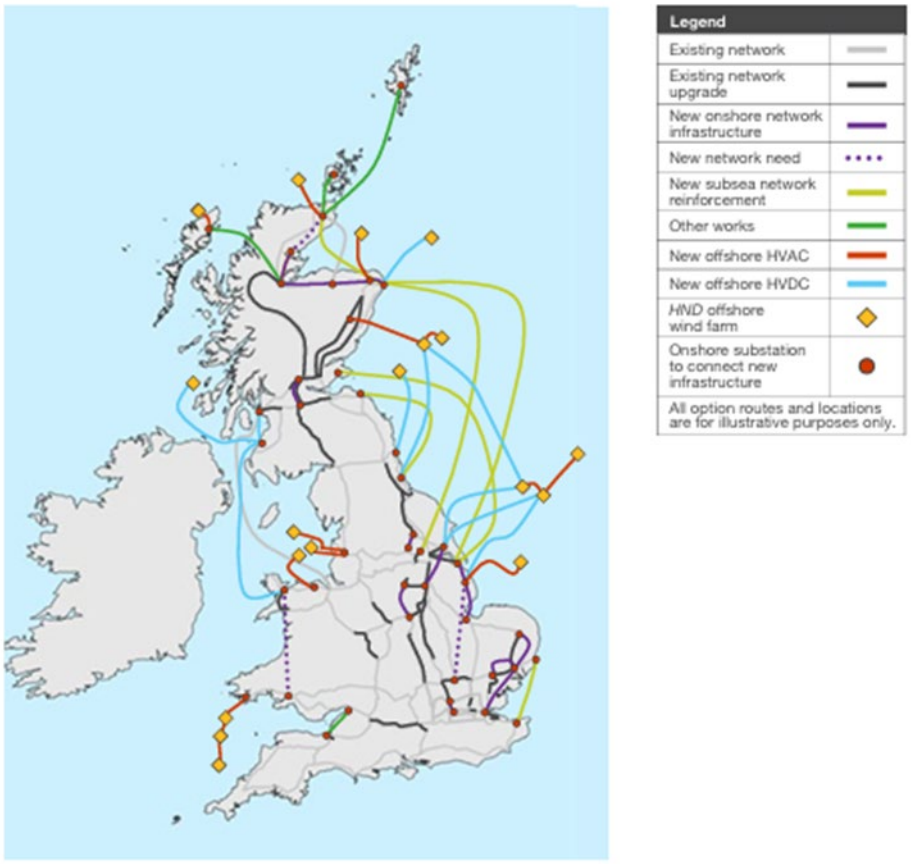
4. The National Energy System Operator (NESO)

The National Energy System Operator (NESO) is responsible for coordinating the planning and operation of the electricity system across Great Britain.

NESO's responsibilities include:

- system balancing and operational planning
- long-term infrastructure planning
- coordination of generation, storage and network development
- development of national strategic planning frameworks.

NESO is currently developing the **Strategic Spatial Energy Plan (SSEP)**, which will determine the optimal geographic distribution of energy infrastructure across Great Britain.



National Energy System Operator's Pathway to 2030 Report.

Figure 4 – Transmission Network Upgrading

Highland Energy Infrastructure Pipeline

Highland Council is developing a growing pipeline of energy infrastructure projects.

This includes:

- Solar generation
- Battery energy storage systems
- Wind projects
- Heat networks
- Emerging hydrogen opportunities

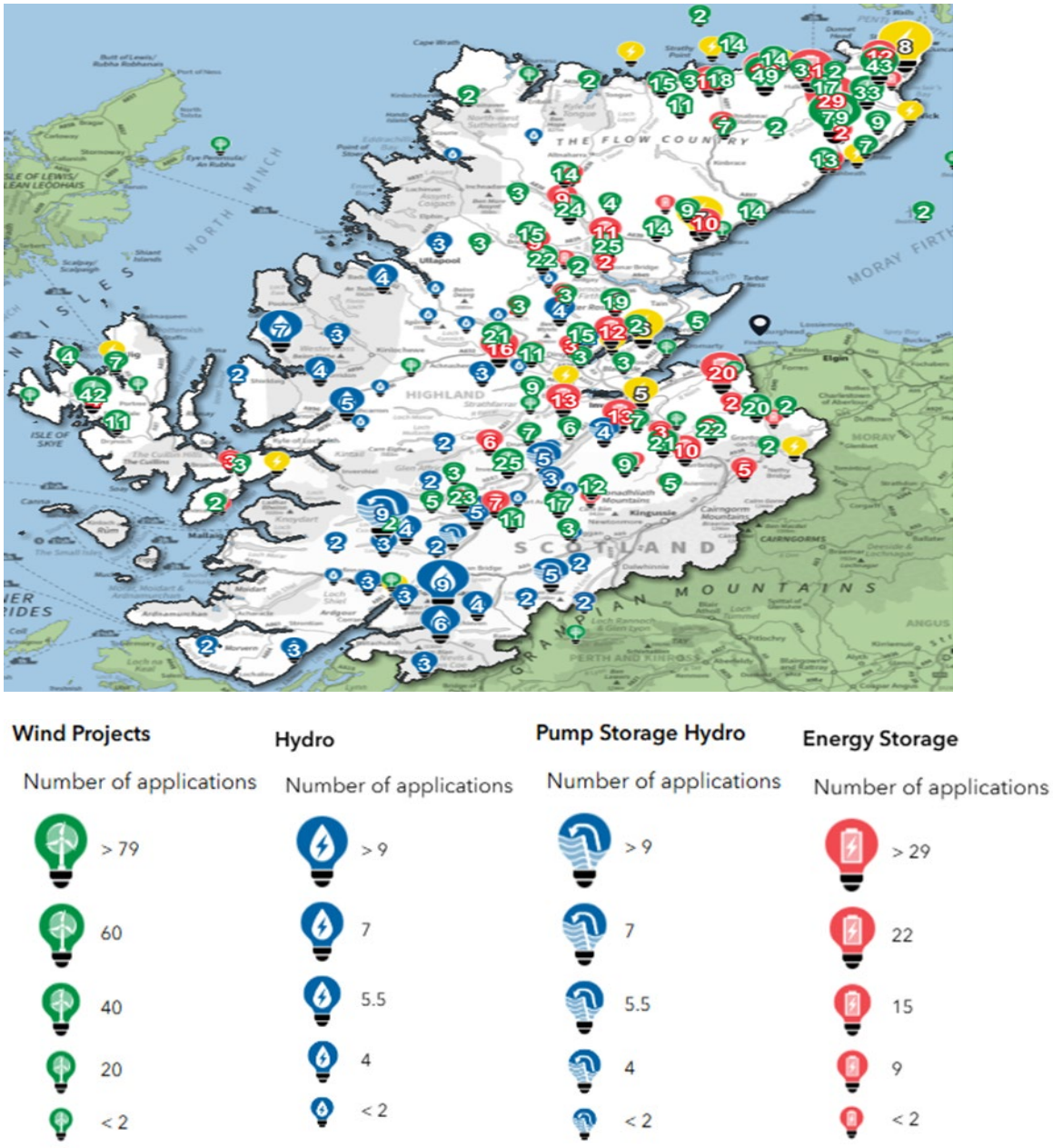
Examples include:

- Torvean Solar and Heat Network integration
- Longman Solar
- Brora Wind

- Wick solar and EV infrastructure
- Invergordon Heat Network

These projects:

- Support local energy resilience
- Reduce exposure to energy price volatility
- Create investment opportunities



5. Regional development and Infrastructure Capacity

Grid capacity is one of the most significant constraints affecting the Highlands.

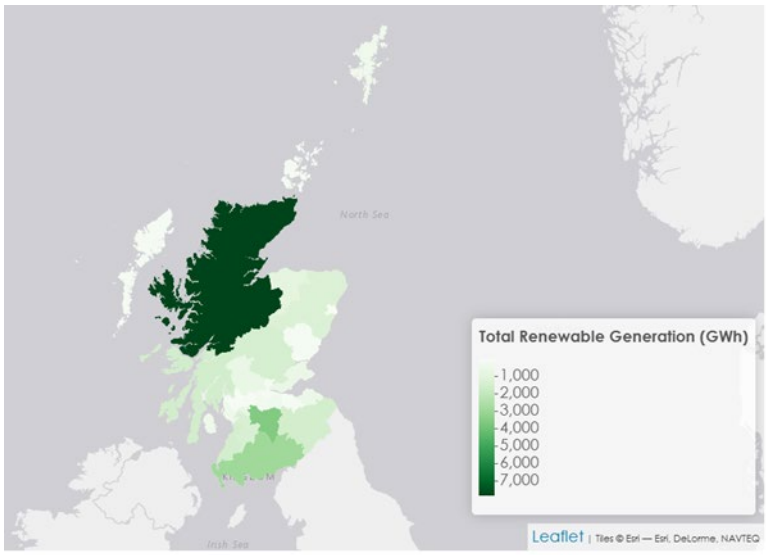
Current challenges include:

- **Transmission limitations restricting export of renewable electricity**
- **Increasing levels of renewable curtailment**
- **Delays in connecting new developments**

These constraints affect:

- **Renewable energy deployment**
- **Electrification of heat and transport**
- **Housing and infrastructure development**

Without coordinated transmission investment and local energy solutions, these constraints will increasingly shape economic growth and service delivery.



6. Grid Constraints and Infrastructure Capacity

5. Heat Networks and Local Energy Demand

Heat networks are a key component of place-based energy systems.

They can:

- **Improve energy efficiency**
- **Reduce system costs**
- **Support low-carbon heating**

In areas with suitable demand, they also enable:

- **Integration of renewable and waste heat**
- **Localised energy solutions**

9. A Place-Based Energy System for the Highlands

A single national energy model is unlikely to reflect the Highlands' geography and infrastructure.

A place-based approach enables coordination of:

- **Renewable generation**
- **Energy storage**
- **Heat networks**
- **Flexible demand**
- **Housing retrofit**

This approach:

- **Reduces pressure on the transmission network**
- **Improves system efficiency**
- **Retains more economic value locally**

Highland Council Energy Infrastructure Pipeline

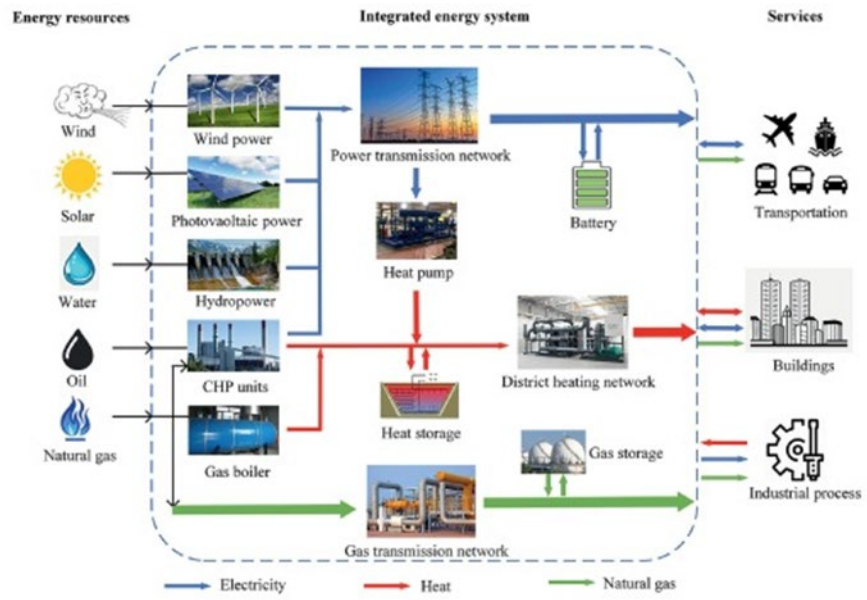


Figure 7 – Place-Based Energy System Mode

10. Alignment with the Highland Investment Plan

Energy infrastructure is a core component of the Highland Investment Plan.

A coordinated approach enables the Council to:

- Develop investment-ready pipelines
- Align infrastructure with housing and regeneration
- Attract public and private investment
- Support regional economic growth

11. Strategic Implications for the Highlands

Energy system reform presents both opportunities and risks.

Key priorities include:

- Ensuring national planning recognises the Highlands as a strategic energy region
- Securing transmission investment to unlock renewable capacity
- Developing place-based energy systems
- Retaining economic value locally
- Strengthening the Council's role in shaping infrastructure decisions

12. Conclusion

The Highlands are central to the UK's energy transition.

However, without coordinated infrastructure planning and place-based energy systems, the region risks continuing to host nationally significant infrastructure without realising the full economic and community benefits.

A coordinated, place-based approach aligned with national reform and regional investment priorities provides an opportunity to:

- **Improve affordability**
- **Strengthen resilience**
- **Support economic growth**
- **Deliver long-term value for Highland communities**

Appendix 5: Fuel Poverty and Retrofit in the Highlands

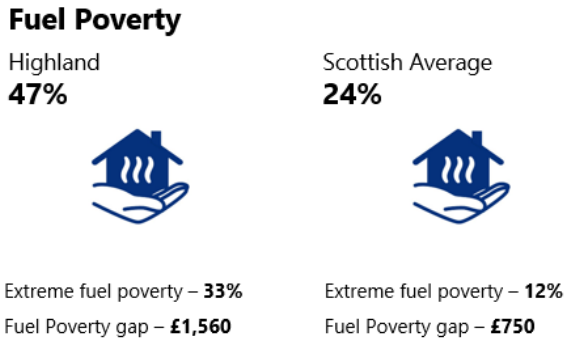
This appendix summarises the scale and structural drivers of fuel poverty across Highland and outlines the need for a coordinated approach. Whole house retrofit forms a critical component of the region's long-term energy, resilience and support fuel poverty reduction.

Fuel poverty in Highland is caused by the condition of housing stock, wider infrastructure issues, income levels and higher energy costs rather than peoples choices or behaviour. Reducing fuel poverty therefore requires coordinated long-term intervention rather than incremental improvements.

Improving housing energy performance also plays a critical role in supporting the wider energy transition. Reducing heat demand lowers pressure on electricity networks, improves affordability and strengthens resilience for communities across the Highlands.

1. Scale of Fuel Poverty

Fuel poverty remains a significant challenge across the Highlands. A Changeworks report 'A Perfect Storm'[1] report indicates:



The average fuel poverty gap is the amount energy costs must be reduced to lift a household out of fuel poverty; in rural Scotland it is estimated to be more than double the Scottish average.

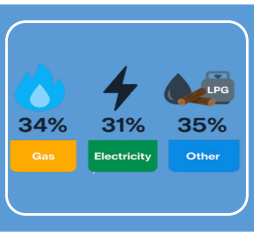
Homes which are poorly insulated require increased fuel consumption to maintain comfortable temperatures, with a high proportion of homes being underheated due to self-rationing which can result in associated health risks.

2. Structural Drivers of Fuel Poverty

Fuel poverty in Highland is attributed to the condition of housing stock, wider infrastructure issues, income levels and higher energy costs rather than individual household behaviour.

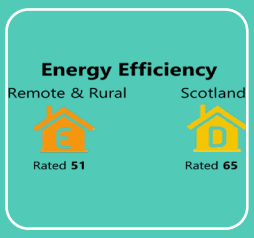
Drivers of fuel poverty:

[1] A perfect storm – fuel poverty in rural Scotland | Changeworks



High fuel costs

- Highland residents face higher energy costs due to a reliance on **off gas heating (64.3%)**, properties which are inefficient and face harsher weather conditions.
- Electricity is currently **three to four times more expensive** than mains gas per kWh and rural households often require more units to heat homes due to poorer energy efficiency. This **directly impacts 31% of Highland homes** which use electric heating as the primary source.

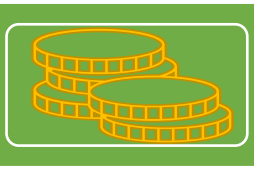


Poor energy efficiency

- Homes which are poorly insulated **require increased fuel consumption** to maintain comfortable temperatures, with a high proportion of homes being underheated due to self-rationing which can result in **associated health risks**.
- Rural homes have significantly lower average energy efficiency ratings (rated 51) than the Scottish average (rated 65).
- Highland has a **high proportion of solid wall and non-traditional construction types** which are typically less energy efficient and harder to treat.
- 24.2% of properties were built before 1950, with 33.9% of properties built between 1950-1983.

Cold & wetter climates

- Highland experience increasingly harsh weather conditions, with **36% of homes located in areas rated as severe or very severe to wind driven rain**.
- Rural houses are typically larger, isolated with an increased exposure to wet and windy weather. Unlike flats and terraced housing, which is typical in urban areas, rural homes do not have neighbouring properties to benefit from shared heat.

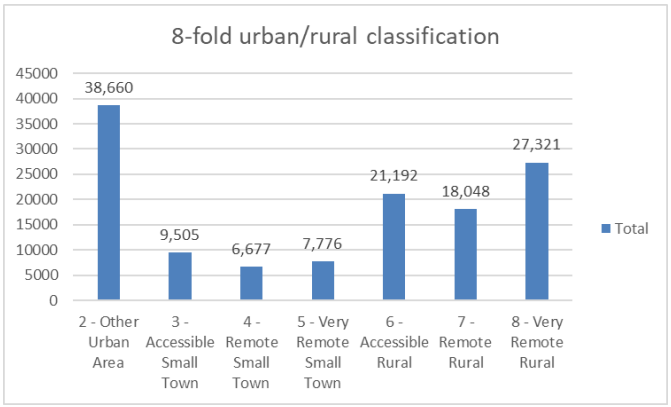


Low income/ high cost of living

- Highland and Islands Enterprise (HIE) report 'A Minimum Income Standard for Remote Rural Scotland' found rural households **typically require 10%-40% higher budgets to achieve a minimum acceptable living standard** than elsewhere in the UK.

3. Rurality and Delivery Costs

Highland Council serves over 25,000 km^2, encompassing one third of Scotland and 11.4% of the UK's landmass. The Scottish Governments 8-fold rural classification classifies 63% of Highland domestic properties as being in rural and remote areas (classifications 4 – 8).



Source: Energy Saving Trust's (EST) Home Analytics v4.1

Retrofit costs are significantly higher in Highland than national averages, this is due to a large proportion of homes not having access to the mains gas and often require:

Costly installations

Higher specification

Coastal considerations

Specialist installers are required to travel longer distances

Higher transportation and fuel costs

National delivery programmes recognise these challenges, Scottish Government and Energy Company Obligation (ECO) schemes provide additional funding uplifts for rural properties (22% and 35% respectively).

4. Approach

The Council's Local Heat and Energy Efficiency Strategy (LHEES) provides the statutory framework for planning improvements to building energy performance and identifying priority areas for place-based retrofit delivery. Coordinating retrofit delivery through LHEES enables housing improvement, energy infrastructure and community resilience planning to be aligned.

Domestic retrofit should therefore be viewed as core investment, supporting the long-term energy transition, economic resilience and enhancing community wellbeing.

Supporting long-term LHEES objectives by:

- Prioritising a fabric-first approach to improve insulation, airtightness and building performance.
- Accelerating the transition to low-carbon heating across all buildings.
- Reducing fuel poverty, especially in rural and off-gas communities with high heating costs.
- Focusing investment through targeted, area-based programmes to maximise carbon and social benefits.
- Strengthening community engagement and partnership working.
- Targeting homes with the lowest Energy Performance Certificate (EPC) ratings to prioritise improvement.
- Strengthening the evidence base with better data on buildings, heat demand and local energy opportunities.

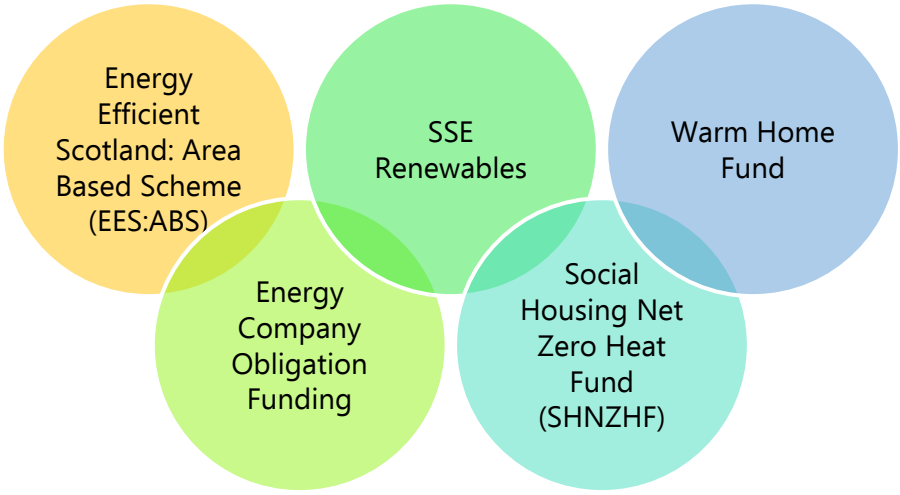
A whole house, fabric-first retrofit approach is essential for reducing fuel poverty. To ensure successful decarbonisation through the deployment of heat pumps in rural homes, interventions must first be taken to reduce heat losses through insulation and airtightness improvements. Failure to address insulation often results in heat pumps being oversized, which is a common challenge in rural and traditionally built properties.

This approach offers multiple benefits including:

Reducing heat demand not only cuts overall energy consumption but also lowers peak electricity demand at the time when the grid is under the most strain. This helps ease pressure on the already constrained electricity networks in Highlands, improving reliability and reducing the need for expensive grid upgrades.

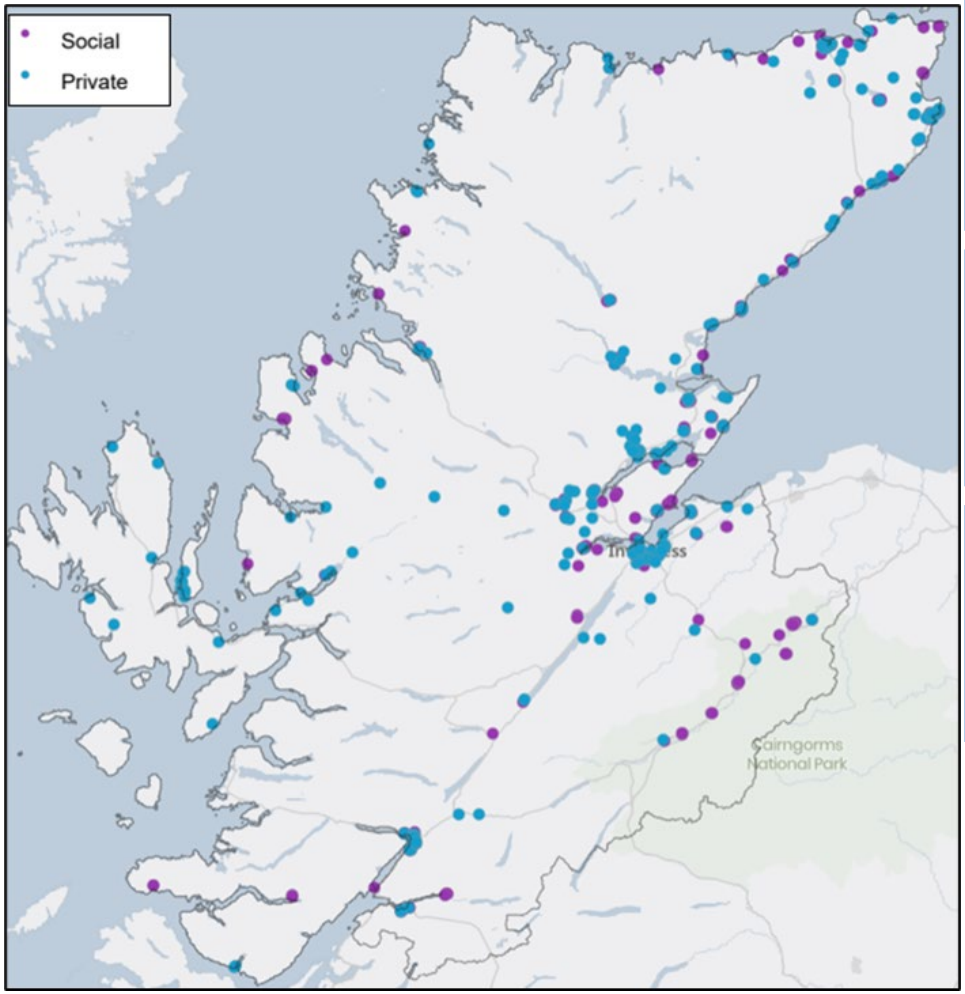
5. Current Council Delivery

Highland Council has a proven track record delivering domestic retrofit programmes across the region. Since 2014, the Council has leveraged over £69 million of external investment, sources listed below, to support energy efficiency and retrofit initiatives across the region.

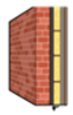


Energy Efficient Homes Programme Overview

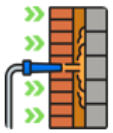
Since April 2024, the Council has leveraged over £25 million to deliver:



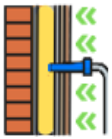
110 External Wall Insulation



97 Internal Wall Insulation



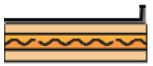
251 Cavity Wall Insulation



13 Cavity Internal Wall Insulation

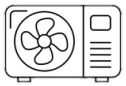
89 Room in Roof

10 Under floor insulation

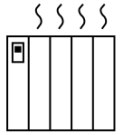


11 Flat roof insulation

200 Loft Insulation



547 Air source heat pump



36 Electric storage heaters

835 Solar PV

229 Solar PV with battery storage (privates only)

154 Roof replacement

65 Windows

65 Doors

6. Scale of the Challenge

Despite this progress, the scale of the challenge remains substantial. Initial desktop data modelling suggests:

Domestic Energy efficiency upgrade modelling

All tenures	Council Houses
	
Over £4.6 billion	**Over £500 million**

These figures do not include additional remedial works which may be required before energy efficiency improvements can be delivered. Additionally, some properties may remain unable to achieve EPC C ratings, which may affect the Council's ability to let properties under future housing standards.

Current delivery rates remain significantly below the pace required to meet national targets. Without a step-change in scale and funding certainty, the gap between required and actual progress will continue to widen.

7. Strategic Implications

Fuel poverty, housing performance and energy system resilience are closely interconnected across the Highlands. The region's dispersed settlement, varied building stock and constrained energy networks mean that domestic energy use is both a social challenge and a constraint on the wider energy system. The LHEES provides the framework for addressing these issues in a coordinated way, setting out a strategic pathway for improving building energy performance, reducing heat demand and supporting the transition to low carbon forms of heating.

Domestic retrofit therefore supports multiple strategic objectives:

- Fuel poverty reduction
- Improved energy performance
- Enabling electrification of heating
- Reducing peak electricity demand
- Mitigating grid constraints
- Support local supply chains and skilled employment
- Improved health and wellbeing

Domestic retrofit plays a vital role in achieving these objectives, representing a strategic investment that delivers long-term economic, social and environmental benefits. By improving the efficiency, comfort and affordability of homes, retrofit work helps build healthier communities, strengthens the resilience of local energy networks and supports progress towards both local and national decarbonisation goals.