Chapter 4 : Climate Change and Energy

Information required by the Act regarding the issue addressed in this section	Town and Country Planning (Scotland) Act 1997 as amended: Section 15 (5) (a): • the principal physical, cultural, economic, social, built heritage and environmental characteristics of the district. • the principal purposes for which the land is used Section 15 (5) (d): • the infrastructure of the district (including systems for the supply of water and energy) Section 15 (5) (e): • how that infrastructure is used Section 15 (5) (f) • any change which the planning authority think may occur in relation to any of the matters mentioned in paragraphs (a) to (eb) Town and Country Planning (Development Planning) (Scotland) Regulations 2023: Regulation 9 requires the LDP to have regard to: • the location of Control of Major Accident Hazard establishments and/or pipelines The Climate Change (Local Development Plan) (Repeals) (Scotland) Order 2025 came into effect 1 November 2025 (repealing Section 3(f)). *Section 3 (f):* • *LDPs must include policies requiring all developments in the area to be designed so as to ensure that all new buildings avoid a specified and rising proportion of the projected greenhouse gas emissions from their use, calculated on the basis of the approved design and plans for the specific development, through the installation and operation of low and zero-carbon generating technologies.*
NPF4 LDP Requirements	NPF4 Policy 1: • LDPs must address the global climate emergency and nature crisis by ensuring the spatial strategy will reduce emissions and adapt to current and future risks of climate change by promoting nature recovery and restoration in the area. NPF4 Policy 2: • The LDP spatial strategy should be designed to reduce, minimise or avoid greenhouse gas emissions. The six spatial principles identified in NPF4 should form the basis of the spatial strategy,

	helping to guide development to, and create sustainable locations. The strategy should be informed by an understanding of the impacts of the proposals on greenhouse gas emissions. • LDPs should support adaptation to the current and future impacts by taking into account climate risks, guiding development away from vulnerable areas, and enabling places to adapt to those risks. NPF4 Policy 11: • LDPs should seek to realise their area's full potential for electricity and heat from renewable, low carbon and zero emission sources by identifying a range of opportunities for energy development. NPF4 Policy 18: • LDPs and delivery programmes should be based on an integrated infrastructure first approach. Plans should: ○ Be informed by evidence on infrastructure capacity, condition, needs and deliverability within the plan area, including cross boundary infrastructure; ○ Set out the infrastructure requirements to deliver the spatial strategy, informed by the evidence base, identifying the infrastructure priorities, and where, how, when and by whom they will be delivered; and ○ Indicate the type, level (or method of calculation) and location of the financial or in-kind contributions, and the types of development from which they will be required. • Plans should align with relevant national, regional, and local infrastructure plans and policies and take account of the Scottish Government infrastructure investment hierarchy and sustainable travel and investment hierarchies in developing the spatial strategy. Consistent early engagement and collaboration between relevant stakeholders will better inform decisions on land use and investment NPF4 Policy 19: • LDPs should take into account the area's Local Heat and Energy Efficiency Strategy (LHEES). The spatial strategy should take into account areas of heat network potential and any designated Heat Network Zones (HNZ).
Links to Evidence	**(THC052)** Draft Updated Sectoral Marine Plan: Offshore Wind Energy **(THC053)** THC Regional Coastal Change Adaptation Plan **(THC055)** Highland Strategic Flood Risk Assessment **(THC056)** Inverness West Bank and Inverness Castle Heat Network Feasibility Studies

(THC057) Heat Network Feasibility Report
(THC058) Highland Energy Project Mapping Technical Note
(THC059) Climate Change Adaptation Strategy 2025 (including Appendix 2: Highland Local Climate Impact Profile)
(THC060) Climate Change Committee Minutes, 7 November 2024
(THC061) Net Zero Programme Update
(THC140) CONFIDENTIAL Strategic Planning Report Inverness IP
(THC141) CONFIDENTIAL Strategic Planning Report Conon Bridge – Invergordon IP
(THC074) Dava Moor, Nairn and Monadhliath Wind Energy Landscape Sensitivity Study
(THC143) Strategic Spatial Framework for Onshore Wind Energy: CaS
(THC138) Strategic Spatial Framework for Onshore Wind Energy: IMF
(THC139) Strategic Spatial Framework for Onshore Wind Energy: WH&I
(THC035) Response from Historic Environment Scotland
(THC039) Response from RPSB
(THC040) Response from Council to ScottishPower Renewables and Scottish Renewables Feedback on Chapters 4 & 5
(THC041) Scottish Renewables Response to Evidence
(THC042) ScottishPower Renewables Response to Evidence
(THC043) Response from Defence Infrastructure Organisation
(THC044) Response from Highland Adapts
(THC045) Response from SSEN Transmission
(THC046) Response from SSEN Distribution
(THC047) Response from Scottish Forestry
(THC080) Response from Highlands and Islands Enterprise
(THC088) Response from NatureScot
(THC089) Response from SEPA
(THC089) Response from Homes for Scotland
(THC152) Response from Network Rail

Ref no.	Online Resources	Date Accessed
THC010	Ardgour Local Place Plan	29.06.26
THC011	Black Isle Local Place Plan	29.06.26
THC012	Broadford and Strath Local Place Plan	29.06.26
THC024	Caol Local Place Plan	29.06.26
THC026	Croy and Tornagrain Local Place Plan	29.06.26
THC013	Dores and Essich Community Local Place Plan	29.06.26
THC014	Duror and Kentallen Local Place Plan	29.06.26
THC022	Fort Augustus and Glenmoriston Local Place Plan	29.06.26

	THC015	Gairloch Local Place Plan	29.06.26
	THC016	Garve and District Local Place Plan	29.06.26
	THC029	Glen Urquhart Local Place Plan	29.06.26
	THC021	Golspie Local Place Plan	29.06.26
	THC017	Kinlochleven Local Place Plan	29.06.26
	THC028	Kyle of Sutherland Local Place Plan	29.06.26
	THC018	Lochalsh Local Place Plan	29.06.26
	THC027	Morvern Local Place Plan	29.06.26
	THC023	Nairnshire Local Place Plan	29.06.26
	THC025	Sleat Local Place Plan	29.06.26
	THC019	Stratherrick and Foyers Local Place Plan	29.06.26
	THC020	Torridon and Kinlochewe Local Place Plan	29.06.26
	THC192	Climate Change (Scotland) Act 2009	01.08.25
	THC193	Climate Change (Emissions Reduction Targets) Act 2024	16.10.25
	THC194	Update to the Climate Change Plan 2018-2032	16.10.2025
	THC195	The Environment Strategy for Scotland: Vision and Outcomes	20.10.2025
	THC196	Scottish National Adaptation Plan 2024-2029	20.10.2025
	THC197	National Performance Framework	01.08.2025
	THC198	Local Development Planning Guidance	01.08.2025
	THC199	Climate Change Act – Section 72: fourteenth annual report	01.08.2025
	THC200	Climate Change Act – Section 72: fifteenth annual report	01.08.2025
	THC201	The Climate Change (Local Development Plan) (Repeals) (Scotland) Order 2025	01.11.2025
	THC202	IPCC Special Report: Global Warming of 1.5 ºC	01.08.2025
	THC203	UK Local Authority and Regional Greenhouse Gas Statistics	01.08.2025
	THC204	Scottish Greenhouse Gas Statistics 2023	01.08.2025
	THC205	Highland Forest and Woodland Strategy	14.05.2026
	THC206	Scottish Transport Statistics 2024	01.08.2025
	THC207	Progress in reducing emissions in Scotland 2023 report to parliament	20.10.2025
	THC208	Climate Projections for Scotland Summary	20.10.2025
	THC209	MetOffice Historic Station data	01.08.2025
	THC210	Climate Ready Scotland: Second Scottish Climate Change Adaptation Programme	20.10.2025
	THC211	15 key consequences of climate change for Scotland	20.10.2025

THC212	SWF statement on Morayshire Wildfires - Updated 10.07.25	20.08.2025
THC213	Storm Floris - SSEN Report	15.08.2025
THC214	Storm Floris - Met Office Report	15.08.2025
THC215	Storm Floris - BBC Report	15.08.2025
THC216	Highland Weather & Climate Story Map	01.08.2025
THC217	Dynamic Coast Erosion Reporter	01.08.2025
THC218	Dynamic Coast Differences between a high and low emissions future	01.08.2025
THC219	Dynamic Coast Erosion Disadvantage	01.08.2025
THC220	Dynamic Coast Social Vulnerability Classification Index (SVCI) for Scotland	01.08.2025
THC221	Local Authority Climate Explorer	01.08.2025
THC222	North Scotland Community Risk Register 2024	20.10.2025
THC223	Summary for Scotland: Evidence for the third UK Climate Change Risk Assessment (CCRA3)	20.10.2025
THC224	National Risk Register	20.10.2025
THC225	NatureScot Research Report No. 1228: Anticipating and mitigating projected	20.10.2025
THC226	Private Water Supplies and Climate Change	20.10.2025
THC227	Highland Climate Change and Energy Map	20.10.2025
THC228	Scottish Water Climate Change Adaptation Plan	20.10.2025
THC229	Scotland future predictions of water scarcity: impact on distilleries & agricultural abstractors	20.10.2025
THC230	Provision of Analyses of Scottish Fire & Rescue Service (SFRS) Incident Reporting System (IRS) Data in Relation to Wildfire Incidents	20.10.2025
THC231	Regional Report Highland Climate Risk and Opportunity Assessment Economic Analysis	20.10.2025
THC232	Highland Strategic Flood Risk Assessment Map	05.08.2025
THC233	Wildfire Risk Viewer Maps from EFFIS	05.08.2025
THC234	Scottish Wildfire and Muirburn Extents	05.08.2025
THC235	Energy Report HCROA Economic Analysis	20.10.2025
THC236	Forest and Timber Report HCROA Economic Analysis	20.10.2025
THC237	Food and Drink (Whiskey and Salmon) HCROA Economic Analysis	20.10.2025
THC238	UK Climate Projections Headline Findings 2022	20.10.2025
THC239	Indicators and trends: Extreme weather and infrastructure	05.08.2025

	THC240	Scotland Climate Ready Plan for Railway 24-29	20.10.2025
	THC241	Just Transition and Climate Change Adaptation	20.10.2025
	THC242	The impacts of climate change on population groups in Scotland	27.08.2025
	THC243	Local Climate Adaptation Tool	05.08.2025
	THC244	Scottish Index of Multiple Deprivation (SIMD)	05.08.2025
	THC245	Digital connectivity and climate change in Scotland – Evidence review	05.08.2025
	THC246	Scotland's Carbon Budgets	20.10.2025
	THC247	Highland Council Net Zero Strategy	15.05.26
	THC248	Scottish Biodiversity Strategy	20.10.2025
	THC249	Biodiversity: delivery plan 2024 to 2030	20.10.2025
	THC250	Scotland's Forestry Strategy	20.10.2025
	THC251	Woodland Carbon Code	20.10.2025
	THC252	Scotland's National Peatland Plan	20.10.2025
	THC253	The Flow Country WHS Nomination Dossier	22.08.2025
	THC254	Carbon Removal & Storage Project in Highland	20.10.2025
	THC255	Route Map for 20% car use reduction by 2030	20.10.2025
	THC256	National Transport Strategy 2	20.10.2025
	THC257	Hydrogen Action Plan	20.10.2025
	THC258	Economic Assessment of Climate Change Impacts on the Highland Region	20.10.2025
	THC259	National Flood Resilience Strategy	20.10.2025
	THC260	Using future climate scenarios to support today's decision making	20.10.2025
	THC261	NPF4 planning guidance for Policy 2	20.10.2025
	THC262	Planning (Scotland) Act 2019	06.08.2025
	THC263	Lifecycle Greenhouse Gas Emissions of NPF4 proposed National Developments (2022)	20.10.2025
	THC264	Research to Inform NPF4: Planning and Climate Change Guidance Report Issue 3	20.10.2025
	THC265	Sustainable Design Guide Supplementary Guidance - Highland Council	15.05.2026
	THC266	Carbon Guidance for Planning Applications, S36 & S37 consents	20.10.2025
	THC267	Wind farm carbon calculator: Sottish peatland	20.10.2025
	THC268	Wind farm carbon calculator Scottish peatland by ClimateXChange: research	20.10.2025
	THC269	Peatland Code	20.10.2025
	THC270	UK Land Carbon Registry	20.10.2025

THC271	December 2020 Information Note - Climate Mitigation: Woodland creation & management	20.10.2025
THC272	Energy Act 2023	20.10.2025
THC273	Clean Power 2030 Action Plan	20.10.2025
THC274	Draft Energy Strategy and Just Transition Plan	20.10.2025
THC275	Electricity Act 1989	06.08.2025
THC276	Pathway to 2030 Holistic Network Design 2022	20.10.2025
THC277	Beyond 2030 report (2024)	20.10.2025
THC278	Onshore wind: Policy Statement 2022	20.10.2025
THC279	Highland Energy Project Mapping	06.08.2025
THC280	Energy Trends – Regional Renewable Statistics	20.10.2025
THC281	UK residual fuel consumption at regional and local authority level, 2005 - 2023	20.10.2025
THC282	Strategic Spatial Energy Plan Summary	20.10.2025
THC283	Local Energy Net Zero Accelerator data story	20.10.2025
THC284	Highland Local Heat, Energy Efficiency Strategy	15.05.2026
THC285	Distribution Future Energy Scenario 2024	20.10.2025
THC286	Distribution Future Energy Scenario 2023	20.10.2025
THC287	Scottish Onshore Transmission Network Boundaries	20.10.2025
THC288	Pathway to 2030: SSEN-T Projects	20.10.2025
THC289	Highland Housing Land Audit	06.08.2025
THC290	Deliverable Housing Land Pipeline March 2025	15.05.2026
THC291	Highland Business and Industrial Land Audit	06.08.2025
THC292	SHEPD Network Development Report 2024	02.09.2025
THC293	Strategic Development Plan areas (SSEN-D)	20.10.2025
THC294	Thurso South SDP	20.10.2025
THC295	Taynuilt SDP	20.10.2025
THC296	NESO Gas Network Capability Needs Report(	20.10.2025
THC297	Midstream gas system: update to the market	06.08.2025
THC298	Planning Permission Appeal - PPA-270-2293	27.08.2025
THC299	Highland Wind Turbine Mapping	06.08.2025
THC300	Aviation Lighting Impact Assessment	22.08.2025
THC301	Offshore Wind Policy Statement	06.08.2025
THC302	Scotland Marine Economic Statistics 2022	06.08.2025
THC303	Sectoral Marine Plan for Offshore Wind Energy	06.08.2025
THC304	National Marine Plan	20.10.2025
THC305	Scotland's Hydrogen Assets	06.08.2025
THC306	UK Hydrogen Strategy	27.08.2025
THC307	Planning Improvement Hub - Hydrogen	20.10.2025
THC308	Hydrogen Planning Process Map	20.10.2025

THC309	A Guide to Early Engagement in Planning for Hydrogen Developers	20.10.2025
THC310	Hydrogen webpage - SEPA	20.10.2025
THC311	Town & Country Planning (Environmental Impact Assessment) Scotland Regulations 2017	20.10.2025
THC312	Hazardous Substances Consent	20.10.2025
THC313	Pollution Prevention and Control (Scotland) Regulations 2012 (PPC)	20.10.2025
THC314	Highland Renewable Energy Strategy and Planning Guidelines	14.05.2026
THC315	Onshore wind energy supplementary guidance	14.05.2026
THC316	The Flow Country Planning WHS Planning Position Statement 2	14.05.2026
THC317	Onshore Wind Sector Deal	14.05.2026
THC318	North of Scotland Hydrogen Programme	06.08.2025
THC319	Long-term Waste Management Communities & Place Committee Report	15.05.26
THC320	Local Energy Scotland	06.08.2025
THC321	Landscape Sensitivity Assessment Guidance	20.10.2025
THC322	Social Value Charter for Renewables Investment - Highland Council	15.05.2026
THC323	Local Heat & Energy Efficiency Strategy (Scotland) Order	06.08.2025
THC324	Scottish House Condition Survey: Local Authority Analysis 2017-2019	06.08.2025
THC325	New Build Heat Standard 2024	06.08.2025
THC326	Heat in Buildings Strategy (2021)	20.10.2025
THC327	Heat Networks (Scotland) Act 2021	06.08.2025
THC328	Scotland Heat Map	06.08.2025
THC329	Heat Networks Planning Database	06.08.2025
THC330	Government's First National Assessment of Potential Heat Network Zones	06.08.2025
THC331	Waste Site Capacity - SEPA	20.10.2025
THC332	Large point emitters from National Atmospheric Emissions Inventory	20.10.2025
THC333	SSEN Network Maps – Generation Availability	20.10.2025
THC334	British Geological Survey - hydrogeology	20.10.2025
THC335	Mine Remediation Authority Map	20.10.2025
THC336	A Perfect Storm: Fuel Poverty in Rural Scotland	06.08.2025
THC337	Scottish Fuel Poverty Index	06.08.2025

THC338	Consultation on increasing the threshold for applications under The Electricity Act	08.01.2026
THC339	Highland Climate Change Risk and Opportunity Assessment – Technical Report	16.03.2026
THC340	Battery Energy Storage Systems: planning guidance	19.03.2026
THC341	Transitional RESP (tRESP) Executive Summary	19.03.2026
THC342	Climate change duties: statutory guidance	20.03.2026
THC343	SSEN 2025 Report: Technology change log	09.04.2026
THC344	Beauly 132kv Supply Area Strategic Development Plan	22.04.2026
THC345	Fort Augustus 132kv Supply Area Strategic Development Plan	22.04.2026
THC346	Errochty 132kv Supply Area Strategic Development Plan	22.04.2026
THC347	Thurso South Strategic Development Plan	22.04.2026
THC348	Inverness and Aviemore 132kv Supply Area Strategic Development Plan	22.04.2026
THC349	Outer Hebrides and Skye 132kv Supply Area Strategic Development Plan	22.04.2026

In order to avoid repetition of content contained elsewhere within the Evidence Report, this chapter should be read in conjunction with other chapters. We recognise that there are relevant crossovers between Climate Change and Energy and other topics including:

- **Chapter 5: Nature and Environment**
- **Chapter 6: Coastal Development**
- **Chapter 7: Flood Risk Management**
- **Chapter 8: Economy, Business, Tourism and Productive Places**
- **Chapter 9: Housing**
- **Chapter 10: Transport**
- **Chapter 11: Infrastructure**
- **Chapter 12: Historic Assets, Brownfield Land and Empty Buildings**
- **Chapter 13: Design, Wellbeing, Local Living and Placemaking**

Where apparent, the Council has referenced relevant linkages between policy areas throughout the chapter.

Summary of Evidence

4.1 The Council considers it has undertaken thorough engagement with stakeholders for this chapter and collected sufficient evidence on the topic for the Proposed Plan development. This Summary of Evidence focuses on information relating to:

- **National Context**
- **Climate Emissions**
- **Climate Impacts**
- **Climate Risks**
- **Vulnerability and Resilience**
- **Climate Mitigation**
- **Climate Adaptation**
- **Energy**
- **Heat and Cooling**

National Context

4.2 In 2019, the Scottish Government declared a climate emergency. The Climate Change (Scotland) Act 2009, including its amendments, aims to ensure that Scotland will be fully net-zero by 2045. The Act contains a legal duty across the public sector to deliver the objectives of the Act (Section 44). In 2025, Scotland's interim targets for 2030 to 2040 were repealed and replaced with carbon budgets (statutory limits on greenhouse gas emissions) through the Climate Change (Emissions Reduction Targets) Act 2024.

4.3 The pathway to achieve the Act's targets for emissions reduction is set out in the Scottish Government Update to the Climate Change Plan 2018-2032, which outlines how Scottish Government intends to meet emissions reduction targets across all portfolio areas and sectors of the economy. It highlights the role of the planning system in guiding and achieving the outcomes with key priorities for development at a national level and policy on how local development planning should manage change.

4.4 The Environment Strategy for Scotland: Vision and Outcomes sets out a vision—By 2045: By restoring nature and ending Scotland's contribution to climate change, our country is transformed for the better - helping to secure the wellbeing of our people and planet for generations to come.

4.5 Scotland's climate change legislation also requires Scottish Ministers to set out Scottish Climate Change Adaptation Programmes (SCCAPs) to reflect the latest UK-wide evidence base on climate risk. The Scottish National Adaptation Plan (SNAP3) 2024-2029 has 23 objectives that set out priorities for action in the next 5 years (2024-2029). Important enabling factors for effective adaptation include the National Planning Framework, the Place Principle, Flood Resilience Strategy, Biodiversity Strategy among other plans. Objective Development Planning (NC3)

states: *"development planning (including Local Development Plans and associated delivery programmes) takes current and future climate risks into account and is a key lever in enabling places to adapt."*

4.6 In 2024, the Scottish Government proposed that building Scotland's resilience to climate change becomes a national outcome in Scotland's National Performance Framework, anticipated to be launched in 2026. This change is proposed to drive climate action that aligns with the UN Sustainable Development Goals and addresses the urgency and scale of the climate crisis.

4.7 In March 2026, Scottish Government published Climate change duties: statutory guidance for public bodies to support public bodies to implement their climate change duties under Climate Change (Scotland) Act 2009. Annex J – Sectoral Guidance: Planning and the Built Environment describes the planning system which provides opportunities and duty to respond to climate change, including through the Local Development Plan.

National Planning Framework

4.8 NPF4 is Scotland's national spatial strategy and forms part of the statutory development plan. Meeting emission reduction targets is one of six statutory outcomes for the National Planning Framework. The six overarching spatial principles of NPF4 guide planning to respond to the global climate emergency. Addressing the global climate emergency and the nature crisis have formed the foundations for the spatial strategy as a whole. NPF4 policy intent and outcomes are directive in preparing for current and future climate change, principally through Policies 1 and 2:

- Policy 1 gives significant weight to the global climate emergency and nature crises and recognises that it is a priority for all plans and decisions. This policy has connections with all other policies.
- Policy 2 ensures that greenhouse gas (GHG) emissions are reduced, minimised or avoided in new developments as much as possible and that developments adapt to the current and future impacts of climate change.

4.9 Reducing emissions in the energy sector is a key part of the response to climate change. Policy 11 supports renewable energy development, Policy 19 helps to decarbonise heat, while Policy 18 encourages an infrastructure-first approach.

4.10 Local Development Planning Guidance notes that Policy 1 will be implemented by the cumulative impact of all the other policies, in particular policies 2, 3, 4, 5 and 6. Implementation of NPF4 as a whole should underpin the response to the intertwined climate and nature crises. This Chapter makes connections between other relevant evidence report Chapters (and NPF4 policies therein) to demonstrate the interrelated body of evidence related to Policy 1.

4.11 Other NPF4 policies to varying degrees contribute to responding to climate change. Action on adaptation is supported via policies 3, 4, 5, 6, 10, 20, 21 and 22. Action on emissions reduction and mitigation is supported via policies 3, 4, 5, 6, 8, 12, 13, 14, 15, 16, 20 and 24. This includes policies supporting the health of the natural environment, supporting transition of key emissions generating activities, support for more local living and, creating productive places that are consistent with our ambition for green growth in the future.

4.12 NPF4 includes the following definitions, which are referred to in this chapter:

- **Climate change adaptation** - Climate change adaptation is about responding to the changes that we have seen in our climate over the last few decades and preparing for the challenges that we will face as our climate continues to change.
- **Climate change mitigation** - Climate change mitigation refers to efforts to reduce or prevent emissions of GHGs, which have a direct impact on global average temperatures, and reducing the current concentration of carbon dioxide by enhancing carbon sinks (for example, increasing the area of forest).
- **Decarbonisation** - Reducing the amount of gaseous carbon compounds released by buildings, activities or operations.
- **Just transition** - Ending our contribution to climate change in a way that is fair and leaves no one behind.
- **Net zero** - Scotland has set a target to become 'Net Zero' by 2045. This means the amount of GHG emissions we put into the atmosphere and the amount we are able to take out will add up to zero.

4.13 NPF4 emphasises the importance of Scotland's quality natural environment in our approach to tackling climate change, and for our economy, health and wellbeing. Recognising links with **Chapter 5: Nature and Environment**, there is increasing recognition that the climate and nature crises are intertwined. Natural assets can be managed and used to secure a more sustainable future and will play a crucial role in achieving a Just Transition to Net Zero.

4.14 NPF4 outlines that LDPs are required to identify and support National Developments relevant to their areas. For Highland, relevant National Developments to climate change and energy include Pumped Hydro Storage, Strategic Renewable Energy Generation and Transmission Infrastructure, Circular Economy Material Management Facilities, National Walking, Cycling and Wheeling Network, Digital Fibre Network and Energy Innovation Development on the Islands.

4.15 Regional Spatial Priorities for 'North and West Coast and Islands', 'North' and 'North East' Scotland, including of Highland as part of each of those areas, are identified in NPF4. These support emissions reduction through the transition to

low carbon and net zero energy and making sustainable use of environmental assets. These priorities include:

- Maximise the benefits of renewable energy whilst enhancing blue and green infrastructure, decarbonising transport and building resilient connections.
- Support coastal and island communities to become carbon neutral, thus contributing to net-zero commitments and reducing fuel poverty.
- Seize the opportunities to grow the blue and green economy, recognising the world-class environmental assets that require careful management and opportunities to develop skills and diversify employment.
- Protect environmental assets and stimulate investment in natural and engineered solutions to climate change and nature restoration, whilst decarbonising transport and building resilient connections.
- Maintain and help to grow the population by taking a positive approach to rural development that strengthens networks of communities.
- Support local economic development by making sustainable use of the areas' environmental assets to innovate and lead greener growth.
- Plan infrastructure and investment to support the transition from oil and gas to net zero whilst protecting and enhancing blue and green infrastructure and decarbonising connectivity.
- Focus on continued regeneration through the principles of local living and 20 minute neighbourhoods to sustain the skilled workforce and improve local liveability.
- Support continued economic diversification and innovation.

4.16 With regard to section 3F of the Town and Country Planning (Scotland) Act 1997, the Fourteenth Annual Report from Scottish Ministers concluded that Section 3F is no longer necessary because NPF4 and the New Build Heat Standard (NBHS) goes beyond what Section 3F can achieve and the dominant operational GHG emissions source, heat, is addressed by NBHS. Following the annual report, Ministers commenced work to prepare the repeal Order.

4.17 The Fifteenth Annual Report from Scottish Ministers states that "S*ection 3F was not designed for the new approach to LDPs"* (para 4.5). NPF4, Policy 2 in particular as well as policies 11, 19, and 26, which taken together with Policy 2, are considered to represent a *"more holistic approach to emissions reduction than is presented by the approach set out in Section 3F."*

4.18 The Climate Change (Local Development Plan) (Repeals) (Scotland) Order 2025 came into effect 1 November 2025 and this Section 3F has now been repealed.

Climate Emissions and Impacts

Greenhouse Gas (GHG) emissions

4.19 The 2018 Intergovernmental Panel on Climate Change (IPCC) Special Report: Global Warming of 1.5 ºC delivers a stark warning on the importance of limiting temperature rise to 1.5°C, in order to avoid the worst impacts of climate change. The report also warns of the extremely short window for action – limiting warming to 1.5°C will require global emissions to almost halve by 2030.

4.20 The Council declared a climate and ecological emergency in May 2019 and recognises that climate change is a wide-ranging problem with ecological, environmental, social and economic implications.

4.21 The UK Local Authority and Regional Greenhouse Gas Statistics published annually (with a two-year reporting lag), provides a nationally consistent set of emissions estimates at the local authority level. The latest publication provides data on territorial GHG emissions for Highland (2023) by sector (Figure 4:1).

4.22 The Highland (including part of Cairngorms National Park Authority (CNPA)), grand total of GHG emissions in 2023 was 2,904 kt CO_2e, and 12.3 t CO_2e per capita. The highest emitting sectors were Land-Use, Land-Use Change and Forestry (30.26%), Agriculture (21.43%), Transport (19.7%) and Domestic (12.4%).

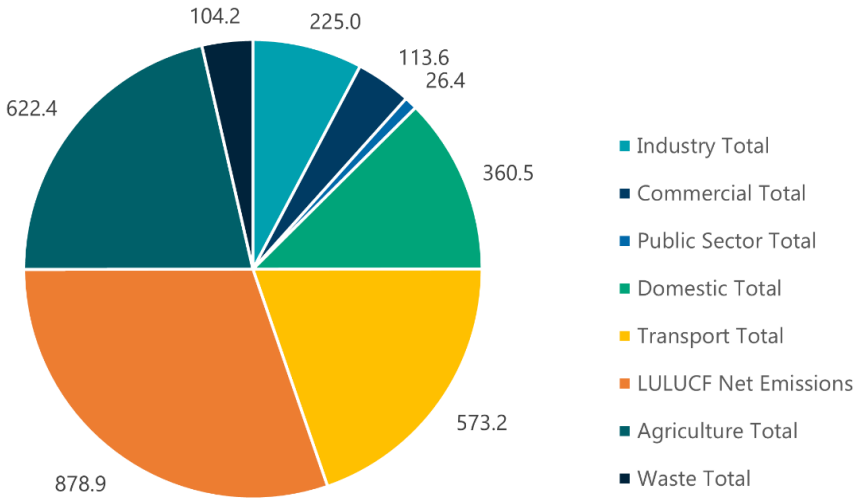

Figure 4:1: Highland local authority territorial GHG emissions, 2023 (kt CO_2e) (Source: UK Local Authority and Regional Greenhouse Gas Emissions Statistics)

4.23 Land-Use, Land-Use Change and Forestry (LULUCF) is a major source of emissions in Highland and is a critical consideration for planning for net zero. LULUCF includes carbon sinks from forestry and grassland mineral soils change and sources of emissions from peatland, cropland mineral soils change, settlements and other LULUCF (Figure 4:2). The decline in Forestry contributions to carbon

sinks is notable and could be attributed in part to the maturation of commercial woodland and associated felling (part of a ~50 year cycle). Considerations for carbon offsetting through Forestry are considered in **Lifecycle Greenhouse Gas Emissions**.

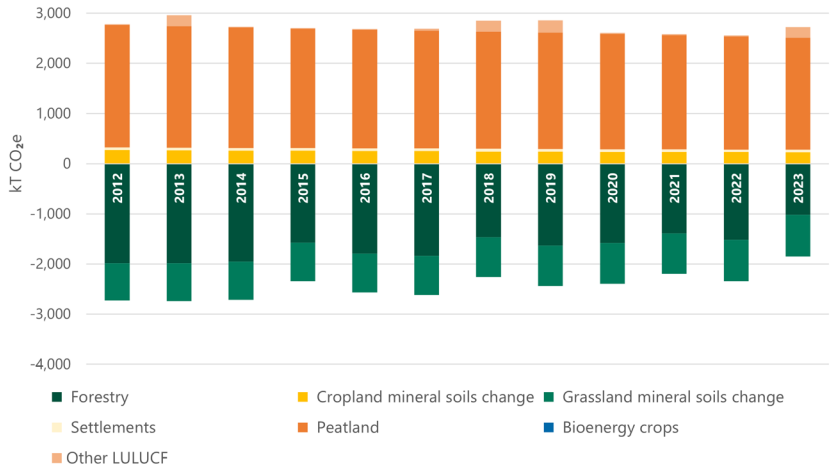

Figure 4:2 Highland LULUCF Net Emissions overview, 2012-2023 (Source: UK Local Authority Greenhouse Gas Emissions Statistics

4.24 In 2023, LULUCF emissions in Highland (including CNPA) were a larger proportion of total emissions, compared to the share of emissions from LULUCF in Scotland - 0.5 Mt CO_2e in 2023, forming just over 1.2% of total emissions (Scottish Greenhouse Gas Statistics 2023) whereas in Highland emissions from LULUCF were 30.26% (0.88MtCO_2e) of total CO_2e emissions. Therefore, in Highland the management and restoration of carbon sinks such as peatlands, forests and woodlands - as considered in the Highland Forest and Woodland Strategy (HFWS) as discussed in **Chapter 5: Nature and Environment** - are especially important for reducing GHG emissions from LULUCF.

4.25 While Agriculture in Highland (including CNPA) was a significant sectoral contributor to GHG emissions in 2023 (Figure 4:1), they were predominantly from livestock emissions (346.9 kt CO_2e) where there is no jurisdiction for planning to influence emitting activities. Evidence related to prime agricultural land and registered croft land is presented in **Chapter 5: Nature and Environment**, while allotments and community food growing in urban settings is presented within **Chapter 13: Design, Wellbeing, Local Living and Placemaking**.

4.26 Transport is a considerable contributor to carbon emissions in Scotland, and even more so in Highland. While total Scottish net emissions from all sources decreased by 0.1% between 2021 and 2022 falling from 40.63 Mt CO_2e to 40.61 MtCO_2e, transport total emissions (including international aviation and shipping) comprised 31.7% of all net emissions from all sources, and increased from 11.8

Mt CO2e to 12.9 Mt CO2e, an increase of 9% (Scottish Transport Statistics 2024). Figure 4:3 shows transport emissions over time, by mode.

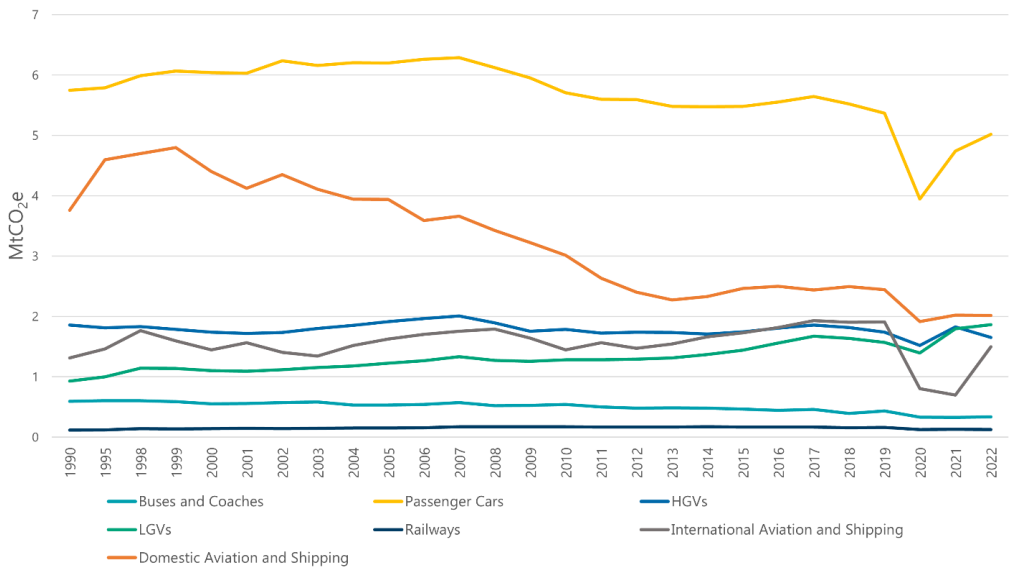

Figure 4:3 Estimated GHG emissions of Scottish transport for 2022 (Source: Scottish Transport Statistics 2024)

4.27 In 2023, Highland (including CNPA) transport emissions were predominantly from Road Transport: 0.42 $MtCO_2e$ from 'A Roads' and, 0.121 $MtCO_2e$ from 'Minor roads' (UK Local Authority and Regional Greenhouse Gas Emissions Statistics). In the context of wider Scotland, domestic transport is also a major source of emissions 28.78% (11.4 $MtCO_2e$ out of net emissions of 39.6$MtCO_2e$) (Scottish Greenhouse Gas Statistics 2023). Therefore, consideration of the transport system, including decarbonisation and mode-shift, are important for planning to reduce GHG emissions. This is further considered in **Chapter 10: Transport**.

4.28 The Domestic sector for emissions detailed in the UK Local Authority and Regional Greenhouse Gas Emissions Statistics comprises electricity, gas and other fuel sources such as oil and solid fuels. In Highland (including CNPA), domestic emissions have been trending downward since 2005, from 800 $ktCO_2e$ to 360.5 $ktCO_2e$ in 2023—most notably due to reduced emissions from electricity (Figure 4:4). This trend is also observable in Scotland-wide statistics (Scottish Greenhouse Gas Statistics 2023). The emissions from gas and other domestic fuel sources, such as wood burners, have remained relatively steady in Highland over the same period (Figure 4:4). This is discussed further, in **Heat and Cooling**.

4.29 Electricity supply has been the main driver of emissions reduction in Scotland to date as evidenced by the Progress in reducing emissions in Scotland 2023 report to parliament with significant reductions due to the phase-out of coal and ramp-up of low-emissions renewable energy generation.

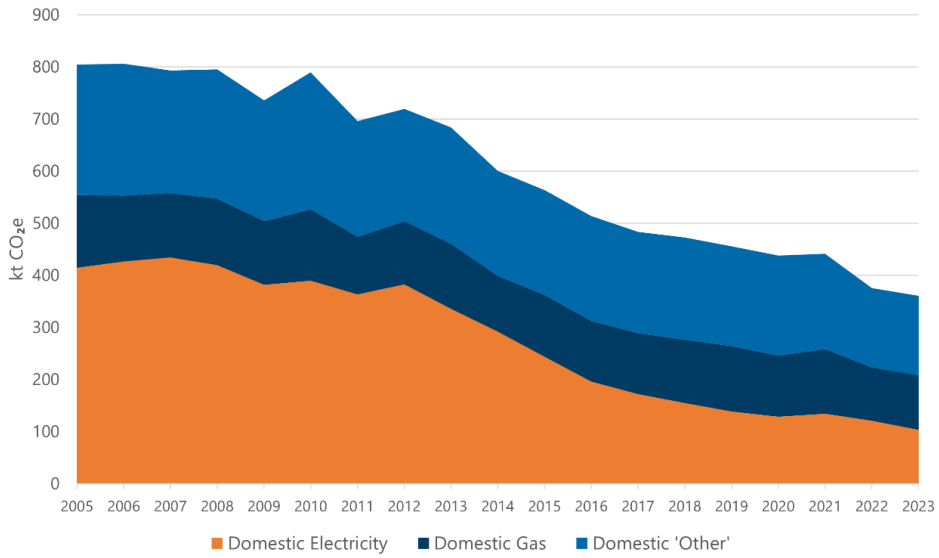

Figure 4:4 Highland Domestic GHG emission estimates by source (2005 - 2023)

4.30 Highland continues to make a major contribution to increasing renewable energy capacity, which is critical to support the transition away from fossil fuel energy generation. In 2023, electricity generation in Highland formed a proportionally small part of the local greenhouse emissions profile (Industry Total, Figure 4:1). Highland's growing renewable energy sector, discussed later in **Energy**, has wide ranging impacts on greenhouse gas emissions both in Highland and beyond, to Scotland and the United Kingdom, as emissions statistics are estimated at the point of use, not the source.

4.31 It is estimated that local authority emissions accounted for 2-3% of emissions in Highland as reported in the *Climate Change Committee Minutes 7 November 2024* (**THC060**). As part of the Council's statutory reporting through the Public Bodies Climate Change Duties Report return for 2023/24, the organisation reported consumption of electricity, gas, oil, Liquefied Petroleum Gas (LPG), biomass and water account for 73% of corporate emissions. Council fleet and staff travel account for 22% of corporate carbon emissions as reported in the Net Zero Programme Update, 7 November 2024 (**THC061**). In the minutes of the Climate Change Committee on that date, it was explained that data on Highland area-wide emissions was being collated by the Climate Intelligence Service, and a report in that regard would be presented to a future meeting of the Committee.

Climate Impacts

4.32 Climate impacts are the actual effects of climate change to both natural and human systems. Over the last few decades Scotland has experienced a warming trend, shifting rainfall patterns, and rising sea levels evidenced by the Climate

Projections for Scotland Summary. Scotland's ten warmest years on record have all occurred since 1997 (MetOffice Historic Station data) indicates that Scottish meteorological records date back more than 100 years, to 1873 in Stornoway, 1911 at Eskdalemuir and 1914 in Wick). From 2014-2023, average annual rainfall in Scotland has increased 10%. Since 2015, when the storm naming convention began, Scotland has been impacted by at least 60 named storms.

4.33 The changes in Scotland's climate that we are already experiencing are projected to continue and intensify, Climate Projections for Scotland Summary report, including:

- Average temperatures will increase across all seasons.
- Typical summers will be warmer and drier.
- Typical winters will be milder and wetter.
- Intense, heavy rainfall events will increase in both winter and summer.
- Sea levels will rise.
- Reduced frost and snowfall.
- Weather will remain variable and may become more unpredictable.

4.34 The Climate Ready Scotland: Second Scottish Climate Change Adaptation Programme identified and published 15 key consequences of climate change for Scotland, several of which interact with planning activities: (1) The productivity of our agriculture and forests, (3) The quality of our soils, (4) The health of our natural environment, (6) Availability and quality of water, (7) The increased risk of flooding, (8) The change at our coast, (9) The health of our marine environment, (11) The health and wellbeing of our people, (12) Our cultural heritage and identity, (13) The security and efficiency of our energy supply, (14) The performance of our buildings, and (15) Infrastructure – Network connectivity and interdependencies.

4.35 The latest Highland Local Climate Impact Profile 2025 (HLCIP) was presented to the Climate Change Committee in August 2025 (Appendix 2 of **THC059**). HLCIP (2025) uses media analysis to show how climate change is affecting people, infrastructure and Council services from 2012-2023 and is consistent with other climate change trends and impacts data. Communities across Highland are seeing and experiencing the local impacts of climate change through severe weather events such as storms, excessive rainfall/flooding, wind, wildfires, lightening, droughts and high temperatures/heatwaves.

4.36 HLCIP reports that, between 2012 and 2023, there has been a six-fold increase in adverse weather events in Highland. The most frequently recorded weather event is excessive rainfall flooding (41 news articles), followed by storms (33 articles). The weather event with the greatest change in frequency from 2012-2023 was droughts, followed by high temperatures. Impacts have also increased in number over this period. The impact with the highest number over 2012-2023 is travel

disruption/delays, followed by damage to biodiversity and damage to infrastructure. The impact with the greatest change over the HLCIP time period is reduced water supply/water quality with no recordings from 2012-2017 to 7 news pieces identified in 2023. These HLCIP findings are useful in providing local indicators and a rough guide to adverse weather events and their associated impacts across Highland.

4.37 In late June 2025, large wildfires in Dava and Carrbridge caused damage to around 8,716 ha of moorland and peatland and 1,036 ha of forest, reported the Scottish Wildfire Forum (SWF statement on Morayshire Wildfires). The fires threatened homes and damaged moors, forests, peatland and farming infrastructure such as fences. Smoke was an issue over a wide area. Many roads in the area had to be closed and residents were advised to close windows and doors on public health grounds. This incident underlined the requirement to improve Scotland's resilience and preparedness for the growing wildfire risk.

4.38 In August 2025, Storm Floris - a Category 2 Severe Weather Event - demonstrated the extent of damage and disruption which can be caused by extreme climate events. Met Office reported the strongest wind gust of 82 mph at Wick in Scotland, equalling the country's all-time August wind gust record, and SSEN reported that the widespread storm-force gusts caused considerable network damage, affecting power to 72,000 households. BBC reported major disruption to railway services, road closures, flight and ferry cancellations.

4.39 Since 2023, the Highland Weather & Climate Story Map has collated stories from people who live, work and visit Highland about first-hand experiences of weather and climate impact. Insights from this map will inform the Highland Climate Risk and Opportunity Assessment (HCROA) which is planned to begin in August/September 2025 for completion in December 2025, and subsequent publication in 2026.

4.40 Some of the most significant impacts of climate change within the Highlands will affect our coastal communities as mentioned in **Chapter 6: Coastal Development and Aquaculture**. The impact of rising sea levels, more extreme weather events, coastal change and risk will vary across the Highland area, depending on several factors including physical factors such as geology, existing manmade or natural defences, as well as societal factors, such as demographics and social vulnerability. The Dynamic Coast project, also discussed in **Chapter 6: Coastal Development and Aquaculture** and **Chapter 7: Flood Risk Management**, provides a strategic evidence base on climate change coastal risks and the extent of coastal erosion in Scotland, including:

- The Erosion Reporter maps recent coastal erosion in Scotland and future erosion for high emissions scenarios to 2050 and 2100.

- The differences between a high and low emissions future demonstrate relative sea level rise ranges to the year 2100 are estimated from 0.27-0.29m (RCP2.6 50%) to 0.92-0.94m (RCP8.5 95%) in the Moray Firth. The largest relative sea level rise anticipated to the year 2100 is along the north and north-west coast of Highland which ranges from 0.33-0.37m (RCP2.6 50%) to 0.99-1.02m (RCP8.5 95%).
- Erosion Disadvantage uses Social Vulnerability Classification Index (SVCI) for Scotland which embeds SIMD datasets to present social vulnerability to coastal change (1 - highly vulnerable to 6 - highly resilient) for the entire coastline of Scotland. Highly and moderately vulnerable to erosion data zones in Highland include Inverness coastal areas, and parts of Loch Ness, Ross and Cromarty Central and Lochaber West.

4.41 The Local Authority Climate Explorer reports on changes to local areas projected due to climate change. For Highland, changes relative to 1981-2000 include:

- Summer annual average temperatures are projected to change by 0.7^{0}C – 1.5^{0}C under a 1.5^{0}C global warming scenario, and from 2.8^{0}C-3.7^{0}C in a 4^{0}C global warming scenario.
- Winter annual average temperatures are projected to change by 0.5^{0}C–1.3^{0}C under a 1.5^{0}C global warming scenario, and from 2.0^{0}C-3.0^{0}C in a 4^{0}C global warming scenario.
- The change in summer precipitation varies, from -8% to +7% in a 1.5^{0}C global warming scenario, to -16% to +2% in a 4^{0}C global warming scenario.
- The change in winter precipitation varies, from -4% to +10% in a 1.5^{0}C global warming scenario, to -5% to +15% in a 4^{0}C global warming scenario.
- By 2030, sea levels are projected to rise 13cm in a central future or 21cm in a high-impact future. By 2050, sea levels are projected to rise 21cm in a central future or 39cm in a high-impact future.
- The change in average number of Summer Days (maximum of over 25^{0}C) rises to 8-13 days per year in a 4^{0}C global warming scenario. In the most recent decades, 2001-2020, the average number of summer days modelled per year was 3.
- The change in average number of Hot Summer Days (maximum of over 30^{0}C) rises to an average of 1-3 days per year in a 4^{0}C global warming scenario. In the most recent decades, 2001-2020, the average number of hot summer days modelled per year was 0.
- The average annual number of Frost Days (daily minimum temperature is below 0°C) is projected to decrease from 70 to just 8-26 per year in a 4^{0}C global warming scenario.

4.42 Highland Adapts highlights **(THC040)** that climate change impacts are not confined to a single policy area, and the challenges they presents will influence every aspect of the HLDP. When trying to understand climate change risk and

vulnerability, particularly when the scale of assessment is beyond project level, it can often be simpler to break the hazards and risks into smaller segments, however this approach risks obscuring the bigger picture. The full risk profile cannot be understood if we do not bring the segmented parts back together and consider how they behave in a wider context. Climate hazards often occur and interact simultaneously, increasing the likelihood of compounding or cascading risks (a chain reaction of events set off by an initial hazard). Understanding and preparing for these interconnected sequences is crucial, as they can escalate the complexity and severity of impacts.

4.43 These interactions also mean that the evidence base cannot be static. It must be iterative to reflect emerging relationships between hazards, sectors and communities, and to ensure that policy decisions remain based on current understanding. Thus, applying systems thinking to the evidence base can reveal where information needs to be shared across themes, where multiple datasets could be aligned, and where new evidence should be gathered to fill gaps. To this end, the challenge for adaptation lies not only in identifying evidence but in deciding what to do with imperfect, shifting and complex evidence. Unlike other policy areas, adaptation evidence continually changes as new science, local experience and socio-economic conditions evolve.

4.44 The Highland Climate Change Risk and Opportunity Assessment 2026 (HCCROA) complements and contributes to this Evidence Report. It is the first regional assessment of climate change impacts on the Highland region and considers current impacts and forward-projections through the 2080s. The HCCROA covers risks and opportunities across five themes: built environment; community and economy; health and wellbeing; infrastructure; and land, nature, and food.

	Current level of risk or opportunity (2025)			**Future level of risk or opportunity (2050s/2080s)**			**Urgency**		**Priority for regional collaboration?**	
Score	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**	**No**	**Yes**	**No**	**Yes**
# of Risks (%)	5 (11%)	21 (47%)	19 (42%)	0 (0%)	11 (24%)	34 (76%)	5 (11%)	40 (89%)	5 (11%)	40 (89%)
# of Opportunities (%)	2 (33%)	4 (67%)	0 (0%)	0 (0%)	4 (67%)	2 (33%)	3 (50%)	3 (50%)	3 (50%)	3 (50%)
# of Total Risks and Opportunities (%)	7 (14%)	24 (48%)	19 (38%)	0 (0%)	15 (30%)	35 (70%)	8 (16%)	42 (85%)	8 (16%)	42 (84%)

Figure 4:5 Summary of HCCROA Risk and Opportunity Scores (Source: HCCROA)

4.45 HCCROA gathered formal evidence sources and stories of lived experience. It identified 50 risks and opportunities and assessed these to identify the magnitude of risks (current and future, economy, landscape, people and cultural) and how risks and opportunities cascade and interact with others. Case studies

were used to understand a selection of climate risks and opportunities in Highland in more detail, across scales and contexts. The HCCROA highlights known evidence and knowledge gaps for each risk, and options for regional collaboration. Figure 4:5 shows the summary of HCCROA risk and opportunity scores – current and future – urgency and priorities for regional collaboration

4.46 The key findings of the HCCROA are:

- Climate change risks in Highland are already significant and widespread, causing measurable harm or disruption across the region. For example, 89% of risks are scored as Medium or High for current period.
- Climate risks are expected to intensify substantially between now and 2050s/2080s, in terms of both severity and prevalence. For example, 76% of risks scored as High for the future time period. All risks are expected to have significant impacts in Highland in the future.
- Urgent action would be beneficial for addressing climate change risks. All urgent Highland climate change risks (40 out of 45) are priorities for regional collaboration. While some impacts cannot be fully avoided, additional action in the next five years could improve how risks are managed and experienced. This is especially significant for decisions affecting long lived assets and systems, including housing, transport networks, energy and water infrastructure, and land management.
- Opportunities from climate change are fewer and are generally lower priorities for regional collaboration. No opportunities were identified within the built environment or infrastructure themes.

4.47 HCCROA options for regional collaboration are:

- Address risk across interconnected systems to limit cascading failures and protect lifeline connectivity. This could include critical asset mapping and prioritisation, scenario testing and lifeline routes and remote service continuity.
- Coordinate land and water management across boundaries and land uses. Risks affecting land, nature, and food systems frequently operate at catchment or coastal scales. Individual land-use decisions can have downstream effects on flooding, erosion, water quality, infrastructure and settlements. Regional collaboration could include catchment-scale restoration, and coastal habitats and blue-carbon.
- Develop skills and capacity where they are limited.
- Finance adaptation at a scale that cannot be delivered alone.
- Share evidence, assumptions, and limitations transparently. The assessment identifies needs for consistent monitoring, shared data, and transparent use of evidence to support decision-making.

- Enable communities and households to navigate disruption and long-term change. This includes fair management of long-term change: developing transparent, inclusive approaches to decisions related to settlement viability and relocation, where risks cannot be managed in place.

Climate Risks

4.48 Climate risks are the potential negative consequences that can occur from the impacts of climate change. Climate risk is a product of hazard, exposure and vulnerability.

4.49 Characteristics of Highlands that influence the climate risk experienced are evidenced from the North of Scotland Community Risk Register 2024 and include the predominant rural and dispersed settlement pattern, limited transport links, ageing population and relatively high prevalence of coastal settlements and infrastructure and their exposure to coastal climate impacts. Combined with climate change impacts, key climate risks in Highland include: lifeline infrastructure damage or disruption (e.g. coastal transport links, power and communications), community isolation and disruption to access to employment, core services and amenities, damage or flooding to homes, property and businesses in vulnerable areas, economic losses (including tourism) and, exposure of vulnerable people to life and/or health threatening situations including physical isolation, pollution and unhealthy temperatures.

4.50 Every five years the UK Climate Change Committee prepares an Independent Assessment of UK Climate Risk. The most recent summary of the implications for Scotland is Summary for Scotland: Evidence for the third UK Climate Change Risk Assessment (CCRA3).

4.51 HM Government also produced a National Risk Register (2023), which presents the nation-wide natural and environmental hazards (among numerous other risk areas) and the impact and likelihood of risks such as wildfire, storms, high temperatures and heat waves, low temperatures and snow, coastal flooding, fluvial flooding, surface water flooding, and drought.

4.52 In Scotland, climate risks with a 'high future magnitude' score in CCRA3 and where more action is required now to address them, include:

- Impacts on biodiversity (further discussed in **Chapter 5: Nature and Environment**) are closely connected to the nature crisis, with implications for Highland's natural environment, biodiversity, habitats and species. The Scottish National Adaptation Plan 2024-2029 also outlines that climate change is the biggest threat to Scotland's wildlife and habitats. Changing rainfall patterns, water scarcity, flooding, ocean warming and acidification, extreme heat and wildfire are all impacting the rate and extent of terrestrial, freshwater and marine species losses across Scotland.

- Impacts on the natural environment, as wetlands are especially sensitive to changes in water levels, the large projected increases in drought in Caithness in NatureScot Research Report No. 1228 are particularly concerning due to the potential impacts this could have on TFCWHS. For areas along the west coast increases in droughts were projected to be lower however this could impact on the World Heritage Site within Sutherland, for example. These drought increases are likely to interact with other climate-driven changes and anthropogenic pressures, creating feedback loops that can negatively impact built and ecological environments. More frequent and/or prolonged periods of water scarcity cited in in NatureScot Research Report No. 1228 may also reduce the ability of wetlands to fulfil their usual ecosystem functions including carbon sequestration and water management.
- Flood Risk (further detailed alongside the Highland Strategic Flood Risk Assessment **(THC055)** in **Chapter 7: Flood Risk Management**) with CCRA3 analysis estimates current flood damages at £11 million/year (equivalent annual damage) for the Highland region, which could increase to £20 million/year by mid-century and potentially double this amount by the end of the century, as evidenced by the Regional Report Highland Climate Risk & Opportunity Assessment Economic Analysis.
- Drought and Water Scarcity, with over 2,500 Private Water Supplies (PWS) in Highland, serving a population of over 30,000 people, located in rural areas where treated mains water connections are not available. A study of Private Water Supplies and Climate Change in Scotland found that a handful of areas are at high risk of drought for the period 2020-2050, including settlements around Loch Broom and Dornoch Firth, Eigg, and low-lying areas of Inverness-shire, and PWS reliant on surface water are more vulnerable. Surface water fed Private Water Supplies are mapped in the Highland Climate Change and Energy Map. NatureScot Research Report No. 1228: Anticipating and mitigating projected identified increases in drought frequency and duration in all locations with the highest increases in Caithness. Drought conditions are the highest risk climate impact identified by Scottish Water, across both the 2-degree and 4-degree increase in warming scenarios to 2050, risking low river flows and or reservoir levels and impacting supply of potable water to customers (Scottish Water Adaptation Plan). Increasing droughts are likely to affect water users in the eastern parts of Scotland, particularly agriculture (livestock, arable and horticulture) and the distilling sector, according to research on future predictions of water scarcity in Scotland: impact on distilleries and agricultural abstractors.
- Wildfires, where Highland has had more recorded (Incident Reporting System) wildfires than other authorities in Scotland, from Provision of

Analyses of Scottish Fire and Rescue Service (SFRS) Incident Reporting System (IRS) Data in Relation to Wildfire Incidents. The Regional Report Highland Climate Risk and Opportunity Assessment Economic Analysis estimates current economic costs of wildfires in Highland at £0.3 billion/year which potentially increase fourfold by the mid-century. European Forest Fire Information System (EFFIS) Wildfire Risk Viewer Maps of wildfire vulnerability indicates that the Inner Moray Firth area and north-east Caithness are the highest population vulnerability areas. Significant areas of Highland, especially west Highland areas, are ecologically vulnerable to wildfires. This aligns with NatureScot's Scottish Wildfire and Muirburn Extents. EFFIS wildfire vulnerability is shown on the Highland Climate Change and Energy Map.

- Coastal Change, (detailed in **Chapter 6: Coastal Development and Aquaculture**), namely the viability of coastal communities and the impact on coastal businesses due to sea level rise, coastal flooding and erosion, where sea level rise due to climate change is expected to result in an almost doubling of the number of properties considered to be at coastal erosion and flood risk in Scotland by 2080s.
- Landslides (further detailed alongside Soils in **Chapter 5: Nature and Environment)** where slope instability occurs when particular characteristics (such as geology, gradient, sources of water, drainage, or the actions of people) combine to make the slope unstable, but can be exacerbated by climate change effects including more intense rainfall and weather events.

4.53 Regional Report HCROA Economic Analysis reports regional economic risks of climate change in Highland are estimated to be equivalent to around -1.5% Gross Domestic Product (GDP) a year by the 2050s, rising to up to -3.3% a year by the 2080s.

4.54 In addition to the Regional Report, Highland Adapts commissioned sectoral economic assessments of climate change impacts for three key sectors of the Highland economy as part of the Highland Climate Risk and Opportunity Assessment (HCROA) including Energy, Forest and Timber, and Food and Drink (Whiskey and Salmon).

4.55 Rising sea temperature and acidification is a risk to salmon production and extreme weather events and climate conditions impact whiskey production (Food and Drink Sector HCROA Economic Analysis), with the potential costs of impacts in the low tens of millions per year, rising to mid tens of millions by 2050s.

4.56 The Forest and Timber Sector HCROA economic analysis found potentially high costs from windstorms, changes in pests and diseases (focus on Phytopthora) and from wildfires, all of which could potentially increase with climate change. However, it noted that costs are likely to be larger if other risks are included, such

as other pests and diseases, changes in rainfall and extremes, and other effects along the value chain (such as forestry infrastructure and transport infrastructure). There is also some potential for positive effects from the extended growing season and other possible beneficial factors

4.57 The Energy Sector HCROA Economy Analysis, the climate change impact economic assessment reported a total of £138m of climate-related disruption to electricity supply between 2001 – 2023 (Figure 4:6). For example, storms can impact construction and maintenance of energy infrastructure, and damage cables connecting islands.

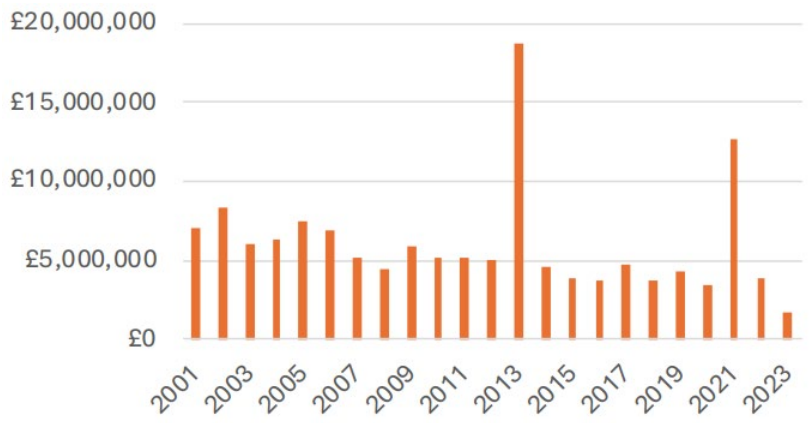

Figure 4:6 Economic impacts of climate-related electricity disruption in Highland (source: Energy Sector Report HCROA)

4.58 Energy Sector Report HCROA identified current climate risks related to the generation of electricity, including:

- Ability to generate electricity compromised by extreme weather (e.g., extreme heat can impact the ability of solar panels to generate electricity).
- Competing demand for water across sectors during periods of drought.
- Weather delays and vessel availability compromising offshore wind deployment.
- Local and global extreme weather impacting all aspects of the supply chain.

4.59 Hydroelectric power is vulnerable to low and high river flows and therefore to extreme weather events, though hydroelectricity may benefit from higher-than-average river flows. Although future rainfall projections are highly uncertain, evidence indicates that generation will increase in winter and decrease in the summer (Energy Sector Report HCROA). For hydroelectricity, across different net zero scenarios, changes could cause a minimum of £320m reduction to a maximum of £128m increase in hydroelectricity generation by 2050.

4.60 For onshore wind, the changing climate may affect the frequency and intensity of storms, storm tracks, and wind velocity. This could affect wind power generation in several ways including: variability in generation, damage to turbines, increased shutdowns, and intermittency in generation. Even a small reduction in wind generation has large economic consequences, with results suggesting a cumulative reduction in revenues in Highland of £1.3 – £1.5bn by the mid-2050s (Energy Sector Report HCROA). Conversely, an increase in wind speeds due to climate change has recognised benefits for the generation of electricity via wind (onshore and offshore).

4.61 Due to the long-term nature of investment in the Inverness & Cromarty Firth Green Freeport further discussed in **Chapter 8: Business, Economy, Tourism and Productive Places**, the economic impact of climate change may be very high if adaptation measures are not considered. Hydrogen production is a key project within the Green Freeport and represents a significant economic opportunity for Highland. However, it is a water-intensive process, requiring on average 12.6L – 30L of water for every kg of hydrogen. Climate change poses a serious risk to water availability in the area.

4.62 For energy demand, the general trend of warmer, wetter winters and hotter, drier summers outlined in UK Climate Projections Headline Findings (2022) are projected to result in a reduction in heating demand and an increase in cooling demand, due to rising summer temperatures and more frequent and extreme heatwaves.

4.63 There are a wide range of infrastructure risks that arise from extreme and challenging weather in Scotland. By way of a summary, ClimateXChange's Indicators and trends: Extreme weather and infrastructure analysis identifies four major impacts of extreme weather on Scottish infrastructure:

- Transport links interrupted by geo-hazards including landslides and scour damage to bridges.
- Reduced water availability due to periods of reduced rainfall.
- Dampness in buildings due to wind-driven rain. (When wind and rain coincide, water may penetrate vertical walls).
- Damage to energy and ICT networks caused by storms, winds and lightning.

4.64 Climate Ready Plan for Scotland's Railway (2024-2029) sets out the actions Scotland's Rail will take over the next five years to improve the resilience of the railway against physical changes in climate. This includes direct intervention on infrastructure assets, as well as introducing additional climate science and adaptation capabilities to underpin and strengthen decision-making processes. Over the next five-years Scotland's Railway have set the challenge of achieving four key outcomes in this space:

- Ensuring the decisions we make are based on a maturing understanding of climate-related risk.
- Developing a long-term climate adaptation and resilience strategy to increasingly guide our investment decisions.
- Delivering a programme of asset refurbishments and renewals that deliver resilience to acute weather events, as well as preparing for longer term changes in climate.
- Delivering new and improved risk, assurance, competence, and data processes to underpin our climate ready journey

4.65 Successful delivery of this plan will allow Scotland's Railway to contribute positively to national objectives in this space, such as Scotland's National Adaptation Programme, while delivering benefits for the passengers and customers that we serve. This plan merges the legacy ScotRail Trains Ltd Climate Change Adaptation Plan with Network Rail's previous Weather Resilience and Climate Change Adaptation.

Vulnerability and resilience

4.66 The 2022 Climate Change Committee briefing The Just Transition and Climate Change Adaptation considers the distributional effects of climate change and adaptation, stating, *"the effects of climate change will be felt across all of society, but they will not affect the whole of society equally".*

4.67 ClimateXChange analysis The impacts of climate change on population groups in Scotland considers that climate change vulnerability—how strongly people or ecosystems are likely to be (adversely) affected by climate change—depends on two sets of factors**:**

- The likelihood that people and communities are exposed to climate-related hazards, e.g. where they live and the dwelling type.
- The characteristics of people and communities that make them more or less likely to experience a negative outcome if they were to be exposed to a hazard. These characteristics include e.g. age, health, income, property tenure and insurance cover.

4.68 Local Climate Adaptation Tool provides insight on how local UK climates will change, what health and community impacts may occur as a result, who will be most vulnerable and why and, which adaptations to consider.

4.69 Those experiencing multiple vulnerabilities are also more vulnerable to climate impacts. Characteristics that are likely to lead to increased vulnerability and reduced adaptive capacity across multiple categories of climate risk are evidenced from The Just Transition and Climate Change Adaptation (March 2022) and the Local Climate Adaptation Tool to be:

- Low income
- Older people, Under 5s, people with health conditions
- Rural residents
- Tenants in private or social housing
- People living in an area for a short time
- People who are socially isolated
- People with low personal mobility

4.70 Highland communities have increased vulnerability due to the higher proportions of these demographics within our communities than national equivalents, evidenced from the North of Scotland Community Risk Register. **Chapter 13: Design, Wellbeing, Local Living and Placemaking** discusses socioeconomic and health inequalities in greater detail, drawing on Scottish Index of Multiple Deprivation (SIMD) data.

4.71 Local Development Planning Guidance recommends taking into account unevenly felt effects and inequalities that may increase the climate vulnerability of different groups of people consideration of climate change.

4.72 ClimateXchange analysis The impacts of climate change on population groups in Scotland found that low income and poor health were strong drivers of social vulnerability to flooding, high temperature and poor air quality. In rural areas, like Highland, poor or no access to the internet and isolation heighten vulnerability. In urban areas, like Inverness, poor health, income deprivation, high levels of social and private renting, lack of local knowledge and limited mobility all contribute to vulnerability. This study highlights the importance of policy that enhances resilience to *multiple* climate hazards, through action and adaptation and increasing the capacity of the socially vulnerable to appropriately prepare for and recover from hazard events.

4.73 A recent study Digital connectivity and climate change in Scotland – Evidence review found digital connectivity and ICT can have either a positive or a negative effect on a just transition, either addressing or exacerbating existing inequalities such as access to digital connectivity and skills. Studies repeat the need for strong policy in this area.

4.74 One way to respond to climate vulnerability is to increase resilience. Resilience to climate change (or climate-readiness) is the ability or capacity for people or ecosystems to prepare, respond to and recover from the current and future impacts of climate change, with the right knowledge, systems and plans. Strategies for building physical resilience through the LDP are discussed in the following **Climate Adaptation** section.

Climate Mitigation

4.75 The Update to the Climate Change Plan 2018-2032 sets out the policies and trajectories towards the overall emissions reduction target for Scotland. The Climate Change (Emissions Reduction Targets) (Scotland) Act 2024 moved Scotland onto a carbon budget approach to emissions reduction - a carbon budget sets a limit on the amount of GHGs emitted in Scotland over a five-year period. The upcoming carbon budget Scottish Statutory Instrument will set levels for four budget periods: 2026-2030; 2031-2035; 2036-2040; and 2041-2045. Scotland's Second Climate Adaptation Programme 2019-2045 reported that Scotland has almost halved its emissions since 1990, but ongoing efforts are required to meet the carbon budgets towards the 2045 target.

4.76 The Climate Change Committee published a report on Scotland's Carbon Budgets in May 2025, which sets out the Committee's advice on the level of Scotland's four carbon budgets from 2026-2045 (as percentage reductions from 1990 levels of carbon emissions) referred to as the Balanced Pathway. Since the introduction of the Climate Change (Scotland) Act in 2009, over 70% of the emissions reduction seen in Scotland has been in the energy supply sectors. This is largely due to the phase-out of coal and the ramp-up of renewable electricity generation.

4.77 The Highland Council Net Zero Strategy outlines the Council's approach to reduce corporate emissions and prepare for the unavoidable impacts of climate change, contributing to Scotland's legally binding target to become Net Zero by 2045. The Council's key interim targets are to reduce emissions by at least 75% by 2030 and at least 90% by 2040. The Council recognises that climate action can deliver comprehensive economic, environmental, social and health benefits and seeks to embrace the potential of the 'green economy' to create jobs and wealth. Future development of this Strategy is expected to broaden consideration of emissions reduction to include area-based emissions also.

4.78 A Strategic Environmental Assessment (SEA) is a legal requirement that Local Authorities must undertake when they are preparing a new LDP. The main purpose of the SEA is to consider how the new LDP might affect the environment, so that the likely impact of a public plan on the environment can be minimised, where any such effect(s) are considered likely to be significant. The Highland LDP SEA Scoping Report is being prepared in parallel to this Evidence Report and will inform the assessment to be presented in the Environmental Report, with that assessment informing decisions on the contents of the Proposed Plan.

4.79 Local Development Planning Guidance encourages a whole-systems or area wide approach to emissions management and requires details of local opportunities for GHG sequestration and storage, either nature based or technological, where available. As NPF4 Policy 2 is expected to be delivered by effective delivery of

other NPF4 policies as a whole, there are cross-linkages here with other Chapters of this Evidence Report and their policies referenced therein.

Nature-based

4.80 Emissions reduction can be achieved by promoting nature recovery and restoration. Scottish Biodiversity Strategy outlines the role of biodiversity in helping to mitigate the impacts of climate change and Biodiversity: delivery plan 2024 to 2030 is part of the strategic framework for biodiversity, in conjunction with the Scottish Biodiversity Strategy.

4.81 The creation of new forests and woodlands is recognised as an important tool for reducing GHG emissions. Nature-based opportunities for GHG sequestration and storage in Highland, are primarily from land use, forestry, and peatland restoration. Scotland's Forestry Strategy found that for each new hectare of forest and woodland created, it is estimated that, on average, seven tonnes of CO_2 will be removed from the atmosphere each year. Scottish Forestry's Woodland Carbon Code is the voluntary UK quality assurance standard for woodland carbon projects, and also manages the UK Land Carbon Registry.

4.82 HFWS identifies the mitigation potential of forestry and woodlands such as new tree planting and restocking on areas of deep peat, carbon offsetting (new woodlands), use of wood and biomass as an energy source, and increased use of timber as a building material to store carbon long term. This Strategy is in the process of being updated, and will consider carbon offsetting opportunities for productive and native woodlands.

4.83 The Balanced Pathway approach to Scotland's Carbon Budgets includes nature-based measures including restoring peatland and planting new woodland for land-based carbon sequestration. Nature-based measures are proposed to contribute 8% of the emissions reductions required by 2035 and increase to 13% by 2045. There is a delay between the planting of woodlands and the time it takes for them to reach peak rates of absorbing CO_2, so immediate action is needed to capture these benefits later in the Pathway. Rewetting and restoration of degraded peatlands delivers the majority of the emissions reductions in land use in the Balanced Pathway, with a rise in the proportion of peatland under such management from the current 29% to 45% in 2035, and to 67% by 2045. In the Balanced Pathway, the proportion of woodland cover in Scotland rises from the current 19% to 21% in 2035, and 23% by 2045.

4.84 Scotland's National Peatland Plan states that peatlands are the country's largest natural carbon stock and that a significant contribution can be made to reducing GHG emissions by managing the land to maintain existing peat deposits, and the extent and health of peat-forming habitats, and by ensuring that land use and management limits loss of stored carbon and enhances the sequestration of new

terrestrial carbon. It explains that restoring peat-forming habitats will be an important part of this, and that where restoration to open, peat forming habitats is not possible, management should still aim to reduce loss of the carbon stock and maximise any potential for carbon sequestration. The UK Peatland Code sets out the process to independently verify projects the restoration of peatland for achieving carbon credits, and real, measurable climate benefits.

4.85 According to The Flow Country WHS Nomination Dossier, The Flow Country in Caithness and Sutherland alone stores about 400 million tonnes of carbon – more than double the amount stored in all of Britain's woodlands.

4.86 The role of Highland in contributing to forest and native woodland restoration, alongside peatland restoration for climate mitigation is further discussed in **Chapter 5: Nature and Environment,** but in summary, the Scotland Update to the Climate Change Plan 2018-2032 includes commitments to:

- Incrementally increase the annual woodland creation target from 10,000 to 18,000 ha per year by 2024/25.
- Achieve a target of at least 250,000 ha of peatland restored by 2030, of which Highland will make a notable contribution.

4.87 It is recognised that to achieve these commitments, contributions from both the public and private sectors will be required and therein some of the contributions can be delivered through development.

Technology-based

4.88 Negative Emissions Technology (NET) and Carbon Capture Utilisation and Storage (CCUS) opportunities for GHG sequestration and storage are emerging technologies with limited uptake at present in Highland. There is one small-scale carbon removal and storage project in Highland focused on biogenic carbon from a whisky distillery, capturing CO_2 from fermentation. The Council have identified that a stronger evidence base on the potential for these technologies in Highland and the associated planning implications would benefit HLDP preparation and will continue to engage with stakeholders on developments on these aspects.

Transport and Local Living

4.89 As shown in Figure 4:1 and Figure 4:3, road transport is the largest contributor to transport emissions in both Scotland and Highland. Transport Scotland's route map to achieve a 20 per cent reduction in car kilometres travelled by 2030 recognises that reducing car use is essential to decarbonising the transport system as part of the statutory emissions reduction targets set in the route map. **Chapter 10: Transport** fully details the Council's transport baseline, and how the

proposed HLDP can facilitate the decarbonisation of transport in Highland. It is recognised that due to the geography and spatial isolation of communities in Highland, private car transport is often a necessity to retain access to goods, services, amenities and social connections for many communities, especially with consideration for a just transition to net zero.

4.90 Related to transport, digital connectivity is another factor which supports 'reducing the need to travel', the top of the Sustainable Investment Hierarchy in the National Transport Strategy 2. Similarly, local living and 20-minute neighbourhoods (where appropriate) support transport policies which foster connected communities to reduce emissions, by changing how people move around, access services and connect in their community. **Chapter 13: Design, Wellbeing, Local Living and Placemaking** further discusses local living opportunities and considerations for HLDP.

4.91 As an area with a significant tourism sector, which centres on our natural features and assets situated in rural, scenic locations with limited or no public transport accessibility, it is recognised that Highland's tourism sector is likely a significant contributor to our transport carbon emissions. As discussed in **Chapter 8: Business, Economy, Tourism and Productive Places**, HLDP will require to consider how to support tourism in ways that offer better sustainable transport options.

Energy Generation, Transmission and Consumption

4.92 The Climate Change Committee report on Scotland's Carbon Budgets in May 2025 advises on the level of Scotland's four carbon budgets from 2026-2045. The Balanced Pathway approach to the carbon budgets means that the capacity of variable renewables in Scotland (including offshore and onshore wind and solar) more than triples from 15 GW in 2023 to 49 GW by 2035, increasing to 66 GW by 2045. This provides 98% of electricity generation in Scotland in 2035 and caters for increasing demand in Scotland and the rest of Great Britain (GB). Grid storage, use of storable fuels on the GB-wide network, and smart demand flexibility ensure a reliable supply of electricity even in adverse weather years. These technologies need to be accompanied by rapidly expanding the transmission grid, upgrading the distribution network, and speeding up the grid connection process. To deliver clean electricity, the planning process to approve large electricity infrastructure projects in Scotland needs to be urgently improved.

4.93 Highland is a major contributor to renewable energy development in Scotland, significant work by SSEN Transmission (SSEN-T) and SSEN-Distribution rapidly expanding electricity networks, and a considerable onshore and offshore wind presence, which makes a significant impact on Scotland's national energy composition. This is discussed further in **Energy**. SSEN-T are delivering and

achieving at least a 10% biodiversity enhancement for all major projects which further contributes to talking the climate and nature crisis arising from the effects of climate change.

4.94 The Scottish Government's Hydrogen Action Plan aims to establish Scotland as a leading nation in hydrogen production and use, with a goal of 5 GW of renewable and low carbon hydrogen by 2030 and 25 GW by 2045. It has a significant focus on decarbonising transport, recognising the potential of hydrogen and its derivatives to reduce emissions in various transport sectors, as discussed further in **Chapter 10: Transport**.

4.95 Emissions reduction from domestic activities include consideration of the siting and design of homes, including embodied carbon and operational energy efficiency, energy demand and fuel sources. Decarbonisation of buildings, both for existing stock (retrofit) and new development, is essential for meeting net zero emissions targets. The spatial planning opportunities and implications for reducing domestic sources of emissions are discussed further in **Heat and Cooling**, while housing policy is detailed in **Chapter 9: Housing**. Opportunities to retrofit buildings, conserve embodied carbon and support brownfield development in well-located areas are further discussed in **Chapter 12: Historic Assets, Brownfield Land and Empty Buildings**.

Waste Management

4.96 While an assessment of the Council's waste infrastructure capacity is detailed in **Chapter 11: Infrastructure**, it is acknowledged that within Scotland it will be prohibited to send biodegradable municipal waste to landfill from 31 December 2025, and so the Council's Waste Service is required to establish compliant and suitable waste management practices. At present, Long-term Waste Management Communities & Place Committee Report states that biodegradable municipal waste is incinerated at a licensed facility in Dunbar, generating electrical energy for the national grid. There are a range of potential options to reduce emissions from waste across the Highlands including emissions from landfill (predominantly methane), the transport of residual waste to a processing facility and incineration. In addition, opportunities to re-use existing buildings, minimise waste, re-use materials or use natural materials can reduce embodied carbon emissions from development. **Energy from Waste** (EfW) is discussed further below in this Chapter.

Climate Adaptation

4.97 Whilst global efforts to reach net zero remain critical, adaptation will also be an important priority in supporting wellbeing and the economy in Highland over the next twenty years. Climate change adaptation, climate readiness, and climate-

proofing all refer to the process of making adjustments in response to or in preparation for current and future climate-related impacts, which in turn leads to climate resilience. The Council recognises how climate change impacts people and places across Highland differently. Adaptation action needs to be inclusive and targeted towards addressing the most vulnerable.

4.98 Is Scotland climate ready? 2022 Report to Scottish Parliament from the Climate Change Committee (CCC) is an independent assessment of progress in adapting to climate change in Scotland. This report notes that the second Scottish Climate Change Adaptation Programme (SCCAP2) vision is not sufficient to drive effective adaptation, specific time-bound objectives and actions are required. Progress in delivering adaptation has stalled across most sectors including those relevant to planning, and systems for monitoring and evaluation of adaptation is urgently needed, to monitor the changes to climate risks. Scotland has an opportunity to link Net Zero ambitions with climate adaptation, integrating fairness and The Just Transition and Climate Adaptation and Scottish Government holds the power to shift levers to implement a step-change in climate adaptation.

4.99 In Highland, the regional adaptation partnership is Highland Adapts - nine organisations working to build climate resilience across the region. Highland Adapts has led the development of the Highland Weather & Climate Story Map, the Economic Assessment of Climate Change Impacts on the Highland Region including Regional Report and Sector Reports for Energy, Forest and Timber, and Food and Drink (Whiskey and Salmon), and the forthcoming Highland Climate Change Risk & Opportunity Assessment. These resources provide details about climate impacts and risks in Highland and will support our adaptation planning response in HLDP.

4.100 The Highland Climate Change Adaptation Strategy **(THC059)** was approved at the August 2025 Climate Change Committee, and sets out how The Council will act, in partnership with communities and stakeholders, to build a climate-ready Highland. The strategy outlines the climate trends, risks, and priority actions that will guide Highland in delivering a resilient future for all. The priority actions are: flood defence and coastal protection, nature-based solutions, heat and health resilience, resilient infrastructure and services, community preparedness and inclusion and, economic opportunities in adaptation.

4.101 Climate adaptation opportunities most relevant to Highland cover a range of NPF4 policy areas, similar to mitigation opportunities, and are summarised by topic as follows:

- Biodiversity, Natural places, Soils, Forestry, Woodland and Trees – through opportunities for nature-based solutions for climate adaptation, including facilitating nature networks, strengthening connections between them, restoring degraded habitats or creating new habitats, managing soils and

natural assets in a sustainable way, and protecting and expanding forestry, woodlands and trees (as discussed in **Chapter 5: Nature & Environment**). Nature-based solutions improve resilience to climate change. The HFWS highlights the role of trees and woodland in adaptation, including within Sustainable Urban Drainage Systems (SUDS), tree planting to reduce flood risk (stabilising slopes, slowing water flow and forming riparian corridors) and consideration of species selection for enhance woodland adaptability and resilience to climate change.

- Brownfield, vacant and derelict land, and empty buildings – through re-using brownfield land and empty buildings which reduces the need for greenfield development, reducing the developed area exposed to climate risks, supporting nature recovery and biodiversity net gain (as discussed in **Chapter 12: Historic Assets, Brownfield Land and Empty Buildings**). Also, SNAP3 sets out Objectives C4 (New and Existing Buildings) and C5 (Cultural and Historic Environment) which refer to the importance of building maintenance, the passive qualities of traditional buildings for moderating extreme temperatures as well as retrofitting for energy efficiency.
- Local Living and 20 minute neighbourhoods – where people have the ability to meet their daily needs within a reasonable distance of home, this supports community resilience by providing sustainable alternatives to get around when other transport choices are not available following a major weather or climate event, and sustains local access to daily services and amenities through walking, wheeling or cycling access (as discussed in **Chapter 13: Design, Wellbeing, Local Living and Placemaking**).
- Heating and cooling – The design of buildings and how they are heated and cooled, is an important consideration as temperatures change, to ensure thermal comfort year-round for housing, and to meet heat and cooling demands from the operation of commercial and industrial activities efficiently. Opportunities to reduce the operational carbon emissions from heating and cooling are discussed below in **Heat and Cooling**.
- Flood risk management – Scotland's National Flood Resilience Strategy identifies flooding as Scotland's biggest climate adaptation challenge, and NPF4 makes clear that, *"LDPs should strengthen community resilience to the current and future impacts of climate change, by avoiding development in areas at flood risk as a first principle"* (as discussed in **Chapter 7: Flood Risk Management**).
- Water management – where management of water-based systems such as water supply, sewers and, renewable energy (including hydroelectric power generation, pumped hydro storage and water-intensive hydrogen generation) will need to adapt. Catchment land-use, network improvements, blue-green infrastructure and water management practices can help to

regulate water supply and improve resilience of supply, reduce flood risk and support energy generating capacity. Scottish Water Climate Change Adaptation Plan has identified 27 key water-related climate change risks and outline a long-term plan for strategic long-term adaptations to water systems and wastewater systems, and specific risks to assets or projects.

- Blue and green infrastructure – which can be optimised to support sustainable flood risk management, drainage and create places that are resilient to climate change (as discussed in **Chapter 13: Design, Wellbeing, Local Living and Placemaking**).
- Digital infrastructure – which can support resilience to extreme weather events and climate impacts, especially in isolated areas. Digital connectivity is identified in several Local Place Plans as a priority, which HLDP will take account of in preparing the Proposed Plan (as discussed in **Chapter 11: Infrastructure**).
- Transport – where adequate investment (including developer contributions where appropriate), and maintenance of resilient transport infrastructure can minimise damage and disruption from events (as detailed in **Chapter 10: Transport**).
- Coastal Adaptation – where the Regional Coastal Change Adaptation Plan (Regional CCAP) **(THC053)** enables communities to become more resilient to the impacts of climate change over time through the pathways approach to adapting to coastal change. The Plan identifies twenty-nine high-risk locations in Highland for further investigation and potential development of Local Coastal Change Adaptation Plans (as discussed in **Chapter 6: Coastal Development and Aquaculture**).

4.102 The links between emissions reduction and climate adaptation responses are numerous, and present opportunities to developed linked responses, such as addressing both energy efficiency and overheating in housing together.

4.103 Climate scenario analysis (or simply, scenario analysis) is a tool and process developed that can help address the complex data landscape, highly uncertain and difficult to communicate nature of risks from climate change. It assesses the impact of different plausible future climate change scenarios on an organisation, project or strategy. Research by ClimateXChange - Using future climate scenarios to support today's decision making – makes recommendations on a range of factors for a practical scenario analysis decision tool to help public bodies in climate adaptation planning, and strengthen consistency across the public sector in Scotland.

Lifecycle Greenhouse Gas Emissions

4.104 Lifecycle GHG emissions, or whole of life carbon, are the sum of emissions resulting from the materials, construction and operation of a building throughout its life, including demolition and disposal. This is often considered as the sum of embodied carbon emissions (emissions emitted in producing materials and construction) and operational emissions (emissions for running a building, including electricity, heating and cooling).

4.105 NPF4 planning guidance for Policy 2 Climate Mitigation and Adaptation was published by Scottish Government in June 2025. The guidance clarifies the intent NPF4 policy 2 that, for managing lifecycle GHG emissions, the level of detail considered or requested should be commensurate with and proportionate to the stage at which the project is being considered (i.e. development planning and development management). Early consideration of lifecycle GHGs is key to their effective minimisation, for any development. It presents the established practice in considering GHG emissions (embodied, operation and end of life), with relevant and established tools, databases, data sources and standards which can be applied in a proportionate and flexible manner to enable meaningful lifecycle GHG assessments for informed planning and decision-making.

4.106 The guidance presents factors that may have a bearing on whether information on lifecycle GHG emissions is required to assess a proposal, and if this should be qualitative or quantitative, including:

- The emissions reduction opportunity
- Uncertainty or lack of detail
- Assumed mitigation / other regulatory controls or standards (e.g. building regulations)
- The importance of quantified data versus qualitative data for decision making

4.107 The Policy 2 guidance also notes that it is up to the decision-maker (usually the planning authority) to determine what information about lifecycle GHG emissions is needed to accompany a planning application. It is in both the applicant and planning authority's interest to establish requirements as early as possible to ensure the right level of quality information is sought and provided timeously. Highland recognises that the preparation of the HLDP is a key opportunity to establish these requirements, to support the preparation and consideration of planning applications in Highland in the future. Section 4.3 of the Policy 2 guidance outlines the development types that are unlikely to require assessment of lifecycle GHG: changes of use (including retrofit), householder development or equivalent scale of other development types, proposals for less than 10 residential units and non-residential buildings <1,000m^2 floorspace. These thresholds and those in guidance prepared by other planning authorities will be

used to inform the preparation of requirements on lifecycle GHG assessments for Highland.

4.108 The Planning (Scotland) Act 2019 introduced a requirement for the National Planning Framework to include an assessment of the likely impact of each proposed national development's lifecycle GHG emissions on achieving national GHG emissions reduction targets, which is considered in Annex B of NPF4.

4.109 A research project on Lifecycle Greenhouse Gas Emissions of NPF4 proposed National Developments (2022) concluded that considering both direct and indirect effects, the lifecycle GHG emissions of the proposed National Developments would make a positive contribution to the 2030 carbon reduction targets, helping to reduce emissions. It is noted that since the publication of this research, Scotland's carbon reduction targets have been replaced by carbon budgets, however the general conclusion that National Developments make a positive contribution to emissions reduction remains valid. Overall, the greatest contributions to sectoral emission reductions are likely to be in terms of electricity and, to a lesser extent, transport. Where individual development proposals come forward for National Developments, this lifecycle GHG emissions assessment can be used to inform detailed project-level consideration of emissions.

4.110 Policy 2a) of NPF4 also requires development proposals to minimise lifecycle GHG emissions through siting and design, as far as possible.

4.111 NPF4 Planning Guidance: Policy 2 - Climate Mitigation and Adaptation and Research to Inform National Planning Framework 4: Planning and Climate Change Guidance Report Issue 3 provide guidance on information sources, tools and models, methods and approaches that can be used to undertake whole life carbon assessment. The Council also notes that some other Planning Authorities have prepared and published their own guidance on this, such as Moray Council's Carbon Guidance for Planning Applications and S36 and S37 consents.

4.112 In the most recent LDP prepared by Highland Council, IMFLDP2 **(THC003)** Policy 1 concerning Low and Zero Carbon Development sets a requirement for a "Low Carbon Development Section" in any supporting statement with a planning application as there is merit in requiring a developer to consider low carbon as part of a proposal in order to satisfy the legislative requirement and NPF4 policy requirements. The Council has not as yet prepared the Low and Zero Carbon Development guidance document referred to in the policy. In the interim the Supplementary Guidance Sustainable Design Guide is the most relevant of the Council's own guidance.

4.113 There is a growing awareness of the importance of GHG lifecycle analysis in other determinations (such as applications for consent under the Electricity Act 1989), and other local authorities developing or considering carbon guidance to support

implementation of Policy 2. The Council presently does not have an appropriate framework to assess such information in a robust manner, even if it were provided by an applicant, which is an implication for HLDP to consider.

4.114 For wind farm developments on Scottish peatlands, Scottish Government's guidance developed in 2008 (Carbon calculator for wind farms on Scottish peatlands) can be used to calculate the impact of wind farm development on peatland carbon stocks. This can be applied as part of a broader lifecycle GHG emissions assessment. Research on the Carbon Calculator for wind farms on Scottish Peatlands by ClimateXChange in 2024 highlighted recommendations and considerations for a review of this carbon calculator to make it more suitable for future use.

4.115 The UK has two government-backed voluntary carbon standards: the Woodland Carbon Code (version 3.0, 1 August 2025) and Peatland Code. These standards provide a framework for measuring and monitoring the carbon benefits of new woodlands and peatland restoration projects in the UK. Every 5-10 years the progress of projects is independently verified, and a 'carbon credit' is issued for every tonne of carbon dioxide equivalent that has been successfully captured or avoided. Eligible Woodland Carbon Code and Peatland Code projects and their associated carbon benefits are publicly listed on the UK Land Carbon Registry.

4.116 In 2020, Scottish Forestry published an information note Climate Mitigation: Woodland Creation and management. It evidences that, faster-growing, generally coniferous tree species sequester carbon quickly in the medium to long term (50) by resourcing the use of renewable wood products and wood fuel in place of non-wood products that involve high GHG emissions in their manufacture, and fossil fuels. Slower-growing broadleaf tree species can accumulate high carbon reserves, within the woodland itself, in the very long term (>50-100+ years), but provide fewer substitution benefits.

4.117 The Scottish Forestry information note also refers to a recent study which found that creating a forest by planting native broadleaf tree species today (2020), and managing them as conservation woodlands, could typically sequester 1.9 tonnes of CO_2 per hectare per year over the period up to 2050, and typically 6.2 tonnes of CO_2 per hectare per year over the period up to 2100 with potentially more under low impact management systems. Creating a new "productive forest" now (2020), with the objective of managing it for wood production, typically contributes overall GHG savings equivalent to 3.5 tonnes CO_2 per hectare per year up to 2050, and typically 7.0 tonnes CO_2 per hectare per year over the period up to 2100. These estimates allow for net carbon sequestered in the wood products harvested from the forest and for product substitution effects. However, there is considerable variability depending on species used and management system. For example, planting higher yielding (YC20) improved Sitka spruce now

(2020), and managing for wood production can sequester more than 14 tonnes of CO_2 per hectare per year up to 2050, and more than 7 tonnes of $C0_2$ per hectare per year up to 2100. Product substitution effects can provide additional GHG savings of at least 3 tonnes CO_2 per hectare per year up to 2050 and at least 6 tonnes CO_2 per hectare per year up to 2100.

4.118 The HFWS classified land sensitivity to woodland expansion, to give a general impression of an area's suitability for woodland expansion that will help maximised benefits and integrate with adjacent land uses, rather than being prescriptive. Site-specific assessment of individual proposals for woodland expansion would still be required. It is suggested similar methodology could be applied to identify land suitable for carbon offset through woodland planting or peatland restoration in Highland.

Energy

National and Regional Context

4.119 The Energy Act 2023 sets the legislative framework for an independent system planner and operator to help accelerate Great Britain's energy transition, leading to the establishment of the National Energy System Operator (NESO).

4.120 The Clean Power 2030 Action Plan sets out the UK Government's pathway to 2030 and tackling three major challenges: the need for a secure and affordable energy supply, the creation of essential new energy industries, supported by skilled workers in their thousands, and the need to reduce GHG emissions and limit our contribution to the damaging effects of climate change. This Plan sets targets for the 2030 capacities for Scotland in key energy technologies, including 43-50 GW of offshore wind, 27-29 GW of onshore wind, and 45-47 GW of solar power. Also, providing for flexible capacity, including 23-27 GW battery energy storage, 4-6 GW of long-duration energy storage, and development of flexibility technologies including gas carbon capture utilisation & storage, hydrogen, and substantial opportunity for consumer-led flexibility.

4.121 Scotland's Draft Energy Strategy and Just Transition Plan sets the key ambitions for Scotland's energy future:

- Over 20 GW of additional renewable electricity on and offshore by 2030.
- Hydrogen to provide 5 GW or 15% of Scotland's current energy needs by 2030 and 25 GW of hydrogen production capacity by 2045.
- Increase share of solar, hydro and marine energy to our energy mix.
- Accelerated decarbonisation of domestic industry, transport and heat.
- Establishment of a national agency – Heat and Energy Efficiency Scotland.
- By 2030, new petrol and diesel cars and vans phased out and car kilometres reduced by 20%.

- Generation of surplus electricity, enabling export of electricity and renewable hydrogen to support decarbonisation across Europe.
- Energy security through development of our own resources and additional energy storage.
- A just transition by maintaining or increasing employment in Scotland's energy production sector against a decline in North Sea production.
- Maximising the use of Scottish manufactured components in the energy transition, ensuring high-value technology and innovation.

4.122 Furthermore, the Scottish Government Onshore Wind Policy Statement (2022) confirmed with regard to onshore wind, the ambition for a minimum installed capacity of 20 GW of onshore wind in Scotland by 2030. As of June 2022, Scotland had 8.7GW of installed onshore wind, so this ambition would more than double the installed onshore wind capacity within a period of 8 years.

4.123 While a national Strategy and Plan, it recognises that much of the action to deliver Scotland's energy transition will happen at a local and regional level. The just energy transition needs to meet the needs of different communities and workers, and deliver on the opportunities offered by different geographies and infrastructure assets.

4.124 Scotland has executive devolution for electricity infrastructure consenting in Scotland, but legislation under the Electricity Act 1989 is reserved for Westminster.

4.125 The first Strategic Spatial Energy Plan (SSEP) for Great Britain is being developed by the National Energy System Operator (NESO), with publication scheduled for Autumn 2027. SSEP modelling and pathway development progressed through Q2 and Q3 2025, and a decision to re-run the SSEP modelling using refreshed data from DESNZ was made in November 2025 which has influenced the timeline for the Centralised Strategic Network Plan (CSNP) and Regional Energy Strategic Plans (RESPs). The first SSEP will be Great Britain-wide and will map potential zonal locations, quantities, and types of electricity and hydrogen generation and storage over time, to set out a long-term view of what energy sources are needed to reach net zero. The SSEP will not identify or recommend specific projects to be delivered. When available, the SSEP will inform the HLDP, including any spatial framework included to guide energy sector developments, although the extent of the usefulness of the SSEP for informing the HLDP in this way will depend upon how regionally or locally specific its content is. The SSEP works with and supports other important energy transition programmes, like the Centralised Strategic Network Plan (CSNP) and Regional Energy Strategic Plans (RESP). Note that SSEP will only identify optimal locations on a zonal basis, qualities and types of recommendations, it will not make site specific recommendations and should not be interpreted in this way.

4.126 In early 2025, NESO became responsible for producing Regional Energy Strategic Plans (RESP). These ensure a joined-up whole systems approach to energy planning so that local areas get the energy infrastructure they need to meet net zero and growth ambitions. There will be one RESP for Scotland. As part of supporting and engaging in the development of the transitional RESP (tRESP), in summer 2025 the Council responded to NESO's request for information on projects, programmes and initiatives across the region that will influence future energy needs. Individual submissions to the request for information are not published, however the tRESP was published in January 2026.

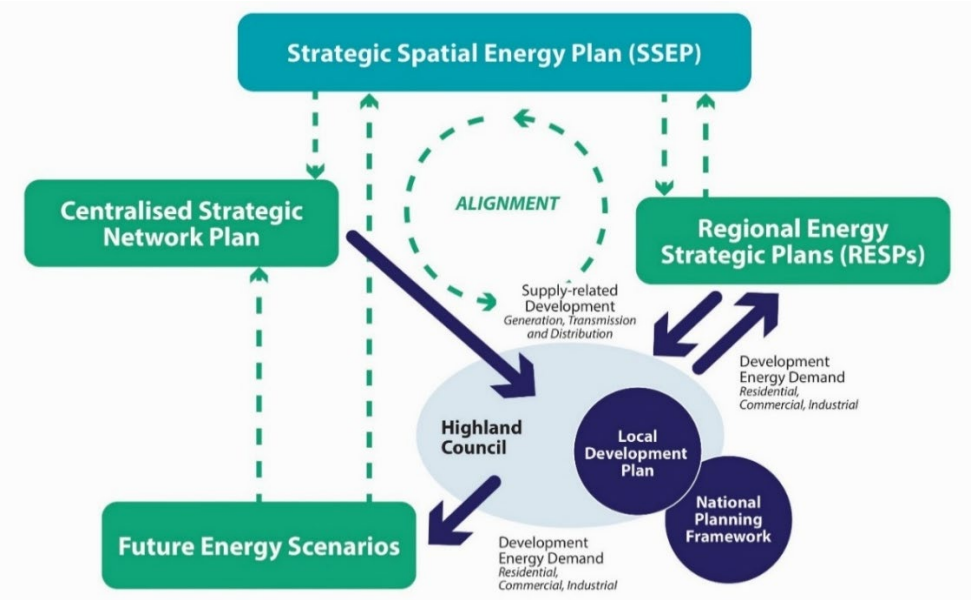

Figure 4:7 Relationship between HLDP and SSEP, CSNP, RESP and DFES

4.127 District Network Operators (DNO) can use the tRESP to inform their business planning processes. While the tRESP only considers the electricity system, when a full RESP is developed (publication planned for the end of 2028), consideration of other energy types such as hydrogen and gas will be considered. The RESP Methodology decision is expected in Q2 of 2026.

4.128 The CSNP, when fully developed with publication expected by the end of 2028 (dependent on the Secretary of State decision on the SSEP pathway), will be a network blueprint for the country, informed by the SSEP, mapping demand and optimal locations for onshore and offshore transmission infrastructure to support a decarbonised energy grid. Consultation on the CSNP methodology was undertaken by NESO during summer 2025. Two transitional CSNP have been developed in the interim:

4.129 The Pathway to 2030 Holistic Network Design (2022) sets out a single, integrated approach that supports large scale delivery of electricity from offshore wind, to

where it is needed across Great Britain. This was to help unlock the UK Government's ambition for 50GW of offshore wind by 2030.

4.130 Beyond 2030 report (2024): A national blueprint for a decarbonised electricity system in Great Britain recommended a coordinated offshore and onshore network design that can connect 86GW of offshore wind.

4.131 SSEN Transmission will need to develop their infrastructure projects in Beyond 2030 report (2024) further before they can be considered for funding. These options, along with any other proposals, will be assessed by NESO in a refresh of the second transitional CSNP analysis, hence known as the "tCSNP2 Refresh". This will be published by the end of June 2026.

Energy Development and Planning

4.132 The Scottish Government has an ambition to increase onshore wind capacity by 20 GW by 2030 as set out in the Onshore wind: policy statement 2022. Highland is a global centre for the energy industry, with rich resources that are ideally suited to renewables development. Highland is already making a substantial contribution to renewable energy generation, including significant growth in onshore and offshore wind in the last 20 years, and growth of production and investment in renewable energy which has brought opportunities to the area.

4.133 Enhancing energy transmission and distribution networks in Highland, as well as elsewhere across the UK, is critical for further unlocking the region's renewable energy potential and enabling it to continue to play the vital role expected in the nation's decarbonisation. As the energy industry evolves and makes the transition to net zero, the region is well-placed to harness and deploy the existing skill set by securing new jobs and investment through the energy transition. Evidence in relation to the Energy sector's contribution to the Highland economy is provided separately in **Chapter 8: Business, Economy, Tourism and Productive Places.**

4.134 NPF4 sets out that LDPs should seek to realise their area's full potential for electricity and heat from renewable, low carbon and zero emission sources, by identifying a range of opportunities for energy development.

4.135 NPF4 Policy 11 Energy is explicit in being supportive of expanding all forms of renewable, low-carbon and zero emission technologies, including energy generation, storage, new and replacement transmission and distribution infrastructure and emerging low-carbon and zero emissions technologies including hydrogen and carbon capture utilisation and storage (CCUS).

4.136 NPF4 National Developments include 'Strategic Renewable Electricity Generation and Transmission Infrastructure' clarified as national while previously major.

4.137 Decarbonising energy supply by transitioning to renewable energy is a key part of the response to climate change. The transition to renewables, particularly to

generation located in the UK, is also driven by the need for greater energy security – less reliance on other countries' oil and gas markets. Scottish Government's ambitious targets for achieving net zero by 2045 (with periodic carbon budgets) fuel the development of electricity generation and storage facilities by the energy sector. Drivers for the nature and location of these energy sector developments include: availability of renewable energy resource, availability/capacity of the grid, the need to balance the energy system, the policy framework that influences consenting decisions and other regulatory processes.

4.138 The Council's Development Management data was collated to give evidence on the scale and nature of applications for energy developments being considered in Highland. This data spans from initial baseline records of energy applications in 2015 to 31 December 2024. A summary of applications by energy type is provided in Table 4:1, and by planning authority in Table 4:2. Wind energy application data is provided as of December 2024, all other energy generation data is provided as of July 2025. Work is ongoing to improve the quality of data collected through planning applications to support Council's understanding of the scale, capacity and nature of energy development in Highland as it progresses. For example, aside from wind energy, there were limitations in getting consistent energy generation capacity figures (MW) for all other generation types and so number of applications, application stage and planning authority are presented to demonstrate the scale of energy developments in Highland. The Highland Energy Projects Mapping provides a spatial map of all planning applications and provides some energy capacity data. Where energy generation capacity data is poor quality or incomplete through development management data, the National Statistics: Energy Trends – Regional Renewable Statistics is the primary source used in this report.

Table 4:1 Highland Energy Applications – by generation type and status

Generation Type	Approved*	In Consideration	Scoping/Screening
Wind - Onshore	347	25	53
Wind – Offshore**	7	1	0
Hydro***	328	3	233
Solar	170	17	0
Tidal	1	0	2
Battery Storage	19	34	82
Biomass	208	0	17
Anaerobic Digestion	14	0	9

* Includes applications approved on appeal

** Not 'within' Highland as are offshore, but are closest to Highland coastline

*** Includes pumped hydro storage

4.139 Data from Council Development Management records in Table 4:2 shows the split of applications for energy developments considered by the Council and the ECU, and Table 4:3 for wind energy developments specifically (and by capacity). At the time of preparing this report, applications for onshore energy generation and storage developments with generating capacity in excess of 50 MW are determined by the Energy Consents Unit (ECU) of Scottish Government. There is currently a consultation underway by Scottish Government considering the threshold for applications under the Electricity Act 1989. The licences and consents required for offshore projects are administered by the Scottish Government's Marine Directorate – Licensing Operations Team (MD-LOT). As offshore wind projects are placed within the territorial sea adjacent to Scotland (0-12 nm) or the Scottish part of the Renewable Energy Zone (12-200 nm), these are below mean low water spring (MLWS) and therefore are not strictly within Highland, do not require planning permission or have a planning authority. Their inclusion in Table 4:1 and Table 4:2 is intended to highlight the implications for terrestrial development to support the offshore wind sector including but not limited to associated infrastructure within and/or servicing from Highland.

Table 4:2 Highland Energy Applications – number and percentage, by Consenting Authority*

	Consenting Authority					
Generation Type	**Highland Council**		**ECU**		**MD-LOT**	
Wind - Onshore	305	88%	42	12%	-	-
Wind – Offshore**	-	-	-	-	7	100%
Hydro***	313	95%	18	5%	-	-
Solar	185	99%	2	1%	-	-
Tidal	0	0%	-	-	1	100%
Battery Storage	28	90%	25	10%	-	-
Total	**831**	**90%**	**87**	**10.5%**	**8**	**<1%**

* Approved or in planning (not including refusals)
** Not 'within' Highland as are offshore, but are closest to Highland coastline
*** Includes pumped hydro storage

4.140 The Highland Council determines all other energy generation and energy storage development applications (noting that some other projects or components thereof benefit from Permitted Development Rights (PDR)) and provides recommended conditions and regulates the development following approved ECU applications. The share of onshore wind energy applications determined by both the Council and the ECU is shown in Table 4:3.

Table 4:3 Onshore Wind energy development applications in Highland, by status with number of applications, number of turbines and total MW production.*

	No. Applications		No. Turbines		Capacity (MW)		
	THC	ECU	THC	ECU	THC	ECU	Total
Constructed	264	20	642	453	1,746	1,313	3,059
Under Construction	**	**	**	**	89	121	210
Approved	36	17	134	125	471	1,324	1,795
In Planning	8	17	369	31	140	3,418	3,558
Total	-				**2,446**	**6,176**	**8,622**
Scoping/Screening	53		664		2,550		

* A small number (c<10) of redesigned schemes may result in double counting
** Data not available

4.141 Energy applications for energy network developments such as overhead lines, underground lines and substations are not included in these energy application summaries, at the time of issuing the draft Evidence Report, due to time constraints. The Council acknowledges that works of significant scale are ongoing or anticipated to improve the capacity of the grid.

Energy Consumption

4.142 Highland electricity and gas consumption statistics from 2023 are outlined in Table 4:4. Electricity consumption data is collated from the 142,100 domestic meters in Highland, and 16,000 non-domestic meters. For 2023, sub-national statistics report residual fuel consumption in Highland of 199.2 kilo tonnes of oil equivalent (across all fuels). Electricity consumption is also mapped spatially by postcode within the Local Energy Net Zero Accelerator (LENZA) data story which is integrated within the Highland Climate Change and Energy Map.

Table 4:4 Highland Energy Consumption Domestic/Non-domestic (Source: Subnational electricity Consumption Statistics 2005-2023 & Subnational gas consumption statistics 2005-2023)

Energy Source	All Domestic			All non-domestic	
	Total consumption (GWh)	Mean consumption (kWh per household)	Mean consumption (kWh per meter)	Total consumption (GWh)	Mean consumption (kWh per meter)
Electricity	581.6	5,153.8	581.6	830.4	51,951.4
Gas	565.5	-	12,116.8	524.7	975,298.2

4.143 Electricity consumption in Highland is intrinsically linked to heating in Highland, due to the high (and increasing) proportion of properties with electric-sourced heating as evidenced in the Local Heat and Energy Efficiency Strategy (LHEES) and discussed further in **Heat and Cooling**.

4.144 DFES 2024 reports Electric Vehicles (25,400) as a key baseline electricity demand type in the North of Scotland and there has been a 50% growth in non-hybrid EV ownership since DFES 2023, and an eight-fold increase is anticipated by 2030 (under the Holistic Transition scenario). This demand will have an impact on the electricity network. Electric vehicle uptake and the EV charging infrastructure network in Highland are discussed in **Chapter 10: Transport**.

Electricity Generation, Transmission and Distribution

4.145 The electricity grid and transmission network support development in Highland, though in some locations there are network capacity constraints or, planning constraints to options for grid connections such as the TFCWHS (across Caithness and Sutherland), the Cairngorms National Park, environmental designations, other pre-existing land management commitments such as established Habitat Management Plan areas and compensatory woodland planting plans. From a planning policy perspective, network constraints do not prevent development, and grid connections are not a material consideration in considering generating stations; however, these considerations do influence energy development patterns in Highland.

4.146 SSEN Distribution (SSEN-D) is responsible for the electricity distribution network in the north of Scotland and distributes the electricity from the transmission network to homes and businesses across their distribution areas. SSEN Transmission (SSEN-T) maintains and invests in the high voltage 132kV, 220kV, 275kV and 400kV electricity transmission network. SSEN-D maintains and invests in the low voltage network 33kV and below in Scotland. The Scottish Onshore Transmission Network Boundaries and power flow distribution for Scotland is published online: Highland is within the B0 – Upper North and B1a – North West boundaries.

4.147 Pathway to 2030: SSEN-T Projects delivering a network for Net Zero sets out how SSEN-T are investing over £20bn to upgrade the network infrastructure across the north of Scotland between now and 2030. Across Highland there are numerous National Development projects for grid transmission infrastructure of significant scale planned which enable the transmission and distribution of the renewable energy and support the transition to net zero by 2045. Certain sub-regions of Highland have a particularly high concentration of National Developments for grid and transmission infrastructure. SSEN-T published a

Project Map, and also provided a list of their proposed projects (current as of August 2025):

- Substations and HVDC converter stations
    a. Banniskirk - Banniskirk Hub (Spittal Area 400kV substation and HVDC converter station) – SSEN-T
    b. Carnaig - Carnaig (Loch Buidhe Area) 400kV substation – SSEN-T
    c. Fanellan - New 400kV substation and Converter Station – SSEN-T
    d. Bingally - Bingally 400kV Substation - SSEN Transmission
    e. Fort Augustus (Auchterawe) - Substation 400kV Upgrade – SSEN-T
- New overhead transmission lines
    a. 400kV overhead line between Banniskirk substation and Fanellan substation, via Carnaig substation - Spittal – Loch Buidhe – Beauly 400kV Connection – SSEN-T
    b. 400kV overhead transmission line between Fanellan (Beauly) substation and Netherton (Peterhead) substation, Aberdeenshire - Beauly to Blackhillock to New Deer to Peterhead 400kV OHL-SSEN-T
- New underground transmission lines
    a. Underground line between Banniskirk substation and Netherton (near Peterhead) substation
    b. Underground line between Fanellan (Beauly) and Western Isles.

4.148 The Distribution Future Energy Scenario (DFES) 2024 reports a baseline of 3.8GW of operational generation and storage capacity (including non-renewable sources) connected to SSEN-D's network in the north of Scotland License Area. There is a pipeline of 14.7GW of generation and storage capacity that have connection offers to the distribution network. Table 4:5 shows the DFES 2024 baseline and 2030 projected generation for the license area. In Highland, these future capacity connections are predominantly onshore wind, battery energy storage and Solar PV. In DFES 2025, by 2035, the installed capacity is modelled to be 3.1 GW, representing a 1.9 GW increase from the 2024 DFES projections. The most up-to-date DFES data that is available will be used to inform the LDP preparation.

4.149 The 2050 outlook from DFES 2024 under the Holistic Transition scenario, is that renewable energy generation capacity is expected to reach just under 12 GW which is over three times the current deployment and is driven by growth in large-scale onshore wind (concentrated in Caithness, Sutherland and Skye) and solar PV of all scales. New DFES 2025 data suggests an increase to overall capacity of 720 MW higher by 2050 compared to DFES 2024, for the Holistic Transition scenario. The most up-to-date DFES data that is available will be used to inform the LDP preparation.

Table 4:5 DFES North of Scotland baseline summary and 2030 highlights of renewable energy generation capacity (MW) Source: DFES 2024

Capacity (MW)	Baseline (2024)	2030 highlights under Holistic Transition	Change
Renewable			
Solar PV	193	1,300	+1,107
Onshore Wind	2,200	3,900	+1,700
Marine	21	51	+30
Hydropower*	895	940	+45
Battery Energy Storage Systems	291	4,000	+3,709
Other			
Waste and bioenergy	*124*	*153*	*+29*
Gas	*48*	*17*	*-31*
Diesel	*134*	*134*	*-*
Hydrogen	*-*	*18*	*+18*

*Note the Hydropower figures do not include pumped hydroelectric storage due to such projects typically connecting at transmission level.

4.150 SSEN-D's Local Energy Net Zero Accelerator (LENZA) tool provides data for local authorities on electricity demand, electricity network topology and substation supply area capacity (primary and secondary) through a RAG analysis. A LENZA data story for Highland has been developed for this Evidence Report. SSEN-D note that LENZA data is time sensitive, and may change as new connections are enabled. Engagement with SSEN-D noted that higher voltage network connections which impact primary substation capacity (and may trigger upgrades) include Heat Network Zones, energy generation projects and most multi-unit housing projects. Larger energy projects may trigger requirements for transmission capacity upgrades. While the LENZA tool doesn't show line connections in the queue (and therefore their impact on substation capacity), NESO is currently analysing the queue and prioritising 'clean power 2030' projects to support the national energy decarbonisation target, but it is as of yet unclear what implications may arise from this as a result.

4.151 SSEN-D prepare Strategic Development Plans (SDPs), which assess the current network infrastructure and model projected electricity demand across the region to identify future network constraints and outline potential interventions to resolve them. On 23 July 2025, Highland Council submitted data for the DFES 2025. It included projected demand data from the Highland Housing Land Audit, Deliverable Housing Land Pipeline March 2025, windfall sites, the Highland Business and Industrial Land Audit as well as other data from Council projects

such as the EV charging pipeline and heat networks. This data informed the preparation of the 2025 DFES and future SDPs. This up-to-date projected demand data considers the Inverness and Cromarty Firth Green Freeport and IMFLDP2 energy demand. It is expected that SSEN Distribution (SSEN-D) will model the energy network requirements of anticipated future development and provide inputs to inform the HLDP Proposed Plan. SDPs also inform the 2-yearly Network Development Report for the SHEPD license area, setting out longer term Network Development Plans for the Distribution networks with information pertaining to network plans for the next ten years in relation to SSEN-D 11kV networks and above. The most recent SHEPD Network Development Report 2024 brings together plans for the current price control period (RIIO-ED2, which runs until March 2028) and initial programmes for subsequent years, up to 2034. The next SHEPD is expected in 2026. Using latest available Distribution Future Energy Scenarios (DFES) at the time of publication, the NDR sets out SSEN-D proposed investments and likely areas for service requirements going forward.

4.152 The HLDP will have a significant impact on the potential future electricity load growth on SSEN-D's distribution network as most of the electricity generation in Highland is distribution-connected, rather than transmission-connected. As such, ongoing engagement between SSEN-D's SDP process and the HLDP development process is important to align strategic planning for grid development with development planning.

4.153 The Highland area includes eight SDP areas: Outer Hebrides and Skye, Fort Augustus, Beauly, Inverness and Aviemore, Mybster and Dounreay, Thurso South, Taynuilt and Errochty. An interactive map of Strategic Development Plan areas is available online. At the time of writing this Evidence Report, all SDPs were published and are expected to be refreshed with new DFES data in 2026. As more SDPs within Highland are updated, the Council will align the Proposed Plan with the published SDPs as appropriate.

4.154 Thurso South SDP - For the Extra High Voltage (EHV) system serving Thurso South mainland, the 132kV/33kV transformers at Thurso South could be close to full capacity due to the ongoing generation applications in this area. With the proposed capital works at Thurso South mainland, the Thurso South mainland network meets the future demand needs in 2050. HV/LV spatial plans indicate that there is no clear pattern to future demands on these lower voltage networks and so a forecast volume process is proposed. However, increasing use of low carbon technologies will impact capacity in the electricity network in the future such as for example, by increasing demand for electric vehicles and associated charging infrastructure. It is likely that a combination of flexibility and asset replacement will be employed to resolve the projected HV system needs.

4.155 Beauly SDP is informed by the DFES 2023, focusing on the area supplied by Alness, Beauly, Cassley, Grudie Bridge, Lairg, and Shin Grid Supply Points (GSPs) and includes the Inverness and Cromarty Firth Green Freeport. The baseline energy mix is largely hydropower and onshore wind (total 360MW) with 0.5MW of battery storage (exclusively from domestic storage). By 2050, in the Consumer Transformation scenario, it is expected to be 80% onshore wind (total generation 910MW) and BESS increased to 220MW. EHV/HV spatial plan indicates areas of capacity shortfall, which is most critical around the Green Freeport substation supply area. HV/LV spatial plans have shown that there is no clear pattern to future demands on these lower voltage networks so SSEN are planning on a forecast volume basis. The SDP flags that further work is required in understanding how rural decarbonisation could impact load on the network. Specifically, the electrification of distilleries and ports along the east coast of the area and how to capture those plans in load forecasts.

4.156 Taynuilt SDP – This supply point is predominantly within the Argyll and Bute area, with a small area of rural Highland served along the Loch Linnhe coast from the Barcaldine primary substation.

4.157 Fort Augustus SDP – The SDP focus area is that supplied by Ceannacroc, Fasnakyle, Fort Augustus, Fort William, Kinlochleven and Quoich Grid Supply Points (GSPs) that make up the Fort Augustus 132kV substation supply area. The Fort Augustus 132kV supply area is experiencing high levels of battery storage and generation connection applications from Clean Power 2030. Due to the significant potential for renewable energy resources across the central highlands and the Fort Augustus 132kV supply area there is a list of contracted generation connections due to connect to the transmission network and SSEN Transmission currently have a large portfolio of works to be delivered to facilitate these connections and support the drive towards net zero. Projects include:

- Fort Augustus substation 400kV upgrade/reinforcement. This supports the upgrade to the second circuit of the Beauly – Denny overhead line (OHL) from 275kV to 400kV.
- Coire Glas Connection
- Bingally 400kV Substation
- Quoich Power Station to Switching Station OHL Replacement
- Glenmoriston Grid Transformer Replacement
- Foyers Substation Extension Works
- Ceannacroc GSP 2

4.158 In Fort Augustus SDP, based on the DFES 2023 projections, under the Consumer Transformation scenario, distributed renewable generation across the supply area will increase significantly from 298.241MW in the currently connected baseline to 496.17MW in 2050. Solar PV and onshore wind are expected to account for most

of the distributed generation increase from 2025 onwards. A cumulative storage capacity of approximately 111.55MW is projected by 2050 under the Consumer Transformation scenario, predominantly from standalone grid storage services. Spatial plans for future needs recognise the growing demand in the Fort Augustus 132kV distribution network which will likely require reinforcement of the 33kV circuits, and possible new GSPs given the significant growth from onshore generation anticipated. Also, increased integration of low carbon technologies (LCTs) (e.g. decarbonisation of ports and distilleries) connecting to the distribution network is expected to result in system needs on the High Voltage (HV) and Low Voltage (LV) networks.

4.159 Outer Hebrides and Skye SDP – The focus area of this SDP is the areas supplied by Grid Supply Points (GSPs) in the Outer Hebrides (Stornoway, Harris, and Ardmore GSPs) and Skye (Broadford, Dunvegan GSPs). The Outer Hebrides and Skye are supplied from a 132kV circuit from Fort Augustus, with several Grid Supply Points then feeding into SSEN Distribution's network. There has been a significant increase in generator connection applications in the Outer Hebrides and Skye, predominantly in renewable generation supporting the country's drive towards Net Zero. The SSEN Transmission's network Strategy to connect such projects consists of four developments: Stornoway – Beauly HDC link, Balallan switching station & 132kV overhead line (Isle of Lewis), Fort Augustus – Skye 132kV OHL reinforcement, Quoich Power Station to Switching Station overhead line replacement. Based on the 2024 DFES projections, under the Holistic Transition (HT) pathway, distributed renewable generation (that connects to the local distribution network) across the Skye region could increase from 37MW (baseline) to 265MW by 2050. The baseline value for hydropower is 8MW, onshore wind is 29MW. The largest increase in onshore wind projected to reach 194MW by 2050, followed by solar PV reaching 59MW cumulative installed capacity by 2050. Decarbonisation and expansion of industry, such as distilleries, is currently limited by grid constraints. Electrification of maritime transportation, using shore power to charge, could equate to a significant load at ferry terminals and demand requirements from 1-5MVA to meet Caledonian Maritime fleet decarbonisation targets. Increased penetration of low carbon technologies (LCTs) connecting to the distribution network will result in system needs on the High Voltage (HV) and Low Voltage (LV) networks and EHV system.

4.160 Mybster and Dounreay SDP – This SDP focus is the Mybster and Dounreay supply area, and considers DFES 2024 analysis. The Mybster and Dounreay network is made up of 33kV, 11kV, and LV circuits. It is a mix of rural and urban network spanning across the Scottish highland region. While much of the land is used for agricultural purposes, there is a mix of residential, commercial, and industrial land. Significant generation growth expected across the Mybster and Dounreay supply area. SSEN Transmission have studied and confirmed the need to

reinforce the onshore transmission infrastructure between Spittal and Beauly. To enable these reinforcements, a new 400kV substation is required in Loch Buidhe and will connect to a new 400kV connection between Spittal and Beauly and the existing Loch Buidhe 275kV substation. Decarbonisation of the agricultural sector and ports is an important consideration in this geographic area. The shipping sector is a new, large electricity customer, and the UK's target of achieving zero-emissions shipping by 2050 will lead to a substantial increase in the demand for electricity across the maritime industry. EHV system needs to 2035 are clear (upgrades to address low voltage in two circuits), for High Voltage (HV) and Low Voltage (LV) networks the increased integration of low carbon technologies (LCTs) connecting to the distribution network will result in system needs.

4.161 Inverness and Aviemore SDP – The focus of this area is that supplied by the Boat of Garten, Inverness, and Nairn Grid Supply Points (GSPs), some of which are in the Moral Council, Aberdeenshire and Perth and Kinross areas. The Inverness and Aviemore 132kV Supply Area is currently experiencing a significant volume of battery storage and generation connection applications. As Clean Power 2030 progresses, its implications for both ongoing projects and future system requirements will be carefully evaluated. To support generation, a new 400kV circuit running from the Beauly to Peterhead substations is planned by SSEN-T to be completed in the early 2030s. There are also new GSPs triggered by generation connections in the area; however, these projects may be subject to change due to the impact connections reform and Clean Power 2030. Substantial housing development within Nairn and Inverness GSP areas is expected, and SSEN-D are actively engaging with developers to understand future capacity requirements. Ardersier Port is developing as a major hub for offshore renewable energy infrastructure, and SSEN-D are also engaging with the Port to understand future capacity requirements. There are 18 registered distilleries in the GSPs and the decarbonisation of these distilleries, to align with the Scotch Whiskey Industry target for net zero emissions by 2040, could significantly increase demand on local distribution networks. Other large demand consumers with long-term decarbonisation ambitions will drive electricity requirements, including Inverness Airport, Inverness Airport Business Park and major manufacturing facilities such as West Fraser in Dalcross. Increased penetration of low carbon technologies (LCTs) connecting to the distribution network will result in system needs on the High Voltage (HV) and Low Voltage (LV) networks, as well as EHV system. It is likely that a combination of flexibility and asset replacement will be employed to resolve the projected HV system needs. For HV needs, flexibility is likely to be provided through Distributed Energy Resources (DER), Consumer Energy Resources (CER), and domestic/commercial Demand Side Response (DSR).

4.162 Errochty SDP – This supply point is predominantly within the Perth and Kinross area, with a small area of rural Highland east of Ben Nevis.

4.163 Due to the scale of energy generation and distribution in Highland and pace of growth in this sector, network capacity constraints are acute in some areas, such as Inverness, presenting a challenge to new connections for proposed developments. The HLDP will have a significant impact on the future electricity load growth within SSEN's distribution network, reflecting the unique position of Highland as a region where a vast majority of renewable generation is connected at distribution level rather than transmission level. This distinguishes Highland from many other parts of Scotland and places a particular emphasis on the need to align land use planning with grid development. The HLDP will therefore act as a critical source of spatial intelligence for SSEN's Strategic Development Plan (SDP) process, incorporating projected demand from housing growth, transport decarbonisation (including widespread EV adoption), and the electrification of heat identified through the Local Heat and Energy Efficiency Strategy (LHEES).

4.164 In practice, this means ensuring that the HLDP not only identifies suitable locations for renewable generation and storage but also anticipates the transmission and distribution network implications of large-scale electrification across Highland's dispersed settlements, islands, and rural communities. NPF4 policies (particularly Policy 11 on renewable energy, Policy 18 on infrastructure-first planning, and Policy 19 on heat) collectively require development plans to take a proactive role in supporting the grid transition. For Highland, this includes early engagement with SSEN-T and SSEN-D to identify substation areas, distribution bottlenecks, transmission requirements and other future reinforcement needs, so that energy and housing allocations in the HLDP are grounded in realistic delivery pathways.

4.165 Given that Highland contains eight SDP areas— Outer Hebrides and Skye, Fort Augustus, Beauly, Inverness and Aviemore, Mybster and Dounreay, Thurso South, Taynuilt and Errochty —the HLDP will need to consider spatial variations in grid capacity and constraints. For example, acute pressures are emerging in the Inverness and Cromarty Firth Green Freeport area, where industrial decarbonisation and new housing delivery coincide with limited capacity at local substations. Similarly, electrification of rural industries such as distilleries and ports is forecast to create new demand hotspots in east coast areas, requiring coordinated planning.

4.166 Close collaboration between SSEN-D's SDPs and the HLDP will therefore underpin an 'infrastructure first' approach in line with NPF4 Policy 18, ensuring that the Council can deliver its statutory planning obligations under NPF4 while enabling the renewable energy sector to expand. By embedding this engagement, the HLDP can help to balance the dual pressures of hosting nationally significant renewable generation and delivering local development

needs, thereby ensuring that Highland's energy transition supports both the national net zero pathway and the resilience of local communities.

4.167 As per NPF4 Policy 11e), grid capacity constraints should not have a direct bearing on proposed energy generation development. Conversely, Policy 11e) does not relate to electricity consumers and it is recognised that there are impacts on development from when or where network capacity is enabled. However, the Council is keen to promote to the energy sector a joined-up approach whereby, in the interests of efficiency, we provide information on future development ideally through a single information provision process that is then used by the energy sector to inform all of the relevant energy network planning workstreams. Further, it may be beneficial to good planning overall if SSEN-T were to seek land use allocations to support energy network development where it is practical to do so. This is something that SSEN-T are considering and note is most practical if projects reach an advanced enough stage to provide sufficient certainty to the next LDP. Ongoing discussion with Council and SSEN-T will clarify timescales and practicalities to achieve this.

4.168 Engagement with SSEN-T noted that upgrades to the transmission network require specialised skills that cannot regularly be provided locally in Highland. For this reason, SSEN-T projects often provide accommodation for workers and some agreement around provision of legacy infrastructure (e.g. serviced housing sites). SSEN-D projects most likely use local contractors, and so worker accommodation is not required. The housing and accommodation implications of major energy developments are further considered in **Chapter 9: Housing**. Employment and economic considerations from energy development are considered in **Chapter 8: Economy, Business, Tourism and Productive Places**.

4.169 Transport considerations are critical in that upgrades to energy transmission and distribution infrastructure contribute to a significant degree of freight transport (delivery of equipment and materials, construction traffic) in Highland. This often necessitates access to remote areas using the trunk and local road network, and requires careful route planning considerations, particularly in cases of abnormal load routing. These aspects are detailed further in **Chapter 10: Transport**.

Gas Network

4.170 NESO now serves as Great Britain's gas network planner. The NESO Gas Network Capability Needs Report (GNCNR) (2024) presents an independent view of the National Transmission System and its capability to meet current and future network requirements for gas. Key findings relevant to Highland from the GNCNR are that:

- The probability of network constraints remains very low over next 10 years.

- Beyond 2035, the energy system is faced with increasing uncertainty because of the evolving dynamics of technology, policy, market forces, and societal expectations. Due to the high degree of ambiguity and complexity, there is a further emphasis on the importance of strategic energy planning and adopting a holistic approach to ensure the UK addresses net zero and security of supply in the most efficient and economical way.

4.171 The GNCNR report findings will be used by National Gas Transmission (NGT) to propose network reinforcement options in the Strategic Planning Options Proposal (SPOP). Subsequently, NESO will evaluate any proposed reinforcement options and create a Gas Options Advice Document (GOAD) by the end of 2025. NESO is currently considering stakeholder responses to the Gas Options Advice (GOA) and the GOA methodology will be published in Q3 2025. The GNCNR represents a stepping-stone towards building a whole system Centralised Strategic Network Plan (CSNP), which will set out the coordinated, multi-vector approach to long-term energy network planning.

4.172 SGN owns and operates the low-pressure gas distribution network in Scotland. The regulator Ofgem (Office of Gas and Electricity Markets) sets price controls which impact how much SGN can invest, and what assets they can invest in. Ofgem is currently working on the RIIO-3 price control framework for 2026-2031, which will determine the investment allowed for maintaining the gas network and how and when these costs will be recovered from consumers.

4.173 The UK government policy paper Midstream gas system: update to the market (June 2025), sets out the challenges facing the UK gas system during the transition to a net zero energy system. With gas demand declining in the coming decades, the role of the gas network is expected to change. The government proposes to develop future gas policy that ensures consumers and those working in the gas sector are protected and supported. Future options include continued use of the network for carbon neutral or negative gases, repurposing part of the network for other energy uses (e.g. conveying carbon dioxide for CCUS or hydrogen) or for non-gaseous uses. A just transition is a key consideration also. The government proposes to publish a call for evidence in 2026 seeking views on how to ensure the gas transition is operationalised in a way that is fair, planned and orderly.

4.174 Baseline fossil gas generation in the North of Scotland license area is 48 MW and generation decommissioning is estimated to reduce capacity to 17MW by 2030 (DFES 2024), including some fossil fuel modelled to convert to hydrogen generation.

4.175 Anaerobic digestion plants, producing biogas, also contribute to the gas network in Highland. Table 4:1 summarises that there are 14 approved Anaerobic Digestion projects in Highland, and 17 in scoping/screening. A recent planning

application PPA-270-2293 was approved at appeal for an anaerobic digestion plant and ancillary infrastructure near Inverness Airport. This application was considered with equal weight for NPF4 Policy 11 and Policy 12.

4.176 The Highland LENZA data story shows the gas topology, off-gas post codes and the energy sources used for heating (e.g. gas, oil, LPG, biomass, solid fuel or electricity). The extent of Highland's gas grid is centred around Inverness, settlements of the parts of the Inner Moray Firth area, Wick and Thurso. The gas grid in Wick and Thurso are independent systems, not connected by pipe to the national gas network. In Highland, 61% of buildings are off the gas grid, which is a much higher proportion than the UK average (DFES 2024).

4.177 At the time of preparing the IMFLDP2, SGN had previously provided to Council two (confidential) planning documents: Strategic Planning Report for Inverness Interconnection Point (IP) (2019) **(THC140)** and Strategic Planning Report for Conon Bridge – Invergordon IP (2019) **(THC141).** These SGN planning documents for the gas network are informed by the site allocations of the proposed IMFLDP2 and the most recent Highland Housing Land Audit (at that time, 2017 HHLA). SGN reported the anticipated growth in Tornagrain and East Inverness which identified the need for additional reinforcement of the Inverness IP network**.** SGN were cognisant of committed development and would plan for network improvements accordingly. The Council seeks input from SGN regarding whether these remain reflective of the current context, and whether they are comfortable with these being shared with the DPEA as part of the Evidence Report Gatecheck.

4.178 For the Conon Bridge – Invergordon IP **(THC141)**, domestic growth potential to impact the gas network is relatively small, however the Industrial/Commercial allocation of sites in the IMFLDP2 was considered as potentially significant. Network reinforcement in this IP will be driven by industrial development at Invergordon, and to a lesser extent Evanton and Alness. Speculative infill development opportunities for off-gas areas in the Conon-Bridge IP were noted, in line with those investigated as part of the RIIO-GD2. As with all networks supplied via the Northern Transmission system, available capacity on the LTS network is a major dictating factor in assessing the capability of SGN's Network to accept additional demand in this area. It is important that committed demand and proposed development is closely monitored to ensure security of supply across all pressure tiers.

4.179 To support the transition to net zero, decarbonisation of heating is being progressed through the Local Heat and Energy Efficiency Strategy (LHEES) including the consideration of Heat Network Zones, which are discussed in **Heating & Cooling.** Additionally, work is underway exploring options for retrofitting the gas network for potential hydrogen distribution.

Renewable Generation

4.180 In 2024, Highland's renewable energy generation and capacity is predominantly onshore wind and hydroelectricity (Table 4:6). There is significant offshore wind energy generation off Highland's coastline (see Highland Council Turbine Mapping); however, because the grid connection is made in neighbouring Moray (i.e. outwith Highland), these sites are not attributed to Highland in these regional renewable statistics. There are many solar photovoltaic sites, that are included, but the overall capacity they contribute to the network is disproportionately low compared to other renewable source sites. There has been a notable growth in onshore wind generation (Figure 4:) and capacity (Figure 4) from 2014-2024.

Table 4:6 - Renewable Energy Summary for key sources in Highland (2024) (Source: National Statistics: Energy Trends – Regional Renewable Statistics)

	Solar PV	Onshore Wind	Hydroelectricity	Other*
Generation (MWh)	28,204	4,582,872	3,024,188	191,210**
Installed Capacity (MW)	40.0	2,043.8	818.8	42.3
# sites	11,700	275	309	18

*Other category includes Anaerobic Digestion, Offshore Wind, Wave/Tidal, Sewage Gas, Landfill Gas, Municipal Solid Waste, Animal Biomass, Plant Biomass and Cofiring.
**For Other generation in Highland, data on Wave/Tidal, Sewage gas and Landfill gas is suppressed (and excluded from the total Other figure) as the output of individual plants is no to be revealed but there is some generation in the category.

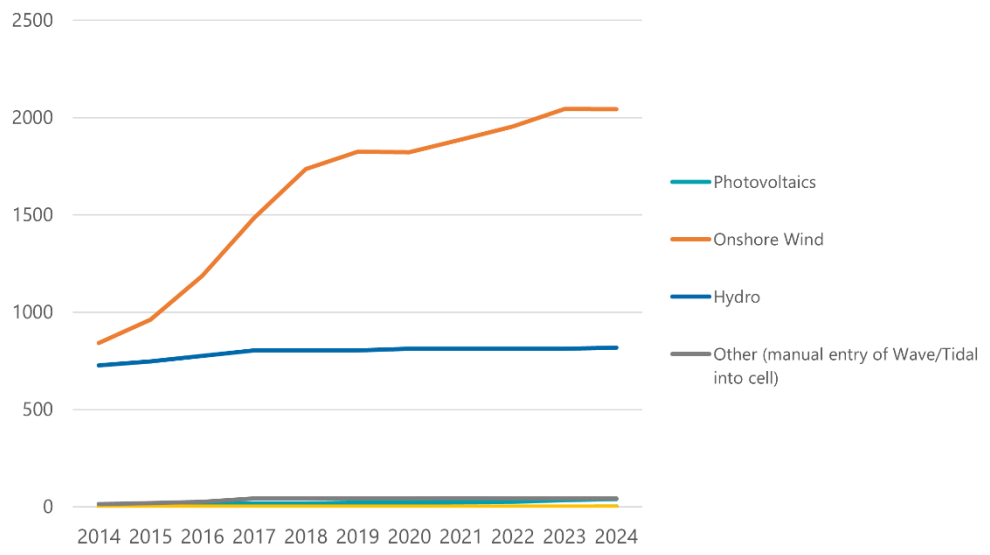

Figure 4:8 Renewable Energy Generation in Highland, 2014-2024 (MWh) (Source: National Statistics: Energy Trends – Regional Renewable Statistics)

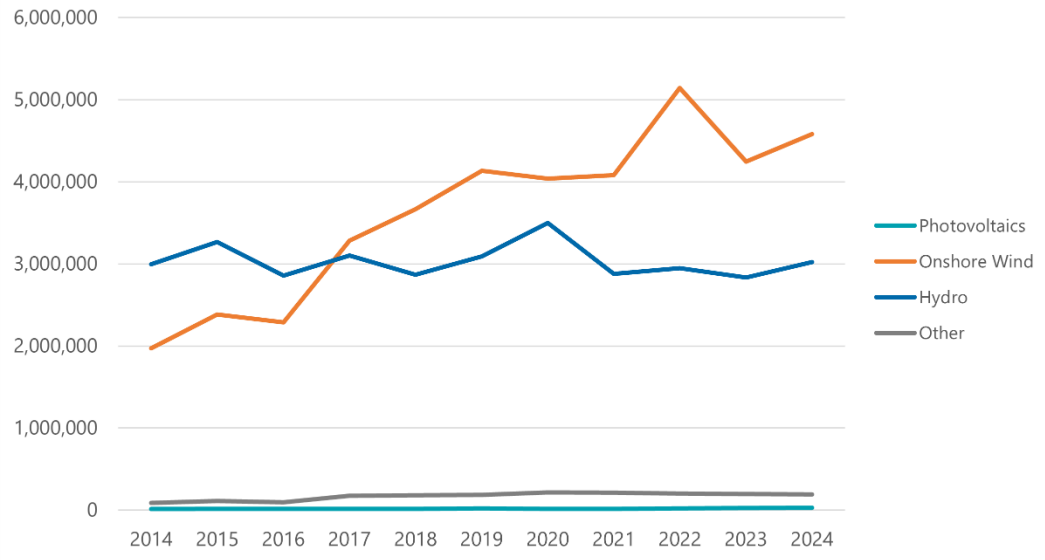

Figure 4:9 Installed Renewable Energy Capacity in Highland, 2014-2024 (Source: National Statistics: Energy Trends – Regional Renewable Statistics)

4.181 The scale, distribution and height of existing and proposed renewable energy developments on land and sea in Highland can be understood and interpreted by using the Highland Energy Project Mapping prepared by the Council. The Council maintains this database from the development management system, with monthly updates, showing the location of each energy project that is the subject of a planning application or application under the Electricity Act 1989 (but excluding projects proceeding under permitted development rights). This evidence will support the development of a spatial strategy that realises Highland's full potential for electricity from renewable sources. A technical note explaining the data presented in Highland Energy Project Mapping, source of data and its limitations is provided in **THC058.**

4.182 In addition, the Council has previously developed Highland Wind Turbine Mapping (updated to 31 December 2024) with granular information on the location of wind turbines onshore and offshore and their status: constructed, under construction, approved, in planning, refused/expired/withdrawn or scoping/screening.

4.183 From Highland Development Management data a summary of approved, in planning and scoping/screening hydro energy generation and storage developments has been prepared (Table 4:1, Table 4:2 and Table 4:3). For ECU applications, whilst Highland Council is not determining decisions it is both a consultee for the application and responsible for recommending conditions and handling condition compliance.

Onshore wind

4.184 National Statistics: Energy Trends - Regional Renewable Statistics (2024) report 2.04 GW of installed onshore wind capacity in Highland (Table 4:6). As of July 2025, Council development management reports total constructed onshore wind capacity of 3.06 GW (Table 4:3). The number of onshore wind planning applications, by status and by planning authority, are reported in Table 4:1 and Table 4:2 respectively. The Council has been the determining authority in 88% of the onshore wind applications, from initial baseline records collated from 2015 up to 31 December 2024. It should be noted that these figures are not intended or presented as a forecast of future capacity, and it is understood that the decommissioning of onshore wind sites will be a further dimension affecting available capacity.

4.185 The past requirement for planning authorities to produce a Spatial Framework for onshore wind energy development that was set out in Scottish Planning Policy 2014 has not been carried forward into NPF4. In the context of Scottish Planning Policy 2014 (including the methodology for the spatial framework set out in its Table 1), the Council prepared Onshore wind energy supplementary guidance with a landscape sensitivity appraisal for the Loch Ness Area. An addendum in 2017 added a landscape sensitivity appraisal for Caithness, the Black Isle, Surrounding Hills and Moray Firth Coast. That Table 1 is available to view as Table 1 in Onshore wind energy SG. The clearest steer provided by the Framework is 'Group One' (where development will not be supported) which comprises National Parks and National Scenic Areas, which is consistent with NPF4 Policy 11b). For Highland, the Spatial Framework for Onshore Wind Energy as a whole (Groups One, Two and Three) is still a useful planning tool to demonstrate constraints and where suitable sites for energy development may be located and will be used to inform HLDP. The Highland Spatial Framework mapping was updated in 2020 (to reflect updates to the underlying constraints layers) for Caithness and Sutherland (2020) **(THC143)**, Inner Moray Firth (2020) **(THC138)**, and West Highlands and Islands (2020) **(THC139)**. In 2021, a pilot landscape sensitivity study was commissioned by NatureScot and Highland Council for Dava Moor, Nairn and Monadhliath **(THC074)**. This study sought to support strategic planning and assist with the appraisal of specific wind energy development proposals in these landscapes, including consideration of cumulative and cross-border landscape and visual effects. It is recognised that other constraints (spatial or otherwise), further updated constraints datasets, or pointers to opportunities for development would also be considered for development of the Proposed Plan. In referring to constraints in this context, the Council means planning considerations which, through the consideration of potential impacts arising from proposed development, have the potential to influence siting, design and

suitability of development proposals. Further, by constraints the Council is not only referring to 'no go areas' for development.

4.186 NatureScot has recently published guidance on Aviation Lighting Impact Assessment (November 2024) which brings consistency to the assessment and illustration of effects on the landscape and visual resource from visible aviation lighting located on onshore wind turbines.

4.187 In Highland, the traditional period of consent to build and operate onshore wind has generally been a lifespan of 25 years, as set out in planning permission conditions, by or after which time the wind farm would need to be decommissioned. However, in recent years applicants are seeking operational periods in the order of 35-40 years. It is recognised that the decision for applying for repowering is a commercial one for the wind farm operator, rather than being driven by the timeframes on the conditions of any existing planning consent. This decision looks to strike an optimal balance between the remaining operational life of the wind farm and the prospects and benefits associated with introducing larger more efficient turbines, as well as onsite BESS.

Offshore wind

4.188 Scotland's Offshore Wind Policy Statement (2020) states a target of 8 - 11 GW of offshore wind capacity in Scottish waters by 2030, based off the commitment to reach net zero by 2045. The draft updated Sectoral Marine Plan for Offshore Wind Energy (SMP-OWE) **(THC052)** sets the course for delivering this capacity, maximising deployment in Scottish waters whilst protecting marine users and our environment and is anticipated to be finalised in autumn 2025.

4.189 Additional offshore wind capacity will require further reinforcement of grid infrastructure, connections and battery storage. SWP-OWE identifies current infrastructure and available capacity for the short-term but there are still network constraints that will need to be addressed to support future development. Offshore Renewable Energy Catapult ("ORE Catapult") are examining these grid infrastructure and connectivity issues and possible solutions, to inform future revisions to the SWP-OWE Plan **(THC052)**.

4.190 Scotland Marine Economic Statistics 2022 evidence that offshore wind generated 5,242 GWh of electricity, 15% of all renewable energy generation in Scotland. Scottish offshore wind had an estimated turnover of £4.2 billion in 2022, 1.4% of overall Scottish turnover. The Highland Energy Projects Mapping Time Filter demonstrates the growth in offshore wind since 2010.

4.191 Offshore wind farms adjacent to Highland's coastline have an installed capacity of 2.42 GW, as shown in Table 4:7. The licences and consents required for offshore projects are administered by the Scottish Government's MD-LOT.

Table 4:7 Offshore Wind sites adjacent to Highland's coastline, by turbines, height and capacity (MW) (Source: THC Development Management and Marine Directorate Scottish Government).

Name	No. Turbines	Max Height	Operational capacity (mW)
Beatrice Demo (no longer operational)	*2*	*150*	-
Beatice Offshore Wind	84	198	588
Moray East (MacColl) Offshore Wind Farm	46	204	437
Moray East (Stevenson) Offshore Wind Farm	30	204	285
Moray East (Telford) Offshore Wind Farm	24	204	228
Moray West Offshore Wind Farm	60	265	882
*Pentland Floating Offshore Wind Farm (consented, not yet constructed)**	*Up to 6*	*300*	-
West of Orkney Wind Farm (consented, not yet constructed)	*125*	*360*	-
Total	**428**		**2,420**

**S36 application approved by Scottish Ministers*

4.192 At the time of preparing this Evidence, two energy network planning applications were under consideration for onshore connections for the offshore network: West of Orkney Wind Farm and Ayre Wind Farm (off the north-east coast of Highland, close to Orkney). Both proposed to connect to Banniskirk, where there are also multiple applications for BESS.

4.193 Pathway to 2030 Holistic Network Design (2022) (HND) sets out the network requirements to facilitate the connection of the 23 GW of in scope offshore wind projects. When combined with existing offshore wind projects and those already further advanced in their development, the HND should enable the connection of 50 GW of offshore wind in Great Britain by 2030. The HND includes the offshore transmission network, the onshore works essential to facilitate each connection and the network needed to transport the electricity around the country.

4.194 The National Marine Plan addresses the potential for interactions between renewable energy development and other marine users (including, but not limited to, recreational users, commercial fishers, other construction works, shipping traffic, ports and harbours). Marine and terrestrial planning need to be aligned, including for the electricity transmission grid and supporting infrastructure. While the HLDP does not have scope to consider the marine environment beyond 12 nautical miles from the coastline, there are impacts from offshore wind development on other coastal assets, such as shipping lanes and aquaculture which are discussed in **Chapter 6: Coastal Development and Aquaculture.**

4.195 In contrast with offshore wind energy development, where rounds of development bids are assessed in designated marine sectors defined in the SMP-OWE, no such process of assessing cumulative onshore wind energy developments is in place, and is therefore currently unstructured and ad-hoc in nature (i.e. there are no allocated energy grid development sites), which makes development planning and development management challenging.

Hydroelectric and pumped hydro

4.196 In 2024, hydroelectric generation capacity in Highland was 818 MW (National Statistics: Energy Trends – Regional Renewable Statistics). Table 4:1 evidences that as of July 2025 there are 328 approved, 3 in planning and 233 scoping/screening applications in Highland for both pumped hydro storage or hydroelectric generation projects. The Council is in the process of improving data collection through development management for all hydro developments, which will enable more up to date capacity estimates for hydro in Highland.

4.197 The current and future pipeline of pumped hydro storage in Highland is set out in Figure 4:8. While Foyers is the only currently operational pumped hydro scheme in Highland since the 1970s with a 300 MW installed capacity, there are several consented pumped hydro schemes with a capacity of 3,550 MW including Red John (known as Loch na Cathrach more recently), Earba, and Coire Glas. In addition, the Kemp, Glen Earrach, and Fearna schemes are still being considered through the planning process and would have 4,400 MW if all were granted consent from the ECU.

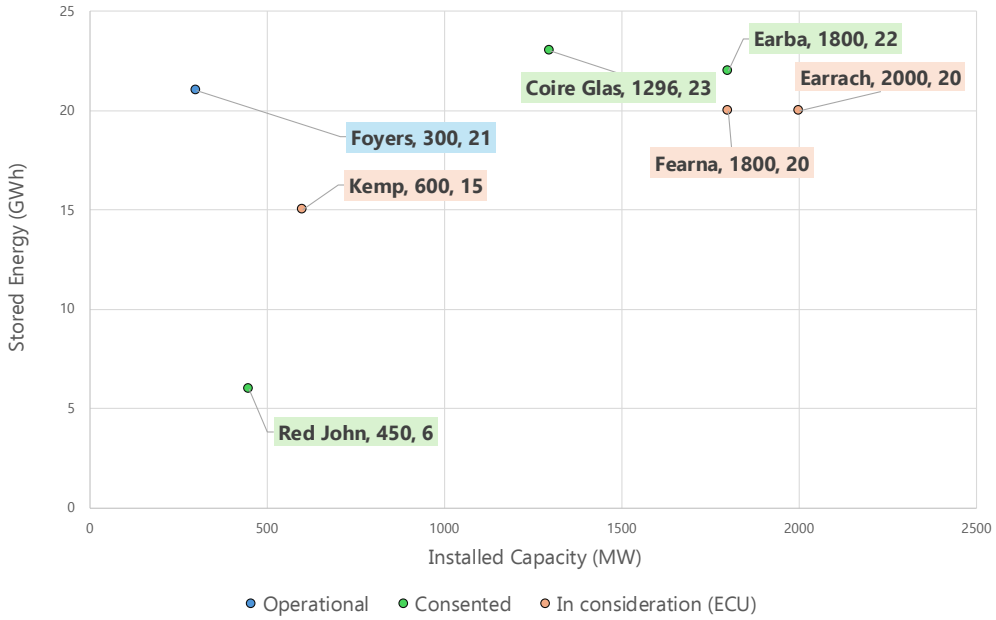

Figure 4:10 Highland Pumped Hydro Storage Installed Capacity and Stored Energy (Source: Development Management, Highland Council)

Solar Photovoltaics

4.198 In 2024, there was 40 MW of solar capacity installed in Highland (National Statistics: Energy Trends – Regional Renewable Statistics). The Scottish Government's Draft Energy Strategy and Just Transition Plan aims to deploy an additional 4-6 GW of solar capacity in Scotland by 2030. Table 4:1 evidences that there are 170 approved, 17 in planning and 0 scoping/screening solar applications in Highland. Of the 187 applications considered for solar development in Highland, 99% are determined by Council as a planning authority (Table 4:2).

Tidal

4.199 There is currently one tidal site 'MeyGen' operating adjacent to Highland's coast, in the Pentland Firth, which is being developed in stages. National Statistics: Energy Trends – Regional Renewable Statistics (2024) report that, of the total 7.7 MW of installed wave/tidal energy capacity in the UK, 3.7 MW is installed adjacent to Highland's coastline, but as there are no wave energy sites adjacent to Highland, this should be interpreted as meaning that the 3.7 MW relates to tidal. Table 4:1 evidences that there are 2 scoping/screening applications for tidal developments in Highland, which relate to variations to MeyGen.

Hydrogen

4.200 The production of low carbon hydrogen through commercial scale hydrogen electrolysis is still an emerging sector, with uncertainty around the scale of its future role in the energy system. The Scottish Government's Hydrogen Action Plan is targeting 5 GW of electrolysis by 2030 and another 5 GW by 2035. Scotland's Hydrogen Assets map shows existing Hydrogen Assets and Potential Demand.

4.201 The Council is in the process of developing a Highland Hydrogen Strategy which is being informed by the UK Hydrogen Strategy. From an economic perspective Regional Transformational Opportunities in the Highlands and Islands, which is further discussed in **Chapter 8: Economy, Business, Tourism and Productive Places**, identified green hydrogen as a potential regional transformational opportunity (RTO). The Highlands and Islands region's potential for renewable energy generation, and levels of constrained energy in particular, as well as existing pipeline infrastructure makes the region well placed to become an exporter of green hydrogen. There is an interdependency with renewable energy generation and green hydrogen. Though, with the lack of infrastructure to support green hydrogen uptake, significant investment will be required to enable green hydrogen to scale in Scotland.

4.202 In 2024, Scottish Government established a National Planning Hub on hydrogen with an initial priority for supporting decisions on hydrogen planning applications, and providing local authorities with specialist expertise in hydrogen projects. Hydrogen has been identified by government and industry as having great potential to support Scotland's ambitions on net zero whilst there is a challenging consenting pipeline for hydrogen projects. The Hub also supports planning for hydrogen including guidance on the planning process (Hydrogen Planning Process Map), industry engagement guidance (A Guide to Early Engagement in Planning for Hydrogen Developers) and training for EIA and HSE.

4.203 SEPA has detailed information about hydrogen production, planning and environmental regulation requirements published on their website: Hydrogen | Scottish Environment Protection Agency (SEPA). Key environmental considerations from hydrogen are production and consumption, sustainable water use and discharges into water environment, Control Of Major Accident Hazards (COMAH) and consenting. For example, there is a preferred hierarchy for water use for hydrogen production: Reuse of final stage effluent, sea water, direct freshwater abstraction from sustainable ground / surface water, treated water / public water supply.

4.204 Planning permission will generally be required from the relevant planning authority (local authority or Energy Consents Unit of the Scottish Government) for hydrogen projects and relevant requirements under the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 will also apply. Hazardous Substances Consent regulates the presence of hazardous substances to ensure risks to people and environment are properly addressed in land use planning. It is required from the planning authority (in consultation with both HSE and SEPA) where 2 or more tonnes of hydrogen is present on a site, or where hydrogen is present in addition to certain other chemicals.

4.205 The production of hydrogen is a listed activity under the Pollution Prevention and Control (Scotland) Regulations 2012 (PPC) as a Part A production of inorganic chemicals activity 4.2 (a) (i). A permit must be obtained from SEPA prior to any hydrogen being produced or burned as a fuel in any plant greater than 1MW net rated thermal input. Installations comprising of a combustion plant with a total RTI greater than 50MW require a Part A permit.

4.206 A hydrogen industry event hosted by Highlands and Islands Enterprise in Elgin in September 2025 noted the current challenges to developing the Hydrogen sector in the Highlands and Islands. It will require skills development (such as STEM, project management, safety), ongoing research and recruitments efforts to attract and retain talent. Outwith Highland, current areas of hydrogen activity are identified in the east coast of Scotland and the Islands.

4.207 The Cromarty Hydrogen Project, 12km north of Alness, is the first project in the Scotland Hydrogen Programme. It originated from a collaboration between the Port of Cromarty Firth, ScottishPower, Glenmorangie, Whyte & Mackay and Diageo and the project originator, Storegga during the feasibility stage. This project is looking to develop a green hydrogen production hub (10.6MW) in the Cromarty Firth region and revolves around the local distilleries forming the baseload demand for early phases of the project, which would enable them to decarbonise in line with their own ambitions and sector targets.

Renewable Energy Guidance

4.208 Existing guidance on renewable energy development such as the Highland Renewable Energy Strategy and Planning Guidelines and Onshore wind energy supplementary guidance - Highland Council and the 2021 pilot study landscape appraisal for Dava Moor, Nairn and Monadhliath **(THC074)** will be considered when preparing the Proposed Plan as to whether we will retain, review or extend these tools, either as incorporated into the HLDP or as non-statutory guidance. New tools and guidance may also be required to respond to the changing energy sector development context and new constraints data or areas (e.g. The Flow Country World Heritage Site (THCWHS)). For example, developing a more specific location, siting and design steer for emerging types of energy sector development, such as Battery Energy Storage Systems and Hydrogen, may be required. Similarly, consideration may need to be given to a more joined up spatial approach to the planning of renewable development proposals to enable assessment of cumulative effects, cohesive integrated design and environmental land management.

4.209 For the avoidance of doubt, the Council does not generally envisage allocating sites for energy developments within the HLDP (although we may consider doing so for limited types and purposes). However, the Council does consider that policies in the HLDP can include spatial policies, in terms of the both the identification and consideration of constraints and the identification of opportunities for energy developments. It remains the case that each development proposal will require specific assessment, including where appropriate Environmental Impact Assessment, and will be considered on its individual merits.

4.210 The Flow Country Planning WHS Planning Position Statement 2 is relevant guidance for any development within TFCWHS, including renewable energy. This Planning Position Statement will be accompanied by the management plan for TFCWHS and guidance on the consideration of 'setting', noting that this will be appropriate to the criterion and attributes for which the Site is inscribed as further explained in **Chapter 5: Natural Environment**.

4.211 As part of the Onshore Wind Sector Deal Scottish Renewables has committed to creating a mechanism for onshore wind developers to submit information prepared as part of the consenting process to create a central geospatial database, including habitat management plans, peatland management and annual bird monitoring, which can be accessed publicly. If this is established and available, it may form useful Evidence for the preparation of the HLDP.

Inverness and Cromarty Firth Green Freeport

4.212 Highland's legacy of strategically important oil and gas fabrication sites and abundance of renewable energy resources off its coast mean it is ideally placed to be at the forefront of the fast-moving green energy revolution.

4.213 The Inverness and Cromarty Firth Green Freeport aims to realise significant local economic benefits from investment in renewable energy infrastructure, and is already coinciding with significant change within the Highland economy detailed separately within **Chapter 8: Business, Economy, Tourism and Productive Places**. It will be the prime location for assembly, operation and maintenance services for renewable energy development and extend to becoming an international base for fabrication and manufacturing of renewable energy components and a leading research and educational hub.

4.214 The Green Freeport is designed to support the ScotWind expansion through the North of Scotland Hydrogen Programme. The programme aims to develop a state-of-the-art hub in the Cromarty Firth to produce, store and distribute green hydrogen at scale to the region, Scotland, other parts of the UK and Europe. The Cromarty Firth is an ideal location for the green hydrogen hub due to its proximity to large-scale renewable electricity supply and a high level of demand locally for this sustainable fuel, as shown on the map of Scotland's Hydrogen Assets, including: distilleries, industry, transport (road, rail & aviation) and domestic applications, supported by local supply chain expertise and the Council's ambition for the region to become a hydrogen economy.

Battery energy storage systems

4.215 As the UK looks to achieve Clean Power by 2030 and a net zero power system by 2035, the rapid deployment of new large-scale battery energy storage systems (BESS) is projected under every future energy scenario. Low-carbon dispatchable power and flexibility are required to manage variable generation, meet peak demand, ensure security of supply, manage network constraints and maximise the economic value of abundant renewable energy when it is available. In Highland this is especially pertinent as the scale of renewable energy generation

and variability of generations creates localised network constraints that BESS can help to manage.

4.216 Certain site-specific factors, primarily grid capacity and access points to the electricity transmission network, are essential for the implementation of BESS. Scottish Government published planning guidance on Battery Energy Storage Systems (BESS) in March 2026. The purpose of the guidance is to assist applicants, decision-makers, and other participants in the planning system to effectively plan for BESS across Scotland. It seeks to support a clearer understanding of the specific technical, environmental, and wider issues associated with planning for BESS, and how these may be positively addressed through the planning process, to ensure that development is appropriately sited, well designed, and responsive to its context. The guidance recognises that BESS remains an evolving sector, with few currently operational sites and the potential for change of battery technologies likely in the future. It therefore encourages a proportionate, positive and collaborative approach between applicants and decision-makers with a strong emphasis on appropriate site selection and effective pre-application engagement.

4.217 The deployment of large-scale batteries has continued to accelerate in the north of Scotland license area, with 110 MW connecting in the past year and a total baseline of 291MW of large-scale battery energy storage (DFES 2024). The pipeline of grid-scale battery storage sites that have a quote issued or accepted connection offer with SSEN was 9.3 GW across 221 sites in the licence area (an increase of 20% since DFES 2023).

4.218 By 2030, energy storage capacity in the North of Scotland is expected to reach 4.0GW (DFES 2024) but the deployment of large-scale battery storage is projected to slow in the 2030s and 2040s, as the market becomes saturated and alternative sources of flexibility see increased uptake, for instance smaller-scale battery storage, thermal storage and Vehicle-to-Grid (V2G). Also, with significant reforms to network connection policy and battery storage asset revenues becoming challenging for new entrants, it is likely that only a limited proportion of the BESS pipeline will progress through to development, even in the longer term. This is partially evidenced by only 2.3 GW (25% of the full pipeline capacity) being found to have obtained planning approval to date. With reference to BESS application statistics in Table 4:1, past trends observed through Council's Development Management pipeline indicates that a number of these BESS applications are likely to be speculative and not all are expected to be delivered.

4.219 The Highland Energy Projects Mapping Time Filter demonstrates the rapid increase in planning applications for operational large-scale battery storage sites in the last 5 years. The current Development Management data on BESS is not complete or accurate enough to support a reliable estimate of total BESS capacity

in Highland (as distinct from the SSEN North of Scotland license area). Work is ongoing to improve the recording of planning application information to support the tracking of BESS installed and operational capacity in Highland.

4.220 Small-scale battery storage, in the form of domestic batteries and batteries installed at commercial and industrial properties with high energy demand, has a relatively small baseline in the North of Scotland licence area (DFES 2024) but has a potential to grow under every modelled scenario. Domestic battery uptake is closely tied to the uptake of domestic rooftop solar PV. In the past two years, over half of domestic PV installations have been installed alongside a domestic battery.

4.221 From a network perspective, SSEN procures Flexibility Services from owners, operators, or aggregators of Distributed Energy Resources (DERs) or Consumer Energy Resources (CERs), which can be generators, storage, or demand assets. These services are needed in areas of the network which have capacity constraints at particular times or under certain circumstances. SSEN purchases Flexibility Services from all types of providers (e.g. domestic or commercial).

Data centres

4.222 Data centres host and support the digital infrastructure that underpins modern life and are an emerging development type in Scotland. Green data centres are supported by NPF4 as part of National Development 12 – Digital Fibre Network (see **Chapter 11: Infrastructure**). NPF4 policy 24 supports the delivery of digital infrastructure as fundamental utilities, with the intent to encourage, promote and facilitate the roll-out of digital infrastructure across Scotland to unlock the potential of all our places and economy. Policy 24 is not explicit in referring to data centres; however, the intent of the policy is considered supportive of data centre development. Data centres generate excess heat and are recognised as heat source opportunities, for establishing heat networks as per NPF4 policy 19d).

4.223 There has been limited interest in data centre development in Highland to date. In 2020, Highland Council received a Screening and Major Pre-development application for one large-scale data centre development, which did not progress further. One small-scale data centre application was approved in 2010. However, as data centres are high energy users and the density and direct access to renewable energy sources available in Highland, it is reasonable to anticipate future demand for locating data centres in Highland within the life of the HLDP. The HLDP Call for Sites included one site proposal for a potential data centre use.

Nuclear Decommissioning

4.224 Scotland's national position affords no support at present for nuclear power generation, and NPF4 contains no nuclear-specific policies, or direction for the spatial strategy of LDPs. Scotland has only one remaining active nuclear power site generating electricity, which is outwith the Highlands. Within the Highlands, there is one civil nuclear site at Dounreay, in Caithness. It is a former prototype reactor that served as the UK's centre for fast reactor research and development, now at an advanced stage of decommissioning, and undergoing a large-scale clean-up and demolition project to return the site to a safe condition (discussed in **Chapter 13: Design, Wellbeing, Local Living and Placemaking**), led by Nuclear Restoration Services (NRS). The Vulcan Naval Reactor Test Establishment is an adjacent Ministry of Defence nuclear submarine test reactor site, preparing for decommissioning.

Energy from Waste

4.225 Incinerators in Scotland are fitted with technologies that enable energy to be recovered from the treatment of waste, known as Energy from Waste (EfW). EfW can be used to produce electricity only, heat only, or combined heat and power (CHP). Bioenergy and EfW accounted for 8.1% of all renewable electricity generated in Scotland in 2019 (2,472 GWh).

4.226 NPF4 is only supportive of new EfW proposals under limited circumstances where a national or local need has been sufficiently demonstrated (e.g. in terms of capacity need or carbon benefits) as part of a strategic approach to residual waste management and subject to specific criteria such as being connected to a heat network.

4.227 In November 2024, the Council Communities & Place Committee made a decision on Long-term Waste Management, that an Energy from Waste facility within the Highlands was not considered to be a suitable course of action. Instead, seeking a long-term contract with a merchant service provider operating within Scotland was considered the most appropriate strategic approach. There are six new merchant energy-from-waste facilities under development across Scotland, and so the supply capacity indicates greater certainty of future provision, and they are considered to provide enough capacity to serve the Highlands. Waste management and zero waste policy are further discussed in **Chapter 11: Infrastructure**.

Local and Community Energy

4.228 Local Energy Scotland provides an overview map of communally and locally owned, shared ownership and community benefit schemes in Scotland which

provide 1108MW of energy to communities. Compared to other local authorities, Highland has a high concentration of operational community-owned and local owned energy projects, including hydro schemes, biomass and turbine projects predominantly small scale (0.05 – 5.0MW capacity), with the exception of Boulfruich Wind Farm (12.75 MW) and Achairn Wind Farm (6.15 MW). Many Local Place Plans have aspirations for developing community energy or small-scale schemes to power community buildings – this is discussed later in this Chapter.

4.229 Remote islands including Rùm, Eigg, Muck and Canna are all completely 'off-grid' (not connected to the national electricity or gas networks). These remote islands are considering innovative ways to supply, distribute and generate energy including opportunities to ensure local maintenance and supply chain opportunities are realised.

Environmental impacts of energy development

4.230 While fulfilling Scotland's renewable energy targets is recognised as playing our part in mitigating the inter-related climate and biodiversity crises, it is recognised that the installation of renewable energy infrastructure can result in environmental impacts. Understanding cumulative impacts is an important planning consideration for energy developments and is required by NPF4 Policy 11 e). Notwithstanding this, it is understood that there are examples of well-designed developments delivering, for example, both climate and nature benefits simultaneously. Scottish Government's Onshore Wind Policy Statement (OWPS) 2022 (specifically Chapter 3) acknowledges this and references guidance and good practice examples, in addition to which there are key corresponding outputs from the Onshore Wind Sector Deal workstreams.

4.231 Areas of Highland have different physical and environmental characteristics which impact their suitability for energy development. This includes established designations such as National Parks, National Scenic Areas, and Local Landscape Areas which are mapped as Evidence in **Chapter 5: Nature and Environment** and presented in the three Strategic Spatial Frameworks **(THC143, THC138, THC139)**. Caithness, for example, has globally important blanket bog including The Flow Country World Heritage Site, as well as internationally important seabird colonies. Peatland ground conditions also impact the suitability of an area for subsurface infrastructure.

4.232 The Council acknowledges the value of landscape sensitivity studies (LSS), with regard for NatureScot's Landscape Sensitivity Assessment Guidance (2022), for identifying landscape sensitivities from energy development. With regard to policy NPF4 Policy 11 d) and Policy 4, the interface between development related to the Green Freeport and natural designations is highlighted in **Chapter 5: Nature and Environment**, and additionally in **Chapter 6: Coastal Development**

and Aquaculture. Further discussion of sensitive landscapes and the implications for the HLDP is included in **Chapter 5: Nature and Environment**.

4.233 Engagement with the energy sector working in the coastal environment, considered in **Chapter 6: Coastal Development and Aquaculture**, highlighted their ongoing and active responsibilities with sharing information and data on environmental monitoring of sites.

Community Wealth Building

4.234 Aligned with Policy 25 Community wealth building, NPF4 Policy 11c) states that for energy development, *"Development proposals will only be supported where they maximise net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities."* Community benefit packages are voluntary arrangements offered by renewable energy businesses to communities located near developments, and are not a material consideration in a planning application. Social Value Charter for Renewables Investment sets out the community benefit expectations the Council has from developers wishing to invest in renewables in Highland. Matters on the economic and community benefits of the energy sector are fully evidenced in **Chapter 8: Business, Economy, Tourism and Productive Places**.

Heat and Cooling

4.235 Reducing emissions from homes and buildings by moving to cleaner heating and cooling systems is an important action for combatting climate change and achieving our national net zero target by 2045.

4.236 The Local Heat & Energy Efficiency Strategy (Scotland) Order was passed in May 2022. The Order mandates local authorities to prepare, publish, and update their LHEES and Delivery Plan. These must be published by 31 December 2023 and updated at least every 5 years thereafter. The Scottish Government has passed legislation and produced accompanying strategy documents relevant to the implementation of Local Heat & Energy Efficiency Strategy (LHEES). LHEES are at the heart of a place based, locally-led approach to the heat transition and underpin an area-based approach to heat and energy efficiency planning and delivery.

4.237 LHEES presents an opportunity to identify dwellings suitable for low carbon heating and promotes the importance of a fabric-first approach to improving energy efficiency. The LHEES main direct links to spatial planning is through the identification of potential heat network zones. Decarbonisation of housing stock, including retrofitting of renewable and low carbon energy systems, also has spatial planning implications largely through the consenting process.

4.238 The Council published its first LHEES in December 2023. It establishes a framework for heat decarbonisation in both public and private buildings, reducing energy demand, tackling fuel poverty, and contributing to net zero targets. LHEES includes a comprehensive summary of domestic and non-domestic building stock characteristics, energy efficiency and heating statistics for Highland and identifies area-based solutions and indicative zones for developing heat networks. Scottish Housing Condition Survey 2021 and 2019 data is used, among other data sources, to provide a summary of both domestic and non-domestic data. The LHEES is updated every 5 years.

4.239 The age of a dwelling, the built form and heating fuel all impact the running costs, energy performance and living conditions. LHEES reports that of the total 127,066 domestic properties in Highland (at the time of LHEES publication), 61% (77,648 dwellings) are in an off-gas grid area (spatially show in LENZA map in Highland Climate Change and Energy Map). The main fuel types in Highland are mains gas (34%), oil (28%) and electricity (26%). Areas with limited access to the gas grid are more likely to suffer from fuel poverty and are evidently more reliant on fossil fuels, like oil, LPG and solid fuels. In Scotland, primary heating fuels are mains gas and electricity but in Highland there are higher rates of oil and LPG fuels being used (LHEES).

4.240 Figure 4:9 demonstrates the range of domestic property ages and their EPC Bands & Ratings in Highland. Energy efficiency ratings in Highland fall below the average for Scotland, due to their age, heating fuel and levels of insulation. Over 65% of dwellings are in EPC bands D-G, and likely to require significant energy efficiency and heating upgrades to achieve a higher rating. The region has a high proportion of detached (38%) and semi-detached (21%) properties, and only a small proportion are small blocks of flats (12%). In Highland, 92% of homes have double or triple glazing. Beyond energy efficiency, refer to **Chapter 9** for more evidence on housing quality and rural homes in Highland.

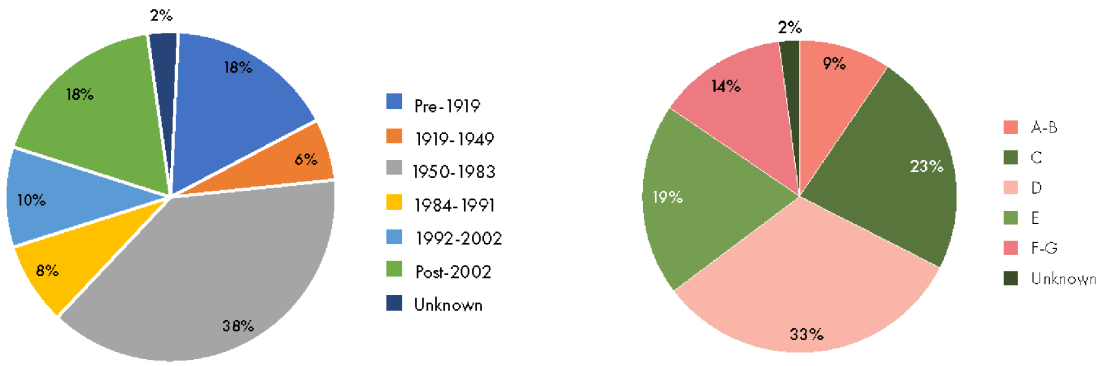

Figure 4:11 : Highland property age (L) and EPC banding (R) figures (Source: LHEES via Scottish House Condition Survey)

4.241 DFES 2024 identified domestic heat pumps (48,000) as a key baseline source of electricity demand in the North of Scotland, and the number of domestic heat pumps has increased substantially since DFES 2023. An increase to 229,000 domestic heat pump units is projected by 2030 under the Holistic Transition scenario, as new homes and off-gas homes install heat pumps.

4.242 At the time the LHEES was published there were 16,904 non-domestic properties in Highland, with 45% classed as very remote rural and 14% remote rural (LHEES). The highest heat demand by non-domestic typology split by floor area (MWH/yr) belongs to residential, hotels, offices and retail. The highest heat demand buildings by property age are those built post-1983 (374,292 MWh/yr) and pre-1919 (383,353 MWh/yr). The main fuel type for non-domestic properties is electricity (65%), followed by oil (17%), mains gas (8%) and other fuels (9%) (LHEES). The highest heat demand for typology split by fuel (MWh/yr) belongs to residential, retail, offices, hotels, clubs and community centres. Mains gas and oil-heated buildings in Highland have high potential for decarbonisation and are likely suitable for heat network connections as they will have a wet heating distribution system. Retrofit for heat networks for these buildings is likely to be less costly and complex compared with electricity heated buildings.

4.243 Poor energy efficiency is a driver for fuel poverty. Energy efficiency (single glazed windows, loft insulation and wall insulation) and fuel poverty by data zone are presented in the Highland Climate Change and Energy Map.

4.244 LHEES analysis categorised on-gas and off-gas domestic properties by readiness for heat pump retrofit, to identify opportunities for decarbonisation. Category 1 identifies properties highly suited for heat pump retrofit with good levels of insulation and a wet heating system, excluding any consideration of electricity network impacts or costs of any network upgrades. Around 53% of on-gas properties are Category 1 properties, meaning that they can be considered heat pump ready. Around 24% of properties in off-gas areas are considered Category 1, meaning these properties would not need additional insulation measures before installing a heat pump and can be considered heat pump ready.

4.245 The New Build Heat Standard 2024 (NBHS) applies to new buildings applying for a building warrant from 1st April 2024, as per the Scottish Government's Heat in Buildings Strategy (2021). New buildings must use a 'zero direct emissions heating system', such as a heat pump or heat network. An amendment to this standard in November 2024 allowed the use of bioenergy in both new homes and buildings, but as a secondary heating system only.

4.246 Through NPF4, development planning has a role in setting the ambition for optimising build quality (policy 16) and performance to minimise lifecycle emissions to assist in achieving net zero carbon (policy 2), embedding the circular

economy (policies 12 & 9), going above and beyond Building Standards Regulations.

Heat Networks

4.247 Heat networks distribute heat or cooling from a central source or sources and deliver it to a variety of different customers and buildings, avoiding the need for individual boilers or electric heaters in every building, and can contribute to decarbonising heating by transitioning from fossil fuels to low carbon heat. Often heat networks are developed in zones around public buildings which offer anchor loads (high heat demand) that drive the economics of heat works.

4.248 The Heat Networks (Scotland) Act 2021 requires local authorities to carry out a review of potential areas for heat networks. The Act has set statutory targets that 2.6 Terawatt hours (TWh) of output by 2027 and 6TWh by 2030 – 3% and 8% respectively of current heat supply should be supplied by heat networks. Scottish local authorities have an obligation to review their area to consider if it is likely to be particularly suitable for construction or operation of a heat network and decide if the area should be designated as a heat network zone.

4.249 The Scotland Heat Map shows current heat demand by settlement or with a 50m grid. Within Highland, heat demand is clustered around Inverness city (655.27 GWh/yr), towns and settlements (up to 300GWh/yr) in the Inner Moray Firth, and Thurso, Wick, Brora, Golspie, Halkirk, Ullapool, Gairloch, Portree, Broadford, Kyle of Lochalsh, Fort William, Dunbeg, Kinlochleven, Spean Bridge, Newtonmore, Kingussie, Aviemore, Nethy Bridge, Grantown-on-Spey.

4.250 Scotland Heat Map also shows current operational and in development district or communal heat networks in Highland. LHEES highlights several of these as notably successful heat networks:

- District Heating Scheme Wick
- Caol Community District Heating Scheme
- Glen Mhor Hotel District Heating Scheme
- The Aviemore Heating Project (Albyn Housing Society Ltd)
- The Milton Burn, Aviemore

4.251 The Heat Networks Planning Database (April 2025), administered by the Department for Business Energy and Industrial Strategy (BEIS), records two heat networks in Highland: Townhouse Carpark Energy Centre (Air Source Heat Pump) and Sabhal Mor Ostaig, Teangue (ASHP). The withdrawal of the planning application for Heather Brae District Heating Facility (biomass) is also noted.

4.252 The Scottish Government's First National Assessment of Potential Heat Network Zones (2022) identified areas where district heating could be economically viable, including areas with high linear heat densities where a substantial heat demand is

concentrated across multiple buildings within a relatively small area. Using stringent screening criteria (8000 kWh/m/yr linear heat density and requiring at least five anchor loads within a potential heat network zone), one large potential Heat Network Zone was identified within central Inverness. This Assessment provided valuable data which helped to inform and support the Council's LHEES development and subsequent work to progress heat network zone opportunities in Inverness, as outlined in this Chapter.

4.253 Highland's LHEES investigated indicative Heat Network Zones (HNZ) to understand the scale of potential and initial areas of focus. Using a radii-buffering approach the analysis identified clusters of buildings where potential anchor loads for a heat network were in proximity of each other. Existing infrastructure and constraints within indicative zones have been analysed, with strategic consideration given to how these zones could be further developed, considering heat source opportunities, technology and proximity to existing networks.

4.254 Opportunity summaries for each potential cluster to form an HNZ are presented in Figures 18 – 24 of the Highland LHEES, including the location, anchor loads, heat demand, constraints, nearby LDP allocations (from IMFLDP2 **(THC003)** or WestPlan **(THC005)** and total area and number of nearby green spaces with potential to be green heat sources (e.g. ground-source heat pumps). The potential zones shown as Heat Network Prioritised Clusters in the Highland Climate Change and Energy Map are:

- Invergordon Academy and Invergordon Sports Centre
- Dingwall Academy and Highland Council Techs Depot
- Highland Football Academy, Ross Memorial Hospital and The Health Centre
- Inverness High School and the Highland Council Headquarters
- The Justice Centre and Police Scotland
- Police Headquarters and Bannatyne Health Clubs
- Belford Hospital and The Nevis Centre

4.255 In November 2022, the Council applied to the Heat Network Support Unit (HNSU) for funding to conduct two feasibility studies to assess the opportunities in the development of district network in Inverness. These were Inverness West Bank and Inverness Castle. Inverness West Bank and Inverness Castle Heat Network Feasibility Studies **(THC056)** were presented to the Climate Change Committee in April 2023. Inverness was chosen as the first location to explore the feasibility of new heat network opportunities due to heat demand, the extent of Inverness currently connected to the gas grid and the opportunity of decarbonising heating, as well as market interest in developing heat network in Inverness.

4.256 To expand the potential for heat networks and support economic viability it was decided to take a broader approach and explore opportunities across a wider area beyond the original boundaries of the two Inverness sites. Three strategic

key areas for new heat network zones in Inverness were identified and chosen to undergo further feasibility analysis (also supported by HNSU), building on the findings and outputs of earlier work. This led to the development of four draft heat network zone boundaries, shown in the Highland Climate Change and Energy Map, which are: Longman, City centre, Westbank and Raigmore. Multiple heat source options were considered by Council, through the Techno-Economic Model, to progress the analysis of potential heat networks. In this analysis, air source heat pumps (ASHP) were identified as the most suitable heat source for City centre, Westbank and Raigmore zones. Longman is proposed to utilise a waste heat source (Scottish Water Pumping Station). Back up gas boilers are also indicated for each network. Ultimately, depending on how the Council decide to progress/delivery models and other aspects it will be up to developers in most instances to take these forward, and they may choose to pursue alternative sources based on feasibility, temperature suitability cost, or other project-specific factors.

4.257 A summary of the four viable heat networks identified is in Table 4:9. Additional data on core plus infill development scenarios and network maps are provided in the Heat Network Feasibility Report **(THC057)**. For Longman and Raigmore there are additional scenarios that consider variations for linking or segmenting the heat network.

*Table 4:8 Summary of Viable Heat Networks (Source: Highland Council Climate Change Committee 21 May 2025 **THC057**)*

Criteria	West Bank (core)	City Centre (core)	Longman (full)	Raigmore (full)
Total Demand (MWh/yr)	24,015	21,540	-	48,750
Planned Growth in the Area	Low	Moderate/ High	Low	Moderate/ High
Council land share (%)	46.80	9.70	38.3	18
Number of Anchor Loads (>=500MWh/yr)	13	16	12	8
Number of connected buildings	23	17	14	15
Number of Council buildings	8	2	-	4
Fuel poverty mean (%)	29	36	n/a	n/a

Total social housing (units)	419	153	n/a	n/a
Primary heat source	ASHP	ASHP	Waste heat	ASHP
Carbon saving TCO_2e over 40 years	158,170	131,690	62,789	270,611

4.258 Following completion of the wider opportunity scan and engagement with the Council's Climate Change & Energy Team, analysis has been undertaken to assess potential opportunities for the development of heat networks in Aviemore, Dingwall, Alness, Tain, Invergordon, and Wick (north of the river). The findings indicate that Invergordon, Tain, and Aviemore present the strongest opportunities among the areas assessed, based on a combination of heat demand, strategic fit, and deliverability considerations.

4.259 The general methodology for evaluating the feasibility of a heat network zone area considers several factors, including:

- Heat demand: consideration for buildings in the area, heat demand by site/activity, existing heat systems, building and land ownership, and grid connections. The opportunity to target areas affected by fuel poverty are also considered.
- Heat sources: two types, renewable heat opportunities (wastewater, biomass, water sources, air source, ground source) and waste heat opportunities (excess heat or cold from industrial or commercial activities) as per Section 48(1)(a) (i)-(ii) of the Heat Networks (Scotland) Act 2021.
- Technology appraisal: technologies vary, depending on the scale of the HNZ and heat sources available. A qualitative technology appraisal is carried out to assess the suitability of different low carbon technologies for a heat network. Technologies are assessed against various criteria, including resource availability, capital cost, spatial requirements.
- Energy centre: suitable location for an energy centre and route for heat network, impact on other underground services.

4.260 HNZ are not exclusive: In addition to HNZ, developers, community groups and other stakeholders can identify opportunities in areas outside the indicative heat network zones based on local demand or strategic interest. Council encourages innovation and community-led initiatives that align with decarbonisation goals. LHEES also considers small-scale heat network opportunities. From the 'heat-pump ready' property clusters in both the on- and off-gas areas, over 1,550 green spaces in the off-gas areas were identified as having high potential to be used for small-scale heat networks (e.g. shared ground source heat pumps) and over 760 for on-gas areas. Identified areas from this desktop analysis include

Thurso, Wick, Skye, Beauly and Muir of Ord. The Highland Climate Change and Energy Map includes Green Heat in Greenspaces data.

4.261 Site specific investigations are always required to confirm the potential and suitability of a heat resource, with reference to the range of heat source datasets which can indicate heat source potential. In Highland, a range of heat resource opportunities were analysed to explore potential for supporting heat networks, including:

- Excess or waste heat
  - Wastewater treatment works (unpublished data via Scottish Water),
  - Waste sites from SEPA (e.g. from incineration, anaerobic digestion, co-incineration)
  - Large point emitters from National Atmospheric Emissions Inventory which are expected to have large process heat demands.
  - Energy supply points (see Scotland Heat Map)
  - Process loads (e.g. supermarkets, bakeries, breweries, distilleries, laundries, paper and pulp sites)
  - Data centres (no data centres currently in Highland)
  - Electrical substations via SSEN Generation Availability dataset
- Renewable heat opportunities
  - Green spaces (see Highland Climate Change and Energy Map) categorised as any nearby green spaces that could support potential low carbon heat solutions.
  - Geological and hydrogeological sources (see Scotland Heat Map and British Geological Survey). Limited data exists on the potential for tapping into geothermal resource for energy production and associated heat. These geothermal resources include:
    - Hot dry rocks (HDR), present around the Inner Moray Firth coastal and inland area inclusive of Dornoch, Tain, Alness, Dingwall, Fortrose, Inverness and Nairn as well as much of Caithness inclusive of Thurso and Wick.
    - Hot wet rocks (HWR), present around the eastern Inner Moray Firth settlements and south to Loch Ness, including of Nairn, Ardersier, Inverness and Drumnadrochit, also an area around Brora.
  - Mine Workings - Mine Remediation Authority Map
  - Wastewater: For Highland, Inverness is the only area with wastewater heat extraction opportunities (see Highland Climate Change and Energy Map).
  - Rivers and waterbodies, which act as heat sources or sinks (Ordnance Survey map shows proximity of heat demand to a waterbody)

4.262 The formal designation of Heat Network Zones depends on the progress of the Heat in Buildings Bill through the Scottish Parliament and the associated resource implications for designation and management.

4.263 A number of developers have recently approached the Council expressing interest in developing heat networks in Inverness and the wider local area. Inverness is their priority, with a view to expand further depending on how things evolve. This growing interest aligns with Council's strategic objectives around decarbonisation, energy resilience and supporting the transition to low-carbon infrastructure. In response, the Council has been working closely with its legal advisors to explore and assess a range of potential delivery models that could help unlock and accelerate the deployment of heat networks across the region. This work includes identifying viable governance structures, risk-sharing mechanisms, and partnership opportunities that would support long-term, sustainable delivery. To better understand the level and nature of market interest, the Council is preparing to issue a Request for Information (RFI) to the market in September 2025. The purpose of the RFI is to gather insights from potential developers, investors, and other stakeholders on their appetite for involvement, preferred delivery approaches, and any perceived barriers or enablers to progressing heat network projects in the area. The feedback received through this process will help inform the Council's next steps, including the potential development of a formal procurement strategy or partnership framework.

Fuel Poverty

4.264 Fuel poverty is where a household is unable to afford to heat their home to a comfortable temperature. It is defined by the Scottish Government as any household spending more than 10% (20% for extreme fuel poverty) of their income on energy, after housing costs have been deducted. Fuel poverty can be caused by low income, high fuel prices, poor energy efficiency and unaffordable housing prices.

4.265 In Highland, the rural geography, lack of gas connections (see Highland Climate Change and Energy Map LENZA data story for extent of off-gas areas), and acute issues of housing availability and affordability (See **Chapter 9: Housing**) are factors that contribute to the likelihood of fuel poverty. Data has been received on Fuel Poverty and once disaggregated it will be added to the Highland Climate Change and Energy Map.

4.266 A Perfect Storm: Fuel Poverty in Rural Scotland highlights the overarching drivers of fuel poverty and a number of factors specific to rural areas, which impact fuel poverty rates:

- Cold and wet climates

- High cost of living
- The type and profile of employment and training available
- A shortage of affordable housing
- Ageing demographics
- Limited access to support services

4.267 Due to the rural nature of the Highlands, the overarching drivers of fuel poverty and the specific rural drivers compound in the region. This results in an overall fuel poverty rate of 47% in Highland (2022) which is significantly higher than the national average of 36% and the second highest rate of Scottish Local Authorities. These impacts are also visible in the figures for extreme fuel poverty, the average rate across Scotland is 18.5%, while the percentage of Highland households classed as extreme fuel poor is 29%.

4.268 An alternative indicator of fuel poverty is the Scottish Fuel Poverty Index score. Highland scored 0.65 based on the local authority area 'ability to pay' and 'demand' for fuel, the second highest fuel poverty score for a Scottish local authority.

4.269 The Council is committed to addressing fuel poverty through targeted, place-based retrofit programmes which improve the energy efficiency of homes and reduce household energy costs. These initiatives are strategically aligned with national climate, energy goals and specifically target fuel poor households. Multiple sources of external funding support delivery, including Energy Efficient Scotland Area Based Scheme, Energy Company Obligation, and SSE Renewables Funding. These funding streams enable the Council to take a coordinated, place-based approach to retrofit delivery, prioritising areas with high levels of fuel poverty and ensuring that interventions are tailored to local housing stock and community needs. This approach supports wider objectives around climate resilience, health and wellbeing and social equity.

4.270 The LHEES and NBHS are measures which respond to fuel poverty by tackling energy efficiency of buildings. LHEES are designed to identify areas with high fuel poverty, propose potential interventions to improve energy efficiency and decarbonise heat. In the context of the HLDP, a *spatial planning* mechanism to support fuel poverty reduction relates to the establishment of heat networks. That said, the LHEES is broader than this and the HLDP alone will not address all the drivers of fuel poverty. Mainly the larger scale heat network viability depends on high heat demand density, which is typically found in public buildings, commercial sites etc. Heat networks are one of the mechanisms to decarbonise heat, but are not a targeted fuel poverty solution especially in Highland due to the geography. For example, heat networks are not suitable for all areas, especially those with low-density domestic housing. Fuel poverty in such areas is

better addressed through fabric upgrades, individual low-carbon heating systems (like heat pumps), and targeted support.

Summary of Stakeholder Engagement

4.271 A full breakdown of all stakeholder engagement methods and exercises undertaken to support the Evidence Report is provided within the **Chapter 3: Statement of Engagement**. A summary of the representations made by Key Agencies and other stakeholders for the evidence contained within this chapter are presented below.

Stakeholders and Key Agencies

4.272 All meetings and engagement exercises with stakeholders and key agencies are detailed within the Log of Engagement **(THC001)**. Prior to the drafting of the HLDP Evidence Report an early engagement exercise HLDP Evidence Consultation was undertaken from 31st Jan – 2nd May 2025. Responses to the HLDP Evidence Consultation (including from key agencies) are included in **THC006**. Drafts of the evidence presented in this chapter were then circulated to key agencies, listed below, and a range of other stakeholders, not listed, on 28 August 2025:

- SEPA
- Scottish Water
- NatureScot
- Historic Environment Scotland
- Highlands and Islands Enterprise
- HITRANS
- NHS Highland
- Crofting Commission
- Transport Scotland
- Highland Adapts
- Wider Council Services: Climate Change and Energy Team, Development Management, Environment.

4.273 A summary of feedback received from key agencies and other stakeholders is as follows:

- **NatureScot (THC088):** Agree evidence in Chapter 4 will be sufficient on matters relevant to NatureScot. **Council Response:** Noted. Statement of agreement provided within **(THC088)**.
- **Network Rail (THC152):** Evidence on Scotland Railway's Climate Ready Plan provided. **Council Response:** Noted and included as evidence. Statement of agreement provided within **(THC152)**.
- **Homes for Scotland (THC090):** Provided various additional sources of evidence considered relevant. **Council Response:** Noted and references added, and SEPA document is specifically referred to in **Chapter 7: Flood**

Risk Management. Several documents already included in Chapter. At this stage no disputes were raised, provided the additional documents were considered as evidence **(THC090)**, which Council has done.

SEPA (THC089)	
Main views raised	Planning Advice Note for Planning Authorities – LDP Evidence Gathering: Water Scarcity has been published, which provides additional evidence sources. SEPA notes that climate change is a topic that impacts on other chapters, but are content that issues related to flood risk, for example, are covered in other chapters.
Council's response	Planning advice Note considered, and relevant sources added to **Chapter 4** and **Chapter 7**.
Outstanding issues	No outstanding issues.
Is agency content with the evidence?	Yes, statement of agreement provided within **(THC089)**.
Proposed plan implications	See Chapter 7.
Actions for proposed plan stage	No actions have arisen from these comments.

Historic Environment Scotland (THC035)	
Main views raised	Welcomes recognition of overlap between historic environment matters and climate change, and notes linkages within SNAP (2024-2029) with historic environment in Objectives C4 and C5.
Council's response	Reference to linkages between historic environment and SNAP strengthened within **Chapter 4**. Recognise overlap with climate change and historic assets.
Outstanding issues	No outstanding issues.
Is agency content with the evidence?	Yes, statement of agreement provided **(THC035)**.
Proposed plan implications	Have regard for SNAP 2024-2029

Actions for proposed plan stage	No actions have arisen from these comments.

Scottish Forestry (THC047)	
Main views raised	Add reference to the HFWS Seeks clarification of LULUCF emissions as emissions and removals from forests, cropland, grassland, peatland and settlements. Nationally sector emissions rose largely due to lower emissions sinks from forest land. Further meeting with Scottish Forestry **(THC047)** confirmed sufficiency.
Council's response	Reference to Strategy added, Figure 4:2 demonstrates the balance of LULUCF emissions and sinks. Add reference to the HFWS
Outstanding issues	No outstanding issues.
Is agency content with the evidence?	Yes, follow up teams meeting with Scottish Forestry **(THC047)** confirmed sufficiency.
Proposed plan implications	HLDP Spatial Strategy will identify the significant potential for natural opportunities for greenhouse gas sequestration and storage, such as with woodlands and peatland and will require to develop a policy framework that protects existing natural assets alongside supporting their expansion.
Actions for proposed plan stage	Quantify the potential for natural opportunities for greenhouse gas sequestration and storage, as part of update to Highland Forest and Woodland Strategy.

RSPB Scotland (THC039)	
Main views raised	Overall agreement that evidence base is sufficient. Matters that would benefit from additional information include reference to Scottish Biodiversity Delivery plan, The Flow Country Planning WHS Planning Position Statement 2, and development of spatial database including Habitat Management Plans as proposed in Onshore Wind Sector Deal.
Council's response	Noted, and references added. Agree to need to add references to further information.
Outstanding issues	No outstanding issues.
Is agency content with the evidence?	Yes, statement of agreement provided within **(THC039)**.

Proposed plan implications	No implications have arisen from these comments.
Actions for proposed plan stage	No actions have arisen from these comments.

ScottishPower Renewables (THC042)	
Main views raised	The feedback sought clarity on: the role and intent of the SSEP, the application of the Highland Energy Projects Mapping, the decommissioning of capacity in onshore wind capacity data reported, the applicability of the strategic spatial framework for renewables with NPF4 and future LDP and ambiguity of the phrase 'joined up spatial approach' to renewables planning mentioned. Support for the emphasis on the Inverness and Cromarty Firth Green Freeport, acknowledge the environmental impacts of energy development and the examples of the benefits also are available, and matters related to peatlands and peatland restoration.
Council's response	Matters noted, some clarifications made and additions to the chapter made where additional useful evidence has been identified. There are a number of matters raised that are for consideration at plan preparation stage. Full written response provided to ScottishPower Renewables **(THC040)** and see **Disputes with Stakeholders**.
Outstanding issues	• Council recognises the tension between the pursuit of different policy aims within the same area - and a need to prioritise those – and there is potential for some coexistence. There are examples of well-designed developments delivering, for example, both climate and nature benefits simultaneously. • ScottishPower Renewables states that "it would be beneficial to quantifiably understand the perceived pressure [to accommodate major and national energy infrastructure projects] mentioned". The Council is confident in its recognition of such pressure, based on the evidence already available and referred to within the Evidence Report, and has acknowledged that further analysis will help to further quantify and understand the pressure. • The Council maintains that the SSEP remains part of the evidence base for the HLDP. The Evidence Report has acknowledged that the SSEP will not make site specific recommendations and should not be interpreted in this way. • With respect to planning for onshore wind energy, the Council differs from Scottish Renewables in use of the term "constraints" – the Council uses it to refer not only to 'no-go areas' for onshore

	windfarms but also to other planning considerations which, through the consideration of potential impacts arising from proposed development, have the potential to influence siting, design and suitability of development proposals. Applying the Council's use of that the term, the considerations that were set out as Group 2 of the 'spatial framework' methodology (that was set out within Scottish Planning Policy 2014) remain considerations and therefore potential influences on development proposals, and hence to that extent at least such features for consideration are constraints • Council considers that policies in the LDP can include spatial policies, in the interests of good planning of development, in terms of both the identification and consideration of constraints and the identification of opportunities for energy developments.
Is agency content with the evidence?	No response provided following receipt of **THC040**.
Proposed plan implications for	No implications have arisen from these comments.
Actions for proposed plan stage	No actions have arisen from these comments.

Scottish Renewables (THC041)	
Main views raised	Feedback sought to strengthen reference to Scottish Government's Onshore Wind Policy Statement 2022, mention the benefits of increased wind speeds due to climate change for energy generation, seek support for projects that restore degraded peatland, clarity around the role of SSEP and the application of the Highland Energy Projects Mapping, clarity around decommissioning in onshore wind data reported and perception that data is a forecast, query on (additional) constraints that can be considered within the planning system and the status of strategic spatial framework for renewables with NPF4 and future LDP, support for the emphasis on the Inverness and Cromarty Firth Green Freeport, and highlighting that not the benefits of local energy projects (now included in the map) will not materialise if they are not consented and built. Feedback encourages Council to consider risk of imposing undue restriction on renewable energy and infrastructure projects when reviewing supplementary guidance, and to

	be aware of forthcoming BESS guidance. Query about the use of the phrase 'safeguarded constraints layers' to describe potential mapping of future national developments and the intent of the phrase.
Council's response	Matters noted, some clarifications made and additions to the chapter made where additional useful evidence has been identified. There are a number of matters raised that are for consideration at plan preparation stage. Full written response from Council provided to Scottish Renewables **(THC040)**, and email response from Scottish Renewables **(THC041)**. As such, see **Disputes with Stakeholders**.
Outstanding issues	• The Council disagrees with Scottish Renewables' opinion that UNESCO does not acknowledge setting as a consideration for natural OUV, and considers that statement to be based on a cultural heritage focussed context for setting. Rather, a UNESCO World Heritage focussed context for setting as a consideration is applicable to all World Heritage (cultural and natural) and needs to be defined for each WHS individually. The Nomination Draft Management Plan for The Flow Country WHS acknowledges that the site is not identified for natural beauty (under criterion vi, although that should read criterion vii). The setting study that will define setting for the purposes of The Flow Country WHS specifically. However, to be clear, this will be influenced by the criterion for which the WHS is inscribed, not by those for which it is not inscribed. The Council's position is that the provisions of Policy 7 part l) are appropriate to, and are to be applied to, 'natural' World Heritage Sites as well as 'cultural' ones. • Council recognises the tension between the pursuit of different policy aims within the same area - and a need to prioritise those – and there is potential for some coexistence. There are examples of well-designed developments delivering, for example, both climate and nature benefits simultaneously. • The Council maintains that the SSEP remains part of the evidence base for the HLDP. The Evidence Report has acknowledged that the SSEP will not make site specific recommendations and should not be interpreted in this way. • With respect to planning for onshore wind energy, the Council differs from Scottish Renewables in use of the term "constraints" – the Council uses it to refer not only to 'no-go areas' for onshore windfarms but also to other planning considerations which, through the consideration of potential impacts arising from proposed development, have the potential to influence siting, design and suitability of development proposals. Applying the Council's use of that the term, the considerations that were

	set out as Group 2 of the 'spatial framework' methodology (that was set out within Scottish Planning Policy 2014) remain considerations and therefore potential influences on development proposals, and hence to that extent at least such features for consideration are constraints • Council considers that policies in the LDP can include spatial policies, in the interests of good planning of development, in terms of both the identification and consideration of constraints and the identification of opportunities for energy developments.
Is agency content with the evidence?	No. A response **(THC041)** was provided to say that previous comments stand.
Proposed plan implications	No implications have arisen from these comments.
Actions for proposed plan stage	No actions have arisen from these comments.

SSEN Distribution (THC046)	
Main views raised	Reiterated strategic planning elements of SSEN-D work including DFES, SDP and Distribution Network Options Assessment (DNOA). Clarification of the voltage levels for transmission network, listed projects pertaining to SSEN-T, pumped hydro storage excluded from hydropower figures due to the fact that these projects connect at a transmission level. Suggest inclusion of SSEN-D Network Capacity maps in lieu of LENZA map. Updated publication timeframes for all pending SDP to September/October 2025, and noting that Errochty and Taynuilt SDP includes a small area within Highland. Additional feedback provided in April 2026, on SDP publication, DFES 2025 and Network Development Plan.
Council's response	Updates actioned as suggested. Sought clarity from SSEN-D on capacity mapping and it was confirmed that use of LENZA data story is suitable for Evidence Report.
Outstanding issues	No outstanding issues.
Is agency content with the evidence?	Yes, statement of agreement provided within **(THC046)**.

Proposed plan implications	No implications have arisen from these comments.
Actions for proposed plan stage	No actions have arisen from these comments.

SSEN Transmission (THC045)	
Main views raised	Provided clarification on several references to SSEN-D and SSEN-T, or unqualified references to 'SSE' and provided detail about how SSEN-T would approach including land use allocations for network development projects. Notes Climate Change Committee (CCC) Report Scotland's Carbon Budgets which provides evidence on the future carbon budgets and underpins the need for significant and rapid expansion to electricity networks, particularly the transmission components that SSEN-T are proactively working to deliver.
Council's response	Amendments made, and reference to CCC report included in several parts of **Chapter 4** including emissions reduction through energy development and nature-based measures.
Outstanding issues	No outstanding issues.
Is agency content with the evidence?	Yes, statement of agreement provided within **(THC045)**.
Proposed plan implications	No implications have arisen from these comments.
Actions for proposed plan stage	No actions have arisen from these comments.

Defence Infrastructure Organisation (THC043)	
Main views raised	Suggested minor changes to terminology in response, **THC043**.
Council's response	Noted.
Outstanding issues	No outstanding issues.
Is agency content	Yes, agreement on evidence implicit as all comments in **THC043** were resolved.

with the evidence?	
Proposed plan implications	No implications have arisen from these comments.
Actions for proposed plan stage	No actions have arisen from these comments.

Highland Adapts (THC044)	
Main views raised	Evidence presented in **Chapter 4** is considered largely sufficient in relation to climate change adaptation and resilience, noting Council's recognition of the forthcoming Highland Climate Change Risk and Opportunity Assessment (HCCROA) as a key piece of evidence base. Comments on further areas of clarification or update in **THC044**.
Council's response	Noted and agree. Clarifications and additions made as suggested, in **Chapter 4** and **Chapter 7**. Circular economy considerations related to adaptation are included in **Chapter 11: Infrastructure.** On publication of the HCCROA, a summary of key findings was included in **Chapter 4** and implications for the plan updated.
Outstanding issues	No outstanding issues.
Is agency content with the evidence?	Yes, conditional statement of agreement provided within **THC044**, and later full unconditional statement of agreement provided in **THC044**.
Proposed plan implications	HLDP will be informed by the Highland Climate Change Risk and Opportunity Assessment (HCCROA). The objective of the HCCROA is to prioritise the risks and opportunities from climate change to the Highland region's economy, society and environment from now until 2050/2080. The 50 risks and opportunities identified in this assessment, current and future level of risk, their urgency and priority for regional collaboration will inform the preparation of the Proposed Plan. HLDP especially will consider the connected systems of climate risk assessed by HCCROA, and the role of development planning in responding to risk areas, risks with high cascading potential, and systemic fragilities for climate adaptation and resilience, with particular regard for: • Nature-based and spatial planning solutions: Peatland restoration, riparian shading, and sustainable land-use can yield multiple resilience benefits. Spatial planning should also discourage development in erosion- and flood-prone areas.

	• Reinforcing Physical Infrastructure: Transport and building systems often appeared in escalation chains. Upgrades to bridge drainage, culverts, and damp remediation services—especially in remote areas—can prevent manageable hazards from escalating.
Actions for proposed plan stage	TBC

Highlands and Islands Enterprise (THC080)	
Main views raised	Comments on regional economic opportunities, labour market and infrastructure, request for statement of spatial need related to ICFGF, and spatial 'hooks' related to strategic energy planning provided.
Council's response	Noted, and responded to where relevant with the exception of several comments relate to **Chapter 8: Economy, Business, Tourism and Productive Places**, which are considered therein. Abnormal load routes are considered in **Chapter 10: Transport**.
Outstanding issues	No outstanding issues.
Is agency content with the evidence?	N/A
Proposed plan implications	No implications have arisen from these comments.
Actions for proposed plan stage	N/A

Summary of Local Place Plan Priorities

4.274 Ardgour Local Place Plan **(THC010)** has identified the following priorities relating to Climate Change and Energy:

- Opportunities to make a bigger contribution locally to climate change.
- Support community-led renewable power generation & micro-grid options.
- Promote improvements to existing properties to higher EPC ratings.
- Innovative rural housing. Smart clachans/cohousing rural housing clusters with shared heating, power, growing space, guest rooms etc
- Update heating to reduce running costs of Treslaig Village Hall.
- New homes should enhance local character, community & zero-carbon.

4.275 Black Isle Local Place Plan **(THC011)** has identified the following priorities relating to Climate Change and Energy:

- Aim for net zero, resilient & sustainable community, regenerate biodiversity.
- Upgrade homes on lower Council Tax bands to higher EPC ratings.
- Aim for Cromarty Firth region to become a global green energy hub and deliver transformational benefits to communities.
- Build up community assets to generate income & run services, i.e. re-use former churches in Cromarty/Munlochy and community energy generation.

4.276 Broadford and Strath Local Place Plan **(THC012)** has identified the following priorities relating to Climate Change and Energy:

- Prepare for sea levels rising and storm damage pressure of climate change.
- Peatland in area is carbon store, valuable role in climate change mitigation.
- Opportunities to develop a local workforce that could support home improvements and energy-saving retrofitting, which is much in demand.
- Investment in water and renewable energy community heating system.
- Manage pressure & balance between renewable energy developments with maximum community benefits and minimum negative impacts on landscape, environment, biodiversity and tourism industry.

4.277 Caol Local Place Plan **(THC024)** has identified the following priorities relating to Climate Change and Energy:

- Introduction of a community garden as part of climate action.
- Request for Hi-Bike stations in Riverside/Old School Court, if feasible, to facilitate active travel.
- Kerb side food waste collection, if feasible, and informed by assessment as to extent to which it would be likely to be used.
- Concerns around the frequency of bus service, as the service is reduced.

4.278 Dores and Essich Local Place Plan **(THC013)** has identified the following priorities relating to Climate Change and Energy:

- Opportunity for the energy companies operating in the area to collaborate to support a community and/or electric bus service for the area.

4.279 Duror and Kentallen Local Place Plan **(THC014)** has identified the following priorities relating to Climate Change and Energy:

- No direct comments, general recognition of need to develop with climate change in mind.

4.280 Croy and Tornagrain Local Place Plan **(THC026)** has not identified priorities relating to Climate Change and Energy however it has an overarching theme of wanting to shape change in a way that communities become more resilient.

4.281 Fort Augustus and Glenmoriston Local Place Plan **(THC022)** has identified the following priorities relating to Climate Change and Energy:

- Area of unrivalled natural heritage. Conservation of this heritage is vital for wellbeing, economy & identity and to tackle climate change.
- Upgrade EPC ratings on homes on lower Council tax bands with grants/low-interest loans & streamlined consents, so more climate friendly & cheaper.
- Tackle visitor situation in Fort Augustus, joint effort from Scottish Canals, Transport Scotland, THC & more to enable delivery of sustainable transport, climate change, road safety & community wealth building agendas.
- Encourage renewable power development to include measures to conserve wildlife, regenerate woodland, enhance biodiversity & countryside access.
- Landowners & renewables companies ceasing to lock gates in deer fences on hill tracks, preventing pedestrians exercising their legal right of access.

4.282 Gairloch Local Place Plan **(THC015)** has identified the following priorities relating to Climate Change and Energy:

- Reduce carbon footprint through the development of active travel routes and improved public transport

4.283 Garve and District Local Place Plan **(THC016)** has identified the following priorities relating to Climate Change and Energy:

- Community renewable energy for climate change & income generating.
- No further commercial wind farms.
- Well-insulated, energy efficient buildings and homes.
- Improved resilience from climate change, due to current reliance on private water supplies and need to mitigate flood risk.

4.284 Glen Urquhart Local Place Plan **(THC029)** has identified the following priorities relating to Climate Change and Energy:

- Concerns regarding disparity in housing quality, energy efficiency and affordability.
- Energy opportunities at the community level identified in the existing Local Energy Plan that was prepared for the area.
- Community benefits from renewable energy schemes.

4.285 Golspie Local Place Plan **(THC021)** has identified the following priorities relating to Climate Change and Energy:

- Explore tidal energy scheme in Golspie coastal change adaptation plan.
- Explore opportunity for pumped hydro: loch to north big burn/big burn.
- Develop opportunity for community owned power generation, reduce Golspie's carbon footprint and improve energy security.
- Home energy improvements for housing between Main St and Back Road.

- Community shares a will to deal with reality of coastal flooding through initiatives that maximise opportunities & minimise climate change risks.
- 'Greening the grey' hard flood defences.

4.286 Kinlochleven Local Place Plan **(THC017)** has identified the following priorities relating to Climate Change and Energy:

- Install community energy scheme.
- Provide advice and grants related to energy/heat grant schemes to enable upgrading to higher EPC ratings.
- Restore and enhance natural habitats & create community growing spaces.

4.287 Kyle of Sutherland Local Place Plan **(THC028)** has identified the following priorities relating to Climate Change and Energy:

- Incorporated the Community Action Plan's priority for Environmental – Climate Conscious Communities, actions to sustain and nurture the area's landscape, heritage and climate contributions for locals, visitors and nature itself.
- Climate change awareness – the communities are conscious that climate change is affecting the locality through coastal and fluvial flooding; This is particularly noticeable in the areas between Bonar Bridge and Ardgay and around Invershin and Rosehall, and areas affected by potential flooding risk becoming undevelopable which brings economic challenges.
- Despite the area's contribution to the national energy demand, fuel tariffs in the area are higher than elsewhere in the country, exacerbating fuel poverty.
- Concerns about the cumulative impact of energy developments on the environment and safety of rural communities, and calls for changes to planning in order to improve consideration of these issues.

4.288 Lochalsh Local Place Plan **(THC018)** has identified the following priorities relating to Climate Change and Energy:

- Recognise climate change will be major challenge for Lochalsh communities in medium to long term. Priorities include active travel routes, affordable, energy efficient homes, enhancing & retaining community facilities.

4.289 Morvern Local Place Plan **(THC028)** has identified the following priorities relating to Climate Change and Energy:

- Potential Killundine and Community Wind.
- Want to adapt to flooding increase. Options include Wetlands, bioswales, SuDS, green roofs, permeable pavements; and rain gardens.
- Protect road network from future climate change.
- Adapt housing to climate change, maximise energy efficiency. Support the building of new carbon neutral affordable housing.

- Want to ensure renewable energy development on the peninsula, by the community or commercial, emerges in consultation with community & need to balance aims for biodiversity, net zero & community benefit.
- Aim for Morvern to be a model carbon negative community by 2031.
- Opportunities being explored for renewable energy generation: hydroelectricity, wind energy & solar energy & potential battery storage.

4.290 Nairnshire Local Place Plan **(THC023)** has identified the following priorities relating to Climate Change and Energy:

- Promoting sustainability, resilience, and environmental stewardship.
- New development to improve flood map position, using protect, mitigate, adapt system approach. Assess green spaces for suitability for protection from flood risk, or use as river flood water attenuation.
- Support should be given to community-led energy generation schemes. All new and regenerated developments to include renewables.
- Support applications for community district heating schemes associated with community energy developments, redevelopment of public assets.
- Scope to modernise swimming pool using renewables
- New development must improve nature & biodiversity.
- Loch Flemington & water catchment area enhancement as part of system approach to water & flooding. This should perform important function in natural habitat, biodiversity, catchment scale mitigation.

4.291 Sleat Local Place Plan **(THC025)** has identified the following priorities relating to Climate Change and Energy:

- Community carbon reduction strategy.
- Local food growing programme.
- Energy efficiency improvement scheme.
- Climate adaptation planning.
- Environmental education programme.
- Using community-led renewable energy projects to benefit the whole of Sleat.
- Energy systems.
- Community-wide energy audit.
- Feasibility study for hydro scheme expansion.
- Establishment of energy advice service.
- Advocacy for fair rural energy tariffs.
- Portfolio of community-led renewable projects.
- Local smart grid management systems for resilient power infrastructure.
- Resilient backup systems for critical infrastructure.

4.292 Stratherrick and Foyers Local Place Plan **(THC019)** has identified the following priorities relating to Climate Change and Energy:

- Zero-carbon homes for all: easier home upgraded, adapted or extended.
- Potential community hydro on River Farigaig.

4.293 Torridon and Kinlochewe Local Place Plan **(THC020)** has identified the following priorities relating to Climate Change and Energy:

- New renewable schemes should consider appropriate community benefit.
- Balgy Gap needs mains electricity connection.
- Flood risk prevention through natural flood risk management & adaptation needed along whole coastline of Local Plan area.
- Climate change impacts needs to be considered in future developments actions may be required to reduce impact on existing settlements. Already roads in the area are covered by the sea during particularly high tides, heavy rains and storm surges e.g. in Inveralligin, Fasaig and Diabaig.

Summary of Implications for the Proposed Plan

Climate Mitigation and Adaptation

4.294 The Council's existing HwLDP **(THC002)** is of considerable age and precedes much of our current evidence base on climate emissions, impacts and vulnerability. It also precedes the current policy context whereby climate adaptation and reduced emissions are embedded within NPF4 and a wide array of national and regional policies. The most recent Area LDP prepared by Highland Council, IMFLDP2 **(THC003)**, considers climate change impacts by targeting growth at locations that are the most economically viable and environmentally sustainable. Areas are classified by their likely future sustainability and viability as part of the plan's spatial strategy. It recognises the role of planning in delivering effective climate action – regulating how our built environment is designed and, that the decisions we make today will be with us for decades to come. HLDP will require to review and remain abreast of the most recent position, and support this across the whole of the Council area.

4.295 Alongside preparation of HLDP, a Strategic Environmental Assessment (SEA) will be undertaken which shall consider how the new LDP might affect the environment, so that likely negative impacts on the environment can be minimised, where any such effect(s) are considered likely to be significant, and positive impacts on the environment strengthened. The SEA will therefore help the Council to identify and compare the environmental impacts of different options when preparing the HLDP, and to reach a decision as to which options would achieve the most amenable (best) outcomes for the environment based on a thorough consideration of reasonable alternatives. Decisions made on the contents of the HLDP will therefore be made in the light of understanding of environmental effects. The SEA will also help the Council to consider viable mitigation measures to lessen or avoid the negative environmental impacts of the

new HLDP. The Highland SEA Scoping Report is being prepared in parallel to this Evidence Report and will inform the SEA and hence also the Proposed Plan.

4.296 Core principles to influence development planning for climate mitigation and adaptation set out in NPF4 Planning Guidance: Policy 2 - Climate Mitigation and Adaptation will be considered in the preparation of the HLDP.

4.297 HLDP will consider how to develop proportional and flexible whole of life carbon guidance (guided by NPF4 Planning Guidance: Policy 2 - Climate Mitigation and Adaptation) to support the development management process to determine planning applications against NPF4 Policy 2, which requires that "development proposals will be sited and designed to minimise lifecycle greenhouse gas emissions as far as possible".

4.298 HLDP will be informed by the Highland Climate Change Adaptation Strategy **(THC059).** The Proposed Plan will have regard for the key areas set out in the Climate Change Adaptation Strategy where adaptation will be targeted to protect communities, assets, services and the environment. If timeously available, the Council's Adaptation Action Plan (informed by the Strategy) will also be taken into consideration in the preparation of the Proposed Plan.

4.299 HLDP will be informed by the Highland Climate Change Risk and Opportunity Assessment (HCCROA). The objective of the HCCROA is to prioritise the risks and opportunities from climate change to the Highland region's economy, society and environment from now until 2050/2080. The 50 risks and opportunities identified in this assessment, current and future level of risk, their urgency and priority for regional collaboration will inform the preparation of the Proposed Plan. HLDP especially will consider the connected systems of climate risk assessed by HCCROA, and the role of development planning in responding to risk areas, risks with high cascading potential, and systemic fragilities for climate adaptation and resilience, with particular regard for:

- Nature-based and spatial planning solutions: Peatland restoration, riparian shading, and sustainable land-use can yield multiple resilience benefits. Spatial planning should also discourage development in erosion- and flood-prone areas.
- Reinforcing Physical Infrastructure: Transport and building systems often appeared in escalation chains. Upgrades to bridge drainage, culverts, and damp remediation services—especially in remote areas—can prevent manageable hazards from escalating.

4.300 HLDP will consider how to embed the Local Climate Adaptation Tool insights which provides insight on which adaptations to consider. For Highland, 196 climate adaptations are suggested, based on the local climate hazard risks (extreme storms, coastal security, flooding and drought, food and personal

security, marine health and hazards and temperature) which will be taken into consideration for the preparation of the Proposed Plan.

4.301 HLDP will have consideration for the 29 high-risk locations identified within the Regional CCAP **(THC053)** as discussed in **Chapter 6: Coastal Development and Aquaculture** and additionally be informed by the potential development of any Local Coastal Change Adaptation Plans prepared in response to these 29 high-risk locations.

4.302 To deliver a just approach to managing climate related risks, the outcomes for the most vulnerable need to be understood and well managed through the Proposed Plan. The process of identifying, and, if necessary, addressing the disproportionate risk faced by the most vulnerable is therefore a central component of a just approach to climate adaptation and Evidence regarding societal variations in climate vulnerability will inform the development of HLDP policies which are fair, meeting the needs of different groups and delivering multiple benefits for health, wellbeing, equity and employment. A key consideration for Highland is the just transition for the energy sector.

4.303 The HLDP will consider how to manage and mitigate local impacts of flooding and coastal erosion as part of the Coastal Change Adaptation Plan and Local Flood Risk Management Plan, and to consider the application of nature-based solutions (NBS) to help tackle local flooding, coastal erosion, as well as improving active travel options and access to green spaces, and to protect, restore and enhance the natural assets, including soils and landscape interests in a way which reduces carbon emissions (e.g. as a carbon sink or store).

4.304 HLDPs will consider how to provide for the development of places (including new development) that address water scarcity – a current and future climate risk within the global climate emergency and nature crisis - and are designed in a way so that they are climate resilient. LDPs are expected to promote and facilitate the development of a range of renewable energy developments, and these should be informed by water scarcity. In particular, certain technologies which may require water abstraction, or have an impact on the water environment.

4.305 The HLDP Spatial Strategy will identify the significant potential for natural opportunities for greenhouse gas sequestration and storage, such as with woodlands and peatland, and will require to develop a policy framework that protects existing natural assets alongside supporting their expansion.

Energy

4.306 As a national development there is a strong presumption in favour of energy development to meet national need established, and as defined, within NPF4. The Proposed Plan will consider current and proposed renewable energy projects

along with future development proposals associated with the ICFGF and other ports and harbours, including consideration of protected areas, design and mitigation (using the mitigation hierarchy) at the very start of the planning stage for developments and infrastructure requirements associated with the ICFGF.

4.307 The Proposed Plan will be cognisant of the ICFGF project, and renewable energy infrastructure requirements including onshore and offshore wind projects that have particular effects on landscapes / seascapes, protected areas, transport infrastructure and a wide range of environmental receptors. There may also be a need to update the citations for Highland's regionally important Special Landscape Areas, reflecting changes that have occurred to the baseline primarily due to built and consented renewable energy projects, as well as to have cognisance of the emerging pattern and scale of modern onshore energy infrastructure.

4.308 In addition to environmental constraints to energy development (e.g. SSSIs, NSAs) the Proposed Plan will have consideration for other potential constraints, such as on amenity, with regard to the proximity of settlements and any proposed new residential areas to future proposals and applications for hubs, substations, Battery Energy Storage Systems (BESS) and related ancillary works. The national BESS guidance will be considered in the preparation of HLDP.

4.309 For the Proposed Plan, a LENZA model of energy network impacts from planned development could be developed to inform SSEN about network demand and infrastructure requirements to support potential or allocated development sites, or promoted study areas, in addition to the data provided for DFES 2025 and future annual DFES submissions.

4.310 There is also a need for the HLDP to help inform the public, agencies and stakeholders about planned and consented renewable energy and associated grid infrastructure proposals, through spatial mapping to explain how and where Highland will experience change. There is scope for nationally important infrastructure projects to be mapped through allocations or safeguarded 'constraints layers to help inform future development and land management decisions. By this we mean (for example) there could be scope:

- to consider allocating in the LDP a site for a new substation that is within the scope of NPF4's National Development 3 (Strategic Renewable Electricity Generation and Transmission Infrastructure), where it is not yet built but a site suitable in principle has been or can be identified; or
- to consider identifying the site for such a development proposal as a potential constraint upon proposals for other types of development (e.g. housing), by marking it as such within the planning authority's 'constraints maps' so that the potential for a conflict of uses is flagged early for

consideration when the proposals for the other developments are submitted to the planning authority.

4.311 While the Highland Council Wind Turbine Mapping and Highland Energy Project Mapping offer a baseline of what has occurred until now, it is evident that this scale of change was unforeseen within HwLDP, which at that time could not have anticipated the level of expansion of the sector. HLDP will be expected to demonstrate awareness of what is planned and required for energy infrastructure within its lifespan, encompassing not only the generation proposals but the transmission grid projects required to transport renewable energy around the UK, and consider this along with other outcomes sought for Highland as part of the spatial strategy.

4.312 The Proposed Plan will be informed by any amended priority or more information provided by NESO for 'Clean Power 2030' projects, to support the national energy decarbonisation target. Also, the Strategic Spatial Energy Plan (SSEP) for Great Britain and the CSNP, when they are published and if timeously available, will be taken into consideration in preparing the Proposed Plan.

4.313 The Proposed Plan will be informed by any strategic planning direction and network analysis provided by SGN. The Council will share indicative site allocations timeously with SGN to support their analysis to determine the implications of future gas demand (including indicative sequencing of anticipated development), to ensure security of supply across all pressure tiers for the Proposed Plan.

4.314 The Proposed Plan will have consideration for future green data centre development in Highland, including a definition of 'green data centres', and clarifying how 'green data centre' proposals relate to NPF4 policies 11, 18, 19, 24 and 25, and the NPF4 definition of 'essential infrastructure'.

4.315 If timeously available, preparation of the Proposed Plan will be informed by the Highland Hydrogen Strategy.

4.316 HLDP will consider whether to define explicit parameters for development *associated* with essential infrastructure that relates to energy development and grid capacity upgrades. The Council has considered planning applications for several developments that seek to interpret the definition of essential infrastructure as defined in NPF4, as extending to ancillary development, such as temporary workers' accommodation and subsequent temporary workers' amenities (e.g. cafés). The remote rural locations of such proposals has in some instances resulted in such developments being sought owing to the lack of suitable housing options and existing amenities. Interpreting associated developments such as temporary workers accommodation as being *essential infrastructure* affords a more generous policy support from NPF4 in instances of prime agricultural land, peatland and high carbon soils, and flood risk. The

Council considers that conclusive parameters as what constitutes essential infrastructure on such ancillary may be beneficial within HLDP.

Heat and Cooling

4.317 HLDP will be informed by the LHEES and the spatial strategy will take into account any areas of potential, or designated, Heat Network Zones, which will be of significance for site-selection. This will help inform the potential for co-locating developments with a high heat demand together with or alongside sources of heat supply.

4.318 HLDP will be informed by spatial concentrations of higher prevalence of fuel poverty, and will require to develop a spatial strategy that facilitates development that can be served as far as possible by efficient systems for heat and power, served by renewable sources or capable of being readily changed to renewable sources at a future date.

Statements of Agreement / Dispute

Agreement on Evidence

4.319 Agencies who responded and agreed with the evidence and content presented included:

- SEPA, NatureScot, RSPB Scotland, Highland Adapts, Historic Environment Scotland, SSEN Transmission, SSEN Distribution, Network Rail, Homes for Scotland, Defence Infrastructure Organisation.

Disputes with Stakeholders

4.320 Council prepared a response **(THC040)** to consultation feedback from Scottish Renewables **(THC041)** and ScottishPower Renewables **(THC042)** which outlines the areas of dispute and Councils response to each point raised. Scottish Renewables have responded to this to state that their comments still stand **(THC041)**. ScottishPower Renewables have not made any response to Council's prepared response on their initial feedback. Council's response **(THC040)** outlines the points of difference and disputes that remain with these two stakeholders, which are summarised in **Summary of Stakeholder Engagement** section above.

Information Gaps

4.321 It is considered that community-led Local Place Plans would be informative evidence sources of relevance to this section of the Evidence Report, and several are understood to remain in production at the time of writing. To 30 April 2026,

20 communities in Highland have formally registered Local Place Plans. Any Local Place Plans registered will be considered in the preparation of the LDP if timeously available.

4.322 The summary of evidence section of this chapter presented a wide range of detailed evidence relating to climate and energy matters in Highland. There are, however, some data gaps, these are listed below:

- Area-based emissions: The most up to date 2024-2025 Highland Council Emissions report with data from the Climate Intelligence Service was not available at the time of writing this Evidence Report and so the previous years' report (2023-2024) was used as evidence along with the UK Local Authority and Regional GHG Emissions Statistics for the Highlands published 3 July 2025 for the 2023 calendar year. If timeously available, updated SCIS area-based emissions will be incorporated into the Evidence Report which may require further analysis and disaggregation of data.
- The Highland Climate Adaptation Strategy and Action Plan was not published at the time of writing.
- The fourth Climate Change Risk Assessment (CCRA4) Evidence Report: Scotland summary report is currently being prepared and is expected to be available in 2026. For this Evidence Report CCRA3 was used.
- To understand landslide potential, the BGS GeoSure 5km HEX grid data set was used. The Council are aware of higher resolution data that we could potentially source, if funding is available to inform the proposed plan.
- To support future-proofed plans and strategic decision making *SNAP3 (Scottish National Adaptation Plan 2024-29)* made a commitment to develop a practical 'climate scenario decision tool' for operational use by public bodies. This tool was not available at the time of writing this Evidence Report.
- Offshore wind data for Highland appears to be under-reported in Regional Renewable Statistics, and seems to be reported in other local authority statistics (e.g. Moray) where the onshore connection is made. Council's development management data is used to report on generation capacity, except where data is incomplete or poor quality in which case Regional Renewable Statistics are presented as evidence.
- The Council have identified that a stronger evidence base on the potential for Carbon Capture technologies in Highland and the associated planning implications would benefit HLDP preparation and will continue to engage with stakeholders on developments on these aspects.
- Baseline assessments of lifecycle emissions relevant to types of development occurring in Highland have not been completed as of yet. This

is considered a present data limitation for future development of carbon guidance and the HLDP response to NPF4 Policy 2a).

- ScottishPower Renewables referred to the RenewableUK EnergyPulse database as a potential source of evidence on the renewables energy sector. After initial inquiries, it was unclear what information the database could provide (or in what format, to support further analysis), in addition full access to data requires a paid membership. A paid membership could be secured, if this data is deemed important to be considered in the proposed plan, however at present the data presented in the Evidence Report is considered sufficient.
- Highland Council Climate Change & Energy Team continue to evaluate opportunities for the development of heat networks. Feasibility studies underway or completed but unpublished at the time of writing this Chapter will be considered in the preparation of the Proposed Plan, if published.

4.323 Any updated plans or data will be considered in the production of HLDP if timeously available.