

Background Paper - Renewable Energy Infrastructure

Issue No 010

Context: Climate Change (Scotland) Act 2009 NPF Spatial Strategy, NPF 4 Policy 1, 2, 5, 6, 9, 10, 11, 12, 14, 15, 19, 20, 22, 23, 33

This section is the principal section covering production of renewable energy and production and transmission of heat. Electricity Infrastructure is also covered in the Spatial Strategy section.

LINKS TO EVIDENCE

	<p>Policy 11: Energy</p> <p>Overall Policy</p>
ELC 334	<p>UK Government Energy Security Plan “Powering Up Britain” https://assets.publishing.service.gov.uk/media/642708eafbe620000f17daa2/powering-up-britain-energy-security-plan.pdf (March 2023) This Plan sets out the steps the Government is taking to ensure the UK is more energy independent, secure and resilient.</p>
ELC 335	<p>Scottish Government draft Energy Strategy and Just Transition Plan https://www.gov.scot/publications/draft-energy-strategy-transition-plan/ (10 January 2023)</p>
ELC 336	<p>Mapping: Renewable Energy Installations Location of renewable energy installations (1MW and over consented prior to 2021, 150kW and over since)(mapping) https://spice-spotlight.scot/2024/03/11/renewable-energy-map-of-scotland/</p>
ELC 337	<p>Scottish Energy Statistics https://www.gov.scot/collections/quarterly-energy-statistics-scotland/</p>
	<p>Transmission and Distribution</p>
ELC 329	<p>National Grid ESO’s interactive map - overview of largescale transmission reinforcement planned over the next 10 – 15 years. This map is illustrative and does not represent specific cable routes . https://www.nationalgrideso.com/future-energy/pathway-2030-holistic-network-design/holistic-network-design-offshore-wind/our-interactive-map</p>

ELC 331	Scottish Power Energy Transmission https://www.spenergynetworks.co.uk/pages/investment_scotland.aspx
ELC 332	Scottish Power Energy Distribution Network Development Plan https://www.spenergynetworks.co.uk/pages/network_development_plan.aspx
ELC 333	Scottish Power Energy Distribution 'Heatmaps' https://www.spenergynetworks.co.uk/pages/network_development_plan.aspx#tablist1-tab1 This mapping shows where there are constraints to connection and where there may be opportunities to connect.
	Nuclear
ELC 299a	Scottish nuclear energy policy – https://www.gov.scot/policies/nuclear-energy/ Scottish Government, accessed 21 November 2023
ELC 299b	Environmental Impacts of Torness: EDF leaflet https://www.edfenergy.com/sites/default/files/torness_guide_to_environmental_impact.pdf
	Wind
ELC 295	Onshore Wind Sector Deal - https://www.gov.scot/publications/onshore-wind-sector-deal-scotland/documents/ (21 September 2023). This document sets out commitments from the Scottish Government and the onshore wind industry to deliver on their collective ambition of 20GW of onshore wind in Scotland by 2030 whilst delivering maximum benefit to Scotland.
ELC 296	Onshore Wind Policy Statement
ELC 297	Wind turbine applications in East Lothian – GIS layer Landscape Capacity Study for Wind turbines in East Lothian - https://www.eastlothian.gov.uk/downloads/file/24470/landscape_capacity_study_for_wind_turbines_in_east_lothian
ELC 298	Supplementary Landscape Capacity Study for Smaller Wind Turbines
	Hydrogen
ELC 330	Deep Decarbonisation Pathways for Scottish Industries: A study for the Scottish Government (2020) https://www.gov.scot/binaries/content/documents/govscot/publications/research-and-analysis/2020/12/deep-decarbonisation-pathways-scottish-industries/documents/deep-decarbonisation-pathways-scottish-industries-study-scottish-government-final-report/deep-decarbonisation-pathways-scottish-industries-study-scottish-government-final-report/govscot%3Adocument/deep-decarbonisation-pathways-scottish-industries-study-scottish-government-final-report.pdf
ELC 294	Hydrogen Action Plan (2022) - https://www.gov.scot/publications/hydrogen-action-plan/ <ul style="list-style-type: none">- Battery energy storage: there is currently a 'pinch point' in the electricity grid between Scotland and England. This is resulting in applications for battery energy storage so that electricity generated in the north from windfarms there can wait for a chance to cross the border (and vice versa).

	Offshore
ELC 289	National Marine Plan 1 (current) - https://www.gov.scot/publications/scotlands-national-marine-plan/ and 2 (forthcoming)
ELC 290	UK Government Offshore Wind Sector Deal https://www.gov.uk/government/publications/offshore-wind-sector-deal/offshore-wind-sector-deal
ELC 291	Sectoral Marine Plan for offshore wind energy https://www.gov.scot/publications/sectoral-marine-plan-offshore-wind-energy/
ELC 292	Marine Scotland spatial information on off-shore renewables and transmission infrastructure - https://marine.gov.scot/
ELC 293	Offshore Wind Scotland website https://www.offshorewindscotland.org.uk/
	Policy 19 Heating and Cooling
	East Lothian's Local Heat and Energy Strategy and Action Plan (forthcoming)
ELC 338	Scottish Heat Map - https://heatmap.data.gov.scot/custom/heatmap/
ELC 339	Non-Gas Map - https://www.nongasmap.org.uk/
ELC 340	Scottish EPC Register - https://www.scottishepcregister.org.uk/
ELC 341	Permitted Development Rights reviews phase 3 consultation – Scottish Government
ELC 342	Proposed Domestic Building Environmental Standards (Scotland) Bill
ELC 343	written-statement-from-patrick-harvie-under-rule-91413.pdf (parliament.scot)
ELC 345	Proposed Domestic Building Environmental Standards (Scotland) Bill OfficialReport (parliament.scot)
ELC 345	East Lothian Tree and Woodland Strategy Agendas, reports and minutes East Lothian Council
ELC 346	

SUMMARY OF EVIDENCE

- 1.1 NPF4 has a more permissive policy towards renewables with areas of search being abandoned. Scottish Ministers targets for renewable energy generation will continue to support further development of these technologies in the right locations. It will be necessary for the next stage of the LDP to investigate whether National Planning Framework 4 policy is sufficient to manage these developments.
- 1.2 The current LDP contains policies that support wind energy but direct them to the most appropriate locations through the use of areas of search. These policies and guidance have been challenged through numerous appeals and proved to be a reliable assessment of the impact of wind turbines on the environment.
- 1.3 East Lothian has become the focus of connections to offshore projects and associate battery storage or convertor stations. The approval of the eastern link down to England will retain the focus on this area.
- 1.4 To help address the Climate Emergency the Council, through the LDP, will need to investigate opportunities to bring in strategy and policy that supports renewable technologies but sets a limit beyond which the character of

the area will begin to be eroded. This will cover large scale proposals and actions in individual houses such as energy efficiency, solar panels and heat pumps.

SUMMARY OF STAKEHOLDER CONSULTATION

- 1.5 Response to public consultation showed concern to address climate change, including among children and young people. Renewable energy and heat is an important part of this. Specific comments in support of different types of renewable energy were made, including a comment that encouraging renewable energy should be a focus of the LDP.
- 1.6 Another considered that self-sufficiency in energy was a key challenge. Supportive comments were made for both on- and off-shore wind turbines, and about increasing the use of solar panels. However, some respondents had concerns about the visual impact of wind turbines. There was also support for use of renewable energy solutions to increase the energy performance of existing buildings. Calls were also made for an increasing stake for the community in renewable energy projects.
- 1.7 There was also concern for the aspects of the environment that could be impacted by renewable energy development, including the landscape, dark skies, natural places and biodiversity. Protection of nature and green space was a strong theme of consultation.
- 1.8 Few comments overall were made on renewable heat. Partnership working with Midlothian around heat capture from the waste plant at Millerhill was mentioned. Heat pumps were also mentioned as a means of addressing the climate emergency. The link between poor insulation, inefficient heating and fuel poverty was raised. One response called for a firm set of guidelines in terms of what is acceptable in terms of heat pumps (and solar panels) in Conservation Areas.
- 1.9 A number of suggestions were made on how to increase energy performance in buildings. These included policy, development management, buildings level and layout solutions. Many housebuilders commented that this is a matter for Building Standards.

WHAT THIS MEANS FOR THE PROPOSED PLAN? WHAT ARE THE KEY ISSUES FOR THE LDP TO ADDRESS, FROM POLICY ANALYSIS?

Nuclear

1.10 It is likely that the operation and decommissioning of this power station will extend beyond the end of this plan period. The operators of Torness Power Station are consulted over applications within 3km of the facility for health and safety reasons. This will continue and may constrain proposals in the surrounding area.

Wind

1.11 The current LDP identified limited areas of search for wind turbines, and gave guidance on height for smaller wind turbine development. NPF4 no longer includes areas of search, and contains policy which is more supportive of wind turbine development than was previously the case, recognising the urgency of transition to net zero. In terms of landscape, the policy notes that impacts that are localised should be considered acceptable. There are currently a considerable number of energy related projects proposed within East Lothian, and these are causing significant local

interest and concern. There is a need for a study to be undertaken to ascertain the impact of energy development on the landscape and character of East Lothian, to examine where impacts are likely to be more than localised, and where cumulative limits have been reached.

Battery energy storage

1.12 There has been an upswing in interest in this technology, and the LDP will need to address the impacts of these often-large developments. There is a need to consider battery storage as part of the wider study on the impact of energy development.

Domestic renewables

1.13 There will remain a statutory requirement to include an increasing amount of Low and Zero Carbon Technology in new housing development over a certain size, over and above building standards. The level that this should be set at will have to be considered.

1.14 The need to decarbonise the energy use of homes and other premises includes those in Conservation Areas, and Listed Buildings. The LDP should consider the correct balance to be struck between the need to preserve these historic assets and to allow for energy efficiency and decarbonised heating/electricity supply measures. A review of article 4s in conservation areas will take place along side the Proposed Plan to ensure that appropriate protection is in place for the character of these areas.

1.15 Public engagement suggests support for increasing energy efficiency in developments through planning policy, while comments from developers argue that this should be left to building standards.

Heat and cooling

1.16 The LDP will need to ensure that the spatial requirements of the forthcoming LHEES are reflected in the LDP.

1.17 The forthcoming Tree and Woodland Strategy contains targets for tree canopy coverage in settlement. The LDP should consider how this can be supported to help regulate urban temperatures and reduce heating and cooling needs within buildings.

Battery energy storage

1.18 Battery Storage is a relatively new phenomenon at the scale currently being experienced in East Lothian. While their purpose is to be welcomed it is important, as with all development types, that they do not result in undesirable individual or cumulative impacts. The LDP will need to investigate the possibilities of producing spatial guidance for battery storage developments and other energy related projects such as battery storage, hydrogen, wind turbines, infrastructure to support these including underground cabling, substations and converter stations.

AREAS WHERE THERE IS AGREEMENT OR DISPUTE ON ISSUES AND POSSIBLE APPROACHES.

1.19 East Lothian Council considers there is or may be scope to improve the energy efficiency of new buildings through choice of location, layout, house types and encouragement of particular low and zero carbon technology. Section 72 of the Climate Change (Scotland) Act 2009 requires planning authorities to include policy in the Local Development Plan

to ensure a rising proportion of the carbon reduction savings required by Building Standards is met through the installation and operation of low and zero carbon technologies.

1.20 Responses from the public and other stakeholders suggest that this approach is generally supported and not a point of dispute. However, many housing developers have submitted responses arguing that this matter is covered by building standards and policy within NPF4, and therefore should not be included in the LDP. This is a matter of policy approach and not a dispute on the evidence, therefore not an issue for consideration at this stage of the LDP.

EVIDENCE

NPF4 Policy 11 Energy

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.

Transmission and Distribution

The electricity transmission and distribution system allows power to be moved from where it is generated to where it is used. Some renewable energy generation is used on site, however where this is not possible a grid connection is needed. Smaller proposals will connect to the distribution grid (<132kV) run by Scottish Power Energy Networks (SPEN). Larger proposals may be able to connect to the transmission system, run by Scottish Power Transmission (132kV or over).



Figure 1 Transmission network route maps¹

Scottish Power Energy Networks note that what their customers value is reliability, safety, cost-efficiency and being able to consume when they want. Their Network Development Plan outlines the challenge is continuing to deliver this. The energy landscape is fast changing. The key drivers are:

- Decarbonisation: moving to net zero means electrification of much of our transport and heating of buildings
- Decentralisation: more generation is connected to the distribution (rather than transmission)

¹ Extract from National Grid website <https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/network-route-maps> accessed 18/03/2024

- Democratisation: the rise of the active consumer, with smart meters, smart domestic appliances and batteries, and storage of electricity in electric vehicle battery storage, which can have a role in network and system services

SPEN have modelled where intervention is needed to increase capacity, based on different scenarios, and checked against compliance with Net Zero goals. Without change, customer demand and generation growth will overwhelm network capacity.

The following map shows the level of constraints that SPEN consider apply to those seeking to connect generation capacity to their network. This should be read in conjunction with the key to the categories following the map. This shows that there are constraints to connection across East Lothian. Alternative connection offers can be made at distribution level, however, so there may still be some means of export electricity from new proposals (this should be discussed with SPEN). Upgrades to the distribution network would ideally be needed to connect a significant amount of new capacity.

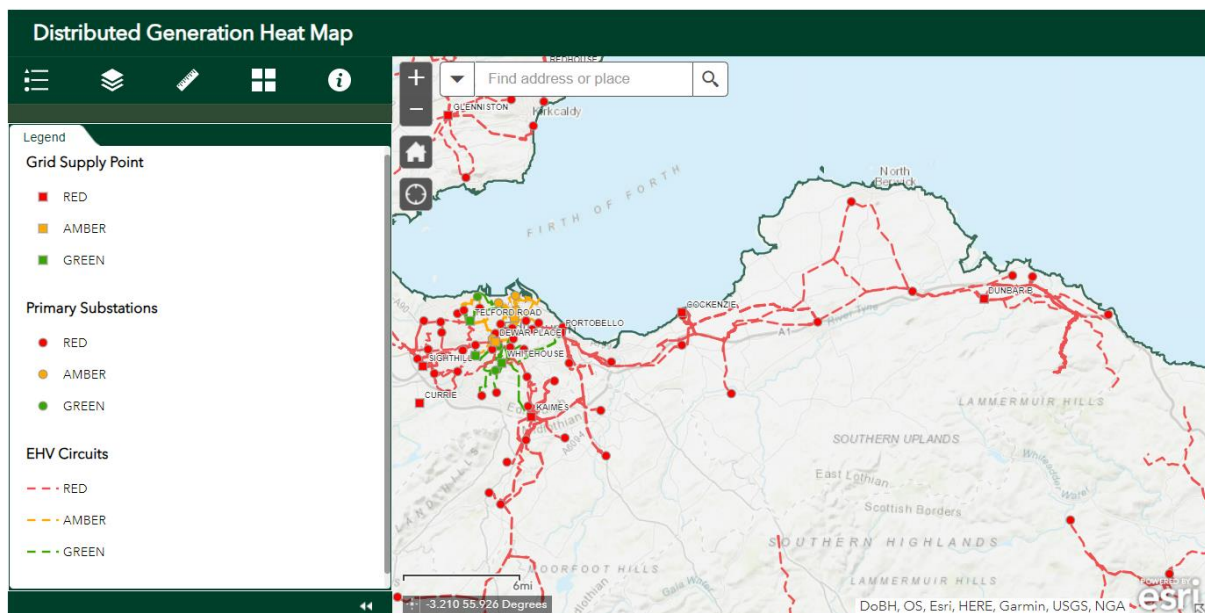


Figure 2 Distributed Generation: implications for connection; ‘Supported by SP Energy Networks Open Data’²

Description of Red/Amber/Green Categories above ³ .	
Category	Description
Green	All operational factors are within tolerable limits and so opportunities may exist to connect additional Distributed Generation without reinforcing the network (subject to detailed studies).

² https://www.spenergynetworks.co.uk/pages/dg_spd_heat_maps_terms.aspx

³ Whilst all reasonable care has been taken in the preparation of the information and data presented within these pages, neither SP Energy Networks nor East Lothian Council are responsible for any loss that may be attributed to the use of the data.

Amber	At least one factor is nearing its operational limit and hence, depending on the nature of the application, network reinforcement may be required. However, this can only be confirmed by detailed network analysis.
Red	At least one factor is close to its operational limit and so installation of most levels of Distributed Generation and a local connection is highly unlikely. It may also require extensive reinforcement works or given the lack of a local connection, require an extensive amount of sole user assets to facilitate such a connection

The following map shows generation and storage resources of 50kW or more, that are connected (or accepted for connection) to the distribution network⁴.

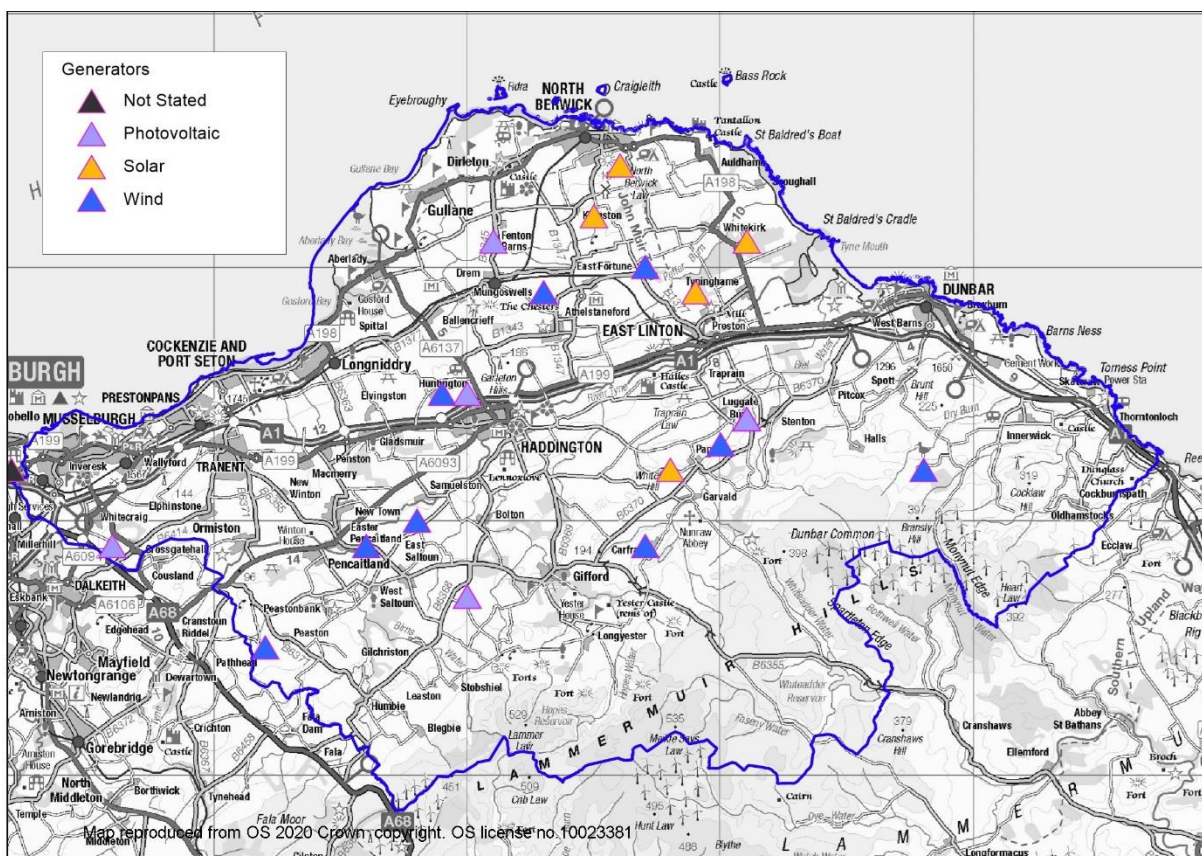


Figure 3 Extract from SPEN Embedded capacity register, downloaded 15 March 2024. 'Supported by SP Energy Networks Open Data'.

Overall generation

Decarbonising the grid is important to help Scotland and the UK meet climate targets. Policy 11 of NPF4 supports renewable energy, though proposals must show how landscape and

⁴ Data download from SPEN website

https://spenergynetworks.opendatasoft.com/explore/dataset/embedded-capacity-register/information/?disjunctive.customer_name&disjunctive.customer_site&disjunctive.town_city&disjunctive.county&disjunctive.postcode&disjunctive.country&disjunctive.grid_supply_point

other impacts are mitigated. NPF4 also contains policy protecting landscape areas as well as other natural and cultural heritage assets.

Renewable energy production has significantly increased in Scotland overall over the last 10 years. Statistics are available from Energy Statistics for Scotland and show a real shift in generation away from fossil fuels and towards renewables.

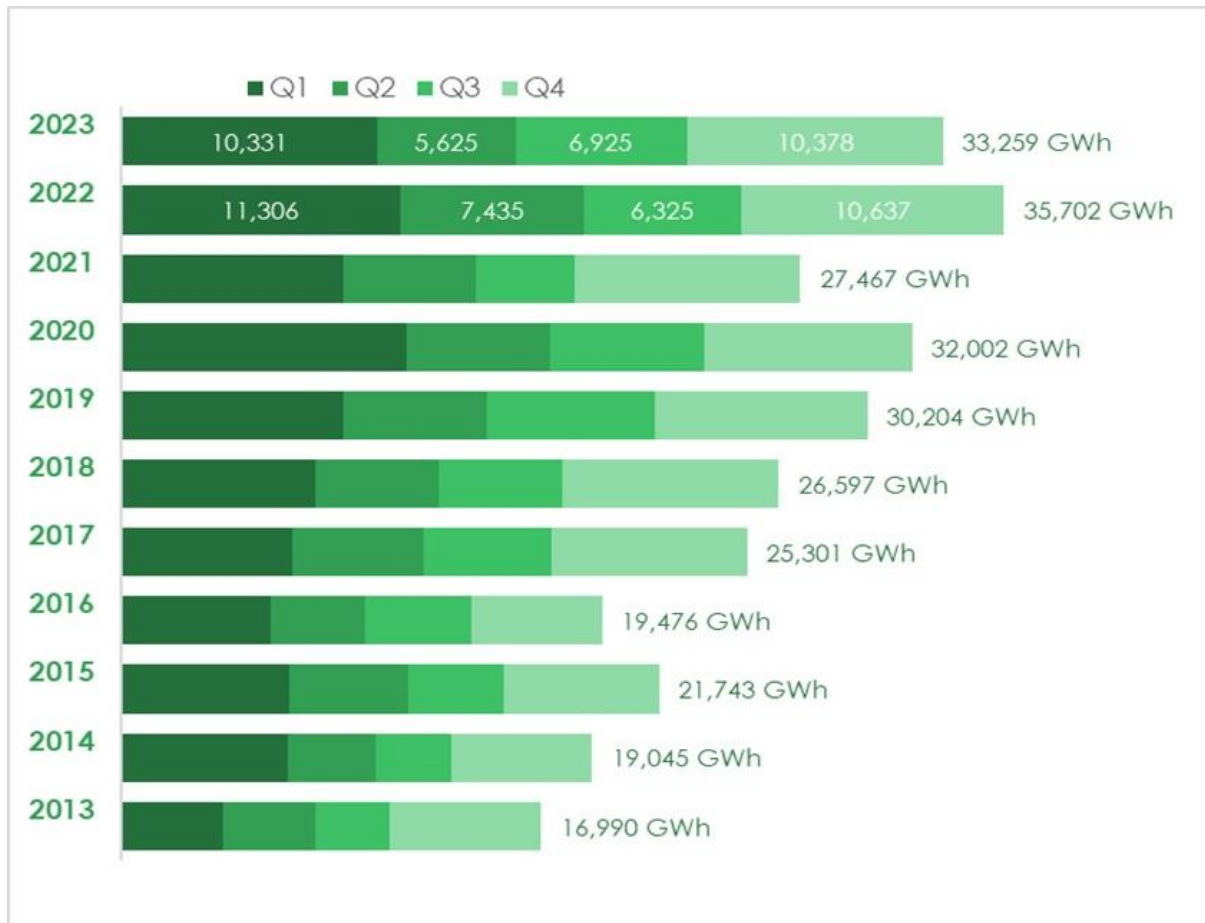


Figure 4 Renewable electricity generation by quarter in Scotland (2013 - 2023) from Scottish Energy Statistics

The different types of renewable energy that make up this mix are shown below.

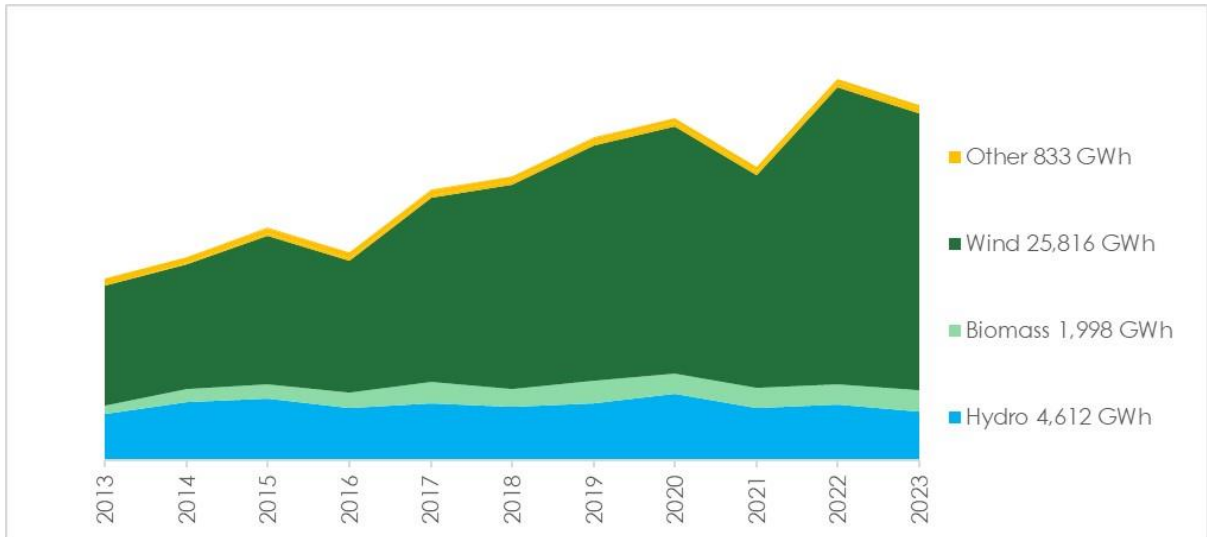


Figure 5 Renewable energy generation in Scotland by source (2013-2023), Scottish Energy Statistics

This renewable generation meets Scotland’s electricity demand in terms of total generation (which doesn’t mean there are no imports, as timing is important as well as total quantity). Overall, Scotland is an electricity exporter, and this has an indicative value of £1.5 billion (Scottish Energy Statistics).

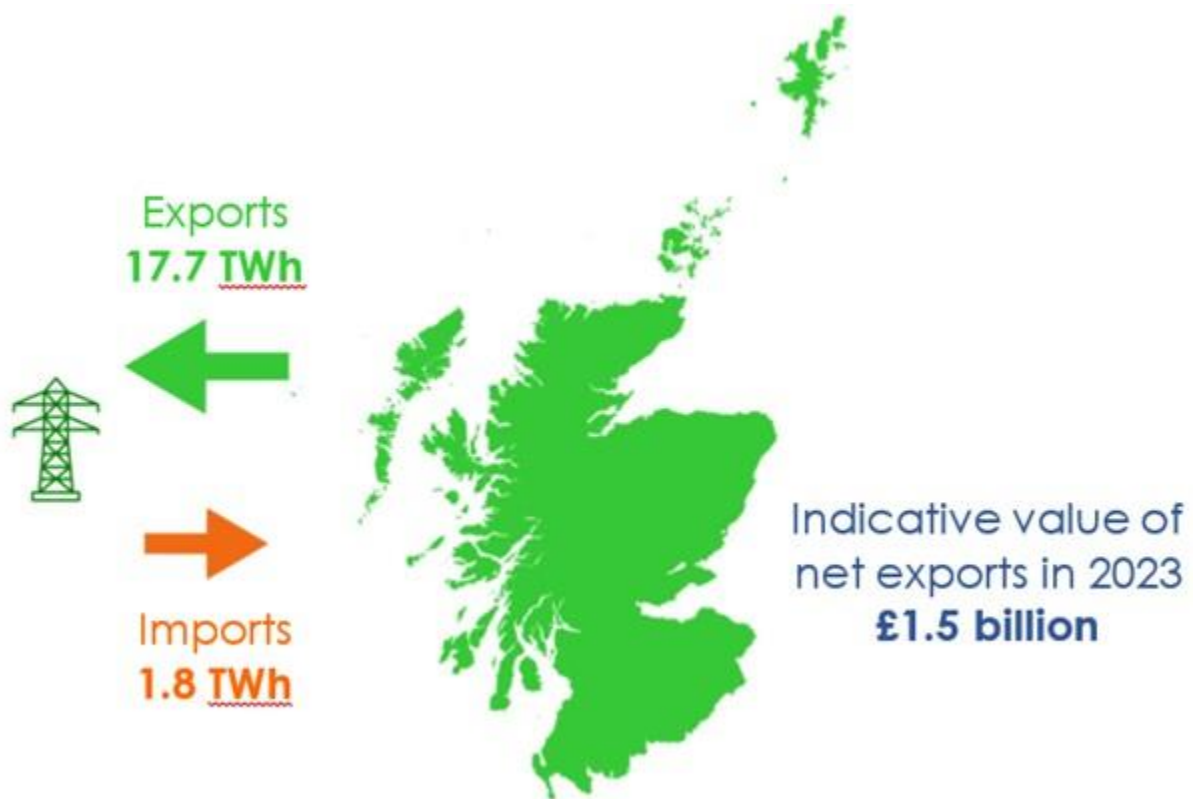


Figure 6 Scotland's electricity transfers 2023

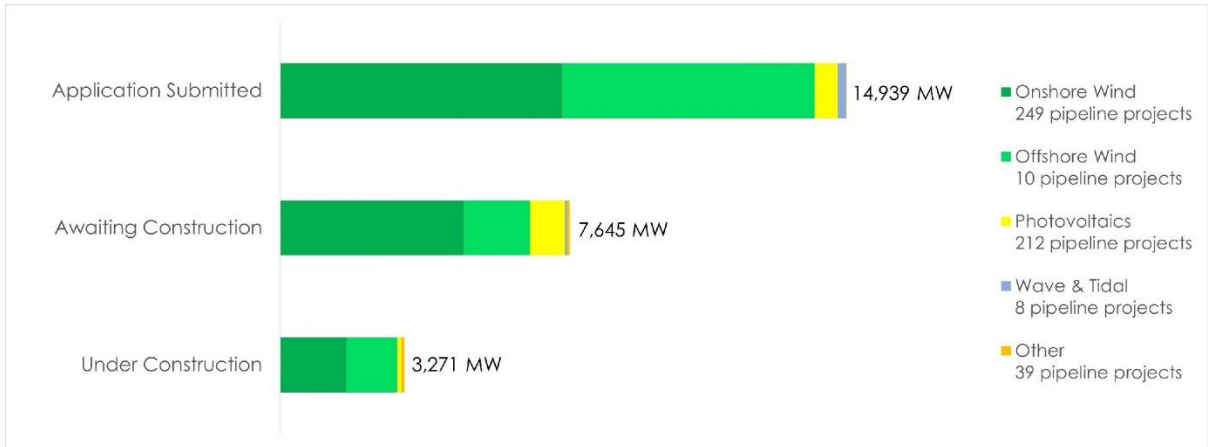


Figure 7 renewable electricity pipeline capacity in Scotland by planning stage and technology (as of end of December 2023)



Figure 8 Current progress towards targets (Scottish Energy Statistics)

This shift towards renewables has been echoed in East Lothian. Here, there has been a long history of energy production, from coal mining since before medieval times, to coal fired generation from the 1960s to 2010s, to nuclear, wind and solar generation now. East Lothian has therefore experienced both the benefits and the impacts of different types of energy generation. East Lothian continues to make a significant contribution to Scotland’s energy needs, hosting a considerable portion of Scotland’s low and zero carbon generating capacity. In addition, several large offshore windfarms make landfall here. Net zero targets imply significantly greater investment in renewable energy across a range of technology, interconnectors and storage.

A significant increase in the use of renewable heat is important if Scotland is to meet its climate targets. There are challenges in matching producers and users of heat, as well as retrofitting heat networks and issues around financing and deregulation of energy supply. East Lothian currently has very low usage of its potential heat resource.



Torness Nuclear power station 1290MW	Crystal Rig 200.5 MW	Aikengall/Wester Dod 180Mw	Dunbar Energy from Waste plant 30MW	Viridor landfill gas
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Nuclear

Torness Nuclear Power station was consented in 1978 and began producing power in 1988. It's total rated supply to the grid is 1190MW. According to EDF, the plant has over its lifetime produced over 290TWh of electricity, enough to power every home in Scotland for 29 years. EDF employs around 550 full time staff, and over 180 full time contractors with other jobs supported by their spend into the local economy. This staffing will be gradually reduced as decommissioning progresses. Decommissioning is currently estimated to start in 2028.

Current Scottish Government policy is opposed to the build of new nuclear stations, however, are supportive of extending the operating life of Torness if strict environment and safety criteria continue to be met. NPF4 does not mention nuclear as a technology to be supported in Policy 11 and Scottish Ministers have stated their intention to use their planning powers to oppose building of new nuclear stations. Any application for new nuclear power stations would be determined by Scottish Ministers under the Electricity Act 1989, and not the council.

Wind - Onshore

The Scottish Onshore Wind Policy Statement sets out Scottish Ministers ambition to deploy 20GW of onshore wind by 2030.

East Lothian is well located for onshore wind in terms of wind resource, though there are constraints in many areas including steep terrain, location of settlement, and built and natural heritage constraints. Existing wind development follows a pattern. The current LDP steers large scale wind development to the larger scale landscapes of the Lammermuirs, where it seeks a 'cluster and space' pattern of development.

Some areas were largely free of wind development or the visual impact of wind development. The plan also sought to restrict the height of wind turbines in the lowland areas, largely to protect landscape and cultural heritage interests. The resulting pattern of development is therefore large-scale windfarms in a cluster and space pattern in the Lammermuirs, with wind turbine development restricted to smaller scale development in the more intimate and highly intervisible landscapes of the lowlands.

Pressure for further large-scale windfarm development continues in the uplands. Recent applications have been made in the Lammermuirs just across the boundary in Scottish Borders Council area at Fallago Rig (the physical extension of which was refused at appeal), Dunside and Longroft. In East Lothian, an application for wind turbine development at Newlands Hill is under consideration.

Repowering is likely to become an issue over this plan period, with the first of the larger windfarms reaching the end of their planned life. The first part of Dun Law started operation in 2000, while Crystal Rig 1 commenced in 2003. Although both of these are in Scottish Borders council area, their visual influence is felt as much in East Lothian.

The location of windfarms can be seen at <https://spice-spotlight.scot/2024/03/11/renewable-energy-map-of-scotland/> . Within East Lothian the largest wind developments are Crystal Rig and

Aikengall Community Windfarm at the east end of the Lammermuirs. Pogie, at the west end, is smaller in scale.

Crystal Rig and Aikengall/Wester Dod windfarms both, straddle the boundary with Scottish Borders. Crystal Rig, with a nameplate capacity of 200.5 MW, was in 2022 the second highest capacity of all windfarms in the UK, with Aikengall at 180MW not far behind. Fallago Rig lies just into Scottish Borders area between Dun Law and Crystal Rig. Recently applications for further windfarms on the boundary with Scottish Borders Council have been made. Dunside windfarm, to the east of Fallago Rig windfarm, is awaiting decision from Scottish Ministers; Longcroft and Ditcher Law, both west of Fallago, are also awaiting decision. The Council did not object to the application at Dunside, and has yet to form a position on Longcroft or Ditcher Law (the Council was not consulted on the latter).

The trend with windfarm development is for fewer, large turbines on a site. Once the height is 150m or more, the need for aviation warning lighting must be considered. The council objected to the application for Crystal Rig 4 on the basis of its lighting, and a reduced scheme was required. Aviation lighting has also been required on other developments in this area.

Wind - Offshore

Significant windfarm development off the coast of East Lothian is under construction or planned. Neart na Gaoithe, 15km east of Fife Ness, is visible from closer parts of our northern and eastern coast, as well as upland areas. Development further afield has been consented at Inch Cape and Seagreen. All of these windfarms will have onshore transmission infrastructure in East Lothian.

Neart na Gaoithe makes landfall at Thorntonloch before connecting to a substation at Crystal Rig. There are also grid strengthening works there known as Eastern Link, which will connect to an offshore cable to England. A substation to connect the proposed Berwick Bank windfarm would also be there. Inch Cape and Seagreen will come ashore by the former Cockenzie Power Station site.

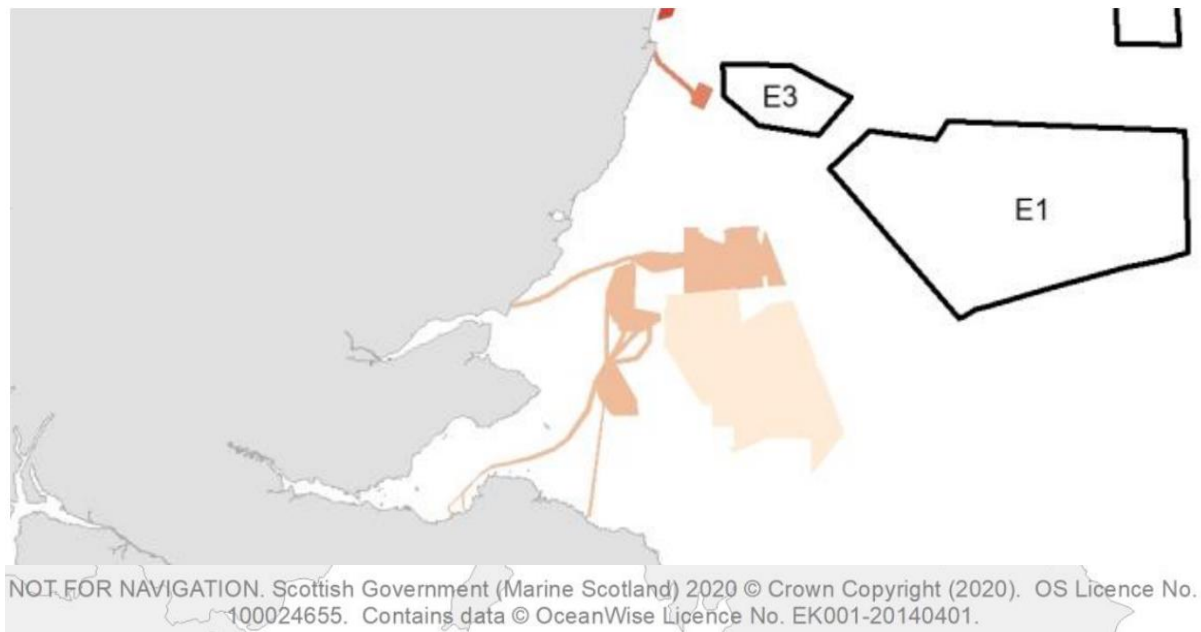


Figure 9 Extract from Scottish Government Sectoral Marine Plan for offshore wind energy, Scottish Government (Marine Scotland) 2020

Battery Energy Storage Systems

Battery energy storage systems of 50MW or over are determined by Scottish Ministers under the Electricity Act 1989, as they are considered as electricity generating stations. Smaller scale proposals are determined by the Council.

The increasing demand for these systems has arisen from the push to decarbonise the electricity system. Intermittent generation from wind, and to a lesser extent other renewable sources, means there is a need to store electricity to match fluctuating generation with demand. Battery energy storage systems do this. Currently and previously, an excess in demand over supply would be met by increasing generation at gas or coal power stations. Periods where there is generation in excess of demand are addressed by 'constraining off' generation – paying generators to switch off their supply. This means that not all of the capacity for renewable energy generation is used. Battery energy storage systems are one solution to this. Other potential solutions are management of charging of electric vehicles, or demand management at the consumer level, or hydrogen technology (see below).

In East Lothian there have been proposals in association with existing windfarms, such as at Aikengall. Battery storage allows the operator to store the electricity from the facility and release it to the grid when the best price can be obtained. Standalone battery energy storage systems allow electricity generated by others to be purchased from the grid at times when more electricity is being produced than needed, then released to the grid when generation falls or demand rises.

In addition, East Lothian is at a point on the electricity transmission system where there is currently a pinch point between Scotland and England. As more windfarm development takes place further north, on days when the wind is favourable, it will not be possible to export all of it at the same time to where it is used, due to lack of grid capacity. This is also being addressed by changes to the transmission system. The recently approved Eastern Link development will allow further transfers south via an offshore cable. As a result of this situation, there have been a number of applications for battery energy storage here. A proposal at Branxton has recently been given consent by Scottish Ministers. The council did not object to a proposal at Smeaton, though this has yet to be determined, while we are considering our position on an application at Dolphinstone, south of Tranent, and a proposal called Braxbess, by Innerwick.

The effects of these systems, especially in combination with other electricity infrastructure, can bring issues for nearby residents and communities, including landscape and visual impact and impacts from traffic. The Council is considering producing guidance to address the impact of Battery Energy Storage Systems and other energy generation development.

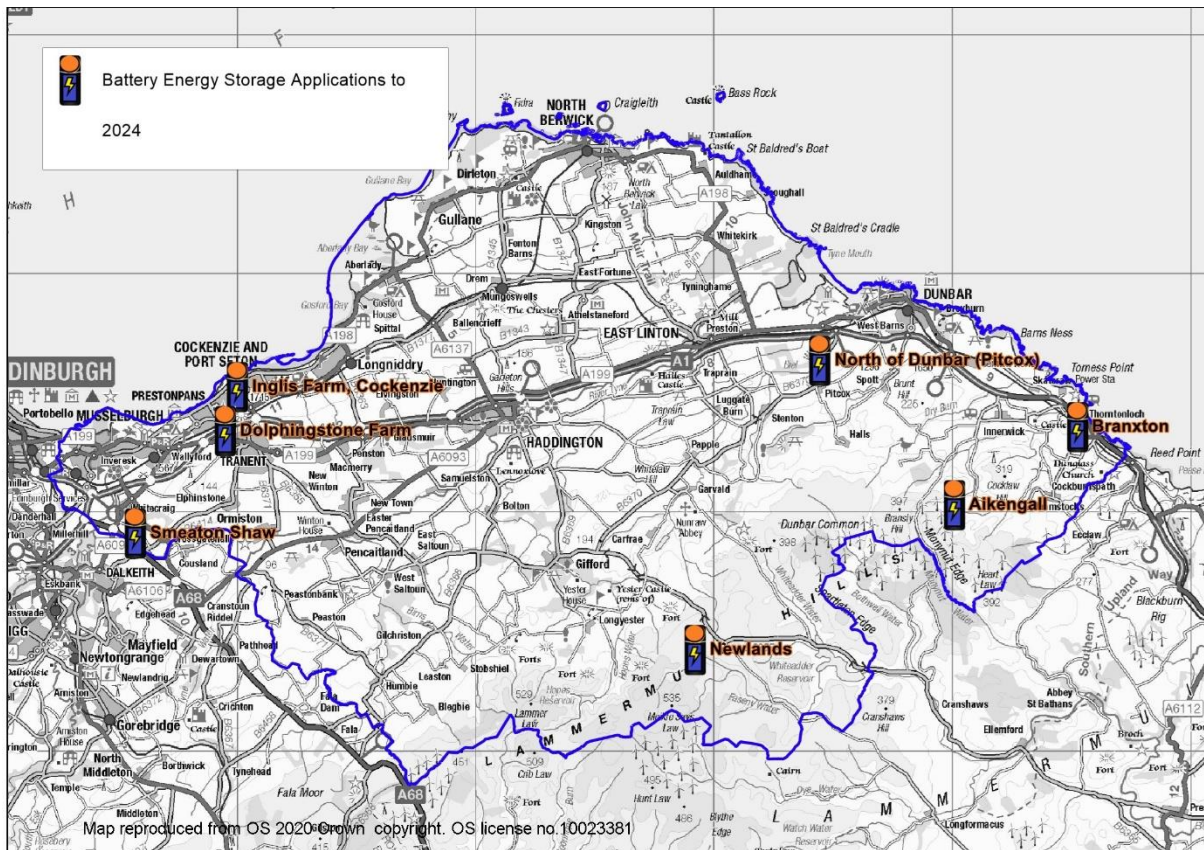


Figure 10 Battery energy storage applications

Anaerobic Digestors

Anaerobic digestion plants use the natural processes of plants and animal materials being broken down by microorganisms to generate heat and power. The feed material is generally something that would otherwise have been waste, such as slurry, crop or food waste.

Three anaerobic digestion plants have received planning consent in East Lothian. A plant at Ruchlaw Mains by Stenton (East Lothian planning reference number 10/00660/P) uses pig slurry and other organics products to generate renewable electricity and create organic fertiliser. A digester at Pure Malt Products, Haddington (Ref: 13/00845/P) was given permission in 2013 and is now operational. A plant at Standalane, Ballencrief (Ref: 16/00068/P) which would have used agricultural and brewery by-products was refused permission (which refusal was upheld at appeal) due to the harm to the character and appearance of the area. A plant to the north of this, at Bangley Quarry, Huntington by Haddington (Ref: 17/00922/P) was given permission shortly afterwards however. It is currently being constructed.

The majority of feedstocks for the Bangley Quarry plant were to be sourced from local farming and agricultural markets, anticipated to consist of grass silage, hybrid rye, straw and vegetable processing residues. Consent was later given (at appeal) to allow household and commercial food waste and animal by-products to be used, and for an increase in the maximum weight of material to 100,000 tonnes per year.

Solar farms

There have been no applications for commercial scale solar arrays since the adoption of the Local Development Plan. The largest application is probably that for 520 solar voltaic panels totalling 260 kW, forecast to generate around 0.227 GWh, to help power Dunbar Waste Water Treatment Works. This is followed by a combined ground source heat pump/solar pv proposal at Howden Farm, including 599 solar pv panels which combined would have an output of 186 kW..

Most of the remaining applications were domestic or to provide small amounts of power for stand alone structures, such as such as the meteorological mast at Newlands Hill, or to light a sculpture at Dunbar.

As solar panels improve in efficiency and/or energy prices increase they may become more viable. This may lead to an increase in development pressure for solar arrays.

See 'Solar – domestic/business' for more.

Hydro

There is a limited amount of hydro generation in East Lothian. Scottish Water generate hydroelectricity at Castle Moffat, which helps decarbonise water supply infrastructure. Recently they have invested £3 million in a scheme at Whiteadder Reservoir, fed by a siphon and believed to be the first of its type in Europe. This system helps regulate water levels in the reservoir and will offset nearly a third of the power used by one of East Lothian's largest pumping stations at Hungry Snout.

Domestic/Business Renewable Generation

There is a range of renewable energy technology that can be installed on existing domestic or other buildings, the main ones being solar panels and heat pumps. There are permitted development rights for houses and flats for biomass and combined heat and power flues, ground, water and air source heat pumps, free standing wind turbines and Solar PV and solar thermal equipment. Planning requirements are more restrictive within Conservation Areas.

Solar

From the adoption of the LDP to the end of 2023, there were 98 planning applications for solar panels, 2 of which were withdrawn and the remainder granted. Most of the applications were on existing houses or buildings. Solar panels can now be installed on existing houses and flats outwith Conservation Areas under permitted development rights. There were a handful of small scale arrays in the countryside to serve either larger houses or business, for example at Howden Farm, Gifford, and Gifford Bank House and Broadwoodside, Gifford, and Kilduff House near Althelstaneford.

East Lothian has a large number of buildings that are either Listed or in Conservation Areas, as well as many vernacular buildings. There is a risk therefore that overall solar panels could harm the historical environment. Seventy-seven of the applications for solar panels were in Conservation Areas, as shown in the table below. There were 9 Listed Building consent applications which included solar, one of which was withdrawn and the remainder granted. Four of these were in Conservation Areas.

Conservation Area	No. of applications (properties involved)	Conservation Area	No. of applications
Aberlady	4	Haddington	5
Athelstaneford	2	Innerwick	2
Belhaven	3 (2 properties)	Inveresk	3
Cockenzie	2	Musselburgh	3
Dirleton	2 (11 properties)	North Berwick	6
Dunbar	10	Pencaitland	7
East Linton	1	Spott	3
East Saltoun	5 (6 properties)	Stenton	2
Garvald	2 (8 properties)	Tranent	2
Gifford	7 (14 properties)	West Barns	2
Gullane	4		

Heat pumps

There were 46 planning applications which mentioned heat pumps between the adoption of the LDP and 2024, three of which were withdrawn and one of which was pending decision at the time of writing.

One application was refused, however this was due to the principle element of the application, a change to materials, being unacceptable and not the heat pump itself. There were 10 listed building applications which included heat pumps, all of which were granted.

Hydrogen

The Scottish Government sees hydrogen as a potentially important tool to meet climate targets. Hydrogen can be used to decarbonise industry, transport, power and heat. The ambition is for Scotland to become a leading producer and exporter of hydrogen. Hydrogen to meet transport demand could be a big part of this, with some hydrogen vehicles already on the road. Hydrogen is expected also to have a role in energy storage. The Scottish Government Hydrogen Policy Statement set a target of 5GW of renewable and low carbon production by 2030 and 25GW by 2045. This is an equivalent of 15% of Scotland's total energy demand. The ambition for hydrogen production is closely linked to expanding capacity for offshore and onshore wind.

The related Hydrogen Action Plan supports the development of Regional Hydrogen Energy hubs, as shown below. None of these are in East Lothian. No planning applications for hydrogen facilities have been made.

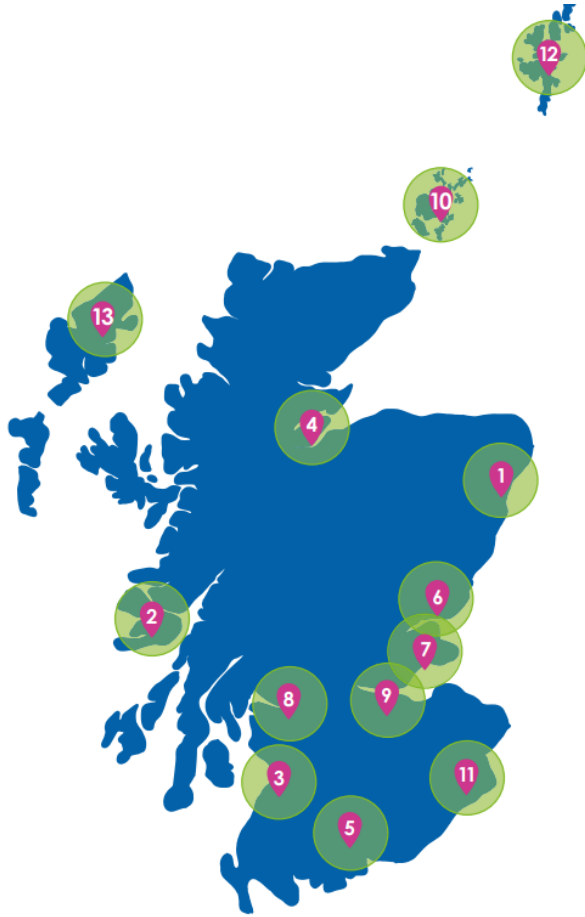


Figure 11 Extract from Scotland's Hydrogen Action Plan showing regional hydrogen hubs

In addition to hydrogen production, the Hydrogen Action Plan also seeks to increase demand by supporting its use. Likely users are seen as some industries, shipping and freight transport, and long term energy storage. It is less likely to be used for cars or light goods vehicles due to competing battery electric solutions. The Hydrogen Action Plan does not see a significant role in decarbonising domestic heat. However, electrolysis produces waste heat which could potentially be captured and contribute to decarbonising heat in the region.

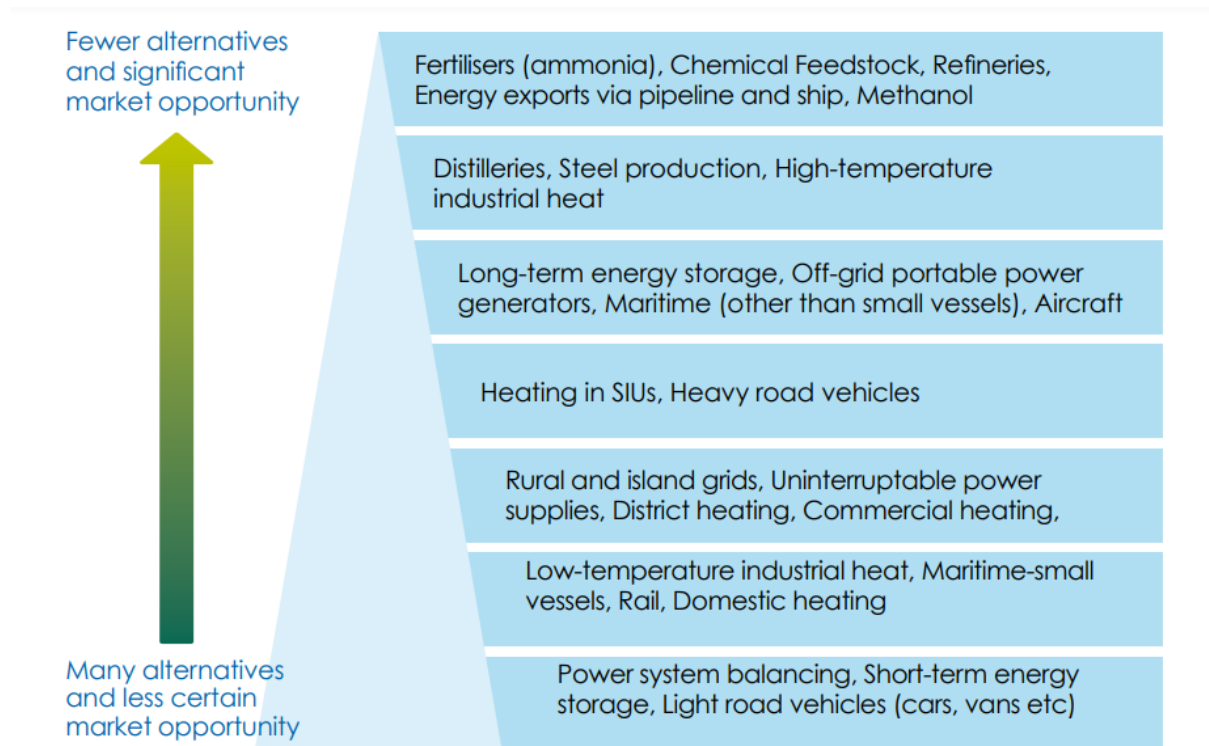


Figure 12 Potential users of hydrogen (extract from Scottish Government's Hydrogen Action Plan)

East Lothian has some features which may potentially make hydrogen related development attractive. There are connections to offshore windfarms, and onshore wind. There is also a mains gas transmission pipeline running north/south through the area.

STAKEHOLDER CONSULTATION

Events

A comment was made at the Prestonpans event that we should aim towards self-sufficiency in energy. "Land for solar farms, decarbonisation, sustainable energy" was added to a post-it at Prestonpans.

In Haddington a comment was made on employment opportunities with wind and solar in the Lammermuirs. The possibility of hydro power in the hills was also raised at this event.

At Dunbar the future of the Torness site after decommissioning was queried. A comment was made at this event that there are also park power and solar farm opportunities. Ground source heat pump for heating was added to a post-it placed at Newtonlees. A post-it placed at Carberry asked for consideration of how to use the site for renewable energy.

At Musselburgh MECA a post-it said “Decarbonising energy partnership working with Midlothian for heat capture from the waste plant”.

The issue was not raised at the North Berwick, Musselburgh Brunton Hall or Tranent events.

Online Survey

The online survey did not ask directly about renewable energy, but it did ask questions about the focus of the Spatial Strategy. More than one choice could be selected. It also asked about how to address the climate emergency. Addressing climate change, which renewable energy development can contribute to, was one of the top responses of the area of focus for the LDP spatial strategy. The cumulative impact of renewable energy developments was chosen by fewer respondents but was still a concern.

There was also a comment that encouraging renewable energy generation should be a focus.

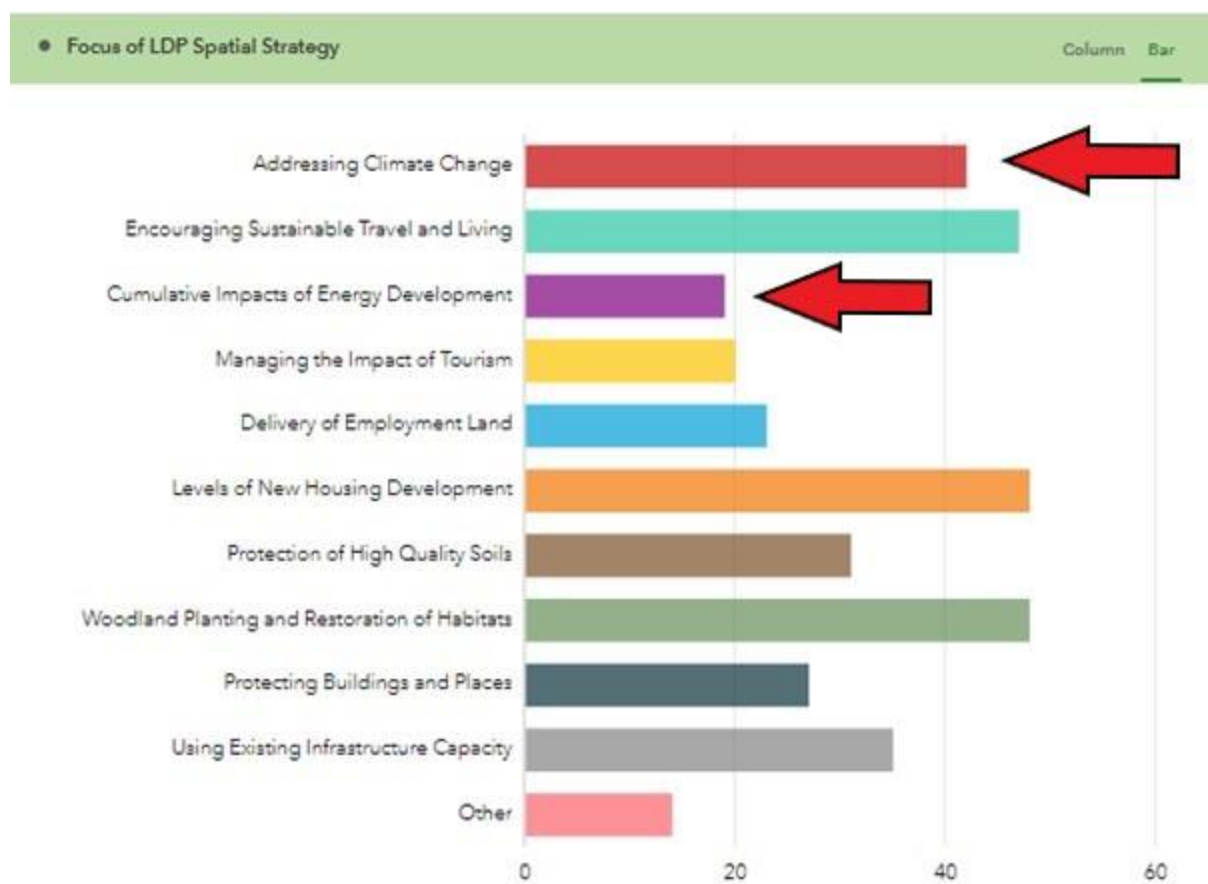


Figure 13 Responses to online survey question on what the focus of the Spatial Strategy should be

The survey asked how the climate emergency should be addressed. Several responses were made in support of renewable energy in general for this reason; increasing uses of solar panels; wind turbines on and off-shore.

For the survey question about what evidence was needed, a comment was made that “Renewable energy is an essential part of our energy plan moving forward it should be supported in all forms in appropriately considered locations.” A call was also made to consider the aesthetic of wind

generators. The commenter considered the turbine in front of Dirleton Castle to be an eye sore and did not think it generated much power. A comment identified self sufficiency in energy as a key challenge.

In response to the question about improving energy efficiency in existing buildings, a responder considered that the planning system could be off-putting for those wishing to install solar panels in Conservation Areas: they considered that regulations prioritising conservation over climate issues should be reviewed. Another response on this issue considered that there should be clear guidelines on, for example, heat pumps in relation to the historic environment. A suggestion was made for the Council to install solar panels for lower income households at a reduced rate. Another thought that options for being a hydrogen county should be explored, and that technical advice and subsidy should be given for conversion to solar.

The survey asked what the LDP should do to increase energy performance in new buildings. Responses in terms of the technical solutions that should be pursued relevant to renewable energy generation were PV/solar panels; smart meter installation. In terms of policy, suggestions were for a mandatory requirement for new builds to install solar panels and/ or air source heat pumps.

A response to the online survey considered investment in solar panels and retrofitting older properties should be an area to focus on in the coming 10 years. Another considered incorporating renewable energy development into housing would address the climate and nature crisis.

A comment was made that new (or renewed) applications for renewable energy generation, storage or supply should prioritise community-owned projects or set a minimum level for a community stake. Another comment was that community initiatives to generate energy should be supported.

Comments were also made on the value of features that could be impacted by some renewable energy development. This included the landscape, including darks skies, natural places and biodiversity.

Place Standard

Children and Young people

Primary schools

Consultation with Primary School children was carried out by the East Lothian Play Association. Key findings included the importance to children of access to natural areas, and their concern for nature. In discussing nature, many children talked about the beautiful scenery in East Lothian, and that they enjoy hill walks, the views, sunsets and having space around them. There is a lot of concern about climate change, and crossover with the theme of nature crisis. When asked 'What is special about where you live' the most frequent response made by children related to natural areas. The beaches, woodlands and hills are clearly appreciated by children. Children gave many reasons for enjoying natural areas including the importance for wildlife, fun and relaxation.

Climate change was not raised as a topic in all schools, but where it was, children were reported as being passionate and knowledgeable about alternative energy sources. In discussing climate change, some children called for more charging points for electric cars; which implies a source of electricity to supply them.

"Solar panels can make power from the sun." - Child at St Mary's Primary School

“I think there should be a lot more wind farms and solar power. It’s not good when you collect it from coal under the ground and all the pollution goes up into the world. It makes forest fires, there should definitely be more wind farms and solar panels on houses. The wind farms could be in the hills or out at sea.” Child at Cockenzie Primary School

“Wind farms at sea and solar panels on houses. Train stations, less cars.” Child at Cockenzie Primary School

“Less oil rigs and should use solar and wind energy instead.” Child at St Mary’s Primary School



Figure 14 Part of a future map of East Lothian, by children at Aberlady Primary School

The report sums up what is important to children for the next Local Development Plan in section 6.1. This includes more use of solar and wind power, and more electric charging points.

Secondary pupils

Secondary school engagement was carried out via a questionnaire and discussion of the Place Standard in groups at five of East Lothian’s seven secondary schools. One of the questions for secondary school pupils in the questionnaire was about what they would like to see done to help tackle climate change. More green energy was one of the solutions, along with protecting nature and green areas. Comments through the questionnaire included:

“Invest in renewable energy and get them windmills CHURNING”

“My dream East Lothian would have solar power and wind power using the windy and mostly sunny coastline. Hydropower could be a great investment too”

Through the Place Standard engagement, a key issue was that the young people appreciated the access to nature they had in much of East Lothian.

WHAT DOES THIS MEAN FOR THE PROPOSED PLAN?

Nuclear

Scottish Government policy and lack of support for nuclear power in NPF4 suggests that the LDP should not plan for a replacement for Torness, but instead for eventual decommissioning of the site.

The issue of decommissioning was raised through consultation. A replacement for Torness was not raised through public consultation, though given the number of employees there, and the amount of low carbon electricity that can be produced by nuclear, it is likely there would be some support for this, if it were an option at national level.

Wind

NPF4 now accepts impacts from wind farm developments where the effects are localised. East Lothian's Landscape Capacity Study still contains relevant information as the underlying landscapes mostly have not changed that much although the original study was carried out nearly 20 years ago. However it may be useful to review where impacts, particularly on landscape, would be more than localised.

The council has previously aimed to match the scale of energy generation to the landscape, with large scale development in the uplands and smaller scale development in the lowland area, where it can be accommodated at all. This basic approach is likely to remain appropriate. The key findings that children and young people, as well as adults, value natural spaces should be kept in mind in seeking to develop wind energy proposals, which can have a significant impact on such areas. There was also support for renewable energy in general, including wind.

As turbines pass 150m, aviation lighting is needed. This has potential for visual impact on the area, and to change its character in nighttime, and at dusk and dawn. The LDP could explore whether there is a way of avoiding the need for this lighting through alternative solutions.

Domestic Renewables

The LDP should consider whether further guidance on renewable energy in relation to the historic environment would be useful. The scope for asking for renewable energy technology to be installed in new development, including housing, beyond building standards requirements could be considered. The LDP will need to address statutory requirements for Low and Zero Carbon Technologies on larger housing sites.

Policy 19 Heat and Cooling

NPF4 Requirements: Policy 19

LDPs should take into account the area's Local Heat & Energy Efficiency Strategy (LHEES). The spatial strategy should take into account areas of heat network potential and any designated Heat Network Zones (HNZ).

EVIDENCE

Local Heat and Energy Efficiency Strategy

Decarbonising energy use in buildings will require both increasing the energy efficiency of buildings and seeking different sources of heat. The Council approved a draft Local Heat and Energy Efficiency Strategy in October 2023. However a final Strategy has not yet been approved. The outcomes from the Local Heat and Energy Strategy will need to be reflected in the plan

The draft LHEES was clear that the strategy must also tackle fuel poverty. There is a clear correlation between areas that are in the most deprived SIMD deciles and at risk of fuel poverty. This is not surprising given that low income is taken into account for both.

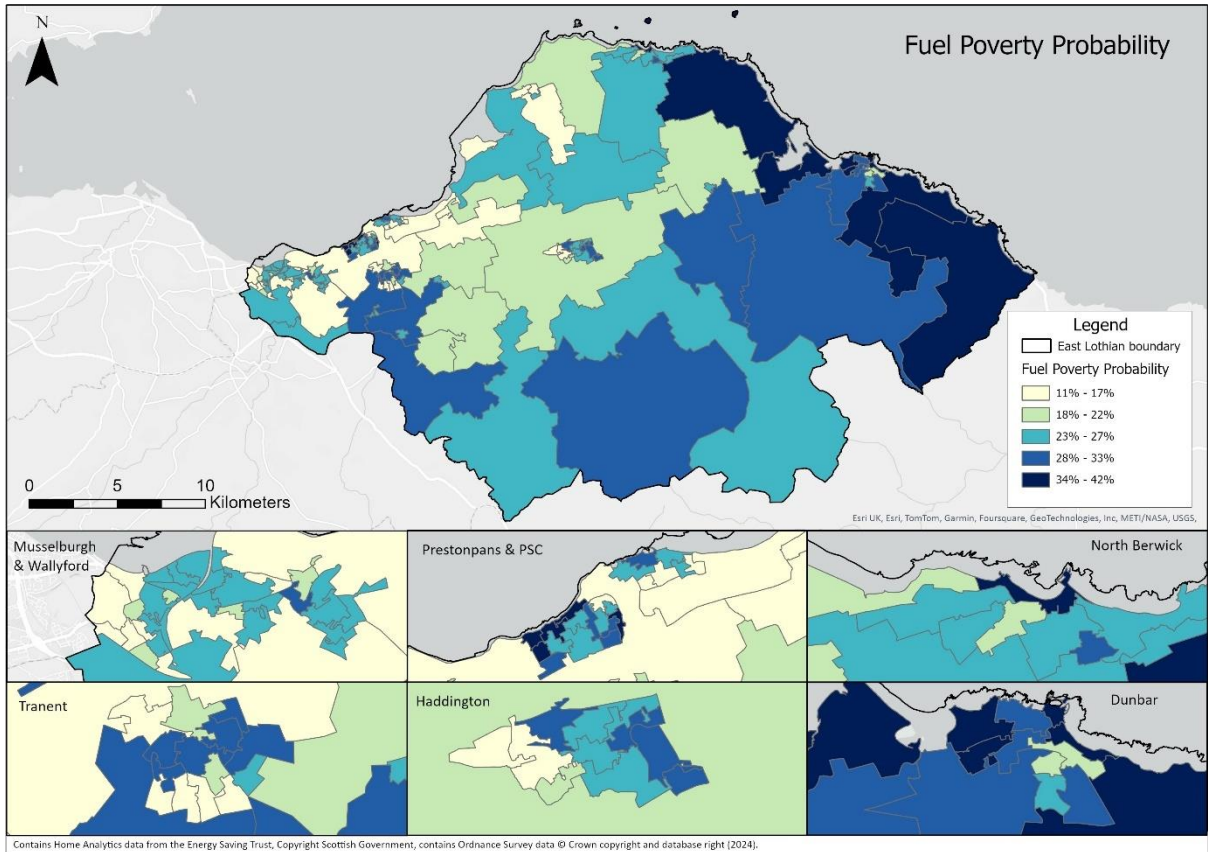


Figure 15 Map showing the probability of households being in fuel poverty (extract from draft LHEES)

Most domestic property in East Lothian, around 8/10, are on mains gas. Around a further 1/10 use electricity, 1/20, oil and the remainder biomass or LPG. Most of the off-gas network properties are in the rural area, as would be expected. Most non-domestic properties use electricity for heating (though some of the ones that don't are larger heat users). The LHEES will likely be less focussed on them as their heating will decarbonise along with the electricity grid.

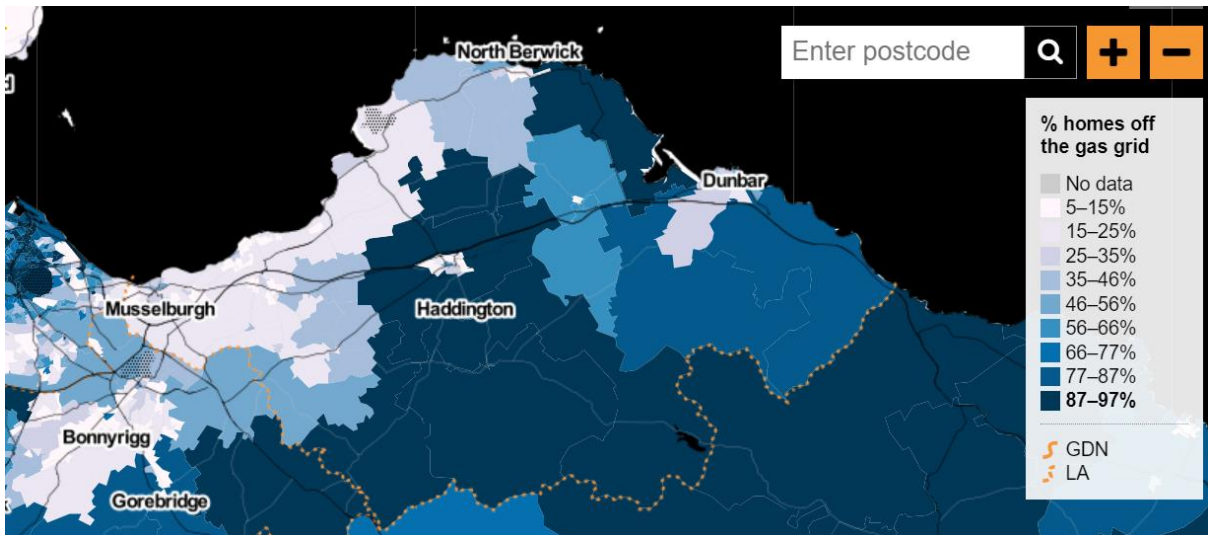


Figure 16 excerpt from Non-Gas map

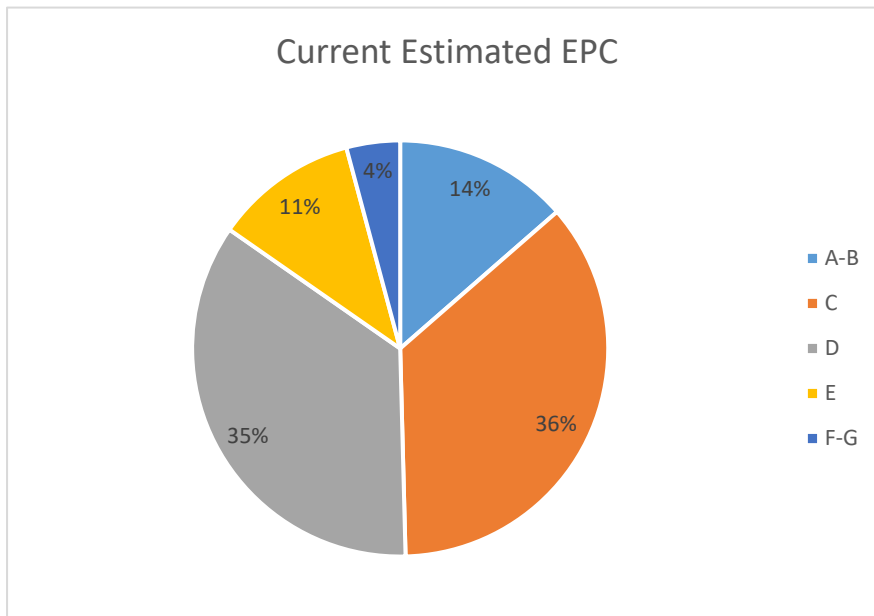


Figure 17 Current estimated EPC of domestic property (extract from draft LHEES)

Around half of East Lothian’s homes are rated poor (D-G) which is in line with the national picture. Older properties are often stone built, and harder to insulate. Around 1/6 of homes are built before 1919. 5% of domestic properties are Listed, and 18% are in Conservation Areas (some are both). The draft LHEES estimated that 11% of domestic properties in East Lothian have single glazing, rising to 31% in Conservation Areas. This difference will partly be because many of those properties are older, and so were built before double glazing was installed as standard. However, it may also be because the need to retain the historic appearance of the building makes installing double glazing more expensive.

There are 26 existing heat networks in East Lothian, all but one, at Queen Margaret University, are small scale. 15 are in social housing or care settings. 10 are rural, based around farms with biomass boilers. Just into Midlothian a heat network is being developed based on the Millerhill waste plant. Some of this heat could potentially be brought to East Lothian.

Heat demand is based in the main settlements, but is a far more dispersed pattern of demand than in Edinburgh. Further information on demand is shown in the draft LHEES, as well as potential local heat sources that could meet this demand.

The main zero emissions heat sources identified in the LHEES are:

1. Mine Water Source. Study found a maximum output of 9.7MW could be delivered at the Coal Authority’s treatment site at Blindwells. Minewater could also supply a heat network at Prestonpans.
2. Sea Source. East Lothian’s coastal location makes utilising the sea as a source of heat promising. A challenge is identifying appropriate locations for heat infrastructure that have development land on the coast and suitable access to the sea.
3. Ground Source and Water Source. A report Green Heat in Greenspaces looked at the potential to use parks and rivers to extract heat for public buildings. Dunbar, Haddington and

Tranent had options for or ground source heat pumps, with a water source pump a possibility at Whitecraig.

4. Electric Boilers linked to Thermal Storage.

Sources of waste heat identified are Viridor and Tarmac, both in Dunbar; waste water sewers; Glenkinchie Distillery; Bairds maltings, and potentially green hydrogen.

Encouraging energy efficient buildings and layouts

Building Standards govern the energy efficiency requirements of home construction and are increasing. Planning can plan housing layouts which shelter or shade buildings so they use less energy or can gain heat from the sun. Although our design policies include encouragement for energy efficient design, this is only one consideration among many. Planning policy could seek a greater emphasis on producing an energy efficient design. This would allow for more of the renewable energy produced on housing sites to be used for appliances within homes rather than heating, so reducing electricity demand overall.

In December 2022, the Minister for Zero Carbon Buildings, Active Travel and Tenants' Rights confirmed that the Scottish Government will make legislation by December 2024 to deliver "a Scottish equivalent to the Passivhaus standard". Consultation on proposals is anticipated to be launched in spring/summer 2024, followed by laying of amending regulations by mid December 2024.

There are five key principles underlying the passivhaus standard:

- High-quality insulation
- Heat control and robust windows
- Building airtightness
- Heat recovery and ventilation
- Thermal bridge free design

Low and Zero Carbon Technology in large new housing development

Section 3F of the Town and Country Planning (Scotland) Act 1997, as amended through Section 72 of the Climate Change (Scotland) Act 2009 states that:

'A planning authority, in any local development plan prepared by them, must include policies requiring all developments in the local development plan 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.'

The current LDP has sought a 15% contribution from this technology as from 2019.

Planning implications [Planning policy - section 3F: research - gov.scot \(www.gov.scot\)](#)

- concerns about the strength of suspensive conditions and the subsequent ability to enforce compliance.
- a need to address the underlying conflict between Planning and Building Standards over the mandatory use of LZCGT.

- the above research recommends that the LZCGT contribution to CO2 emission reductions be defined as a constant and perpetual 12% of the percentage CO2 emission reduction sought through Scottish Building Standard 6.1.

Cooling - Tree and Woodland Strategy

Tree planting can be used to help make more resilient and adaptive urban environments, including by creating shade, urban cooling, and provision of trees as windbreaks. The forthcoming Tree and Woodland Strategy sets a target for 30% tree canopy coverage in each settlement overall and in those areas of East Lothian in the lowest 30% SIMD areas. This will help provide comfortable urban environments in the predicted increasingly hot summers. Well placed trees and shrubs can also help shelter buildings against cold winds, reducing the need for heating in winter.

Existing tree canopy coverage is as shown in the chart below.

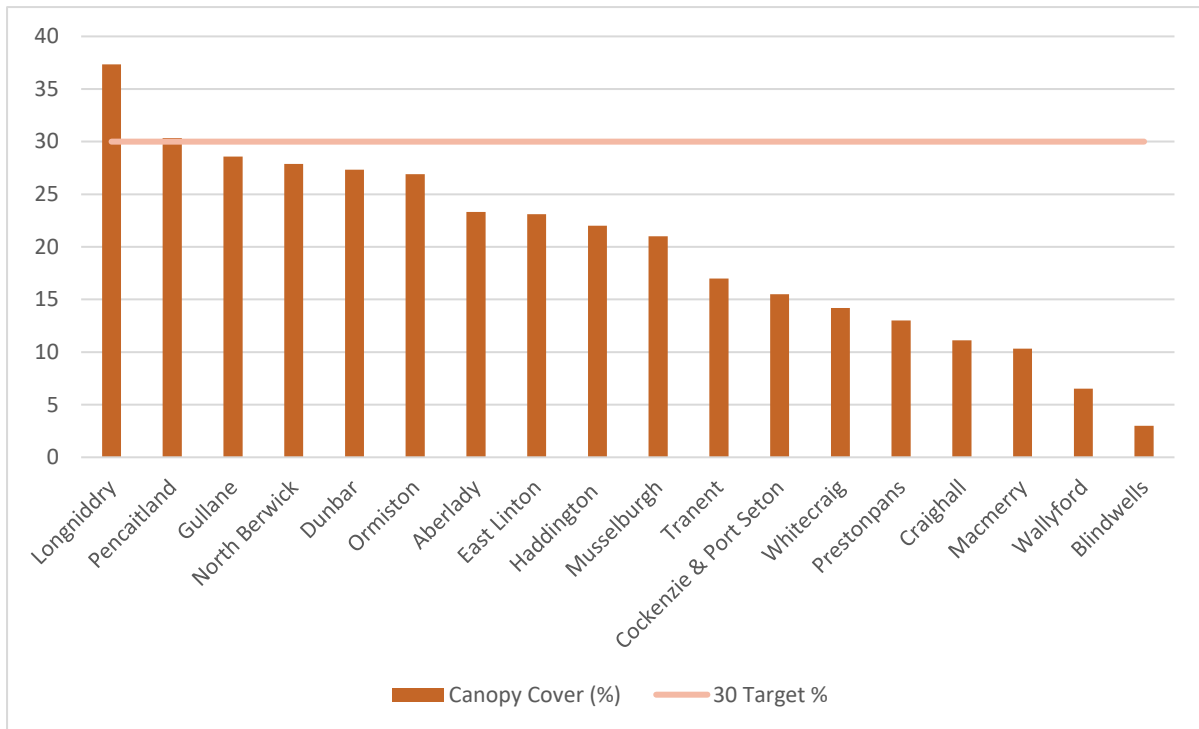


Figure 19 Graph of settlement canopy coverage

For SIMD areas, tree canopy coverage is low in some, especially in Prestonpans and Tranent, which have low tree canopy coverage overall.

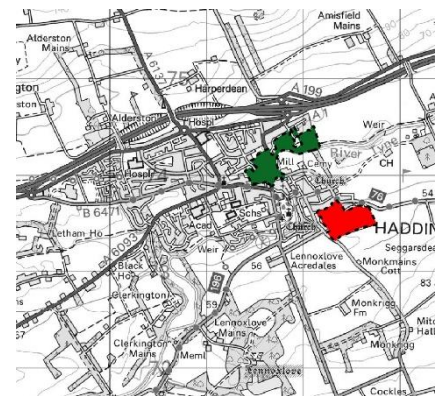
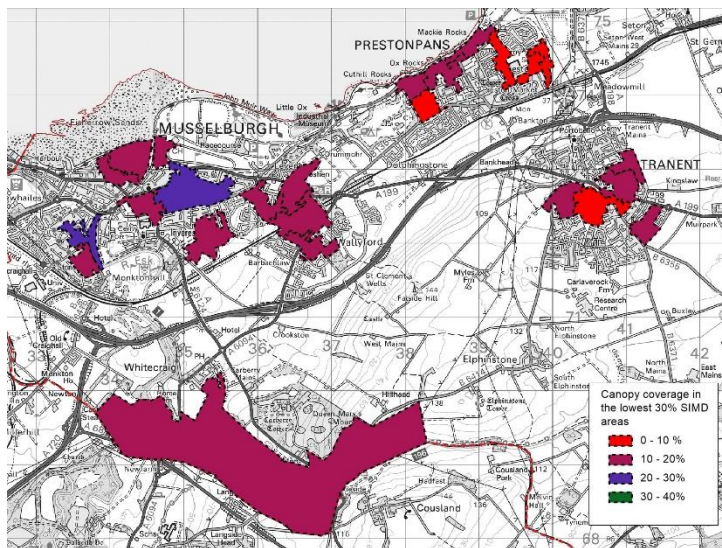


Figure 18 Map of canopy coverage in lowest 30% SIMD areas to west of East Lothian, with Haddington inset

There may be opportunities for LDP policy to support increased tree canopy coverage through development proposals.

STAKEHOLDER ENGAGEMENT

Events

Few comments were made on heating. “Ground source heat pump for heating” was added to a post-it placed at Newtonlees. Park power opportunities for low carbon energy were mentioned at the

Dunbar and Musselburgh events. At the MECA event a Decarbonising Energy Partnership working with Midlothian for heat capture from the waste plant was mentioned.

Online Survey

A number of suggestions were made in response to the online survey question asking how to address the climate emergency. Heat pumps were suggested. A response asked if district or per block/tenement heating would give the economy of scale needed to take advantage of minewater for heating. The link between poor insulation and inefficient heating and fuel poverty was noted by Cala Homes, who quoted a figure of 89% of all new homes built by Homes for Scotland members being a least an EPC Grade B standard. They noted that increasingly home builders are embedding zero emissions heating systems and enhanced energy-efficiency measures into their developments.

The online survey asked about how to improve energy efficiency in existing buildings. The difficulties of carrying out sympathetic conservation measures in old or listed buildings was raised in response. This responder noted they saw a lot that is detrimental to the fabric of buildings and their historic interest and considered that solutions are also only possible for the wealthy. However other responders considered it should be easier to obtain permission for works in older buildings. A response called for a firm set of guidelines for what is acceptable in terms of e.g. heat pumps in relation to Conservation Areas and Listed Buildings, to avoid householders incurring fees for inappropriate schemes. A suggestion was made for the council to install solar panels for lower income households at a reduced rate.

Another response to this question welcomed the council's ideas for district heating scheme to provide hot water for larger settlements, however thought the long term vision might not come soon enough for those wanting to decarbonise now. Another suggestion was to secure a community wealth fund from those who exploit natural resources to support energy efficiency measures, and from the same person, to ensure all new developments have a community energy scheme in place.

The online survey also asked what the LDP should do to increase energy performance in new buildings. Responses in terms of the technical solutions that should be pursued relevant to individual houses were: improved insulation, heat pumps (air and ground source); smart metre installation; underfloor heating should be standard; triple glazing in new builds; battery storage alongside solar panels. Wider scale suggestions were: district heating generally; use waste heat from Viridor to heat houses in Dunbar; take heat from the sea to heat homes in North Berwick; explore tidal power especially in harbours.

It was suggested that to look at Scandinavia and see what they do.

As a matter of policy, suggestions were made to increase both insulation and energy efficient materials. New build standards were variously suggested to be the 'maximum possible', 'A or B classification', 'Passivhaus standard'. Compulsory solar panels and heat pumps were suggested.

- The planning process needs to have requirements on the minimum (and preferred) levels of insulation and energy generation.
- Ground source heat pumps to be encouraged especially over former mine workings
- Insist that commercial builders apply the highest standards of insulation etc in buildings, not just statutory minimum.
- Adopting NPF4 policies and incorporating energy efficiency into the LDPs
- Stricter laws requiring eco-friendly builds

On layout/location/house types/materials

- Smaller house builds / footprints - many 4+ bedroom homes are under utilised.
- By not locating any new builds in exposed locations
- Design standards should be set so that new homes are orientated to benefit as far as possible from passive solar warmth.
- There should be no large windows in north facing walls
- Use sustainable materials only (eg limit concrete/stone, use sustainably produced woods)

Comments were also made on process/development management issue:

- Speak to developers about their plans
- Stop letting developers get away with it eg only 14% of new housing on Dunbar Golf course are energy efficient; Blindwells 1 is going ahead without the geothermal 'Vision 2010'
- Don't grant planning unless they meet strict energy and environmental standards

Many housebuilders commented that this is not a matter for the LDP as it is covered by Building Standards and/or addressed in Policy 2 of NPF4. Many considered the continued advancement of energy efficiency improving technology is best fostered by clear national standards rather than a patchwork of individual requirements across different local authorities. A comment was made that by future proofing housing development, issues such as climate change would be addressed and there would be less pressure for local energy development.

Children and Young People

Secondary engagement

A separate children & young people consultation was carried out and involved a distribution of a short questionnaire to seven state secondary schools in East Lothian. There were a total of 308 respondents containing valid data. The comments highlighted a need to invest in renewable energy and district heating.

"I would like to see district heating, double glazing and better insulation to save wasted energy lost through drafty houses, whilst increasing the living standard and make heating more affordable" Response to secondary school questionnaire.

Primary School Engagement

The key findings of their report noted the importance of protection of natural assets, and concern about climate change.

WHAT DOES THIS MEAN FOR THE PROPOSED PLAN?

Energy efficiency measures in both domestic and non-domestic properties are a priority. The LDP should consider how to encourage such measures.

The LDP should consider how to promote energy efficiency measures while protecting the natural and historic environment, and if there is a conflict between these two aims, where the balance lies.

The LDP should reflect the spatial aspects of the LHEES, safeguarding areas where necessary and considering any required actions for new development or for contributions to the network.

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