



East Ayrshire Local Development Plan

Supplementary Guidance

Heat Generation

December 2017

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1. Context and Purpose of Supplementary Guidance

1.1 Purpose of this Supplementary Guidance

- 1.1.1 As the drive for renewable heat intensifies, a clear and robust policy approach for the development of renewable heat generation in East Ayrshire is essential.
- 1.1.2 In order to achieve the Scottish Government's targets, the Local Development Plan (LDP) supports a broad mix of energy generating facilities which are tied to a tiered approach to heat provision as follows:
1. Energy Efficiency;
 2. Heat from recoverable sources; and
 3. Heat from renewable and non-renewable fuel sources, where greenhouse gas can be significantly reduced.
- 1.1.3 In line with the requirements of Scottish Planning Policy (SPP), this Supplementary Guidance sets out in detail the Council's approach to renewable heat generation and provides further information on the criteria which all renewable sources of heat generation will be assessed, underpinning Policy RE 2 of the LDP.
- 1.1.4 This guidance does not direct renewable heat generation to specific locations but is intended to guide development as a starting point for investigating the potential for proposals in conjunction with Scotland's Heat Map. It is essential that background research is undertaken along with this guidance as renewable heat technology and legislation is continuously evolving. This guidance is aimed at;
- (i) Developers exploring the feasibility of renewable energy as part of proposed or existing development in line with LDP policy
 - (ii) Developers exploring the feasibility of commercial projects and;
 - (iii) Community organisations considering the potential for renewable energy schemes.

1.2 Renewable Energy in East Ayrshire

- 1.2.1 In an East Ayrshire context, similar to much of rural Scotland, the demand for renewable energy production is most evident in relation to onshore wind farms. Guidance on Planning for Wind Energy is provided in separate Supplementary Guidance on the Council's website.
- 1.2.2 East Ayrshire Council is a signatory to the Scottish Declaration for Climate Change and this commits the Council to:
- Acknowledge that Climate Change is occurring
 - Welcome the opportunity to take action
 - Make a commitment to action
- 1.2.3 As part of this commitment, East Ayrshire Council submits an annual report that looks at the achievements to date of reducing carbon emissions and targets for the

year ahead. Reducing the carbon intensity of heat is essential to achieving the Scottish Government's targets and alleviating fuel poverty.

- 1.2.4 A number of small and large scale renewable heat technology developments have been consented in East Ayrshire. Most notably permission was granted for an energy centre incorporating a biomass boiler within Knockroon School Campus, Cumnock and Barr Killoch Energy Recovery Park, Ochiltree in 2017. Other consented applications are listed in Appendix I.

1.3 Background

- 1.3.1 Man-made climate change is considered to be one of the greatest global threats of the modern era. Human activity such as burning fossil fuels increases the concentrations of greenhouse gases in the atmosphere which in turn increases the global average temperature of the Earth. Scientists consider that an increase in temperature of 2 degrees, compared to the temperature in pre-industrial times, poses a higher risk to human health, wildlife and will cause extreme changes in the global environment (e.g. melting ice caps, extreme weather such as flooding and droughts, rising sea levels).
- 1.3.2 One way in which we can reduce the effects of climate change is to increase our use of renewable energy sources and become less reliant on fossil fuels. Renewable energy sources are energy forms which are basically inexhaustible, unlike fossil fuels, and can be used in heating, transportation and electricity generation. There are many forms of renewable energy sources such as wind (onshore and offshore), hydro, wave, tidal, biomass, solar, energy from waste and geothermal.

1.4 Heat Generation in Scotland

- 1.4.1 Heat is the biggest element of Scotland's energy use (accounting for 55% of final energy consumption) and is the largest source of our emissions (47% of total emissions). The Scottish Government has aimed to largely decarbonise the heat system by 2050 and has set a target of 11% of non-electrical heat demand to be generated from renewable energy sources by 2020.
- 1.4.2 A significant consideration for heat is where and when it is needed. Heat demand can vary over the day, at weekends and holidays and, in relation to space heating, demand is significantly higher in the winter months. In Scotland, the majority of heat is generated from gas transmitted from the North Sea through pipelines (the mains gas network) directly into homes and businesses. The gas is combusted in local boilers or Combined Heat and Power plants (CHP). Heat can also be generated by electricity.
- 1.4.3 There are opportunities to improve efficiency of heat distribution including district heating and thermal storage. In order to gain a greater understanding of the heat demand and supply needs across Scotland, the Scottish Government have developed an online Heat Map which can be used to identify heat demand areas and opportunities for heat networks. (See Section 5 for more information on Scotland's Heat Map).

- 1.4.4 The growth of a largely decarbonised heat sector within Scotland will become an important driver in tackling climate change. It can also alleviate fuel poverty by providing low-cost heat generated from renewable sources. Heat generation sources can include harvestable woodlands, sawmills producing biomass material, biogas production sites and developments producing unused excess heat, as well as geothermal systems, heat recoverable from mine waters, aquifers, other bodies of water and heat storage systems.
- 1.4.5 The Scottish Government's targets are expected to be met from a range of energy sources, including on and offshore wind, hydro, solar, biomass and geothermal technologies. The Scottish Government publishes an annual report providing an update on progress towards Scotland's renewable energy targets. The report "Energy in Scotland 2017", published by the Scottish Government¹, stated that progress has been made in the generation of renewable heat:
- In 2014, renewable heat generation equated to 3.8% of Scotland's non-electrical heat demand. (National target is 11%).
 - In 2015, biomass combustion (including biomass Combined Heat and Power) supplied almost 90% of renewable heat in Scotland.
 - Large renewable heat installations account for less than 1% of all Scottish installations but account for 71% of renewable heat output.
- 1.4.6 To reach this point, the Scottish Government have already allocated over half-a-billion pounds since 2009 on a suite of fuel poverty and energy efficiency programmes which have already made thousands of homes, businesses and public buildings warmer and more affordable to heat. The UK and Scottish Governments continue to commit long-term funding to develop local heat energy systems through a number of schemes (See Appendix II: Funding opportunities).

¹ Energy in Scotland, 2017, Scottish Government: <http://www.gov.scot/Resource/0051/00514474.pdf>

2. National and Local Policy Context

2.1 Climate Change (Scotland) Act 2009

2.1.1 The Climate Change (Scotland) Act 2009 sets a target of reducing greenhouse gas emissions (caused by human activity) by at least 42% by 2020 (and at least 80% by 2050). All public bodies have a duty under Section 44 of the Act to operate:

- In the way best calculated to contribute to the delivery of emissions targets in the Act
- In the way best calculated to help deliver the Scottish Government's climate change adaptation programme
- In a way that it considers most sustainable.

2.2 2020 Routemap for Renewable Energy in Scotland

2.2.1 To achieve the national targets on Climate Change, the Scottish Government's vision is to have a largely decarbonised energy system by 2050. The Scottish Government is firmly committed to increasing Scotland's renewable energy output and has set ambitious targets for the generation of renewable energy. The 2020 Routemap for Renewable Energy in Scotland, most recently updated in 2011, sets out the Government's targets for renewable energy generation and how these targets could be met.

2.3 Heat Policy Statement

2.3.1 The Heat Policy Statement sets out the Scottish Government's future policy direction for addressing the three key aspects of the Heat system:

- How we use heat (demand and its reduction)
- How we distribute and store it (heat networks and heat storage)
- Where our heat comes from (heat generation)

2.3.2 Each of these aspects of the heat system is addressed by three specific objectives as set out in the Scottish Government's Heat Hierarchy:

- reducing the need for heat
- supplying heat efficiently and at least cost to consumers
- using renewable and low carbon heat.

2.3.3 The Heat Policy Statement sets out the actions being taken by the Scottish Government, working in partnership with public, private and community groups to tackle the challenges to:

- Largely decarbonise its heat system by 2050, to reduce greenhouse gas emissions;
- Diversify its sources of heat generation and supply to reduce our reliance on fossil fuels and therefore support a resilient heat supply
- Reduce the pressure on household and business energy bills through reducing heat demand and providing affordable heat, in particular supporting the fuel poor

- Seize the sizeable economic opportunities that this transformation offers through the development of new heat generation, distribution and demand reduction programmes

2.4 National Planning Framework 3

2.4.1 National Planning Framework 3 (NPF 3), paragraph 2.7, seeks to transition to a low carbon economy and recognises the importance of the planning of urban and rural towns in supporting the decarbonisation of heat. As per paragraph 3.26, NPF 3 seeks to encourage greater use of all renewable technologies including the recovery of waste heat. It also supports the need to future-proof new development to ensure that connections to existing or planned heat networks are taken forward as soon as they are viable.

2.4.2 Given the relatively high energy costs for households in rural Scotland, paragraph 3.26, states that new approaches to heating including microgeneration will be required for rural developments to help reduce fuel costs. Furthermore, paragraph 3.24, seeks to secure greater community ownership of renewable energy developments. Local and community ownership and small-scale generation can have a lasting impact on rural Scotland, building business and community resilience and providing alternative sources of income.

2.5 Scottish Planning Policy (SPP)

2.5.1 In relation to Heat, paragraphs 158-160 of SPP require Local Development Plans to:

- *Use heat mapping to identify the potential for co-locating developments with a high heat demand with sources of heat supply.*
- *Support the development of heat networks in as many locations as possible, even where they are initially reliant on carbon-based fuels if there is potential to convert them to run on renewable or low carbon sources of heat in the future. Local Development Plans should identify where heat networks, heat storage and energy centres exist or would be appropriate and include policies to support implementation. Policies should support safeguarding of pipework within developments for later connection and pipework to the curtilage of development. Policies should also give consideration to the provision of energy centres within new development. Where a district network exists, or is planned, or in areas identified as appropriate for district heating, policies may include a requirement for new development to include infrastructure for connection, providing the option to use heat from the network.*
- *Where heat networks are not viable, microgeneration and heat recovery technologies associated with individual properties should be encouraged.*

2.6 East Ayrshire Carbon Management Strategy

2.6.1 The East Ayrshire Carbon Management Strategy, produced by the Council's Corporate Infrastructure service, is committed to considering green technologies as part of the capital programme in the form of wind turbines, heat pumps, biomass,

photovoltaic cells and grey water systems (recycle rain water). The East Ayrshire Carbon Management Strategy maps the way forward for East Ayrshire Council's energy consumption reduction for the period to 2020 and sets out the following objectives to reduce carbon consumption:

1. Reduce energy use in the buildings we operate
2. Reduce energy use in our housing stock
3. Contribute towards the aspirations of the "Zero Waste Plan"
4. Reduce the energy requirements of our street lighting
5. Reduce emissions from transport fleet
6. Raise energy awareness
7. Ensure that we procure goods and services that are energy efficient
8. Monitor, report and review energy consumption

2.6.2 In introducing and developing renewable energy technologies to all relevant sectors across the Council, consideration will be given to solar, biomass, wind and other renewable technology solutions including district heating systems. The use of heat mapping will assist in the identification of potential installation options.

2.7 East Ayrshire Local Development Plan

2.7.1 The Local Development Plan supports developments associated with the renewable generation of heat. Where non-renewable generation of heat is proposed, the Council will support these developments only where greenhouse gas emissions are significantly reduced, form part of a carbon capture development or where the applicant can demonstrate plans for conversion to renewable or low carbon sources of heat in the future. The Council will also be supportive of the provision of energy centres, where appropriate, within new development.

3. Heat Generation Technologies

3.1 The low carbon energy sector is fast moving and will continue to be shaped by technological innovation and a changing environment. This section of the Supplementary Guidance (SG) describes a range of different heat generation technologies accompanied by a table of supporting information.

3.2 Heat Pumps

3.2.1 There are three main types of heat pump: ground source, air source and water source. In general terms, a heat pump takes energy from the air, water or soil/ground to provide heating and hot water to a building. The heat pump consists of four components; a compressor, a source of heat, a condenser and a pressure reducer. They require some electricity to operate but they generally produce more energy than the electricity they use. Heat pumps can form part of a District Heating System or energy centre.

3.2.2 Ground Surface Heat Pumps (GSHP): GSHPs capture heat by passing a cool liquid through a system of pipes (vertical or horizontal) installed under the ground (trench or borehole) to absorb heat within the soil. The heated fluid passes through a compressor that raises the fluid to a higher temperature which can then heat water for heating systems such as underfloor heating or radiators in buildings. The cooled fluid passes back into the ground where it absorbs further energy from the ground in a continuous process as long as heating is required. There are two types of ground source heat pump system:

Closed Loop- The majority of ground source heat pumps installed are closed loop heat pumps. These systems extract heat from the ground via heat exchangers installed in boreholes (vertical systems) or shallow trenches (horizontal systems) within the ground.

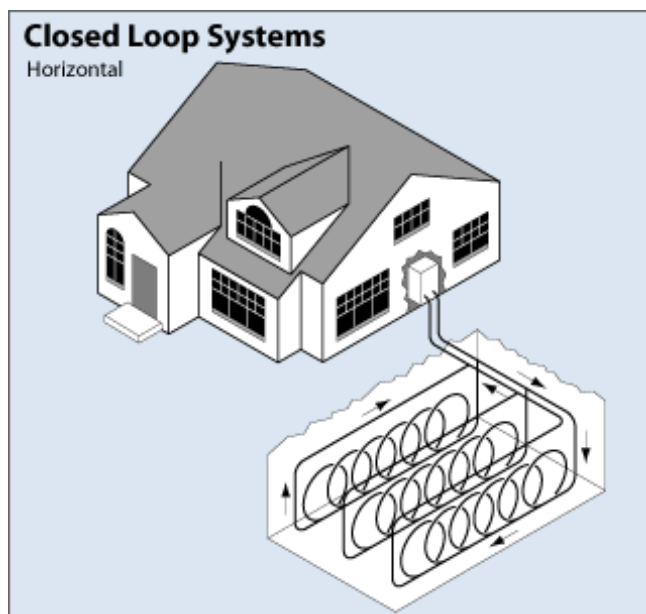
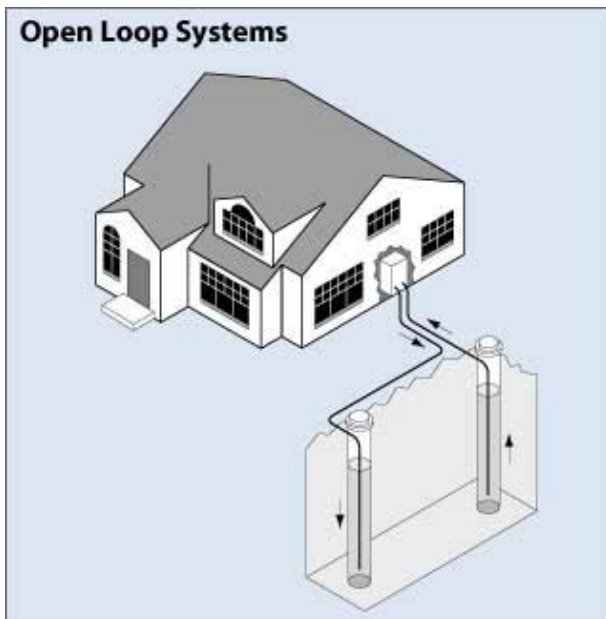


Figure 1: Heat Pump Closed Loop System operational process, Department of Energy, <https://energy.gov/energysaver/geothermal-heat-pumps>



Open Loop- The open-loop ground source heat pump uses ground water to pump around the system; however a number of installations of this type are decreasing because a groundwater source is required. The ground water is abstracted at ambient temperature from the ground, passed through a heat pump before being re-injected back into the ground or discharged surface.

Figure 2: Heat Pump Open Loop Systems operational process, Department of Energy, <https://energy.gov/energysaver/geothermal-heat-pumps>

- 3.2.3 GSHPs may not be suitable for every development. Most systems feature pipes laid in trenches as these are often cheaper to dig. A large amount of land is required for a trench system, however the land can be reverted back to its previous use or landscaped. A borehole system requires less land area but can be more expensive to install and therefore, may not be suitable for every site. In larger developments with open space or Sustainable Urban Drainage (SUDS) requirements, the ground source heat pumps can be placed beneath the surface of the water or open space in order to reduce the impact to the landscape.
- 3.2.4 Air Source Heat Pumps (ASHP): Air source heat pumps absorb heat from the air at a low temperature into a liquid. The fluid passes through a compressor where the temperature increases and then transfers the higher temperature heat into the building. Air source heat pumps can also be used for cooling. ASHP do not generally require extensive underground pipework, however the compressor is required to be fitted to a wall or placed on the ground of a building. The performance of ASHP will vary throughout the year.

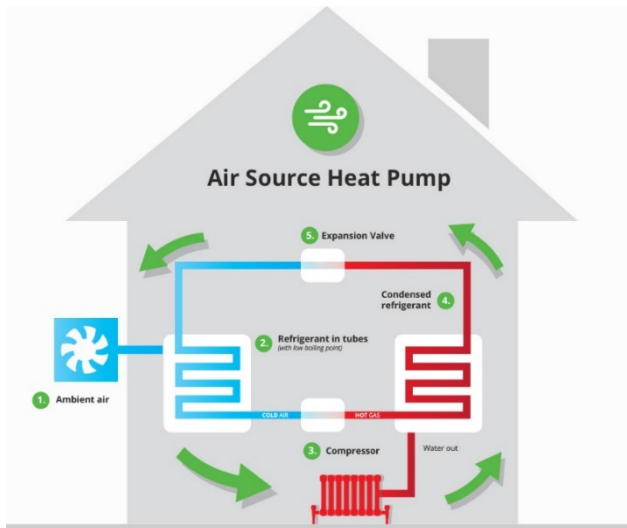


Figure 3: Air Source Heat Pump operational process, Heat Different,
<http://www.heatdifferent.co.uk/our-products/air-source-heat-pumps/>

3.2.5 Water Source Heat Pumps (WSHP): Heat from ground water can be generated by pumping water from a traditional well or from a borehole and returning it to the ground. For WSHP, it is essential to consider the siting of the technology as sufficient land or a water body will be required to accommodate the necessary equipment.

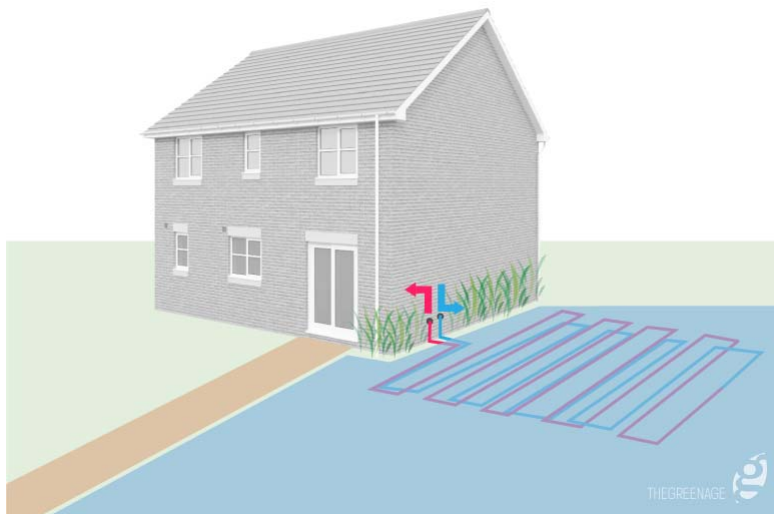


Figure 4: Water source Heat Pump operational process, The Greenage,
<https://www.thegreenage.co.uk/tech/water-source-heat-pumps/>

3.2.6 Supporting information that may be required to aid assessment against Schedule 1 for heat pump proposals

Consideration	Impact	Guidance and Information Required
Landscape and Visual	The likelihood of adverse impacts is dependent on the scale of the built development or on the possibility of combining into one energy centre apparatus for a number of developments.	<i>The landscape and visual impacts of a development will be assessed on all occasions. The level and extent of any landscape and visual impacts will depend on the scale of development that is proposed and should be identified in any landscape and visual impact assessment.</i>
Ecology	Proposals can result in impacts on ecology. Impacts could involve a loss of habitat or habitat connectivity. Ecological impacts on the water environment should also be considered. Smaller-scale development such as single domestic heat pump installations may have less potential for significant impacts.	<p><i>Consideration of potential impacts on protected areas and protected species will be required. Professional Advice for developers is available at:</i> https://www.snh.scot/professional-advice.</p> <p><i>The applicant should ensure trenching works or boreholes have no adverse impact on any ecological site with or without adequate mitigation. An Initial Phase 1 habitat assessment may be required depending on the size of the scheme and if the site is close to any sensitive receptors.</i></p> <p><i>Any development that may adversely impact on areas of local importance for nature conservation, including provisional wildlife sites, local geodiversity sites and local nature reserves, will be expected to demonstrate how the impact can be avoided or mitigated (See Policy ENV 6: Nature Conservation of LDP)</i></p> <p><i>Early consultation with Scottish Natural Heritage (SNH) may be required.</i></p> <p><i>Contact list for SNH can be found at the following link:</i> https://www.snh.scot/professional-advice/planning-and-development/consulting-snh-planning-and-development.</p>
Peat and Carbon Rich Soils	East Ayrshire has many areas of upland and lowland raised bog containing various qualities of peat as well as areas of carbon rich soil. There is a potential impact on habitats due to changes in hydrology and the release of carbon through disturbance of carbon-	<p><i>Any application for a heat pump development must state whether existing areas of carbon rich soil, deep peat or peatland habitats will be disturbed. If these areas are to be affected, the carbon losses arising from the disturbance of the peat must be assessed and any losses should be minimised.</i></p> <p><i>A link to SNH's Carbon and Peatland 2016</i></p>

	rich soils especially in rural locations depending on the scale, type and location of heat pump infrastructure.	<p><u>map is in the Useful Links and Further Information section of this guidance.</u></p> <p>Consultation with SNH may be required.</p> <p>Contact list for SNH can be found at the following link: https://www.snh.scot/professional-advice/planning-and-development/consulting-snh-planning-and-development.</p>
Water Environment	Impacts from water abstraction, pollution from surface water draining and changes to flood risk mainly arise from heat pump developments.	<p>Water extraction proposals are likely to require a CARS licence in line with the Water Framework Directive and The Water Environment (Controlled Activities) (Scotland) Regulations 2011. Any excavation works should have no impacts on any water course.</p> <p>Engage with Scottish Environmental Prevention Agency (SEPA) at an early stage in the process. Contact for SEPA: planning.sw@sepa.org.uk</p> <p>Early Consultation with the Council's Flood Prevention Officer may also be required: enquiries@ayrshireroadsalliance.org</p> <p>Information that should be submitted as part of an application:</p> <ul style="list-style-type: none"> - Water abstraction rates and circulation within the energy system/heat pump - Information on current water quality and any impacts arising from any proposed abstraction or discharge - A flood risk assessment (if appropriate) - Details of hydrology and drainage of proposed site and an assessment of impact. <p>If a Drinking Water Area is present it might require protection through mitigation actions. Similarly, below ground assets, such as water and sewer mains, can be affected by heavy construction traffic and may require protection. Scottish Water will be required to be consulted: DevelopmentOperations@ScottishWater.co.uk</p>
Historic Environment	The cultural heritage of East Ayrshire comprises some 2,680 archaeological sites, buildings, monuments and artefacts. Impacts on these are	<p>Any impacts from renewable heat developments on the historic environment of East Ayrshire should be fully assessed and if appropriate, mitigation measures should be identified.</p>

	likely to either be direct impacts such as archaeological disturbance or indirect (setting) impacts. The level of impact will depend on the scale and location of the proposal.	<p><i>Early consultation with Historic Environment Scotland (HES) may be required.</i></p> <p><i>HES pre-application engagement contact: hmenquiries@hes.scot</i></p> <p><i>Early consultation with WOSAS may be required: enquiries@wosas.glasgow.gov.uk</i></p>
Access and Transport	Large-scale proposals could result in an increase in traffic and require dedicated access particularly during the construction stage of the proposal.	<p><i>The location of the proposal should be carefully considered in terms of its relationship to existing public access and whether there will be a need to divert access paths either temporarily or on a permanent basis. Applicants should detail which routes construction traffic will use during the construction phase.</i></p> <p><i>A separate statutory procedure requires to be followed to allow the temporary or permanent diversion of footpaths.</i></p> <p><i>Early consultation with Ayrshire Roads Alliance (ARA) may be required: enquiries@ayrshireroadsalliance.org</i></p>
Impact on Communities	<p>Visual Impact- there may be visual impact from heat pump infrastructure depending on type and scale of development</p> <p>Noise and Vibration- these can arise from construction, boreholes, operation or creating trenches.</p> <p>Pollution- there may be impacts of pollution or contamination of land or watercourses.</p>	<p><i>Visual Impact- visualisations should be submitted showing impacts from any sensitive receptors including settlement boundaries, individual dwellings or paths.</i></p> <p><i>Noise Impacts- all applications should adhere to best practice construction guidance in relation to noise and hours of construction. Early consultation with the Council's Environmental Health Department required: environmentalhealth@east-ayrshire.gov.uk</i></p> <p><i>Pollution- Permits and licensing relating to groundwater investigation, abstraction or discharge are administered by SEPA.</i></p> <p><i>Early consultation with SEPA may be required: planning.sw@sepa.org.uk</i></p>
Net Economic Benefits	Proposals can contribute to net economic benefits in terms of direct and indirect employment and investment in the local economy.	<i>Proposals for renewable heat should provide a statement, proportionate to the scale of the development, of the socio-economic benefits that will arise from the development e.g. employment, supply chain opportunities or associated business.</i>
Contribution to Renewable Energy and	Proposals could make a significant contribution to meeting the energy targets of	<i>Subject to meeting environmental criteria and all relevant LDP policies, the Council will be in favour of renewable energy proposals which</i>

Greenhouse Gas Emission Targets	the Scottish Government for electricity and heat demand as well as reducing greenhouse gas emissions.	<p><i>contribute to the reduction of greenhouse gas emissions and meet the Scottish Government's targets in this regard.</i></p> <p><i>Applications should contain a statement setting out how the proposal contributes to reducing greenhouse gas emissions. Subject to the above comments, the Council will be supportive of proposals which contribute to the Scottish Government's renewable energy targets where the proposals comply with relevant National policy and regulations (which will be a significant consideration in the assessment of any proposal).</i></p>
Cumulative Impacts	Any cumulative impact with other proposed and consented developments should be assessed and should examine air quality, pollution, ecological and transport impacts.	<i>All applications will be assessed on a case-by-case basis.</i>

3.3 **Biomass and Combined Heat and Power (CHP)**

3.3.1 Biomass is the general term for organic matter from forestry, agricultural sources or food waste which is processed to form a solid or liquid fuel. Bio-fuelled boilers burn biomass, bio-diesels or bio-gasses to provide heat in a similar process to coal, oil or gas. Bio-fuelled heating is considered low carbon or near carbon neutral as the bio-fuels absorb similar levels of carbon dioxide in its growth as it gives off in its combustion. A biomass boiler is normally connected to the central heating or hot water system within a building. Large biomass power stations require structures such as a furnace, generator and a transformer while the smallest installations can consist of a single wood burning stove.

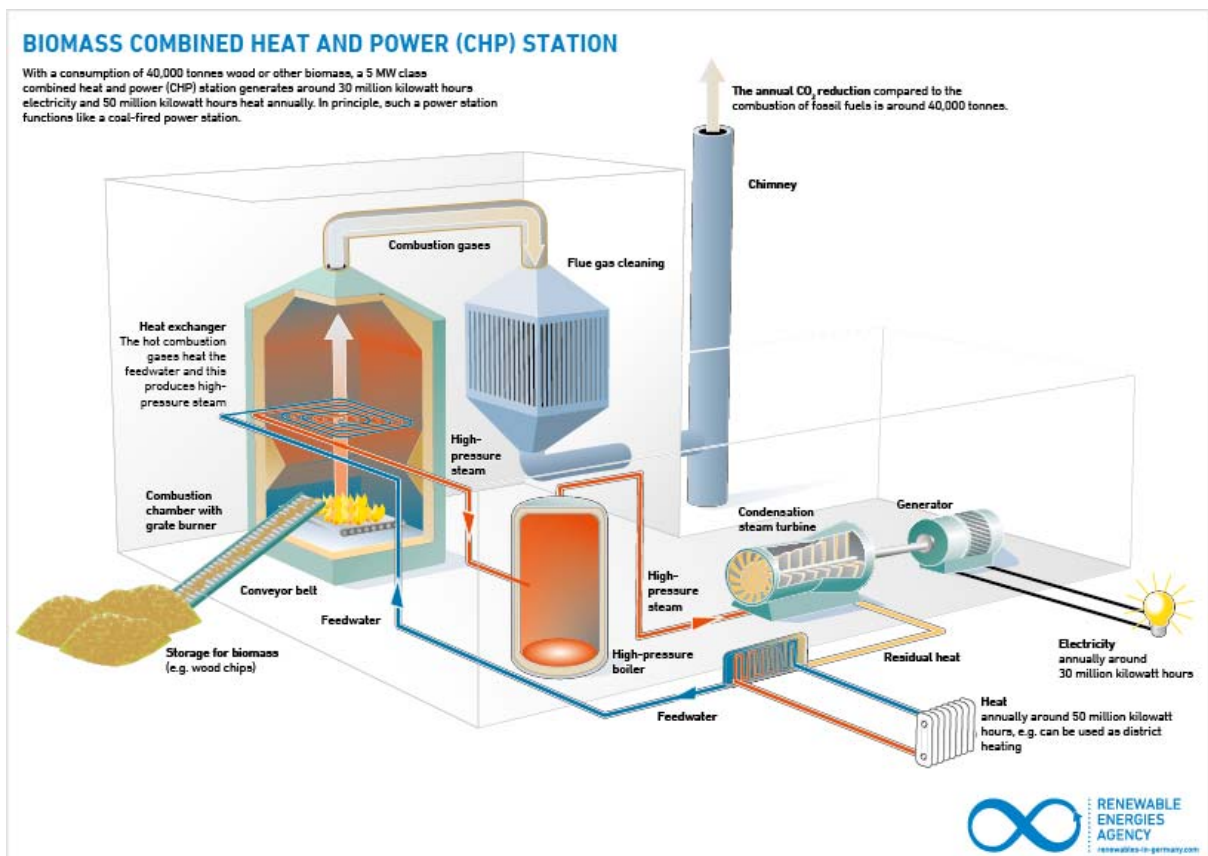


Figure 5: Biomass Combustion operational process, Renewable Energies Agency, <https://www.unendlich-viel-energie.de/media-library/charts-and-data/biomass-combined-heat-and-power-station>

3.3.2 Biomass is most effective when a local fuel source is used as this reduces the transport impacts and therefore, the carbon dioxide emissions. Proposals should provide sufficient space to store and gain access to the fuel to avoid frequent transport deliveries within the proposed site. Domestic biomass boilers can be larger than regular domestic boilers and this should be factored into the design of the development.

- 3.3.3 Combined Heat and Power (CHP) plants are designed so that much of the heat produced, as a consequence of generating electricity, can be efficiently recycled for local space and water heating for residential or industrial use. A CHP system can run on a range of fuels including biomass, energy from waste and fossil fuels. CHP plants are most commonly used in industrial processes where energy efficiency helps users to lower costs, improve their competitiveness and reduce their carbon emissions. CHP is also used in district heating systems and is being increasingly used in the public sector (such as in hospitals). Currently, most of the renewable heat generated in Scotland is from biomass heat and Combined Heat and Power (CHP) facilities.
- 3.3.4 Biomass and CHP developments in East Ayrshire to date have mainly involved small scale installation of boilers and associated buildings to provide a heating source for domestic residences in urban and rural locations.
- 3.3.5 The Scottish Government would prefer to see biomass be developed in heat only or good quality CHP schemes, to consume off-gas grid wherever possible, and at an appropriate scale so that any heat is supplied locally. There are several reasons for this approach:
- Biomass for heat-only or CHP will be essential to meet Scotland's target for renewable heat;
 - Biomass or CHP for heat is 80-90% energy efficient compared to 30% in electricity only schemes.
 - Biomass using off-grid gas delivers the highest carbon savings and makes the greatest impact on alleviating fuel poverty;

3.3.6 Supporting Information that may be required to aid assessment against Schedule 1 for biomass and CHP proposals

Biomass Supply

When submitting an application for a biomass boiler or CHP facilities, the applicant must consider the supply of the biomass source. The Scottish Government and Forestry Commission Scotland are keen to ensure that a sustainable supply of biomass fuel is available and that the co-location of supply to users is considered as part of any biomass scheme.

Applicants should be clear where the biomass will be sourced from and ensure that, where possible, this is from renewable sources. The Forestry Commission can provide further information on potential sources of fuel (See Useful Links and Further Information in Section 10). You can also search for your local fuel supplier here: <https://biomass-suppliers-list.service.gov.uk/find-a-fuel>

Trees and Forestry

When submitting an application for a biomass boiler or CHP plant, applicants should consider whether the proposal will directly affect trees subject to Tree Preservation Orders (TPO) or where there are Ancient and Semi-Natural Woodlands. Tree surveys should be undertaken and the Council's Senior Arboricultural Officer should be consulted.

In line with Policy ENV9 of the LDP, there will be a presumption against the loss of ancient woodland and semi-natural woodland or trees protected by a TPO. Compensatory planting will be required to the satisfaction of the Council and Forestry Commission Scotland and in line with the provisions of the Ayrshire and Arran Forestry and Woodland Strategy. Any loss of trees or woodland should be quantified in the early stages of a proposal. A felling licence may be required from the Forestry Commission Scotland where development involves loss of trees or forestry. (SNH should also be consulted on the potential loss of Ancient and Semi-Natural Woodlands).

Consideration	Impact	Guidance/Information Required
Landscape and Visual	There is the potential for impacts on landscape and visual amenity from biomass and CHP developments which require substantial built structures such as a flue or tower.	<i>The landscape and visual impacts of a development will be assessed on all occasions. The level and extent of a landscape and visual impact assessment (LVIA) required will depend on the scale of development that is proposed and also where the development is located. Smaller</i>

		<i>schemes will be assessed on a case-by-case basis as to whether there is a requirement for an LVIA.</i>
Ecology	Depending on the scale and location of the proposal, biomass and CHP schemes can result in direct impacts on ecology as well as contributing to the loss of habitat or habitat connectivity.	<p><i>Consideration of potential impacts on protected areas and protected species will be required. Professional Advice for developers is available at: https://www.snh.scot/professional-advice.</i></p> <p><i>An Initial Phase 1 Habitat Assessment may be required depending on the scale and location of the proposal.</i></p> <p><i>Any development that may adversely impact on areas of local importance for nature conservation, including provisional wildlife sites, local geodiversity sites and local nature reserves, will be expected to demonstrate how the impact can be avoided or mitigated (See Policy ENV 6: Nature Conservation of LDP)</i></p> <p><i>Protected species should be considered.</i></p> <p><i>Early consultation with SNH may be required.</i></p> <p><i>Contact list for SNH can be found at the following link: https://www.snh.scot/professional-advice/planning-and-development/consulting-snh-planning-and-development.</i></p>
Access and Transport	Biomass and CHP development could potentially have significant impacts on the road network with the scale of delivery of biomass supply dependent on the scale of development.	<p><i>A Transport Assessment may be required for large-scale developments. All applications for biomass and CHP should include a description of site access and parking, anticipated vehicle movements, frequency and volume of deliveries and anticipated heavy loads.</i></p> <p><i>Early consultation with ARA will be required: enquiries@ayrshireroadsalliance.org</i></p>
Air Quality	There is potential for developments to have impacts on air quality including Nitrogen Dioxide, small particles and Sulphur Dioxide emissions.	<i>An Air Quality Assessment will be required for all biomass and CHP developments (no matter the scale of the development). The following information should be included in an Air Quality Assessment:</i>

		<ul style="list-style-type: none"> - <i>Justification for choice of location in relation to proximity to settlements</i> - <i>Net reduction in carbon emissions as a result of the choice of fuel</i> - <i>Emissions standard of boiler</i> <p><i>Early consultation with the Council's Environmental Health Department and SEPA: environmentalhealth@east-ayrshire.gov.uk</i></p> <p>SEPA: planning.sw@sepa.org.uk</p>
Historic Environment	The cultural heritage of East Ayrshire comprises some 2,680 archaeological sites, buildings, monuments and artefacts. Impacts on these are likely to either be direct impacts such as archaeological disturbance or indirect (setting) impacts. The level of impact will depend on the scale and location of the proposal.	<p><i>Any impact from renewable heat developments on the historic environment of East Ayrshire should be fully assessed and if appropriate, mitigation measures should be identified.</i></p> <p><i>Early consultation with Historic Environment Scotland may be required.</i></p> <p><i>HES pre-application engagement contact: hmenquiries@hes.scot</i></p> <p><i>Early consultation with WOSAS required: enquiries@wosas.glasgow.gov.uk</i></p>
Impact on Communities	<p>Air quality and pollution- there may be impacts on air pollution in urban areas from biomass and CHP developments.</p> <p>Noise, odour and dust- there may be impacts from the operation of biomass boilers, odour and dust directly from the flue or chimney emissions.</p> <p>Transport- there may be impacts relating to the delivery of biomass supply</p>	<p><i>Biomass and CHP developments may be located within the urban area, therefore it is important that any impacts on communities are carefully considered.</i></p> <p><i>Air Quality assessments will be required for all biomass and CHP developments- see Air Quality consideration.</i></p> <p><i>Early consultation with the Council's Environmental Health Department required: environmentalhealth@east-ayrshire.gov.uk</i></p> <p><i>Noise reduction features may be required to be incorporated into the design of the plant. Operations that will give rise to noise should be located as far away as possible from sensitive receptors e.g. dwellings.</i></p> <p><i>See Transport and Access consideration- early consultation with Ayrshire Roads Alliance will be required.</i></p>
Net Economic Benefits	Proposals can contribute to net economic benefits in terms of direct and indirect employment and	<i>Proposals for renewable heat should provide a statement, proportionate to the scale of the development, of the socio-</i>

	investment in the local economy.	<i>economic benefits that will arise from the development e.g. employment, supply chain opportunities or associated business.</i>
Contribution to Renewable Energy and Greenhouse Gas Emission Targets	Proposals could make a significant contribution to meeting the energy targets of the Scottish Government for electricity and heat demand as well as reducing greenhouse gas emissions.	<i>Subject to meeting environmental criteria and all relevant LDP policies, the Council will be in favour of renewable energy proposals which contribute to the reduction of greenhouse gas emissions and meet the Scottish Government's targets in this regard. Applications should contain a statement setting out how the proposal contributes to reducing greenhouse gas emissions. Subject to the above comments, the Council will be supportive of proposals which contribute to the Scottish Government's renewable energy targets where the proposals comply with relevant National policy and regulations (which will be a significant consideration in the assessment of any proposal).</i>
Cumulative Impacts	Any cumulative impact with other proposed and consented developments should be assessed and should examine air quality, pollution, ecological and transport impacts.	<i>All applications will be assessed on a case-by-case basis.</i>

3.4 **Solar thermal/Photovoltaic Cells (PV)**

- 3.4.1 Solar panels are made up of photovoltaic (PV) cells which capture the sun's energy to produce electricity. These panels are typically seen on south facing roof slopes of homes and buildings, but they can also be installed as free-standing structures in gardens or fields (see Figure 6).



Figure 6: Free-standing solar arrays, The Renewable Energy Hub,
<https://www.renewableenergyhub.co.uk/>

- 3.4.2 Connecting several solar panels together creates what is known as a solar array. This section of the guidance will examine free-standing solar photovoltaic systems for large-scale commercial or industrial uses.



Figure 7: Solar Hot Water Installation, Energy Matters,
<http://www.energymatters.com.au/solar-hot-water/solar-hot-water-projects/>

3.4.3 Solar hot water systems comprise of solar collectors (tubes or flat plates), a heat transfer system and a hot water store (hot water tank). Water is pumped through the solar panel and heated by solar energy. The heated water flows through a heat exchanger so that water, stored in the hot water tank, is heated. These systems can be used for domestic use, light industrial or agricultural use. They are less sensitive to shading than PV panels.

Domestic solar (PV) panel systems are addressed in the Microgeneration section of this guidance.

3.4.4 Supporting Information that may be required to aid assessment against Schedule 1 for solar thermal and solar photovoltaic (PV) cells

Consideration	Impact	Guidance/Information Required
Landscape and Visual	There is the potential for landscape and visual amenity impacts depending on the scale and location of the scheme. Solar arrays can result in potentially significant impacts through “glint and glare” and can change the character of a rural landscape. Ancillary development including access tracks, security fencing and CCTV cameras may also have an impact.	<p><i>For a solar array or large scale developments, a Landscape and Visual Impact Assessment will be required. Clear illustrations showing the panels and ancillary development should be submitted with any application.</i></p> <p><i>Other information which will be required includes:</i></p> <ul style="list-style-type: none"> - <i>Description of landscape character and setting</i> - <i>Equipment to be installed (e.g. number, colour, size of panels, pitch/elevation of panels, foundations)</i> - <i>Layout and design (include any landscaping and earthworks)</i> - <i>Details of ancillary infrastructure required.</i> - <i>Details on the use of natural features to be used to screen any security fencing required</i> - <i>Maintenance regime of land around panels during operation of development</i>
Aviation	Large-scale solar array developments can cause “glint and glare” which could have implications for aircraft navigation.	<p><i>For large-scale developments, applicants should engage with the Civil Aviation Authority and Prestwick Airport to identify potential impacts of the proposal.</i></p> <p><i>Contact for Civil Aviation Authority:</i> aerodromes@caa.co.uk</p> <p><i>Contact for Prestwick Airport:</i> safeguarding@glasgowprestwick.com</p>
Ecology	Solar array developments can result in direct impacts on ecology as well as displacement of species, loss	<i>Consideration of potential impacts on protected areas and protected species will be required. Professional Advice for developers is available at:</i>

	<p>of habitat and habitat connectivity. Depending on the location of the proposal, there is the potential for impacts on nationally and locally designated sites (SPA, SAC, and SSSI) or a sensitive landscape (wild land).</p> <p>There is also the potential for solar array developments to have an impact on birds (collision risk). The process of returning the land to its previous state after decommissioning should also be considered.</p>	<p>https://www.snh.scot/professional-advice.</p> <p><i>An initial Phase 1 Habitat Assessment may be required dependent on the location (proximity to sensitive receptors) and scale of the scheme. If a development is located close to or within a nationally or locally designated site, an ecological assessment will be required.</i></p> <p><i>Any development that may adversely impact on areas of local importance for nature conservation, including provisional wildlife sites, local geodiversity sites and local nature reserves, will be expected to demonstrate how the impact can be avoided or mitigated (See Policy ENV 6: Nature Conservation of LDP)</i></p> <p><i>Solar array developments can present an opportunity for biodiversity enhancement as these sites tend to encounter little disturbance from humans and machinery once construction is complete. A site-specific biodiversity action plan should be devised for a proposal where enhancements to biodiversity are likely.</i></p> <p><i>Applicants should examine SNH guidance: “Large scale solar photovoltaic installations: considering landscape, visual and ecological impacts” for more advice on biodiversity enhancements.</i></p> <p><i>In some instances fencing/appropriate measures may be required to facilitate continued access by animals such as deer, foxes and badgers.</i></p> <p><i>Early consultation with SNH may be required.</i></p> <p><i>Contact list for SNH can be found at the following link:</i> https://www.snh.scot/professional-advice/planning-and-development/consulting-snh-planning-and-development.</p>
<p>Peat and Carbon Rich Soil</p>	<p>East Ayrshire has many areas of upland and lowland raised bog containing various qualities of peat as well as areas of carbon rich soil. In most cases, there is likely to be little ground disturbance associated with solar arrays, however, ancillary infrastructure in and around</p>	<p><i>Any solar array development must confirm whether existing areas of carbon rich soil, deep peat or peatland habitats will be disturbed. If these areas are to be affected, the carbon losses arising from the disturbance of the peat must be assessed and any losses should be minimised.</i></p> <p><i>Early consultation with SNH may be required.</i></p>

	areas of peat and carbon rich soil may have an impact.	<p>Contact list for SNH can be found at the following link: https://www.snh.scot/professional-advice/planning-and-development/consulting-snh-planning-and-development.</p>
Water Environment	Solar arrays may result in potential surface water run-off, which could impact on the drainage of the site and increase the risk of flooding.	<p>There may be a requirement for a Flood Risk Assessment (FRA). This would be considered on a case-by-case basis.</p> <p>Early consultation will be required with SEPA and the Council's Flood Prevention Officer.</p> <p>Contact for SEPA: planning.sw@sepa.org.uk</p> <p>Contact for the Council's Flood Prevention Officer: enquiries@ayrshireroadsalliance.org</p> <p>If a Drinking Water Area is present it might require protection through mitigation actions. Similarly, below ground assets, such as water and sewer mains, can be affected by heavy construction traffic and may require protection. Scottish Water will be required to be consulted: DevelopmentOperations@ScottishWater.co.uk</p>
Access and Transport	Depending on the scale and location of the development, there may be temporary closure or diversion of public access required.	<p>The location of the proposal should be considered in relation to existing public access and whether there is a need to divert access paths temporarily or permanently.</p> <p>A separate statutory procedure requires to be followed to allow the temporary or permanent diversion of footpaths.</p> <p>Early consultation with Ayrshire Roads Alliance will be required: enquiries@ayrshireroadsalliance.org</p> <p>The application should contain detailed information on the following:</p> <ul style="list-style-type: none"> - Existing path routes and access of site - Paths/areas available for the public to access during construction phase - Paths/areas available for the public to access during operational phase - Details of any path diversions or closures
Historic Environment	The cultural heritage of East Ayrshire comprises some 2,680 archaeological sites, buildings, monuments and artefacts. Impacts on these are likely to either be direct impacts such as	<p>Any impact from renewable heat developments on the historic environment of East Ayrshire should be fully assessed and if appropriate, mitigation measures require to be identified.</p> <p>Early consultation with Historic Environment</p>

	archaeological disturbance or indirect (setting) impacts. This will depend on the scale and location of the proposal. Setting can also be affected by noise, dust or vibration.	<p><i>Scotland may be required.</i></p> <p><i>HES pre-application engagement contact:</i> hmenquiries@hes.scot</p> <p><i>Early consultation with WOSAS required:</i> enquiries@wosas.glasgow.gov.uk</p>
Impact on Communities	There may be visual impacts, including glint and glare from solar array developments depending on the scale and location of proposal.	<i>Visualisations should be submitted as part of the planning application showing impacts in relation to settlement boundaries and individual dwellings and paths, where appropriate.</i>
Net Economic Benefits	Proposals can contribute to net economic benefits in terms of direct and indirect employment and investment in the local economy.	<i>Proposals for renewable heat should provide a statement, proportionate to the scale of the development, of the socio-economic benefits that will arise from the development e.g. employment, supply chain opportunities or associated business.</i>
Contribution to Renewable Energy and Greenhouse Gas Emission Targets	Proposals could make a significant contribution to meeting the energy targets of the Scottish Government for electricity and heat demand as well as reducing greenhouse gas emissions.	<p><i>Subject to meeting environmental criteria and all relevant LDP policies, the Council will be in favour of renewable energy proposals which contribute to the reduction of greenhouse gas emissions and meet the Scottish Government's targets in this regard.</i></p> <p><i>Applications should contain a statement setting out how the proposal contributes to reducing greenhouse gas emissions. Subject to the above comments, the Council will be supportive of proposals which contribute to the Scottish Government's renewable energy targets where the proposals comply with relevant National policy and regulations (which will be a significant consideration in the assessment of any proposal).</i></p>
Cumulative Impacts	Any cumulative impact with other proposed and consented developments should be assessed and should examine air quality, pollution, ecological and transport impacts.	<i>All applications will be assessed on a case-by-case basis.</i>

3.5 **Energy from Waste (EfW)**

3.5.1 Energy from waste is the process of creating energy, in the form of electricity and/or heat, from incinerating municipal and commercial waste thus resulting in less waste going to landfill and reducing our reliance on fossil fuels. Energy generated from waste can play an important role in meeting energy requirements and could contribute up to 31% towards Scotland's renewable heat target for 2020 and 4.3% to the electricity target for 2020. However, in order to be truly sustainable, EfW should only be used with resource streams which cannot offer greater environmental benefits through reuse or recycling.

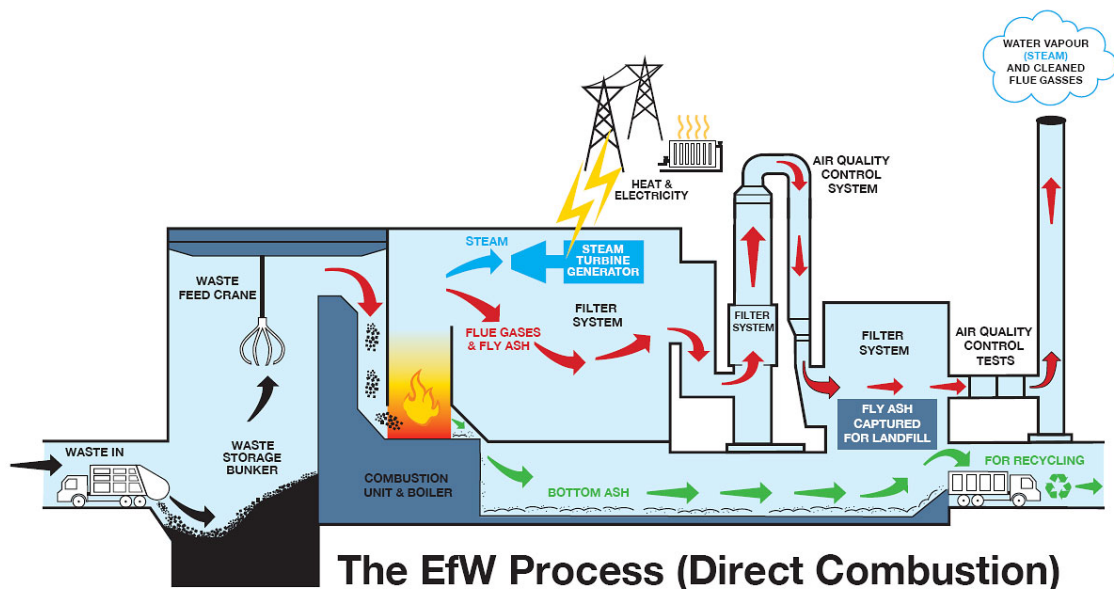


Figure 8: The Energy from Waste process, Arc21, <http://www.arc21.org.uk/opencontent/?itemid=27§ion=Residual+Waste+Project>

3.5.2 EfW facilities can provide energy to District Heating Systems and Combined Heat and Power plants. For some District Heating Systems, hot water can be pumped underground through insulated pipes from the EfW facility and enter properties through a heat exchanger supplying heating and hot water needs. All EfW facilities must support sustainable water management and not impede recycling and waste prevention. Preferred locations for EfW development takes account of the proximity of waste streams, end users (e.g. buildings with high heat demand such as hospitals), rail links or road infrastructure.

3.5.3 EfW plants are regulated under the Pollution Prevention and Control (Scotland) (PPC) Regulations 2012. To operate an EfW facility, the applicant must apply for a permit under the PPC regulations from SEPA. A number of assessments are required when submitting a PPC application for a permit including air modelling and a Human Health Impact Assessment. More information on the application process can be found here: <https://www.sepa.org.uk/regulations/waste/energy-from-waste/>

3.5.4 It should be noted that EfW developments also apply to the Council's LDP policies for waste management. Policy WM6: Recovery or Disposal of Waste states that proposals for development associated with the recovery and/or disposal of waste, including energy recovery from waste, will be supported by the Council where certain criteria can be met. All proposals for energy from waste facilities and thermal treatment plants must achieve high efficiency in terms of energy recovery and will be required to provide a Heat and Power Plan for the proposed facility in accordance with SEPA's Thermal Treatment of Waste Guidelines 2014. An Environmental Impact Assessment (EIA) may be required for EfW facilities.

3.5.5 Supporting Information that may be required to aid assessment against Schedule 1 for EfW facilities

Considerations	Impact	Guidance/Information Required
Landscape and Visual	There is the potential for impacts on landscape and visual amenity from developments which require substantial built structures such as buildings, waste handling areas and chimneys/towers.	<p><i>The landscape and visual impacts of an EfW development will be assessed on all occasions. The level and extent of landscape and visual impact assessment (LVIA) required will depend on the scale of development that is proposed and also where the development is located.</i></p> <p><i>Site layout, building design, boundary treatment and lighting should be considered.</i></p> <p><i>Buffer distances may be considered by the planning authority as per SPP paragraph 191:</i></p> <p><i>Consideration should be given to the need for buffer zones between dwellings or other sensitive receptors and some waste management facilities. As a guide, appropriate buffer distances may be:</i></p> <ul style="list-style-type: none"> - <i>100m between sensitive receptors and recycling facilities, small-scale thermal treatment or leachate treatment plant;</i> - <i>250m between sensitive receptors and operations such as outdoor composting, anaerobic digestion, mixed waste processing, thermal treatment or landfill gas plant</i> - <i>greater distances may be required between sensitive receptors and landfill sites</i>
Ecology	Depending on the scale and location of the new proposals, energy from waste facilities	<i>Consideration of potential impacts on protected areas and protected species will be required. Professional Advice for</i>

	can result in direct impacts on ecology as well as loss of habitat or habitat connectivity.	<p>developers is available at: https://www.snh.scot/professional-advice.</p> <p><i>An Initial Phase 1 Habitat Assessment may be required depending on the scale and location of the proposal.</i></p> <p><i>Early consultation with SNH may be required.</i> <i>Any development that may adversely impact on areas of local importance for nature conservation, including provisional wildlife sites, local geodiversity sites and local nature reserves, will be expected to demonstrate how the impact can be avoided or mitigated (See Policy ENV 6: Nature Conservation of LDP)</i></p> <p><i>Contact list for SNH can be found at the following link:</i> https://www.snh.scot/professional-advice/planning-and-development/consulting-snh-planning-and-development.</p>
Access and Transport	Energy from Waste facilities could potentially have significant impacts on the road network given the need to transport waste and waste by-products to and from the site.	<p><i>A Transport Assessment may be required for large-scale developments. All applications for EfW developments should include a description of site access and parking, anticipated vehicle movements, frequency and volume of deliveries and anticipated heavy loads.</i></p> <p><i>Early consultation with Ayrshire Roads Alliance will be required:</i> enquiries@ayrshireroadsalliance.org</p>
Air Quality	There is the potential for developments to have impacts on air quality including odour and air quality issues.	<p><i>An Air Quality Assessment will be required for all developments. The following information should be included in an Air Quality Assessment:</i></p> <ul style="list-style-type: none"> - <i>Justification for choice of location in relation to proximity to settlements</i> - <i>Net reduction in carbon emissions</i> - <i>Emissions standard of combustion unit/boiler</i> - <i>Impacts on air quality particularly in nearby communities</i> <p><i>Early consultation with Council's Environmental Health Department and SEPA may be required:</i></p>

		<p>environmentalhealth@east-ayrshire.gov.uk</p> <p>Contact for SEPA: planning.sw@sepa.org.uk</p>
Historic Environment	<p>The cultural heritage of East Ayrshire comprises some 2,680 archaeological sites, buildings, monuments and artefacts. Impacts on these are likely to either be direct impacts such as archaeological disturbance or indirect (setting) impacts. This will depend on the scale and location of the proposal.</p>	<p><i>Any impact from EfW developments on the historic environment of East Ayrshire should be fully assessed and if appropriate, mitigation measures require to be identified.</i></p> <p><i>Early consultation with Historic Environment Scotland and/or WOSAS required.</i></p> <p><i>HES pre-application engagement contact: hmenquiries@hes.scot</i></p> <p><i>WOSAS contact: enquiries@wosas.glasgow.gov.uk</i></p>
Impact on Communities	<p>Air quality and pollution- there may be impacts on air pollution in urban areas from EfW plants due to storage of waste. There also may be odour and other air quality issues arising from storage/operation of the EfW plant.</p> <p>Noise and dust- there may be impacts from the operation of boilers engines, handling equipment and dust directly from the chimney emissions.</p> <p>Transport- there may be impacts relating to transporting waste material and by-products to and from the site.</p>	<p><i>EfW developments can be located within an urban area. It is important therefore that impacts on communities are fully and carefully considered.</i></p> <p><i>Air Quality assessments will be required for all Energy from Waste developments- see Air Quality consideration.</i></p> <p><i>Early consultation with Council's Environmental Health Department: environmentalhealth@east-ayrshire.gov.uk</i></p> <p><i>Noise reduction features may be required to be incorporated into the design of the plant. Operations that will give rise to noise should be located as far away as possible to sensitive receptors e.g. dwellings.</i></p> <p><i>Transport- See Transport and Access consideration.</i></p> <p><i>Early consultation with Ayrshire Roads Alliance will be required: enquiries@ayrshireroadsalliance.org</i></p>
Net Economic Benefits	<p>Proposals can contribute to net economic benefits in terms of direct and indirect employment and investment in the local economy.</p>	<p><i>Proposals for EfW developments should provide a statement, proportionate to the scale of the development, of the socio-economic benefits that will arise from the development e.g. employment, supply chain opportunities or associated business.</i></p>

<p>Contribution to Renewable Energy and Greenhouse Gas Emission Targets</p>	<p>Proposals could make a significant contribution to meeting the energy targets of the Scottish Government for electricity and heat demand as well as reducing greenhouse gas emissions.</p>	<p><i>Subject to meeting environmental criteria and all relevant LDP policies, the Council will be in favour of renewable energy proposals which contribute to the reduction of greenhouse gas emissions and meet the Scottish Government's targets in this regard.</i></p> <p><i>Applications should contain a statement setting out how the proposal contributes to reducing greenhouse gas emissions. Subject to the above comments, the Council will be supportive of proposals which contribute to the Scottish Government's renewable energy targets where the proposals comply with relevant National policy and regulations (which will be a significant consideration in the assessment of any proposal).</i></p>
<p>Cumulative Impacts</p>	<p>Any cumulative impact with other proposed and consented developments should be assessed and should examine air quality, pollution, ecological and transport impacts.</p>	<p><i>All applications will be assessed on a case-by-case basis.</i></p>

3.6 Anaerobic Digestion

- 3.6.1 Anaerobic Digestion (AD) is the breakdown of organic material such as food waste and crops by micro-organisms in the absence of oxygen. This process produces a bio-gas which is methane-rich which can be used to produce heat, electricity or a combination of both.

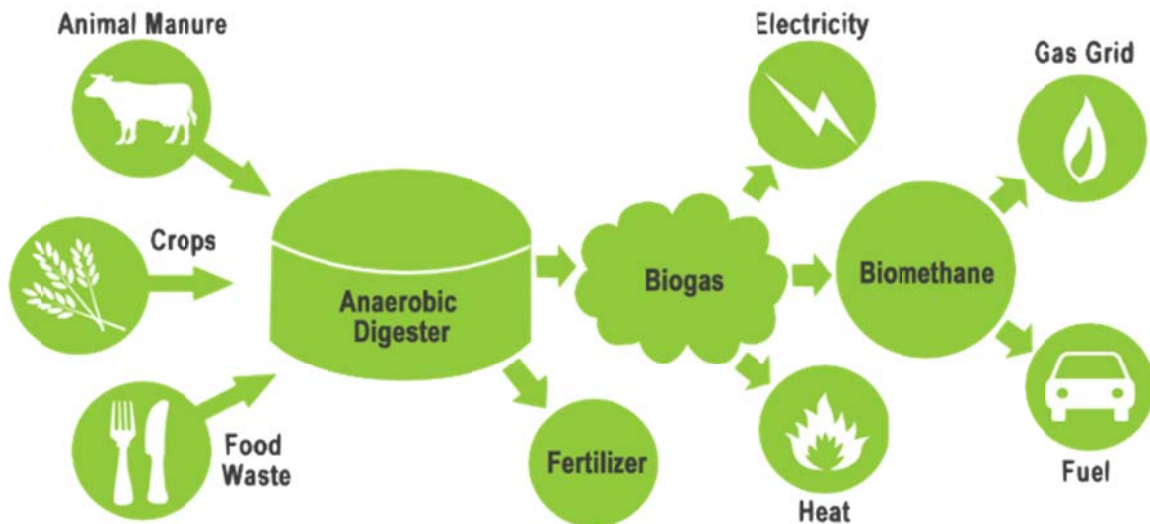


Figure 9: The Process of Anaerobic Digestion, Eco food recycling,
<http://www.ecofoodrecycling.co.uk/news/2016/04/27/lets-talk-anaerobic-digestion/>

- 3.6.2 Anaerobic digestion provides an alternative to large quantities of biodegradable waste going to landfill which could result in a significant amount of harmful greenhouse gases being released into the atmosphere. The bio-gas produced from anaerobic digestion can be used to supply heating systems within a site or to the surrounding area or can be used for combined heat and power (CHP) schemes.
- 3.6.3 Anaerobic digestion plants can be developed at two broad scales. Firstly, small-scale plants can be designed to treat the household biodegradable waste of a village or group of villages or can be situated on farms to treat that farm's agricultural wastes. Secondly, large-scale centralised facilities can be developed, which may co-digest municipal wastes with other wastes such as agricultural wastes, sewage sludge and industrial organic wastes. It is considered that these large-scale plants would be more suited to areas allocated for business or industrial use.
- 3.6.4 A typical anaerobic digestion plant will comprise of waste water pre-treatment equipment, a digester tank, a gas storage tank, a flare stack, associated pipework and buildings to house ancillary equipment such as a generator. The most visible elements of a plant is the flare stack, used for burning off surplus gas. The ground around anaerobic digestion tanks and in waste reception areas require to be paved and bunded to prevent pollution from any accidental discharge of spilled wastes. A collection system can be installed within and around the plant to enable spilled waters to be collected and pumped either directly into the digester or into a mixing tank to increase the water content of the solid waste.

3.6.5 Supporting Information that may be required to aid assessment against Schedule 1 for Anaerobic Digestion plants

Consideration	Impact	Guidance/Information Required
Landscape and Visual	<p>There is the potential for impacts on landscape and visual amenity from developments which require substantial built structures such as buildings, waste handling area and stacks.</p> <p>It will be desirable for plants to be located as close to the waste source as possible.</p>	<p><i>The landscape and visual impacts of a development will be assessed on all occasions. The level and extent of landscape and visual impact assessment (LVIA) required will depend on the scale of development that is proposed and also where the development is located.</i></p> <p><i>Site layout, site location, building design, boundary treatment and height of stack should be considered.</i></p> <p><i>As per SPP, appropriate buffer distances may be considered by the planning authority. Consideration should be given to the need for buffer zones between dwellings or other sensitive receptors and any proposed anaerobic digestion plants. As a guide, a 250m buffer distance should be considered between the proposed plant and sensitive receptor.</i></p>
Ecology	<p>Depending on the scale and location of the new proposals, energy from AD facilities can result in direct impacts on ecology as well as loss of habitat or habitat connectivity.</p>	<p><i>Consideration of potential impacts on protected areas and protected species will be required. Professional Advice for developers is available at: https://www.snh.scot/professional-advice.</i></p> <p><i>An Initial Phase 1 Habitat Assessment may be required depending on the scale and location of the proposal.</i></p> <p><i>Any development that may adversely impact on areas of local importance for nature conservation, including provisional wildlife sites, local geodiversity sites and local nature reserves, will be expected to demonstrate how the impact can be avoided or mitigated (See Policy ENV 6: Nature Conservation of LDP)</i></p> <p><i>Early consultation with SNH may be required.</i></p> <p><i>Contact list for SNH can be found at the following link: https://www.snh.scot/professional-advice/planning-and-development/consulting-snh-planning-and-development.</i></p>
Water Environment	<p>Waste water can be produced when the solid digestate is de-watered. This can contain</p>	<p><i>Tanks and digesters may be required to be surrounded by containment bunding of either concrete or clay.</i></p> <p><i>Early consultation with SEPA is required and a</i></p>

	relatively high concentrations of metals, dissolved nitrogen and organic material and may cause pollution if left untreated.	<p>PPC licence will be required.</p> <p>Contact for SEPA: planning.sw@sepa.org.uk</p> <p>If a Drinking Water Area is present it might require protection through mitigation actions. Similarly, below ground assets, such as water and sewer mains, can be affected by heavy construction traffic and may require protection. Scottish Water will be required to be consulted: DevelopmentOperations@ScottishWater.co.uk</p>
Air Quality	There is the potential for AD developments to have impacts on air quality and for odour issues to arise.	<p>An Air Quality Assessment will be required for all developments. The following information should be included in an Air Quality Assessment:</p> <ul style="list-style-type: none"> - Justification for choice of location in relation to proximity to settlements - Net reduction in carbon emissions - Details of emissions from stack - Any proposals to minimise odour (if relevant). <p>Early consultation with Council's Environmental Health Department and SEPA will be required.</p> <p>Contact for the Council's Environmental Health Dept.: environmentalhealth@east-ayrshire.gov.uk</p> <p>Contact for SEPA: planning.sw@sepa.org.uk</p>
Historic Environment	The cultural heritage of East Ayrshire comprises some 2,680 archaeological sites, buildings, monuments and artefacts. Impacts on these are likely to either be direct impacts such as archaeological disturbance or indirect (setting) impacts. This will depend on the scale and location of the proposal.	<p>Any impact from AD developments on the historic environment of East Ayrshire should be fully assessed and if appropriate, mitigation measures should be identified.</p> <p>Early consultation with Historic Environment Scotland and/or WOSAS required.</p> <p>HES pre-application engagement contact: hmenquiries@hes.scot</p> <p>WOSAS contact: enquiries@wosas.glasgow.gov.uk</p>
Access and Transport	Anaerobic Digestion facilities could potentially have significant impacts on the road network from the transport of waste and waste by-products	<p>A Transport Assessment may be required for large-scale developments. All applications for Anaerobic Digestion developments should include a description of site access and parking, anticipated vehicle movements, frequency and volume of deliveries and anticipated heavy loads.</p>

	to and from the site.	<i>Early consultation with Ayrshire Roads Alliance will be required:</i> enquiries@ayrshireroadsalliance.org
Impact on Communities	<p>Air quality and pollution- there may be impacts of air pollution in urban areas due to provision for storage of waste, odour and other air quality issues.</p> <p>Noise- there may be impacts in relation to the operation of equipment.</p> <p>Transport- there may be impacts relating to transporting waste material and by-products to and from the site</p>	<p><i>As Anaerobic Digestion developments may be located within an urban area, it is important that impacts on communities are carefully considered. Air Quality assessments will be required for all anaerobic digestion plants- see Air Quality consideration.</i></p> <p><i>Noise reduction features may be required to be incorporated into the design of the development. Operations that will give rise to noise should be located as far away as possible from sensitive receptors e.g. dwellings.</i></p> <p><i>Early consultation with Council's Environmental Health Department: environmentalhealth@east-ayrshire.gov.uk</i></p> <p><i>See Transport and Access consideration. Early consultation with Ayrshire Roads Alliance will be required:</i> enquiries@ayrshireroadsalliance.org</p>
Net Economic Benefits	Proposals can contribute to net economic benefits in terms of direct and indirect employment and investment in the local economy.	<i>Proposals for AD plants should provide a statement, proportionate to the scale of the development, of the socio-economic benefits that will arise from the development e.g. employment, supply chain opportunities, associated business.</i>
Contribution to Renewable Energy and Greenhouse Gas Emission Targets	Proposals could make a significant contribution to meeting the energy targets of the Scottish Government for electricity and heat demand as well as reducing greenhouse gas emissions.	<p><i>Subject to meeting environmental criteria and all relevant LDP policies, the Council will be in favour of renewable energy proposals which contribute to the reduction of greenhouse gas emissions and meet the Scottish Government's targets in this regard.</i></p> <p><i>Applications should contain a statement setting out how the proposal contributes to reducing greenhouse gas emissions. Subject to the above comments, the Council will be supportive of proposals which contribute to the Scottish Government's renewable energy targets where the proposals comply with relevant National policy and regulations (which</i></p>

		<i>will be a significant consideration in the assessment of any proposal).</i>
Cumulative Impacts	Any cumulative impact with other proposed and consented developments should be assessed and should examine air quality, pollution, ecological and transport impacts.	<i>All applications will be assessed on a case-by-case basis.</i>

3.7 **Hydro**

3.7.1 Hydropower produces about 12% of Scotland's electricity, with potential remaining to introduce new hydro schemes and expand or improve on existing facilities. Hydro technology uses running water to generate electricity and thereafter, heat. Scotland's wet climate and mountainous terrain, especially on the west coast means it is well placed to make use of the technology on a large scale. Hydro power is a cost-effective electricity and heat source. There are 3 main types of hydroelectric schemes in use in the UK:



Reservoir schemes (Impoundment) - A dam or series of dams hold water back in flooded valleys, creating a hydraulic head from which electricity is generated. These often operate with a vertical fall of greater than 25m. The majority of Scotland's large hydro stations are based around the use of a dam and impoundment reservoir.

Figure 10: Reservoir hydro scheme, SEPA,
<https://www.sepa.org.uk/making-the-case/water/water-economy/hydropower-consultant/unlocking-hydropower/>

Run-of-river schemes (Diversion) - these schemes involve a proportion of water being diverted via a weir into a pipe to a turbine, which generates electricity, before returning the water to the river downstream. These schemes can often operate on a vertical fall of 20m or less.

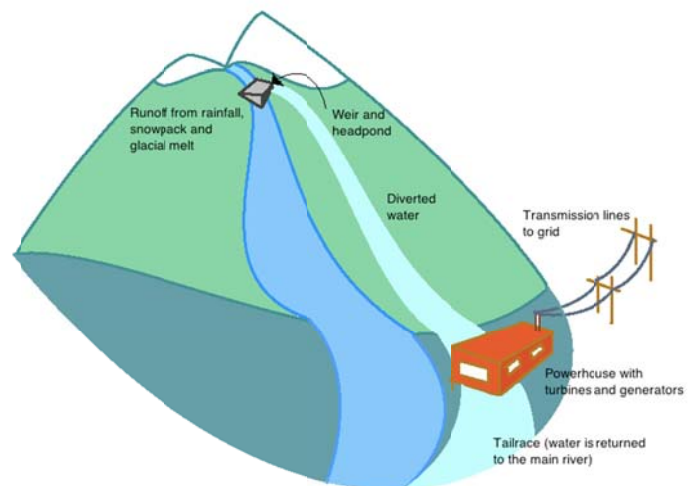


Figure 11: Process of run-of-river scheme, Energy BC,
<http://www.energybc.ca/runofriver.html>



Pumped storage-

Schemes allow off-peak electricity to be used to pump water from a river or lower reservoir to a high reservoir to allow its release during peak times. These schemes are not energy sources but are storage devices.

Figure 12: Pumped hydro storage, Department of Energy,
<https://www.energystorageexchange.org/projects/553>

3.7.2 Supporting Information that may be required to aid assessment against Schedule 1 of hydro schemes

SEPA

SEPA is supportive of renewable energy developments and has a team focussing on streamlining and assessing applications for hydro developments. It is SEPA's duty to license hydro schemes and to ensure that the benefits delivered from renewable energy generation balance against any environmental impact

When developing a hydro power scheme, the development will require CARS authorisation which is regulated by the Water Environment (Controlled Activities) (Scotland) Regulations 2011. All hydropower schemes will have to demonstrate appropriate mitigation to ensure that impacts to the environment are reduced to an acceptable level.

For more information visit: <https://www.sepa.org.uk/regulations/water/hydropower/>

Trees and Forestry

When submitting an application for a hydro scheme, applicants should consider whether the proposal will directly affect trees subject to Tree Preservation Orders (TPO) or where there are Ancient and Semi-Natural Woodlands. Tree surveys should be undertaken and the Council's Senior Arboricultural Officer should be consulted.

In line with Policy ENV9 of the LDP, there will be a presumption against the loss of ancient woodland and semi-natural woodland or trees protected by a TPO. Compensatory planting will be required to the satisfaction of the Council and Forestry Commission Scotland and in line with the provisions of the Ayrshire and Arran Forestry and Woodland Strategy. Any loss of trees or woodland should be quantified in the early stages of a proposal. A felling licence may be required from the Forestry Commission Scotland where development involves loss of trees or forestry. (SNH should also be consulted on the potential loss of Ancient and Semi-Natural Woodlands).

Consideration	Impact	Guidance/Information Required
Landscape and Visual	Schemes can result in localised landscape and visual amenity impacts depending on the scale of the proposal. This can be the result of weirs/dams or ancillary infrastructure such as pipework, access tracks and buildings.	<i>For large-scale commercial developments, a Landscape and Visual Impact Assessment will be required. Other proposals will be assessed on a case-by-case basis. Cumulative landscape and visual impacts with other proposed and consented developments should be assessed (if appropriate).</i>
Ecology	<p>Hydro schemes can result in direct impacts on ecology including loss of habitat or habitat connectivity depending on the scale and location of proposal. Schemes can also cause obstruction of riparian corridors or loss of habitat networks. The impact of ancillary development required to operate the hydro scheme should also be considered.</p> <p>Schemes can also result in impacts on strictly protected species such as Arctic Charr. This could be as a result of changes in watercourse as a result of abstraction, disturbance or displacement of supporting habitat as a result of construction of ancillary building.</p>	<p><i>Consideration of potential impacts on protected areas and protected species will be required. Professional Advice for developers is available at: https://www.snh.scot/professional-advice.</i></p> <p><i>An initial Phase 1 Habitat Assessment is required for all developments of hydro schemes. Depending on location, further detailed studies maybe required to ascertain what species may/may not be on the site.</i></p> <p><i>Any development that may adversely impact on areas of local importance for nature conservation, including provisional wildlife sites, local geodiversity sites and local nature reserves, will be expected to demonstrate how the impact can be avoided or mitigated (See Policy ENV 6: Nature Conservation of LDP)</i></p> <p><i>Early consultation with SNH will be required and further information can be found in SNH guidance "Hydroelectric schemes and the natural heritage."</i></p> <p><i>Contact list for SNH can be found at the following link: https://www.snh.scot/professional-advice/planning-and-development/consulting-snh-planning-and-development.</i></p>
Water Environment	<p>Schemes can have a significant impact on water quality and the ecological status of the water environment.</p> <ul style="list-style-type: none"> - Changes can arise in ecological status as a result of impoundment (reservoir) and changes in water flow 	<p><i>All hydro proposals will require a CARS licence which is administered by SEPA.</i></p> <p><i>The timing of a CARS licence should be carefully considered in relation to the planning process.</i></p> <p><i>Schemes should meet the terms of the Water Framework Directive and the relevant River Basin Management Plans. The</i></p>

	<p>in rivers</p> <ul style="list-style-type: none"> - Pollution from construction - Flooding and surface water drainage. <p>Hydro schemes can also have the potential to impact on Groundwater-Dependent Terrestrial Ecosystems.</p>	<p><i>current ecological status of waterbodies will be a key consideration when identifying potential locations for hydro schemes.</i></p> <p><i>Applicants should refer to SEPA Pollution Prevention Guidelines and early consultation with SEPA will be required.</i></p> <p><i>Contact for SEPA:</i> planning.sw@sepa.org.uk <i>A Flood Risk Assessment may be required for hydro schemes. SEPA will require developers to include mitigation measures to protect the water environment.</i></p> <p><i>If a Drinking Water Area is present it might require protection through mitigation actions. Similarly, below ground assets, such as water and sewer mains, can be affected by heavy construction traffic and may require protection. Scottish Water will be required to be consulted:</i> DevelopmentOperations@ScottishWater.co.uk</p>
Peat and Carbon-rich soils	<p>East Ayrshire has many areas of upland and lowland raised bog containing various qualities of peat as well as areas of carbon rich soil.</p> <p>Ancillary development associated with hydro schemes such as access tracks and buildings could have an impact in terms of:</p> <ul style="list-style-type: none"> - Habitat loss due to changes in hydrology - Loss of sensitive species and habitats - Release of carbon through disturbance of carbon rich soils 	<p><i>Any hydro development must confirm whether existing areas of carbon rich soil, deep peat or peatland habitats will be disturbed. If these areas are to be affected, the carbon losses arising from the disturbance of the peat must be assessed and any losses should be minimised.</i></p> <p><i>Early consultation with SNH may be required.</i></p> <p><i>Contact list for SNH can be found at the following link:</i> https://www.snh.scot/professional-advice/planning-and-development/consulting-snh-planning-and-development.</p>
Trees, Woodland and Forestry	<p>Proposals may result in the felling of trees and woodland to accommodate access tracks or ancillary infrastructure.</p>	<p><i>A tree survey should be undertaken, where relevant. Any loss of trees or woodland should be quantified in the early stages of a proposal.</i></p> <p><i>Compensatory planting will be required to the satisfaction of the Council and Forestry Commission Scotland and in line with the provisions of the Ayrshire and Arran Forestry and Woodland Strategy.</i></p>

<p>Historic Environment</p>	<p>The cultural heritage of East Ayrshire comprises some 2,680 archaeological sites, buildings, monuments and artefacts. Impacts on these are likely to either be direct impacts such as archaeological disturbance or indirect (setting) impacts. This will depend on the scale and location of the proposal.</p>	<p><i>Any impact from hydro developments on the historic environment of East Ayrshire should be fully assessed and if appropriate, mitigation measures will require to be identified.</i></p> <p><i>Early consultation with Historic Environment Scotland and/or WOSAS required.</i></p> <p><i>HES pre-application engagement contact:</i> hmenquiries@hes.scot</p> <p><i>WOSAS contact:</i> enquiries@wosas.glasgow.gov.uk</p>
<p>Access and Transport</p>	<p>Hydro schemes may result in an increase in traffic and require special access arrangements during the construction phase.</p> <p>Schemes can also result in the temporary closure or diversion of public access including Rights of Way and Core Paths.</p>	<p><i>The location of the proposal should be carefully considered in terms of its relationship to existing public access, and whether there will be a need to divert paths temporarily or permanently.</i></p> <p><i>Additional information required:</i></p> <ul style="list-style-type: none"> - <i>Detailed plan of public access across the site and immediate hinterland</i> - <i>Existing public access</i> - <i>Paths/areas available for public access during construction</i> - <i>Paths/areas of public access available after completion</i> - <i>Details of any diversion of paths temporary or permanent</i> <p><i>A separate statutory procedure requires to be followed to allow the temporary or permanent diversion of footpaths.</i></p> <p><i>Early consultation with ARA may be required:</i> enquiries@ayrshireroadsalliance.org</p>
<p>Impact on Communities</p>	<p>Visual Impact: some sites may be visible from paths and roads.</p> <p>Noise: impacts can result from the scheme or during the construction stage. The level of disturbance will depend on the distance from residential properties and communities of the development.</p>	<p><i>Visual Impact: visualisations should be submitted with the planning application showing impacts from any sensitive receptors such as settlement boundaries, individual dwellings and paths.</i></p> <p><i>Noise: applications should adhere to best practice construction guidance in relation to noise and hours of operation. Early consultation with the Council's Environmental Health Department required:</i> environmentalhealth@east-ayrshire.gov.uk</p>

	Safety Issues: the site including individual components of the hydro scheme should be considered in terms of public safety, especially during the construction stage.	<i>Safety Issues: Details should be provided as part of the planning application in relation to security on site (temporary and permanent) as well as the location of signage, scale and type of fencing required.</i>
Net Economic Benefits	Proposals can contribute to net economic benefits in terms of direct and indirect employment and investment in the local economy.	<i>Proposals for renewable heat should provide a statement, proportionate to the scale of the development, of the socio-economic benefits that will arise from the development e.g. employment, supply chain opportunities or associated business.</i>
Contribution to Renewable Energy and Greenhouse Gas Emission Targets	Proposals could make a significant contribution to meeting the energy targets of the Scottish Government for electricity and heat demand as well as reducing greenhouse gas emissions.	<i>Subject to meeting environmental criteria and all relevant LDP policies, the Council will be in favour of renewable energy proposals which contribute to the reduction of greenhouse gas emissions and meet the Scottish Government's targets in this regard. Applications should contain a statement setting out how the proposal contributes to reducing greenhouse gas emissions. Subject to the above comments, the Council will be supportive of proposals which contribute to the Scottish Government's renewable energy targets where the proposals comply with relevant National policy and regulations (which will be a significant consideration in the assessment of any proposal).</i>
Cumulative Impacts	Any cumulative impact with other proposed and consented developments should be assessed and should examine air quality, pollution, ecological and transport impacts.	<i>All applications will be assessed on a case-by-case basis.</i>

4. District Heating

4.1 What is District Heating?

4.1.1 The term “district heating” refers to a network system for distributing heat from a central location (instead of individual boilers in homes) to meet requirements for heating and hot water in residential and commercial developments. Networks vary in size and length from carrying heat a few hundred metres between a relatively small number of homes and flats, to several kilometres supplying whole communities and industrial areas. Heat is normally generated in an energy centre and distributed through a pipe network to which customers are connected. District Heat networks can be supplied by a diverse range of sources including:

- Power stations
- Energy from Waste (EfW) facilities
- Industrial processes
- Biomass boilers and Combined Heat and Power (CHP) plants
- Gas-fired CHP units
- Fuel cells
- Heat pumps (ground, air and water)
- Geothermal sources
- Electric boilers and solar thermal arrays.

4.1.2 The main component of a district heating system other than the energy centre consists of the primary pipe network below ground level. The primary pipe network transports heat in the form of hot water or steam to each consumer, the hot water or steam is passed through a heat exchanger which is then passed onto heating systems such as radiators within buildings and is used as space heating and/or hot water. The anticipated lifetime of the pipework is around 40 to 50 years.

4.1.3 There are various development models for delivering and operating district heating such as:

- District heating networks to serve new housing or mixed use development
- Networks to serve public buildings such as hospitals and schools
- Social housing development schemes- owned/managed by local authorities or housing associations
- Energy from Waste facilities can serve District Heating networks

4.2 Advantages to District Heating Systems

4.2.1 Compared to owning and operating a single boiler, a switch to district heating can benefit users in a number of ways:

- District Heating systems can generate heat at low costs which can contribute to reducing fuel poverty
- Systems are built with stand-by heating capacity (more than one boiler) to ensure that heat is always available to the user.
- Compared to older heating systems, district heating provides heat that can be easily controlled within a building for the user.

- Within a new building, the owner avoids the cost of purchasing a boiler/individual boilers and associated facilities such as a flue.
- The user only pays for the heat that is actually used leading to substantial savings in energy.
- Domestic hot water can be generated instantly through a dedicated heat exchanger, saving losses incurred with storage and eliminating the time delay in regeneration.

4.3 Cost of District Heating Networks

4.3.1 The largest element of capital cost is the heat network. The pipe required is expensive as is installation. Installation requires a trench to be made, preparation of the bed of the trench for the pipe, joining the steel and insulating cover and re-instatement of the trench. In urban areas, the pipe route will need to be navigated around existing services (water, sewage, gas and electricity pipes). The Scottish Government state that the cost per metre of a heat pipe ranges from £400 per metre for the smallest diameters of pipe (20mm) to almost £3,000 per metre for the largest (1,100mm).

4.4 District Heating in East Ayrshire

4.4.1 There are currently no district heating systems operating in East Ayrshire. However, there are a number of proposals for individual heat generation technologies which could be connected with a District Heating system in the future. The East Ayrshire LDP supports in principle the development of heat and electricity generation proposals, such as biomass, combined heat and power plants, energy from waste and heat pumps. Where compatible proposals are located near large-scale users of heat such as public buildings, sport and leisure facilities, hospitals, schools, residential areas etc. the opportunity for providing district heating should be fully investigated and implemented where feasible.

4.4.2 In addition, where applicable, proposals for new development should ensure that the site can be connected to heat networks including district heating, which may be developed in the future. This will require developers to safeguard sufficient capacity within the site's infrastructure to allow pipework to be connected to premises within the site and to future heat networks. For example, there are benefits of co-locating heat networks with green networks. This could improve the multifunctional aspect of green networks and might bring the added practical benefit of improving access to pipework.

5. Heat Mapping

5.1 The Need for Heat

5.1.1 A key consideration for heat is where it is needed. All new heat generating developments should, be located as close as possible to potential heat users so that the possibility of developing heat networks, including district heat networks, can be investigated.

5.1.2 SPP requires Local Development Plans to support the development of heat networks in as many locations as possible and states that heat mapping should be used to identify the potential for co-locating developments with a high heat demand with sources of heat supply. Heat demand refers to how much heating or cooling is needed and heat supply refers to how much heating or cooling can be provided.

5.2 Scotland's Heat Map

5.2.1 Scotland's Heat Map (<http://heatmap.scotland.gov.uk/>) was developed by the Scottish Government as a tool to identify where there are opportunities for decentralised energy projects across Scotland. It can be used to identify where there are opportunities for district heat networks, to assess heat density and proximity to heat sources. Data within the Heat Map includes:

Heat Demand: Scotland's Heat Map includes a scale of heat demand ranging from blue areas which are classed as low heat demand areas to red areas which are classed as high heat demand areas. High heat demand tends to be associated with urban areas (such as Kilmarnock) where there is more dense building layouts and where there are buildings with constant high heat demand such as swimming pools, hospitals and industrial buildings. As shown on Map 1, high heat demand is not exclusive to large urban areas. Towns such as Cumnock, Mauchline, Stewarton and Galston can be identified as areas with relatively high heat demand. In addition, there may be high heat demand at individual sites within rural communities or in the rural area such as school buildings, recreation facilities and industrial sites.

Energy Supply: These have been identified by locating sources of waste streams, surplus heat (e.g. from industrial buildings), sites suitable for biomass and heat pumps. As shown on Map 2, Scotland's Heat Map has indicated the existing and potential renewable heat generation technologies that can be developed in East Ayrshire. The Heat Map identifies the opportunities for onshore wind, water source heat pumps, landfill gas, heat only boilers and energy from waste facilities².

5.2.2 Heat maps can assist in spatial planning and co-locating areas of high heat demand and need with heat supply opportunities. The data held within Scotland's Heat Map will be subject to ongoing updates and can form a useful baseline of information for developing heat networks for the future. The opportunities for developing more detailed maps and the feasibility of creating heat networks will be examined in more detail as part of the Council's preparatory work for LDP 2.

² Scotland's Heat Map may only show existing and the potential for large scale developments and does not identify microgeneration developments which may be already operational.

Scotland Heat Map

www.gov.scot/heatmap

Reset Layers

Create Report

Heat Demand

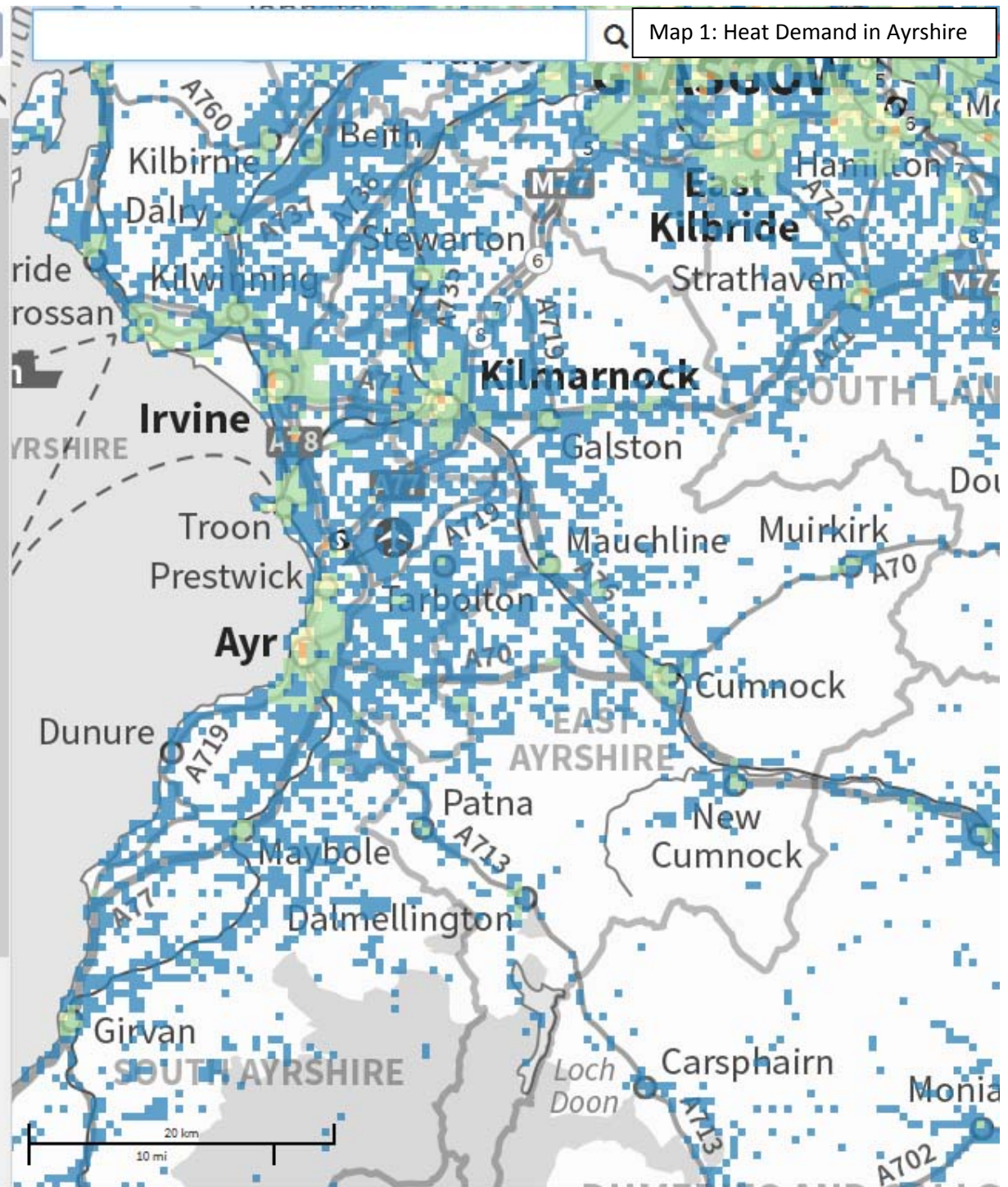
1 Active Layers

- Heat Demand (Auto Scale)
- + Heat Demand (1km²)
- + Heat Demand (500m²)
- + Heat Demand (250m²)
- + Heat Demand (50m²)
- + Confidence (1km²)
- + Confidence (500m²)
- + Confidence (250m²)
- + Confidence (50m²)
- + Datazone Summary
- + Settlement Heat Demand

Energy Supply

0 Active Layers

Geothermal



Scotland Heat Map

www.gov.scot/heatmap

Reset Layers











Create Report

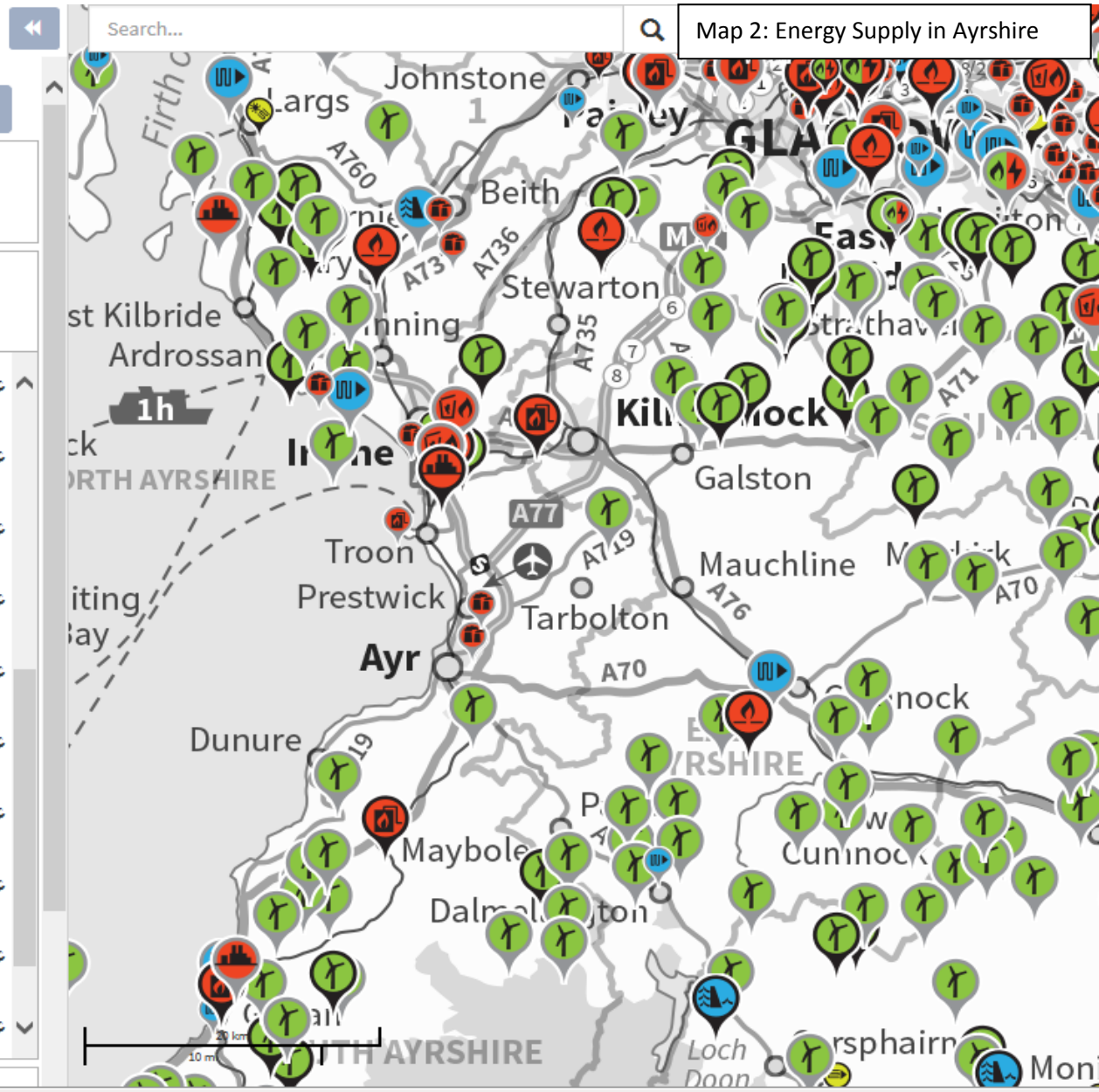
Heat Demand

0 Active Layers

Energy Supply

14 Active Layers

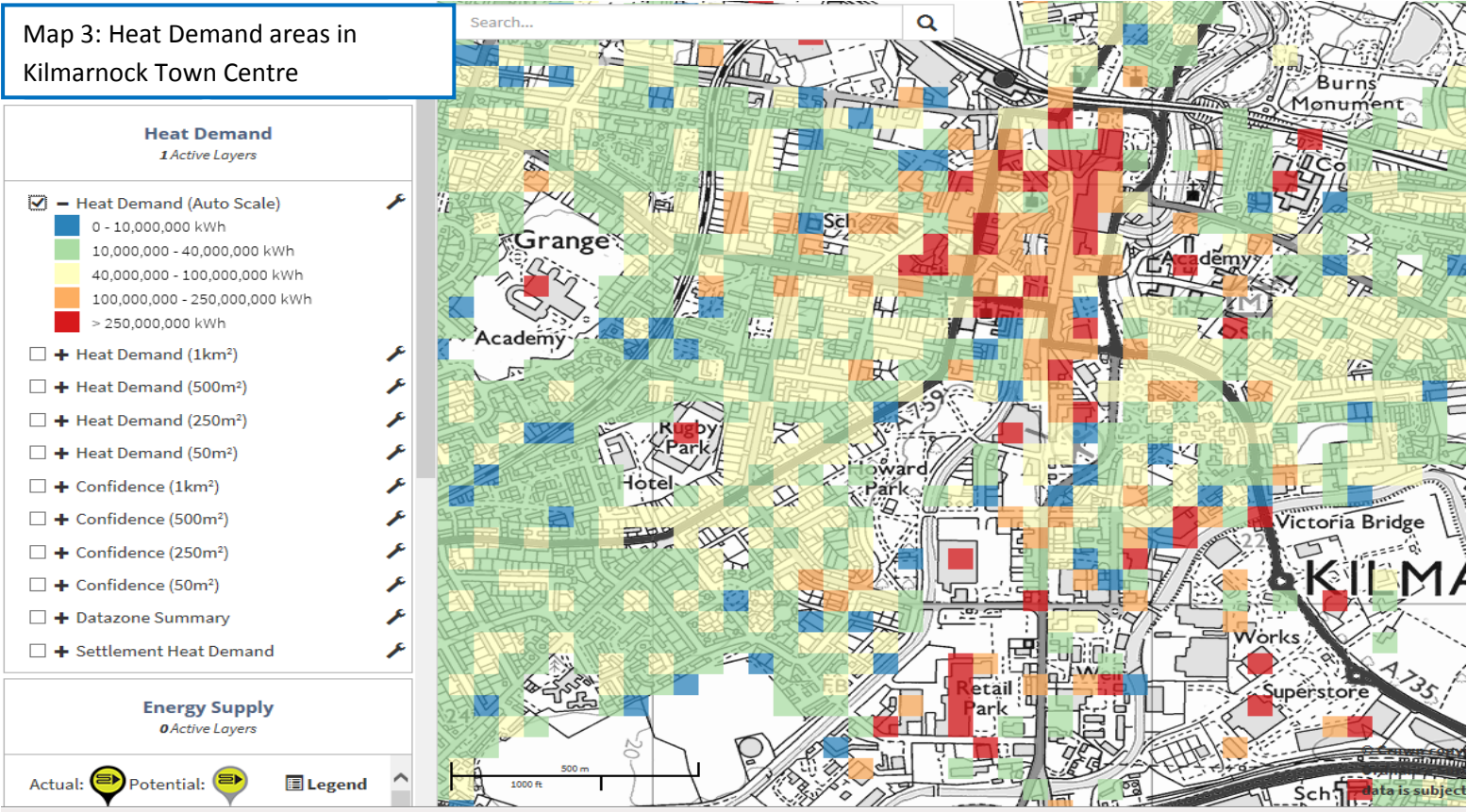
-  Wave Power
-  Tidal Stream
-  Anaerobic Digestion
-  Cooling Towers
-  Energy From Waste
-  Heat Only Boiler
-  Landfill Gas
-  Thermal Power
-  Nuclear
-  Combined Heat and Power



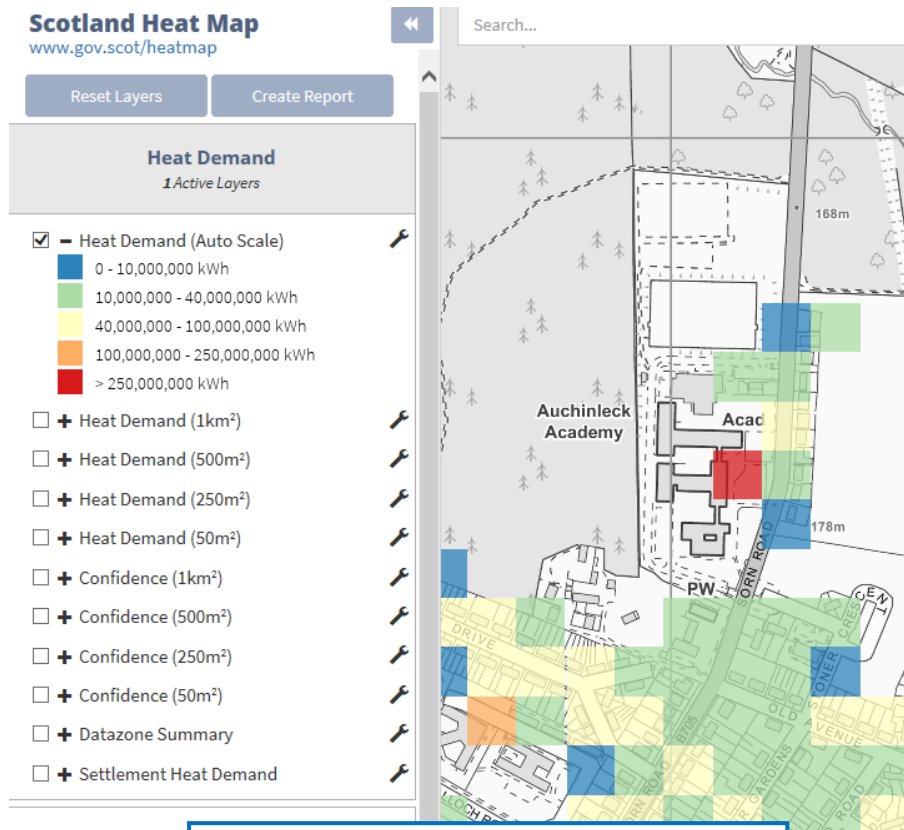
5.3 How to use the Heat Map to identify areas for district heating networks

5.3.1 The process of identifying whether there is potential for a district heating system starts with an examination of Scotland's Heat Map. Developers should follow the below example to identify opportunities for District Heat Networks in East Ayrshire.

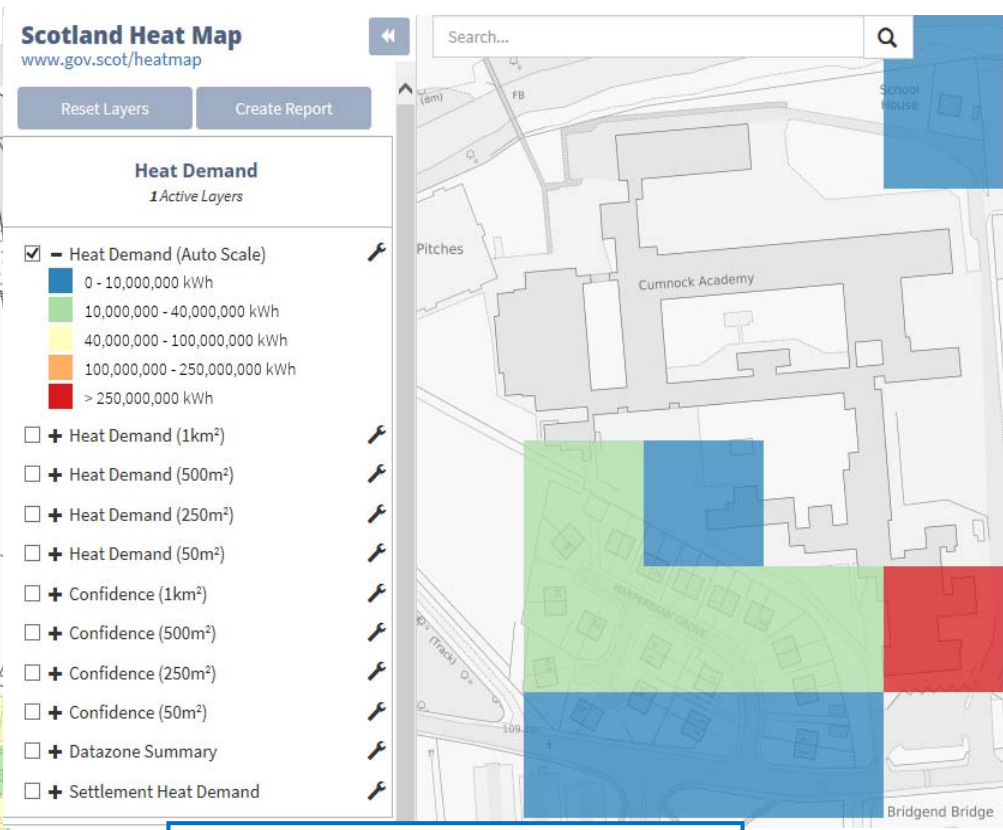
1. **Identify areas/sites of high heat demand-** Using Scotland's Heat Map, developers should identify areas or sites of high heat demand which are displayed as "hot" colours (red-orange). The Heat Map allows users to zoom in to view more detail down to individual buildings or groups of buildings. The confidence layer can also be used as a broad indicator of reliability of the data within the map. The confidence levels are calculated by assigning a confidence score to each property, e.g. a property where the heat demand value was taken from actual energy consumption data would be assigned a score of 4 to signify a high level of confidence in heat demand. In contrast, a property where very little energy consumption information has been gathered, a score of 1 would be assigned to this building/site to signify low confidence.



- Identify areas/sites with high heat demand that are located close to existing Heat Networks/Technologies-** Developers should use Scotland's Heat Map to identify current operational renewable heat generation technologies within close proximity to high heat demand areas/sites. These areas could form future district heat networks. In the example below, Auchinleck Academy and Cumnock Academy are shown on the Heat Map as high heat demand sites. Planning permission has been consented for Knockroon Learning and Enterprise campus (combining Auchinleck and Cumnock academies) which will include an energy centre incorporating a biomass boiler. The energy centre will provide renewable heating to the school and associated community and recreational facilities on site. Cumnock will be examined for the potential for further district heating opportunities as part of LDP 2.



Map 3: Heat Demand for Auchinleck Academy



Map 4: Heat Demand for Cumnock Academy

3. **Potential Anchor Heat Load areas-** Potential Anchor Loads are sites which are likely to have heat loads which vary little throughout a day, a month or a year such as schools, sports facilities, industrial estates/buildings and hospitals. These are the most reliable uses in terms of securing a stable demand for heat and may therefore be more suitable to accommodate proposals for district heating systems. Examples of potential anchor loads of the five service centre towns of East Ayrshire are shown in the table below.

Table 1: Potential Anchor Heat Load Areas of the service centre towns of East Ayrshire

Site	Location
Crosshouse University Hospital	Kilmarnock
Galleon Leisure Centre	Kilmarnock
Grange Academy	Kilmarnock
Rugby Park- Kilmarnock FC	Kilmarnock
Glencairn Retail Park	Kilmarnock
East Ayrshire Community Hospital	Cumnock
Greenmill Primary School	Cumnock
Netherthird Primary School	Cumnock
Barshare Primary School	Cumnock
Hillside Primary School	Cumnock
Thistle Business Park	Cumnock
Caponacre Industrial Estate	Cumnock
Doon Academy	Dalmellington
Dalmellington Community Centre and Recreation area	Dalmellington
Dalmellington Care Centre	Dalmellington
Dalmellington Area Centre	Dalmellington
Glebe House Care Centre	Dalmellington
Stewarton Academy	Stewarton
Nether Robertland Primary School	Stewarton
Stewarton Sports Centre	Stewarton
Lainshaw Primary School	Stewarton
Loudoun Leisure Centre	Galston
Loudoun Academy	Galston
Galston Primary School	Galston
St Sophia's Primary School	Galston

6. Microgeneration Heat Technologies

6.1 What is Microgeneration?

- 6.1.1 Microgeneration (micro-renewables) refers to the generation, from low or zero carbon sources, of electricity of up to 50kW (kilo watts) capacity and heat of up to 45kW capacity as set out by the UK Government Energy Act 2004. Microgeneration technologies can contribute to the national targets for reducing greenhouse gas emissions, can help to alleviate fuel poverty and improve fuel security by increasing access to more affordable and locally available supplies of electricity and heat.

Permitted Development Rights

Some small-scale/microgeneration heating systems/technologies may be classed as Permitted Development and as such may not require planning permission but are subject to limitations including:

- Flues for Biomass Heating System installed in existing property
- Flues for Combined Heat and Power installed in existing property
- Single Ground and Water Source Heat pumps installed in existing property
- Free-standing wind turbines and air source heat pumps

However, this will depend on the technology, design involved and the characteristics of the proposed building. If the proposal requires an outside building to store fuel or related equipment, a planning application for the building and technology will be required.

Permitted Development Rights do not apply to buildings that are listed or located in Conservation Areas, or sites of archaeological interest. Proposals which involve development on a listed building or on a site located within a Conservation Area or on a site of archaeological interest will require planning permission.

Since 2016, Permitted Development Rights for air source heat pumps do apply to an extent in conservation areas.

Applicants are advised to check with East Ayrshire Council Development Management Department and the Scottish Government's "Guidance on Householder Permitted Development Rights" for more information.

- 6.1.2 Renewable heat can be produced from microgeneration technologies such as ground, air or water source heat pumps, biomass, energy from waste, hydro, anaerobic digestion, solar PV panels and wind turbines. To date there has been limited growth in the number of microgeneration installations in Scotland. SPP supports investment in renewable energy projects at all scales of development including microgeneration.

6.2 Types of microgeneration heat technology

- 6.2.1 *Micro hydro*: Hydro-electricity systems abstract water from water courses and use it to turn turbines which generate electricity, before returning the water to the water environment. In Scotland, there is an increasing number of micro-hydro schemes, generally taking the form of “run-of-river” schemes generating up to 10kW (kilo watts) of electricity.
- 6.2.2 *Solar panels/Photovoltaic (PV) cells*: Photovoltaic panels consist of semi-conductor cells that convert sunlight into electricity. The panel can produce electricity in cloudy conditions but the electricity generated increases with the intensity of the sun. The siting and orientation of PV panels in domestic and non-domestic buildings is crucial as the main issue of PV panels is the potential for overshadowing from other structures such as buildings or trees.
- 6.2.3 *Solar hot water systems*: These comprise of solar collectors (tubes or flat plates), a heat transfer system and a hot water store (hot water tank). Water is pumped through the solar panel and heated by solar energy, the heated water flows through a heat exchanger warming the water stored in the hot water tank. These systems can be used for domestic use, light industrial or agricultural use. They are less sensitive to shading than PV panels.
- 6.2.4 *Heat pumps (ground, air and water)*: Heat pumps transfer the heat contained in the ground, water or air to a building for the purposes of providing heating. They require some electricity to operate but they generally produce more energy than the electricity they use.
- 6.2.5 *Micro CHP*: A gas-fired boiler is used to produce electricity and heat from the mains gas. It can also produce heat as a by-product and most schemes that use fossil fuels are capable of being converted to utilise renewable sources of energy (such as biomass). Some domestic biomass and small-scale CHP schemes may not fall within the scope of Environmental Impact Assessment (Scotland) Regulations 2011 (EIA) unless located within sensitive landscape areas. Biomass energy proposals >50MW are subject to an EIA.
- 6.2.6 *Biomass*: At micro-generation scale, all biomass systems burn wood pellets or logs to provide heat. Biomass will deliver environmental benefits in the form of greenhouse gas savings provided the fuel supply originates from sustainable sources. Most biomass installations, at micro-scale, tend to involve minor building alterations limiting the scale of any potential impacts.

Please note that separate supplementary guidance on Planning for Wind Energy is available on the Council’s website for guidance on small-scale wind turbines.

6.2.7 Supporting Information that may be required to aid assessment against Schedule 1 for microgeneration technologies

Consideration	Impact	Guidance/Information required
Landscape and Visual	There is the potential for microgeneration technologies to impact upon the natural landscape. This is dependent on the type and scale of technology proposed.	<i>An LVIA may be required but this will be assessed on a case by case basis.</i>
	Micro-hydro: impacts may include construction of pipework, track construction, changes in river flow and visibility from viewpoints.	<i>Micro-hydro: consideration should be given to colour, location and screening of ancillary buildings or structures and visibility from viewpoints. All micro-hydro proposals will require a CARS licence from SEPA and early consultation with SEPA is required.</i> <i>Contact for SEPA: planning.sw@sepa.org.uk</i>
	Solar PV panels and biomass flues: there may be impacts on the appearance of a landscape or settlement from a distance, especially if located within a designated landscape. Solar PV panels can cause flashes of reflected light which can be seen from a long distance and can impact on walkers, cyclists or farmers.	<i>Solar and Biomass: Clear visualisations showing the panels, flue tower and ancillary development should be submitted with any application.</i> <i>Other information which would be required includes:</i> <ul style="list-style-type: none"> - <i>Description of landscape character and setting</i> - <i>Equipment to be installed (e.g. number, colour, size of panels, elevation of panels, foundations, or height of flue tower)</i> - <i>Details of ancillary infrastructure required.</i>
Ecology	Micro-generation development has the potential to have an impact on ecology such as disturbance of habitats or impacts on habitat connectivity.	<i>Consideration of potential impacts on protected areas and protected species will be required. Professional Advice for developers is available at: https://www.snh.scot/professional-advice.</i> <i>The siting, location and design of the proposal should be carefully considered. The following information will be considered for all types of microgeneration technology:</i> <ul style="list-style-type: none"> - <i>Impact on ground water quality of installation phase of development</i> - <i>Potential drainage problems</i> - <i>Disturbance of species during installation or operation</i> - <i>Potential disturbance to peatlands or</i>

		<p>wetlands</p> <p><i>Any development that may adversely impact on areas of local importance for nature conservation, including provisional wildlife sites, local geodiversity sites and local nature reserves, will be expected to demonstrate how the impact can be avoided or mitigated (See Policy ENV 6: Nature Conservation of LDP)</i></p> <p><i>Applicants should refer to SNH guidance note on “Micro renewables and the Natural Heritage” for more information.</i></p> <p><i>Contact list for SNH can be found at the following link:</i> https://www.snh.scot/professional-advice/planning-and-development/consulting-snh-planning-and-development.</p>
Historic Environment	<p>The cultural heritage of East Ayrshire comprises some 2,680 archaeological sites, buildings, monuments and artefacts. Impacts on these are likely to either be direct impacts such as archaeological disturbance or indirect (setting) impacts. See section 6.1.1 on details about Permitted Development Rights.</p>	<p><i>Any impact from micro-generation heat developments on the historic environment of East Ayrshire should be fully assessed and if appropriate mitigation measures require to be identified.</i></p> <p><i>Early consultation with Historic Environment Scotland and/or WOSAS required.</i></p> <p><i>HES pre-application engagement contact:</i> hmenquiries@hes.scot</p> <p><i>WOSAS contact:</i> enquiries@wosas.glasgow.gov.uk</p> <p><i>Applicants should refer to Historic Environment Scotland’s guidance on “Micro-renewables in the Historic Environment” for more information.</i></p>
Water Environment	<p>Schemes can have a significant impact on water quality and the ecological status of the water environment:</p> <ul style="list-style-type: none"> - Changes can arise in ecological status as a result of impoundment (reservoir) and changes in water flow in rivers - Pollution from construction 	<p><i>All hydro proposals will require a CARS licence which is administered by SEPA. The timing of a CARS licence should be carefully considered in relation to the planning process.</i></p> <p><i>Schemes should meet the terms of the Water Framework Directive and the relevant River Basin Management Plans. The current ecological status of waterbodies will be a key consideration when identifying potential locations for hydro schemes.</i></p> <p><i>Applicants should refer to SEPA Pollution Prevention Guidelines and early consultation with SEPA will be required:</i></p>

	<p>- Flooding and surface water drainage.</p> <p>Hydro schemes can also have the potential to impact on Groundwater-Dependent Terrestrial Ecosystems.</p>	<p>planning.sw@sepa.org.uk</p> <p><i>A Flood Risk Assessment may be required for hydro schemes. SEPA will require developers to include mitigation measures to protect the water environment.</i></p> <p><i>If a Drinking Water Area is present it might require protection through mitigation actions. Similarly, below ground assets, such as water and sewer mains, can be affected by heavy construction traffic and may require protection. Scottish Water will be required to be consulted:</i></p> <p>DevelopmentOperations@ScottishWater.co.uk</p>
Access and Transport	<p>Microgeneration development may result in an increase in traffic and require special access arrangements during the construction phase.</p> <p>Schemes can also result in the temporary closure or diversion of public access including Rights of Way and Core Paths.</p>	<p><i>The location of the proposal should be carefully considered in terms of its relationship to existing public access, and whether there will be a need to divert paths temporarily or permanently.</i></p> <p><i>Additional information required:</i></p> <ul style="list-style-type: none"> - Detailed plan of public access across the site and immediate hinterland - Existing public access - Paths/areas available for public access during construction - Paths/areas of public access available after completion - Details of any diversion of paths temporary or permanent <p><i>A separate statutory procedure requires to be followed to allow the temporary or permanent diversion of footpaths.</i></p> <p><i>Early consultation with ARA may be required:</i></p> <p>enquiries@ayrshireroadsalliance.org</p>
Impact on Communities	<p>Common issues with micro generation technologies: there may impacts due to the siting of the technology, design/appearance of the technology, amenity, air quality, public safety and noise.</p>	<p><i>Noise Impacts- all applications should adhere to best practice construction guidance in relation to noise and hours of construction. Early consultation with the Council's Environmental Health Department required:</i></p> <p>environmentalhealth@east-ayrshire.gov.uk</p> <p><i>An Air Quality Assessment will be required for all developments of biomass and CHP. The following information should be included in the Air Quality Assessment:</i></p> <ul style="list-style-type: none"> - Justification for choice of location in relation to proximity to settlements

		<ul style="list-style-type: none"> - <i>Net reduction in carbon emissions as a result of the choice of fuel</i> - <i>Emissions standard of boiler</i> <p><i>Early consultation with SEPA required:</i> planning.sw@sepa.org.uk <i>Safety Issues: Details should be provided as part of the planning application in relation to security on site (temporary and permanent) as well as the location of signage and scale and type of fencing required</i></p>
Cumulative Impacts	Any cumulative impact with other proposed and consented developments should be assessed and should examine air quality, pollution, ecological and transport impacts.	<i>All applications will be assessed on a case-by-case basis.</i>

7. Energy Storage

7.1 What is Energy Storage?

- 7.1.1 Electrical and heat energy can be stored in several ways through technologies such as hydro pumped storage, thermal storage and fuel cells. The storage of energy is likely to play an important and growing role alongside renewable energy production. This will help to address the intermittency of certain forms of renewable generation as well as demand and supply issues.
- 7.1.2 The storage of hydrogen as a form of storage for renewable energy (i.e., within fuel cells) is considered to have the greatest potential as it is able to provide reliable and clean heat and electricity for domestic and non-domestic properties, as well as power for vehicles and aeroplanes etc. The benefits of hydrogen are that it can be produced from a wide range of renewable energy sources and offers significant possibilities as a low cost fuel.
- 7.1.3 Thermal storage provides a way of managing the peaks and troughs of heat demand over a period of time. Heat stores store heat in the form of hot water in large insulated tanks above or below ground. Using diverse energy sources in a Heat Network means customers are not dependent on a single source of supply, helping guarantee reliability and continuity of the service.

8. Assessment Criteria for Renewable Energy Developments

- 8.1 SPP requires applications to be considered against identified policy criteria. This section of the guidance outlines the criteria that will be considered in assessing renewable energy applications that are not related to wind farms or wind turbines, and should be used to inform the preparation of planning applications.
- 8.2 All proposals will be required to meet with the Renewable Energy Assessment Criteria set out in Schedule 1 of the LDP. In considering individual applications, the Council, as the planning authority, will make an assessment by balancing all applicable criteria as outlined below. If a proposal is detrimental in one respect, it does not automatically mean that the proposal will be recommended for refusal, as the Council will take a balanced view taking into account all the relevant factors.
- 8.3 Schedule 1: Renewable Energy Assessment Criteria
- Landscape and Visual impacts
 - Cumulative Impacts- likely cumulative impacts arising from all of the considerations below, recognising that in some areas the cumulative impact of existing and consented energy development may limit the capacity for further development.
 - Impacts on carbon rich soils, deep peat and peatland habitats
 - Effects on the natural heritage including birds. Renewable Energy proposals will only be approved where the Council has ascertained that they would not have an adverse effect on the integrity of a Natura 2000 site.
 - Impacts on wild land
 - Impacts on all aspects of the historic environment
 - Effects on hydrology, the water environment, flood risk and groundwater dependent terrestrial ecosystems
 - Reuse of excavated peat, forest removal and forest waste
 - Impacts on forestry and woodlands, with reference to the Ayrshire and Arran Forestry and Woodland Strategy (2013)
 - Effect on Greenhouse Gas emissions
 - Impacts on communities and individual dwellings, including visual impact, residential amenity, noise and shadow flicker
 - Impacts on tourism and recreation
 - Public access, including impact on long distance walking and cycling routes and scenic routes identified in National Planning Framework 3
 - Net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities
 - Impacts on aviation and defence interests and seismological recording
 - Impacts on road traffic including during construction and decommissioning
 - Impacts on adjacent trunk roads
 - Impacts on telecommunications and broadcasting installations, particularly ensuring that transmission links are not compromised
 - The appropriate siting and design of turbines and ancillary works (See Planning for Wind Energy Supplementary Guidance and relevant policies in LDP for wind turbine development)

- The need for conditions relating to the decommissioning of developments, including ancillary infrastructure, and site restoration
- The need for a robust planning obligation to ensure that operators achieve site restoration
- The scale of renewable energy generation targets
- Opportunities for energy storage

8.4 In addition to proposals meeting with the Renewable Energy Criteria, all new heat generating technologies should, where possible, be located close to potential heat users and the possibility of developing heat networks, including district heating networks, should be investigated.

8.5 To this end, developers should use “Scotland’s Heat Map” to identify where heat networks, including district heating systems are required. Please see Section 5 “Heat Mapping” of this guidance for more information.

9. Required Information

9.1 All applications for renewable energy developments associated with heat, but not exclusively limited to, heat pumps, biomass, Combined Heat and Power (CHP) systems, solar panels/photovoltaics, Energy from Waste, anaerobic digestion and hydro will be required to be accompanied by clear and robust supporting information, to allow the Council to make an informed assessment of the application. Information provided should include:

- An Environmental Statement in line with the Environmental Impact Regulations 2011;
- A Planning Statement;
- A Design Statement;
- An Air Quality assessment of the proposed technology on the surrounding environment
- A Noise assessment, where appropriate, which should also include a cumulative assessment where there are other developments nearby
- A Residential Visual Assessment for any properties located in the proximity of the development;
- A Transport Assessment where necessary or an access assessment
- A Woodland Management Strategy (if applicable)
- An assessment of impact on any environmental designations
- Decommissioning, restoration and aftercare proposals
- Details of any “future proofing” proposals e.g. including pipework and infrastructure which could link to district heat networks in the future
- Details of anticipated economic benefits – e.g. overall number of jobs created by the development and the economic activity associated with the procurement, construction and operation of the development
- Where relevant details of the District Heating or electricity scheme including how it would operate and the economic activity associated with the procurement, construction and operation of the scheme.
- Draft Legal agreement - the Council will require applicants to enter into a legal agreement to address, where appropriate, noise mitigation measures, road works and
- other matters that cannot be controlled through planning conditions

10. Useful Links and Further Information

Climate Change (Scotland) Act 2009: <http://www.legislation.gov.uk/asp/2009/12/contents>

National Planning Framework 3: <http://www.gov.scot/Topics/Built-Environment/planning/National-Planning-Framework>

SPP: <http://www.gov.scot/Topics/Built-Environment/planning/Policy>

2020 Routemap for Renewable Energy:
<http://www.gov.scot/Publications/2011/08/04110353/0>

Heat Policy Statement: <http://www.gov.scot/Publications/2015/06/6679>

East Ayrshire Carbon Management Strategy: <https://www.east-ayrshire.gov.uk/Resources/PDF/E/Adopted-2014-Energy-Strategy-and-Carbon-Management-Programme-October-2014.pdf>

East Ayrshire Local Development Plan: <https://www.east-ayrshire.gov.uk/PlanningAndTheEnvironment/Development-plans/LocalAndStatutoryDevelopmentPlans/East-Ayrshire-Local-Development-Plan-2017.aspx>

The Renewable Energy Hub: <https://www.renewableenergyhub.co.uk/>

Resource Efficient Scotland- <http://www.resourceefficientscotland.com/>

Ofgem: <https://www.ofgem.gov.uk/>

Energy Savings Trust: <http://www.energysavingtrust.org.uk/>

Local Energy Scotland: Guidance and advice for communities, business and developers:
<http://www.localenergyscotland.org/>

Scottish Natural Heritage Advice <https://www.snh.scot/professional-advice/planning-and-development/renewable-energy-development/types-renewable-technologies>.

Funding Schemes

Domestic Renewable Heat Incentive- Ofgem: <https://www.ofgem.gov.uk/environmental-programmes/domestic-rhi>

Non- Domestic Renewable Heat Incentive- Ofgem:
<https://www.ofgem.gov.uk/environmental-programmes/non-domestic-rhi>

Feed-In Tariff- Ofgem: <https://www.ofgem.gov.uk/environmental-programmes/fit>

Scottish Government Guidance on Scotland's Energy Efficiency Programme (SEEP):
<http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/SEEP>

The District Heating Loan- Energy Savings Trust:
<http://www.energysavingtrust.org.uk/scotland/grants-loans/district-heating-loan>

Heat Pumps

Air Source Heat Pumps- Energy Savings Trust:

<http://www.energysavingtrust.org.uk/renewable-energy/heat/air-source-heat-pumps>

Ground Source Heat Pumps- Energy Savings Trust:

<http://www.energysavingtrust.org.uk/renewable-energy/heat/ground-source-heat-pumps>

Heat Pumps Handbook- Local Energy Scotland:

http://www.localenergyscotland.org/media/1011/heat_pumps.pdf

SNH Carbon and Peatland Map 2016: <https://www.snh.scot/professional-advice/planning-and-development/general-advice-planners-and-developers/planning-and-development-soils/carbon-and-peatland-2016-map>

Biomass and Combined Heat and Power (CHP)

Scottish Government Guidance on Biomass: <http://www.gov.scot/Topics/Business-Industry/Energy/Energy-sources/19185/17883-1>

Biomass Action Plan for Scotland: <http://www.gov.scot/Publications/2007/03/12095912/0>

Biomass and Wood Fuel-Energy Savings Trust:

<http://www.energysavingtrust.org.uk/renewable-energy/heat/biomass>

Biomass and Air Quality Guidance for Local Authorities:

http://www.iaqm.co.uk/text/guidance/epuk/biomass_guidance_scotland.pdf

Biomass and Air Quality Guidance for Developers:

http://www.iaqm.co.uk/text/guidance/epuk/biomass_developers_leaflet.pdf

Woodfuel and Bioenergy- Forestry Commission Scotland:

<http://scotland.forestry.gov.uk/supporting/strategy-policy-guidance/climate-change/woodfuel-and-bio-energy>

Felling Licences- Forestry Commission Scotland:

<http://scotland.forestry.gov.uk/supporting/grants-and-regulations/felling-licences>

UK Government Guidance for CHP: <https://www.gov.uk/guidance/combined-heat-and-power>

Carbon Trust Guidance on Combined Heat and Power:

https://www.carbontrust.com/media/19529/ctv044_introducing_combined_heat_and_power.pdf

Solar Thermal/ Photovoltaic panels (PV)

Scottish Government Guidance on Large Photovoltaic arrays:

<http://www.gov.scot/Resource/0042/00423079.pdf>

SNH Guidance on Large scale solar photovoltaic installations: considering landscape, visual and ecological impacts: <http://www.snh.gov.uk/docs/A1859348.pdf>

Civil Aviation Authority Interim Guidance- Solar Photovoltaic Systems:

http://www.enstoneflyingclub.co.uk/files/caa_view_on_solar_panel_instalations.pdf?PHPSESSID=8900a41db8a205da84fca7bbc14eae69

Energy from Waste

Energy from Waste- SEPA: <https://www.sepa.org.uk/regulations/waste/energy-from-waste/>

Energy from Waste Potential in Scotland- Scottish Government:

<http://www.gov.scot/Resource/Doc/311011/0098129.pdf>

Scottish Government Guidance on Energy from Waste:

<http://www.gov.scot/Resource/0042/00423076.pdf>

Anaerobic Digestion

Scottish Government Guidance on Anaerobic Digestion:

<https://beta.gov.scot/publications/anaerobic-digestion-planning-advice/>

SEPA Guidance note on Anaerobic Digestion: <https://www.sepa.org.uk/media/117932/ppc-technical-guidance-note-35-anaerobic-digestion.pdf>

SEPA Guidance on Licensing of Anaerobic Digestion Plants:

https://www.sepa.org.uk/media/145269/position_anaerobic_digestion_plants.pdf

Hydro

Scottish Government Guidance on Hydro Schemes:

<http://www.gov.scot/Resource/0044/00440310.pdf>

SEPA Guidance for developers of run-of-river hydropower schemes:

<https://www.sepa.org.uk/media/156800/guidance-for-developers-of-run-of-river-hydropower-schemes.pdf>

Hydropower- SEPA: <https://www.sepa.org.uk/regulations/water/hydropower/>

The Water Environment (Controlled Activities) (Scotland) Regulations 2011: A Practical Guide (for CARS licence) - SEPA:

https://www.sepa.org.uk/media/34761/car_a_practical_guide.pdf

SNH Guidance on Hydroelectric schemes and the natural heritage:

<http://www.snh.gov.uk/docs/C278964.pdf>

District Heating Networks

District Heating Scotland- <http://www.districtheatingscotland.com/>

Scotland's Heat Map- <http://heatmap.scotland.gov.uk/>

Glasgow Commonwealth Games Athletes Village District Heating System Case Study- Vital Energi: <https://www.vitalenergi.co.uk/casestudies/commonwealth-games-2014/>

Shetland Heat Energy and Power- District Heating Network from EfW facility- <http://www.sheap-ltd.co.uk/>

Microgeneration

Guidance on Householder Permitted Development Rights- Scottish Government: <http://www.gov.scot/Publications/2016/06/2685/0>

Scottish Government Guidance on Microgeneration Technologies: <http://www.gov.scot/Resource/0041/00415738.pdf>

SNH Guidance on Micro renewables and the natural heritage: <http://www.snh.gov.uk/docs/A301202.pdf>

HES Guidance on Micro Renewables in the Historic Environment: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=7604a41c-077c-42ab-941f-a60b009a4f95>

11. Glossary of Terms

Abstraction- the removal or diversion of water from the natural water environment, by a variety of means including pumps, pipes, boreholes and wells.

Air pollution- the presence in or introduction into the air of a substance which has harmful or poisonous effects.

Anaerobic Digestion- a series of biological processes in which micro-organisms break down biodegradable material in the absence of oxygen.

Biodegradable waste- includes any organic matter in waste which can be broken down into carbon dioxide, water, methane or simple organic molecules by micro-organisms and other living things using composting, anaerobic digestion or similar processes.

Bio-diesel- an alternative fuel similar to conventional diesel that can be produced from vegetable oil, animal oil/fats and waste cooking oil.

Biodiversity- the variety of life on earth, the range of different species (types) and variations with them

Biogas- a mixture of methane and carbon dioxide produced by the bacterial decomposition of organic wastes and used as fuel

Biomass- organic matter used as fuel, especially in a power station for the generation of electricity.

Borehole- a deep, narrow hole made in the ground to locate water.

Carbon neutral- the making or resulting in no net release of carbon dioxide into the atmosphere.

Climate change- a change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels

Combined Heat and Power (CHP) - integrates the production of useable heat and power (electricity) in one single highly efficient process.

Cumulative Impact- impact in combination with other development e.g. the impact of an energy centre on the landscape, when it is considered alongside other renewable energy development such as wind turbines.

Decarbonisation- the reduction or removal of carbon dioxide from energy sources.

District Heating- the supply of heat or hot water from one source to a district or a group of buildings

Energy efficient- a device or building which uses relatively little energy to provide the power it needs to operate.

Energy from Waste- the process of generating energy in the form of electricity and/or heat from the controlled incineration of waste.

Fossil fuels- a natural fuel such as coal or gas, formed in the geological past from the remains of living organisms.

Fuel poverty- a fuel poor household is defined as one which needs to spend more than 10% of its income on all fuel use and to heat its home to an adequate standard of warmth.

Geothermal energy- heat generated and stored from the Earth.

Greenhouse gases- a gas that contributed to the greenhouse effect by absorbing infrared radiation.

Ground water dependent terrestrial ecosystems- an ecosystem whose sustenance relies on groundwater input. These ecosystems emerge from aquifers and water tables, in simpler terms, it is a community of plants and animals which interact with each other and feed off water which comes from the ground.

Habitat- an ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism.

Habitat connectivity- the degree to which the landscape facilitates animal movement and other ecological flows.

Heat exchanger- a device for transferring heat from one medium to another.

Heat Network- a sustainable and efficient form of heating, with a single source directly heating a number of different users.

Heat pump- a device that transfers heat from a colder area to a hotter area by using electrical or mechanical energy.

Hydropower- power derived from the energy of falling water or fast running water, which may be harnessed as a renewable energy source.

Local Development Plan- local spatial plan about place which guides future land use

National Planning Framework 3- the spatial expression of the Scottish Government's Economic Strategy, setting out a long term vision for development and investment across Scotland over the next 20 to 30 years.

Photovoltaic cells (PV) - a specialised semi-conductor electronic device that converts light energy into electrical energy.

Rights of Way- a route along which the public have a right of passage

Scottish Planning Policy- sets out national planning policies, reflecting the Scottish Government's priorities for the operation of the planning system and the development and use of land.

Solar array- a collection of one or more solar panels.

Solar thermal- solar thermal technologies capture the heat energy from the sun and use it for heating and/or the production of electricity.

Special Area of Conservation (SAC) - a European designation which protects rare and threatened species and habitats listed in the Habitats Directive.

Special Protection Area (SPA) - a European designation which protects rare or threatened birds listed in the Birds Directive and migratory birds which are regular visitors, together with their habitats.

Site of Special Scientific Interest (SSSI) - designated by Scottish Natural Heritage, SSSIs contain the best examples of particular species, habitats, geology or geomorphology.

Transport Assessment- a process that sets out transport issues relating to a proposed development and identifies the measures to be taken to deal with the anticipated transport impacts.

Zero Waste Plan- Scottish Government policy that sets out a vision for a zero waste society, where all waste is seen as a resource instead of a problem.

12. Appendices

Appendix I: List of consented renewable heat energy developments in East Ayrshire (as of July 2017)

Technology Type	Application Number	Description	Location
Biomass Boiler	14/0426/PP	Erection of detached boiler house/biomass pellet storage building	Auchinleck
	17/0011/NMV	Entrance door location revised; biomass boiler flue added; firefighting water tank added to car park of previous planning consent	Dalmellington
Energy Centre with Biomass Boiler	17/0019/PP	Knockroon Learning and Enterprise Campus, incorporating nursery, additional special needs, primary and secondary school buildings for around 2500 pupils; community facilities, indoor and outdoor sports pitches and facilities, plant, renewable energy (incorporating biomass boiler) and utilities infrastructure, public realm, drainage and SUDs, landscaping, boundary treatments and security, open space, remodelled footbridge, access, pick-up and drop-off, car parking, way finding and signage, external lighting including floodlighting and demolition of existing buildings and structures	Cumnock
Heat pumps	16/0326/PP	Proposed shed to house heat pumps and equipment to dry hen manure	Muirkirk
	11/0854/PP	Installation of domestic 14kw air source heat pump	Mauchline
Combined Heat and Power (CHP)	17/0121/PP	Erection of plant and machinery to provide a combined heat and power plant for supply of electricity	Kilmarnock
Solar Panels (PV)	06/1182/FL	Proposed installation of 2 No Solar Heating Panels	Newmilns
	07/0807/FL	Alterations to Dwellinghouse to include front and side extensions, three solar panels and freestanding extension	Stewarton
	08/0580/FL	Extension to dwelling house including installation of solar panels and flue for wood burning stove	Waterside
	11/0326/PP	Fitting of solar PV panels on south west facing roof	Kilmarnock

	11/0813/PP	Erection of solar panels on post in existing garden of existing dwelling house	Kilmarnock
	12/0551/PP	Installation of 16 solar panels to rear roof pitch	Dalmellington
	13/0070/PP	Installation of solar panels to south facing roof	Ochiltree
	14/0040/PP	Install 16 solar panels on the roof to the rear of the property	Catrine
	14/0052/PP	Solar panels to roof	Kilmarnock
	14/0416/PP	Installation of solar panels to rear roof	Kilmarnock
	15/0086/PP	Site 16 solar panels to the rear of house	Cumnock
	15/0010/PREA PP	5Mw solar (PV) installation covering approximately 30 acres (12 hectares) of land with arrays of PV panels. Panels will be mounted horizontally in rows of 3 with an estimated height of 2.4 metres	Kilmarnock
	15/0225/PP	Installation of Photovoltaic Solar panels (in retrospect)	Kilmarnock
	15/0964/PP	Erection of 4no hot water solar panels (in retrospect)	Auchinleck
	16/0278/PP	Installation of roof velux windows and internal alternation and solar panel installation	Mauchline
	17/0049/PP	Alterations and extension of an existing vacant dwelling including erection of 18no freestanding solar panels	Dalmellington
Hydro	10/0476/PP	Installation of a micro hydro scheme consisting of intake structure, buried pipe and powerhouse	Doon Valley
	11/0657/PP	Installation of 50KW hydroelectric scheme	Muirkirk
	14/0864/PP	The installation of a micro-hydro electricity scheme consisting of intake structure, buried pipe and generator	Dalmellington
	15/0038/PP	Proposed hydro scheme comprising above ground powerhouse and new turbine unit, modifications to existing and installation of new, below ground pipework formation of internal access road, hardstanding and associated works	Cumnock
	15/0435/PP	Construction of 100kw hydroelectric scheme including erection of powerhouse building	Dalmellington

Appendix II: Funding Opportunities (Information correct as of August 2017)

Renewable Heat Incentive (RHI)

The RHI is a UK government financial scheme to promote the use of renewable heat. There are two Renewable Heat Incentive schemes- Non-Domestic and Domestic. The schemes have separate tariffs, joining conditions, rules and application processes, therefore applicants are advised to check with the Ofgem website for more information.

- Domestic RHI- This scheme is for heating systems for single homes. Biomass only boilers, biomass pellet stoves, air and ground source heat pumps and solar thermal panels flat plate or evacuated tube are eligible for the Domestic RHI. The scheme is available for households both off and on the gas grid. If householders comply with the scheme rules, they can receive quarterly payments for seven years for the amount of clean, green renewable heat it's estimated their system produces.
- Non-Domestic RHI- The scheme is for industrial, commercial, public sector and not-for-profit organisations e.g. businesses, hospitals, schools and district heating schemes. The scheme covers the following technologies: solid biomass, combined heat and power (CHP), solid biomass contained in waste, all heat pumps, solar thermal, geothermal, biomethane and biogas. The RHI makes regular payments for 20 years to participants that generate and use renewable heat.

Feed-In Tariffs (FIT)

The FIT scheme is available for anyone who has installed, or is looking to install one of the following technology types up to a capacity of 5MW or 2kW for CHP; solar PV, Wind, Micro combined heat and power (CHP), Hydro and Anaerobic Digestion.

Feed-In Tariff payments are made quarterly for the electricity that the installation has generated and exported. Payments are based on the meter reading submitted to the energy supplier. It is now a requirement for buildings, domestic and non-domestic, to have an Energy Performance Certificate (EPC) of Band D or greater to be eligible for the full tariff. FIT support is payable for 20 years or 10 years for CHP. Applicants are advised to refer to Ofgem and Energy Saving Trust website for more information on eligibility and the application process.

Scotland's Energy Efficiency Programme (SEEP)

SEEP is a long-term programme designed to improve the energy efficiency of both domestic and non-domestic buildings with the aim of decarbonising heat supply, making energy more affordable and reducing carbon emissions from the built

environment. Over the next 15-20 years, SEEP will offer support to ensure that all buildings (domestic and non-domestic) in Scotland can achieve a good energy efficiency rating. As a first step in preparing for the launch of the SEEP programme, the Scottish Government offered funding to all local authorities and partners for a range of SEEP pilot projects through the SEEP Pathfinder Fund. Eleven local authorities received over £9 million of funding to carry out SEEP pilot projects in 2016-2017. Some projects included installing energy efficiency measures to domestic and non-domestic premises such as wall insulation, installing new heat exchangers, trialling solar PV panels on public buildings and heating upgrades to domestic properties. The Scottish Government are currently under-way with another phase of inviting local authorities and partners to submit proposals for delivery in 2018-2019. Evaluation of these projects will be used to inform the design of the overall programme and to measure the impacts of energy efficiency refurbishments. The programme is still being developed by the Scottish Government and is intended to be launched in 2018.

District Heating Loan Fund

The District Heating Loan Fund is designed to help address the financial and technical barriers to district heating projects as commercial borrowing can be expensive and difficult to obtain. Loans up to £500,000 are available as low interest unsecured loans with repayment terms of either 10 or 15 years. The scheme is open to local authorities, registered social landlords, small and medium sized enterprises and energy services companies with less than 250 employees. More information can be found on the Energy Saving Trust website.



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