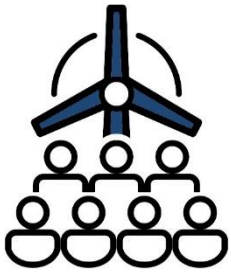
# Community and locally owned energy in Scotland

## 2023 report

05 April 2024

**Report produced on behalf of the Scottish Government**

## Executive summary

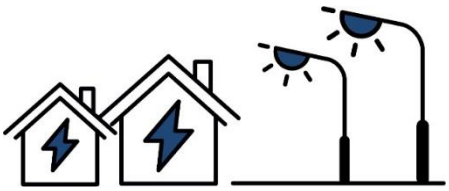


There were 27,900 community and locally owned renewable energy installations at the end of December 2023, with a capacity of 1,028 MW.[1]

The Scottish Government has progressed 51% towards its 2030 target of having 2GW (2,000MW) of operational renewable energy capacity in community and local ownership.


These installations could produce an estimated 1,862GWh of renewable energy annually. That's the same as

- Providing electricity[2] to 25% of households in Scotland for one year
- powering all of UK's street lighting for one year



At the end of December 2023, there was an estimated 11MWh of operational energy storage capacity in community and local ownership in Scotland from 1,130 installations with a further 2MWh in development from 150 installations.[3]

[1] Numbers of installations have been rounded to the nearest ten throughout this report.
[2] We acknowledge that not all energy output is electricity, but for the ease of illustration, we assume all energy output are electricity in this equivalent alone.
[3] MWh is a measure of energy, while MW is a measure of power generation. Since energy storage technologies only store rather than generate energy, their capacities are measuring in MWh instead of MW.

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# 1. Introduction

Community and locally owned renewable energy places communities at the heart of the energy transition, supporting Scotland's pathway to net zero. By transitioning away from fossil fuels and toward renewable sources of energy, we can reduce our carbon emissions and mitigate the impacts of climate change. Moreover, locally owned renewable energy initiatives contribute to energy security by reducing dependence on imported fossil fuels, enhancing resilience to supply chain disruptions, and fostering self-sufficiency in energy production. In addition to the environmental benefits, community and locally owned renewable energy supports local economies. Local projects create jobs, attract investment, and provide a source of income for communities.

Scotland already has a positive legacy of community and local ownership of energy, which provides a firm foundation to build on. The Scottish Government has committed to further grow this sector in line with the target of 2GW (2,000MW) by 2030.

This report presents the headline figures for community and locally owned renewable energy in Scotland and reviews the progress made by the Scottish Government on delivering its target of 2GW of community and locally owned renewable energy by 2030. It then explores community and locally owned renewable energy by ownership category, technology and local authority, to provide a broader picture of the sector in Scotland. Finally, the report identifies some of the factors that have been driving installation and development.

A high-level summary of what has been reported on is presented in Chapter 2. Appendix A-C provides further information on community and locally owned definitions, data tables for figures and Scottish policy perspective. A full methodology can be found in the separate methodology document.

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# 2. Reporting in 2023

Since 2011, Energy Saving Trust has maintained a database of all community and locally owned renewable energy installations in Scotland. The database has been updated annually from multiple data sources.

Community and locally owned renewable energy is defined as technologies producing heat and/or electricity from a renewable source,[4] where the owner of the installation is in one of the following categories:

- A community group
- A local Scottish business[5]
- A farm or estate
- A local authority
- A housing association
- A public sector or other charitable organisation

Further information on each category is available in Appendix A.

There are 21 datasets that contribute to the community and locally owned renewable energy database. These datasets include voluntary surveys from public sector organisations, different funding programs administered by Energy Saving Trust, and government provided private datasets. In 2023, we have received updates for 10 datasets and added one new dataset. The figures reported in this publication are correct as of 31 December 2023. Further information on the list of datasets is available in Section 4.1 in the adjoining methodology document.

## 2.1 Limitations of the analysis

We meticulously examine all new data intended for inclusion in the database. This involves a thorough process of verifying ownership status and cross-referencing against the existing database to prevent any instances of double counting. Whenever we become aware of changes in operating status or ownership, we strive to update them to the best of our understanding. While we aim to be robust in our data collection and take due care to minimise data and information gaps, it is important to highlight the following limitations and caveats.

Installations can change over time. They may become decommissioned or change ownership, impacting the accuracy of the data in cases where this was unknown to us. Due to the large number of records, it is not possible to proactively review the status of every historic installation. The related records are reviewed and rectified in response to new information from new or improved datasets, or research. Historical data gaps are often filled as new or improved data sources become available.

There may be gaps in the data, both in terms of space (due to voluntary reporting) and time (because operational installations may not be immediately known to us). We pursue access to new datasets and review and revise (where necessary) the assumptions we use

[4] A full description of each eligible technology is given in Appendix A.
[5] Note this excludes Scottish businesses whose purpose is to develop renewable energy projects when the installation is at a distance from their own properties or where ownership and management of the installation is provided as an energy service company (ESCO).

to fill in some of the data gaps. This year we gained access to the Non-domestic Renewable Heat Incentive dataset which helped fill many gaps in our recording of past heating installations.

We anticipate that a proportion of the in-development capacity has either already become operational or is no longer going ahead, but we are unable to confirm the proportion due to the voluntary reporting nature of some data sources.

Despite these limitations, we consider the results presented are the best available on community and locally owned renewable energy in Scotland to date. We endeavour to continually improve the methodology and access to data sources.

# 3. Headline results

This section reports the latest updates towards the 2030 target of 2GW (2,000MW) of community and locally owned renewable energy. Here we explore the headline numbers around what has been achieved to date.

In December 2023, an estimated 1,028MW of community and locally owned renewable energy capacity was operational in Scotland. The Scottish Government has progressed 51% towards their target of having 2GW (2,000MW) of operational community and locally owned renewable energy capacity by 2030. The increase in capacity from 2010 to 2023 is shown in Figure 1. The capacity in operation is from a total of 27,900 renewable energy installations.

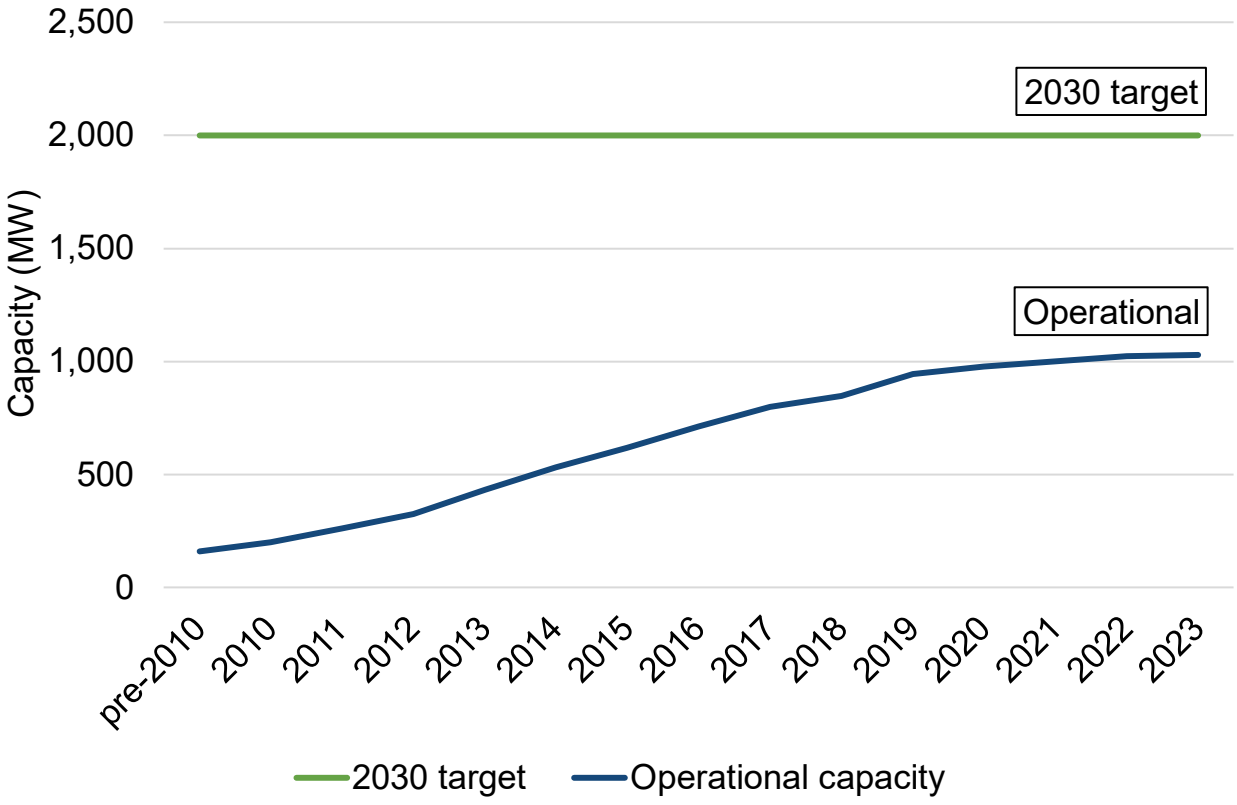



**Figure 1. Total operational capacity and the 2030 2,000MW (2GW) target**

Over a year, the 1,028MW of operational community and locally owned renewable energy capacity is estimated to produce 1,862GWh of renewable energy. This consists of around 926GWh of electricity, 739GWh of heat and 194GWh of energy from combined heat and power (CHP) installations.

926GWh of electricity is the same amount needed to provide electricity for 319,000 homes for a year, whilst 739GWh of heat energy equates to heating 59,000 homes using natural gas boilers for a year. Please see the accompanying methodology document for more information on this.

Some renewable energy technologies, like solar photovoltaic (PV) panels and wind, generate energy intermittently and energy storage technologies may be in a position to help mitigate this issue. A robust energy storage system helps to de-couple costly fossil fuels from electricity generation, where fossil fuels are often the energy backup when

renewable resource is low. For this reason, it is important to report on the development of energy storage in the community and locally owned energy sector. However, storage capacity itself is not included in the community and locally owned renewable energy target as it does not generate renewable energy.

At the end of December 2023, there was an estimated 11MWh of installed energy storage capacity in community or locally owned ownership in Scotland. This was spread over approximately 1,130 installations.

The increase in capacity of energy storage technologies supports Scotland's progress towards providing flexible and reliable energy systems and they are key for the transition to net zero.

## Buchanan Hydro

**Technology**: 100kW community hydroelectric scheme
**Location:** Milton of Buchanan, by Drymen, near Loch Lomond
**Date operational**: July 2022

In 2018, **Buchanan Community Hydro Society (BCHS)** was incorporated as a community benefit company (BenCom). The project is based on land owned by Forestry and Land Scotland and the Montrose Estates. A land lease was agreed with both landowners and the Montrose Estate is supportive of the project.

BCHS received funding and support from the Scottish Government's Community and Renewable Energy Scheme (CARES). Local Energy Scotland, which manages CARES, supported the hydro scheme's development by providing capital and loan funding as well as handholding support, financial, technical, and due diligence support to the community.

The 100kW run-of-river community hydro scheme was built and was fully operational on 15 July 2022. It was officially opened with a community event on 1 September 2022. In its first year of operation, the development generated 357,000kWh of clean power, which was 11% more than expected.

The society made the first awards from its Community Benefit Fund in Spring 2023. The fund has made eleven awards totalling almost £24k; these went to the Memorial (Village) Hall, the East Loch Lomond Community Trust, the Buchanan Sheep Dog Society, Buchanan Castle Golf Club, Drymen Scouts, and Drymen Youth Café.

Jamie Graham, Chair of Buchanan Community Hydro Society, says "The project has given the community a sense that it can have the principal say in shaping its future without relying on outside actors and resources."
You can read the full case study on the **Local Energy Scotland website**.

# 4. Landscape of community and locally owned energy

This section provides insight into the source of the 1,028MW operational capacity. This is reported by ownership category, technology, and local authority. From the available data we aim to identify the drivers of progress towards the 2GW (2000MW) target. In addition, this section provides additional information on energy storage systems and shared ownership.

## 4.1. Ownership & technology

At the end of 2023, from an ownership point of view, the largest proportion of operational capacity was on Scottish farms and estates (44%). This is despite making up a small proportion (4%) of the total number of installations. Local authorities have the largest share of the total number of installations (45%) with the second largest share of total capacity (16%). Housing associations have the second largest share of total number of installations (43%), but with the lowest share of the total capacity (8%). A data table is available in Appendix B, Table 2.

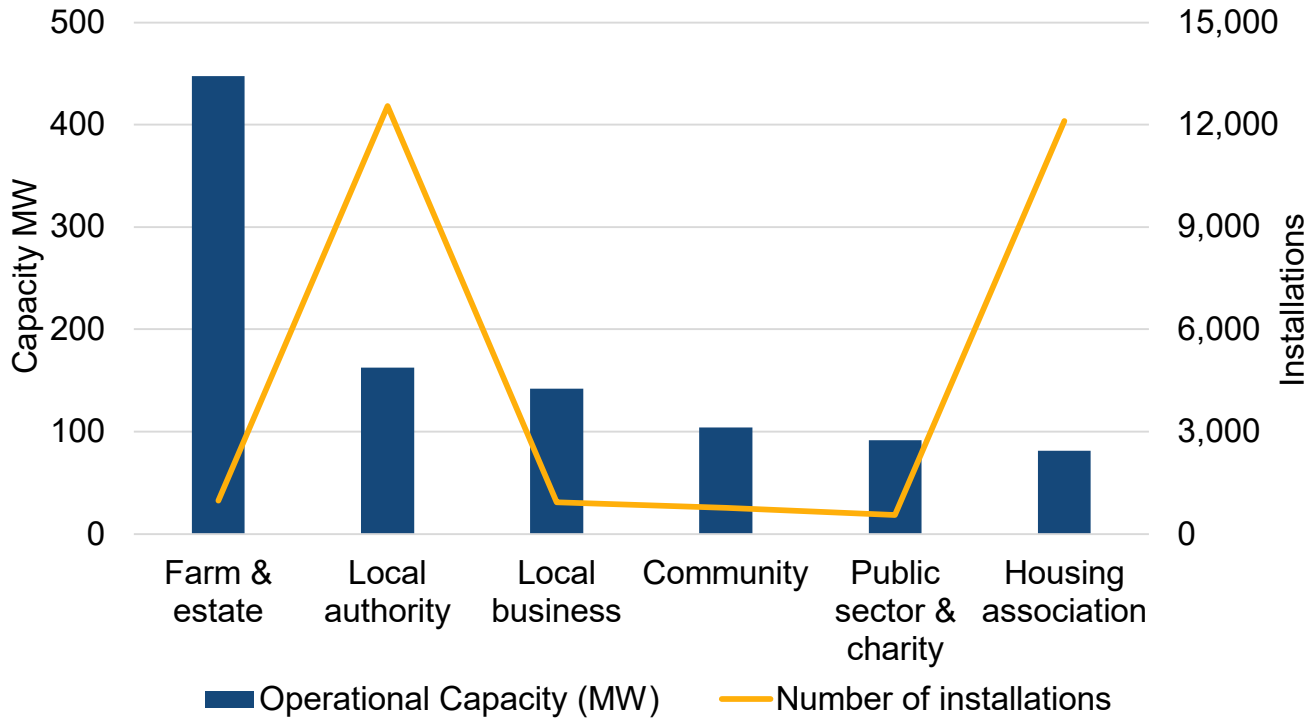



**Figure 2. Operational capacity and installations by ownership, 2023**

From a technology point of view, Table 3 in Appendix B shows that the greatest share of operational capacity is from biomass (33%). Wind follows at 30%. However, both technologies account for a relatively small share of operational installations. Biomass is 5% of installations, while wind is 3%. In comparison, solar PV accounts for the largest share of operational installations (47%). Heat pumps follow at 32%. However, solar PV and heat pumps make up relatively small percentages of the total capacity, at 9% and 12% respectively. A data table is available in Appendix B, Table 3.

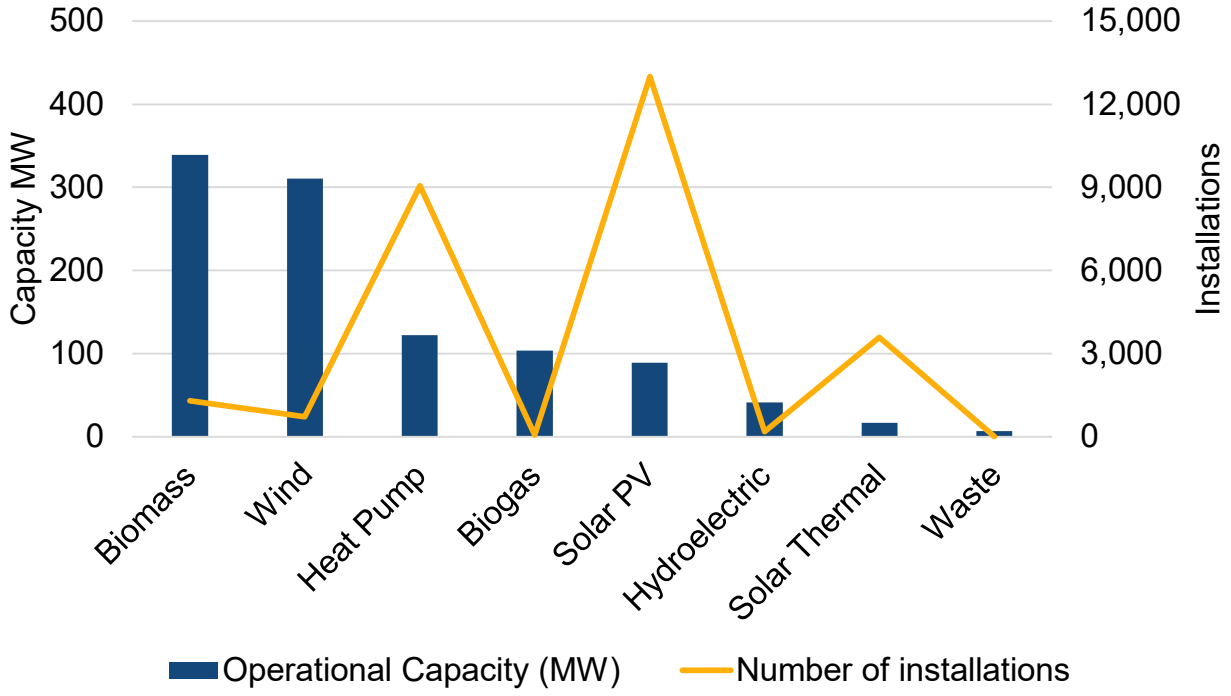


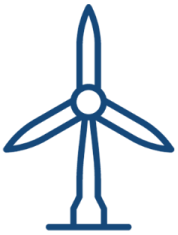

**Figure 3. Operational capacity and installations by technology, 2023**

Community and locally owned renewable energy ownership categories include a wide range of needs and use cases. For this reason, adoption of technology varies across ownership categories depending on the suitability, end user and available resources. Since we have illustrated ownership and technology individually, we will now explore the relationship between ownership and technology to better understand what is driving community and locally owned energy. Table 1 outlines the operational capacity by technology and ownership category.

**Table 1. Operational capacity (MW) by technology and ownership category, 2023**

| Technology/ Ownership category | Farm & estate | Local authority | Local business | Community | Public sector & charity | Housing association |
|---|---|---|---|---|---|---|
| **Wind** | 188 | 2 | 33 | 71 | 3 | 13 |
| **Biomass** | 140 | 74 | 69 | 6 | 41 | 8 |
| **Heat Pump** | 29 | 41 | 3 | 4 | 5 | 40 |
| **Solar PV** | 7 | 31 | 5 | 5 | 27 | 13 |
| **Biogas** | 64 | 4 | 28 | 0 | 6 | <1 |
| **Hydroelectric** | 19 | <1 | 2 | 12 | 8 | 0 |
| **Solar Thermal** | <1 | 7 | <1 | <1 | 1 | 7 |
| **Waste** | 0 | <1 | 0 | 6 | <1 | 0 |

Nearly a third of the total community and locally owned renewable energy capacity is sourced from wind and biomass on farms and estates. Farms and estates are more likely to have the available space and resources, like unobstructed wind or agricultural waste that make high-capacity technologies suitable and appealing. Farm and estate installations generally have much larger capacities than other ownership categories across all technologies.

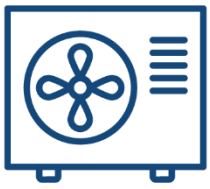


Biomass and biogas installations can be an appealing replacement for more expensive fossil fuels. Local woodchip or on-site agricultural waste can also be used to generate heat. While the majority of biomass installations on farm and estates are small or medium sized (<0.5MW), four single installations account for 15% of this capacity.

Housing associations tend to install a high number of low-capacity renewable energy for domestic use. 99% of housing association installations were heat pumps, solar PV or solar thermal. The average capacity of installations in housing associations was 0.008MW for heat pumps and 0.002MW for solar PV.

Similar to housing associations, local authorities had a large number of low-capacity renewable energy installations for domestic use. 97% of installations and 49% of capacity is from heat pump, solar PV and solar thermal. Local authorities also own 22% of the total operational biomass. These are normally used to meet the high and relatively steady heat demands of non-domestic properties, such as schools. They may also feed into heat networks.

The public sector and charity organisations use a wider mix of technologies compared to most other ownership categories. This may be because of the wide variety of organizations in this category such as facilities belonging to the NHS, further education institutions or public bodies. Some individual organisations also operate a wide range of technologies. These technologies are tailored to meet or make use of site-specific demands and opportunities. For instance, Scottish Water (Scotland's publicly owned water company) has installed biogas combined heat and power (CHP) units. They have incorporated anaerobic digesters into sewage treatment plants to produce gas. They have also installed heat pumps to extract heat from wastewater and solar PV to generate electricity at their wastewater treatment sites.[6]



[6] https://www.scottishwater.co.uk/about-us/energy-and-sustainability/renewable-energy-technologies

The local business category also owns a wide variety of different technologies. This may be due to the variety of local businesses in Scotland. The local businesses ownership category has a relatively high share of capacity coming from biogas (27%). This can be attributed to waste management businesses having a readily available supply of waste to generate energy.

The majority of community owned renewable capacity is from wind and hydroelectricity technologies. Community groups own 23% of all wind capacity, and 28% of hydroelectricity. Both can be attractive investments to local community groups. They can be used to directly make use of natural resources within their local area. They can also be part of shared ownership offers from renewable developers.

From a capacity per installation point of view, biogas has the highest median capacity (0.556MW), however 13% of biogas capacity comes from 5 installations. More than half of biogas capacity installations are CHP. 62% of the biogas capacity comes from farms and estates and 27% from local business respectively. This may be because biogas, similar to biomass, is suitable to offset higher farming or business-related energy consumption. Anaerobic digestion biogas can also be fuelled from agricultural waste and animal feedstocks which are more available to farms and estates.

After biogas and biomass, waste has the third largest median capacity per installation (0.141kW). Though waste only contributes to 1% of the total capacity, 98% of the waste technology capacity comes from communities. There is insufficient data to examine the reasons behind this.

## 4.2. Distribution across local authorities

As shown in Figure 4,[7] most of the community and locally owned renewable energy capacity is found in more rural local authorities.[8,9] Aberdeenshire (27%) and Highland (11%) contribute the most capacity.

In Aberdeenshire, 83% (228MW) of total capacity in the local authority area is owned by farms and estates. Aberdeenshire also had the highest capacity owned by local businesses across all local authorities (27MW). 11% of the total 1,028MW capacity is sourced from wind on farms and estates in Aberdeenshire.

Similar to Aberdeenshire, the largest share of capacity in Highland is farms and estates (40%). However, Highland capacity is also complimented with local authority (20%), local business (14%) and community (12%) ownership.

[7] Please refer to Table 4 in Appendix B for the data table of this graphs.
[8] Please note that these maps show more than 99% of the reported total capacity and number of installations. A small percentage has been omitted because we cannot allocate it to specific local authority areas.
[9] Areas are analysed according to the Scottish Government's 8-fold urban rural classification https://www.gov.scot/publications/scottish-government-urban-rural-classification-2020/

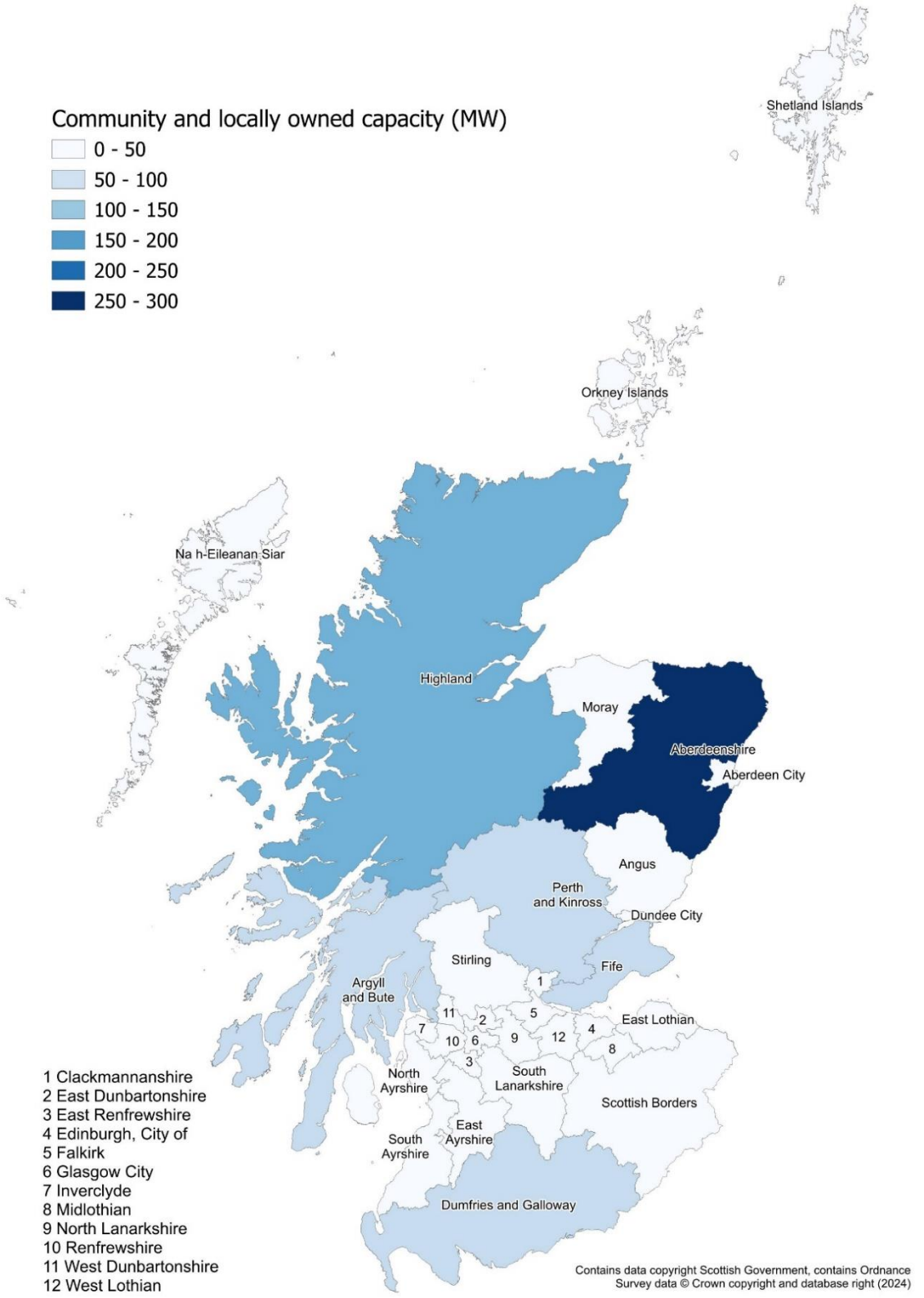



**Figure 4. Total operational renewable energy capacity in community or local ownership, 2023[7]**

While capacity is centred in rural locations, Figure 5[7] shows that local authorities with a mix of urban and rural areas have a higher number of installations. South Lanarkshire, Stirling, and Fife have the most installations. Unlike capacity, the majority of installations are under housing associations and local authority ownership. This tends to be consistent across most local authorities. However, installations in local authorities like Stirling, have higher percentage of installations per capita and when compared to social housing stock.[10] This is also true for Orkney and Shetland Islands.

It is important to note that local authority distribution is impacted by our data collection methodology. Local authority and housing association data is provided through voluntarily survey responses annually. Local authority planning portal data is also collected in a three-year cycle. For more information, see the accompanying methodology document.

[10] Population and Public sector housing stock numbers are from Scottish Government Housing Statistics. https://www.gov.scot/publications/housing-statistics-local-authority-housing-stock/

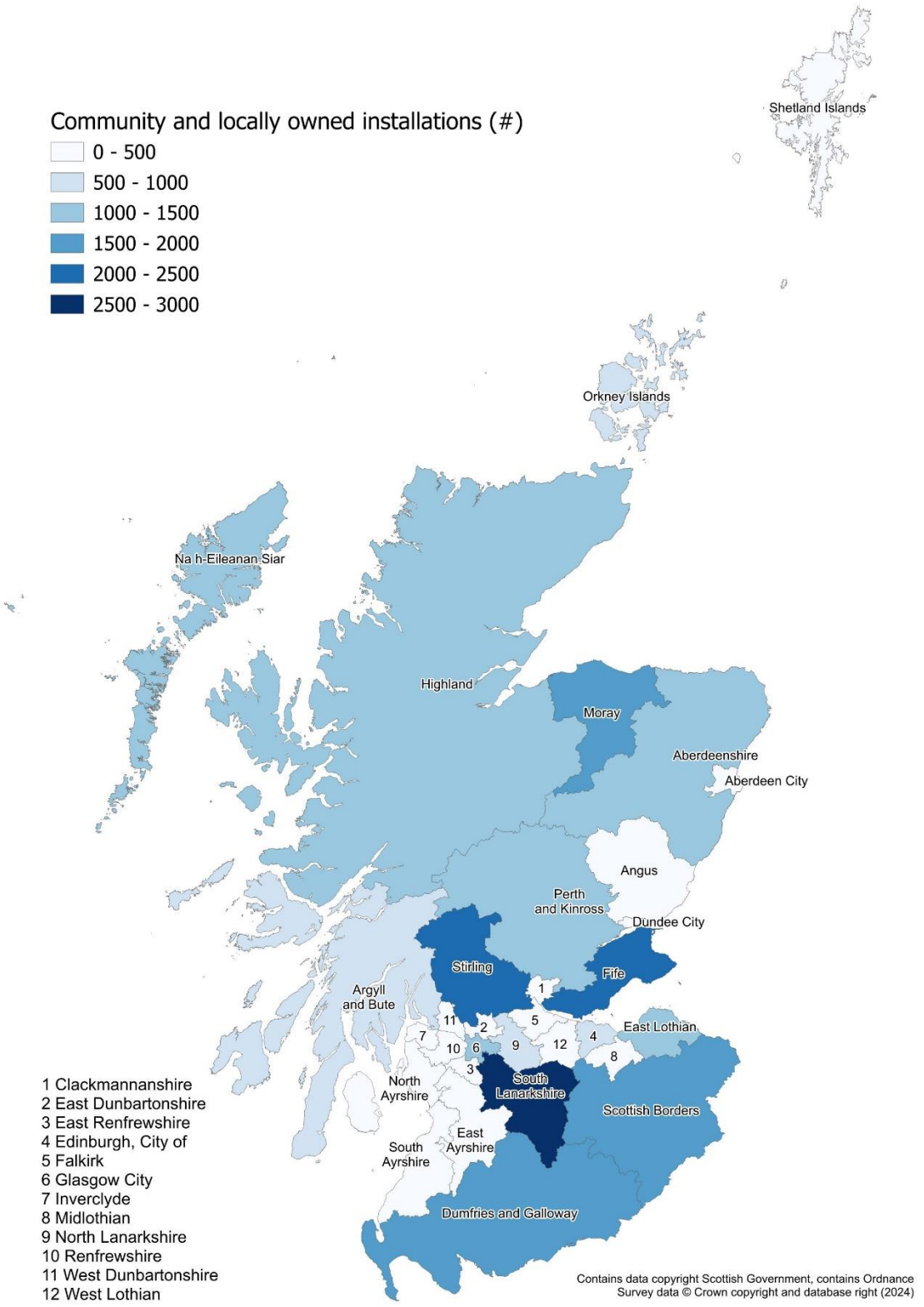
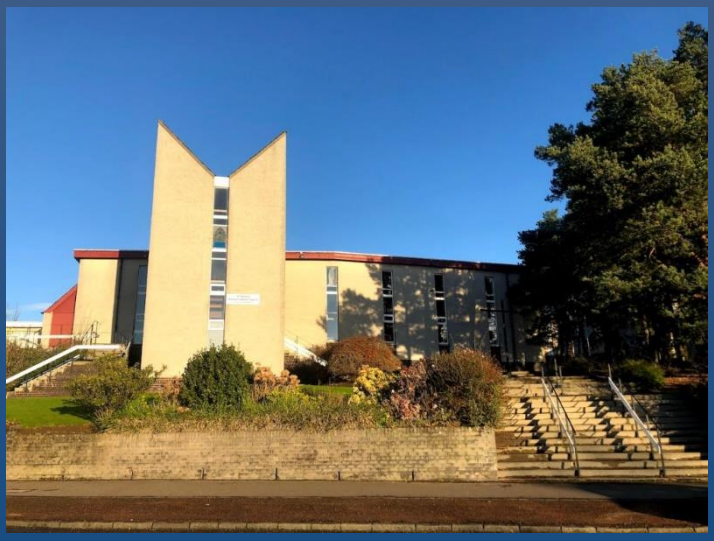



**Figure 5. Total operational renewable energy number of installations in community or local ownership, 2023[7]**

## St Ninian's RC church

**Technologies:** air source heat pumps, LED Lighting, cavity wall and underfloor insulation
**Location:** Dundee
**CARES funding:** £75,670 capital grant
**Date operational:** February 2023



St Ninian's RC Church is situated in the west of Dundee and was built in the 1960s. It is in the Diocese of Dunkeld and serves the community of Menzieshill and the surrounding area.

The church already had solar panels fitted and had been awarded a Silver Award from Eco-Congregation Scotland for its environmental efforts but wanted to build on this by switching from using gas boilers for heating to a greener alternative.

The church contacted Zero Waste Scotland's Energy Efficiency Business Support Service (now **Business Energy Scotland**), who provided an energy efficiency audit and report recommending the installation of air source heat pumps alongside other improvements, including insulation and lighting.

CARES then provided a £75,670 grant, as well as advice and support via the Local Energy Scotland local development officer, to install air source heat pumps with a total rating of 54KW, plus LED lighting, and cavity wall and underfloor insulation.


Read the full case study on the **Local Energy Scotland website**.

## 4.3. Energy storage in 2023

Energy storage technologies are important to provide flexible and reliable energy systems in the transition to net zero. As energy storage does not generate energy it is not included in the community and locally owned renewable energy target. However, it does provide important insight into the progress to net zero. For this reason, it is included in this report.

At the end of December 2023, there was an estimated 11MWh of installed energy storage capacity in community or locally owned ownership in Scotland. This was spread over approximately 1,130 installations.

Of the 11MWh of energy storage capacity known to be installed, there was an estimated:

- 4MWh of electrical storage capacity
- 6MWh of heat storage capacity
- 1MWh of hydrogen storage capacity

The growth in energy storage capacity since December 2022 was mainly attributable to electrical storage (<1MWh, 50 installations).[11] The ownership of the new electrical storage installations is as follows:

- Communities own 30 installations (<1MWh)
- Local businesses own 20 installations (<1MWh)
- Housing associations own 10 installations (<1MWh)
- Local authorities, the public sector, charities, farms, and estates each have fewer than 10 installations (<1MWh) respectively.

The community owned electrical storage includes 30 individual storage installations. They are located across six Scottish islands not connected to the mainland UK electricity grid. The islands rely on generators and renewable energy systems for their electricity. The installed battery storage systems allow communities to better manage discrepancies between periods of renewable electricity supply and demand.

In addition to the 11MWh of community and locally owned energy storage capacity estimated to be installed in Scotland at the end of December 2023, a further 2MWh was estimated to be in development. Of this 2MWh of energy storage capacity in development:

- <1MWh was under construction. This is all electricity storage capacity.
- <1MWh was in planning. This is mostly heat storage capacity with a very small amount of electrical storage capacity
- 1MWh was consented, not built. This increase is mostly from electrical storage and some hydrogen storage.

[11] Due to data sensitivity reasons, all storage capacity less than 1MWh will be displayed as <1MWh.

## 4.4. Shared ownership installations

The Scottish Government encourages developers to offer shared ownership opportunities as standard on all new renewable energy projects. This includes the repowering of existing sites and extensions to existing projects.[12,13] Shared ownership can include installations that are wholly owned by a community, those owned by multi-community cooperatives and installations that have multiple owners which include a community. Installations that are 'under discussion' with a community through the Community and Renewable Energy Scheme (CARES) are also included in this report, recorded under 'in development' capacity. A full description of shared ownership is available in the methodology document.

At the end of December 2023, there were 140 installations with either shared ownership or where shared ownership is under discussion. Of these, 30 were reported as operational and accounted for 43MW of community and locally owned capacity. The remaining 110 installations were in various stages of development and account for 1,065MW of the in-development capacity.

Wind turbines make up the vast majority of the shared ownership operational capacity in operation (42MW) and under development (1,054MW). The average capacity of shared ownership under development installation (10MW) is much higher than that of non-shared ownership installation (0.1MW). The main reason is that wind turbines tend to have larger capacity. However, it is expected that not all of the projected 1,065MW of shared ownership capacity will be achieved. This is because some installations will not be consented or built, the percentage of ownership could also decrease, or shared ownership may not be agreed.

The number of installations reported is the sum of the percentage of each installation owned by the shared ownership organisation. This methodology also applies to shares of individual installations. We are often counting fractions of an installation within our database. Moreover, we have adopted the same rounding convention as the rest of the report for consistency. This also reduces the risk of individual projects being identified from reporting data.

[12] https://www.gov.scot/publications/draft-energy-strategy-transition-plan/pages/4/
[13] https://www.gov.scot/publications/onshore-wind-policy-statement-2022/pages/5/

# 5. Changes in community and locally owned energy over time

In this section we will review the changes in community and locally owned renewable energy since 2010. The number of installations and capacity can change in the years following publication as we review new or improved datasets. This data may provide information on omitted installations, an updated date of operation or a new operational status. It can be years before the total capacity for a particular reporting year can be confirmed or become known to us through survey or other data collection.

A full list of data sources used in 2023, and historically, is available in the methodology document.

120MW[14,15] of operational capacity was newly reported to us this year. Approximately 5MW of this capacity became operational in the 2023 reporting year. The remaining 115MW is attributed to previous reporting years. The significant increase from the previous reporting year capacity is due to the inclusion of Non-domestic Renewable Heat Incentive (RHI) data. To focus our resources, we reduced the number of local authority planning portals checked from 12 to two. This allowed analysis of the non-domestic RHI dataset, the automation of cross checking between datasets, and moving the database to the R platform. This might be one of the reasons that the reported capacity that started operating in 2023 is relatively low. Revisions to the more recent reporting years can be significant. It can take a year or more for us to learn about operational installations after their operating date. For instance, out of the 115MW that was added to historic years, 65MW was added to 2019, which has increased the capacity that started operating in 2019 by 92%. Therefore, we should expect an increase in the capacity reported to have become operational in the 2023 reporting year in subsequent reports in the series. Please refer to the methodology for further information.

In addition, 39MW of operational capacity was removed from the community and locally owned renewable energy database in this reporting cycle. Capacity is removed when we become aware of changes in circumstance, such as installations being decommissioned or where the owner is no longer in an eligible ownership category. For example, some community installations were sold into non-community and non-local private ownership several years after completion. This means that such installation should be present in our time series from the point of completion but be removed from the point of sale. We acknowledge that any decommissioned or sold-out-of community owned installations would not be counted towards the 2GW (2,000MW) target in 2030, as the target is to measure against the time point of 2030, but it is factual to include them in their corresponding years.

The growth in capacity was generally steady between 2011 and 2019 before slowing down (Figure 6). The number of installations follows a similar trend but with growth slowing down from 2020.

[14] Please note that summed figures may not precisely equal reported totals due to rounding.
[15] The 120MW is the net gain including operating records newly known minus records confirmed to be decommissioned and other records removed as a result of data improvement.

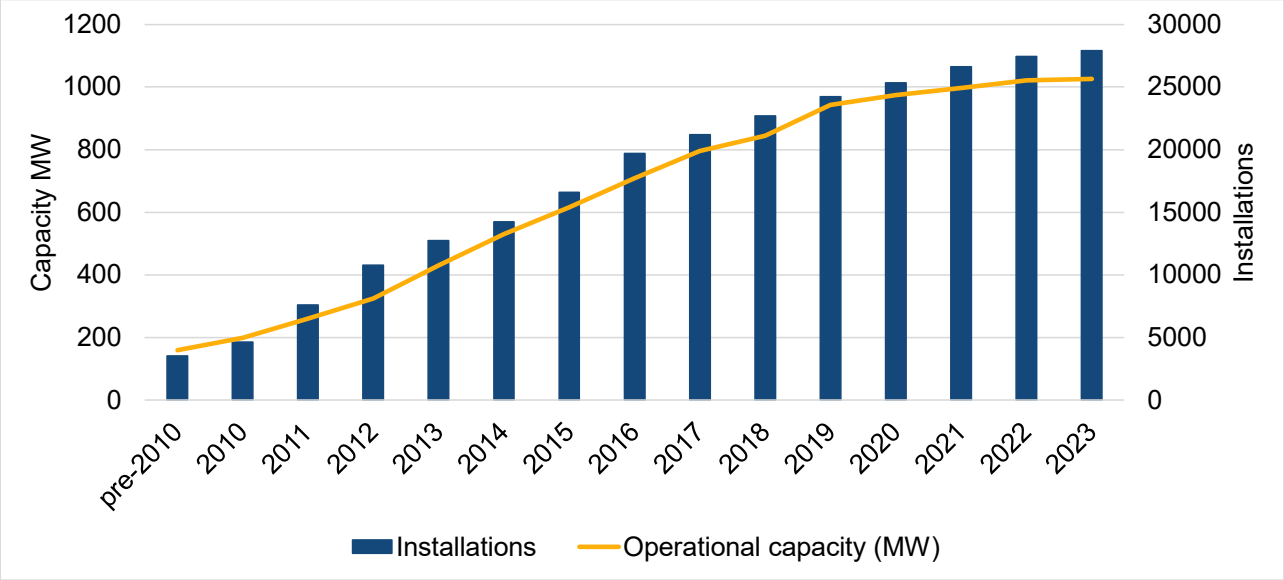



**Figure 6. Total operational capacity and installations, pre-2010 to 2023**

From 2011 to 2019, the average annual growth in operating capacity was 83MW. This is much higher compared to the average annual growth of 21MW from 2020 to 2023. The same trend is also true for technologies with relatively large capacity like biomass and wind. The average annual growth rate for the number of installations of biomass and wind was 25% and 13% respectively before 2017, in contrast with an annual growth of just 2% from 2017 onwards for biomass and <1% for wind.

From 2010 to 2019 the likely key contributors to the rapid growth in capacity were the UK Government's Feed in Tariff (FiTs) scheme[16] and Renewable Heat Incentive (RHI) scheme.[17] These schemes subsidised renewable electricity and renewable heat, respectively. Both schemes closed after 2019. The Smart Export Guarantee (SEG) scheme was launched in 2020 to subsidise renewable electricity. However, it offers a lower support level than FiTs. The financial viability of renewable energy installations and the available financial support are key drivers in the growth of renewable energy. We expected to see a slowdown in installations as this would be in line with significant changes to the availability and size of UK Government renewable energy subsidies.

In addition to UK government subsidies, we recognized that various factors influence the uptake of renewable energy installations. These factors include, but are not limited to, original equipment manufacturer (OEM) price, supply chain resilience, economic conditions, and Scottish policy and regulations. Although we have limited information to comment on all the factors above, we have provided information about the Scottish policy and support environment in Appendix C.

[16] The Feed in Tariff (FiTs) scheme launched in 2010 and closed in 2019.
[17] The Renewable Heat Incentive (RHI) scheme launched for non-domestic in 2011 and domestic in 2014, closed in 2021 and 2022 respectively.

# 6. In development capacity

At the end of December 2023, 1,028MW of community and locally owned renewable energy capacity is estimated to be operational. A further 1,499MW is estimated to be in various stages of development.

Of the renewable energy capacity estimated to be in development:

- 41MW was under construction.
- 194MW had been granted planning permission, but construction had not yet started ('consented, not built').[18]
- 137MW was waiting for a planning decision to be made ('in planning').[18]
- 1,064MW was under discussion for potential shared ownership between a community group and a renewable developer ('shared ownership under discussion').
- 62MW was in the scoping stage.
- 2MW was at an unknown stage of development.

The total capacity in each stage of development held within the community and locally owned renewable energy database is shown in Figure 7, and a breakdown by technology type is given in Appendix B Table 5.

Shared ownership under discussion holds the largest share of in-development capacity. Most capacity of this status is from community owned wind installations. This is reasonable because shared ownership is often sought in wind farm developments for community ownership. Moreover, these wind farm developments often have a development cycle of 5-8 years,[19] whereas other technologies have a significantly shorter development cycle. Therefore, a community wind installation can sit as in-development for years while other technologies would have commissioned and planned new installations.

The second largest ownership category in in-development capacity is farms and estates. This roughly matches the operating capacity distribution where farm and estate owned installations make up the largest capacity.

[18] Applies only to installations that would require planning permission.
[19] The development cycle is commented by Shared Ownership Manager from Community and Renewable Energy Scheme (CARES).

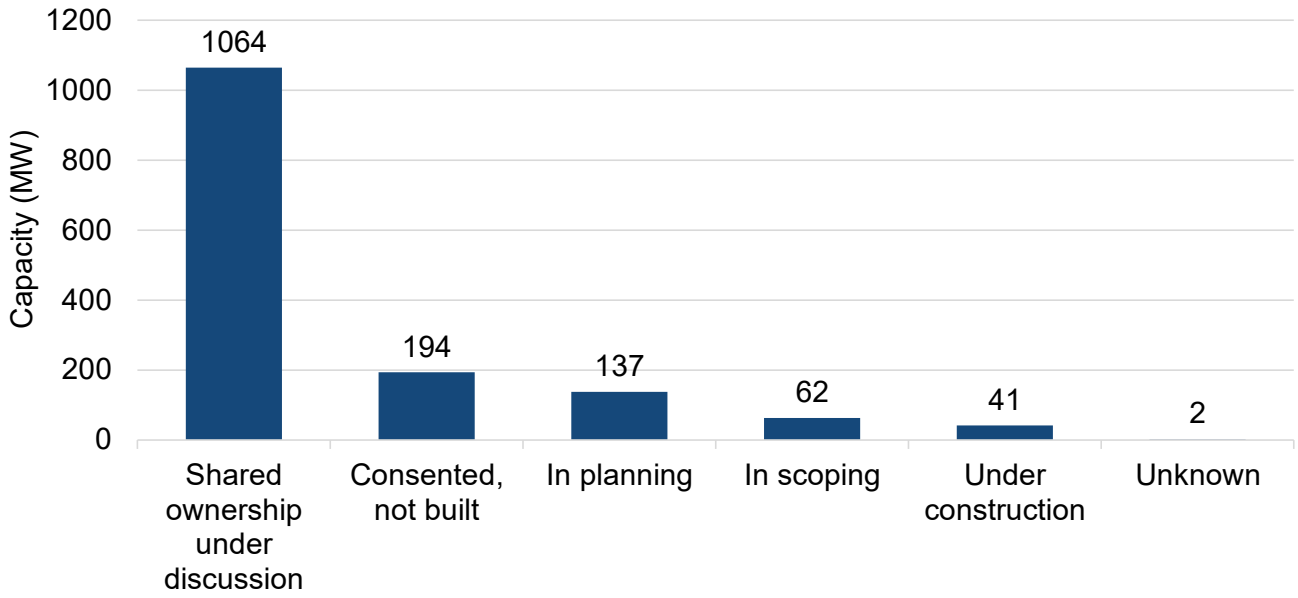



**Figure 7. Capacity in each stage of project development, 2023**

# 7. Future developments in reporting

- We will continue manual checks on the non-domestic Renewable Heat Incentive dataset to identify community and locally owned renewable energy. This year we assessed 35% of the capacity in dataset and we will continue this check in the coming years.
- We reduced the number of local authorities that we collect planning portal data from 12 to two this reporting year. We reduced the number of local authorities checked to prioritise resource for reviewing non-domestic RHI dataset, automation and moving the database to R platform. We will seek to restore the previous level of local authority planning portal data collection in future reporting years.
- We will seek to add the Scottish Energy Performance Certificate (EPC) register as a new data source for social let housing that have renewable installations. This means that in the current report we are underestimating the true capacity and number of installations in community and local ownership, but to an unknown extent. We will seek to address this in future reporting years.
- We are seeking new datasets to be added to the database, such as Distribution Network Operator (DNO) data and Feed-in Tariff (FIT) data. The timing of processing these data would be subject to resource and the format of the data. We will always prioritise the datasets that can fill in the largest data gap to ensure the reporting results are as close as possible to the real growth.

## With thanks to

The report draws on various sources of data from Energy Saving Trust and other organisations and has been compiled with thanks to:

- Local Energy Scotland, who deliver the Community and Renewable Energy Scheme (CARES)
- Scottish Federation of Housing Associations (SFHA)
- Business Energy Scotland
- The housing associations who responded to our survey
- The local authorities who responded to our survey
- Eunomia, who prepare the Renewable Energy Planning Database (REPD)
- Scottish Forestry (previous Forestry Commission Scotland)
- Scottish Water
- UK Department for Energy Security and Net Zero (DESNZ)[20]
- Community Energy Scotland, who with Community Energy England and Community Energy Wales publish the Community Energy: State of the Sector report[21]

We would also like to extend our thanks to the many other organisations and individuals who helped with time or information.

If you have any questions or comments about the community and locally owned renewable energy database, analysis or report, please contact RenewableReporting@est.org.uk.

[20] Formerly the Department for Business, Energy and Industrial Strategy (BEIS)
[21] https://communityenergyscotland.org.uk/wp-content/uploads/2022/06/UK-State-of-the-Sector-Report-2022_Full_Version.pdf

# Appendix A Community and local owned energy definition

As with previous versions of the database, the Scottish Government has requested that 'community and locally owned renewable energy' be defined as technologies producing heat and/or electricity from a renewable source,[22] where the owner of the installation is in one of the following categories:

- A community group
- A local Scottish business[23]
- A farm or estate
- A local authority
- A housing association
- A 'Public sector or other charitable organisation', including:
    - Charities, including faith organisations and those found on the Scottish Charity Regulator (OSCR) website[24]
    - Public bodies or publicly owned companies
    - Further or higher education establishments such as universities and colleges

'Ownership' has not been restricted to cases where the organisation owns the entire renewable installation. It also includes cases where, for example, a community group or farmer has helped to meet part of the cost of developing and installing a renewable system in return for some benefit, such as a share in the income generated. In such cases, a percentage of the installation's capacity is equal to the share owned by the community or local owner is counted towards the target.

'Ownership' does not include cases where the only benefit to the farmer or community group is a land rental payment from the owner or developer of the installation, or installations that generate community benefit payments but are owned by another organisation (for example a wind farm developer). The Scottish Government has established a register of community benefits from renewable energy installations[25] which allows developers and communities to upload community benefit details attached to these projects. This details fund spend, provides ideas and advice for communities looking to ensure their funds are spent wisely.

There is naturally some overlap between the different categories of owners. For example, some community groups have charitable status, as do many housing associations; and farms and estates could also be considered local Scottish businesses. For the purposes of this report, the following definitions have been used to determine which category each installation belongs to:

- The **community** category has been defined as communities of place, i.e., based around a sense of shared location. They often have charitable status. In some instances, the renewable technology and/or income from it may be owned by a

[22] A full description of each eligible technology is given in the adjoining methodology document
[23] Note this excludes Scottish businesses whose purpose is to develop renewable energy projects when the installation is at a distance from their own properties or where ownership and management of the installation is provided as an energy service company (ESCO).
[24] https://www.oscr.org.uk/
[25] https://localenergy.scot/community-benefits-map/

trading subsidiary, which may be registered as a separate company; but in all such cases the installations have been treated as under community ownership.

- The **farm or estate** category includes organisations where the renewable technology is installed on land currently used for agricultural or other farming purposes, or on buildings that are part of a farm or estate layout; and (where the installation needs planning permission) where the person or organisation listed as the applicant in the planning application gives their address as being in Scotland. Estate ownership is often difficult to establish, but, where possible, publicly available information has been used to establish whether estate owners are a normal resident on the estate where the installation is to be built. Estate ownership is sometimes connected to or maintained through a charitable trust or a local business, but in such cases any related renewable energy installations have been included under farm and estate ownership.
- The **public sector and other charitable organisation** category cover public bodies and charities. Public bodies are those listed in the National Public Bodies Directory,[26] including health bodies such as NHS health boards and public corporations such as Scottish Water. Other publicly owned organisations such as the fire and rescue services and the police force are also included in this category, although they are not strictly public bodies. This category also includes further or higher education establishments who are members of Association of Scotland's Colleges (ASC)[27] or Universities Scotland.[28] Charities have been defined as charitable organisations found on the Scottish Charity Regulator website, which are not also a community group, housing association or estate-owned charitable trust. This category also includes leisure trusts,[29] churches and other religious organisations.
- The **local business** category includes small or medium-sized enterprises (SMEs) registered with Companies House[30] at an address in Scotland. The businesses must have fewer than 250 employees and not be a subsidiary of another business which has more than 250 employees or is registered outside of Scotland as per Companies House. Businesses receiving funding through CARES or through Resource Efficient Scotland (RES) SME loans have been included. This definition excludes Scottish SMEs whose purpose is to develop renewable energy installations at a location significantly removed from their registered office, and where the business does not own the land where the installation will be built.[31]
- The **local authority** category includes all 32 unitary local authorities in Scotland.
- The **housing association** category includes all registered providers of social housing within Scotland other than local authorities. Although some housing associations are registered charities and others are community groups, any

[26] www.scotland.gov.uk/Topics/Government/public-bodies/about/Bodies
[27] www.scotlandscolleges.ac.uk/about-us/
[28] www.universities-scotland.ac.uk/
[29] Leisure trusts supply sports facilities to local communities, often on behalf of unitary authorities.
[30] www.companieshouse.gov.uk/
[31] For example, an SME established to build and operate a renewable energy project could count as a 'local Scottish business' for the purposes of the Scottish Government's target if it was registered with Companies House at an address in Scotland, and either a) owned all the land where the installation was to be built, or b) if it did not own all the land, its registered address indicated that it was physically located close to the address of the proposed installation.

renewable energy installations owned by a registered social landlord are recorded under the housing association ownership category.

Any source of renewable energy generation, other energy categories (e.g., energy from waste installations) or types of energy storage which fell into the ownership categories listed above were included in the database.

# Appendix B Data Tables

**Table 2. Operational capacity and number of installations by community or local ownership category, 2023**

| Ownership category | Operational capacity (MW) | Percentage of operational capacity | Number of installations | Percentage of installations |
|---|---|---|---|---|
| Farm and estate | 448 | 44% | 980 | 4% |
| Local authority | 162 | 16% | 12,550 | 45% |
| Local business | 142 | 14% | 930 | 3% |
| Community | 104 | 10% | 770 | 3% |
| Public sector and charity | 92 | 9% | 560 | 2% |
| Housing association | 81 | 8% | 12,110 | 43% |
| **Total** | **1,028** | **100%** | **27,900** | **100%** |

**Table 3. Operational capacity and number of installations by technology, 2023**

| Technology | Operational capacity (MW) | Percentage of operational capacity | Number of installations | Percentage of installations |
|---|---|---|---|---|
| Biomass | 339 | 33% | 1,300 | 5% |
| Wind | 311 | 30% | 720 | 3% |
| Heat pump | 122 | 12% | 9,050 | 32% |
| Biogas | 104 | 10% | 60 | <1% |
| Solar PV | 89 | 9% | 13,000 | 47% |
| Hydroelectric | 41 | 4% | 190 | 1% |
| Solar thermal | 17 | 2% | 3,590 | 13% |
| Waste | 6 | 1% | <10 | <1% |
| **Total** | **1,028** | **100%** | **27,900** | **100%** |

**Table 4. Total operational renewable energy capacity and number of installations in community or local ownership, 2023**

| Local Authority | Total Capacity (MW) | Total number of installations |
|---|---|---|
| Aberdeen City | 8 | 100 |
| Aberdeenshire | 275 | 1,030 |
| Angus | 21 | 470 |
| Argyll & Bute | 51 | 880 |
| City of Edinburgh | 13 | 870 |
| Clackmannanshire | 1 | 120 |
| Dumfries & Galloway | 74 | 1,500 |
| Dundee City | 5 | 360 |
| East Ayrshire | 10 | 70 |
| East Dunbartonshire | 10 | 340 |
| East Lothian | 13 | 1,260 |
| East Renfrewshire | 2 | 310 |
| Falkirk | 5 | 330 |
| Fife | 52 | 2,150 |
| Glasgow City | 18 | 1,050 |
| Highland | 115 | 1,360 |
| Inverclyde | 2 | 70 |
| Midlothian | 7 | 380 |
| Moray | 28 | 1,510 |
| Na h-Eileanan Siar | 41 | 1,220 |
| North Ayrshire | 10 | 400 |

| | | |
|---|---|---|
| North Lanarkshire | 17 | 1,000 |
| Orkney Islands | 22 | 850 |
| Perth & Kinross | 57 | 1,280 |
| Renfrewshire | 12 | 300 |
| Scottish Borders | 30 | 1,540 |
| Shetland Islands | 13 | 300 |
| South Ayrshire | 11 | 110 |
| South Lanarkshire | 40 | 2,920 |
| Stirling | 23 | 2,440 |
| Various | 2 | 850 |
| West Dunbartonshire | 11 | 320 |
| West Lothian | 29 | 200 |
| **Total** | **1,028** | **27,900** |

**Table 5. Capacity (MW) in each stage of development by technology[32]**

| Technology | In scoping | In planning | Consented, not built | Under construction | Shared ownership under discussion | Total |
|---|---|---|---|---|---|---|
| Wind | 21 | 99 | 129 | 8 | 1,054 | **1,310** |
| Solar PV | 29 | 7 | 24 | 4 | 7 | **72** |
| Biogas | <1 | <1 | 20 | 11 | <1 | **32** |
| Heat pump | <1 | 4 | 6 | 13 | 0 | **23** |
| Tidal | <1 | 20 | 1 | 0 | 0 | **21** |
| Hydroelectric | 5 | 4 | 6 | 3 | 3 | **21** |
| Biomass | 2 | 4 | 7 | 2 | 0 | **16** |
| Geothermal | 4 | 0 | 0 | <1 | 0 | **4** |
| Solar thermal | <1 | <1 | <1 | <1 | 0 | **<1** |
| **Grand total** | **62** | **137** | **194** | **41** | **1,064** | **1,499** |

[32] For ease of reading, the 2MW of capacity classed as being in an unknown stage of development has been omitted from this table.

# Appendix C Scottish policy perspective

The Scottish Government has supported community and locally owned renewable energy for the last decade. They have used various funding and support schemes, including:[33]

- Community and Renewable Energy Scheme (CARES)
- District Heating Loan Fund (DHLF)
- Small and Medium Enterprise (SME) loan and cashback scheme
- Low Carbon Infrastructure Transition Programme (LCITP) – the scheme is now closed to new applications.
- Energy Investment Funding (EIF) / Renewable Energy Investment Funding (REIF)

Of the above schemes, CARES is due to run until at least 2025. The SME loan and cashback scheme and other support for small businesses are also expected to continue. The Scotland's Heat Network Fund,[23] the successor to the LCITP, opened to applications on 21 February 2022. It will support the development of new zero-emission heat networks and communal heating systems. It will also support the expansion and decarbonisation of existing heat networks across Scotland. On the same date, the Scottish Government also announced the opening of applications to the Social Housing Net Zero Heat Development Fund.[24] This fund provides grant support to Registered Social Landlords to help decarbonise their existing housing stock. The fund supports both the installation of green heating and 'fabric first' enhancements.

Previously, the uptake of renewable energy installations was encouraged in Scottish social housing through the Energy Efficiency Standard for Social Housing (EESSH), enacted by the Scottish Government in 2014. The first EESSH milestone required that where feasible to do so, all social let properties should reach an EPC band of D or C (average energy efficiency or above) by 2020. The post-2020 Energy Efficiency Standard for Social Housing (EESSH2) required properties to meet an EPC band B (high energy efficiency) by 2032. In addition, no social housing below EPC band D could be re-let from December 2025, subject to temporary specified exemptions.

The review of energy standards set by Scottish Building regulations have continued to set challenging emissions and, more recently in 2023, energy performance targets for new buildings. These standards apply to all development regardless of tenure. Following the introduction of the 2015 standards, on-site generation of power to offset energy demand is now a common part of newbuild specifications. This increased uptake in solutions, primarily photovoltaic arrays, is also driven by the wider availability and lower cost of such technologies. Current standards continue to recognise the effective use of renewable technologies, where they are installed as part of a new development.

Under EESSH2, it was possible to meet the 2020 standard in many properties without installing renewable technologies because an efficient fossil fuel heating system and good levels of insulation could be sufficient to meet the more immediate targets. For this reason, and in order to establish a standard that is in line with net zero, the Scottish Government convened a review of EESSH2 in 2022.

[33] New Build Heat Standard, https://www.gov.scot/publications/new-build-heat-standard-factsheet/

The work of this review group fed into the development of proposals which the Scottish Government published in a consultation for the new Social Housing Net Zero Standard, which ran from November 2023 to March 2024. The Social Housing Net Zero Standard consultation sought views on a standard that will require social landlords to improve fabric efficiency and install clean heating, across their stock, where it is technically feasible and cost-effective to do so. The new standard is yet to be confirmed, but renewable technologies are very likely to be needed in order to meet the net zero ambitions. We therefore expect to continue to see the steady uptake of renewable technologies in social housing.

For new build properties, similar regulations enacted by the Scottish Government in 2016 stipulate that property developers must show carbon dioxide emission reductions for new build properties relative to baseline property models. An efficient way to meet these standards can be to install renewable energy technologies and as a result, the regulations encourage the uptake of renewable technologies in a considerable number of new build properties, of which a proportion will be social tenure.

In addition, the New Build Heat Standard (NBHS) will affect the type of heating system that new-build homes and properties will be allowed to use. From April 2024, changes to building regulations will mean new homes and buildings will not be allowed to use direct emission (or polluting) heating systems like oil and gas boilers, and bioenergy. This approach is likely to affect the construction of new social housing units and non-domestic buildings under community and local ownership, potentially leading to a growth in community-owned heat production over the next few years.