



JUST-Systems

Case Study Profile

East Ayrshire: Green Recovery and Rural Transformation

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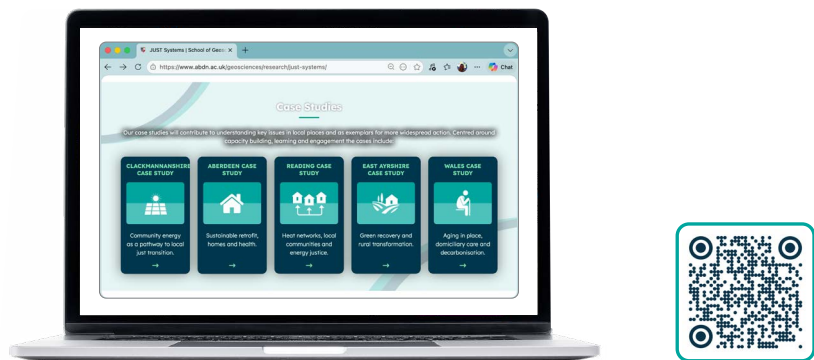
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1. Background

The JUST-Systems project (2025-2030) was developed in response to the UKRI Net Zero Challenges call, which supports original research programmes advancing the UK's transition to net zero with stakeholder engagement at their core. Our interdisciplinary team includes researchers from six universities, five UK case study partners (across East Ayrshire, Aberdeen, Clackmannanshire, Reading & Wales) and an expert advisory board. Together, we aim to better understand the contexts and challenges of local and regional transitions and co-develop pathways for action.

The East Ayrshire case study explores how rural areas experience the transition to net zero and how these processes can address community cohesion. It focuses on the three wards within the East Ayrshire Council area (Doon Valley, Cumnock & New Cumnock, and Ballochmyle) which are covered by the Community Renewable Energy Project (CoRE) programme (<https://www.east-ayrshire.gov.uk/Ayrshire-Growth-Deal/Community-Renewable-Energy/Core.aspx>). Funded through the Ayrshire Growth Deal in 2019, CoRE includes projects on infrastructure, skills, inclusion and community wealth building, injecting over £250 million into the local economy.

The case study explores how the CoRE programme, through net zero demonstration projects can tackle three interlinked challenges: **fuel poverty**, by building community resilience to energy crisis; **equitable transition**, by supporting the most vulnerable and in-need residents; and **depopulation**, by developing a holistic approach focusing on community health and well-being. The case study has a particular focus on the whole place demonstrator project, based on the village of Rankinston which is at the sharp end of all three challenges highlighted.

East Ayrshire Council, the core partner for this case study, committed to achieving net zero in its operations by 2030, and in the wider council - by 2045. The wards in focus represent challenges correlated to East Ayrshire's rural setting and industrialised past: lower than average life expectancy, unpaid social care, depopulation, high car dependency, fuel poverty, poor access to infrastructure/services, and limited employment opportunities.

Meanwhile, East Ayrshire attracts major low-carbon investment, particularly in onshore wind and electricity networks. These offer economic regeneration

opportunities and jobs but raise challenges over community acceptance and benefit-sharing. The area has low active travel, and housing that is particularly difficult to retrofit - mostly pre-1919 build, mixed infrastructure, and low-income households. Indicators of deprivation in the region include (<https://eabn.east-ayrshire.gov.uk/sas-economy-at-a-glance.php>):

- 22% of households on Universal Credit (compared to 17% in Scotland (2022))
- 31% of the population in the most deprived quintile
- Child poverty standing at 27% versus 22% in Scotland
- 'Good health' 2% below Scotland across age groups, worsening with age
- Life expectancy upon birth lower than the Scottish average across age groups, by 0.7% for males and 0.6% for females.

This case study profile provides scoping and rationale for research to be carried out under the JUST-Systems project, supporting a systems approach to a just transition in East Ayrshire. Summary Table 1 on the next page outlines key indicators and trends. It is followed by a detailed overview of East Ayrshire data and policies, followed by an introduction to the systems methodology applied to the case study.



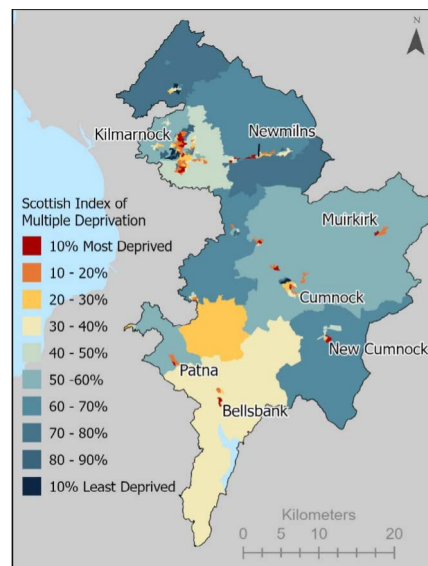
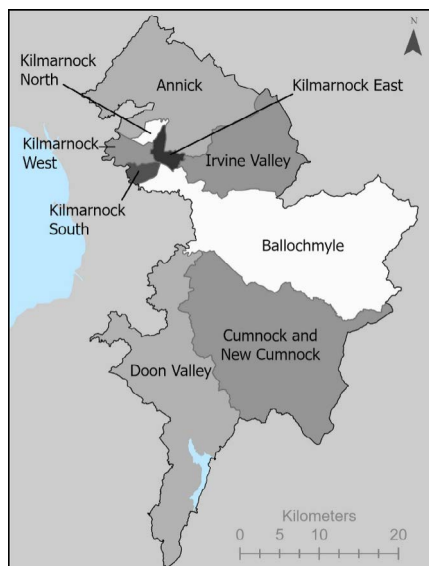
Figure 1: Rankinston Coal Bing: Mound of waste rock moved from coal mining operations nearby the village, Creative commons licence <https://www.geograph.org.uk/photo/6519609>



Theme	Indicator	Latest value (year)	Previous value (year)	Trend (between years)	Comparison with national benchmark
Population, Households, Demography	Population	120,400 (2022)	122,700 (2011)	↓	2.21% (2022)
	Occupied households	56,162 (2024)	55,436 (2022)	↑	2.14% of Scotland (2024)
	Age Dependency Ratio	62.9% (2024/25)	61.0% (2021)	↑	Scotland 60%
	Immigration (flow)	Net +980 (2022-23)	Net +720 (2021-22)	↑	Net migration rate 8.1 per 1,000 vs Scotland 11.3 per 1,000 (2022-23)
	Ethnicity (minority)	3.9% ethnic minority (2022)	2.4% (2011)	↑	3.9% vs Scotland 12.9% (2022)
	Religion	No religion 54.8%, Church of Scotland 26.7% (2022)	No religion 37.2%, Church of Scotland 35.7% (2011)	↓	No religion 54.8% vs Scotland 46.5%
Economic	Income (median weekly earnings, full-time)	£687.8 per week (2024)	£570.9 per week (2019)	↑	£687.8 vs Scotland £740
	Employment (employment rate 16-64)	72.4% (year ending March 2025)	71.3% (year ending Dec 2022)	↑	72.4% vs Scotland 76.6%
Communities and Place	Deprivation (SIMD 2020)	31.1% of population in most deprived quintile (2020)	31.7% of population in most deprived quintile (2016)	↑	Scotland 20.0% in most deprived
	Education & qualifications	34.1% (adults 16+) with no qualifications (2022)	Previous (2011): 29%	↓	Scotland 17.1% (with no quals) (highest in Scotland)
	Health (life expectancy at birth)	Male 75.2 yrs; Female 78.6 yrs (2021-23)	Male 73.5 yrs; Female 77.95 yrs (2001-23)	↑	Male 75.2 vs Scotland 76.8 → -1.6 yrs; Female 78.6 vs Scotland 80.8 → -2.2 yrs
	Fuel poverty	38% (2022-2024)	27.1% (2017-2019)	↓	31% across Scotland (2022-2024)
	Community pride	93% of adults positive about living in their community (2024)	91% (2022)	↑	95% across Scotland
Net Zero	Community & Locally Owned Renewable Energy Capacity	12MW, 430 Installations (2025)	10MW, 210 Installations (2024)	↑	1% of Scotland's total capacity
	Car dependence for work commute	52.8% (Census 2022)	47% (Census 2011)	↓	45.9% across Scotland

Table 1: Summary Table of Key Data Trends for East Ayrshire (sources found throughout Data Profile section)

2. Location and Context



Clockwise from Top left to right:

Figure 2: East Ayrshire on the map of Scotland

Figure 3: East Ayrshire wards - focus of the case study

Figure 4: East Ayrshire - Scottish Multiple Deprivation Index

Figure 5: Littlemill Place, the main street of Rankinston, taken by Finlay Bain Kerr on site visit

Figure 6: East Ayrshire village. (Photograph by Matt Hannon)

Figure 7: Example of housing. (Photograph by Matt Hannon)

3. Data Profile

3.1. Historical Background

East Ayrshire is one of Scotland's 32 Local Authority areas and makes up part of the historic country of Ayrshire. Kilmarnock, the largest town within the historic county, serves as the administrative centre. It is an area with a rich history in agriculture, and in many forms of industry, most prominent of which was coal mining (Lebon, 1933). This case study focuses on 3 wards that lie in the southern half of East Ayrshire. These are Doon Valley, Cumnock and New Cumnock, and Ballochmyle (see figure 2). Some of the notable communities in these wards include Mauchline in the north, Dalrymple in the west, Muirkirk in the east, Dalmellington and Bellsbank in the south and west, as well as New Cumnock in the south east.

To build a complete picture of the data profile in East Ayrshire, data was accessed from various sources. A complexity associated with this activity is that UK and Scottish data is collected and analysed differently, creating inconsistencies. For this reason, this section focused on trends and directions of travel, creating a sense of the macro perspective over time in East Ayrshire.

3.2. Population, Households and Demographics

Population trends

East Ayrshire had an estimated population of 120,400 at the 2022 national census and makes up an area of 1,262km [1]. East Ayrshire's estimated population represents 2.2% of the total population of Scotland [1]. The population was estimated as 122,700 at the 2011 census, showing a slight decrease over recent years. In the southern localities of Cumnock and New Cumnock, Doon Valley and Ballochmyle the population was estimated as 38,793.

By 2043, East Ayrshire's population is expected to decline by 6.6% compared to a 2.5% increase for Scotland based on 2018 population projections [1]. The key factors behind this estimation relate to demographic challenges found across Scotland with declining birth rates and migration away from rural areas.

¹ <https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Ffeabn.east-ayrshire.gov.uk%2Ffiles%2FAIt%2520Data%2FAbout%2520the%2520Population%2520%26%2520Households%2520data.docx&wdOrigin=BROWSELINK>

Households

There are 56,162 households with residents in East Ayrshire (2023) which represents 2.14% of all occupied households in Scotland (2024) [2]. Table 2 explores 2021 household data in which vacant dwellings, and council tax bands are compared to the Scottish average, where East Ayrshire generally has a higher proportion of households in lower council tax bands.

2021 households and dwelling estimates	Scotland	East Ayrshire	Data Set (see EAC ¹)
Dwellings per hectare	0.35	0.47	https://www.nrscotland.gov.uk/publications/households-and-dwellings-in-scotland-2025/ Households > Household Estimates > Estimates of Households and Dwellings in Scotland, 2021 (All tables, Table 4)
% Dwellings vacant	3%	3%	
% Dwellings in Council Tax bands A-C	59%	68%	
% Dwellings in Council Tax bands D-E	27%	24%	
% Dwellings in Council Tax bands F-H	14%	8%	
Median House Price £	185,000	116,000	https://statistics.gov.scot/data_home Atlas > Key Facts > Housing

Table 2: Household estimates by Council tax band

Gender

The percentage of males and females in East Ayrshire (2022) is 48.56% and 51.44%, respectively, consistent with the Scottish average [2].

3.2. Population, Households and Demographics cont.

Age

The percentage of population in East Ayrshire (2022) aged under 16 is 16.93%, aged 16-64 is 61.66%, and aged 65 and over is 21.42% [2]. The Dependency ratio in 2024 was 62.9% in East Ayrshire versus the Scottish average of 56.2% (EAC: <https://eabn.east-ayrshire.gov.uk/sas-economy-at-a-glance.php>). The is the ratio of the non-working age (0-15 and 65+) to working age (16-65) population, using NRS mid-year population estimates. The ratio was 61% in East Ayrshire in 2021, showing an increase over time.

According to the East Ayrshire Council data on the southern localities and case study relevant wards, the population in such areas are slightly older, with Ballochmyle, Cumnock and Doon Valley all having 1% higher population at 65+ and 75+ ranges.

Immigration

The net migration for all ages in East Ayrshire between 2013 and 2023 was 2,880 people while the net migration for people aged 15-64 was 1,797 people. Net migration for all ages in Scotland in the same period has been 296,796 while for people aged 15-64 it has been 232,157 [1]. Net migration was 980 in 2022-2023, up from 720 in 2021-2022, with the net migration rate of 8.1 per 1000 lower than the 11.3 per 1000 rate for the rest of Scotland in 2022-2023.

89.78% of the population in East Ayrshire (2022) were born in Scotland followed by England (6.21%), Northern Ireland (0.58%), Wales (0.23%), and Republic of Ireland (0.2%) (Scottish Government 2022). The percentage of people living in East Ayrshire (2022) born outside the UK is 3.2% while for Scotland the percentage is 10.24% [2].

Ethnicity

People in East Ayrshire (2022) that perceive themselves as 'white' represents 97.83% of the population. In turn, 1.04% perceive themselves as 'Asian, Asian Scottish, or Asian British' while 1.13% belong to 'other ethnic groups' [2]. Figure 8 details the main ethnicities within East Ayrshire in 2022.

Religion

While 54.85% of the population in East Ayrshire (2022) are not religious, 39.61% consider themselves religious (5.54% did not state) [2]. The breakdown is as follows Church of Scotland - 26.69%; Roman Catholic - 8.12%; Other Christian - 3.33%; Muslim - 0.59%; and Other religions represents less than 1% (0.88%) (Scottish Government 2022). From the 2011 census, the percentage that identify with no religion has increased by 17.6%. The Scottish average identifying as not religious is at 46.5%, lower than in East Ayrshire.

Language

98.6% of the population in East Ayrshire (2022) are able to speak English which is slightly above that of Scotland (98.04%) [2]. 95.6% of the population speak only English, which is down from 97% in 2011, signifying the increasing migration found not only in East Ayrshire but across Scotland.

The percentage of people able to speak Scots in East Ayrshire (2022) is 38.93% which is higher than the percentage for Scotland (28.49%). In turn, only 0.71% are able to speak Gaelic in East Ayrshire (2022) which is below Scotland (1.32%) (Scottish Government 2022). [2]

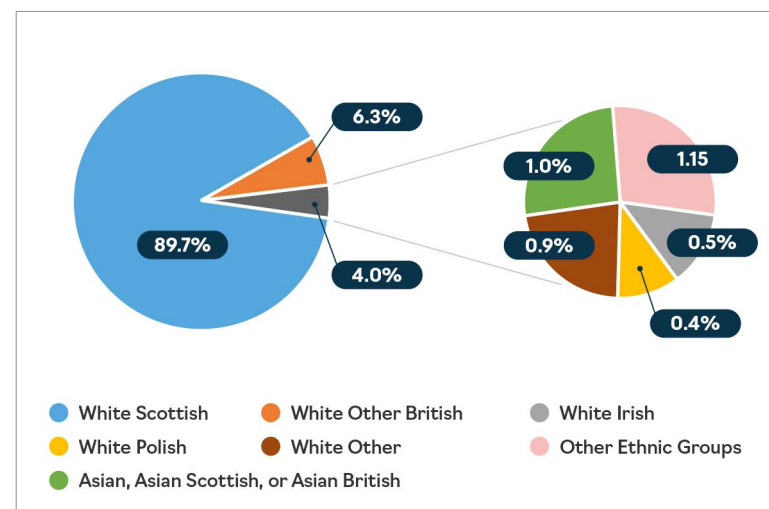


Figure 8: Share of main ethnicities in East Ayrshire in 2022 (Own elaborations based on data from Scotland's Census 2022)

3.3. Economy

Economic trends

The value of goods and services produced in East Ayrshire, known as Gross Value Added (GVA), in 2024 was at £1,712m, 1.2% of total Scottish output in the same year [1].

Income

The median earnings for full-time employees residing in East Ayrshire (2024) is £687.8 per week while in Scotland (2024) it is £740 and in Great Britain (2024) it is £729.8 (5). The median earning for full-time employed males residing in East Ayrshire (2024) is £700.5 per week while females in the same situation earn £650.9.

The wage gap between both genders (i.e. £49.6) is lower than in Scotland (males earn £767.7 and females £701) and Great Britain (males earn £777.5 and females £673.2) (5). Further, the wage has increased over time, with £570 median weekly earnings reported in 2019. Finally, the household income mean for East Ayrshire (2017-2019) was £26,000 while for Scotland it was £29,500 [7].

According to the Office for National Statistics, in the April 2024 – March 2025 period, 72.4% of people aged 16-64 in East Ayrshire were economically active (PEA). This percentage was below Scotland (76.6%) and Great Britain (78.5%) in the same year (ONS 2025). East Ayrshire Council data estimates that for the 3 southern wards the employment rate was lower than for both East Ayrshire as a whole, and for Scotland. Ballochmyle has an employment rate of 58.3%, Cumnock at 65.8% and the Doon Valley at 46.5%, hinting at the long-term legacy of deindustrialisation in these former coal mining areas.

4.2% of East Ayrshire's population aged 16 and over are unemployed while in Scotland and Great Britain it reaches 3.6% and 4.1%, respectively [5]. The main reasons for economic inactivity in East Ayrshire (Apr 24 – Mar 25) are long-term sickness (43.2%) and being retired (12.9%). While 84.7% of the economically inactive people do not want a job, 15.3% do want one [5]. There are 3,627 full-time students aged 18-74 in East Ayrshire (2022). 39.14% of them are economically active in employment and 10.4% are economically active unemployed. 50.51% are economically inactive [2].

Sectoral employment

Biggest employers are health/social work, retail/wholesale, water utilities and construction, employment by sector is presented in Figure 9.

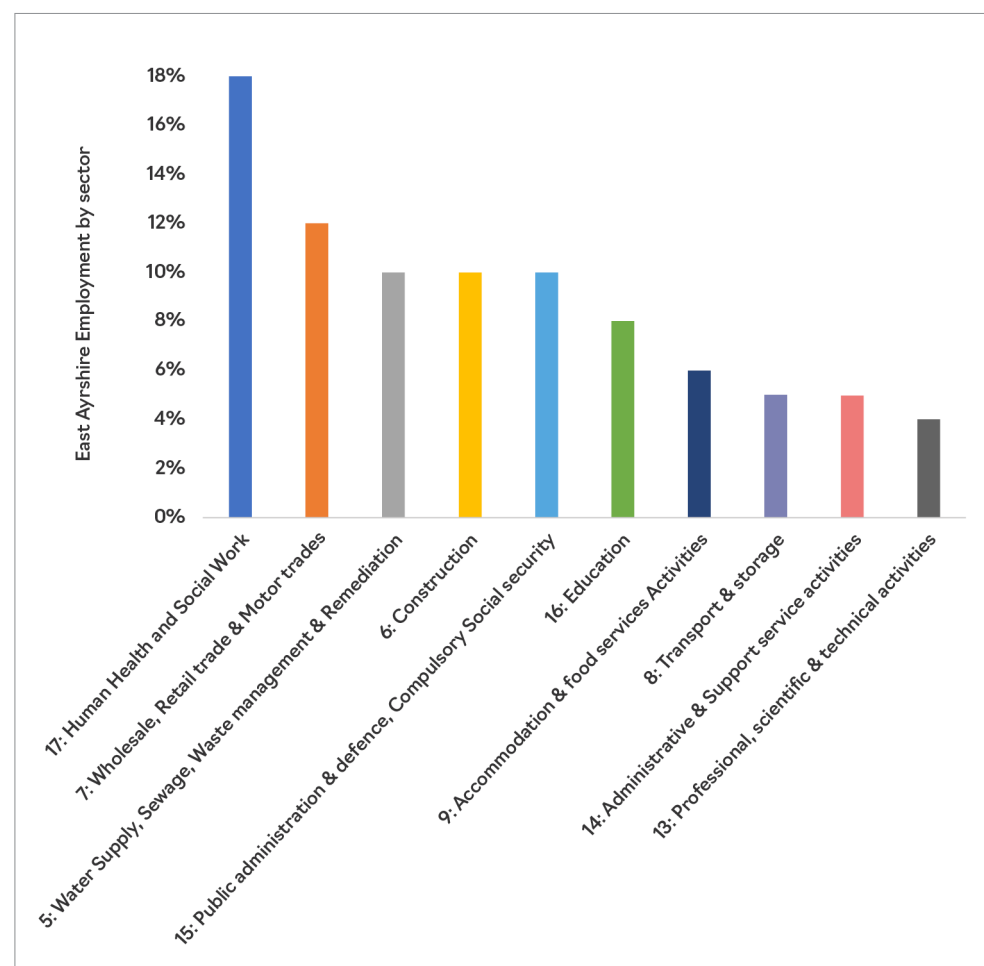


Figure 9: East Ayrshire employment by sector (2022) [11]

3.3. Economy cont.

Future employment trends

The sectors forecasted to be the most job demanding in East Ayrshire between 2024 and 2027 are health care (600 jobs), tourism (600 jobs), social care (400 jobs), construction (200 jobs), food and drink primary production (300 jobs), childcare (100 jobs), and professional services (100 jobs) [1]. This is reflected in the projections for the period covering 2027-2034, which are presented in Figure 10, where the same sectors lead. It is worth noting that engineering employment was projected to fall by 100 jobs over the same period.

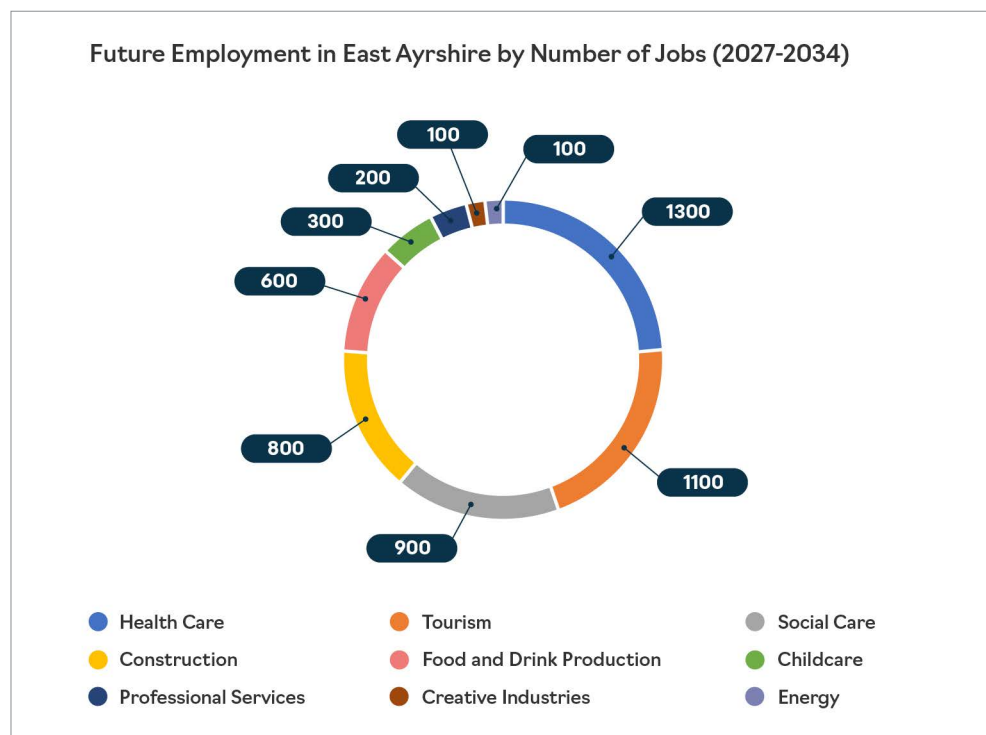


Figure 10: Future employment projections in East Ayrshire by number of jobs (2027-2034)

3.4. Communities and Place

Deprivation

25 data zones in East Ayrshire (2020) are in the 10% most deprived group from the Scottish Index of Multiple Deprivations (SIMD). There are 697 data zones in Scotland in the same group (Scottish Government 2022). In southern locality of East Ayrshire which forms the focus of this case study, 41% of the population reside in the most deprived quintile. EAC data (<https://eabn.east-ayrshire.gov.uk/sas-population-at-a-glance.php>) has the following breakdown:

Scottish Index of Multiple Deprivation % of population in most deprived quintile	Scotland	East Ayrshire
SIMD20	20%	31%
SIMD20 Employment	20%	32%
SIMD20 Income	20%	28%
SIMD20 Education	20%	25%
SIMD20 Health	20%	28%
SIMD20 Access	20%	25%
SIMD20 Crime	20%	23%
SIMD20 Housing	20%	3%

Education and qualifications

In the 2022 census, the percentage of adults (over 16) in East Ayrshire with no qualifications is 34.16% which is above that for Scotland (17.6%) and is the highest level found in all local authority areas. It also higher than the estimate from the 2011 census which was given as 29%.

The remaining population qualifications is divided into lower school qualifications (20.54%), upper school qualifications (10.23%), apprenticeship qualifications (8.69%), degree level qualifications or above (23.44%), and further education and sub-degree Higher Education qualifications (14.94%) [2].

Health

Based on self-assessment of their health, 45% of people in East Ayrshire (2022) feel very good, 30.77% feel good, 16.04% feel fair, 6.27% feel bad, and 1.92% feel very bad (2). 27.1% of East Ayrshire's population (2022) have some type of limitation (12.81% are limited a lot while 14.29% are limited a little) [2]. These numbers are poorer for the southern locality of East Ayrshire where more people feel in bad or very bad health and less people feel in good health.

Life expectancy at birth for females and males in East Ayrshire (2021-2023) is 78.6 and 75.2 years old, respectively. Both are slightly below the Scottish life expectancy at birth for females (80.8) and males (76.8) [8]. Over time the life expectancy of males and females has increased, more so for males. In the 2001-2003 data period males in East Ayrshire had a life expectancy of 73.5 years and females 77.95 years [8].

Housing

56,162 occupied households were located in East Ayrshire in 2024, this was up from 2022, with 55,436 household. Of the 2022 data, 63.51% are owned, 25.72% are social rented, 9.53% are private rented, and 1.24% have rent free residents [2].

According to East Ayrshire Council, 99.4% of their own properties are in line with the Energy Efficiency Standard for Social Housing (EESH) East Ayrshire Local Housing Strategy 2019-2024 [12]. The Scottish House Condition Survey estimated in 2012-2014 that 20,500 properties in East Ayrshire were failing the Scottish Housing Quality Standard. For builds pre-1945, the same report stated that 71% had urgent repair, the figure was 56% for post 1945 builds.

Fuel poverty

The percentage of fuel poor households in East Ayrshire was 38% compared to 31% across Scotland (2022-2024) [15]. 9% of East Ayrshire household were in extreme fuel poor households in 2017-2019 compared to 12% in Scotland [7].

22% of fuel poor dwellings in East Ayrshire were built prior to 1945 while 29% were built post-1945. In the case of extreme fuel poor dwellings in East Ayrshire, 15% were built prior to 1945 while 8% after 1945 (Scottish Government 2017 – 2019) [7].

The percentage of social housing in fuel poverty in East Ayrshire was 42% while for owner-occupied households it was 17%. In the case of households in extreme fuel poverty in East Ayrshire, 16% were social housing and 5% were owner-occupied [7].

Community pride

93% of adults are positive about living in their community in East Ayrshire versus 95% in Scotland [2]. For the southern localities this was higher at 98%. 85% of adults have either a fairly or very strong feeling of belonging to their community versus an 82% average for Scotland.

Politics and voting history

The parliamentary constituencies at both the Scottish and UK levels spread across the Ayrshire council regions, meaning there is not a direct overlap with the East Ayrshire local authority. At the UK level, the constituency of Ayr, Carrick and Cumnock overlaps most prominently with the southern wards of East Ayrshire, the northern part of the local authority is mostly represented by the Kilmarnock and Loudon constituency. At the Scottish parliament level, the Carrick, Cumnock and Doon Valley constituency covers the southern localities and the Kilmarnock and Irvine Valley constituency in the north.

The Ayrshire region is historically a Labour stronghold, through its industrial and mining past. Although it has a long-rooted history in unionist aligned politics due to the large movements of people to and from the northern part of Ireland since the 17th century (Fitzgerald, 2005). From its creation in 2003 at the UK elections, Ayr, Carrick and Cumnock has returned a Labour MP 3 times including the sitting MP, and SNP MP twice, and a Conservative MP once. At the Scottish parliament, a Labour MSP has been returned 3 times, and an SNP MSP 4 times going back to 1999. At the recent 2026 election the SNP won the constituency, although the Reform candidate as a new entrant picked up 24.1% of the vote share, amongst the highest in the country.

At the Council election level, the last election occurred in 2022 with a 43.7% turnout. Current council consists of 14 SNP, 10 Labour, 4 Conservative, 3 Independents and 1 member of the Rubbish Party councillors. Drilling down to the ward level.

3.5. Net Zero

Emissions by source

The estimated total emissions for East Ayrshire (2023) is 770ktCO₂e which represents 2.04% of Scotland's (2023) total estimated emissions. Figure 11 breaks down the emissions as a percentage by source. In turn, emissions derived from land use, land use change, and forestry (LULUCF) were negative (-1.33%) [9].

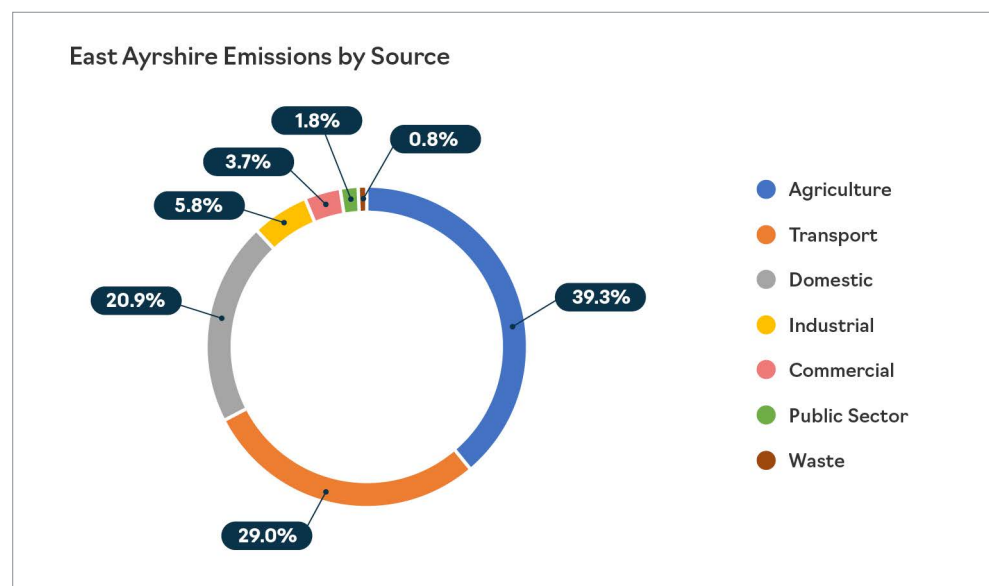


Figure 11: East Ayrshire emissions as a % by source [9]

Energy and transport in East Ayrshire

There are 20 operational renewable energy projects in East Ayrshire that together have the capacity to produce 5.93MW. 85% of those projects utilise biomass while 15% are onshore windfarms [10].

Only one project in East Ayrshire (High Park Farm Community Wind project) is community-owned [10].

In 2025, 96.5% of East Ayrshire premises had 4G coverage, compared to 100% in Great Britain (8). For 5G coverage, East Ayrshire (2025) reaches 50.8%, while Great Britain 95.6% [6].

In 2025, there were 119.6 publicly available electric vehicle charging stations per 100,000 population in East Ayrshire compared to 89.2 in Great Britain [6].

The median domestic electricity consumption in East Ayrshire (2023) was 2,251.1kWh and for Great Britain it was 2,586.6kWh (6). The median domestic gas consumption in East Ayrshire (2023) was 10,401.3kWh while in Great Britain it was 9,925.1kWh [6].

4. Policy Snapshot

There southern localities of East Ayrshire, as discussed above, face challenges across critical policy areas. It is a rural area with several urban, post-industrial population centres. It has higher rates of fuel poverty, lower qualification levels, and higher unemployment than the Scottish average. There is little cultural diversity, and local people are proud of their communities.

Net zero transition here is shaped by the UK and Scottish Governments, regional, and local policies. Key policies are summarised here and listed below. At the UK level, the Clean Power 2030 policy, the Climate Change and Great British Energy Acts drive broad alignment towards the carbon budgets and net zero ambitions. Although energy is a reserved matter, the Scottish Government controls planning, consents, and well renewable energy developments. This role is reflected in sector specific policies such as the Heat in Buildings Strategy and National Planning Framework 4.

Community Planning in East Ayrshire has produced Community Action Plans. In southern localities, which are the focus of this case study, several community action plans have been developed including Cumnock, Dalmellington Darlymple, Hollybush and Skeldon, Drongan, Rankinston and Stair, Mauchline, Muirkirk, and New Cumnock.

Community Wealth Building (CWB), a core element of the Ayrshire Growth Deal, guides economic development and cuts across all areas of council activity, in particular the five year strategic plan “Building a fairer economy”. Alongside CWB, East Ayrshire consistently emphasises “just transition” in net zero discourse, prioritising local, inclusive, and equitable economic practices employment, supply chains and ownership. This certainly signals the intentions of the council at this early stage of activity. The CoRE project is at the centre of the council's strategic plan and net zero activities, focused on skills development, affordable energy, health and well-being and sustainable homes.

Regionally, the Ayrshire Growth Deal provides funding and coordination for infrastructure, energy, and local economy. East Ayrshire council has a target for net zero by 2030, supported by Climate Change Strategy focused on energy, waste, transport, and natural environment.

East Local Heat and Energy Efficiency Strategy (LHEES) is framed around off-gas grid buildings, on-gas, heat network, energy efficiency, fuel poverty, and mixed-use buildings.

Key local policies and interventions are highlighted below:

4.1. Local policies

- Five Year Strategic Plan: “Building a fairer economy” (East Ayrshire Council, 2024)
- Local Development Plan 2 (East Ayrshire Council, 2024)
- Clean Green East Ayrshire: Climate Change Strategy (East Ayrshire Council, 2021)
- East Ayrshire Community Plan 2015 – 2030 (East Ayrshire Council, 2015)
- East Ayrshire Community Plan 2015 – 2030: Economy and Skills delivery plan 2024 - 2027 (East Ayrshire Council, 2024)
- East Ayrshire Community Action plans (East Ayrshire Council)

4.2. Local interventions

Examples of available funding:

- The Scottish Government's Community and Renewable Energy Scheme (CARES) (Local Energy Scotland)
- ECO4 Flex (East Ayrshire Council subsidies for energy efficiency housing initiatives)
- The Community Renewable Energy (CoRE) project (East Ayrshire Council funding to promote skills that contribute to low carbon just transitions)
- Coalfields Regeneration Trust available funding for Ballochmyle, Cumnock and New Cumnock, and Doon Valley (Coalfields Regeneration Trust)
- Ayrshire Growth Deal
- StayConnected (East Ayrshire email bulletin on net zero progress)

5. System Challenges for a Just Transition to Net Zero

Significant environmental, social, and economic challenges in East Ayrshire are critical to a just net zero transition. As an integrated process, social outcomes such as wellbeing, equity and participation, environmental goals like emission reductions and habitat protection, and economic dynamics such as jobs, cost of living and local wealth, together shape a local net zero transition. For example, retrofitting houses in East Ayrshire has the potential to reduce emissions, lower costs for residents, provide local employment, and improve the wellbeing of the residents; if designed to retain local wealth, it can also improve local equity and participation. A systems approach highlights these co-benefits and the potential to tackle multiple challenges at once through net zero action.

Effective and just net zero transitions, however, require coordinated and connected action across scales. A fuller picture of the existing social, technical and environmental systems is necessary, informed by both quantitative and qualitative data. Research methods and design must be co-created and tailored to the case study area. Further, power and positionality must be acknowledged within the systems approach, ensuring diverse knowledge and experiences shape any intervention.

The just transition in East Ayrshire raises several challenges, as pursuing multiple priorities risks fragmentation, duplication, and negative feedback loops. Policy, funding, governance, and technical misalignment can entrench existing or create new injustices and inequalities.

The CoRE project serves as the anchor for net zero activity in East Ayrshire, including several proposed demonstrator projects and a centre for excellence facility. Demonstrator projects include a Barshare housing retrofit pathfinder in Barshare, a whole place pathfinder for net zero interventions in Rankinston, an EV car club and an active travel pathfinder in Cumnock, and a flexible energy initiative. The centre for excellence aims to enhance skills development, research and innovation, and serve as a community hub to engage locally with net zero developments. Accounting for justice considerations within CoRE's activities and the wider net zero transition in East Ayrshire will be essential so communities can articulate and contribute to what a just system looks like to them.



Figure 12 (left): The former shop & post office in Rankinston, taken by Finlay Bain Kerr on site visit



Figure 13 (right): Some houses in Rankinston have had PV installed by the council, taken by Finlay Bain Kerr on site visit

This project draws on Critical Systems Heuristics and Systemic Intervention literature [13] (Ulrich and Reynolds, 2010). Applying a systems thinking approach to the proposed activities of CoRE, alongside other net zero actions in East Ayrshire will enable fuller understanding of the different realities that emerge and interact. The council, communities, residents, and local businesses – all hold distinct perspectives to be reconciled. By recognising and analysing these through boundary, we can provide better opportunities for effective interventions and a more just system design, informing governance and interventions with a place-based approach.

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