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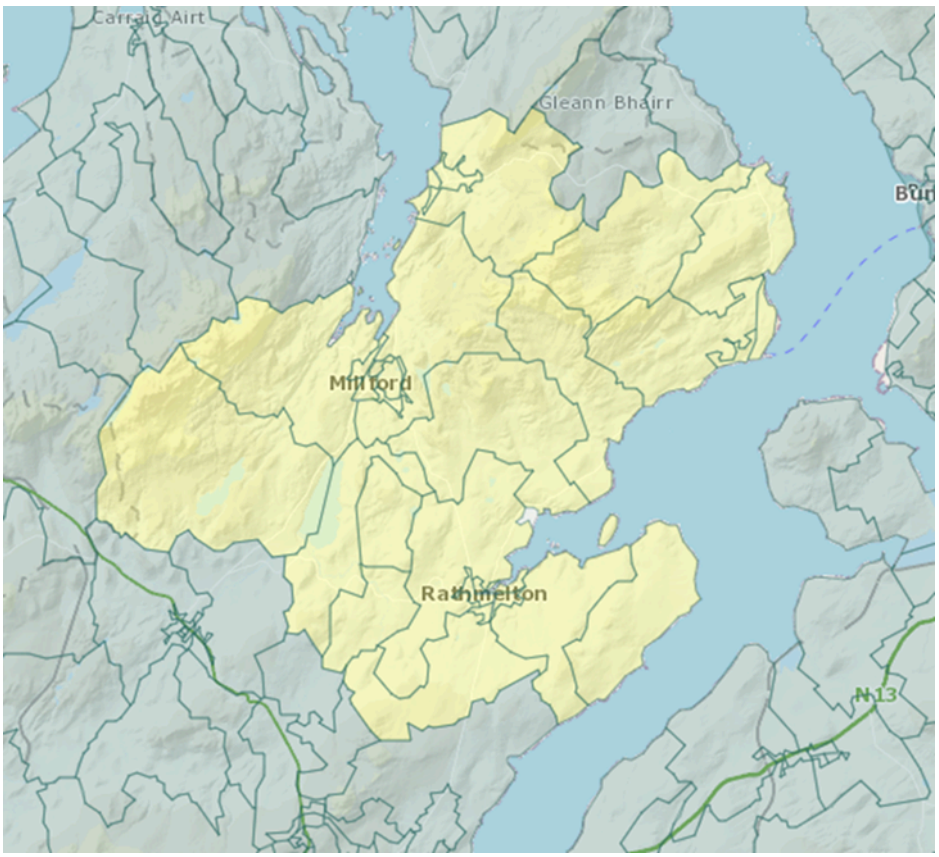
Milford SEC

Energy Master Plan for Milford & District

November 2024



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1. Executive Summary

Milford SEC was formed in late 2023. The challenge is to achieve the national 42% carbon reduction in Carbon tonnes by 2030. The energy baseline is explored in detail but is summarised below.

Table 1 – SEC Primary Energy Baseline (kWh)

Sector	Electricity	Fossil Fuel	Renewable	Total
Residential	17,228,373	53,890,470	0	71,118,842
Non-residential	47,690,809	120,144,159	204,840	168,039,808
Transport	0	21,593,340	1,106,592	22,699,932
Other	0	0	0	0
Total Energy	64,919,182	195,627,968	1,311,432	261,858,582

A number of domestic BERs and non-domestic energy audits were completed and published for the area. From these, energy savings for specific projects are predicted and area-wide energy savings predicted in order to meet 2030 targets. These results are compiled in a Register of Opportunities.

1.1.Milford SEC -Residential

The population is approximately 7,400 living in 2,552 homes. The SEAI BER map is used to extrapolate the energy baseline from those houses with published BERs. The residential energy baseline is summarised below:

Table 1.1a – Residential Performance Indicators

Total number of Dwellings	% B rated or better	% of Fossil Fuel Heating Systems	% of Renewable Energy
2552 (1333 with BERs)	18	89	11 (e.g. heat pumps)

Table 1.1b – SEC Residential Energy, CO2 and Spend

	Electricity	Fossil Fuel	Renewable	Total
Total Primary Energy (kWh)	17,228,373	53,890,470	0	71,118,842
Total CO2 (tonnes)	3,535	14,082	0	17,617
Total Spend (€)	3,642,570	5,887,571	0	9,530,141

1.2.Milford SEC -Non Residential

'Non-residential' covers businesses and farms. At present, 12 businesses have been audited but more are to follow. None of the over 400 farms are audited but the audit results from 8 typical farms outside the SEC area provide benchmark data. Energy consumption from the audited businesses will be extrapolated on a per m2 basis (or per farm, for farms) to determine the non-residential energy baseline.

In the main report, farms are considered separately from commercial businesses but both contribute to the non-residential portion of the overall energy baseline.

The non-Residential Energy Baseline is summarised below:

Table 1.2.1 – SEC Non-Residential Energy, CO2 and Spend

	Electricity	Fossil Fuel	Renewable	Total
Total Primary Energy (kWh)	47,690,809	120,144,159	204,840	168,039,808
Total CO2 (tonnes)	8,843	28,621	0	37,464
Total Spend (€)	7,913,764	17,642,575	0	25,556,339

The energy audits are published and include reference to energy-saving opportunities and potential grant supports. Some opportunities from each audit will be included in the EMP register of opportunities.

1.3.Milford SEC -Transport

Transport pertains to how people in the SEC area travel – whether on foot, by car, by bus, etc. This is of significance to the SEC as it has implications for the need for public transport, EV charging points and pedestrianisation/cycle-lanes.

The transport energy baseline is summarised below:

Table 1.3a – SEC Transport Energy, CO2 and Spend

	Electricity	Fossil Fuel	Renewable	Total
Total Primary Energy (kWh)	0	21,593,340	1,106,592	22,699,932
Total CO2 (tonnes)	0	4,609	0	4,609
Total Spend (€)	0	2,359,087	120,896	2,479,983

1.4.Milford SEC -Sustainable Energy Roadmap

There are SEC targets for primary energy (kWh) and carbon dioxide reductions by 2030. There is also a target for the renewable energy ratio (e.g. how much electricity from solar/wind, how much heat from biomass/heat-pumps). The Register of Opportunities includes SEC-wide options to meet these targets. The specific results for domestic BER uplift and SSEA energy savings are extrapolated to all the houses and all the businesses/farms. These extrapolated savings are applied to the overall baseline to meet the 2030 targets. The plan to 2030 will be summarised below, after the baseline is complete:

Table 4b – Plan to 2030

	Number of projects	Primary Energy saving (kWh)	CO2 saving (tonnes)
No. houses to be refurbished to a B	*c. 2,300*	*55,302,116 (21%)*	*12,485 (21%)*
Potential from commercial sector	*c. 600*	40,078,774 (15%)	8,251 (14%)
Potential from Public Sector	*0*	*0*	*0*
Renewable Energy potential	*c. 600*	*47,734,242 (18%)*	*10,336 (17%)*
EV potential	*0*	*0*	*0*
Other	*0*	*0*	*0*
Total saving potential	*c. 2,900*	*143,115,133 (55%)* *RER = 78%*	*31,132 (52%)*

The 2030 Climate Action Plan targets require kWh savings of 50%, CO2 savings of 30% and a renewable energy ratio (RER) of 30%. These are the targets for the plan to 2030. It is predicted that these can be achieved.

1.5.Milford SEC -Register of Opportunities

The register of opportunities is available as a separate document, an Excel spread sheet. It contains a number of opportunities: some to represent general, SEC area-wide opportunities to meet the 2030 targets. The remainder are based on SSEA recommendations and the domestic BER advisory reports generated as part of the EMP.

The Register of Opportunities includes a scoring template for ranking opportunities based on simple payback, capital cost, downtime needed during installation, and whether they confer extra, non-energy related benefits. The availability and impact of grants is not included in the Register but is available in the domestic BER advisory reports and SSEA reports. Most of the opportunities on the Register can be grant-aided. The Register will be summarised below when the baseline is complete.

1.6.Milford SEC -Project Development Strategy

The team will have to absorb the Register of Opportunities and EMP.

Milford SEC are to maintain the Register of Opportunities and push for the wider community to engage and embrace energy efficiency. The 1st step is to communicate the EMP to the community.

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The 2nd step is to look for homeowners, businesses, non-profits willing to explore applying for a Better Energy Community grant. This co-ordinated approach could have a very positive impact.

One recommendation for the EMP is to use savings/revenues from Year 1 projects to help to fund Year 2 and Year 3 projects. Solar projects might be candidates for early adoption. Energy metering/management projects can lead to more accurate feedback on the energy savings. LED lighting is straightforward to implement and there is a simple process for claiming EEOS credits for their savings.

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Milford SEC

Energy Master Plan for Milford SEC November 2024

This project is supported by the Sustainable Energy Authority of Ireland *[and others if applicable e.g., sponsor, Local Authority]*

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1. Introduction

Milford SEC was formed in late 2023. The area has a mix of permanent and holiday homes, farms, shops, schools and businesses. All can benefit from the Energy Master Plan. The prospect of applying energy auditing methodologies – data gathering, energy base-lining, identification of opportunities, savings' predictions – on a community-scale was tempting as it would enable members of the community, collectively and individually, to benefit from reduced energy costs, etc. This is especially attractive as the area is classed under the Pobal HP Description as ranging from 'marginally above average' to 'disadvantaged'. The regions along Lough Swilly, including the town of Rathmullan, are marginally above average while the towns of Milford and Ramelton are disadvantaged.

Thus energy costs are a grave concern for businesses (which tend to cluster around the disadvantaged towns of Milford and Ramelton) and homeowners alike. While there have been efforts to address energy efficiency and costs on an individual level, such as SSEA pursued by businesses, these efforts are piecemeal and uncoordinated. Domestic BERs and SSEA audits have indicated significant scope for energy savings across a range of applications.

The collective concern over costs and emissions facing the community can best be ameliorated through collective, coordinated action via an EMP and the subsequent implementation of its register of opportunities. Co-benefits of energy, carbon and cost reductions will be enhancements to comfort and health, boosted local employment, reduced emigration (County Donegal currently has among the lowest rates of natural population increase, which is currently about half of the rate of population decrease witnessed from 2011 to 2016. The population in general is aging), and community development. An EMP is seen as a pathway to deeper, broader and longer-term energy performance improvement compared to those offered by SSEA, SSRH, etc.

Apart from energy costs, there are additional concerns that could be addressed by the EMP. There are few public EV charging points in the area (Milford business park has two), for example. This will hinder the uptake of EVs in the area going forwards.

This report follows the EMP template. The Milford SEC is introduced and the energy baseline defined. The 2030 energy reduction targets are reviewed to see if they can be met for the SEC area as a whole, and specific opportunities are included in the Register of Opportunities. Finally, a roadmap going forward is suggested.

1.1.Milford SEC

Milford SEC is based on the geographic community as shown in Fig. 1.1.1. The area in question includes the Electoral Divisions of Milford, Carrowkeel, Killygarvan, Rathmullan, Glenalla, Ramelton, Ballyarr and Loughkeel.

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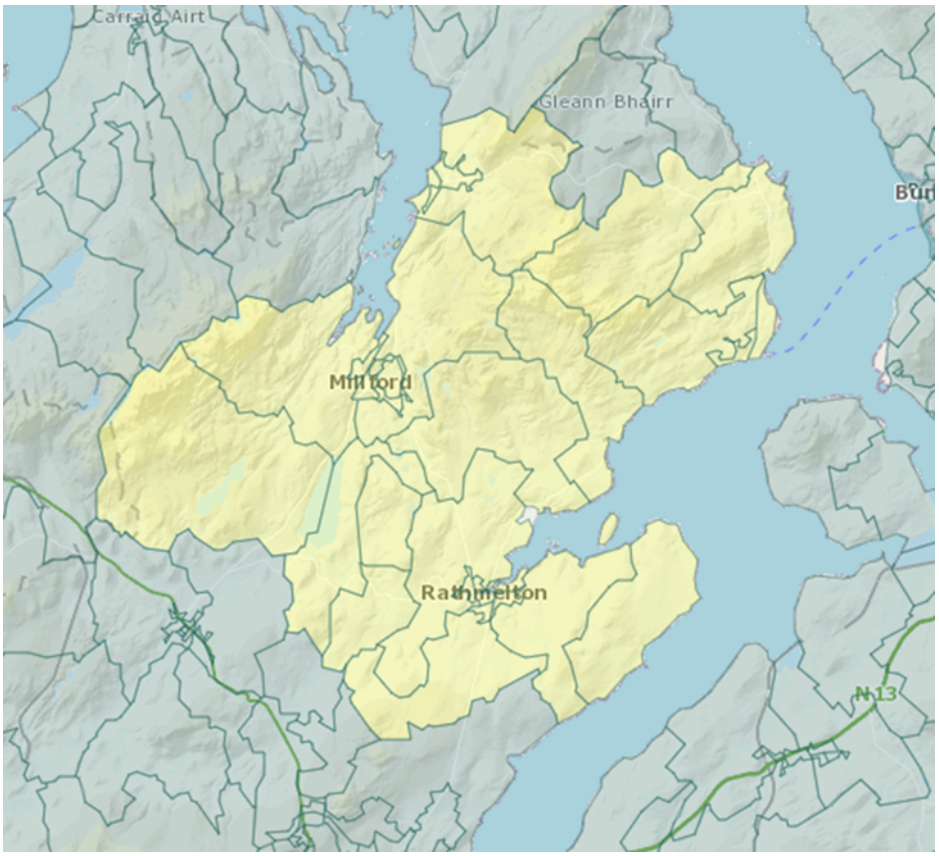

Fig 1.1.1 – The EMP study area. The town of Letterkenny is just out-of-frame at the bottom of the figure.

The Climate action Plan has specific national targets for carbon reductions, as shown below:

Table 1.1.1 – Climate Action Plan sectoral reductions' targets.

Sectoral Targets 2021 Climate Action Plan			
Sector	Reduction	2018 MtCO2eq	2030 Ceiling MtCO2eq
Electricity	75%	10.50	3.00
Transport (40% electric vehicles and investment in Public Transport 1/2 million daily journeys	50%	12.00	6.00
Buildings (Commercial and Public)	45%	2.00	1.00
Buildings (Residential)	40%	7.00	4.00
Industry	35%	7.00	4.00
Agriculture	25%	23.00	17.25
Other	50%	2.00	1.00
Total	43%	63.50	36.25

This EMP will attempt to meet these reductions' targets within the SEC, or at least provide a pathway to such reductions. These national reductions' targets are set in the context of the national energy emissions' balance, as shown below:

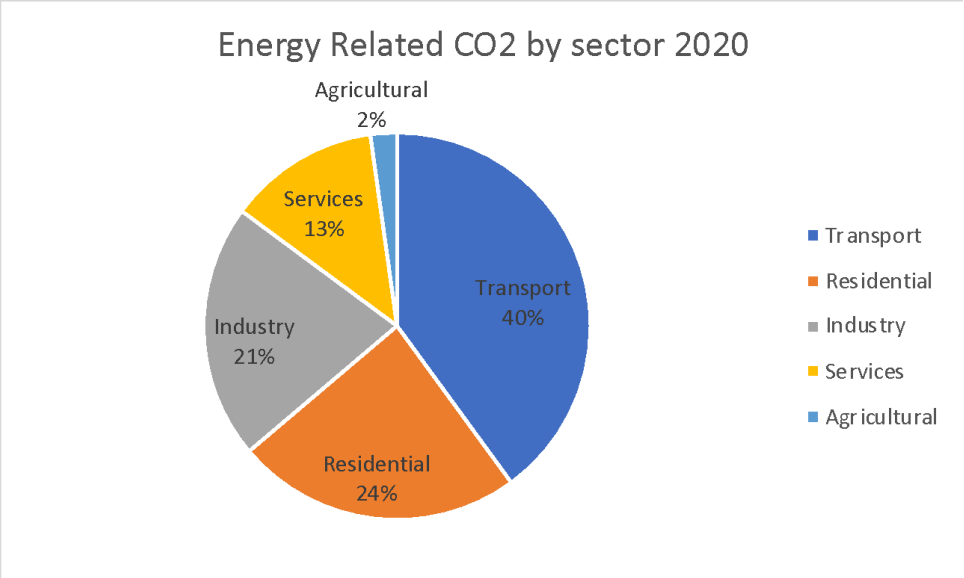

Fig. 1.1.2 – National energy-related carbon emissions, 2020.

Thus the SEC can prioritise certain opportunities, if necessary, to align with the national plan. For example, transport is the largest sector in Fig. 1.1.2 and has the most ambitious reductions' target (50%) in Table 1.1.1 so the SEC may prioritise opportunities pertaining to transport, if practicable.

History of Milford

The Irish name, Baile na nGallóglach (Town of the Gallowglass), is derived from an incident when Gallowglass mercenary units encamped at what is now the top of main street. The town remained under the jurisdiction of local Gaelic chieftains until after the Flight of the Earls (from the town of Rathmullan – also in the SEC area). The town and lands passed to Trinity College Dublin until it was leased by Nathaniel Clements in 1748. Nathaniel's son, Robert, Earl of Leitrim, succeeded him and between 1783 and 1794 the town received its modern English name. The name derives from an actual mill that was present in the town from at least 1656 until 1964. The current health centre marks the site of the mill, with the mill wheel's axle on public display.

The town was the site of a Famine Workhouse, built in 1846, closed in 1922 and demolished in 1967. In 2023, President Micheal D Higgins held a commemoration at the site of the workhouse, now used as a farmer's mart.

The third Earl of Leitrim was assassinated near the town in 1878 in response to evictions and rent increases. In nearby Glenveagh, John George Adair has successfully evicted families on a large scale in the 1860s. Nationwide, land reform was a serious concern; the Land League was established in

1879. The fourth Earl of Leitrim established a steamer service from Milford to Glasgow. This enhanced the town's position and status. The town was famous for its Fair Days, though these ended in 1972. The town drew tourists and gained a reputation as a fishing destination. In 1894, the town's hotel was built (though it is now closed and the current Mulroy Woods Hotel is the local hotel). Geographically, the town lies at the root of Mulroy bay, controlling access to the Fanad and Downing's peninsulas.

The two largest industries in the town were Milford Bakery and McMahon's Garage. Both are shut now but the Milford Bakery brand lives on today. The bakery itself is still standing though derelict. McMahon's garage was once the largest in Ireland. Other industries remain present, such as Henry McGinley & Sons – a steel fabrication factory, which supplied steel frames to Killybegs's Atlantic Dawn cold store. Other businesses include furniture workshops, hotels, restaurants, etc.

The town retained some status despite some declines: it has been a Garda District Headquarters, though in 2024 this is in doubt. In recent years, a new business park opened – first with a Lidl and then with a Homesavers, chemist, two restaurants, and multiple shops; the Gallowglass Community Centre was reopened; the Mulroy Woods Hotel is a popular wedding hotel; and the town is host to a County Council office.

Also in the SEC area is the town of Ramelton. It was the site of an O'Donnell castle (destroyed in the 1640s) It served as a port in support of the flax and later linen industries in the 18th century. Donegal's largest linen bleaching works were located in town. This industry peaked in Ireland in the 1860s when Britain's domestic cotton crops failed but by the 1840s Ramelton began to suffer from competition from Belfast. Silting of the river Lennon in the 1850s and the introduction of the railway to nearby Letterkenny in 1909 led to further decline. Ramelton is a designated heritage town due to its Georgian waterfront (in 1995 *The Hanging Gale*, set in 1846, was filmed in Ramelton). Ramelton is also the home of Football Special, which recently earned a chance to distribute nationwide via Lidl.

Rathmullan is the third notable town in the SEC area. This was the site of the Flight of the Earls and the town still occasionally plays host to passing Irish navy ships and once to the Famine-replica ship, the Jeanie Johnston. There is a Napoleonic-era (1812) fort nearby, one of a number designed to protect Lough Swilly from the French navy. The town features the ruins of a Carmelite Abbey, which dates back to the 1510s and was sacked in 1595. It was later used as a barracks and then as the home of Bishop Andrew Know in the 1600s but by the end of the century became derelict. Rathmullan House is a premier hotel and originally a Georgian manor, while the more modern *Water's Edge* recently reopened. The town is a popular for its beach, competing with Portsalon/Knockalla just up the coast. A ferry service operates between Rathmullan and Buncrana, significantly shortening journeys from north-west Donegal to Inishowen.

Population

The total population for the area is approximately 7,393. Most are of Irish stock, though the next-largest demographic is from the UK (Fig. 1.1.3). This is to be expected due to the historical ties between Britain and Ireland in general and between Donegal and Scotland in particular. There is also a number of Ukrainians in the area, displaced by the war with Russia, who likely to not appear in the census data as they likely arrived after the census was taken.

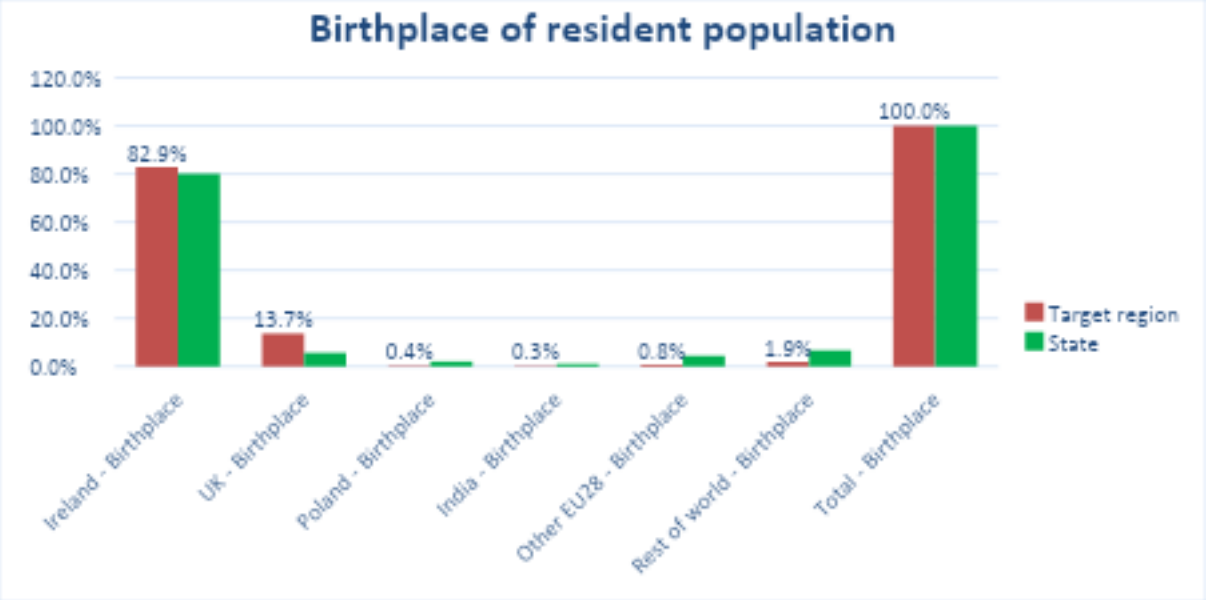

Fig. 1.1.3 – the birthplace of the resident population.

Figure 1.1.4 shows the area's age profile, compared to the national profile.

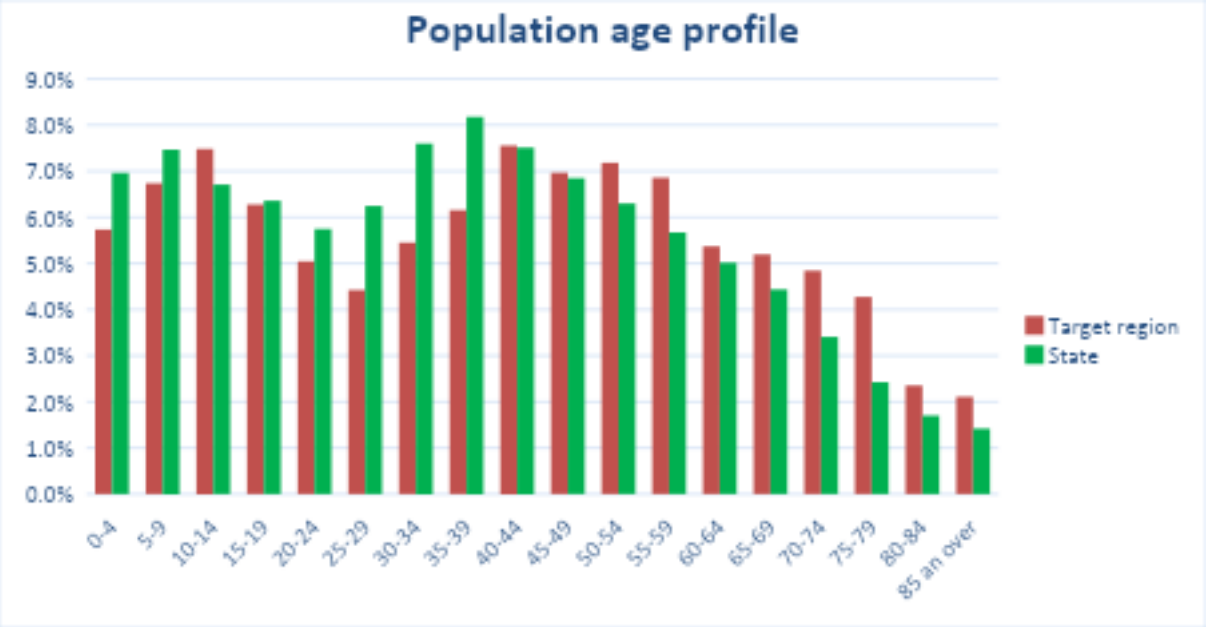

Fig. 1.1.4 – The area's population profile by age group.

It is clear from Fig. 1.1.4 that the area's age profile broadly tallies with Ireland as a whole, though it appears to be a marginally older population; every age group from 40 and up is a higher proportion of the population than the national norm. Meanwhile, every age category under 40 except one is below the national norm. This may reflect the effects of 2010s emigration (the most extreme

differences are in the age-groups 25 to 39). Thus the EMP may identify opportunities of particular interest to pensioners rather than young professionals. The population pyramid may also have implications for housing in future.

32% of the population is able to speak Irish, compared to 39% nationally. This may have implications for the EMP regarding support from Údaráis na Gaeltachta, for example.

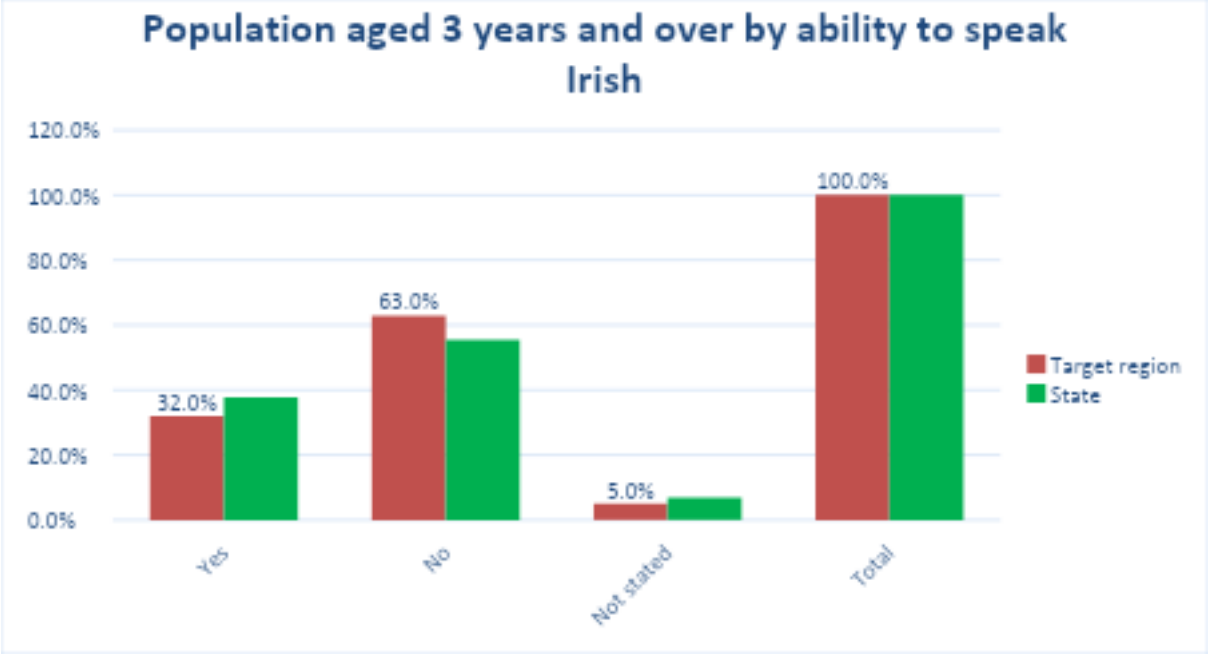

Fig. 1.1.5 – The local area's reported ability to speak Irish compared to the State's

Family is the bedrock of community. The area's family sizes are consistent with the national norm (Fig.1.1.6), though there is a slightly higher incidence of 5- and 6-person families. This might play a role in what opportunities the SEC prioritise. These families overwhelmingly live in bungalows (Fig. 1.1.7) so the EMP can focus on these household types to achieve the greatest impact. Access to roof-space will likely make solar PV more practical than would be the case for a flat.

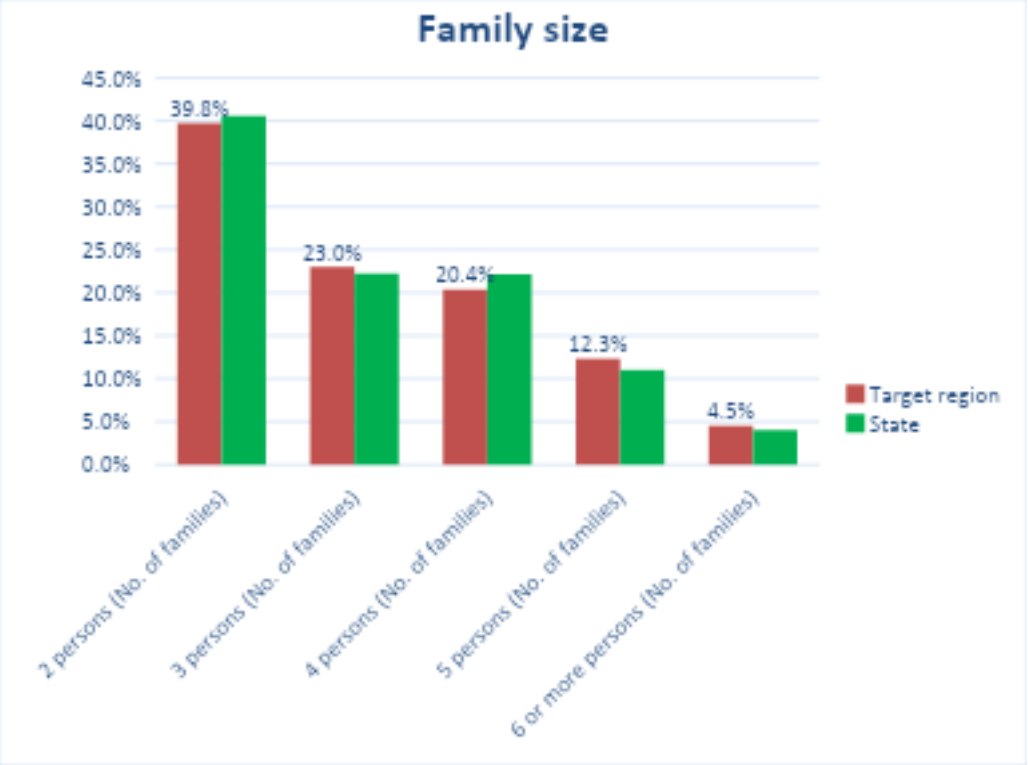

Fig. 1.1.6 – The area's family sizes compared to the State's

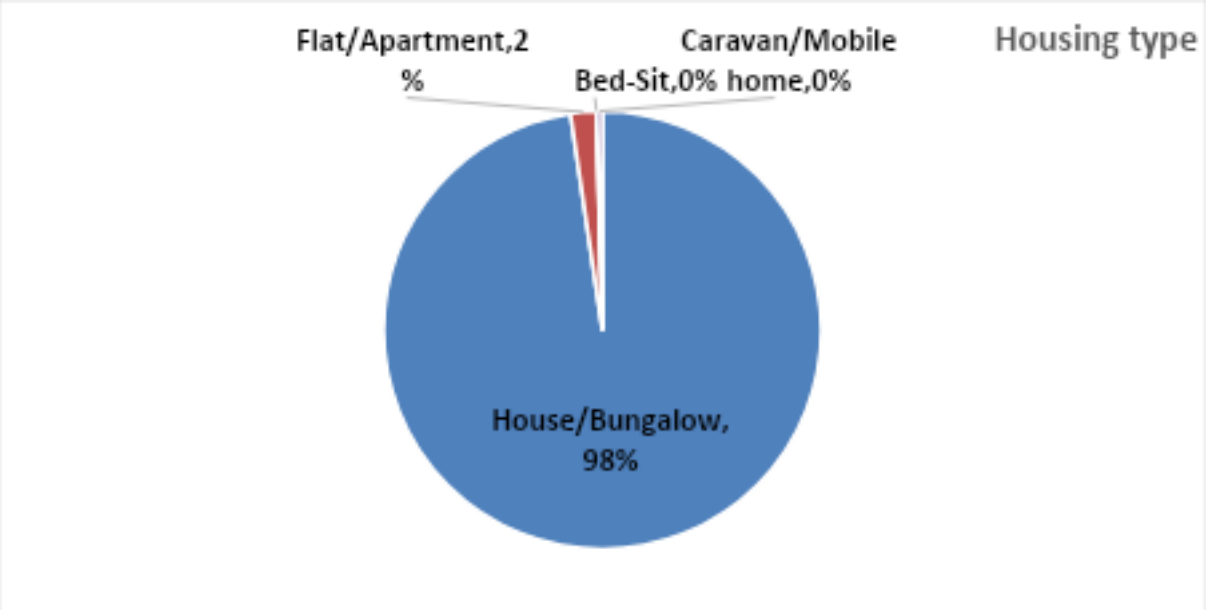

Fig. 1.1.7 – the area's breakdown of housing type

Local industries

There are approximately 220 separate businesses in the SEC area. These range from shops to hotels to restaurants to factories. There are approximately 420 farms too. The local industries are a reflection of its working population. The people's economic status is described below:

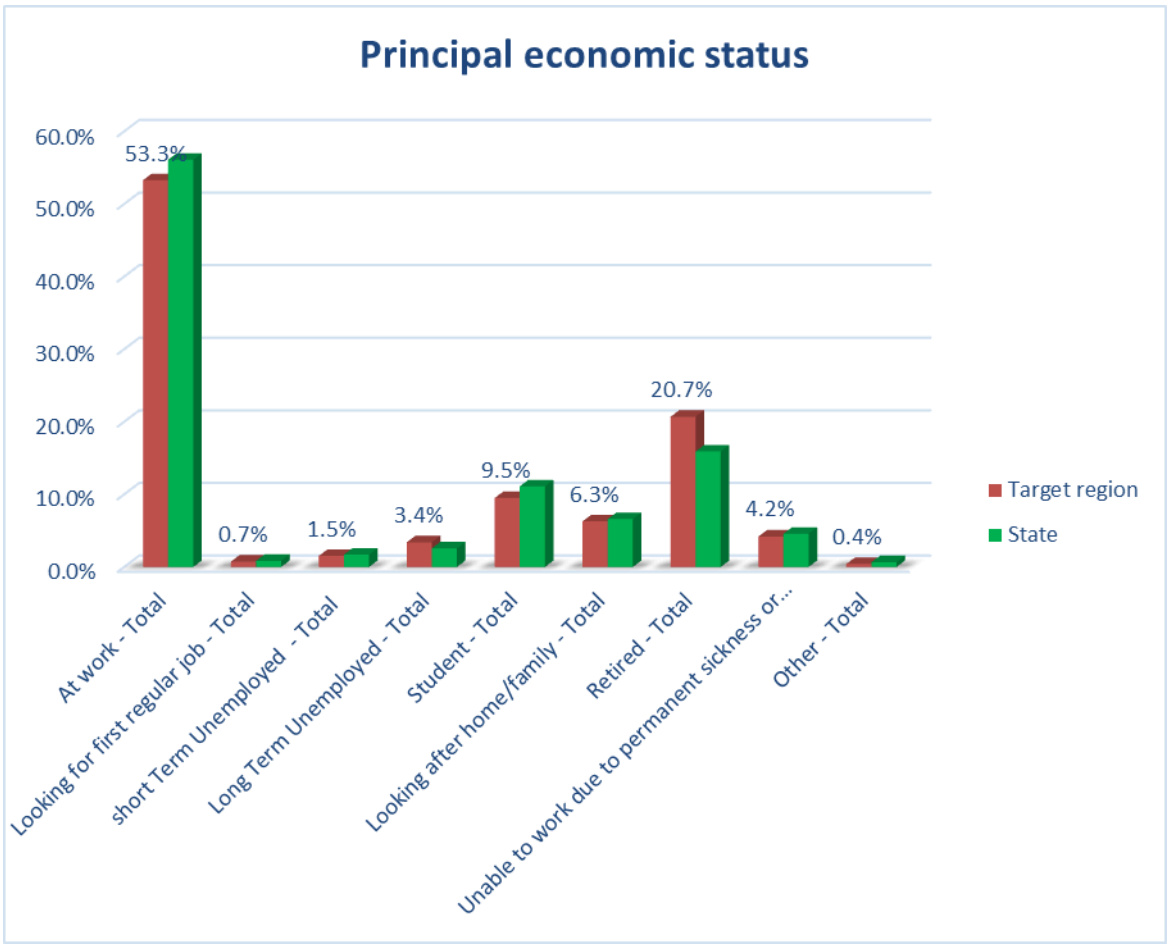

Fig. 1.1.8 – Comparison of the area's population's economic status versus the State's

Donegal's aging population is pertinent to Fig. 1.1.8. There are more retired (e.g. older) people present than the State norm. The working population is lower than the State norm, possibly due to a lower working-age population than the State norm (see Fig. 1.1.4), due to emigration nationally, e.g. to Dublin, or internationally. This explains the relative lack of students too. Donegal, colloquially 'the forgotten county', has not felt Ireland's economic recovery as keenly as other counties, thus unemployment in the area is above the State norm.

Figures 1.1.9 and 1.1.10 show a breakdown of the types of employment in the area. The area is relatively short on professionals but is consistent with the State in other matters. In particular, the area has above-the-norm levels of managers/technicians, skilled traders, and semi-skilled. This reflects the types of industry – shops, farmers, fabricators, etc.

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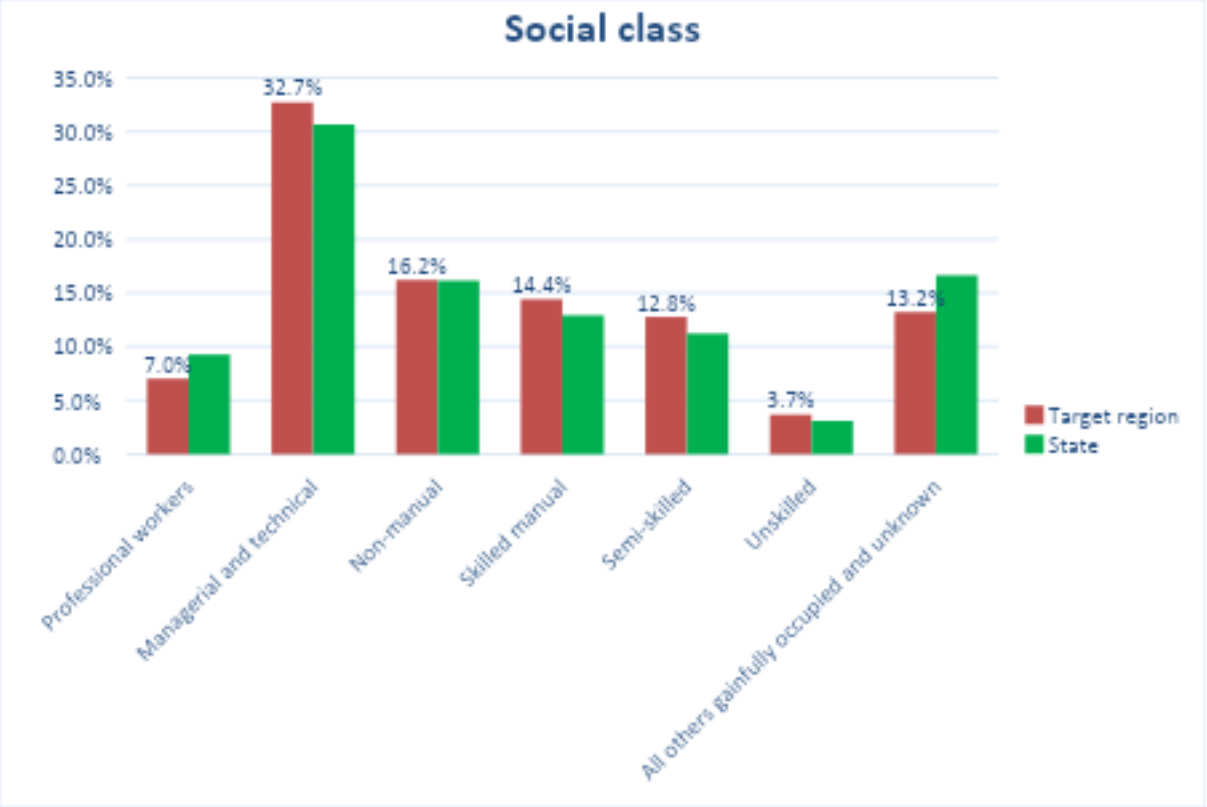

Fig. 1.1.9 – Comparison of social class in the area versus the State.

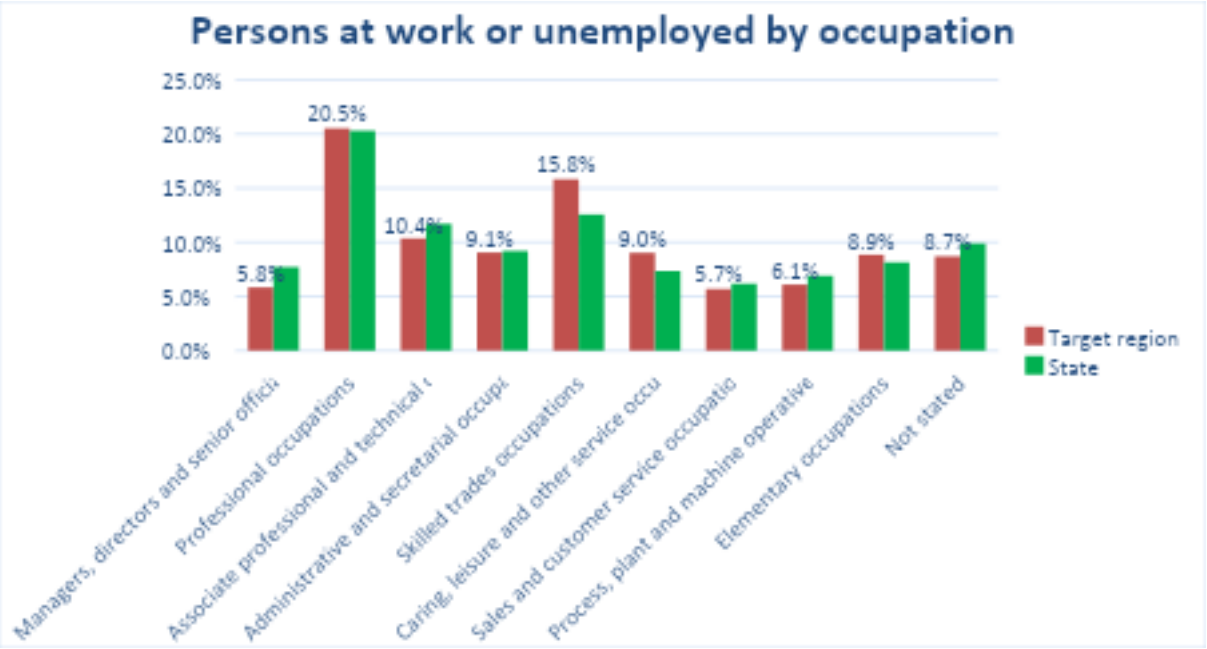

Fig. 1.1.10 – Comparison of occupation in the area versus the State.

Figure 1.1.11 shows the types of industries present in the area. There appears to be a relative lack of manufacturing; commerce and trade; and transport and communications. There is a relative trend towards agriculture/forestry/fishing, as well as professional services. This may affect the EMP's ability to target transport as an energy sector, but there may be increased scope for opportunities such as remote-working.

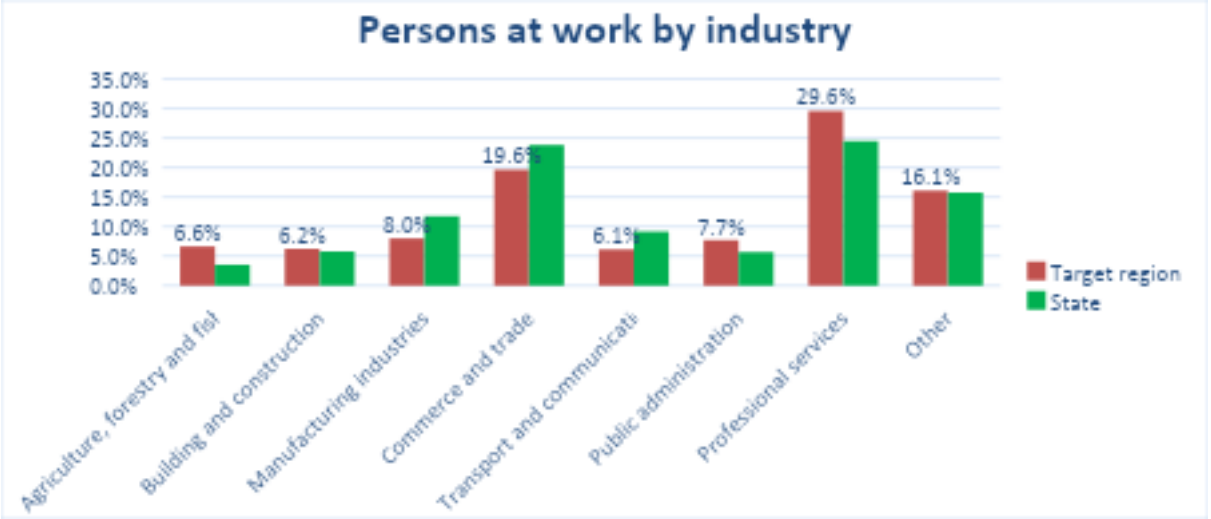

Fig. 1.1.11 – Comparison of social class in the area versus the State and the relative breakdown of industries within the SEC area.

Commuters

Figure 1.1.12 shows the methods by which people in the area commute. The use of private vehicles (cars, driven or passenger) is higher than the State norm. The area is highly rural but appears to have adequate public transport (note the high uptake of public transport) from McGinley's and Local Link bus services, as well as a number of schoolbuses. Narrow, unlit roads and long distances, precludes safe or convenient non-vehicle travel (cycling/pedestrian).

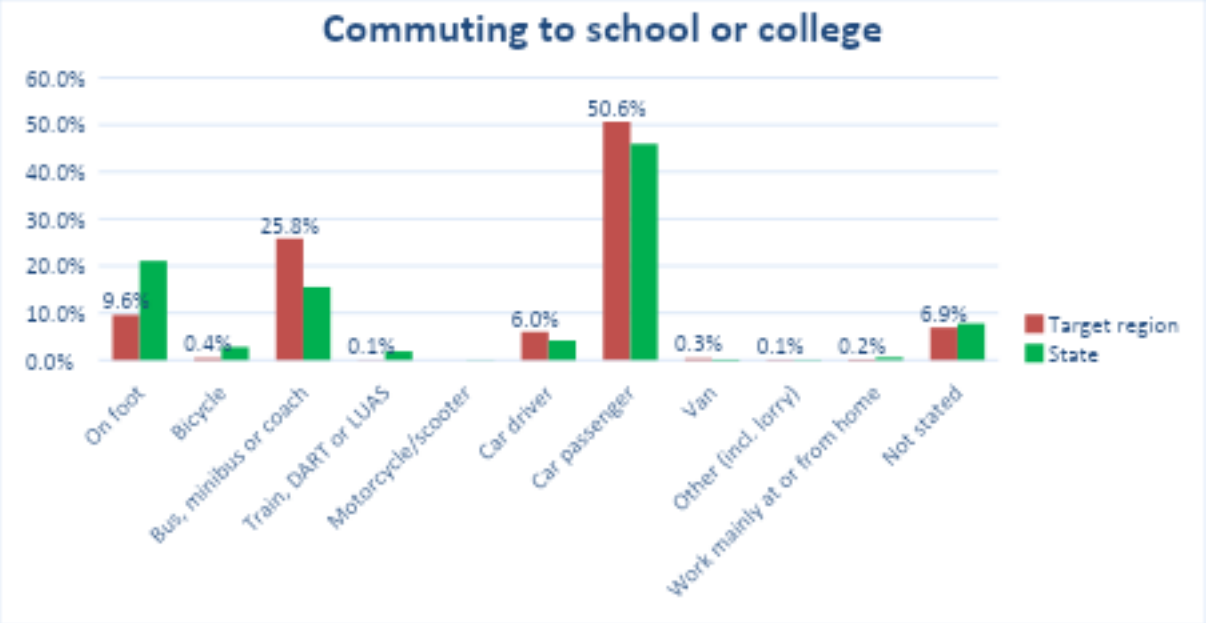

Fig. 1.1.12 – Comparison of commuter methods in the area versus the State.

Transport infrastructure

Milford and Ramelton sit on the R245 leading to Letterkenny. Local Link bus services serve Fanad via Ramelton and McGinley's private bus serves Milford. Public EV chargers are uncommon – Milford business park has two but it is not clear where others can be found. This is likely an impediment to the uptake of EVs and might be worthy of review by the SEC.

The SIMI show that 10% of the new cars sold in Donegal in 2023 were EV's. As a border community 2nd hand EV imports may be a factor but there is no data for the SEC area specifically. Figure 1.1.13 shows car-ownership in the SEC area. Car-ownership is consistent with the national norm. The SEC area has an estimated 3,886 private cars.

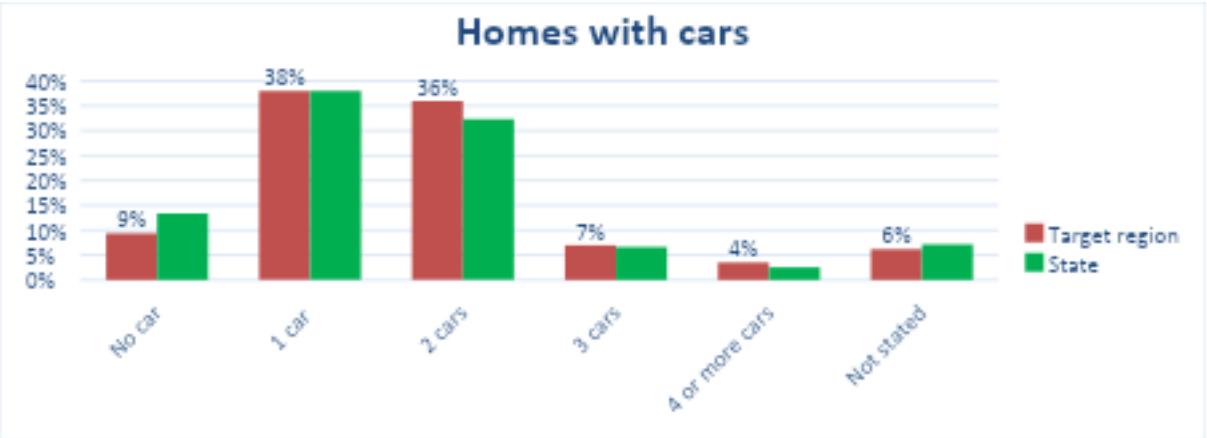

Fig. 1.1.13 – Comparison of homes with cars in the area versus the State.

Agriculture

The SEC area is very rural, with a total of 418 farm holdings at an average of 29.4 ha each. According to the CSO, there are approximately 52,300 heads of livestock, of which 38,400 (73%) are sheep. The abundance of sheep might reflect the terrain, which might not be suitable for crops or cattle. However, there is a diversity of farming; the Ramelton and Milford electoral divisions (EDs) have dairy farms while the other six EDs have none. The Ramelton ED, on Lough Swilly, appears to have superior land quality and has over 6,000 of the total 14,000 heads of cattle as well as 3,400 of the total 12,300 ha. of farms.

The relative emphasis on sheep might be a result of Brexit, and there are ongoing attempts by the government to reduce the cattle herd. The SEC area appears somewhat insulated from these challenges due to a reliance on sheep. The EMP may need to focus particularly on the agricultural sector, which is a heavy transport-fuel user and should offer good scope for solar PV, wind energy and anaerobic digestion.

Historic renewables

The SEC area has one wind farm, Lurganboy, though it might be located just outside the SEC area. It is a 5 MW farm. There are no formal hydro installations. Some companies have installed solar PV independently (e.g. Milford & District Resource Centre) but there is scope for large-scale, roof-mounted arrays – the Lidl at Milford is just one candidate.

The river Lennon passes through the SEC area, terminating at Ramelton. It and other rivers might have scope for hydro installations.

Milford SEC

The Milford Community Development Company Ltd became the Sustainable Energy Community for the area. There is widespread interest in the success of the Energy Master Plan and implementing its recommendations, as evidenced by the eagerness to obtain BERs for houses and energy audits for businesses as part of the EMP. There is also a general culture of wanting energy-efficiency and sustainability.

1.2.Sustainable Energy Communities

The SEC programme is designed to encourage community-led energy efficiency projects. The community is defined in this case by geographic proximity. SEC activities are led and coordinated by a committee with membership from a cross-section of the community to represent different energy sectors; residential, non-residential, agriculture, transport and schools.

The SEC develops an EMP to act as a roadmap to reduced energy consumption, costs and emissions, as well as increased renewable energy. Each energy sector is reviewed to determine the baseline energy consumption. The energy consumption is analysed to detect opportunities for energy savings. These savings can then be implemented in stages to reduce the community's energy profile. There

may be grant supports to implement them and such applications could be planned along with the opportunities. An SEC can partner with the SEAI over a 3-year period. The SEC provides local knowledge while the SEAI provides technical expertise.

The energy baseline is determined through BERs (residential), energy audits (non-residential), CSO data, Teagasc data, SEAI data, and other literature sources such as CIBSE benchmarking. Energy audits can provide the baseline for a sample, which is then extrapolated to the whole area, for example. Likewise, homes with published BERs provide energy data to extrapolate to all homes. Energy savings can be predicted using different calculation methods (e.g. DEAP, iSBEM, PVGIS, SEAI lighting tools, bespoke methods). Based on the SEC's confidence in the results, local priorities, etc., several projects can be chosen for implementation.

The advantages of such a program is that the energy performance improvement actions (EPIAs) that arise from the SEC program are a) specific to the community's needs, b) chosen and adopted with the consent of the community and c) sustainable in the sense that the EMP that the SEC produces is a multi-year plan (rather than one-off projects) and is part-funded by the energy savings arising from the EPIAs.

The benefits of SEC are financial, energy and carbon savings, although there may be indirect benefits, such as reduced excess winter deaths due to warmer homes, fewer road accidents due to sustainable transport, cleaner air from fewer emissions and enhanced utilisation of community buildings from reduced operating costs.

Further information on the SEAI's SEC programme can be found at www.seai.ie/SEC/

1.3.EMP Consultant: Raleigh & Associates Ltd

The EMP consultant determines the energy baseline and arranges for data-gathering, etc. The EMP consultant for this project is Raleigh & Associates.

Raleigh & Associates Ltd was founded in 1990 and delivers commercial and technical energy advice to SME's, Large Companies, Public Sector, Agriculture, and Communities across Ireland. The company has delivered major change programs in the State Sector (Bord Na Mona, Coillte) and Large Enterprises (Glanbia, Ornua) and mentored over 300 Lean Programs in companies throughout Ireland and the UK.

Raleigh & Associates Ltd has extensive experience of energy projects: they have completed numerous SEAI EXEED projects in 2018 to 2024. As part of our wider team, we have registered non-domestic BER assessors and Domestic BER assessors and have been involved in over 300 SEAI supported energy audits. We have been involved as EED (Energy Efficient Design) in HSE Pathfinder and School Pathfinder projects since 2022.

We are passionate about Climate Change and playing our part in delivering the Climate Action Plan. We assist clients in determining their Carbon Footprint (using the SSEA audit) and creating a bespoke action plan for the client with the supports available from the various grant schemes. We then assist clients with suppliers, tenders, evaluations, and grant claims. Our client base includes community centres, sports clubs, farms, schools, hotels, restaurants, filling stations and factories.

The team has experience in energy baselining, M&V (per ISO 50015), energy modelling (DEAP, iSBEM, IESVE, PVSol) and identification of opportunities across a range of industries across the energy sectors associated with the SEC.

2. Energy Master Plan

2.1.Scope and outputs

The EMP scope is the energy users within the geographic area of the SEC. This is the study area. Within the study area, the energy sectors within the scope are residential, non-residential, transport, agriculture and schools. The energy sources are grid-supplied electricity, LPG, kerosene/gasoil/fuel oil, petrol and diesel, coal/peat/biomass, and renewable energy sources.

Specific sites within the study area audited as representative samples of the study area as a whole. SEAI BER data provides full coverage of published BERs for the study area. Energy audits indicate annual energy consumption by energy source, which is then broken down into energy users (e.g. space heating, lighting, etc.). The data allows for the calculation of an energy baseline (Section 3).

The energy baseline is one EMP output. Predicted energy savings from audits and BER advisory reports allow for the identification of EPIAs and their savings. The savings are used to predict the necessary projects for the SEC to meet 2030 energy targets (Section 4). The EPIAs are summarised in a Register of Opportunities (Section 5) for the SEC to review.

2.2.Methodology

The methodology employed is collaborative in nature and innovative where possible, although conventional approaches may be adequate in terms of reliability of results and ease of use.

The collaborative approach and methodology used for the EMP are summarised in Tables 2.2a and 2.2b.

Table 2.2a – Collaboration

Data and tools used	SEC input	Consultant input
CSO & BER data	▪ Collation of data from CSO and SEAI sources	▪ Data analysis
Energy survey – local small business	▪ Outreach to local businesses for participation ▪ Distribution of survey questionnaire	▪ Survey design & setup ▪ Analysis of results
Home energy survey	▪ Outreach to local community for participation ▪ Distribution of survey questionnaire	▪ Survey design & setup ▪ Analysis of results ▪ Cross reference to CSO/BER data

Table 2.2b – Methodology

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Data and tools used	SEC input	Consultant input
CSO & BER data	▪ Collation of data from CSO and SEAI sources	▪ Data analysis ▪ Energy base-lining
Energy survey – local small business	▪ Outreach to local businesses for participation ▪ Distribution of survey questionnaire	▪ Survey design & setup ▪ Analysis of results
Home energy survey	▪ Outreach to local community for participation ▪ Distribution of survey questionnaire	▪ Survey design & setup ▪ Analysis of results ▪ Cross reference to CSO/BER data
Energy Audits - homes	▪ Identification/selection of key home types for audit ▪ Coordination with homeowners	▪ Energy audit & report ▪ BER & advisory report ▪ Heat pump assessment ▪ Retrofit menu / ROO
Energy Audits – non-residential	▪ Identification/selection of facilities/buildings for audit ▪ Coordination with owners/managers	▪ Energy audit & report ▪ ROO ▪ Identification of grant opportunities
Local development plans and zoning maps	▪ Identification of relevant maps	▪ Analysis for Renewable Energy project potential
ESBN Generation Capacity Maps Designated areas maps	▪ Identification of potential Renewable Energy Generator sites	▪ Analysis for Renewable Energy project potential
Any other relevant tools	▪	Calculations tools/models for use in calculating energy-savings: ▪ PVSol (solar PV) ▪ IESVE (HVAC, solar PV) ▪ SEAI lighting tool (lighting) ▪ SEAI VSD tool (VSD motors, pumps) ▪ Atlantic Technical University farm models (biomass, solar PV) ▪ Case study data: Consultant has a library of percentage energy savings for a range of energy saving actions across a wide variety of building-types (hotels, shopping centres, schools, kitchens, factories, farms, cold stores, etc.)

3. SEC Baseline Analysis

This section provides a sectoral baseline of energy use. Figures are expressed in kWh, CO2 and € as much as possible. CO2 is the most important in terms of Climate objectives and € are the most tangible for the communities and will give the report greater impact. The costs are based on SEAI SSEA audits, which are based on billing information.

3.1.Energy Audits

Direct energy audits are a valuable way to engage greater local participation in the EMP. A number of SSEA audits have been completed for the following businesses:

- Milford Community Centre (EA002752)
- Milford Sports Centre (EA002208)
- Milford Presbyterian Church (EA002008)
- Ramelton Community Centre (EA005278)
- Old School Community Centre (EA005174)
- Triagh Lough Community Centre (EA005229)
- Narrow Quarter (EA005276)
- Henry McGinley Steel (EA005594)
- Logue's of Cranford
- Mulroy Woods Hotel (EA005595)
- Ramelton Town Hall
- Rathmullan & District Resource Centre
- McGettigan's Butchers
- Barry Browne Autos
- The Village Inn
- More to follow

They provide a quick path to implementing energy upgrade projects. Information from them is included in the EMP to determine the overall energy baseline and overall energy savings. Energy savings are calculated using a wide literature-review of academic papers, case studies, etc.

21 BERs were published as part of the EMP. Their results indicate the level of energy savings to expect while the BER database allows the residential energy baseline to be estimated.

CSO data provides clues regarding the transport energy baseline and these are explored in more detail in Section 3.4.

All BERs and SSEA audits are published. The BERs were conducted according to DEAP methodology. The SSEA audits were conducted to ISO 50002 Type 1 detail as a minimum. They were published and paid by the SEAI, confirming their rigour and suitability. The audit detail is summarised below.

Table 3.1 – Audit detail	
Audit element	**Details**
Energy bills	• Review and analysis of energy billing information for a minimum of 1 year: kWh, average unit price (€/kWh), day/night electricity share, penalties, etc.
Building operation	• Review of building operation (occupancy, opening times, annual operating hours)
Significant energy users	• List of significant energy equipment or facilities • Estimates of associated energy demand with calculations • Rank-order of energy users by use/cost
General building assessment	• Visual inspection of building envelope and services • Note significant energy related defects (e.g. dampness, draughts, over-/under-heating)
Renewable energy potential	• Analysis of appropriate renewable technologies e.g. solar thermal, solar PV, heat pump, heat recovery, biomass, wind, hydro
Register of Opportunities (RoO)	• Should include a concise list of energy upgrades with cost and savings estimates • Candidate supports (e.g. SSRH, TAMS, Micro-generation scheme, EEOS)

NOTE: SEAI have launched a voucher scheme for energy audits in SME and eligible public sector buildings:
https://www.seai.ie/business-and-public-sector/small-and-medium-business/supports/energy-audit/

3.2.Analysis of Residential Sector

The SEAI BER map was consulted to determine how many BERs have been carried out in the target area and how many houses are present in total. Table 3.2.1 provides estimates of the houses with and without BERs for different age bands.

Table 3.2.1: A breakdown of homes by number, age, and published BER

Age of construction	Sample size (No. of homes with a BER)	Approx. total number of homes in target area	BER sample %
Pre 1919	118	281	42%
1919 - 1945	30	98	31%
1946 - 1960	33	121	27%
1961 - 1970	50	137	36%
1971 - 1980	105	264	40%
1981 - 1990	111	268	41%
1991 - 2000	244	395	62%
2001 - 2010	620	892	70%
2011 - 2020	18	87	21%
2021 - 2030	4	9	44%

Totals	1333	2552	52%

It is clear that almost half the homes in the SEC area lack a BER, with particularly poor coverage for the 1919-45 and 2011-20 periods. The best coverage is for the 1991-2010 periods. Table 3.2.2 provides the share of BERs recorded for the area.

Table 3.2.2: Breakdown of BER ratings in the SEC area.

BER	No. of homes	% of homes
A1	13	1%
A2	21	2%
A3	49	4%
B1	16	1%
B2	35	3%
B3	93	7%
C1	183	14%
C2	215	16%
C3	171	13%
D1	153	11%
D2	126	9%
E1	61	5%
E2	57	4%
F	59	4%
G	81	6%
Totals	**1,333**	**100%**

Average BER	Average BER category
237	D1

The national target is B2 or better and considering that only 11% achieve that in the published list of BERs the challenge is highlighted. However, 7% of the houses are B3 and 14% are C1, indicating that BERs of B2 or better are feasible with modest upgrades for many houses, while the published BERs indicate that even houses with BERs as high as F can be improved to A3 or better.

Table 3.2.3 indicates that 37% of the houses pre-date 1980. There is significant potential for energy savings with such houses, especially due to advances in insulation technology since 1980.

Table 3.2.3. The breakdown of residence age in Milford

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Age of construction	Sample size (No. of homes with a BER)	Approx. total number of homes in target area	BER sample %	
Pre 1919	118	281	42%	
1919 - 1945	30	98	31%	Pre
1946 - 1960	33	121	27%	1980
1961 - 1970	50	137	36%	35%
1971 - 1980	105	264	40%	
1981 - 1990	111	268	41%	Post
1991 - 2000	244	395	62%	1980
2001 - 2010	620	892	70%	65%
2011 - 2020	18	87	21%	
2021 - 2030	4	9	44%	
Totals	**1,333**	**2,552**	**38%**	

The data in Tables 3.2.1 to 3.2.3 come from a BER spread-sheet, prepared by Atlantic Technical University, Sligo as a way to parse BER data available on the SEAI website (e.g. interactive maps). It is used to provide a residential energy baseline as follows:

- The BER data includes dwelling ages, areas, and BER ratings. It also includes fuel types, consumption by energy service, etc.
- For any age bracket, the average house area, kWh/m2/y and carbon emissions can be calculated based on the surveyed houses belonging to that age bracket.
- The energy results are then extrapolated to the houses in the same age bracket that have no BER.
- The total across all houses can provide the residential energy baseline.

The residential energy performance indicators:

Table 3.2a – Residential Performance Indicators

Total number of Dwellings	% B rated or better	% of Fossil Fuel Heating Systems	% of Renewable Energy
2552 (1333 with BERs)	18	89	11 (e.g. heat pumps)

Table 3.2b – SEC Residential Energy, CO2 and Spend

	Electricity	Fossil Fuel	Renewable	Total
Total Primary Energy (kWh)	17,228,373	53,890,470	0	71,118,842
Total CO2 (tonnes)	3,535	14,082	0	17,617
Total Spend (€)	3,642,570	5,887,571	0	9,530,141

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In the analysis, the energy unit prices are as follows, based on results from the BER database:

- Electricity = €0.37/kWh delivered; primary energy factor = 1.75
- Fuel = €0.12/kWh delivered; primary energy factor = 1.1

Residential projects aim to achieve a post-works BER of at least C3 and a BER uplift of 150-200 kWh/m2/y. As part of the EMP, a number of domestic BERs are published. The BERs, uplift and improved BERs are in Table 3.2.4.

Table 3.2.4: Summary of BERs and uplift for houses assessed as part of the EMP

Dwelling age bracket	BER	Improved BER	Primary kWh uplift; kWh/m2/y, %
2000 – 2009	B3	A2	89.4, 66%
1900 – 1909	E2	A2	306.5, 87%
1970 – 1979	D2	A2	216.0, 83%
1980 – 1989	D1	A3	176.9, 76%
2000 – 2009	C3	A2	156.7, 78%
2000 – 2009	B2	A1	91.8, 89%
1930 – 1939	F	A2	382.3, 89%
1990 – 1999	D1	A2	184.5, 79%
1980 – 1989	C3	B2	82.6, 41%
1950 – 1959	F	A3	333.1, 86%
2010 – 2019	C2	A2	134.7, 75%
1900 – 1909	E1	A3	272.3, 82%
2000 – 2009	C1	A2	114.0, 73%
2000 – 2009	C1	A2	115.8, 70%
1900 – 1909	C3	A3	158.6, 72%
2000 – 2009	C2	A3	131.8, 70%
1980 – 1989	D1	A3	185.4, 77%
2000 – 2009	C3	A3	154.4, 74%
1990 – 1999	C3	A2	163.5, 77%
2000 – 2009	C1	A2	123.7, 74%
1970 – 1974	G	A2	470.2, 91%

The average uplift is 77%. When a BER is published, it comes with an Advisory Report, which details the effects of various upgrades to produce the improved BER. Among the details included in the Advisory Report is the building heat-loss index (HLI). From the sample above, the overall improvement to the HLI is 26%. This is applied in the register of opportunities when calculating the effect of fabric upgrades. The overall baseline boiler efficiency is 71% for the sample above. Heat pumps are taken as having a COP of 2.0 (an efficiency of 200%). This is used in the Register of Opportunities to calculate the energy savings from renewable heat. The BER uplift also tends to include the effect of 2 kWp of solar PV.

In the Register of Opportunities, for the energy savings applied across the SEC area, the BER spread-sheet splits domestic energy into space heating, hot water, lighting and other electricity. The fabric upgrade is taken as a 26% improvement to space heating. The remaining water and space heating is taken to have an efficiency of 71%, to be replaced by heat pumps with efficiency of 200%. Solar PV is taken as 2 kWp x 850 kWh/y/kWp. The data from the advisory reports provide energy-saving predictions for the specific 21 houses analysed.

3.3.Analysis of Non-Residential Sector

3.3.1. General

The non-residential energy sector baseline is established based on extrapolation of energy data from audits to the general population of businesses. Farms and businesses are tackled separately.

With respect to businesses, schools, etc. in the EMP area, 16 SSEA audits were conducted, covering community centres, hotels and GAA clubs, among others. These represented the following:

- Total floor area approx. 11,200 m2
- Total delivered kWh:
    - Electricity = approx. 515,000 kWh/y
    - Fuel (thermal and transport) = approx. 937,000 kWh/y
    - Renewable (heating and electricity) = approx. 23,000 kWh/y
- Total carbon:
    - Electricity = approx. 167.0 TCO2/y
    - Fuel = approx. 2239.8 TCO2/y
- Total cost:
    - Electricity = approx. €185,000/y
    - Fuel = approx. €103,000/y
    - Renewable = approx. €0/y

The summary of the energy baselines for the audited businesses is as follows:

		Electricity			Fossil fuel			Renewable		
client	area	€	kWh	TCO2	€	kWh	TCO2	€	kWh	TCO2
resource centre	850	3997.796	7995.591	2.594569	6658.74	22195.8	5.089497	0	0	0
sports		3772.577	10778.79	3.497718	9200	74281.04	19.81019	0	0	0
church		2975	8500	2.75825	8400	63300	17.31888	0	0	0
Kilkeel Old School	380	5947.89	10043.5	3.259117	4842.1	52750	13.92073	0	0	0
Ramelton Community C	857	5734.855	14449.33	4.688807	6033.022	42339.03	9.708339	0	0	0
Triagh Lough	680	2221.194	5274.049	1.711429	7938.297	63652.51	14.59552	0	0	0
Mulroy Woods	5100	106037.4	295629	95.93161	26549.23	299995.7	78.1973	0	0	0
Logues of Cranford	700	15278.67	43442.54	14.0971	5546.143	46217.86	10.59776	0	0	0
McGinely Steel	1600	18605.16	61113.36	19.83129	5476.64	45638.74	12.04406	0	0	0
Browne Auto	450	5252.259	14814.34	4.807255	6291.036	73712.29	18.92428	0	0	0
Narrow Quarter	275	3262.25	9087.047	2.948747	6858.18	71942.98	18.01219	0	22500	0
Village Inn - Kerrykeel	339	12204.8	33442.58	10.85212	9699.801	81074.86	21.62395	0	0	0
sum	11231	185289.8	514570.1	166.978	103493.2	937100.8	239.8427	0	22500	0
per m2		16.49807	45.81695	0.014868	9.214958	83.43877	0.021355	0	2.003383	0
prim kWh			900497.7			1030811			24750	

Fig. 3.3.1.1. The energy baseline for the audited businesses in the SEC area

A review of the EMP area using Google Maps revealed approximately 210 other businesses of different size. The total floor area across all these businesses is approximately 92,950 m2. The total energy kWh, carbon and costs from Fig. 3.3.1.1. can be made into per-m2 values and then multiplied by the total m2 value to give total values for the energy baseline. This is summarised as follows:

Table 3.3.1.1: Sum of energy for the SEC area, extrapolated from SSEA audits

Energy source	€/y	kWh/y (delivered)	TCO2/y	kWh/y (primary)
Electricity	1,533,529	4,258,777	1,382	7,452,860
Fossil fuel	856,549	7,755,800	1,985	8,531,380
Renewable	0	186,219	0	204,840

Predicted energy savings for the Register of Opportunities are based on (a) the energy savings specific to audited businesses and (b) per m2 energy savings across the audited businesses, extrapolated to the 200+ businesses, similar to how the baseline was established.

3.3.2. Agriculture

Agriculture is an important sector in the SEC. The Consultant and SEC worked together to identify the key farm types and sizes in the study area. Estimates of energy use are based on direct survey data, extrapolated to the total number of farms.

The economic sustainability of farms is a subject of concern, with recent agreements to reduce the size of the suckler herd, to permit Brazillian beef to compete in the EU market, the UK's exit from the EU market, and to limit the allowable level of nitrates per hectare. Thus the bureaucratic cost of owning a farm rises while the productivity decreases and the price of goods falls.

According to the CSO 2020 results, the number of farms in Ireland has fallen from 170,600 in 1991 to 135,000 in 2020, a fall of 21%. However the average area of utilised land rose by 28% from 26 ha. To 33.4 ha., indicating that the total farmed area has been stable despite the Celtic Tiger building boom.

There are approximately 26,500 farms in the border regions (20% of the total), and the average size is 25.5 ha. In Co. Donegal, the average is 27.4 ha. The average farm size in the SEC area is 23.3 ha.

Nationwide, 55% of farms are dedicated to specialist beef production; 13% for specialist sheep; 11% for specialist dairying; 8.5% for mixed crops; 6.3% for mixed livestock; and the rest for specialised tillage, mixed crops and livestock and others. In the Northern and Western regions, specialist beef farming is 60%; specialist sheep is 20%; mixed livestock 7%; mixed crops 7%; and dairy 4%. Thus the farms of that region are particularly vulnerable to changes in beef regulation/market forces.

The average size of a beef farm is 26.9 ha., while for specialist sheep it is 28.9 ha. In the Northern and Western regions, the average farm has 41 cows or 134 sheep. In Co. Donegal, just 2% of the farms are dairy farms, 45% are sheep and 33% are beef.

In the SEC area, there are approximately 418 farms. The average size is 29.4 ha., with 52,295 heads of livestock (2020 data); an average of 125 animals per farm.

According to Teagasc, the tillage farm of 150 ha. uses 10,500 kWh/y of electricity and 8,500 L/y of diesel. A 100-cow dairy unit uses 30,000 kWh/y of electricity. This can serve as a point of comparison for the SEC area's farms.

As part of the EMP, it was not possible to audit any farms from the SEC area. However, the EMP Consultant has years of experience with energy audits as part of SEAI SSEA. This has permitted them to gather a short database of farm audits. The energy breakdown of 8 farms in Co. Donegal, including sheep- and dairy-farms (similar to the SEC area) permitted a per-holding estimate for electricity and fossil fuels. The results are as follows:

- Total farms: 8
- Total delivered kWh per farm:
    - Electricity = approx. 55,000 kWh/y
    - Fuel (thermal and transport) = approx. 243,000 kWh/y
    - Renewable (heating and electricity) = approx. 0 kWh/y
- Total carbon per farm:
    - Electricity = approx. 17.8 TCO2/y
    - Fuel = approx. 63.7 TCO2/y
- Total cost:
    - Electricity = approx. €15,000/y
    - Fuel = approx. €40,000/y
    - Renewable = approx. €0/y

Compare 125 animals per farm, 55,000 kWh/y in electricity to Teagasc's estimate. This indicates that the estimate for the EMP is reasonable. The results above are extrapolated to 418 holdings.

Table 3.3.2.1: Agricultural energy baseline for the SEC area

Energy source	€/y	kWh/y (delivered)	TCO2/y	kWh/y (primary)

Electricity	6,380,236	22,993,114	7,461	40,237,949
Fossil fuel	16,786,026	101,466,162	26,636	111,612,778
Renewable	0	0	0	0

The agriculture baseline will be added to the commercial to get the total non-residential baseline in Section 3.3.4.

Energy saving predictions for the agricultural sector are based on the per-farm energy savings from the 8 audited farms, extrapolated to 418 farms, similar to how the energy baseline is calculated.

3.3.3. Large Industry

Large Industry companies local to the SEC can be invited to participate in the EMP but in this case, the SEC is not host to any large industries. There are a number of significant businesses:

- Lidl
- Mulroy Woods Hotel
- Rathmullan House
- Football Special
- Ripples Hotel
- Henry McGinley Steel
- John McBride Ltd
- Rockhill Holiday Park

3.3.4. Non-residential sector baseline

Sections 3.3.1 and 3.3.2 estimate the non-residential and agriculture energy baselines. Those results are combined to provide the overall non-residential energy baseline:

Table 3.3.4 – SEC Non-Residential Energy, CO2 and Spend

	Electricity	Fossil Fuel	Renewable	Total
Total Primary Energy (kWh)	47,690,809	120,144,159	204,840	168,039,808
Total CO2 (tonnes)	8,843	28,621	0	37,464
Total Spend (€)	7,913,764	17,642,575	0	25,556,339

3.4.Transport

The analysis of the transport sector considers the energy consumption and carbon emissions of all vehicles which are normally stationed in the SEC area. Public transport use and active travel will also need to be quantified, as modal shift to reduce car journeys will be a key component of any low-carbon mobility plan.

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The transport energy baseline is summarised below:

Table 3.4a – SEC Transport Energy, CO2 and Spend

	Electricity	Fossil Fuel	Renewable	Total
Total Primary Energy (kWh)	0	21,593,340	1,106,592	22,699,932
Total CO2 (tonnes)	0	4,609	0	4,609
Total Spend (€)	0	2,359,087	120,896	2,479,983

The consultant worked with the SEC to compile estimates for the total number of cars, motorcycles, vans and trucks in the SEC area. The CSO census was used rather than resort to local survey data, given that the census likely to be the most comprehensive survey available.

Cars are sub-categorised based on fuel type – petrol, diesel or battery electric vehicle (BEV), and vehicle type – either conventional car or SUV. Hybrids (including plug-in) are counted with petrol or diesel cars rather than BEVs.

The following table is used to calculate the total annual distance travelled, energy consumption and CO_2 emissions for each vehicle type. The national stock breakdown is applied in order to calculate energy consumption and emissions (56.9% diesel, 42.7% petrol, 0.4% BEV). For simplicity, it is assumed that all motorcycles are petrol-fuelled and all vans and trucks are diesel-fuelled.

Table 3.4b – Private Vehicle Transport Energy and CO2 impacts

		National average annual km	kWh/km (TPER)	gCO2/km
Car	**Petrol**	12,113	0.73	167
	Diesel	19,681	0.70	167
	BEV	12,958	0.38	65
Motorcycle		2,741	0.41	94
Van		19,787	1.01	243
Truck		44,671	3.47	832

Total annual distance travelled and the associated energy consumption and emissions for each mode is calculated based on the following table:

Table 3.4c – Transport mode energy and CO2 impacts

	kWh/passenger-km (TPER)	gCO2/passenger-km
Bus Éireann	0.129	31
Dublin Bus	0.100	24
Irish Rail	0.100	24
LUAS	0.111	19
DART	0.082	14
E-bike	0.009	2
Walk	0	0

Cycle	0	0

The renewable portion is taken as the renewable content of electricity consumed (40% in 2020), 5% of petrol consumption and 7% of diesel consumption (as per the Biofuels Obligation Scheme).

The information above regarding kWh/passenger/km, etc. is used in conjunction with CSO data. The methods by which people commute to work and to education are listed below:

Table 3.4.1. Commuter transport in the SEC area

Method	Number of people	Percentage
On foot	296	6
Bicycle	14	0
Bus	512	10
Train	1*	0
Motorcycle/scooter	3	0
Car driver	1,987	40
Car passenger	1,059	21
Van	312	6
Other	32	1
Work from home	414	8
Not stated	303	6
Total		

*Data from census – likely a mistake filling out the census form as there are no railways in the SEC area

The following is assumed:

- 0 kWh/km, 0 gCO2/km for pedestrians, cyclists, Others, Workers from home and Not stated
- Car passengers are the equivalent of Bus Éireann passengers with respect to kWh and carbon
- Car drivers use a weighted average kWh/km and gCO2/km value (based on 56.9% petrol, etc. as described above)

From the data above, it is possible to identify kWh/km and gCO2/km values across the spectrum of commute. It comes to 1,940 kWh/km and 0.46 TCO2/km. To establish how many km are involved, the commuting times are reviewed, as well as assumed average speeds.

The commuting times are taken as a weighted average:

Table 3.4.2. Calculation of the average commuting time

Time interval (minutes)	Percentage of people	Assumed average time (minutes)	Weighted average time
<15	33	7.5	2.47
15, <30	36	22.5	8.10
30, <45	14	37.5	5.31
45, <60	4	52.5	1.91

60, <90	3	75	2.40
90, 90+	1	105	1.42
Not stated	9	0	00
		total	21.61

An assumption regarding the average commuting speed is made:

Table 3.4.3. Assumption of the average commuting speed

Method	Assumed average speed (km/h)	Percentage	Weighted average speed (km/h)
On foot	3	6	0.18
Bicycle	9	0	0.03
Bus	60	10	6.23
Train	60	0	0.01
Motorcycle/scooter	60	0	0.04
Car driver	60	40	24.17
Car passenger	60	21	12.88
Van	60	6	3.79
Other	0	1	0
Work from home	0	8	0
Not stated	0	6	0
		Total	47.32

Thus the following is determined:

- Typical commute = 21.61 minutes at 47.32 km/h; 17.05 km
- 1,940 kWh/km, 0.46 TCO2/km; 33,071 kWh/commute, 7.77 TCO2/commute
- Assume 2x commute per day; 6x day per week; 52 week/year

This comes to 20,636,302 kWh/y and 4,846 TCO2/y.

The renewable fraction is taken as a weighted average across the modes of transport. Buses, trains and vans are each taken as 7% renewable. Cars are taken as a weighted average 6% renewable (based on the share of petrol, diesel and BEV). Applying a weighted average similar to Table 3.4.3, the overall renewable energy ratio is 4.9%. The renewable fraction is subtracted from the total to give the fossil fuel fraction. The cost in €/kWh is taken as the fuel cost from the residential sector.

3.5.Energy Baseline

The findings from each sector are summarised in the following table:

Table 3.5 – SEC Primary Energy Baseline (kWh)

Sector	Electricity	Fossil Fuel	Renewable	Total
Residential	17,228,373	53,890,470	0	71,118,842
Non-residential	47,690,809	120,144,159	204,840	168,039,808

Transport	0	21,593,340	1,106,592	22,699,932
Other	0	0	0	0
Total Energy	64,919,182	195,627,968	1,311,432	261,858,582

4. Sustainable Energy Roadmap

The Sustainable Energy Roadmap is an important output for the SEC and is separate to the Register of Opportunities. The analysis provides a general path or plan for the SEC to reach each reduction target: 30% CO2 reduction, 50% energy reduction and 30% renewable energy generation by 2030.

The renewable energy generation for the area is considered in Table 4a. A number of options have medium or good potential.

Table 4a – Local Renewable Energy suitability

Technology	Scale range (kW, MW)	Target application	Suitability (RYG rating)	Rationale
Wind	10 kW	Farms (418)	Medium potential	Adequate space for installation; adequate wind (5 MW Lurganboy site). However, the terrain might make works difficult
Solar PV	2 kWp; up to 50 kWp	Farms (418); houses 2 kWp (2,295); businesses taking 2 kWp to 50 kWp (200)	High potential	Adequate space; low over-shading; adequate demand to utilise energy output
Hydro	1 kW to 10 kW	Farms with rivers	Low potential	No potential sites in the SEC area, no hydro in the SEC area. Energy consultant has experience that hydro projects suffer from legal and environmental (e.g. inland fisheries) obstacles beyond technical feasibility
Biomass	15 kW to 200 kW	Farms, businesses, schools	High potential	Adequate heat demand, boiler-based systems; fuel sources available in Co. Donegal
Biogas	1 kW to 10 kW	Farms (anaerobic digestion)	Low potential	Keeping digesters at 37oC might make them consume more energy than the gas they produce; the farms have space but might not be suited to AD; issues with gas storage/transport. However, there are over 400 farms and there is a 2030 and 2050 national plan for expanding anaerobic digestion so there could be supports available

Table 4b indicates potential projects required to meet the 2030 targets.

Table 4b – Plan to 2030			
	Number of projects	**Primary Energy saving (kWh)**	**CO2 saving (tonnes)**
No. houses to be refurbished to a B	*c. 2,300*	*55,302,116 (21%)*	*12,485 (21%)*
Potential from commercial sector	*c. 600*	40,078,774 (15%)	8,251 (14%)
Potential from Public Sector	*0*	*0*	*0*
Renewable Energy potential	*c. 600*	*47,734,242 (18%)*	*10,336 (17%)*
EV potential	*0*	*0*	*0*
Other	*0*	*0*	*0*
Total saving potential	*c. 2,900*	*143,115,133 (55%)* *RER = 78%*	*31,132 (52%)*

The 2030 Climate Action Plan targets require kWh savings of 50%, CO2 savings of 30% and a renewable energy ratio (RER) of 30%. The SEC-wide projects required to meet these targets are included in the Register of Opportunities. The predicted savings will meet the 2030 targets, with 55% of the kWh, 52% of the CO2 and a RER of 79%.

The total kWh savings need to be 50% of the baseline. Over a 5-year period (2025 to 2030), this will indicate what annual reductions are needed. The baseline is approximately 260 million kWh. This means a reduction of at least 130 million by 2030, or 26 million per year. The savings for an individual business, farm or house might be in the order of tens of thousands. The SEC should expect thousands of individual projects per year until 2030 if they intend to meet the 2030 targets. This is not mandatory but it is useful context.

5. Register of Opportunities

The register of opportunities is available as a separate document, an Excel spread sheet. It contains a number of opportunities, of which a number represent general, SEC area-wide opportunities in order to meet the 2030 targets. The remainder are based on SSEA recommendations and the domestic BER advisory reports generated as part of the EMP. The register of opportunities spread sheet includes predicted kWh, cost and carbon savings; as well as estimates of investment costs and simple payback periods.

The availability and impact of grants is not included in the spread sheet. Most of the opportunities can be grant-aided. The SSEA recommendations generally include a potential support and the BER

advisory reports say whether certain upgrades have grants available. The typical grants/supports include:

- Microgeneration scheme for solar PV
- SSRH for renewable heating and building fabric
- Accelerated capital allowance for new equipment
- Communities' grants for building fabric
- TAMS III grants for farmers
- EEOS for any opportunity, though it is an easier process for opportunities with savings of over 15% of the energy baseline, or for straightforward opportunities like LED lighting and VSD motor upgrades
- Domestic solar and fabric grants exist for homes (e.g. Deep Retrofit, Warmer Homes, One-stop-shop)
- Leader grants support businesses for a range of projects, including environmental
- Local Enterprise Office (LEO) support businesses in energy-efficiency
- SEAI Business Energy Upgrade grants – for heating, solar, renewables, pumps and building fabric

The register of opportunities requires certain data inputs. The electricity cost and CO2 factor are based on the overall SEC area baseline (€0.360/kWh, 0.32 kgCO2/kWh). All fossil fuels are assumed to have the same cost (€0.110/kWh, also calculated from the SEC baseline) and an average CO2 factor is applied (0.256 kgCO2/kWh). LPG is taken as 0.232 kgCO2/kWh; oil is taken as 0.272 kgCO2/kWh; transport fuel as 0.264 kgCO2/kWh.

The cost categories are assumed to be:

- No/Low = up to €10,000
- Medium = Over €10,000 and up to €30,000
- High = over €30,000

Scores are provided for simple payback based on periods of 2, 5, 12 and 30 years, while scores are provided for capital costs based on €10,000; €25,000; €50,000; and €100,000. The scores out of 100 range from 29.5 to 82.5 in the register. The register is summarised below:

001	Metering/management - Mulroy Woods Hotel	82.5
002	Metering/management - Hentry McGinley Ltd	82.5
003	Metering/management - Logue's of Cranford	80
004	LED - Henry McGinley Ltd	74
005	LED - Milford Presbyterian	74
006	LED - Kilkeel Old School Community Centre	74
007	Renewable Heating - Browne Auto	72.5
008	Energy metering/management - businesses	69.5
009	Energy metering/management - farms	69.5
010	Renewable heating - Milford Presbyterian Church	67.5
011	Renewable Heating - Milford Sports Centre	67.5
012	Solar PV - Logue's of Cranford	64
013	Fabric upgrade - Triagh Loch Community Centre	62.5
014	Heat recovery - Logue's of Cranford	62.5
015	Solar PV upgrade - businesses	62
016	Solar PV - farms	62
017	Renewable heat, 21 houses	62
018	Solar PV - Henry McGinley Ltd	59
019	Fabric upgrade - Kilkeel Old School Community Centre	57.5

020	Solar PV - Mulroy Woods Hotel	56
021	LED upgrade - farms	54.5
022	LED upgrade - businesses	49.5
023	Metering/management - Ramelton Community Centre	47.5
024	Solar PV - The Village Inn	46.5
025	Fabric upgrade - Browne Auto	45
026	Fabric upgrade - Logue's of Cranford	45
027	Heat recovery - Mulroy Woods Hotel	45
028	Renewable heating, c. 2295 houses	42
029	Renewable heating - businesses	42
030	Renewable heating - farms	42
031	Renewable heating - Mulroy Woods Hotel	42
032	2 kWp solar PV, c. 2295 houses	37
033	Fabric upgrade - businesses	37
034	Fabric upgrade - farms	37
035	Fabric upgrade, 21 houses	37
036	Solar PV, 21 houses	37
037	LED- Milford Sports Centre	31.5
038	Fabric upgrade, c. 2295 houses	29.5

Fig. 5.1. The register of opportunities and EMP scores. The shades scores indicate SEC-area-wide opportunities to meet 2030 targets.

From Fig. 5.1, a number of opportunities stand out as high-scoring. Energy metering/management occupy 5 of the top 10 opportunities and LED lighting projects occupy 3 of the top 10. The 8th and 9th are SEC area wide opportunities. This opportunity refers to no/low cost procedures and practices, as well as energy metering for quantitative feedback on energy consumption.

The house upgrades score quite low, with fabric and solar PV both scoring 37 (for the 21 houses surveyed). The renewable heating for the 21 houses scores well, at 62, but it requires fabric upgrades first. In general, all renewable heating upgrades require fabric upgrades first. The SEC should bear this in mind.

6. Project development strategy

This section provides the SEC with the realistic options for local project development and builds on the Sustainable Energy Roadmap. An assessment should be carried out to consider the following:

- Priorities identified in the EMP
- Capacity of the SEC team
- Existing partnerships
- Currently available grants and support schemes

Depending on the assessment, the strategy may range from:

- raising awareness for homeowners to apply for individual grants e.g. Warmer Homes, Insulation and heat pump grants, EV and EV charger grants
- Building SEC capacity through stakeholder engagement and/or training
- Coordinating small groups of individual grants
- Strategic partnerships for Community Grant projects e.g. Project Coordinator, Energy Agencies, Local Authorities, Participating Energy Supplier, Corporate Sponsor

The SEC will decide what opportunities to prioritise but the Consultant can offer some suggestions, based on experience with other EMPs:

- Energy metering/monitoring/management is a useful action to take. It is relatively cheap and can lead to surprising energy savings (e.g. turning off idling equipment/heating now that the meters reveal them to be idling). They are also useful for confirming the energy baseline and verifying savings. This might influence what further opportunities the SEC should prioritise.
- Solar PV helps with the 2030 renewable target and generally has a rapid rerun on investment. Solar has the added bonus of export tariffs, which could be used to finance other opportunities.

- The Consultant recommends thorough energy metering and management training to rapidly eliminate some energy consumption for low/no-cost; to verify and claim savings under EEOS; and to have a data-driven approach for selecting the next opportunities.
- Solar projects should proceed as a means of quickly reaching the 2030 RER, saving energy, and producing some income for the project via export tariffs.

The Consultant also notes that though a number of fabric opportunities might score relatively poorly, they are generally prerequisites for heat pump projects; the SEC should bear this in mind. In general, any heating project should come after or with a fabric upgrade.

The consultant is aware that their suggestions are driven by technical considerations while the SEC has a community-focus. Some opportunities might be more urgent due to the non-energy effects on the community as opposed to the immediate economics – for example a solar upgrade on a farm might not be as immediately useful to the community as a fabric upgrade to a community centre.

Milford SEC are to maintain the Register of Opportunities and push for the wider community to engage and embrace energy efficiency. The 1st step is to communicate the EMP to the community. The 2nd step is to look for homeowners, businesses, non-profits willing to explore applying for a Better Energy Community grant. This co-ordinated approach should have a very positive impact.