Callan ENERGY MASTER PLAN

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Contents

Callan profile

Callan is a town which lies in the south-west of County Kilkenny. It is the second largest town in the county and has a population of 2,475 as per the 2016 census, which is an increase in resident population of just over 6% from the previous 2011 Census.

The town is located 16 km south-west of Kilkenny City, 24 km from Carrick on Suir, 27 km from Clonmel and 56 km from Waterford City. Callan is well connected by road, with the N76 traversing on the west side of the town centre making it accessible to Kilkenny City, and by extension with the M9 to Dublin.

Callan is a town which is steeped in history. Founded by William the Marshal in 1207, the town reportedly gets it's name from the high king of Ireland Niall Caille, who was drowned while trying to ford the river with his army in the area. The river in question is now named the "Kings River".

The town was built on the south side of the Kings River in the form of a cross, with its principal streets running north, south, east and west. The centre of the town where these streets intersect is still known as 'the Cross' today. In fact, the central part of Callan is designated as 'Architectural Conservation Area' in the Kilkenny Council Development Plan 2014-2020 and is also identified as a medieval town. Callan is targeted for growth over the coming years having been identified as a key town in the South-eastern Regional Planning Guidelines 2010-2022.

There are a number of significant natural features in Callan, such as the Kings River, the Abbey Meadow and Motte Field which unite to give the town a unique environmental character, whilst also supporting biodiversity and natural heritage in the town.

Callan has also been leading the way from a sustainability point of view, as it transition's towards being a more sustainable, environmentally friendly town. Callan Community Energy Company have been at the heart of this with their pledge that all energy in the town will be produced renewably by 2030 which is an extremely ambitious commitment. These actions have been supported by multiple solar projects planned for the area, along with the town's status as a Sustainable Energy Community, which shows Callan's commitment to meeting their climate targets.

Glossary of Terms

Although all efforts have been made to keep the language in this report non-technical, through the use of infographics and normal language it is not always possible. To mitigate against this, we have provided a glossary of key terms used through-out this report and an explanation of their meaning. An additional excellent resource for understanding all terminology around energy and environment is https://climatejargonbuster.ie/wp-content/uploads/2021/02/ClimateJargonBuster_A-Z_a.pdf

Building Energy Rating (BER) - BER stands for Building Energy Rating. A BER certificate shows you the energy performance of your home. It is a good indicator of how much you will spend on energy (like heat and light) and how much CO_2 you will release to heat your home to a comfortable level.

The BER rating goes from A to G. A-rated homes are the most energy efficient, comfortable and typically have the lowest energy bills. G-rated homes are the least energy efficient and require a lot of energy to heat the home.

Carbon Dioxide/ CO_2 - Carbon dioxide is a powerful greenhouse gas. It is naturally part of the air we breathe. However, human activities like burning of fossil fuels and deforestation have led to an increase in CO_2 in the air that contributes to climate change.

Carbon Footprint - Carbon footprint measures the carbon emissions linked to a particular activity or product. It includes emissions involved in all stages of making and using a product or carrying out an activity. The lower the carbon footprint the less that a product or activity contributes to climate change.

Energy Efficiency - It is energy efficient when we use less energy to achieve the same result.

Energy Savings - Energy in whatever format it is being consumed usually costs money (€). By reducing the amount of energy consumed you are also reducing the cost associated with providing that energy.

Greenhouse Gas Emissions (GHGs) - Gases that trap heat from the Earth's surface causing warming in the lower atmosphere and slowing down loss of energy from Earth. The major greenhouse gases that cause climate change are carbon dioxide, methane and nitrous oxide.

Kilowatt hours (kWh) - One kilowatt-hour is equivalent to 1000 watts of energy used for 1 hour. For example, a 100-watt lightbulb switched on for 10 hours uses one kWh of electricity.

Megawatt hours (MWh) - A megawatt hour is equivalent to 1 million watts of electricity being used for an hour. 1 MWh is equivalent to 1,000 kWhs. For example, a megawatt hour could be 2 million watts (2 megawatts) of power being used for half an hour

Net zero emissions - This refers to achieving an overall balance between greenhouse gas emissions produced by human activity and greenhouse gas emissions taken out of the atmosphere

Renewable Energy - Renewable energy comes from renewable resources like wind energy, solar energy, or biomass. These resources can regenerate naturally, and we can use them repeatedly without reducing their supply.

Renewable Electricity Support Scheme (RESS) - This Government scheme provides financial support to renewable electricity projects in Ireland to help us achieve our renewable electricity goals. It also aims to increase community participation in, and ownership of, renewable electricity projects. It aims to make sure electricity consumers get value for money and to improve security of our electricity supply.

Sustainable Energy Community (SEC) - An SEC is a community in which everyone works together to develop a sustainable energy system. To do so, they aim as far as possible to be energy efficient, to use renewable energy where feasible and to develop decentralized energy supplies.

Units

Throughout this report we present energy use and energy production, in kilowatt or megawatt hours per annum (KWh/yr) and (MWh/yr). These units of measurement are used regardless of the fuel used. As a reference point, a typical house consumes approximately 22MWh per annum. We also present carbon emissions in tonnes or kg of CO_2/annum. Energy costs are presented in euro spent on energy per annum.

Ireland's Climate Action Plan 2021

- The Climate Action Plan (CAP) is a roadmap developed by the Irish government for taking decisive action to reduce Ireland's emissions by 51% of 2018's totals by 2030, and net zero by 2050. This roadmap sets out targets for achieving these goals and the ways to go about it. This is done sector by sector with a clear goal set out for each sector. Table 1 shows the proposed emissions reductions by sector to achieve the targets set out in this plan

- The statutory national climate objective and 2030 targets are aligned with Ireland's obligations under the Paris Agreement and with the European Union's objective to reduce GHG emissions by at least 55% by 2030 (compared to 1990 levels) and to achieve climate neutrality in the European Union by 2050

- Targets for each sector of the economy will be updated annually, including in 2022, to ensure alignment with the governments' legally binding economy-wide carbon budgets and sectoral ceilings

- Whilst all the sectors referenced in Table 1 are relevant in some form or another to this EMP, of particular importance are the Electricity, Transport and the Built environment sectors, which feature prominently in the report

Table 1 – Summary of the sectoral targets within the Climate Action Plan

Sector	2018 Emissions (Megatonnes of CO2 equivalent)	2030 target Emissions (Megatonnes of CO2 equivalent)	% Reduction relative to 2018
Electricity	10.5	2 - 4	62-81%
Transport	12.0	6 - 7	42-50%
Built environment	9.0	4 -5	44-56%
Industry	8.5	5 -6	29-41%
Agriculture	23.0	16 - 18	22-30%
Land use, land use change, Forestry & Marine	4.8	2 - 3	37-58%
Unallocated Savings	N/A	4	N/A

- One of the standout targets for the Electricity sector which is particularly relevant for the Callan SEC is the target of increasing the amount of electricity generated by renewable sources to 80%. SEC's can play their part through small-scale renewable energy generation in the community as will be discussed later in the report

- Regarding transport, the expectation is that Electric Vehicles will cover 40% of car journeys by 2030. Conversely, public and active transport services will receive heavy investment, enabling an additional 500,000 daily journeys

- Perhaps the sector of most importance to the Callan SEC is the Built Environment. In the residential sector some of the most ambitious targets include:
  - Retrofitting 500,000 homes to a B2 equivalent BER standard
  - Installing 600,000 heat pumps in residential buildings

Energy Master Plan Summary

To assist in achieving the Callan Sustainable Energy Community's goals, an Energy Master Plan study has been conducted. This Energy Master Plan (EMP) has been funded by SEAI to assist in developing and refining short, medium and long-term plans for the Callan Sustainable Energy Community.

The Master Plan aims to help communities understand their current energy usage and carbon footprint so that they can understand where they currently are, thereby allowing them to set reduction targets for the future.

The information gathered and tools developed to review projects will help the SEC strive toward being an exemplar model in the transition to a low carbon community.

The Energy Master Plan is based on a mixture of desktop research utilizing publicly available information sets from a range of sources CSO, SEAI, POWSCAR, CIBSE, Pobal, County Council, etc.

Using modelling tools and methodologies developed inhouse by Plan Energy Consulting, the Energy Master Plan will also capture the energy consumption, emissions and spend within the community.

The EMP report begins with a sectoral energy breakdown that will give a broad overview of each sector's (Residential, Commercial, Transport) energy consumption, energy cost and contribution to CO_2 emissions in the Callan SEC, followed by a brief discussion on how the SEC compares to national averages.

These sections form the basis of the recommendations and options supplied for a transition to renewable energy sources in each of the sectors as well as opportunities for energy reduction and increased efficiency within the Register of Opportunities document.

The EMP will identify the potential for the implementation of sustainable transport models such as electric vehicle (EV) charging infrastructure, alongside renewable energy generation possibilities from many varying sources such as wind, solar etc.

Reviewing the natural resources available to the community, high level analysis is provided on various renewable energy technologies that the community could further pursue. A wide range of natural resources are often within a community's grasp, however the understanding of how to progress from a concept through to reality can be an enormous barrier.

This EMP outlines the processes required by the SEC to quantify what these resources can offer, alongside how renewable projects can transition from an idea to a system that is owned by the community, contributing to the sustainable, decarbonisation of the area.

Finally, the EMP will conclude with an Action Plan and Register of Opportunities section, which the community can use as a benchmarking tool, as they seek to become more energy efficient and reduce their carbon footprint over the next decade.

Perhaps the primary benefit of the EMP is that it can be used as a roadmap for the SEC's progression towards sustainable energy and can be used to support applications for capital grants to upgrade existing housing and commercial building stock.

Additionally, the EMP can also be used as a mechanism to increase awareness in energy efficiency. This process begins through the interactive community survey issued, meetings with the SEC committee, the energy audits alongside the launch of the report at its conclusion.

This report includes recommendations, demonstrating examples of what the community can do to change behaviour and increase the understanding of climate action and how those involved can contribute toward this shared objective of reducing their impact on the environment.

The EMP covers 9 Small Area Plans [1] which are defined by the Central Statistics Office (CSO) and are shown below in Figure 1.

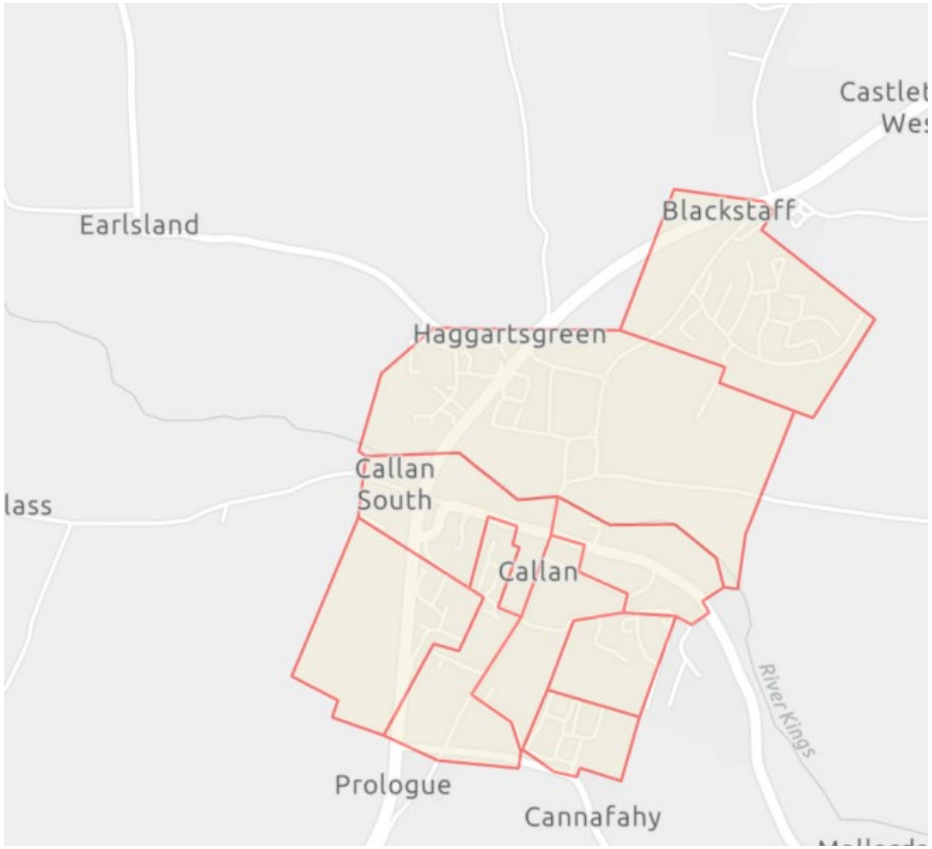


Figure 1 - The image depicts the area covered by Callan SEC. This was generated using the Small Areas as defined by the Central Statistics Office (CSO SAPMAP 2016).

[1] *Small Areas are areas of population generally comprising between 80 and 120 dwellings created by The National Institute of Regional and Spatial Analysis (NIRSA) on behalf of the Ordnance Survey Ireland (OSi) in consultation with CSO. Small Areas were designed as the lowest level of geography for the compilation of statistics in line with data protection and generally comprise either complete or part of townlands or neighborhoods. There is a constraint on Small Areas that they must nest within Electoral Division boundaries.*

Executive Summary

The table below provides a holistic overview of the energy consumption, emissions and cost associated with Callan SEC.

Table 2 – SEC Total Energy, CO_2 and Cost Analysis

	ELECTRICITY	**FOSSIL FUELS**	**TRANSPORT**	**TOTAL**
ENERGY MWh	11,150	19,018	7,145	37,312
CO2 EMISSIONS tCO2	4,097	4,493	1,804	10,393
TOTAL ENERGY COST	€1,640,847	€2,611,817	€1,421,784	€5,674,448

As already mentioned, the EMP breaks down the energy consumption and fuel mix within the community's catchment area into 3 key sectors consisting of:

1) Residential
2) Non-Residential (Building stock that is not classified as a home, e.g., Commercial, community or industrial buildings)
3) Transport

The sectoral baseline energy usage analysis, which will be discussed in more detail in later sections, is summarized in Table 3 in the form of an energy balance for the whole catchment area. This provides a full picture of how much energy is used in each sector, which helps identify and prioritize areas for action by the Callan SEC.

Table 3 – Sectoral percentage energy consumption

Callan SEC Primary Energy Baseline (kWh)				
Sector	**Electricity**	**Fossil Fuel**	**Renewable**	**Total** (MW)
Residential	8,015,563	11,149,655	458,205	19,623
Non-residential	3,134,110	7,868,360		11,002
Transport	10,695	7,134,044	497,156	7,642
Total Energy	11,160,368	26,152,059	955,361	38,268

Our analysis of the energy consumption within the catchment area has identified that 51% of the energy demand relates to the residential sector, 29% for the commercial sector and approximately 20% relates to the Transport sector.

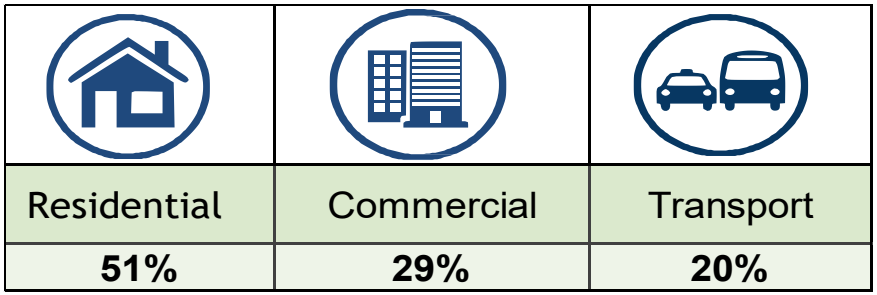


Figure 2 – Primary Energy percentage per sector

Residential sector

Background

The Residential sector is one of the largest emitting sectors in Ireland, accounting for 29% of CO_2 emissions and roughly a quarter of the energy used in Ireland as per 2020 estimates from SEAI. Therefore, if communities want to make progress towards individual targets, as well as contributing to the national target of reducing all CO_2 emissions 51% by 2030, it is vital this sector is given particularly focus.

Whilst energy usage from the residential sector has increased by almost 19% from 2014 to 2020, emissions only subsequently increased by 1%. This can be explained by higher household incomes and expenditure, coupled with improvements in energy efficiency as a result of updated building regulations and homeowners increasingly more willing to invest in fabric upgrades within their homes.

The momentum within the country has been to ensure that as many homes as possible upgrade their homes insulation ahead of 2030, with the Irish Government setting the ambitious target of 'retrofitting' [2] 500,000 homes to a B2 Building Energy Rating (BER) by 2030. By retrofitting homes in a manner that focuses on enhancing their insulation, homeowners don't have to use as much energy on space heating within their home, which will naturally lead to emission reductions within the residential sector.

[2] A process where you look at the house's overall energy efficiency and use a combination of measures to improve it.

The residential section of this report will seek to analyse what retrofit measures may be suitable for properties in the Callan SEC based upon Housing age, occupancy, ownership and type.

The fuel mix can have a significant impact on the carbon footprint of a community as each fuel type has its own associated CO_2 output. For example, coal produces approximately 0.4kg and 0.3kg of CO_2 for every kilowatt hour of energy delivered, compared to just over 0.2kg for natural gas.

The BER is based upon the provision of space heating, water heating for domestic purposes, ventilation, and lighting. The BER does not include what are called point load consumption such as plugged-in electrical appliances. An excellent reference which provides a breakdown of all energy used in the home is the "SEAI Energy in the Residential Sector 2018" Report.

A breakdown of the communities BER per Small Area Plan is provided, which identifies those specific areas in a community that require more investment to improve their BER. Given that a BER is a reflection of a home's energy efficiency, a lower BER implies that homeowners are using more fuel to heat their homes. Given the continued rise in energy costs, upgrading the communities BER can alleviate homeowners from fuel poverty and prevent others from going into it.

Method

An analysis of the residential housing stock in the catchment area of Callan SEC has been carried out based on Central Statistics Office (CSO) data and the Eircode data provided by ESRI.

The residential housing stock is based on a baseline year of 2016 and a breakdown of the number of residential units which are vacant or classified as holiday homes is derived from the Eircode Database which is based on a baseline year of 2021. Statistics for residential heating are based on national averages against primary heating type. This allows for future analysis against future census data.

The SEAI Building Energy Rating (BER) Map shown in Figure 9 displays colour coded 'Small Areas' of the Callan SEC. The colour of a given small area represents the BER of the median geo-located dwelling in that small area. The map only contains BER Information at the Small Area level for dwellings that have had a BER completed. The medians were derived from all geo-located dwellings with a BER in that particular Small Area.

SEAI's corresponding prices and emission factors as of 2020 were applied to calculate the total spend and CO_2 emissions for various sources of energy and heating.

Results and Analysis

Housing Ownership

Within the catchment area approximately 60.7% of the housing is owner occupied. With a 32.8% outright ownership (no mortgage or loan), this can imply a greater appetite to engage in home retrofits as the occupiers are the decision makers in relation to energy upgrades and have a clear incentive to upgrade.

Equally, for rental properties, it is in landowners' best interests to upgrade the homes they own with retrofit measures in line with the projected minimum BER increases for rental properties that the Government are implementing from 2025.

However, given that landlords themselves will not reap the benefits of a warmer home and cheaper energy bills, a strong strategy of engagement and encouragement will be required for landlords until obligatory measures come into effect.

Table 4 – Percentage of homes owned outright by owner

Occupancy type	No. of homes	% of homes
Owned with mortgage or loan	262	32.8%
Owned outright	223	27.9%
Rented from private landlord	163	20.4%
Rented from Local Authority	108	13.5%
Rented from voluntary/co-operative housing body	24	3.0%
Occupied free of rent	8	1.0%
Not stated	11	1.4%
Total	**799**	**100%**

Housing Type

A very significant percentage of the housing stock in the catchment is classified as detached, semi-detached or terraced housing with a small percentage classified as flats or apartments. Flats and apartments mainly consist of smaller developments or over the shop dwellings. This again is a positive sign for Callan SEC, as the options for retrofitting a home increase with detached, semi-detached and terraced housing as there is less chance of interfering with other properties.

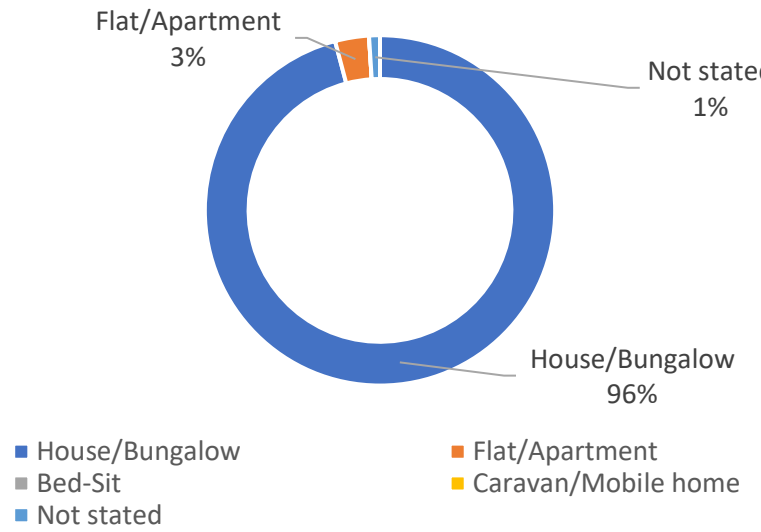


Figure 3 - Housing Stock type within SEC by percentage

Housing Age

Figure 4 illustrates the age spread of the residential housing stock in the catchment area. The age of the properties is displayed alongside a breakdown of the introduction of the buildings regulations which have had an incremental impact on the construction methodologies used.

This information can be quite informative as it illustrates the type of interventions which may be suitable for the housing stock.

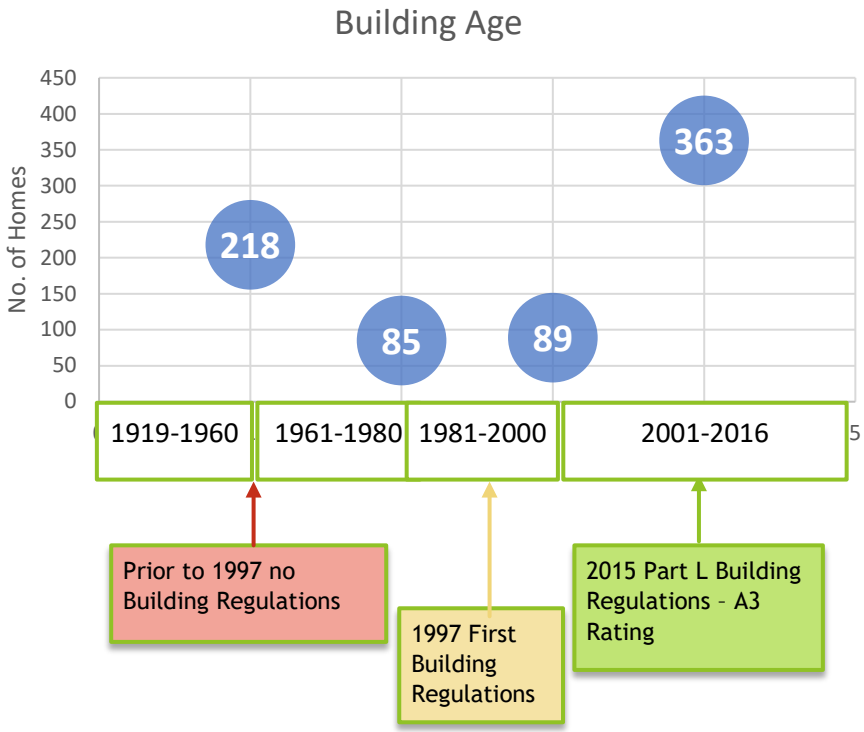


Figure 4 - Relationship between Dwelling Age and Irish Building Regulations

Within the catchment area there is a good mix of housing age types which will each require different energy efficiency measures to achieve a more energy efficient housing stock. 50.9% of Callan's housing stock would be considered modern having been constructed after the year 2000, which indicates that measures such as cavity insulation improvements and attic insulation can be promoted.

Housing which was constructed prior to the introduction of the building regulations tended to be solid wall or hollow block construction which is unsuitable for cavity insulation due to the lack of a suitable cavity. These buildings tend to be more suited to internal or external insulation measures[3].

With 42.1% of dwellings having been constructed from pre 1919 – 1990, this strongly indicates that a very large number of homes will present opportunities to improve energy efficiency and reduce their energy requirements. However, the types of buildings within lower age bands present challenges due to the historic construction methods applied from their era and the materials used, alongside the important significance associated with preserving the heritage of these homes.

Table 5 – Age profile of the Callan SEC housing stock

Period	No. of homes	% of homes
Pre 1919	79	9.9%
1919 - 1945	67	8.4%
1946 - 1960	72	9.0%
1961 - 1970	20	2.5%
1971 - 1980	65	8.1%
1981 - 1990	33	4.1%
1991 - 2000	56	7.0%
2001 - 2010	350	43.8%
2011 or later	13	1.6%
Not stated	44	5.5%
Total	**799**	**100%**

[3] External Wall insulation involves fixing insulation materials such as mineral wool or expanded polystyrene slabs to the outer surface of the wall. The insulation is then covered with a special render to provide weather resistance. A steel or fiber-glass mesh is embedded in this render to provide strength and impact resistance.

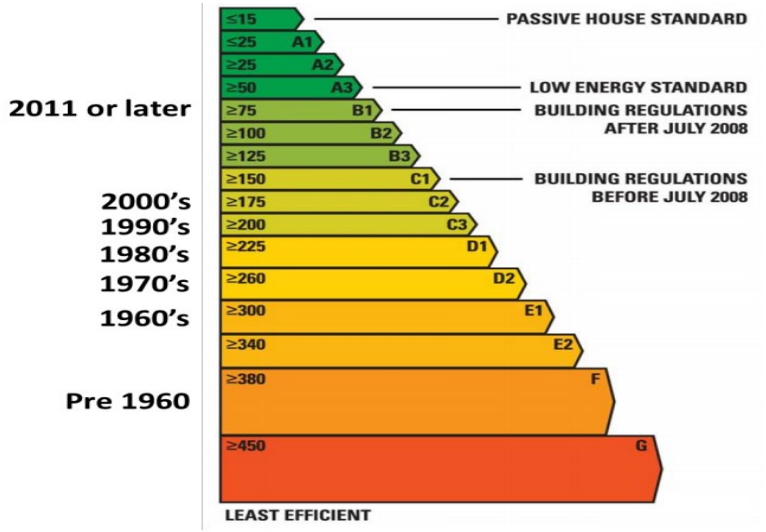


Figure 5 - Typical BER for house age type before upgrade works

Housing Fuel Mix

The residential fuel mix as illustrated in Table 6 provides a breakdown of the different types of fuel sources used in the community for the heating of residential properties. The CO_2 Emissions associated with Callan SEC is linked to the type of fuel consumed within the community. By using different less carbon intensive fuels, a community can significantly reduce the CO_2 footprint from the energy it consumes to heat its homes. The ideal situation for any community is to reduce the level of energy required to heat their homes through energy efficiency measures and to provide the remaining heat requirements from low or natural CO_2 producing fuel sources.

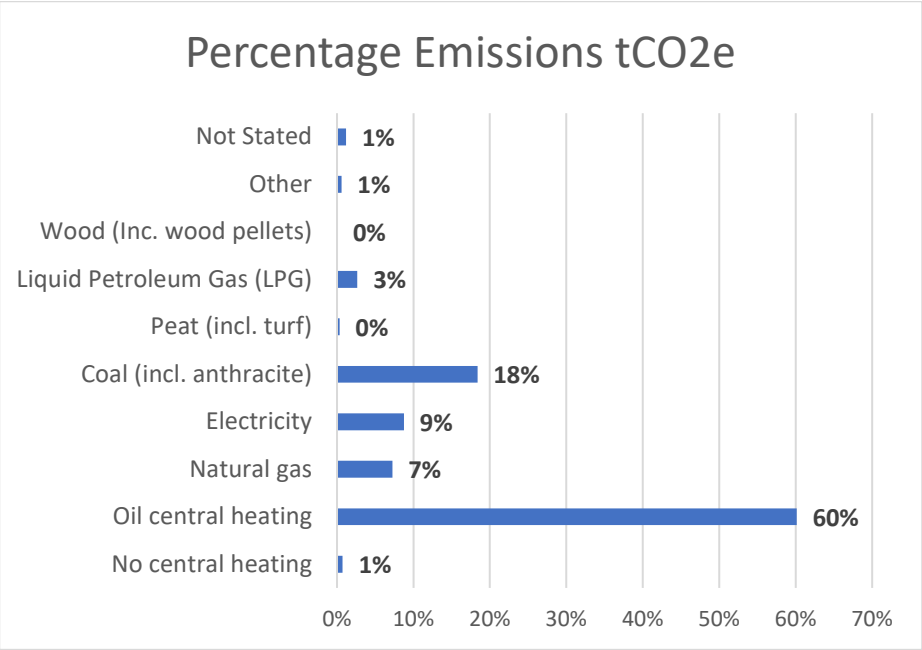


Figure 6 - Percentage emissions in tCO_2e

Within Callan SEC, the main fuel types are currently coal and oil which make up 76% of the total thermal energy consumed. Combined, these two fuel types make up 78% of the CO_2 emissions from the Residential sector. Oil is the primary source at 60% which is typical for a large proportion of houses built pre-2011. Whilst this finding does raise cause for concern, it also demonstrates the huge level of potential for the community to significantly reduce its carbon footprint.

Table 6 - Residential Fuel Mix

Heating Type	Number of units	Fuel	% of Total Thermal Energy	Thermal TFC (kWh)	Emissions tCO_2e
No central heating	6	Oil [4]	1%	83,310	22.0
Oil central heating	490	Oil	61%	6,803,650	1795.5
Natural gas	76	Natural Gas	10%	1,055,260	216.0
Electricity	39	Electricity	5%	541,515	160.2
Coal (incl. anthracite)	116	Coal	15%	1,610,660	548.6
Peat (incl. turf)	2	Peat	0%	27,770	9.9
Liquid Petroleum Gas (LPG)	25	LPG	3%	347,125	79.6
Wood (Inc. wood pellets)	30	Wood Pellets	4%	416,550	0.0
Other	5	Other	1%	69,425	17.8
Not Stated	10	Other	1%	138,850	35.7
Totals	**799**				**2,885**

[4] The fuel specified against no central heating is defined as 'Oil' which is in the mid-range between wood and coal. This is because this type of heating uses a variety of different fuel sources.

The census poses a questions around the primary heating source used by homeowners to heat their home, however this doesn't cover secondary and supplementary heating sources that many use for home heating. In addition to the Census data, an energy survey which gathered data from 69 respondents was carried out as part of the study fieldwork.

The census data shows that almost 77% of homes are heated by oil, while lower-carbon options such as timber and heat pumps are used for heating in about 56%. Whilst coal is the primary heating source in 15% of homes in the SEC, it is used as a heating source across 45% of homes surveyed.

Timber is similar, which suggests that a large proportion of homes within the community either have a wood burning or multi-fuel burning stove. Given the restrictions around the retail sale of coal and turf which are due to be introduced towards the end of the year, it will be interesting for the SEC to revisit this a year or two further down the line.

Indeed, it is these homes that use coal and turf as a supplementary heating source that the SEC could try to target over the next year in an effort to reduce the carbon emissions produced by the community.

It's important to note that whilst the Census was filled in by all of the community, this survey was replied to by 69 individuals, so it is not totally representative of the community. However, a question like this does reveal more about the SECs heating usage when placed alongside the Census results.

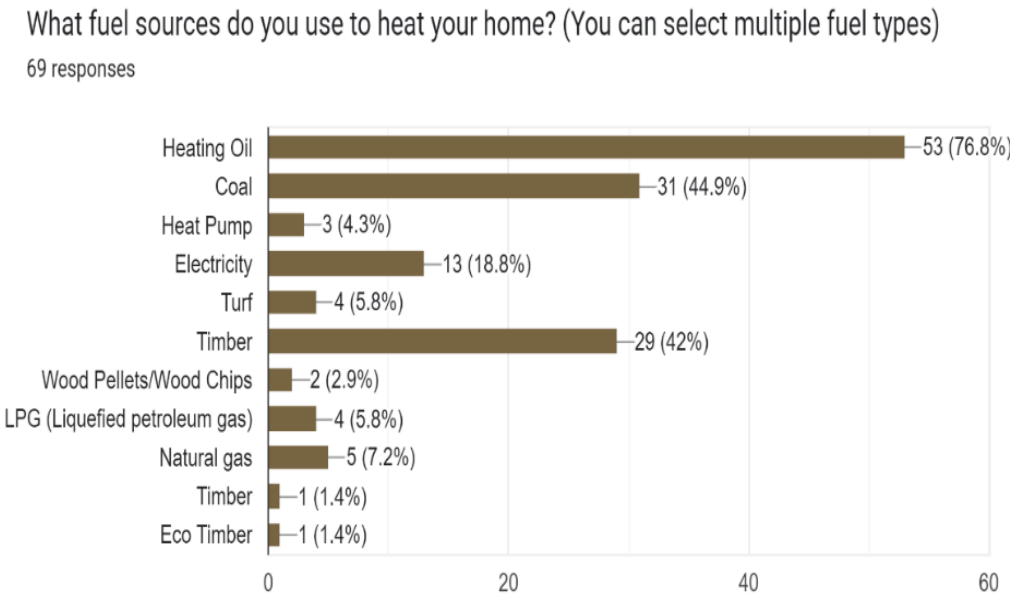


Figure 7 – Results from the SECs Home Energy Survey on the fuel sources used to heat residents' homes

Housing BER Coverage

An analysis of the Building Energy Rating (BER) of the current residential housing stock within the Callan SEC was carried out. The average BER rating has been determined, however this figure is based upon a limited number of buildings which have had BER's carried out on them and should be reviewed in that context.

Of the 799 homes registered within the catchment of the Callan SEC region, 37% of these homes have BER certificates. The number of dwellings in Callan with a BER of B2 or greater is lower than the national average (3% vs 11%), reflected by the fact it lies quite a bit below the national average for its overall BER.

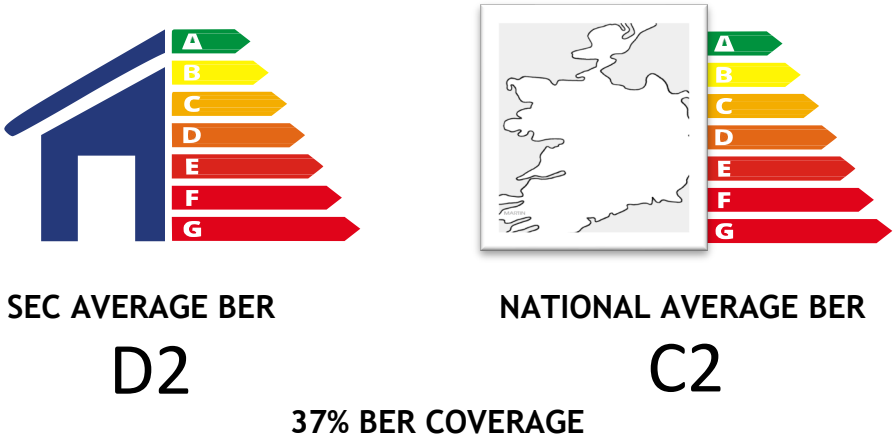


Figure 8 - Building Energy Rating information on Callan SEC [5]

[5] Please note that the SEC average BER is based upon 37% of the building stock within the catchment area which currently has a Building Energy Rating (BER) associated with it. The average BER may be lower based on the fact that buildings are legally required to get a BER carried out when they are sold, leased or rented or when the client is getting grant aided work carried out on the property.

The data in Figure 8 indicates that BERs for a large volume of Callan SEC's residential building stock ranges from a C1 to an D2, 65% collectively, with such dwellings requiring between 150-300 kWh/m2/yr. of energy.

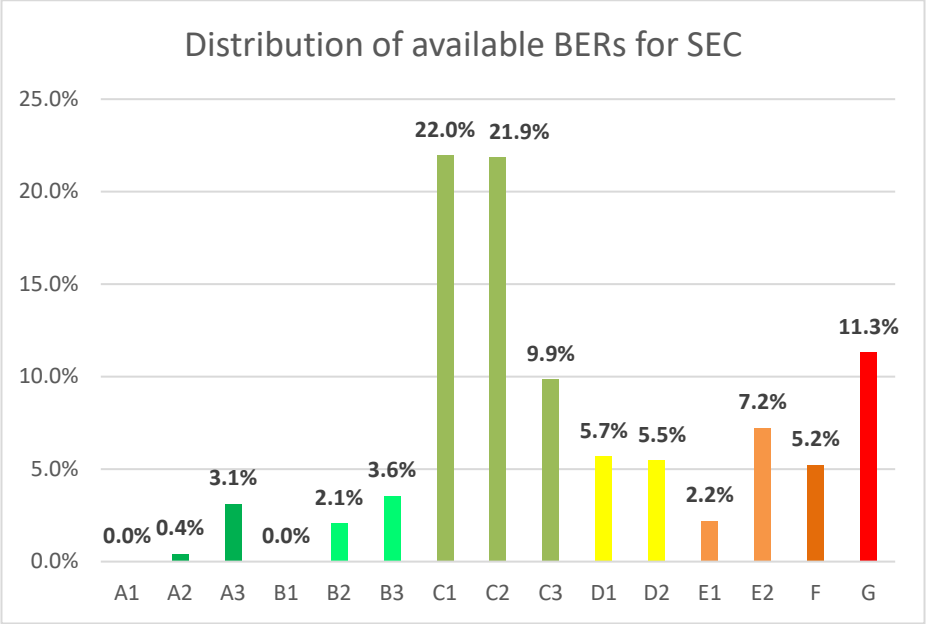


Figure 9 – Distribution of available BERs for Callan SEC

The chart above indicates that 94.4% of the housing stock in the Callan SEC lie below the Irish Government's target BER B2. However, of that total, approximately 57% lies within a boundary of B3 – C3 which shows that a majority of the housing stock can be brought up to this rating without deeply extensive retrofitting measures.

It's interesting for SECs to see how each subsection of their community fares in terms of BERs. This can reveal insights into fuel poverty and nudges decision makers towards those areas in need of most investment.

The map below of the Callan SEC illustrates the median BER's which have been recorded in each Small Area Plan. It should be noted that this information is based on a limited amount of BER data and is presented in an illustrated format to allow for comparison in future reports.

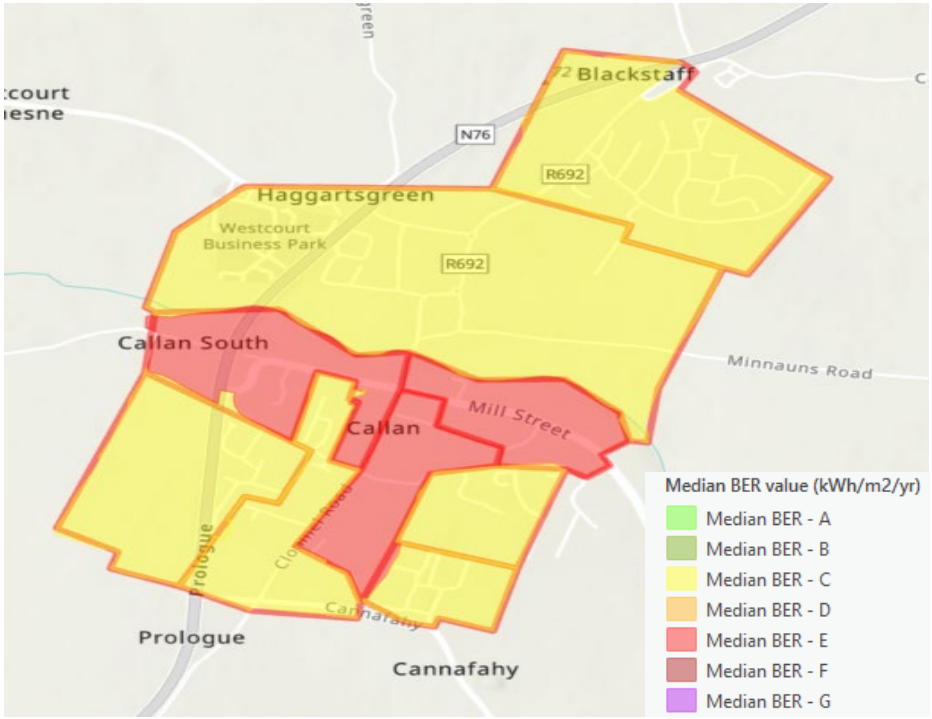


Figure 10 - Map of Median BER in the Callan SEC Catchment Area

When we compare those Small Area Plans with a poor BER rating in the image above, to those which score poorly on the Pobal deprivation index (Figure 10), we can see there is a correlation between the two. This sort of data provides local decision makers and the Callan SEC with the appropriate knowledge about their area, so that they can prioritise which areas should receive investment for home energy upgrades. These two images make clear that it is the Callan Urban Area, specifically those areas close and adjacent to the town centre which are in most need of investment in terms of upgrading the energy efficiency of homes.

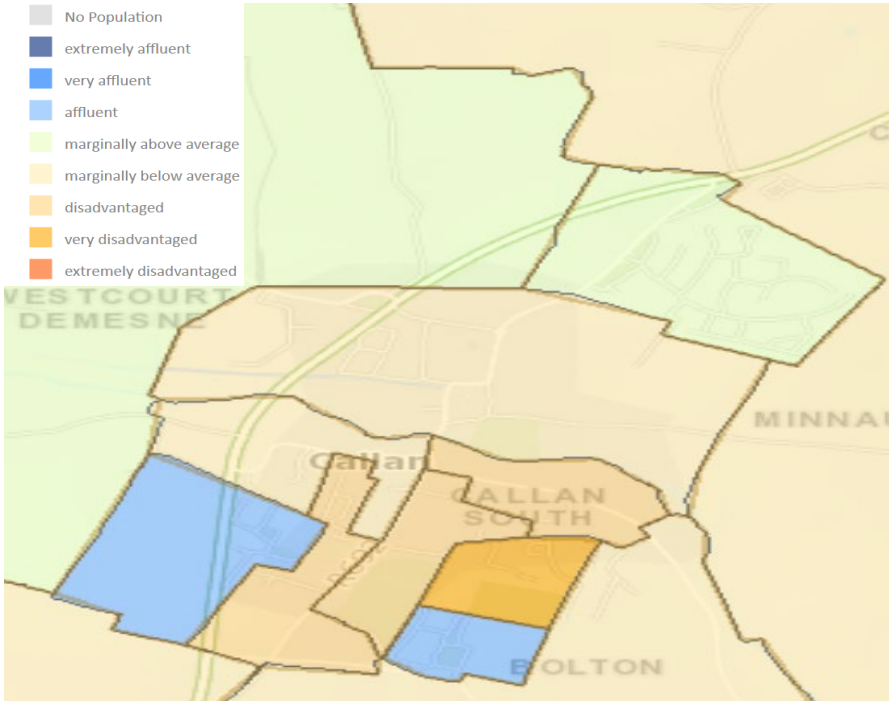


Figure 11 – Trutze Haase Pobal HP Deprivation index for the Callan SEC catchment area

Residential Energy Baseline

To calculate the residential sector's energy baseline, national residential data was obtained from the Central Statistics office (CSO) Small Area Population Statistics (SAPS), which lists the housing stock present in a specific area by house type and year of construction.

Table 7 - Residential Energy, CO_2 and Spend

	Electricity	Fossil Fuel	Renewable	Total
Total Primary Energy (kWh)	8,015,563	11,149,655	458,205	19,623,423
Total CO_2 (tonnes)	2,371	2,998	0	5,369
Total Spend (€)	€1,102,094	€1,400,090	€39,572	€2,541,756

For homeowners who wish to upgrade their BER's, The Sustainable Energy Authority of Ireland (SEAI) provides financial incentives to homeowners in the form of grants and supports, details of which can be found in the Appendices. It's important that homeowners are supported throughout the application process, so that they are investing in measures that are appropriate for their home.

Whilst the costs of many of the retrofit measures associated with improving a home's energy efficiency may appear prohibitive on the surface for both lower income groups and landlords alike, SEAI's new 'National Retrofitting Scheme'[6] has meant home upgrades are more achievable for homeowners than ever before.

For example, homeowners can now avail of grants equivalent to 80% of the typical cost for attic and cavity wall insulation, with an upper limit of €2,500. These measures have been shown to improve energy efficiency significantly within typical Irish homes and should be an affordable measure for the majority of homeowners in Callan SEC.

Furthermore, the Warmer Homes Scheme offers free energy upgrades for eligible homeowners who are most at risk of energy poverty. A budget allocation of €109 million has been provided for this scheme this year. The scheme will target the least energy efficient properties, by prioritising homes that were built and occupied before 1993 and have a pre-works BER of E, F or G. Applications will also be accepted from qualifying homeowners who previously received supports under the scheme, but who could still benefit from even deeper measures.

Given that energy costs are expected to remain at the very least the same level in the coming years, if not increase further, it is vital that homeowners in lower income groups utilise these grant streams to protect themselves against falling into, or further into fuel poverty.

****Further details on grants can be found in the Appendix****

[6] https://www.gov.ie/en/press-release/government-launches-the-national-retrofitting-scheme/

Retrofit Case Studies

Background

The momentum within the country has been to upgrade the fabric of buildings so that heat pumps can be utilised as the primary heating source. However, in order for heat pumps to be a viable option, buildings need to be insulated to a level where they have a Heat Loss indicator of 2.0 or less. SEAI define these dwellings as being 'heat pump ready' [7]. If properties are not insulated to an adequately high level, then this technology is not suitable as a primary heat source.

The government's climate action plan has set a Building Energy Rating (BER) of B2 as the target for the energy performance of retrofitted homes. This target is in line with current building regulations - 'Part L conservation of fuel and energy'[8], which specifies that buildings undergoing 'Major Renovations'[9] must achieve a BER B2 or 'Cost Optimal' level of energy performance.

Method

As part of the Energy Master Plan 6 residential properties were selected within the community for energy assessments using the Building Energy Rating system.

The audits were carried out in XXXX 2022. In conjunction with the Building Energy Rating, an uplift report was produced for each property indicating the works which would provide an increase in the energy rating of the building up to at least A3. The individual building information has been redacted from the following case studies for the privacy of the homeowners. The following table illustrates the spread of buildings which were reviewed.

Table 8 – Residential Building Energy Rating and possible uplift.

Building No.	Building Size m2	Existing BER Rating	Measures No.	Possible BER Uplift
1	91	C2	6	A1
2	134	E1	9	A2
3	196	C3	9	A2
4	169	C3	9	A2
5	131	C1	8	A2
6	141	C1	1	A1

Below is an example of what the BER Audit reports will look like. The rest can be found in the supplementary Appendix section of the Energy Master Plan.

[7] Heat Loss Indicator (HLI) value is the total heat loss per m2 of dwelling floor area. A minimum HLI of 2 Watts/Kelvin/m2 must be achieved to be suitable for a heat pump however in some cases, where upgrades may not be cost- optimal, a value of HLI up to 2.3 Watts/Kelvin/m2 can be accepted provided additional requirements are met

[8] https://assets.gov.ie/180475/e532a9c5-3ec6-4a4c-8309-02f8a653e2d8.pdf

[9] Major renovations refer to upgrades where more than 25% of the building envelope. Painting, re-plastering, rendering, re-slating, re-tiling, cavity wall insulation and insulation of ceiling are not considered major renovation works.

Callan SEC Energy Master Plan

		Dwelling Type		**2 storey with 3 bedrooms - Detached Dwelling-**									
			M2										**C2**
		Total Building Area:	**91.29**										
		Element	BER Rating	Energy Value	Co2 Emissions	Energy Savings	Total Annual Space Heating	Space Heating in Kw/hour	Heat Loss Indicator	Space Heating costs per year	Carbon Emissions		
				(kWh/m2/yr)	KgCO2/m2/yr)		kWh/yr		(HLI) w/km2				
		Dwelling Current Condition	**C2**	**192.29**	**45.96**	-	**10,291**	**5.36**	**2.08**	€1,646.56	4,196		
		Element	BER Rating	Energy Value	Co2 Emissions	% Energy Saving	Total Annual Space Heating	Energy Requirement per hour for space Heating	Heat Loss Indicator	Space Heating Cost per year	Overall Carbon Emission KgCo2/Year	Kwh/m2/year Uplift	
				(kWh/m2/yr)	KgCO2/m2/yr)	%	kWh/yr	Kwh/Hour	(HLI)	€	KgCO2/year		
1	**Ventilation**	Instal mechanical extract ventilation system to dwelling :example https://www.vent-axia.com/range/centralised-mechanical-extract-ventilation-mev	C2	197.9	47.35	**2.92**	10,501	**5.47**	2.15	€1,680.16	4,323	-5.61	
2	**Windows and Doors**	Fit new energy efficient windows and doors thoughout to U Value 1.20 w/m2k or better	C2	175.91	41.91	**8.52**	8,676	**4.52**	1.92	€1,388.16	3,826	#REF!	
3	**Airtightness**	Improve Air permeability to approximately 7 m3/m2/hr by getting air test done and addressing all leakage areas and re test.	C1	168.44	40.07	**12.40**	8,056	**4.20**	1.77	€1,288.96	3,658	#REF!	
4	**New Boiler and controls**	Fit new oil fired condensing boiler (efficiency 95%) and time and temperature zone control (2 no space heating zones and separate hot water zone)	B2	109.42	26.45	**30.69**	5,059	**2.63**	1.77	€809.44	2,415	23.85	
5	**Air to water heat pumo**	*Install an Air to Water Heat Pump (Mitsubishi 6.0 Kw unit used in this assesment) with time and temperature zone control in place of existing Storage Radiators.	A3	71.87	14.13	**19.53**	1,595	**0.83**	1.77	€478.50	1,290	82.87	
6	**Photovoltaic**	Add 8 No. PV Panels to South facing roof 2.47Kwp (assuming 360 watts per panel)	A1	15.6	3.07	**48.79**	1,595	**2.63**	1.75	€462.55	280	120.42	
8												176.69	
											Carbon Dioxide Savings per year - Tonnes	**A1**	
												3.92	

Energy in Transport

Background

Transport in Ireland is currently deeply dependent on imported fossil fuels. Emissions from transport powered by fossil fuels were by far the largest source of energy-related CO_2 in 2020, as they were responsible for 40% of the total and it is the only sector where CO_2 emissions have grown since the end of the recession in 2012. Road transport specifically accounts for 96% of all greenhouse gases associated with transport, so a shift to more sustainable forms of transport is critical.

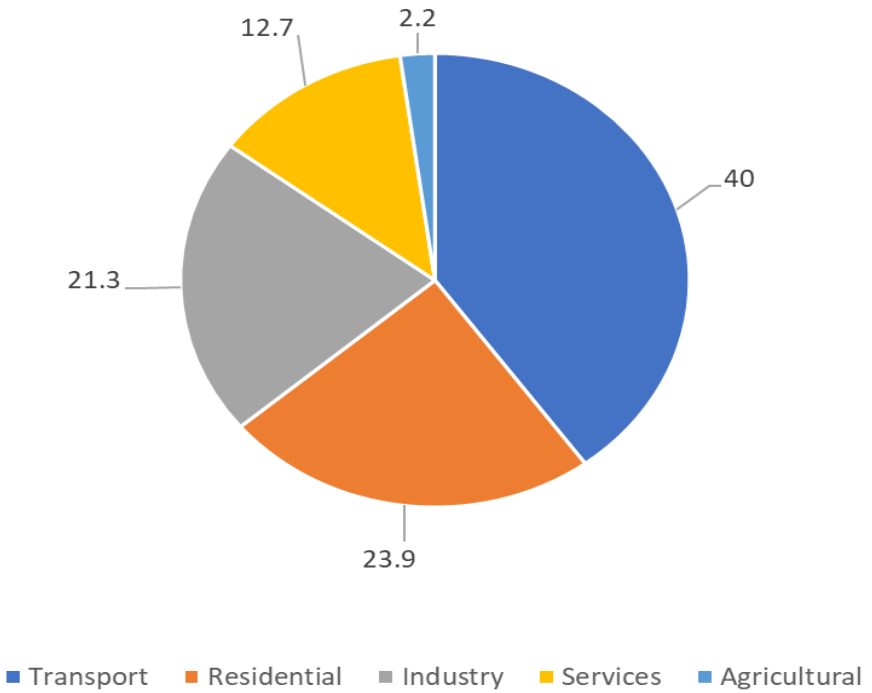


Figure 12 – Percentage share of Energy Related CO_2 by sector for 2020 in Ireland

The Climate Action Plan stipulates that there must be a 42-50% reduction in emissions from the transport sector by 2030 if Ireland is to meet its Climate targets.

In order to achieve these emission reductions, it's clear that a transition towards more sustainable forms of transport is required. To realise this transition, many forms of transport options must be maintained, planned, and provided for the region. This ranges from safe and accessible walking and cycle routes, appropriate public transport links serving the needs of residents, to the implementation of appropriate infrastructure to support the electrification of private car and fleet vehicles.

The standout targets for the Transport sector as part of the Climate Action Plan are to:

- Provide an additional 500,000 daily public and active transport journeys
- Electrify 845,000 passenger cars
- Electrify mass transportation with up to 1,500 Electric Buses

This will necessitate a change in the traditional 'road hierarchy' which has dominated Irish roads for years, starting with active travel and then public transport being encouraged over the private car and the final stage of electrification of the fleet.

Ireland's rapidly growing economy in recent years has brought with it urban sprawl and low-density development which has locked in unsustainable travel patterns and a reliance on private cars bringing entrenched behavioural patterns that won't be easy to overcome.

The impact of the COVID-19 pandemic, with the introduction of severe travel restrictions and greater remote working practices is estimated to have resulted in a reduction of approximately 16% of transport emissions (excluding aviation) in 2020 compared to 2019 levels. The pandemic has shown that large scale behaviour change is achievable and that new patterns of mobility and working can play a part in the transition to a more sustainable transport system.

Method

An analysis of the means of transport for workers and students as well as the transport fuel mix in the catchment area of Callan SEC has been carried out based on data from the Central Statistics Office (CSO).

SEAI's corresponding energy usage, prices and emission factors for various forms of transport as of 2020 were applied to calculate the total spend and CO_2 emissions for various sources of fuel for vehicles in the catchment area.

Results and Analysis

Commuting to work

Commuting to work by private car is the primary method of transport in the Callan SEC with 65.5% of workers either driving or being driven by car.

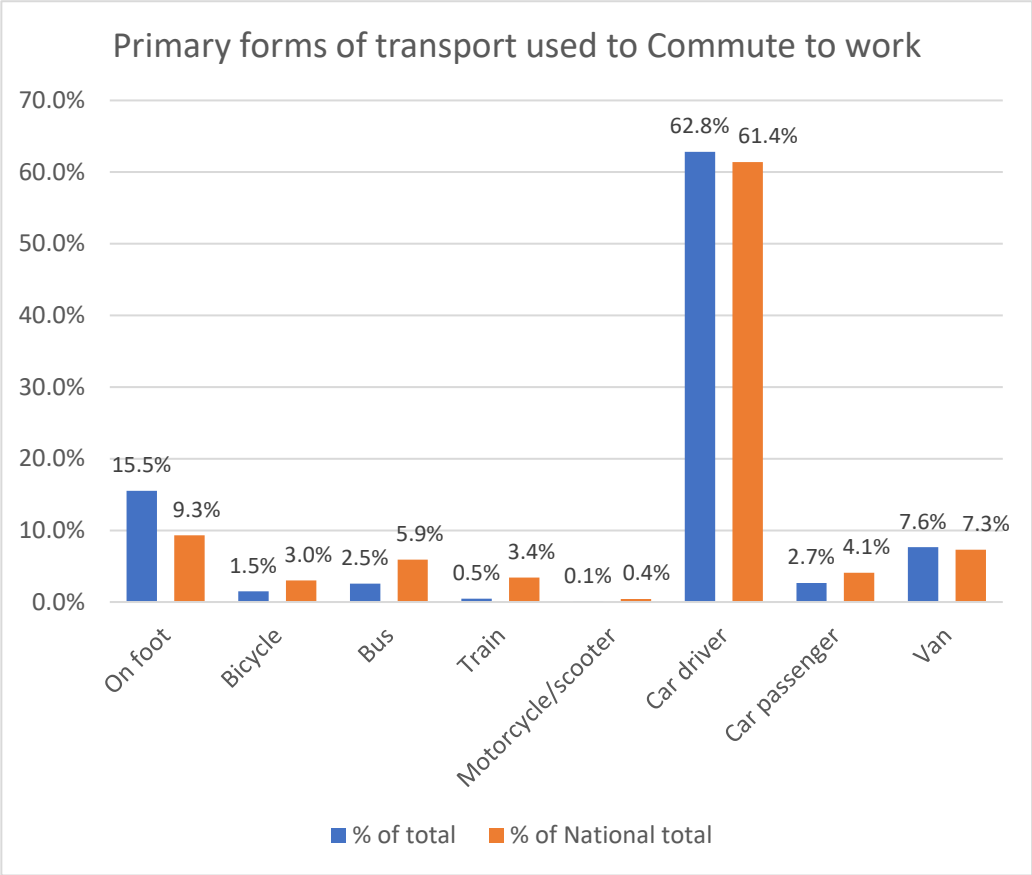


Figure 13 – Primary forms of transport used to commute to work

Callan lags behind national averages in public transport usage for commuting to work. To tackle these low levels and shift more commuters away from driving traditional fossil fueled cars, the Callan SEC could try to encourage commuters who travel within a 15km radius of the town to utilize bus services to the surrounding area. On a positive note, a sizeable number of residents travel by foot to work, with a notably higher percentage than the national average.

Reducing reliance on the private car is difficult, particularly in a low density, dispersed population such as Ireland's. Sustainable transport is among the greatest challenges for semi-urban regions, particularly in a town like Callan which currently does not have a railway station.

Services such as LocalLink operate successful services to isolated and vulnerable people within the community, as well as offering an alternative means of transport within the region. Ensuring consistent and reliable operation of such services can help in increasing the number of Callan residents who will use it. It is also important to circulate the operation of such services through as many means as possible social media, local newsagents etc.

For Callan residents commuting to Kilkenny City for work or leisure, JJ Kavanagh buses provide 10 buses to and from the town Monday to Sunday. Again, it is important that the availability of such services are promoted within the community, particularly given the relatively low percentage of commuters who are travelling over 30 minutes to their place of work (27%).

COVID-19 and commuting to work

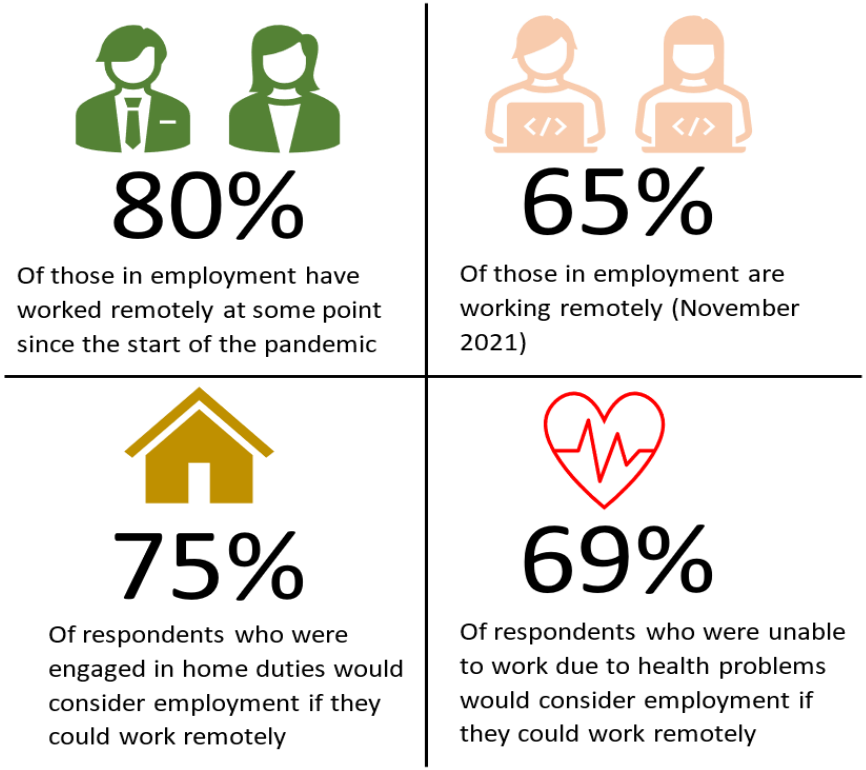
The impact of COVID-19 on the nature of transport in Callan cannot be understated and the profile will have changed significantly in the last two years, with a greater shift to home-based working and education, thus leading to a reduction in car usage.

The CSO have released information compiled during the COVID-19 pandemic. In April 2020 (as part of the Q2 Labour Force Survey) out of 47% of the population who had their employment impacted by COVID-19, just over a third (34%) started working from home. A more recent CSO study indicated that 80% of those in employment have worked remotely at some point since the start of the pandemic.

The recent enforced changes have created a national experiment in the concept of hybrid or remote working models which in many cases have been seen as being successful. Many office-based jobs can be based partly or on a full-time basis at home or within remote office hubs within the community. A reduction of 40% in work associated commutes could be achieved by working remotely 2 days a week, which would mean significant progress in reducing transport emissions by 42-50%.

Callan SEC could explore the potential for smart remote working hubs within existing community building infrastructure or as additions onto community buildings with childcare and after school facilities. It can also be used as an opportunity to give derelict buildings within the The Building Block [10] in Sligo town is an excellent example of this, which is a shared working space that prior to its development in 2017, had been unused for 10 years. Key elements which will be required to make this successful are comfortable buildings with high-speed broadband and shared canteen facilities. Further grant funding for community hubs was recently announced in the Town and Village Renewal Scheme, which the SEC could apply for to modernize or develop remote working spaces in the community.

[10] https://tinyurl.com/9d756vrx



Compared to days when they are in their workplace, when those aged 45-54 years' work remotely:

Figure 14 – Results from the CSO 'Our Lives Online: Remote Work' survey from November 2021

Commuting to school or college

The outcome is similar for students commuting to primary, secondary and college education. Naturally we would expect the car to dominate the uptake for primary school children, so this slightly skews the results. However, the community's low usage of public transport continues amongst the student population, with the Callan SEC's usage 39% lower than the national average.

This may be seen as a cause for concern but could also be viewed as a significant opportunity, as the community could try to address this by lobbying their local councilors and TDs if they can prove there is demand for increased bus services to and from schools.

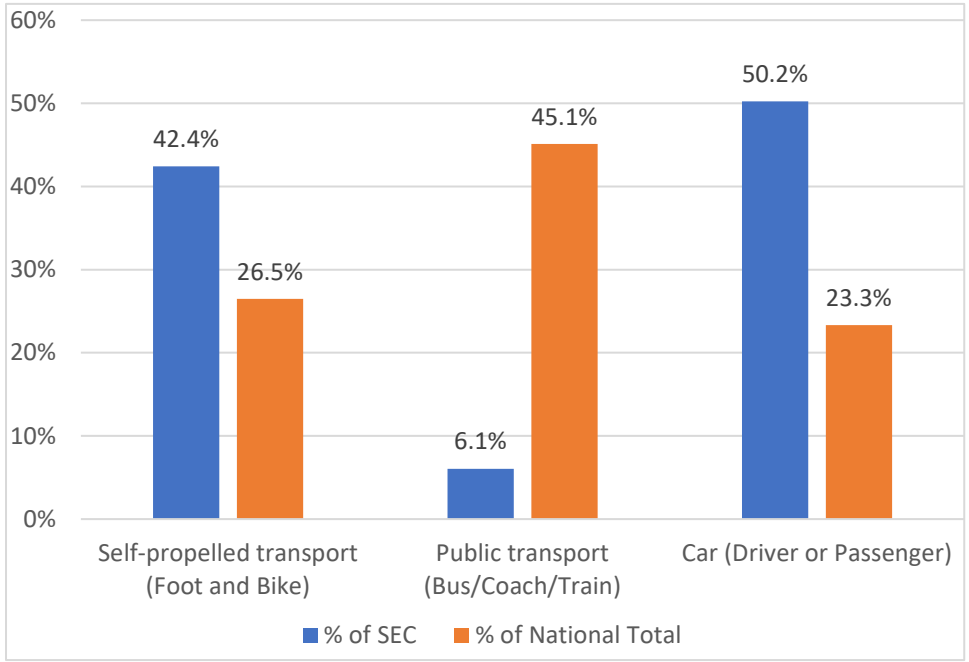


Figure 15 – Primary forms of transport for primary, secondary and college students

Similar to the statistics on those who work commuting to work, there is a notably high number of students who opt to walk to school or college. To increase this rate further the Callan SEC could look to seek funding or grants in order to improve the active travel infrastructure in their community so that walkways and cycle paths are safer for students.

For example, The Safe Routes to School (SRTS) Programme launched in March 2021 and was open to all schools in Ireland to apply for active travel funding and delivery. Over €15 million was provided in Round 1 of funding to accelerate the delivery of walking and cycling infrastructure on key access routes to schools and on school grounds.

Often times, one of parent's primary concerns about their children using active transport to go to school is their safety when going out alone. One way to combat this is through a 'Cycle Bus'. A Cycle Bus is where students cycle along a designated route to school with parents accompanying them.

It is a parent/guardian/community-led initiative whereby several parents and volunteers lead groups of cycling students to one or more schools. Cycle Buses have a specific route with stops along the way where students can join. Whilst this began as in cities, it has since spread to smaller towns such as Skibbereen, Strandhill and Cootehill.

Similar initiatives have popped up over the country, except rather than cycling, parents' guide children by foot in what is known as a 'Walking Bus'.

Energy consumption from transport

An analysis of transport related energy consumption was carried out for the Callan SEC catchment area. The analysis was based upon a statistical analysis of vehicle ownership in the catchment area along with the types of vehicles used and their associated carbon emissions.[11] As already referenced, the Census data shows that the majority of commutes within the Callan SEC catchment area is by car or van.

Table 9 – Means of commuting in the SEC

Commuting to work	No. of people	% of total
Private transport	1040	75.9%
Passenger	56	4.1%
Public transport	24	1.8%
Walking, cycling	54	3.9%
Work from home	125	9.1%
Other or not stated	72	5.3%
Total	**1371**	**100%**

[11] The renewable portion of the fuels has been taken as follows: renewable content of electricity consumed (40% in 2020), 5% of petrol consumption and 7% of diesel consumption (as per the Biofuels Obligation Scheme).

Based on the information for vehicle ownership within the Callan SEC, it is possible to calculate the energy consumption and carbon footprint for the transport sector. A national stock breakdown has been used to calculate energy consumption and emissions (56.9% diesel, 42.7% petrol, 0.4% Battery Electric Vehicle (BEV)) based on national average km travelled.

Table 10 – Private Vehicle Transport Energy and CO_2 impacts

		National average annual km	kWh/km (TPER)	gCO_2/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

Based on this information and values, a conservative estimate of energy used in transport is shown in Table 11 below.

Table 11 - Callan SEC Transport Energy, CO_2 and Spend

	Electricity	Fossil Fuels	Renewable	Total
Total Primary Energy (kWh)	10,695	7,134,044	497,156	7,641,895
Total CO2 (tonnes)	1.83	1,804	0	1,806
Total Spend (€)	€3,181	€1,418,603	€92,471	€1,514,255

Switch to electrical vehicles

An analysis of the impact of changing 20% of the existing private vehicle fleet to battery electric vehicles and decreasing work-associated commutes by 40% is detailed in Table 12. It indicates that if this transition where to occur, it would bring about a CO_2 reduction of 532 tonnes and a reduction in energy spend of approximately €357,533per annum.

Table 12 - Callan SEC Transport Energy, CO_2 and Spend with 20% Electric Vehicles and 40% reduction in work associated commutes

	Electricity	Fossil Fuel	Renewable	Total
Total Primary Energy (kWh)	534,751	4,683,287	358,959	5,576,997
Total CO_2 (tonnes)	91	1,183	0	1,274
Total Spend (€)	€159,035	€930,891	€66,766	€1,156,692

These are savings which can be recirculated around in the local economy, creating a more economically sustainable community. If the Callan SEC is struggling to avoid using cars or shift its residents to active or public transport, then a transition to electric vehicles shows that it can have a significant impact on reducing emissions, showing alignment with the Climate Action Plan's targets.

A significant increase in the availability of long-range electrical vehicles (EV) has made this mode of transport more suitable for environments outside of large urban centres. Electric vehicles will become the dominant mode of privately owner vehicles in the coming decade. The key benefit for the user is the reduced operational costs associated with fuel to power the car.

The following fuel costs for the EV are based upon home charging with night rate electricity in 2020 [12] :

Table 13 - Comparison of CO_2 impacts and fuel costs based on 250km per week

Vehicle	Weekly fuel cost	Weekly gCO_2
Electric e.g. Nissan LEAF	€2.54	13,800
Petrol equivalent	€21.60	27,200
Diesel equivalent	€15.74	21,800

The Callan SEC should consider a public EV awareness event to promote the suitability of electrical vehicles for suburban environments. This event should also discuss the supports available from SEAI for electric vehicles purchase, benefit in kind and home charging points. Whilst the one-off purchase cost can be more expensive than a fossil fuelled car, electric vehicles are significantly cheaper to run, with SEAI reporting running costs for a diesel car as €1000 more expensive annually than an electric vehicle [13]

Although it is a significant investment to purchase an EV, households with 2 vehicles should be encouraged to look at the possibility of having a smaller electric car alongside their first car for shorter journeys as a starting point on the route to electric vehicles. SEAI provides a series of supports to incentivise the transition from fossil fuel-based vehicles towards electrical vehicles, details of which can be found in the Appendices.

[12] https://www.esb.ie/our-business/ecars/ecars-cost-calculator

Whilst we anticipate the accelerated growth of a 'second-hand' market to grow in the next five years, given the lower economic status of a chunk of the Callan SEC's residents, for the meantime the Callan SEC should focus on implementing the 'Avoid-Shift-Improve' or ASI model for transport within the community.

Table 14 – Avoid–Shift–Improve Transport model

Pillar	Description	Example
Avoid	Avoid or reduce travel or the need to travel	Transitioning to increased remote working. Walking or cycling where possible.
Shift	Shift to more energy efficient modes	Using public transport such as bus services.
Improve	Improve efficiency through vehicle technology	Moving towards electric vehicles.

Car Sharing/Pooling

Car sharing within a suburban environment can be complex due to the distribution of homes, however many people are likely to be travelling to the same locations on a regular basis, such as on school runs. Car sharing or pooling can reduce the number of vehicle journeys and reduce the cost for both the driver and its occupancy by sharing costs. Although car sharing/pooling does require planning, it does have benefits that include reduced driving and car maintenance costs, suitability for longer distance commutes and daily school runs.

[13] https://www.seai.ie/technologies/electric-vehicles/compare-and-calculate/comparison-results/?vehicle1=8164927&vehicle2=7910676&vehicle3=4147520&vehicle4=4271646

Transitioning away from Cars

Car ownership

In order to meet the Transport reduction targets set by the Irish Government, the number of car journeys will need to decrease substantially. Naturally this means moving away from the traditional fossil fuelled car and towards alternative forms of transport that have a lower carbon intensity. Whilst EVs will undoubtably form part of the solution to reduce emissions from transport, other modes of transport could help alleviate any reliance on EVs.

There are 955 cars between the 1632 people who are legally of age to drive in the Callan SEC (17 and over). This means there are 585 cars per 1000 adults in Callan. This doesn't account for those individuals who do not have a driving license, so the number of people who are able to drive them is likely to be lower.

If we assume that all drivers in Callan operate diesel powered vehicles, then the annual average CO_2 emissions per driver in Callan is 2.99 tonnes. (Based off the County Kilkenny average annual km driven in 2019 [14]). Given the unpredictable and skewed transport data as a result of COVD-19 over the last two years, it is more beneficial for the SEC to use the conservative estimate of the 2019 data.

There were 799 homes in Callan as per the 2016 census, meaning there are 1.19 cars available for every home in Callan, with 37.7% of homes owning more than one car. The SEC could appeal to those home owners with more than one car to replace it with an e-bike.

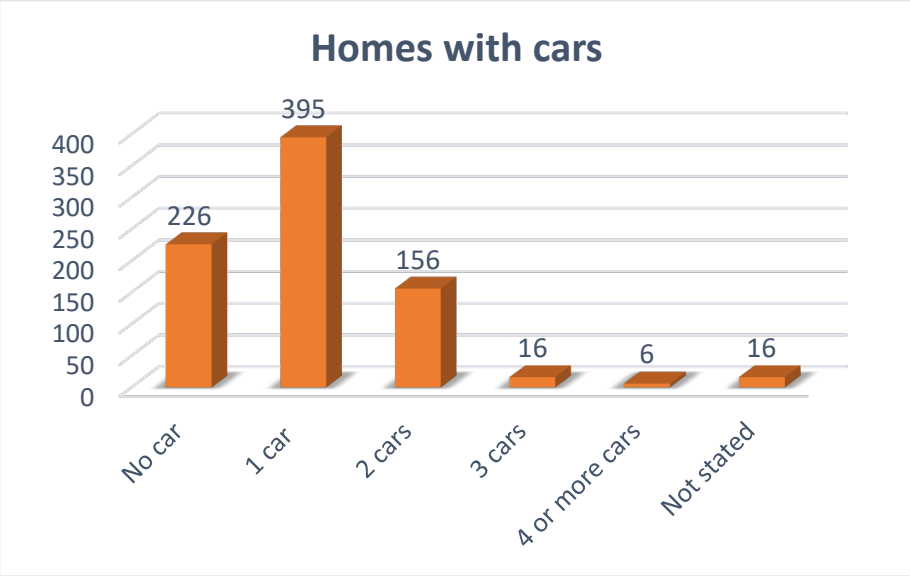


Figure 16 – Bar chart evidencing the number of cars each home in the SEC owns

Whilst estimates for how many grams of CO_2 e-bikes emit per kilometre driven vary widely due to differing methodologies, if a conservative estimate of 10g/CO_2/km was used, this would result in a reduction of 2.83 tonnes of CO_2 emissions annually per driver (based on earlier assumption of 2.98 tonnes of CO_2 per driver).

[14] https://www.cso.ie/en/releasesandpublications/ep/p-tranom/transportomnibus2019/roadtrafficvolumes/

If approximately a third of the 2 car households (87 homes) made this swap and we assume that all cars are diesel powered and every car owner was driving the Co Roscommon average, the SEC would save roughly 246 tonnes of CO_2. For context this equates to 14% of Callan SEC transport emissions. This may be seen as difficult transition to make, but if we look at the average commute times for work, school and college in Callan, the commute times lends itself to a reduction in cars given the significant amount of the SECs population which have a commute time under 15 minutes (36.6%).

Of course, it would be presumptuous to read too much into the commute times, particularly for those under 15 minutes as this is likely to be skewed by students attending school. A more detailed transport study which evidences where individuals are going on their commute, along with a breakdown of what mode of transport they use would provide a more reflective outlook of the transport profile in the SEC.

Table 15 – Commute time for residents in the Callan SEC to education or work

Commuting time	No. of people	% of total
Under 15 mins	514	54.3%
1/4 hour - under 1/2 hour	166	17.5%
1/2 hour - under 3/4 hour	105	11.1%
3/4 hour - under 1 hour	23	2.4%
1 hour - under 1 1/2 hours	46	4.9%
1 1/2 hours and over	23	2.4%
Not stated	69	7.3%
Total	**946**	**100.0%**

Commuting and car usage

It is extremely difficult to accurately calculate the mean car mileage for the Callan SEC. We can see what the average commuting time is for those attending education or going to work, but this doesn't indicate which mode of transport they used on their journey.

There are 955 cars in circulation within the Callan SEC. From that total 543 cars are used for commuting to work, with 21 students driving to school or college via car, meaning 564 cars are used to commute for education or work purposes.

This means that there are approximately 412 cars that are not regularly used for commuting purposes, which are more likely to drive a below average amount of distance annually. The SEC could target those individuals who are not commuting for work or education in an effort to encourage them to use alternative means of transport that are less CO_2 intensive.

E-Scooters

Similar to an e-bike, an e-scooter (Electric scooter) is a small platform with two or more wheels that is propelled by an electric motor. Whilst there are a plethora of start-ups seeking to launch e-scooter services in Ireland, e-scooter operators will have to wait until 2023 to get the green light as the Government formally introduces legislation governing their commercial usage next year.

However, users over 16 are still free to purchase their own e-scooters from retailers without the need for a licence. E-scooters have grown in popularity in recent years, particularly during the COVID-19 pandemic were users sought to find alternative means of transport in urban areas.

E-scooters have proven to be particularly popular with younger users, which is a positive for Callan, were almost 31% of the local population lies between the ages of 16-39 as per the last census results. Callan SEC should monitor progress on legislation regarding e-scooters, but in the meantime could begin building relationships with private vendors who have announced their intention to enter the market when legislation comes into force, particularly Irish start-ups to allow for a 'boots on the ground' presence for any proposed launch of a scheme.

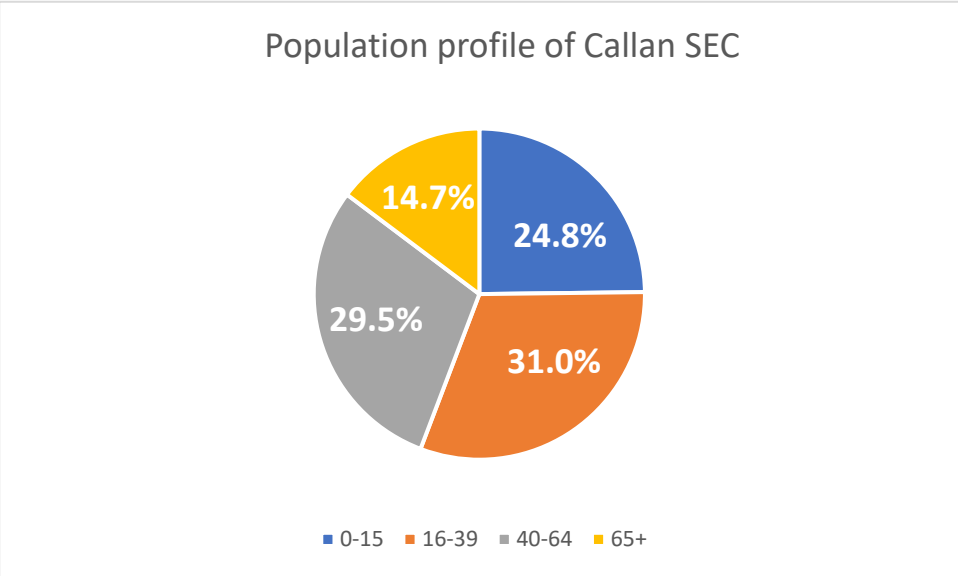


Figure 17 – Pie chart representing the population age breakdown in Callan

Promotion of public transport services

It is noted in feedback from local representatives that the bus network around Callan is disjointed and lacks direct routes to many of the most popular destinations in the surrounding area. To address this, the SEC and other community groups should lobby Kilkenny County Council and/or contact local bus service providers and prove that sufficient demand is there to add more direct and frequent routes.

Ultimately, whilst the census results were recorded in 2016 and the percentage of bus users could have risen, the SEC should try to investigate why the number of bus users is so low.

Whilst it will be difficult for Callan SEC to have any meaningful impact on the fuel choice used by the likes of Bus Eireann, they can campaign their Local Link services to begin the decarbonisation of the bus fleet. For example, Laois County Council along with TFI Local Link Laois Offaly has launched its first electric bus that will operate across both counties. Callan SEC could lobby Kilkenny County Council to replicate this initiative over the coming years and should be able to justify this given the population of Callan and surrounding towns.

Increasing the rate of cycling

It is noted that the amount of cycling within Callan makes up a tiny percentage of the journeys taken for education or work purposes, in contrast to the number of individuals who travel by foot.

Whilst it is encouraging for the SEC that they have a higher-than-average amount of residents who walk on their daily commute, to boost active travel numbers further, the lack of cycling within the community should be addressed.

It is understood that Callan is home to a Cycling club. Perhaps the group could use their influence to provide demonstrations within the local schools and education centres, so to teach younger members of the community about safe cycling and developing good habits at an early age that will continue into adulthood.

By encouraging more people - particularly younger people, to use bicycles, investing in bicycle infrastructure and getting people in the habit of seeing more bikes in their town, this will encourage intergenerational cycling that would have a lasting impact on the towns transport profile.

Given the increasingly higher diesel and petrol costs for fuelling motor vehicles, economically a bicycle has become a more attractive choice, given that after the initial purchase there are essentially no costs bar maintenance. Furthermore, the initial cost of purchasing a bicycle could be offset for individuals with the Bike to Work Scheme. This is a tax incentive scheme to encourage employees to cycle to work. Under the scheme an employer can pay for a new bicycle (including bicycle accessories) and the employee then repays the cost in regular instalments from their gross salary.

As an employee you save on the costs of cycling to work because your repayments come out of your salary before tax, USC and PRSI are deducted. This means that someone on the highest rate of tax will save almost half of the cost of a new bike and equipment. The scheme applies to bikes and equipment up to the value of €1,250 and for e-bikes and related safety equipment up to the value of €1,500.

Given the SECs size, there is a sizeable commercial element (29% of energy usage). The Callan SEC could encourage employers within the community, particularly larger ones who aren't currently offering this scheme to do so and promote the Bike to Work scheme to employees on a regular basis.

The Callan SEC should also take advantage of the recent push by the Government for transport related 'Pathfinder projects'. The Department of Transport have encouraged communities across the country to submit 'Pathfinder' transport projects to their respective County Councils that "demonstrate a pathway to achieving climate goals".

Councils around the country are being asked to put forward suggestions of 2-3 projects each to be funded. It is noted that the Callan Mobility Management Study 2020 – 2025[15] put forward a number of active transport initiatives, many of which would begin to address the sparce cycle network within the Callan SEC. The SEC could use some of these suggestions as inspiration and make a submission to Kilkenny County Council that focuses on active transport.

[15] https://consult.kilkenny.ie/en/system/files/materials/2919/Callan%20MMS%20Draft%201.pdf

Commercial/Business

Background

In order to achieve a 51% reduction in Carbon emissions by 2030 and a subsequent 'Climate neutral economy' by 2050, the business community will have to go through a period of transition in the same way as other sectors of the economy. Over the next decade businesses are encouraged to invest in a greener future, through sustainable products, services and business models.

Since this financial crisis, Ireland's economy has shifted from one influenced by the construction sector, to one which is more influenced by SMEs. There are an estimated 234,000 SMEs in Ireland, meaning there is significant potential to reduce emissions within this sub-sector.

Many of the avenues that the commercial/business sector can take to reduce their carbon footprint and move towards a more sustainable model show crossover with the opportunities in the residential sector. However, there are a significant number of commercial processes such as refrigeration within convenience stores, air compressors at warehouse facilities and lighting arrangements in the hospitality industry which use significant amounts of energy and require tailored strategies to reduce this.

Given the turnover that some SMEs are recording in Ireland it can be difficult to have oversight of all monetary outgoings from a business. Therefore, many business owners simply don't notice the amount of unnecessary energy they are using in the day-to-day running of their business.

For this reason, an important theme throughout all these reports is the importance of engaging employee's regarding good energy management and educating all building users on the simple ways in which everyone within the building can contribute towards saving energy. Simple measures, such as installing lights with motion sensors, or switching off any equipment not in use rather than leaving them on standby, have proven to be successful in saving energy.

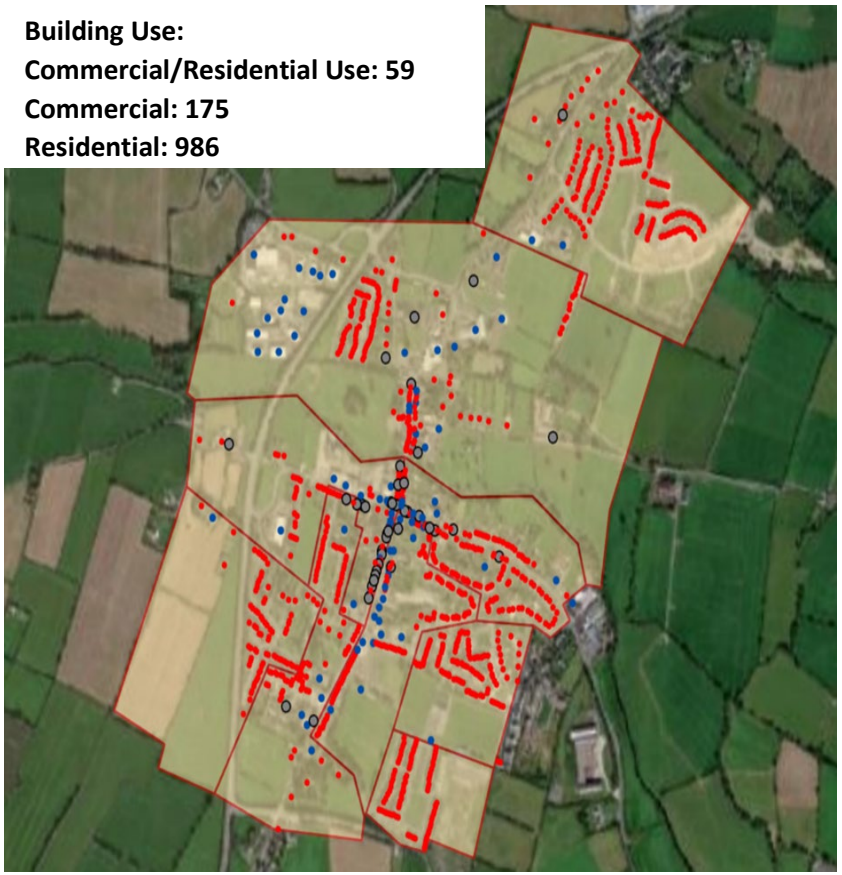


Figure 18 – The spread of commercial businesses in the Callan SEC

Method

An analysis of commercial/business energy consumption within the Callan SEC catchment area was carried out using various data sources including the CIBSE TM46 Energy Benchmarks, Valuations Office and Energy Consumption and SEAI's 'Extensive Survey of Commercial Building Stock in Ireland'.

In order to estimate the potential energy usage of all industrial and commercial premises within the catchment area, a method based on estimated floor area and business category was implemented. Energy benchmarks for various business categories were sourced from the "CIBSE TM46 Energy Benchmarks and Energy Consumption Guide" and were applied to the floor area data available.

As part of the energy master plan for Callan, three non-domestic premises were audited to Ashrae level 1 to identify any opportunities within these premises for energy efficiency upgrades. The recommendations within the reports are based on utility data, a site audit, and related engineering calculations.

The site audit consisted of a walk-through of the facility and review of the electrical and mechanical systems and equipment. It is recommended that the organizations implement the measures identified in their reports to contribute towards the energy consumption reduction goals as set out in the Climate Action Plan.

The premises which were audited are listed below and a detailed report was provided to each of the property owners, the results of which are located within the Appendices:

- Callan Supervalu
- L'Arche Community Centre
- Mount Carmel Support Care Home

Results and Analysis

Below is an overview of the estimated total energy usage, emissions and spend from the Commercial/Business sector within the Callan SEC. This helps the Callan SEC get an idea of just how much their commercial sector needs to reduce its energy usage by in order to keep in line with the Irish Government's targets in the Climate Action Plan.

Table 15 - Callan SEC Non-Domestic Energy, CO_2 and Spend

Electricity typical benchmark (MW·h)	Fossil-thermal typical benchmark (MW·h)	Illustrative electricity typical benchmark (tCO2)	Illustrative fossil-thermal typical benchmark (tCO2)	Illustrative total typical benchmark (tCO2)	Illustrative total Energy Spend (€)
3134	7868	1726	1495	3221	€1,750,481

Support for SMEs

Aside from the recommendations contained within the EMP and supplementary non-domestic audits, businesses can utilize the recently created ClimateToolKit [16] website launched by the government to help businesses get started in taking climate action.

This online tool allows SMEs to input some simple information and get an estimate of their carbon footprint and a personalised action plan to reduce it. Each tailored action plan includes straight-forward, practical instructions and highlights the relevant help that is available from Government, through agencies such as Enterprise Ireland, the Local Enterprise Offices and SEAI.

SEAI have also launched a free, online, learning platform called the 'SEAI Energy Academy' which is designed to help businesses increase their energy efficiency and reduce their energy related costs. It delivers short, interactive, animated modules on a wide array of topic areas including business and office energy efficiency.

Furthermore, SEAI are currently running an energy audit scheme that offers SMEs a €2,000 voucher towards the cost of a high-quality energy audit [17]. These energy audits are suitable for businesses with an annual energy spend of over €10,000. These energy audits delve deeper than those contained within the report, analysing the sites suitability for various renewable technologies, the most significant users of energy in their business and their overall carbon footprint.

A highly detailed audit like this gives business owners the confidence to take appropriate steps to improve both their energy efficiency and reduce their annual energy bills.The non-domestic audits identified several opportunities within the premises and Callan SEC which can be developed into energy efficiency projects and the standout projects are:

Callan Supervalu

- Energy monitoring device - Can provide information on where energy is being consumed within the building which in turn can lead to more targeted interventions
- Service Refrigeration equipment - To keep the refrigeration running efficiently it need to be serviced on a regular basis. Inefficient refrigerators which run for the duration of the shops opening hours can cost the business thousands

L'Arche Community Centre

- LED Lighting - All lighting across the site should be upgraded to energy efficient LED light fitting

Mount Carmel support care

- Heat Recovery Ventilation System - This can improve air quality and reduce the requirement for opening windows to ventilate rooms therefore reducing heating costs by anywhere between 7-15% annually.

[16] climatetoolkit4business.gov.ie

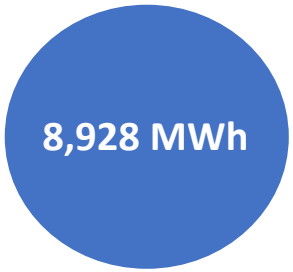
[17] https://www.seai.ie/business-and-public-sector/small-and-medium-business/supports/energy-audits/

Renewable Energy

Renewable energy comes from renewable resources like wind energy, solar energy, or biomass. The Irish Government has a target of producing 80% of the country's electricity from renewables by 2030.

Where a 20% reduction in electricity consumption could be achieved in the SEC by energy efficiency measures, there would remain a residual demand in the Callan SEC of 8,928 MWh. In order to offset this residual demand, a 10 MW solar farm would be required to service the Callan SEC.

Residual Energy Demand



A community led Renewable Electricity Support Scheme (RESS) project which has an upper limit of 5MW would be capable of providing a significant amount of the residual energy demand for the community.

A detailed set of calculations on the generator size and the arrangements to use the energy locally would need to be carried out under a more detailed scoping study. Initial calculations indicate that that a correctly sized solar photovoltaic farm installed with the capacity described above could generate sufficient electricity to meet this demand. A battery or other storage solution may also form part of such an initiative.

Residential Solar PV energy reductions

In order to evaluate the practical potential for Solar PV in the Callan SEC, we have estimated the total roof area that might be suitable for PV installations. Our analysis has assumed that 12m2 of the total roof space for every home in the Callan SEC will be suitable for Solar PV.

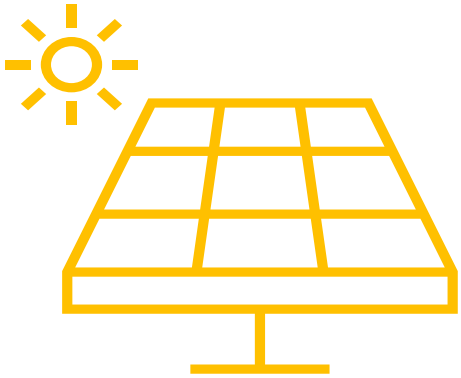
We have also assumed optimal roof orientation, with a 30-degree tilt on a South facing roof, with only mild overshading. We have been unable to include community and commercial buildings within our analysis due to absence of data on the roof area of the buildings.

At the time of writing the planning regulations state that residential Solar PV installations are permitted to be no more than 12m^2 or 50% of the total roof space.

It has recently been announced that this planning law to be scrapped to allow homeowners to install Solar PV systems that exceed the aforementioned sizes without planning permission. This would apply to 98% of homes in the country, with special zones around airports to be excluded. However, it is unknown as to when this will come into effect, so PlanEnergy have taken a conservative view and based calculations on the planning regulation that is currently in place.

Using these assumptions, if every home in the Callan SEC were to install a 2kWp Solar PV structure, thereby not requiring planning permission, theoretically the community would produce 1.25 MW of Solar Power, reducing its annual electricity consumption by roughly 10% (After 20% energy reduction through energy efficiency measures).

Of course, this total would be much higher if we worked under the incoming change Planning Permission for Solar PV or we were able to include the Commercial/Public buildings, but this gives the SEC a good overview of what they could potentially achieve.



1.25 MW of Residential Solar PV

PlanEnergy are aware that the Callan community is already involved in the creation of a community owned Solar farm within the area. For this reason, to avoid duplication of information that the SEC is already aware of, Community owned Solar PV installations will not be discussed in any great detail. Furthermore, Kilkenny County Council have ruled that wind development around Callan will not be permitted as it has been ruled as a zone not suitable for wind development in the County Development Plan.

Renewable Electricity Support Scheme

The Government of Ireland has put in place a scheme called the Renewable Electricity Support Scheme (RESS)[18] which aims to deliver increased community involvement in renewable energy projects. This scheme provides financial support for renewable electricity projects of over 0.5 MW in size in the Republic of Ireland.

RESS is an auction-based scheme, which invites renewable electricity projects to bid for capacity and receive a guaranteed price for the electricity they generate.

Support schemes like RESS, in place all over the world, are a way of ensuring that renewable energy technologies are incentivized to replace the use of fossil fuels in our economy. Communities are incentivized to invest in renewable technologies by Governments who contract to buy electricity at a guaranteed price for the long term, typically a period of about fifteen years.

In total, about 3,000 ‘gigawatt-hours’ will be put up for auction by the state. The most cost-efficient bidder will be the first picked, the second most cost-efficient will be the second picked and so on until all the gigawatt-hours are accounted for. In essence this means only the most efficient project offering a price at the lowest level will get picked

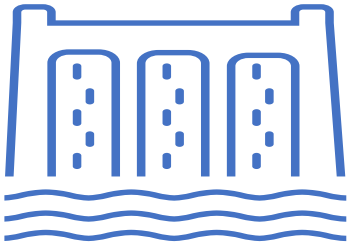
[18] https://www.dccae.gov.ie/en-ie/energy/topics/Renewable-Energy/electricity/renewable-electricity-supports/ress/Pages/default.aspx

Eligible technologies under the RESS scheme include:

Onshore wind turbines/solar thermal/solar PV technology

Onshore wind turbines/solar thermal/solar PV technology with battery storage

High-efficiency Combined Heat and Power (CHP) boilers fueled exclusively by waste/biomass/biogas



Hydroelectric

All projects looking for support under the RESS scheme will need to meet certain criteria before becoming successful. There are two aspects of community participation in RESS:

- Community Led Projects
- Community Benefit Funds

Community Led Project Criteria

The application must be made in conjunction with a Sustainable Energy Community (SEC). The SEC must be identified in the Declaration of a Community-Led Project, together with a description of the relationship between the Applicant and the Sustainable Energy Community. In addition:

- Project size must be between 0.5 and 5 Megawatts
- Fully (100%) owned by a Renewable Energy Community (REC)- primary purpose is community benefit (environmental, economic, or social) rather than financial profit
- Community group must be based on open and voluntary participation
- Participation based on local domicile (within close proximity to the RESS project)

Community Benefit Funds

A key feature of RESS is that all projects must establish a 'Community Benefit Fund' to be used for the wider economic, environmental, social and cultural well-being of the local community. The amount payable by RESS Projects into the Community Benefit Fund by the Government is mandated at €2 per Megawatt hour of electricity generated from a RESS Project. This means there are quantifiable funds made available annually for the benefit of the local community.

This will allow communities to further invest in local renewable energy, energy efficiency measures and climate action initiatives. For RESS-1 alone it is envisaged that almost €4m in annual payments, over a period of approximately 15 years, will be paid into the Community Benefit Funds in communities that host RESS-1 projects.

With several more RESS auctions planned in the coming decade the total funds involved are several hundred million euro in value over the lifetime of RESS.

Recently it was announced that Community-led projects seeking to apply to future RESS auctions, must be 100% owned by the community, as opposed to being majority owned as was the case for RESS-1. Therefore, Community-Led Projects must now meet the following requirements:

(a) at all relevant times be 100% owned by a Renewable Energy Community (the "Relevant REC") either by way of (i) a direct ownership of the RESS 2 Project's assets, or (ii) a direct ownership of the shares in the Generator; and

(b) at all relevant times, 100% of all profits, dividends and surpluses derived from the RESS 2 Project are returned to the Relevant REC.

Community collaboration

Opportunities for renewable energy generation within the Callan SEC catchment area are detailed in the Table below. However, project planning, grid infrastructure and community buy-in remain the major obstacles to a community led development.

Community consensus is the key to the successful development of a community owned project. If there is consensus within the community, an application can then be made to LEADER (or a similar funding body) to carry out a feasibility study for a renewable energy development in the areas within the community identified.

This feasibility study should look at grid capacity and constraints, planning constraints, environmental designations, and residential buffer zones around the proposed sites.

The first step in starting the process of developing a community owned project is to identify generation capacity within the existing electrical grid. Once suitable generation capacity has been identified at a suitable substation within the catchment area, the Callan SEC can start looking at suitable sites for wind or solar projects.

SEAI's 'Community Energy Resource Toolkit' [19] has created some very informative documents to help guide SECs who wish to complete a Renewable Energy project in their area from start to finish. The Toolkit provides a set of guidance modules across a number of different areas (including technology options, business planning, project development stages, setting up an organisation / governance strategy) to support development and delivery of a Renewable Energy project.

[19] https://www.seai.ie/community-energy/ress/enabling-framework/

Sustainable Energy Roadmap

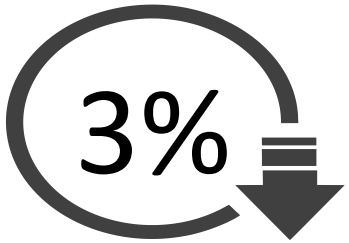
The Sustainability Energy Roadmap is one of the key outputs of the Energy Master Plan as it outlines to the community the scale of the challenge faced in moving the community from their baseline to achieving 2030 reduction targets. The following analysis provides a general path for the Callan SEC to reach its targets of 35% energy reduction and 30% renewable energy generation within the next ten years.

These targets have been broken down in each of the sectors detailed in the table below.

Table 16:- 3% Annual reduction in the Carbon Footprint for Callan SEC

tCO2	**10,393**
% Annual CO2 Reduction	3%
Year	**tCO2**
2022	10,082
2023	9,779
2024	9,486
2025	9,201
2026	8,925
2027	8,657
2028	8,398
2029	8,146

Table 17 - Callan SEC Plan to 2030	**Number of Projects**	**Primary Energy Savings (kWh)**	**CO_2 Savings (tonnes)**
Community owned Solar PV Project in MW	5MW Solar project	4,380,000	1,296
2kWp Residential Solar PV installations	100 homes	135,000	40
Electricity efficiency measures in domestic and non-domestic settings	20% decrease in electricity consumption	2,230,000	819
20% increase in Electrical Vehicle (EV) Ownership and 40% decrease in work commutes		2,064,898	532
Residential Housing Upgrades from F2 to B2	60	1,465,200	337
Residential Housing Upgrades from D2 to B2	100	1,254,000	305
Using larger commercial/industrial buildings rooftops for Solar PV generation	10 buildings	395,712	200
Total		**24,248,792**	**3,529**



Annual Reduction in the carbon footprint for Callan SEC

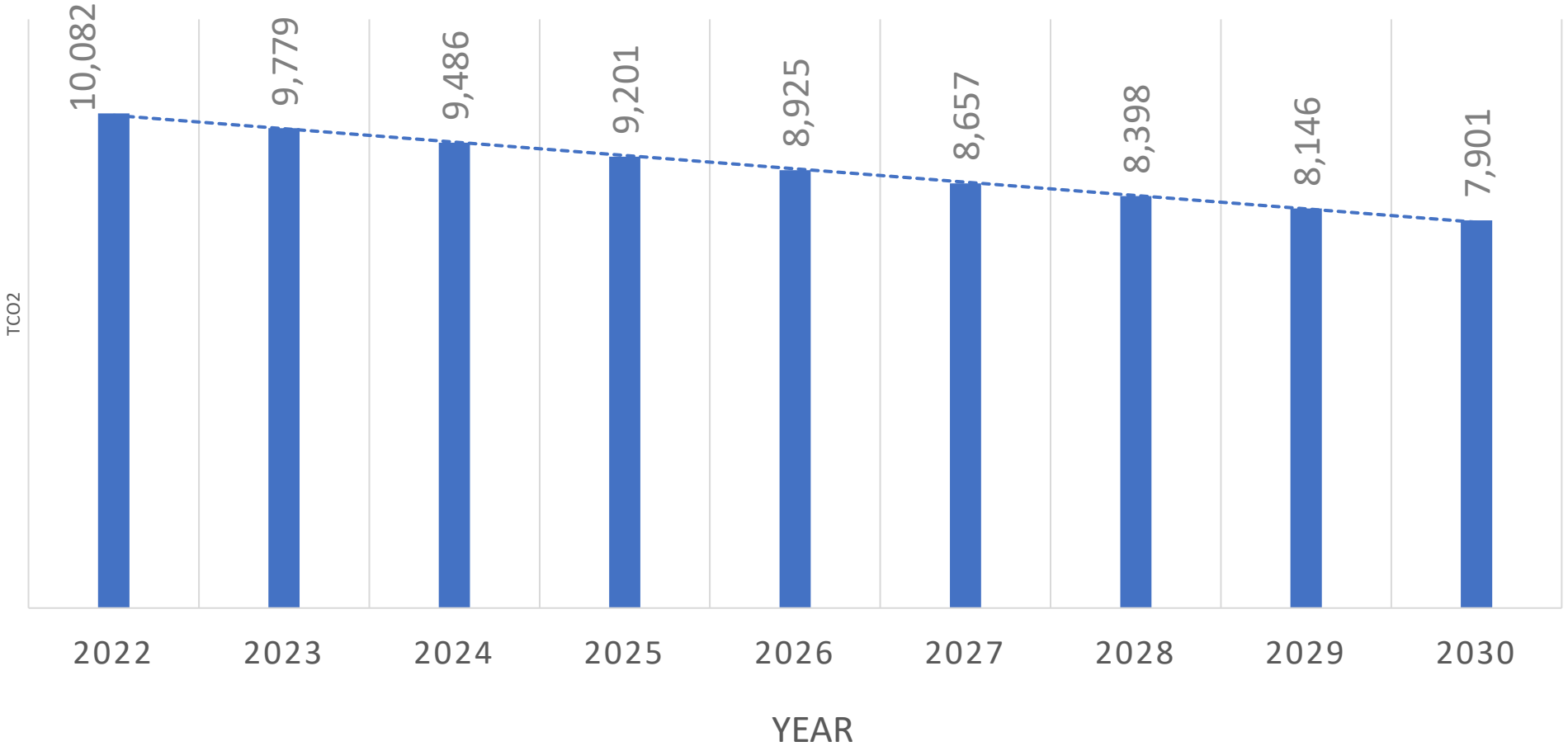


Figure 19 – The reduction in tonnes of CO_2 annually if the Callan SEC reduces its Carbon footprint

Register of Opportunities

The Register of Opportunities (RoO)[20] section developed for Callan SEC is divided into two separate documents. Firstly, as a ' RoO toolkit' which provides the SEC with a detailed list of projects that they can pursue in the immediate and medium term future. These projects are then divided into three categories - Behavior, Energy Efficiency and Renewable Energy projects.

The purpose of the toolkit is very much to act as a detailed project planning tool, providing a description of the actions a SEC needs to take from start to finish to successful pursue a Behavioral, Energy Efficiency or Renewable Energy project.

The RoO toolkit is a live document used to identify, evaluate, and plan your energy projects. The Sustainable Energy Community owns this document and is responsible for using, editing and improving the content in order to match its ambitions.

As part of the scope of works for the Energy Master Plan for Callan SEC, a number of non-domestic audits were carried out on commercial and public buildings selected within the community.

Supplementary to the RoO toolkit is a spreadsheet which focuses specifically on the opportunities which arose from those non-domestic audits. This RoO document goes slightly more in-depth, outlining suggestions from Plan Energy as to what we believe would be sound investments for the SEC to make and includes their potential cost, CO_2 and energy savings based on conservative estimates.

The key criteria when selecting projects where are suitable to progress are:

1) Return on investment or payback period
2) Complexity of the project
3) Are the project costs known?
4) Is supporting funding available?
5) What impact is the project going to have on the communities carbon footprint?

Standout projects from the non-domestic audits are listed below:

- 6kWp Solar PV System for L'Arche Community Centre
- Community Electrical Vehicle Charging point
- Feasibility study for a Renewable Energy Community Power project
- Community Electric Bike scheme

Note: *The costings provided are indicative only and quotations should be sought from suitably qualified contractors following an appropriate design and specification process.*

[20] *Each of the projects are detailed within the RoO spreadsheet, which is a live document attached as Appendix B.*

Action Plan for Callan SEC

Through the data collection undertaken in this EMP and discussions with Callan SEC, PlanEnergy recommend that the SEC proceed with their planned community engagement program over the next 3-5 years**.** This entails:

Creation of Callan Community Green Energy Information Centre
A Community Green Energy Information Centre is planned that would act as a hub of information on renewable energy technologies, energy conservation practices, and other sustainable energy solutions. It will provide information on the benefits of using green energy, how to access funding for green energy projects, and how to reduce energy consumption.

Further to this, the centre should provide education and training on green energy technologies, host workshops and seminars on sustainability, and offer guidance on how to make homes and businesses more energy efficient. This could include demonstrations of renewable energy solutions, such as solar panels, wind turbines, and geothermal systems, to help residents understand how these technologies work.

Finally, the information centre should be used as a hub that nurtures collaboration in the community. The centre could facilitate partnerships between local businesses, government agencies, and community organizations to promote green energy initiatives and coordinate efforts to reduce energy consumption in Callan.

Commissioning a Callan Community Energy Website
The Callan Community Energy Website could serve as an informational resource for community members who want to learn about topics associated with energy consumption, efficiency and renewable energy. It could provide articles, videos, and other resources to educate people about the importance of sustainable energy and how it can be used in their homes and businesses.

A Callan Community Energy website could facilitate communication and engagement among community members around renewable energy initiatives. It could provide a forum for discussing ideas, sharing best practices, and connecting with other community members who are interested in renewable energy.

Finally, it could act as a centralised database for contractors in the region who can carry out works on homes and businesses.

Commissioning a survey of Callan Community residential estates, businesses, and community buildings
The plans to build a database of green solutions that have been implemented in the community will help to identify existing green solutions and promote their use. This will better inform future plans by providing an opportunity to assess the community's current energy usage and identify areas for improvement.

The survey can help identify individuals and organizations that are already implementing green solutions in the community. These individuals and organizations can then be brought together to form a local network of green practitioners. This network can share knowledge and best practices and collaborate on new green initiatives.

School engagement program

An engagement program within primary and secondary schools will ensure that young people are educated about the importance of green energy and energy conservation. This will help to create a culture of energy efficiency in the community, as young people will be equipped with the knowledge necessary to make more sustainable choices and contribute to the community's future plans for reducing their energy consumption.

Best practices on lighting in public spaces, walking and cycling tracks

Producing a localised document, or set of documents on public lighting, that takes pollution into account will provide information on energy-efficient lighting solutions, such as LED lighting or motion sensor lighting, which can help reduce energy consumption in the community.

Furthermore, by providing guidance on lighting design that minimizes light pollution, the guide can help protect the night sky and wildlife habitats, improving the ecological balance of the area.

Finally, the guide can raise awareness among stakeholders, including local authorities, designers, and residents, about the importance of lighting design in public spaces, walking and cycling tracks, and promote engagement in creating a better environment for all.

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NO PLANET 2.0

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Appendix A: Grant Streams

Better Energy Communities

Better Energy Communities is the national retrofit initiative which provides capital grants for energy efficiency projects in Irish communities. The BEC programme with grant support of up to €28 million for 2021 aims to deliver energy savings to homeowners, communities, and private sector organisations. Projects must be community orientated with a focus on cross-sectoral approach.

Successful Community projects must demonstrate some or all of the following characteristics.

- Community benefits
- Multiple elements, not a single focus
- Mix of sustainable solutions
- Innovation and project ambition
- Justified energy savings
- An ability to deliver the project

The following list outlines the types of measures that SEAI want to support through the Communities grant program

- Building Fabric Upgrades
- Technology and System upgrades
- Integration of renewable energy sources
- Domestic Combined Fabric Upgrade
- Single Building Demonstration projects will be considered under the Communities Grant

BEC 2022 Funding Levels

The level of funding and processes associated with Better Energy Communities Grants has been changing over the past number of years and is constantly evolving. It is recommended that prospective fund applicants check for the latest processes and funding levels at the time of enquiry. The latest information available at the time of publication of this document can be accessed at: https://www.seai.ie/grants/community-grants/project-criteria-and-funding/Communities-Grant-Guidelines-2022.pdf.

As a rough guide in the past residential funding has generally ranged from up to 35% in private and rented homes, with up to 80% in fuel poor homes.

SEAI's Home Energy Grants

https://www.seai.ie/grants/home-energy-grants/

SEAI primarily has three grants and supports schemes for individual homeowners who wish to make energy upgrades to their home:

- Free Energy Upgrade
- Individual Energy Upgrade Grants
- One Stop Shop Service

Free Energy Upgrade

This SEAI grant provides free energy-efficient home upgrades for homeowners that receive certain welfare payments. Homeowners will receive a free assessment from an SEAI surveyor who will recommend the most suitable upgrades for the property.

Eligible Free Energy Upgrade home improvements		
Attic insulation	Cavity wall insulation	External wall insulation
Internal wall insulation	Replacement windows	Heating Systems upgrade
Heating controls	Ventilation	Compact fluorescent lamps (CFLs)
Draught proofing	Lagging jacket	

To qualify for any of these SEAI grants under the Free Energy Upgrade Scheme, homeowners need to meet all of the following criteria:

- The home must be your main residence and you must be the homeowner
- The home was constructed before 1993. It must have also been lived in prior to this date
- The home has an energy rating of C, D, E, F, or G.
- You receive one of the following government payments:
  - Fuel Allowance scheme
  - Working Family Payment
  - One-Parent Family Payment
  - Domiciliary Care Allowance
  - Carers Allowance. You must be living with the person you are caring for
  - Disability Allowance for more than six months. You must also have a child less than seven years old
  - Job Seekers Allowance for more than six months. You must also have a child less than seven years old

The Free Energy Upgrade grant will cover all expenses for a Home Survey, Contractor Selection, Contractor Works and a BER certificate. It is important to note that it will be the Surveyor who decides the improvements to make, the homeowner cannot choose which specific upgrades they would like.

Individual Energy Upgrade Grants

This grant allows the homeowner to choose which home improvements to bring, choose the registered contractor, and complete the work yourself. Despite being more in charge of this grant, you still need to wait for the approval of the grant before starting the project.

	Individual Energy Upgrade Grants			
Measure	**Detached**	**Semi D/End of Terrace**	**Mid Terrace**	**Apartment**
Ceiling insulation	€1,500	€1,300	€1,200	€800
Cavity Wall Insulation	€1,700	€1,200	€800	€400
External Wall Insulation	€8,000	€6,000	€3,500	€3,000
Internal Insulation	€4,500	€3,500	€2,000	€1,500
Air to Air Heat pump system	€3,500			
Air to water Heat pump system	€6,000			€4,500
Ground source to water Heat pump system	€6,000			€4,500
Heat Pump Technical Assessment	€200			
Heating Controls (Homes built pre-2011)	€700			
Solar Water heating	€1,200			
Solar PV (Homes built pre-2021)	€1,800 for 2kWp system, additional €300 per kWp up to €2,400			

To qualify for any of the SEAI individual energy upgrade grants, you need to meet all four of the following criteria:

- The home must be your main residence and you must be the homeowner
- For any of the insulation and heating controls grants, your home must have been constructed and lived in before 2011
- For any of the heat pumps and renewable energy systems grants, your home must have been constructed and lived in before 2021
- Your home must not have received the same home improvement government grant in the past

One Stop Shop Service

Under this programme, homeowners will be able to receive a complete home energy upgrade. These will be managed by registered contractors who will manage the entire process for you. From the initial assessment, placing the SEAI grant application for you, conducting the work, and providing the final BER.

	One Stop Shop Service grants			
Measure	**Detached**	**Semi D/End of Terrace**	**Mid Terrace**	**Apartment**
Home Energy Assessment	€ 350			
Air Tightness	€ 1,000			
Mechanical Ventilation	€ 1,500			
Solar Hot Water	€ 1,200			
Bonus for reaching B2 with a Heat Pump	€ 2,000			
Heating Controls	€ 700			
Air to Air Heat Pump system	€ 3,500			
Floor insulation	€ 3,500			
External doors (max of 2)	€800 per door			
Heat Pump Systems	€6,500			€4,500
Central Heating System for Heat Pump	€2,000			€1,000

	One Stop Shop Service grants			
Measure	**Detached**	**Semi D/End of Terrace**	**Mid Terrace**	**Apartment**
Ceiling insulation	€1,500	€1,300	€1,200	€800
Cavity Wall Insulation	€1,700	€1,200	€800	€700
External Wall Insulation	€8,000	€6,000	€3,500	€3000
Internal Insulation	€4,500	€3,500	€2,000	€1,500
Rafter Insulation	€3,000	€3,000	€2,000	€1,500
Windows (Complete Upgrade)	€4,000	€3,000	€1,800	€1,500
Project Management	€2,000	€1,600	€1,200	€800
Solar PV - 0 to 2kWp	€900/kWp			
Solar PV - 2 to 4kWp	€300/kWp			

Your home or property needs to meet all of the following criteria to qualify for the One Stop Shop Service grant:

- The home must be your main residence and you must be the homeowner
- Your home must have been constructed and lived in before 2011 for insulation and heating controls grants
- Your home must have been constructed and lived in before 2021 for heat pumps and renewable energy systems grants
- Your property must have a B3 or lower energy efficiency rating and a minimum of a B2 upon completion of the upgrades
- Your property must not have received government grants in the past for the same home improvement

Electric Vehicles

Privately bought EVs

A maximum grant of €5,000 is available for qualifying new electric vehicles when purchased privately. Approved EVs with a List Price of less than €14,000 will not receive a grant. As of the 1st of July 2021, there is a cap of €60,000 on the full price of all vehicles. The full price of the vehicle to the customer includes all optional extras, paint, and delivery for excludes any incentives such as grants or rebates.

List Price of Approved EV	Grant available
€14,000 to €15,000	€2,000
€15,000 to €16,000	€2,500
€16,000 to €17,000	€3,000
€17,000 to €18,000	€3,500
€18,000 to €19,000	€4,000
€19,000 to €20,000	€4,500
Greater than €20,000	€5,000

Commercially bought EVs

SEAI provides grant supports towards the purchase of new N1 category electric vehicles for business and public entities. N1 category vehicles are typically small goods carrying vans with a technically permissible maximum mass not exceeding 3500kg.

A maximum grant of €3,800 is available for qualifying N1 category EVs when purchased commercially. Approved EVs with a list price of less than €14,000 will not receive a grant. It should be noted that these grants apply to new vehicles only and cannot be claimed on secondhand vehicles.

The grant level depends on the list price of the vehicle. This is the full non-discounted price in the absence of VRT relief or grant support.

Vehicle Registration Tax

Electrical vehicles receive VRT relief separately to SEAI grant support as well as reduced motor tax.

Home Unit Charger

SEAI provide a grant up to the value of €600 towards the purchase and installation of a home charger unit.

Benefit in Kind

For commercial electric cars, Revenue provides an exemption for Benefit in Kind.[21]

[21] https://www.seai.ie/sustainable-solutions/electric-vehicles/