Gormanston ENERGY MASTER PLAN

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Supported by

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

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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 throughout this report and an explanation of their meaning. An additional excellent resource for understanding all terminology around energy and the environment is https://climatejargonbuster.ie/wp-content/uploads/2021/02/ClimateJargonBuster_A-Z_a.pdf

Biomass - Biomass is plant-based material used as fuel to produce heat or electricity. Examples are wood and wood chips, energy crops, agricultural residues, and waste from industry, farms and households.

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 fossil fuels and deforestation have led to an increase in CO_2 in the air which 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) - These are gases in the earth's atmosphere that trap heat. During the day, the sun shines through the atmosphere, warming the earth's surface. At night, the earth's surface cools, releasing heat back into the air. But some of the heat is trapped by the greenhouse gases in the atmosphere. 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 light bulb 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 the 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 decentralised 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 21,000 kWh 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, 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 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 Gormanston SEC is the target of increasing the amount of electricity generated by renewable sources to 80%. SECs 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 Gormanston 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 Gormanston 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 Gormanston Sustainable Energy Community.

The Master Plan aims to help communities understand their energy usage and carbon footprint so that they can see their current energy profile, 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 exemplary model in the transition to a low-carbon community.

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

Using modelling tools and methodologies developed in-house by PlanEnergy, 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, Non-Residential, Transport) energy consumption, energy cost and contribution to CO_2 emissions in the Gormanston 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 identifies 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.

By reviewing the natural resources available to the community, high-level analysis has been 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 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 concludes 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 of energy efficiency. This process begins through the interactive community survey issued, meetings with the SEC committee, the energy audits, and finally 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 1 Small Area Plan [1] which is defined by the Central Statistics Office (CSO) and is shown below in Figure 1.

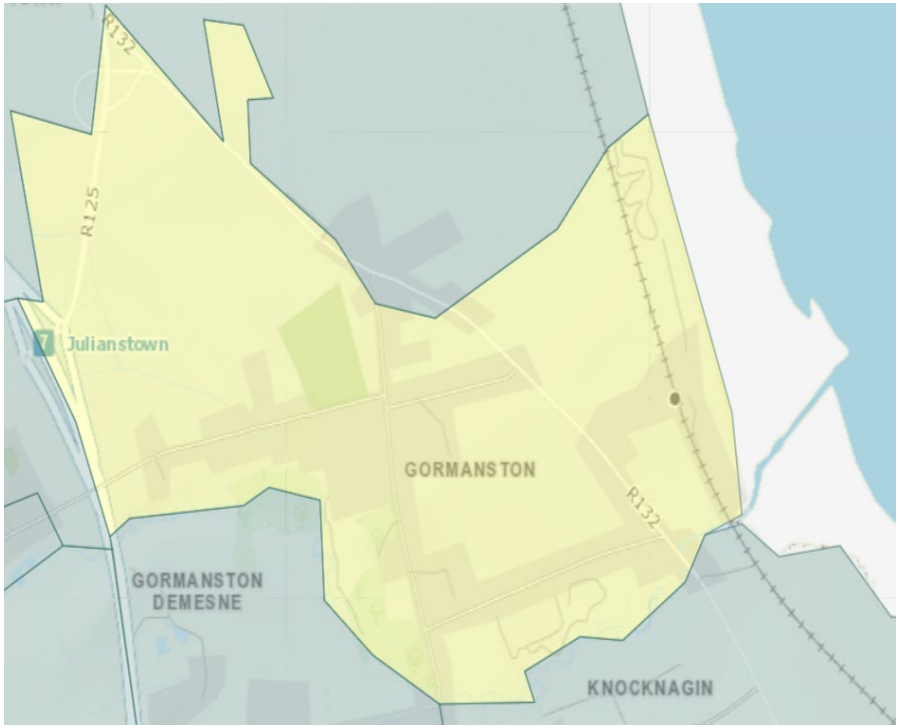


Figure 1 - The image depicts the area covered by Gormanston SEC. This was generated using the Small Areas as defined by the Central Statistics Office (CSO SAPMAP 2016).

[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

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 summarised in Table 2 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 prioritise areas for action by the Gormanston SEC.

Table 2 – Sectoral percentage energy consumption

Gormanston SEC Primary Energy Baseline (kWh) & CO_2 Emissions (tCO_2)				
	Electricity	**Fossil Fuel**	**Renewable**	**Total** (MW)
Residential	1,113,551	1,618,991	30,547	2,763
Non-residential	955,965	2,827,220		3,783
Transport	1,379	893,639	62,127	957
Total Energy	2,070,895	5,339,850	92,674	7,503

	Residential	**Non-residential**	**Transport**	**Total**
Total CO_2 emissions	731	941	226	1,898

Our analysis of the energy consumption within the catchment area has identified that 37% of the energy demand relates to the residential sector, 50% to the non-residential sector and approximately 13% relates to the Transport sector.

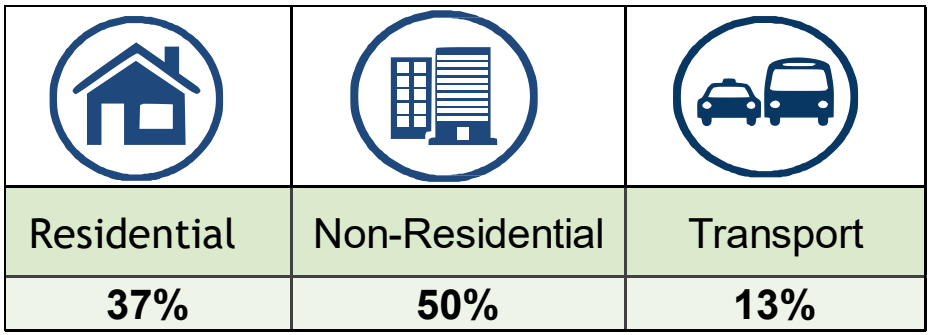


Figure 2 – Sectoral percentage energy consumption

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 by 51% by 2030, it is vital this sector is given close attention.

Whilst energy usage from the residential sector has increased by almost 19% from 2014 to 2020, emissions only subsequently increased by 1%. These figures can be explained by higher household incomes and expenditures which led to higher energy usage but have been balanced out by improvements in energy efficiency as a result of updated building regulations and decreases in both electricity carbon intensity and home coal consumption.

The momentum within the country has been to ensure that as many homes as possible get their insulation upgraded 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 homes, 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 Gormanston SEC based on housing age, occupancy, ownership and type.

Furthermore, the fuels used to heat homes within the Gormanston SEC are analysed for their emissions in tonnes of CO_2 equivalent. 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 and oil respectively produce approximately 0.34 kg and 0.27kg of CO_2 for every kilowatt hour of energy delivered, compared to just over 0.2 kg 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 community's BER ratings per Small Area Plan is provided, which helps identify those sectors of the community which require the most investment in terms of improving their BER. Given that a BER is a reflection of a home's energy efficiency, a lower BER (e.g. G) indicates that homeowners may need to use more fuel to heat their homes to an acceptable level, which would militate against the 2030 targets set by the Government.

Given the continued rise in energy costs, a strong BER to some extent 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 Gormanston SEC has been carried out based on data from the CSO Census 2016, Eircode data provided by ESRI, SEAI's BER database and SEAI Domestic Fuel Cost Comparison.

The residential housing stock is based on the 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 the baseline year of 2022. Statistics for residential heating are based on national averages against primary heating type. This allows for further analysis against future census data.

The SEAI Building Energy Rating (BER) database and the 5 domestic BERs carried out by PlanEnergy were used to calculate the median BER of all dwellings in the Small Area Plan that Gormanston occupies.

SEAI's Domestic Fuel Cost Comparison prices (2022) and Emission Conversion factors (2021) 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 85.6% of the housing is owner-occupied. With a 57.7% 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 upgrades and have the incentive to upgrade. However, given the higher age profile in Gormanston, there may be less motivation to undertake retrofits.

Equally, for rental properties, it is in landlords' best interests to upgrade the homes they own with retrofit measures. This is in line with the predicted regulations that the Government will implement in 2025 that will force landlords to ensure their rental property meets at the very least an E/D BER. 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 3 – Occupancy status of the housing stock in Gormanston SEC (CSO, 2016; ESRI, 2022)

Occupancy type	No. of homes	% of homes
Owned with mortgage or loan	31	27.9%
Owned outright	64	57.7%
Rented from private landlord	4	3.6%
Rented from Local Authority	0	0.0%
Rented from voluntary/co-operative housing body	0	0.0%
Occupied free of rent	8	7.2%
Not stated	4	3.6%
Total	**111**	**100%**

Housing Age

Figure 3 illustrates the age spread of the residential housing stock in the catchment area. The number of properties constructed in particular time periods is displayed. The years when various improved building regulations were introduced are indicated. This is quite informative as it illustrates the type of interventions which may be suitable for the housing stock.

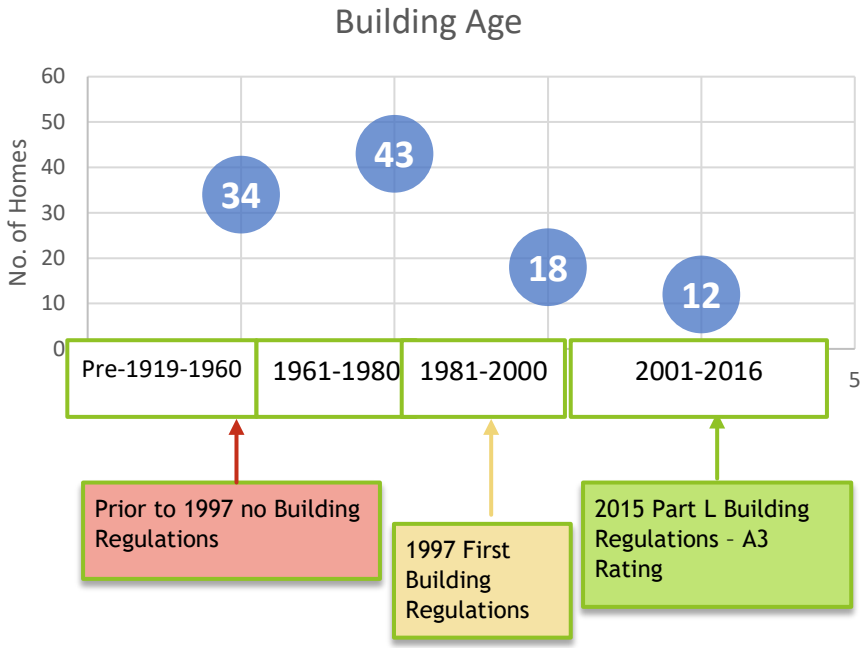


Figure 3 - Relationship between Dwelling Age and Irish Building Regulations (CSO, 2016)

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. Almost 10.8% of Gormanston's housing stock would be considered modern having been constructed after the year 2000, which indicates opportunities exist for promoting more modern insulation measures.

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

With 80% of dwellings having been constructed before 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 older age bands present many 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.

[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.

Table 4 – Age profile of the Gormanston SEC housing stock (CSO, 2016)

Period	No. of homes	% of homes
Pre 1919	18	16.2%
1919 - 1945	8	7.2%
1946 - 1960	8	7.2%
1961 - 1970	17	15.3%
1971 - 1980	26	23.4%
1981 - 1990	12	10.8%
1991 - 2000	6	5.4%
2001 - 2010	11	9.9%
2011 or later	1	0.9%
Not stated	4	3.6%
Total	**111**	**100%**

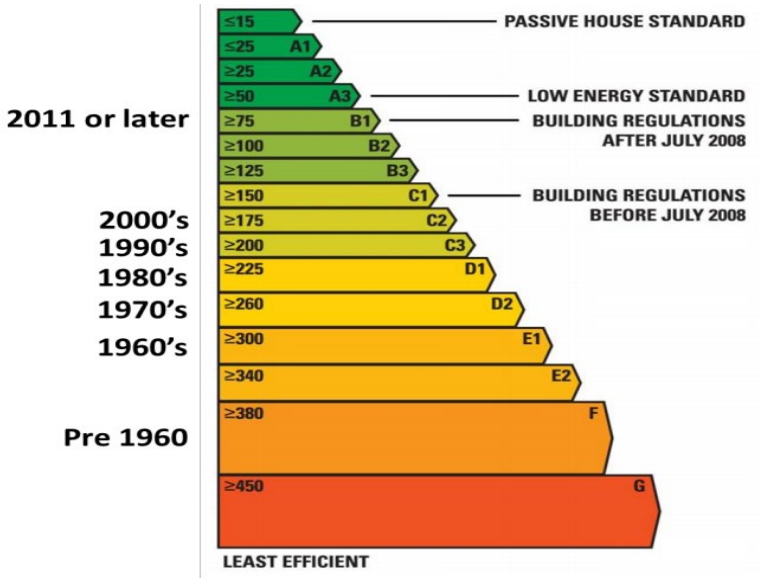


Figure 4 - Typical BER for house age type before upgrade works

Housing Fuel Mix

The residential fuel mix as illustrated in Table 5 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 Gormanston SEC are 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 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 CO_2 producing fuel sources.

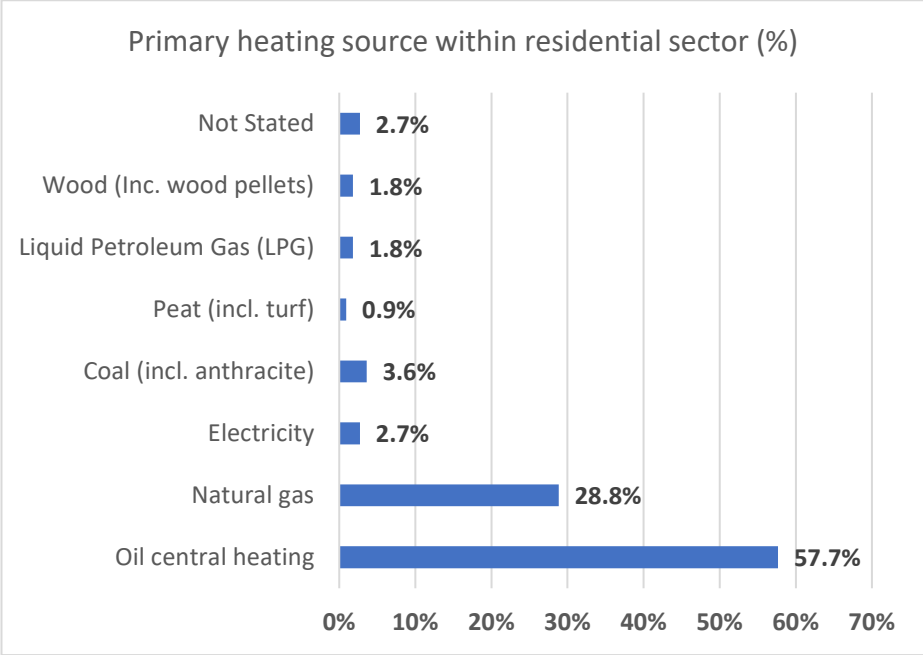


Figure 5 – Most common primary heating source in the SEC (CSO, 2016)

Within Gormanston SEC, the main fuel types are currently oil and natural gas which make up 86.5% of the total thermal energy consumed. Combined, these two fuel types make up 86% of the CO_2 emissions from the Residential sector. Oil is the primary source of heating at 57.7% which is typical for a large proportion of houses built pre-2011. This demonstrates the huge potential for the community to significantly reduce its carbon footprint.

Table 5 - Residential Fuel Mix[4] (CSO, 2016)

Heating Type	Number of units	Fuel	% of Total Thermal Energy	Emissions tCO_2e
Oil central heating	64	Oil	57.7%	234.5
Natural gas	32	Natural Gas	28.8%	89.8
Electricity	3	Electricity	2.7%	12.3
Coal (incl. anthracite)	4	Coal	3.6%	18.9
Peat (incl. turf)	1	Peat	0.9%	4.9
Liquid Petroleum Gas (LPG)	2	LPG	1.8%	6.4
Wood (Inc. wood pellets)	2	Wood Pellets	1.8%	0.0
Not Stated	3	Other	2.7%	10.7
Totals	**111**			**378**

[4] Residential fuel mix is based on the primary heating source of the property and does not take into consideration secondary fuel sources as this information is not available within the CSO data.

Housing BER Coverage

An analysis of the Building Energy Rating (BER) of the current residential housing stock within the Gormanston SEC was carried out. By analysing the BER data files for all the small areas in the Gormanston SEC region, the following information was observed:

Of the 111 homes registered within the catchment of the Gormanston SEC region, 14% of these homes have BER certificates. The number of dwellings in Gormanston with a BER of B or greater is higher than the national average (12% vs 11%), but statistically no conclusions can be drawn from this due to the small population of BER certificates. The SEC as a whole has an average BER equal to that of the national average.

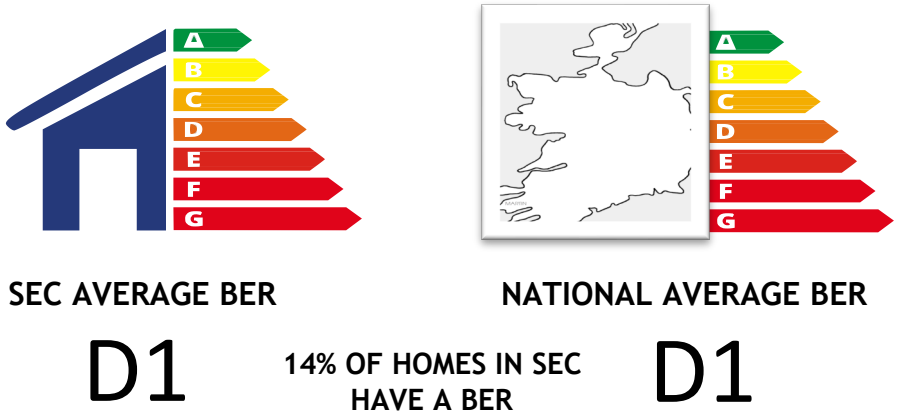


Figure 6 - Building Energy Rating information on catchment (SEAI, 2022)

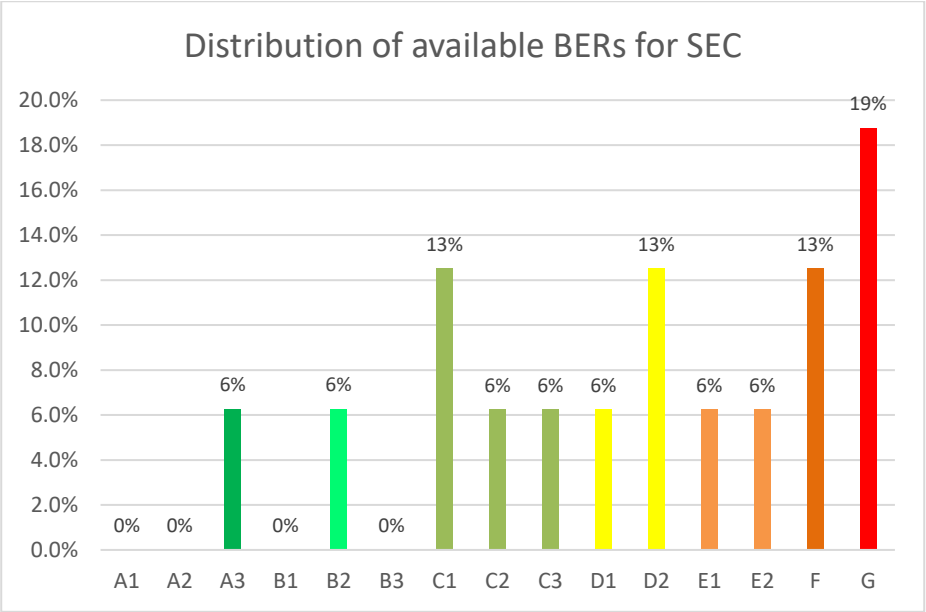


Figure 7 – Distribution of available BERs for Gormanston SEC (SEAI, 2022)

The chart above indicates that 88% of the housing stock in the Gormanston SEC lies below the Irish Government's target BER B2. However, of that total, approximately 44% lies within a boundary of C1 – D2 which shows that a majority of the housing stock can be brought up to this rating without extensive retrofitting measures.

Residential Energy Baseline

To calculate the residential sector's energy baseline, national residential data was obtained from the 2016 Census Data using the Small Area Population Statistics (SAPS), which lists the housing stock present in a specific area by house type and year of construction.

Table 6 - Residential Energy, CO_2 and Spend (CSO, 2016; SEAI, 2022)

	Electricity	Fossil Fuel	Renewable	Total
Total Primary Energy (kWh)	1,113,551	1,618,991	30,547	2,763,089
Total CO_2 (tonnes)	329	402	0	731
Total Spend (€)	€152,901	€199,396	€2,638	€354,935

For homeowners who wish to upgrade their BERs, the Sustainable Energy Authority of Ireland (SEAI) provides financial incentives 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' 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 Gormanston 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 was provided for this scheme in 2022. 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 support under the scheme, but who could still benefit from even deeper measures.

Given expected rising energy costs in the coming years, it is vital that homeowners in lower income groups utilise these grant streams to protect themselves against falling into, or further into fuel poverty.

****Please see the Appendix Section for a Summary of these grants****

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, 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' [5]. 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'[6], which specifies that buildings undergoing 'Major Renovations'[7] must achieve a BER B2 or 'Cost Optimal' level of energy performance.

Method

As part of the Energy Master Plan, 5 residential properties were selected within the community for energy assessments using the Building Energy Rating system.

The audits were carried out in September 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 7 – Residential Building Energy Rating and possible uplift.

Building No.	Building Size m2	Existing BER Rating	Measures No.	Possible BER Uplift
1	166	D2	8	A2
2	92	D1	8	A2
3	77	G	8	A2
4	96	G	11	A2
5	108	D2	10	A2

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

[5] 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

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

[7] 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.

		Dwelling Type		**Storey with lower ground floor with 4 Bedrooms and 2 Living rooms- Detached Dwelling**								
			M2									**D1**
		Total Building Area:	**228.99**									
		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	**D1**	**237.31**	**59.31**	**-**	**39,094**	**20.36**	**2.79**	€4,691.28	13,581	
		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/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	D1	239.54	59.88	- **0.94**	36,565	**19.04**	2.82	€4,387.80	13,712	
2	**Roof Insulation**	Add 200mm quilt insulation to existing 100mm quilt insulation laid perpendicular to existing U Value 0.13 w/m2k	D1	226.25	56.45	**4.66**	36,797	**19.17**	2.65	€4,415.64	12,926	
3	**External Walls**	Full fill bonded bead added to existing partially filled cavity walls with Kore silver bead or equal. U Value 0.37 w/m2k Semi exopsed walls in lower ground floor fitted with 100mm PIR u Value 0.27 w/m2k	C3	205.33	51.06	**8.82**	32,442	**16.90**	2.39	€3,893.04	11,692	
4	**Windows and Doors**	Fit new energyefficient windows and doors thoughout to U Value 1.20 w/m2k or better - Windows and doors to conservatory to stay in place.	C2	186.73	46.27	**7.84**	28,571	**14.88**	2.09	€3,428.52	10,595	
5	**Chimneys**	Block up 2 chimneys in dwelling and remove open fires.	C2	180.12	43.21	**10.62**	27,195	**14.16**	2.06	€3,263.40	9,895	
6	**Airtightness**	Improve Air permeability to approximately 7 m3/m2/hr by getting air test done and addressing all leakage areas and re test.	C1	175.16	41.97	**2.09**	26,162	**13.63**	2.00	€3,139.44	9,611	
7	**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)	B1	99.44	23.84	**31.91**	14,723	**7.67**	2.00	€1,766.76	5,459	
8	**Air Source Heat Pump**	*Install an Air to Water Heat Pump (MitsubishI 10.0 Kw unit used in this assesment) with time and temperature zone control in place of existing Storage Radiators.	A3	51.11	10.05	**52.27**	3,556	**1.85**	2.00	€782.32	2,301	
9	**Photovoltaic**	Add 8 No. PV Panels to South facing roof 2.47Kwp (assuming 360 watts per panel)	A2	28.67	5.64	**9.46**	3,556	**1.85**	2.00	€782.32	1,292	
	* The Heat pump used in this Assessment is a Mitsubishi 10.0 Kw - The Heap Pump installed MUST be specified by the Installer and/or Manufacturer.											**A2**
											Carbon Dioxide Savings per year - Tonnes	12.29

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% and have continued to grow over the last decade. Road transport specifically accounts for 96% of all greenhouse gas emissions associated with transport, so a shift to more sustainable forms of transport is critical.

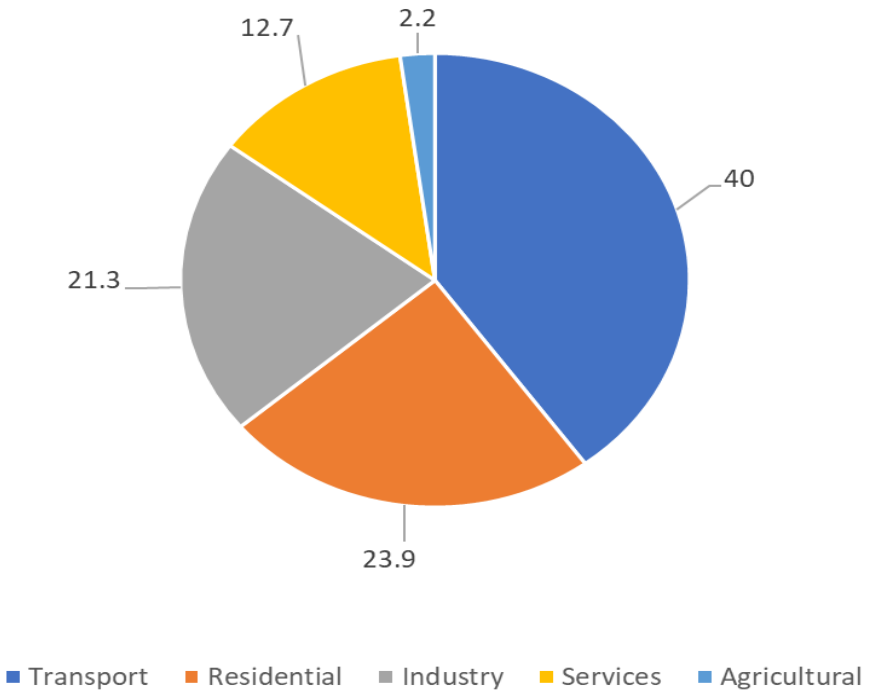


Figure 8 – Percentage share of Energy-Related CO_2 by sector for 2020 in Ireland (SEAI, 2020)

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.

To achieve these emission reductions, it is 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 cars 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’. The road hierarchy is the segmentation and subsequent prioritisation of specific modes of transport on our roads. Over the last century the road hierarchy has seen cars dominate – private cars, taxis, carpooling, followed by public transport and finishing with active transport modes (walking, cycling).

For Ireland and Gormanston to meet their Climate goals this will require the traditional road hierarchy to be reversed, with our roads giving priority to active transport, public transport, electrified cars, shared forms of transport and finally the traditional private car.

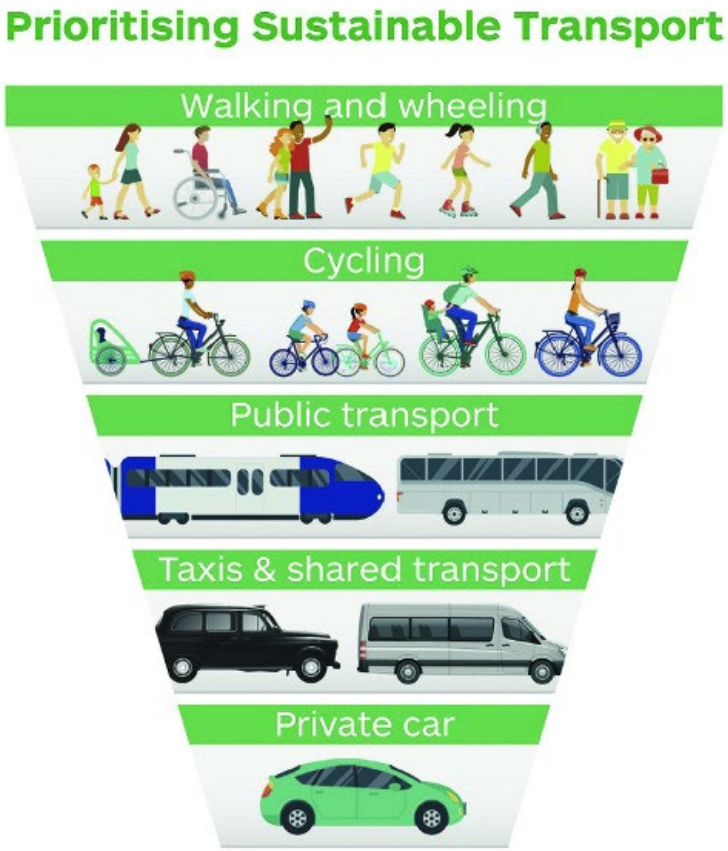


Figure 9 – A Sustainable Transport Road hierarchy

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 with it entrenched behavioural patterns that will not 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 Gormanston SEC has been carried out based on the data from the 2016 Census.

Data from SEAI's Domestic and Industrial Fuel Cost Comparison prices (2022) and Emission Conversion factors (2021) for various forms of transport 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 Gormanston SEC with 63.5% of workers either driving or being driven by car.

Gormanston lags behind national averages in active transport for commuting to work. This can perhaps be attributed to its geographical location within the Dublin commuter belt and also a lack of heavy industry in the SEC. This is reaffirmed by the train usage statistics, which seem to suggest that residents are taking advantage of Gormanston Railway station for their commute to Dublin. However, the number of commuters taking the bus is strikingly low.

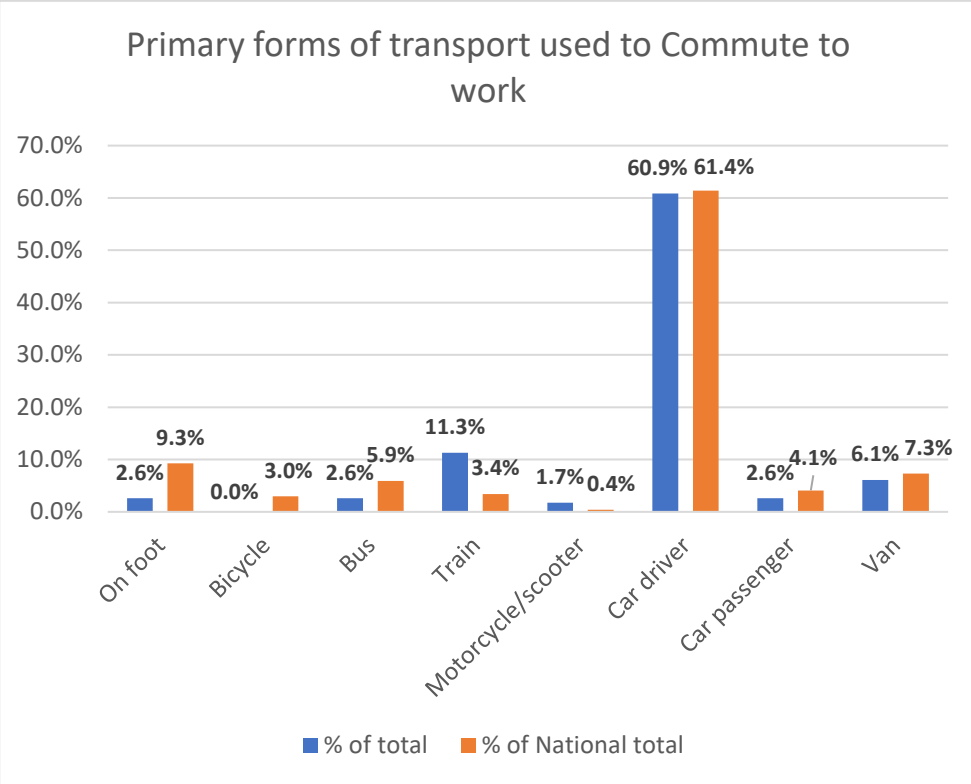


Figure 10 – Primary forms of transport used to commute to work (CSO, 2016)

Sustainable transport is among the greatest challenges for semi-urban regions. To tackle these low levels of bus usage and shift more commuters away from driving traditional fossil-fuelled cars, the Gormanston SEC could highlight the 20% price decrease in selected public transport services that was announced earlier this year. Indeed, for commuters heading towards Dublin, over 40 buses are running each day to the capital that stop off in Gormanston, so there is no lack of flexibility with this service. It is important that the availability of such services is promoted within the community. It is noted that train usage is higher than the national average.

Reducing car journeys through remote working

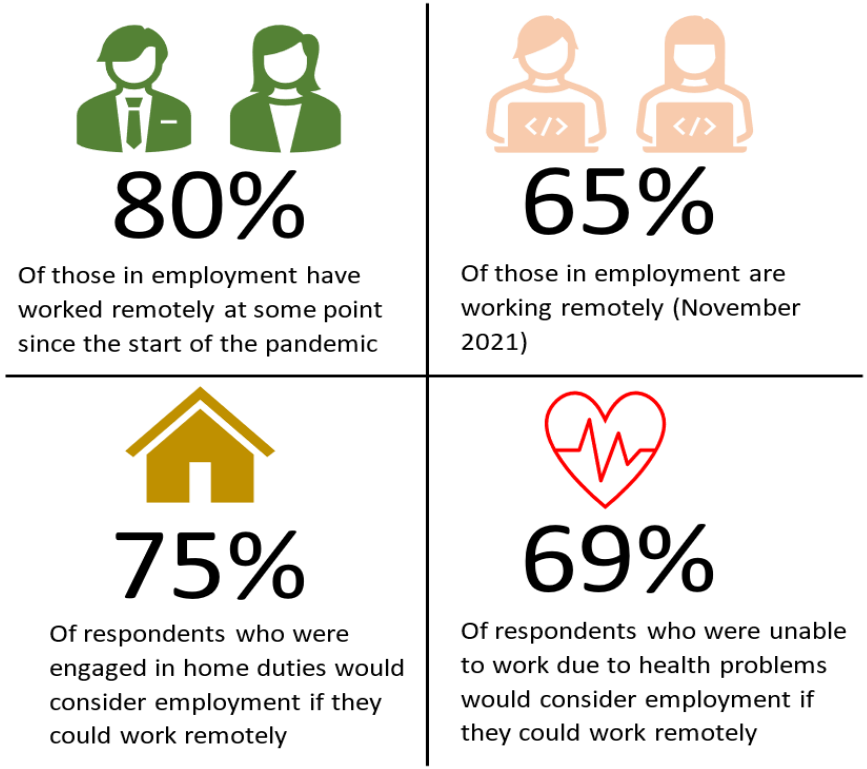
The impact of COVID-19 on the nature of transport in Gormanston cannot be understated and the profile has changed significantly in the last two years, with a greater shift to home-based working and education, thus leading to a reduction in car usage.

The 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 the 42-50% target set by the Government in the Climate Action Plan.

Gormanston SEC could explore the potential for smart remote working hubs within existing community building infrastructure or as additions to community buildings with childcare and after-school facilities. It can also be used as an opportunity to give any derelict buildings within the community a new lease of life. The Building Block [8] in Sligo town is an excellent example of this, which is a shared working space that before 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. The Community Centres Investment Fund is now open for grant applications which could be used to fund remote working facilities in the SEC.

This is a new fund of €15 million which will lead to the improvement and refurbishment of existing community centres in both urban and rural areas. The SEC should also make its residents aware of the voucher scheme for hot desking in hub facilities recently announced by the Government. This would be a great opportunity for remote workers who have not tried hot desking to sample it.



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

Figure 11 – Results from the CSO 'Our Lives Online: Remote Work' survey from November 2021

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

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 Gormanston SEC's usage 18.9% 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 councillors and TDs if they can prove there is demand for increased bus services to and from schools.

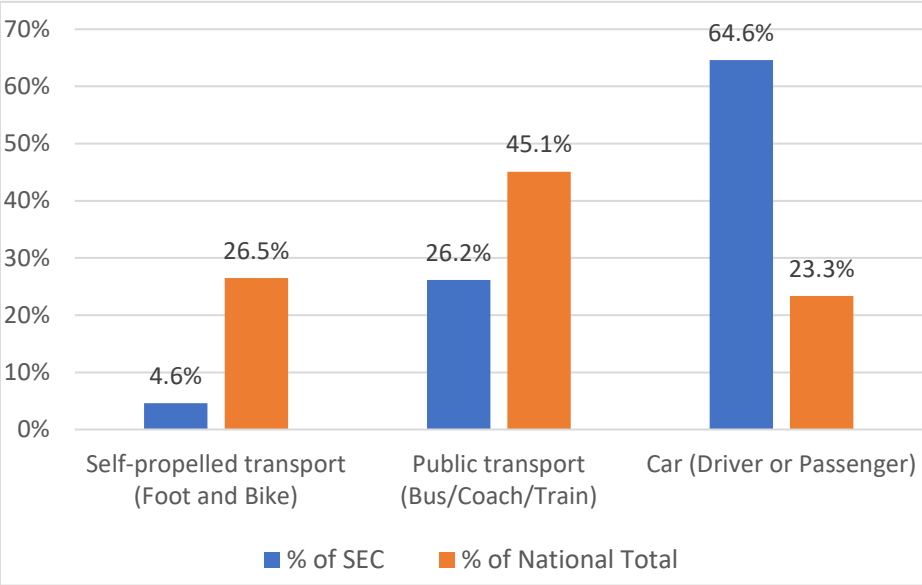


Figure 12 – Primary forms of transport for primary, secondary and college students (CSO, 2016)

Gormanston has a strikingly low level of students who either walk or cycle to school, sitting well below the national average. To increase this rate, the Gormanston SEC could look to seek funding or grants 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 school grounds.

Energy consumption from transport

An analysis of transport-related energy consumption was carried out for the Gormanston SEC catchment area. The analysis was based on statistical data of vehicle ownership in the catchment area along with the types of vehicles used and their associated carbon emissions.[9] As already referenced, the Census data shows that the majority of commutes within the Gormanston SEC catchment area are by car or van.

[9] 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).

Table 8 – Means of commuting in the SEC (CSO, 2016)

Commuting to work	No. of people	% of total
Private transport	79	68.7%
Passenger	3	2.6%
Public transport	16	13.9%
Walking, cycling	3	2.6%
Work from home	8	7.0%
Other or not stated	6	5.2%
Total	**115**	**100%**

Based on the information for vehicle ownership within the Gormanston 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 the national average of kilometres travelled.

Table 9 – Private Vehicle Transport Energy and CO_2 impacts (SEAI, 2020)

		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 10 below.

Table 10 - Gormanston SEC Transport Energy, CO_2 and Spend (CSO, 2016; SEAI, 2022)

	Electricity	Fossil Fuels	Renewable	Total
Total Primary Energy (kWh)	1,379	893,639	62,127	957,145
Total CO2 (tonnes)	0.24	225	0	226
Total Spend (€)	€261	€180,527	€11,742	€192,530

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 commutes through remote working by 40% is detailed in Table 11.

It indicates that if this transition was to occur, it would bring about a CO_2 reduction of 106 tonnes and a reduction in energy spend of approximately €84,062 per annum. Given the relatively small area profile of Gormanston this is a moderate saving, but if this was extrapolated over a number of years it would have a sizeable impact.

If the Gormanston 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.

Table 11 - Gormanston SEC Transport Energy, CO_2 and Spend with 20% Electric Vehicles and 40% decrease in work commutes (CSO, 2016; SEAI, 2022)

	Electricity	Fossil Fuel	Renewable	Total
Total Primary Energy (kWh)	68,937	429,214	34,446	532,617
Total CO_2 (tonnes)	11	109	0	120
Total Spend (€)	€14,327	€86,715	€6,514	€107,556

A significant increase in the availability of long-range electrical vehicles (EVs) has made this mode of transport more suitable for environments outside of large urban centres. Electric vehicles will become the dominant mode of privately owned 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 on home charging with night-rate electricity in 2022 [10] :

Table 12 - Comparison of CO2 impacts and fuel costs based on 250km per week (SEAI, 2022; Bonkers.com, 2022)

Vehicle	Weekly fuel cost	Weekly gCO_2
Electric e.g. Nissan LEAF	€9.84	13,800
Petrol equivalent	€33.40	41,750
Diesel equivalent	€35.51	28,000

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

The Gormanston 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 [11]

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.

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

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

Table 13 – 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 and train 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 school runs. Car sharing or pooling can reduce the number of vehicle journeys and reduce the cost for both the driver and its occupants 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.

Non-residential

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.

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 non-residential 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.

The recent Government announcement aimed at accelerating the decarbonisation of Irish businesses will see a new €55 million programme to help businesses plan for a more sustainable future and accelerate their decarbonisation journeys. The programme, which will run over the next five years will primarily comprise of the following:

- The Climate Planning Fund for Business, will give businesses a €1,800 grant to devise a personalised plan to identify how best to eliminate their reliance on fossil fuels and up to €50,000 matched funding to go towards specific capacity building

- The Enterprise Emissions Reduction Investment Fund will offer up to €1 million for manufacturing businesses to invest in carbon neutral heating processes, smart metering and energy monitoring, and research and development.

Method

An analysis of non-residential energy consumption within the Gormanston 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 non-residential premises within the catchment area, a method based on the estimated floor area and the 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 Gormanston, the Huntsman Restaurant premises were audited to Ashrae level 1 to identify any opportunities within the building 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 a review of the electrical and mechanical systems and equipment. It is recommended that the organisations implement the measures identified in their reports to contribute towards the energy consumption reduction goals as set out in the Climate Action Plan.

[12] 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.

Results and Analysis

Below is an overview of the estimated total energy usage, emissions and spend from the non-residential sector within the Gormanston SEC. This helps the Gormanston SEC get an idea of just how much their non-residential 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 14 - Gormanston SEC Non-Residential Energy, CO_2 and Spend (CIBSE, 2012; ESRI, 2022)

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 (€)
956	2827	404	537	941	€636,893

Although Gormanston has very few businesses within the catchment area, the presence of Gormanston College including its leisure facilities and Gormanston Wood Nursing Home results in a considerable energy spend for the community, accounting for over 50% of the energy spend [12]. It's understood that Gormanston College are constructing a new school which will likely be a highly efficient building. Recommendations about the nursing home have been included within the Register of Opportunities document based on previous audits PlanEnergy have undertaken of nursing homes.

Gormanston college is classified as School & Seasonal Public Building as well as Leisure Facilities. Gormanston Nursing Home is classified as Long Term Residential Care.

Support for SMEs

Aside from the recommendations contained within the EMP and supplementary non-residential audit, businesses can utilize the recently created ClimateToolKit [13] website launched by the government to help businesses get started in taking climate action.

This online tool allows SMEs to input some basic 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 [14]. 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 site's 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-residential audit identified several opportunities within the premises which can be developed into energy efficiency projects. The projects are detailed within the Register of Opportunities document which accompanies this report, and the full reports are included in the Appendices. The standout projects are:

Huntsman Restaurant

- Install Thermostatic Radiator Valves to control output on radiators
- Integrate Energy Monitoring equipment so to identify significant energy users
- All lighting across the site should be upgraded to energy-efficient LED light fittings
- Replacement of inefficient equipment which can be supported through the use of accelerated capital allowances. This allows the business to deduct the full cost of the equipment from their profits in the year of purchase. As a result, the business's taxable profits are reduced by the value of qualifying capital expenditure

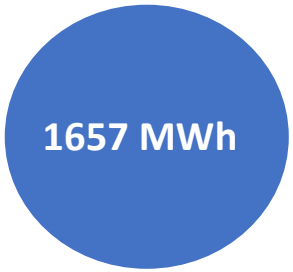
[13] climatetoolkit4business.gov.ie

[14] 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 Gormanston SEC of 1,657 MWh. In order to offset this residual demand, a 0.76 MW Wind turbine or a 1.89 MW solar farm on a 4-5 acre site would be required to service the Gormanston 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 a wind turbine or solar photovoltaic farm correctly sized and 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.

Renewable Electricity Support Scheme

The Government of Ireland has put in place a scheme called the Renewable Electricity Support Scheme (RESS)[15] 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 incentivised to replace the use of fossil fuels in our economy. Communities are incentivised 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

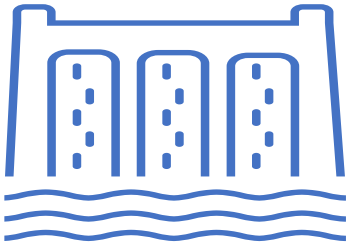
[15] https://www.dccae.gov.ie/en-ie/energy/topics/Renewable-Energy/electricity/renewable-electricity-supports/ress/Pages/default.aspx

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 the 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 Gormanston 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 Gormanston SEC can start looking at suitable sites for wind or solar projects.

SEAI's 'Community Energy Resource Toolkit' [16] 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.

[16] 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 its baseline to achieving 2030 reduction targets. The following analysis provides a general path for the Gormanston SEC to reach its energy reduction targets within the next ten years.

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

Table 15:- 8% Annual reduction in the Carbon Footprint for Gormanston SEC

Community CO2	
tCO2	**1,898**
% Annual CO2 Reduction	8%
Year	**tCO2**
2023	1,746
2024	1,607
2025	1,478
2026	1,360
2027	1,251
2028	1,151
2029	1,059
2030	974

Table 16 - Gormanston roadmap ahead of 2030			
	Number of Projects	**Primary Energy Savings (kWh)**	**CO_2 Savings (tonnes)**
Residential Housing Upgrades to B2 BER	40	369,600	172
Electrical Vehicle (EV) Ownership	20% Change	88,122	26
Reduction in Car Journeys through remote working	40% Change	336,405	80
SEC implement targeted energy efficiency measures (electricity)	20% Change	413,903	122
1.9 MW Community owned Solar Project	1	1,656,716	490
Total		**2,864,746**	**890**

Register of Opportunities

The Register of Opportunities (RoO)[17] section developed for Gormanston SEC is divided into two separate documents. Firstly, as a 'RoO toolkit' it 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 - Behaviour, 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 successfully pursue a Behavioural, 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 Gormanston SEC, a non-residential audit was carried out on the Huntsman Restaurant premises within the community.

Supplementary to the RoO toolkit is a spreadsheet which focuses specifically on the opportunities which arose from those non-residential audits. This RoO document goes slightly more in-depth, outlining suggestions from PlanEnergy 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 which 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 community's carbon footprint?

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

[17] *Each of the projects are detailed within the RoO spreadsheet.*

Action Plan for Gormanston SEC

Capacity Building

One of the key elements in the development of a successful Sustainable Energy Community is the ability to build capacity within the group, which is required for the implementation of successful projects. By increasing the capacity of the SEC there is a higher probability that the group will be able to take on more complex projects as their confidence grows. Capacity building can be achieved by utilising the mentors appointed to the group by SEAI to arrange educational and training initiatives as well as vocational and third level education bodies. The SEC can also work with other established SECs to arrange shared learnings

Energy Master Plan Dissemination to Community

The dissemination of the Energy Master Plan throughout the community is one of the key actions for the SEC now that the plan has been completed. The Energy Master Plan will provide the community with an understanding of what their current energy profile is and where they as a community should put their efforts in reducing their energy and carbon footprint.

Communication and Engagement Events

Engagement with other community organisations to identify shared needs especially in the development of existing community assets for remote working may be beneficial to the greater community. The upgrading and reimagining of community buildings through BEC grants to provide remote working hubs, childcare facilities, or social hubs feeds into the DO stage of the SEC's plan.

In addition to other community groups, private sector groups such as energy project developers which have community benefit funds may be interested in providing support to the SEC, but only if they are aware of its existence.

Quick Wins

The SEC is encouraged to develop low-effort, low-cost efficiency projects first to increase their internal capacity and skills. These low-effort, low-cost efficiency measures can be quick wins for the community and encourage the group to tackle more complex, higher effort projects in the future. These projects also provide a focus point for the greater community to prompt discussions and knowledge-sharing experiences.

In a residential setting this could include the sharing of a Home Energy Kit around the community, so that individuals can identify significant energy users in their home, allowing them to make more informed decisions about how to reduce their daily energy use.

Enhancing community centres in a way that allows individuals to work remotely will have a sizeable impact on reducing emissions associated with commuting to work.

For businesses or public buildings that operate for 40+ hours a week, they should begin a process of selecting the lowest wattage bulb needed to light the room/area and consider the size of the space and how much natural light the space gets.

Bibliography

[1] CSO, "2016 Census- Small Area Data," Central Statistics Office 2017.

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[4] SEAI, "Conversion Factors,", Available: https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors/

[5] SEAI, "Public Sector Energy Monitoring & Reporting System," 2017, Available: https://www.seai.ie/energy-in-business/monitoring-and-reporting/FAQs.

[6] CSO, “2011 Census - Agriculture.” Central Statistics Office 2012

[7] NSAI, SR54 Code of Practise for the Energy Efficiency Retrofit of Buildings

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.[18]

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