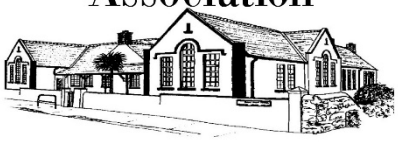
Skerries ENERGY MASTER PLAN

SSECI
Skerries Sustainable Energy Community Initiative

Skerries Community Association



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Contents

Skerries profile

Skerries is a coastal town lying on the East coast of Ireland in the electoral district of Fingal. The name comes from the Norse word ‘skere’ which became the Irish ‘na sceirí’ which means ‘the reefs’.

The population of Skerries shows consistent growth mainly due to the fact that it is now one of the most desirable locations to live in the greater Dublin area, as it is situated just 18 miles from Dublin City Centre, with the 2016 census showing just over 10,000 people living in Skerries. Many new housing developments have sprung up to cater for the demand. For this reason, it has become known as a commuter town for many travelling to the capital.

Skerries has evolved over the course of time and has featured throughout various important points in Irish history. Skerries was once home to St Patrick’s Monastery on Church Island where he lived for a time in 432 AD. A few centuries later in 797 AD, the Vikings carried out one of their earliest raids in Ireland when they plundered the monastery. As the origin of Skerries’ name is Norse and many localities have Norse-based names, it is safe to assume the Vikings did settle and occupy the area. The town has long had a reputation as a fishing port, from the construction of the harbour in the 13th century, right up to its peak in the 18th century when it was widely regarded as the premier fishing port in Ireland.

Nowadays Skerries is one of Fingal’s major coastal residential towns. It is attractive, compact and architecturally intact with significant local services and amenities, including the harbour and sailing club, sandy beaches, Red Island, the Town Park, Skerries Mills complex and refurbished windmills, restaurants and traditional pubs. The historic core has been designated an Architectural Conservation Area and the islands off the Skerries coast are all designated as Special Protection Areas for birds.

The attractiveness of the town and its extensive range of amenities and services support its significant tourism potential. The town has a number of walking trails, including seafront and woodland walks, as well as a number of trails amongst the cornfields and wetlands at the Skerries Mills. These impressive structures stand tall as one of Ireland’s foremost industrial heritage centres, with stone-ground milling in Skerries dating back to the 16th century. Its coastal location also means there are a number of watersports on offer, including kitesurfing, sailing clubs, kayaking and water academies.

The pride which its residents take in their town has been reflected through several awards for its scenery, culture, and community activities. Skerries came second in the 2014 Best Place to Live in Ireland awards and in 2016, it was named Ireland's Tidiest Town in the Tidy Towns competition. This report has been commissioned by Skerries Sustainable Energy Community (SEC); a committee that forms part of an umbrella organization known as Skerries Community Association. The SCA comprises various committees within the town, made up of several hundred volunteers, devoted to making the quality of life in Skerries even better.

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. In order 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/Energy Efficiency

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

Register of Opportunities (RoO) - The Register of Opportunities is a list of projects or opportunities within your community which if executed will result in energy efficiency and a reduction in energy use and the associated CO_2 output.

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.

Thermal Energy - Defined as energy used to generate heat. This commonly refers to the energy used to heat homes by burning oil, natural gas, wood, peat, or using electricity in heat pumps.

Energy Savings - Energy in what ever 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.

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.

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.

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.

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 government's 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 Skerries 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 Skerries 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 Skerries SECs 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 SEC.

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 such as CSO (Central Statistics Office), SEAI (Sustainable Energy Authority Ireland), CIBSE (Chartered Institute of Building Services Engineers), 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 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 SEC, followed by a brief discussion on how the SEC compares to national averages as well as comparisons with the nearby Trim SEC published in 2022.

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.

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 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 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, energy audits of commercial buildings 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 40 Small Area Plans [1] which are defined by the Central Statistics Office (CSO) and are shown below in Figure 1.

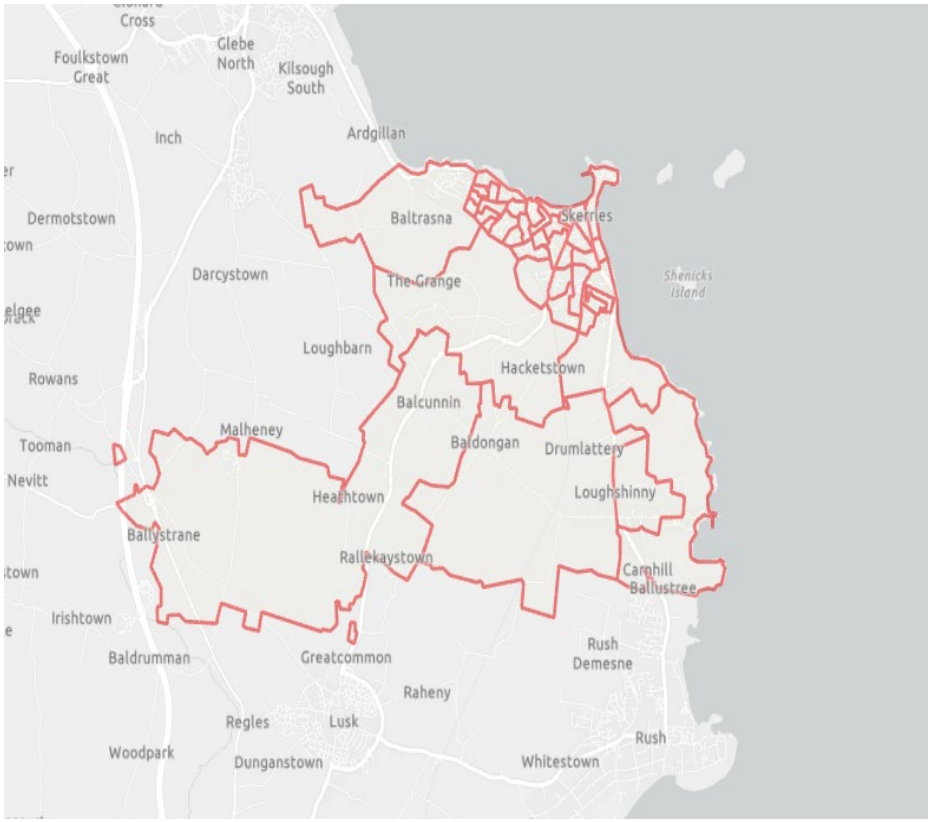

Figure 1 - The image depicts the area covered by Skerries SEC. This was generated using the Small Areas as defined by the Central Statistics Office (CSO SAPMAP 2016).

[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 Skerries SEC. As requested by the SEC, a selection of some of the data from Trim SEC has been included for comparison. Trim was selected due to its similarities in population and geographical proximity with Skerries

Table 2 – SEC Total Energy, CO_2 and Cost Analysis

				
	ELECTRICITY	**FOSSIL FUELS**	**TRANSPORT**	**TOTAL**
ENERGY MWh	42,704	63,661	32,588	138,952
CO_2 EMISSIONS tCO_2	12,969	14,385	8,218	35,572
TOTAL ENERGY COST*[2]	€6,003,605	€8,891,706	€4,222,950	€19,118,261

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
3) Transport

[2] Energy Costs based on April 2022

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 Skerries SEC.

Table 3 – Sectoral percentage energy consumption comparison

Skerries SEC Primary Energy Baseline (kWh)				
Sector	**Electricity**	**Fossil Fuel**	**Renewable**	**Total** (MW)
Residential	41,381,975	59,795,753	397,111	101,575
Non-residential	1,321,915	3,865,180		5,187
Transport	51,171	32,536,424		32,588
Total Energy	42,755,061	96,197,357	397,111	139,350
Trim SEC Primary Energy Baseline (kWh)				
Sector	**Electricity**	**Fossil Fuel**	**Renewable**	**Total (MW)**
Residential	30,667,806	45,560,851	320,743	76,549
Non-residential	11,913,373	15,064,247		26,978
Transport	54,184	37,807,611		37,862
Total Energy	42,635,363	98,432,709	320,743	141,389

	Residential	**Commercial**	**Transport**
Skerries SEC	72.9%	3.7%	23.4%
Trim SEC	54.1%	19.1%	26.8%

Table 4 – Sectoral percentage energy consumption in the Skerries and Trim SEC

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 close focus.

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 expenditure which led to higher energy usage but have been balanced out by improvements in energy efficiency as a result of updated building regulations and homeowners increasingly more willing to invest in fabric[3] upgrades within their homes.

The momentum within the country has been to ensure that as many homes as possible upgrade their home insulation ahead of 2030, with the Irish Government setting the ambitious target of 'retrofitting' 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.

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

Furthermore, the fuels used to heat homes within the Skerries SEC are analysed for their emissions in tonnes of CO2 equivalent. The fuel mix can have a significant impact on the carbon footprint of a community as each fuel type has its own associated CO2 output. For example, coal produces approximately 0.4kg and 0.3kg of CO2 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 is 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[4].

A breakdown of the communities BER ratings per Small Area Plan is provided, which helps identify those sectors of the community which require 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) will imply that homeowners are using more fuel to heat their homes, which is in direct contradiction with the 2030 target's set by the Government.

[3] Building Fabric relates to principle building material including insulation.

[4] *Energy in Ireland 2016 (seai.ie)*

A communities' BER is also closely linked to social deprivation and fuel poverty. Given the continuing rise in energy costs, a strong BER can save homeowners from fuel poverty and prevent others from going into it.

Method

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

4125

No. of Homes

Single Occupancy	763 people
Double Occupancy	2350 people
3 Person Family	2178 people
4 Person Family	3168 people
5 Person Family	2355 people
6 Person Family	960 people
7 Person Family	217 people
8 + Person Family	91 people

Figure 2 – The number of homes and occupants in the Skerries SEC

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 with a baseline year of 2021.

The SEAI Building Energy Rating (BER) Map shown in Figure 9 displays colour coded 'Small Areas' of the Skerries 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. For example, Small Areas that are green represent areas with a 'good' median BER. Small Areas with dwellings that have a poor median BER are either red or purple. 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 77.7% of the housing is owner occupied. With a 39.1% outright ownership, 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 landlords' 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 5 – Percentage of homes owned outright by owner

Occupancy type	No. of homes	% of homes
Owned with mortgage or loan	1591	38.6%
Owned outright	1611	39.1%
Rented from private landlord	521	12.6%
Rented from Local Authority	263	6.4%
Rented from voluntary/co-operative housing body	1	0.0%
Occupied free of rent	54	1.3%
Not stated	84	2.0%
Total	**4125**	**100%**

Housing Type

A very significant percentage of the housing stock in the catchment is classified as individual houses consisting of detached, semi-detached, terrace 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 Skerries 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.

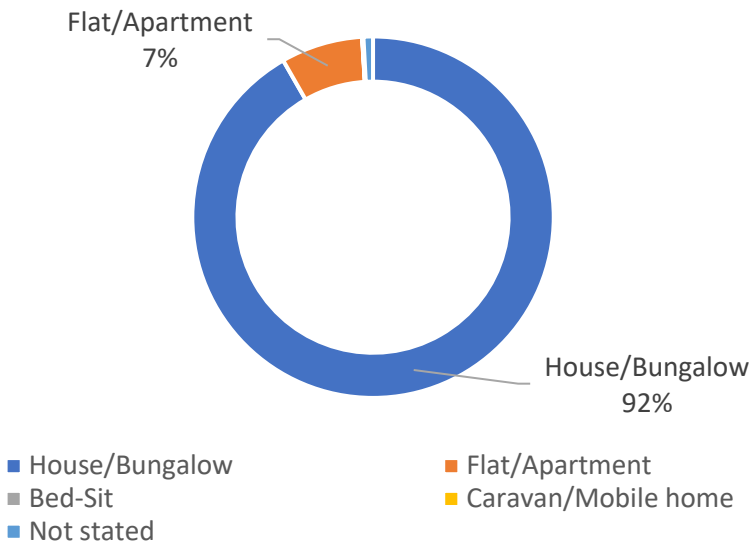

Figure 3 - Housing Stock percentage type

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.

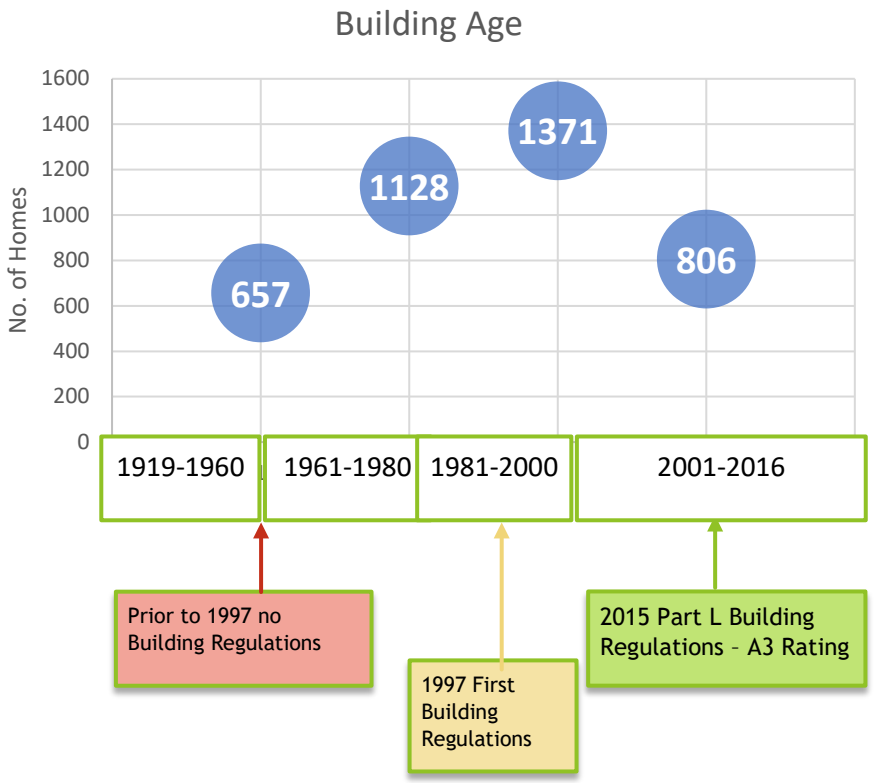

Figure 4 - Relationship between Dwelling Age and Irish Building Regulations

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. 19.5% of Skerries 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[5].

With 54.5% of dwellings having been constructed from pre 1919 – 1990, this strongly indicates that a very large number of homes will present significant opportunities to improve energy efficiency and reduce their energy requirements. However, the types of buildings within lower 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 their heritage.

Table 6 - Age profile of the Skerries SEC housing stock

Period	No. of homes	% of homes
Pre 1919	341	8.3%
1919 - 1945	154	3.7%
1946 - 1960	162	3.9%
1961 - 1970	246	6.0%
1971 - 1980	882	21.4%
1981 - 1990	462	11.2%
1991 - 2000	909	22.0%
2001 - 2010	676	16.4%
2011 or later	130	3.2%
Not stated	163	4.0%
Total	4125	100%

[5] 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.

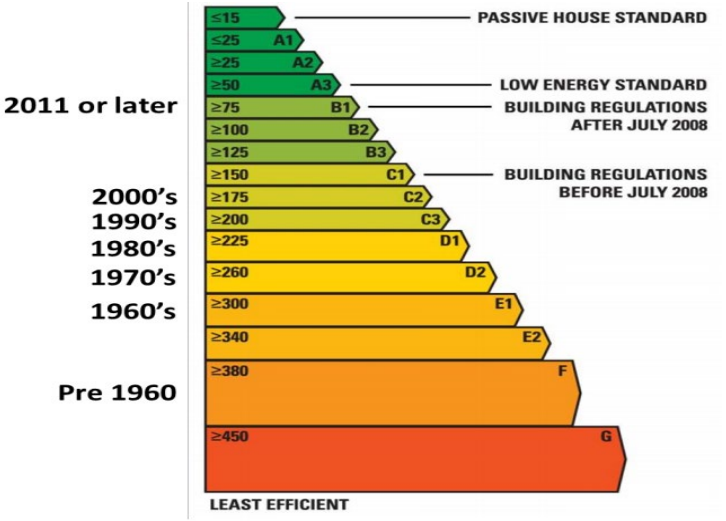

Figure 5 – Typical BER for house age type before upgrade works

Housing Fuel Mix

The residential fuel mix as illustrated in Figure 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 Skerries SEC is linked to the type of fuel consumed within the community. Through using different fuel types, 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.

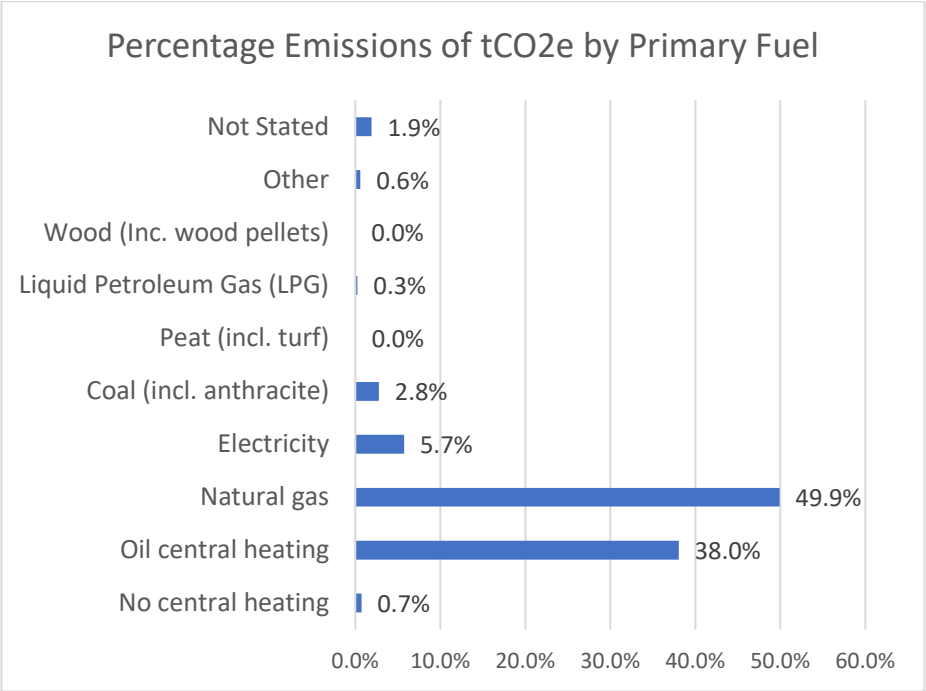

Figure 6 - Percentage emissions in tCO_2e

Within Skerries SEC, the main fuel types currently are natural gas and oil which make up 90% of the total thermal energy consumed. Combined these two fuel types make up 93% of the CO_2 emissions from the Residential sector. In combination with upgrading of the building stocks fabric, a change over to using heat pumps can have a significant impact on the CO2 output from home heating in the catchment area. This is based on the projected continuing de-carbonisation of the electrical generation market.

Table 7 - Residential Fuel Mix

Heating Type	No. of Units	Fuel	% of Total Thermal Energy	Emissions tCO2e
No central heating	26	Oil	1%	95.3
Oil central heating	1367	Oil	33%	5009.0
Natural gas	2340	Natural Gas	57%	6569.7
Electricity	184	Electricity	4%	755.7
Coal (incl. anthracite)	77	Coal	2%	364.2
Peat (incl. turf)	1	Peat	0%	4.9
Liquid Petroleum Gas (LPG)	11	LPG	0%	35.0
Wood (Inc. wood pellets)	26	Wood Pellets	1%	0.0
Other	22	Other	1%	78.5
Not Stated	71	Other	2%	253.4
Totals	**4125**			**12,410**

Housing BER Coverage

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

Of the 1,274 homes registered within the heatmap catchment of the Skerries SEC region, 12% of these homes have Building Energy Rating certificates. Whilst the number of dwellings in Skerries with a BER of B or greater is higher than the national average (12% vs 11%), Skerries lies below the national average for its overall BER.

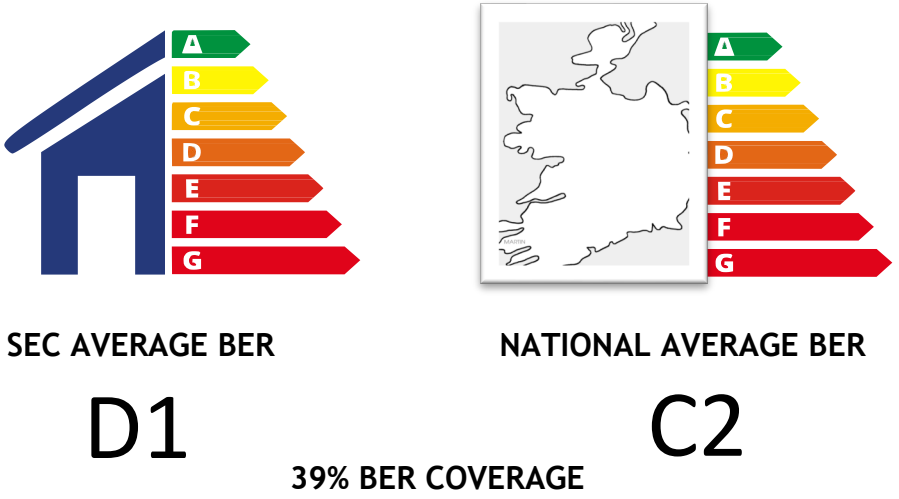

Figure 7 - Building Energy Rating information on catchment

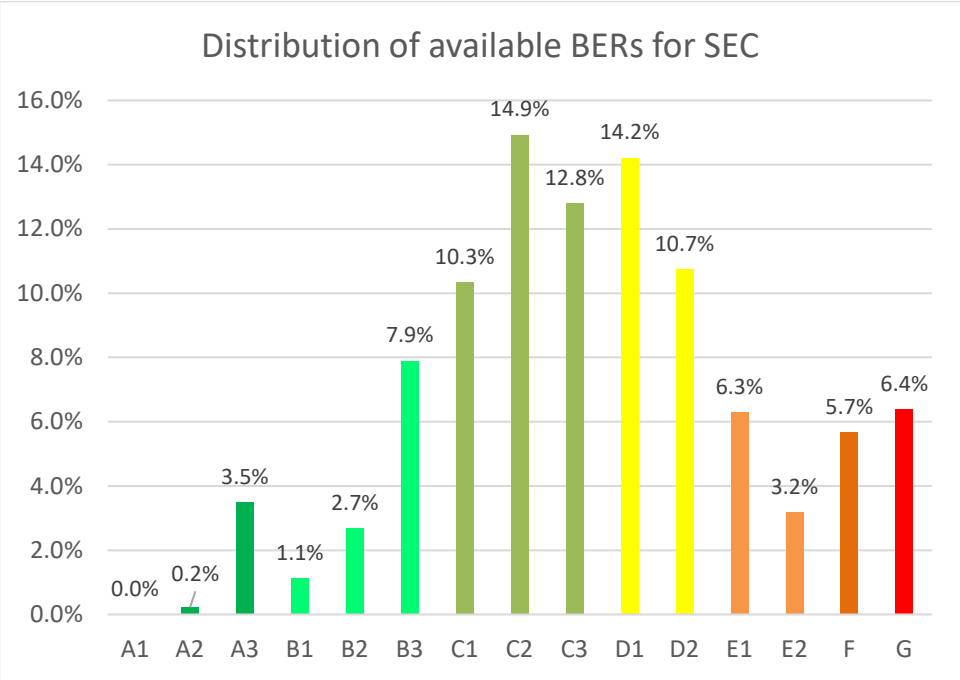

Figure 8 – Distribution of available BERs for Skerries SEC

The chart above indicates that Building Energy Ratings for a large volume of Skerries SEC's residential building stock ranges from a C1 to an D2, 63% collectively, with such dwellings requiring between 150-300 kWh/m2/yr. of energy.

The chart above indicates that 92.5% of the housing stock in the Skerries SEC are below the Irish Government's target BER B2. However, of that total, approximately 46% lies within a boundary of B3 – C3 which shows that a significant chunk of the housing stock can be brought up to this rating without deep retrofit 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 Skerries SEC illustrates the median BER's which have been recorded in each Small Area Plan.

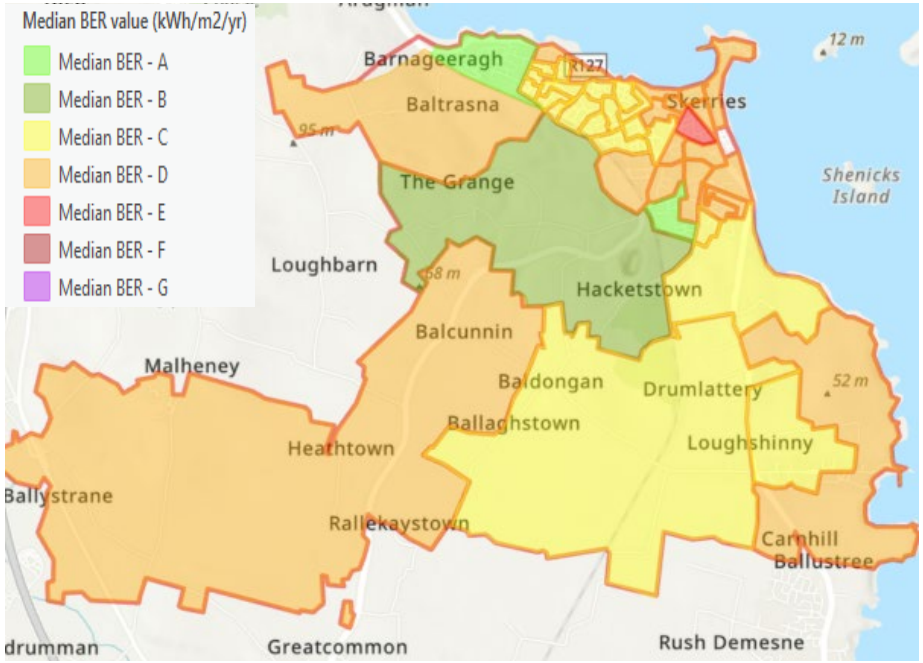

Figure 9 - Map of Median BER in SEC Catchment Area

It should be noted that this information is based on a limited number of BER data and presented for illustrative purposes to allow for comparison in future reports.

Residential Energy Baseline

To calculate the residential sector's energy baseline, national residential data was obtained from the Central Statistics office (CSO), the CSO's Small Area Population Statistics (SAPS), listed the housing stock present in the area by house type and year of construction. For comparison, the Trim SECs totals have also been provided.

Table 7 - Residential Energy, CO_2 and Spend [6]

		Electricity	Fossil Fuel	Renewable	Total
Skerries SEC	Total Primary Energy (kWh)	41,381,975	59,795,753	397,111	101,574,839
	Total CO_2 (tonnes)	12,241	13,651	0	25,892
	Total Spend (€)	€5,689,782	€3,287,195	€34,296	€9,011,273
Trim SEC	Total Primary Energy (kWh)	30,667,806	45,560,851	320,744	76,549,400
	Total CO_2 (tonnes)	14,806	11,003	0	25,809
	Total Spend (€)	€4,210,975	€3,766,086	€277,589	€8,254,649

[6] Total primary energy requirement (TPER) is a measure of your energy consumption that also accounts for the energy that is consumed and/or lost beyond the boundary of the SEC, notably in generating and distributing the electricity that you use.

For further context, the average household energy intensity in the Skerries SEC results in 13,265 kWh of heating energy and 4,638 kWh of electrical energy, which equates to 3 and 1.37 tonnes of CO_2 respectively.

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'[7] 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 Skerries SEC.

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

Furthermore, the Warmer Homes Scheme [8] 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 retrofit 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.

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

[8] *https://www.seai.ie/grants/home-energy-grants/free-upgrades-for-eligible-homes/*

Retrokit

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 (HLI) of 2.0 or less. SEAI define these dwellings as being 'heat pump ready' [9]. If properties are not insulated to an adequately high level, then this technology is not suitable as a primary heat source. The HLI for a building is determined as part of a technical assessment of the home, which is an additional analysis carried out after the Building Energy Rating (BER).

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'[10], which specifies that buildings undergoing 'Major Renovations'[11] must achieve a BER B2 or 'Cost Optimal' level of energy performance.

In order to accurately identify the retrofit upgrades that need to be carried out to upgrade Skerries' residential housing stock to at least a BER rating of B2 (or better) and to achieve "heat pump readiness", a software package known as 'RetroKit' was employed.

Method

RetroKit is a decision-support tool developed by Retrokit Ltd. which compiles a wide range of data sources and applies clever analytics to establish the current energy performance of the housing stock in a community. It generates baseline data on energy performance of the housing stock in terms of energy use and expenditure, CO_2 emissions, BER rating and Heat Loss Indicator amongst many other variables.

RetroKit uses this data to develop and compare a range of retrofit scenarios which are listed below:

1. Shallow Fabric,
2. Medium – (Oil Boiler),
3. Medium – (Heat pump),
4. Deep Retrofit (Heat Pump)

The software conducts a cost/benefit analysis of each scenario in order to identify the optimum retrofit package for the community's housing stock, e.g. a minimum B2 BER rating, decarbonizing the energy supply, eliminate fuel poverty, etc. It considers not only the technical factors, but also financial and environmental concerns.

[9] 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

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

[11] 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.

Once baseline analysis is completed, to determine the energy usage of Skerries's housing stock, RetroKit runs a number of customised scenarios, based on the shallow, medium or deep retrofit upgrade scenarios mentioned above, with associated upgrades to heating systems and renewable energy.

These scenarios are applied against the most common house types in the Skerries community in order to exemplify what fabric upgrades would take place in each archetypal home through a home energy upgrade plan.

Whilst the use of standard assumptions (e.g. fixed heating schedules and hot water usage) and archetypes means that running costs and energy usage estimated by RetroKit will differ somewhat from actual data for specific dwellings, they provide a highly detailed representation of what the impact of a retrofit project would be for typical residencies in the Skerries community.

These home energy upgrade plans will help homeowners in the Skerries community understand how a house like theirs can be upgraded, the typical costs involved and include a breakdown of the revised BER rating, energy consumption, energy costs and payback period of the investment for the homeowner, along with many other variables for each scenario.

Measures are only applied by RetroKit where required and appropriate. This is done on a dwelling by dwelling basis. For example, for cavity wall insulation measures, RetroKit checks to see if the dwelling has a "cavity" wall and if the wall heat loss is high (and therefore worth insulating) before applying that measure.

Table 8 – Overview of each RetroKit Scenario example

RetroKit Scenario	Non-exhaustive summary of works
Shallow Fabric	Basic measures such as better air tightness, cavity and loft insulation, cylinder insulation, LED lights and wood stove
Medium (boiler)	"Shallow fabric" plus External Wall Insulation, boiler, controls, new door, double glazing
Medium (Heat pump)	"Shallow fabric" plus External Wall Insulation, heat pump, controls, new door, double glazing
Deep (Heat Pump)	Medium (Heat Pump)" plus triple glazing, sloping ceiling internal insulation, demand control ventilation, Photovoltaic (PV) system

Results and Analysis

Heat Pump Readiness

RetroKit enables high level comparison of the four scenarios across a range of metrics that cover the entire Skerries community, not just archetypal homes. This is the likelihood of dwellings in the scenario having a suitably low heat loss indicator (2.0 or less, or below 2.3 in certain cases) for a heat pump to perform effectively in the dwelling. A suitably low heat loss indicator is also needed if seeking grant funding for heat pumps. A dwelling should have additional fabric or airtightness measures applied if a heat pump is to be installed and if it isn't heat pump ready.

As per the graph below, 12% of residencies in the Skerries SEC are Heat Pump ready, however this figure jumps to 43% under the 'Shallow fabric' scenario, meaning a significant proportion of homes in the community would only require a moderate amount of investment to be Heat Pump ready.

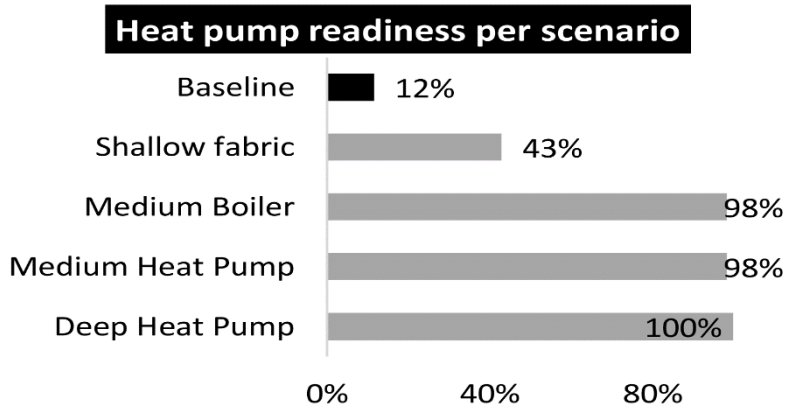

Figure 10 – Heat pump readiness under each RetroKit scenario for SEC

Reduction in Final Energy Use

Reduction in final energy use shows how far 'energy usage' is reduced compared to the baseline if the upgrades associated with each scenario were implemented into every home in the Skerries SEC.

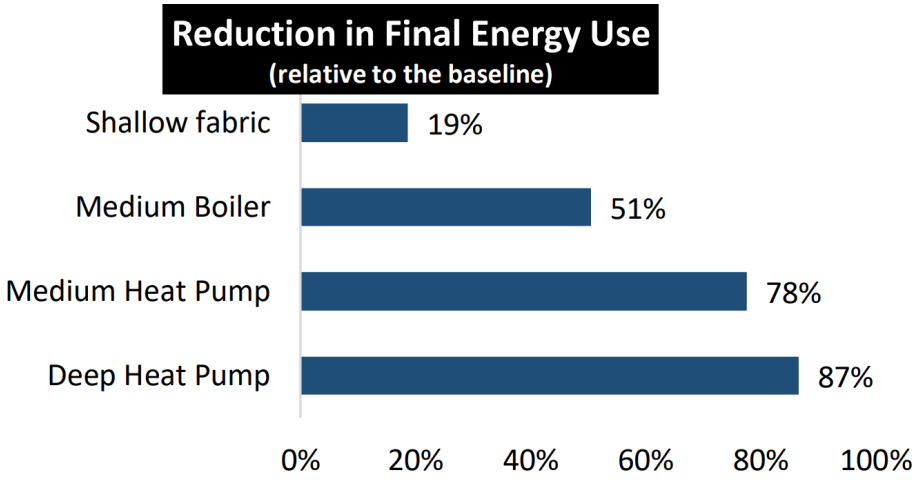

Figure 11 – Reduction in Final Energy Use compared to baseline data in the SEC

As can be seen from the graph above, significant reductions in energy use across the SEC can be achieved under the Medium (boiler) scenario, but particularly in the two Heat Pump scenarios. This is in alignment with the Irish Government's Climate Action Plan and the country's long-term goal of reaching net-zero emissions by 2050.

Total Annual Energy Savings

Naturally, reductions in energy usage will lead to a corresponding decrease in energy costs for the community. The total annual energy savings graph evidences the fuel cost savings per scenario, broken down by the age bands of dwellings in the SEC. As the below graph shows, the Example SEC could save anywhere between €1.8 million - €6.02 million annually depending on which of the fabric upgrade scenarios were adopted by the community.

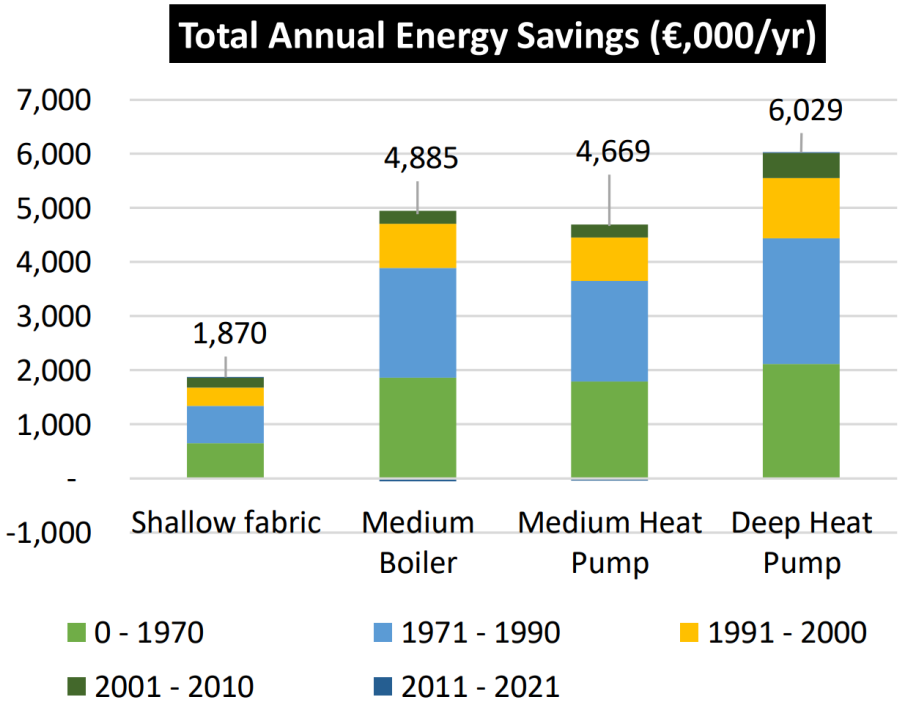

Figure 12 – Total Annual Energy Savings in millions of Euros per year versus baseline conditions if each scenario was adopted by the SEC

Energy Cost per dwelling

On an individual homeowner level, the fuel costs arising from energy usage show significant reductions on an annual basis, with the potential to save over €1450 annually if implementing upgrades in their home that align with the Deep (Heat Pump) scenario.

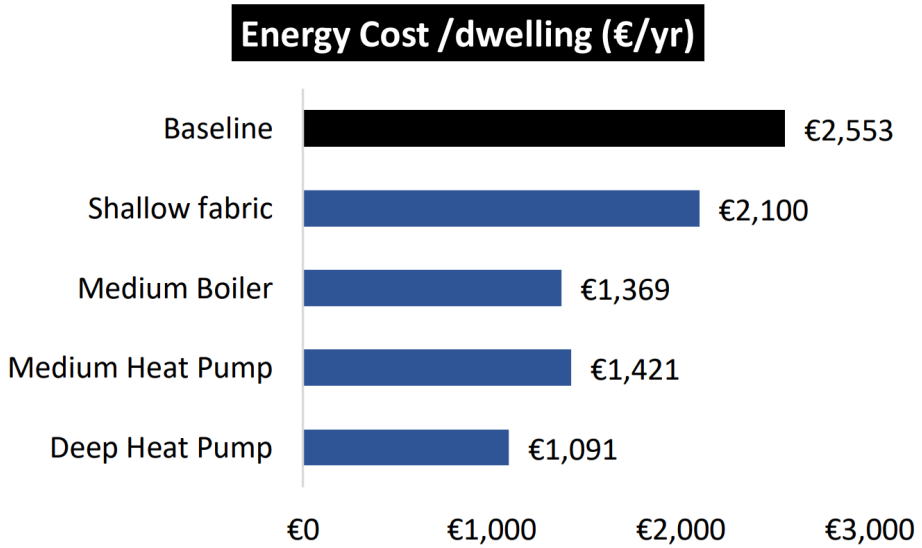

Figure 13 – The average annual energy cost per dwelling under each of the four scenarios

As energy costs look set to continually rise, it is quite likely that the potential savings for both individual homeowners and the community as a whole would also increase if the four scenarios were adopted. It would be hoped that this would create both a more environmentally and economically sustainable community.

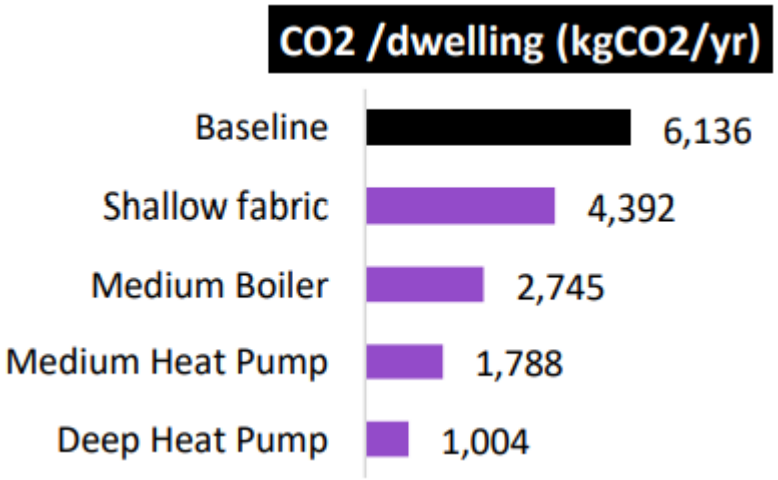

Figure 14 – The average annual CO_2 emissions per dwelling under each of the four scenarios

RetroKit Case Studies

From the BER Research tool, RetroKit creates a set of "typical" archetype dwellings (up to 240 archetypes in total). The archetypes are classified based on 5 age bands, 4 dwelling types, 4 main space heating fuels and 3 main external wall types.

RetroKit then determines how many of each of the archetype dwellings are in the SEC. The CSO Small Area data is utilized to determine how many dwellings are in the study area as well as percentage of these dwellings in each age band and fuel type. As the CSO data does not indicate the dwelling types in sufficient granularity or the wall type, the BER small area data is used to determine the percentage of dwellings belonging to each dwelling type and wall type.

As neither the CSO or BER small area data detail exactly how many dwellings are in each of the 240 archetypes, RetroKit uses the percentage of dwellings in each age band, each dwelling type, each fuel type and each wall type to determine the spread of dwellings across the 240 archetypes.

The software then deduces the most common property types in the community based on their percentage spread across the study area. This provides most homeowners across the community with a case study very similar to their own dwelling. In the case of the Example SEC, six common property types were selected. An example of one of these case studies is shown in the following pages, with the remainder contained within the Appendices.

Table 9 – Example SEC RetroKit dwelling selection

Age Band	Dwelling Type	Main fuel type	Main wall type
1971 - 1990	Semi-detached house	Heating oil	Solid or hollow
<1971	Semi-detached house	Gas or Liquid Petroleum Gas	Solid or hollow
1971 - 1990	Detached house	Heating oil	Cavity
1991 - 2000	Semi-detached house	Gas or Liquid Petroleum Gas	Cavity
1971 - 1990	Terraced house	Gas or Liquid Petroleum Gas	Cavity
2001 - 2010	Semi-detached house	Gas or Liquid Petroleum Gas	Cavity

Please see an example of RetroKits housing upgrade plans below for a 1971 -1990 Semi-detached house.

Housing Upgrade Plan

Urban
Semi-d house
114m2

Built:1979
Heating oil

Your home energy upgrade will give you

- More comfort
- Money saved
- Healthier home
- Warmer home
- Better for our planet

How you can achieve this

	Current	Shallow fabric	Medium Boiler	Medium Heat Pump	Deep Heat Pump
BER	D1	C3	B2	B1	A2
Comfort Level					
Roof					
External Wall					
Windows					
Doors					
Floor					
Draughts					
Main Heating					
Water Heating					
Heating Controls					
Lighting					
Ventilation					

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Your options to achieve a more comfortable home

Shallow fabric

BER:	Fuel Bills:	Environmental Impact:	Payback:
C3	↓ €-376/yr	↓ -1771 kgs CO_2/yr	13 yrs

	Cost	Impact
Fit low energy lighting throughout property	€119	★ ☆ ☆
300mm Attic insulation at ceiling (from 0mm)	€1599	★ ★ ★
Draught proofing - windows, doors and attic hatch	€387	★ ★ ☆
Fit chimney draught excluder	€178	★ ☆ ☆
Change open fire for high efficiency wood stove	€4052	★ ★ ★
Energy credits	€0	
Potential grants	€1300	
Total investment	€5037	

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Your next 5 easy steps to a more comfortable home

1. Arrange a home energy survey:
2. Get quotes for the work
3. Appoint a contractor
4. Complete upgrade
5. Get a warmer home

Your options to achieve a more comfortable home

Medium Boiler

BER:	Fuel Bills:	Environmental Impact:	Payback:
B2	↓ €-2131/yr	↓ -5111 kgs CO_2/yr	16 yrs

	Cost	Impact
External wall insulation to solid wall. Target U-value is 0.27	€18670	★ ★ ★
300mm attic insulation at ceiling level. Add to existing insulation where present.	€3059	★ ★ ☆
Draught proofing - full fabric sealing	€1499	★ ☆ ☆
Replace windows with double glazed windows	€9501	★ ★ ☆
Replace door with highly insulated door	€1514	★ ☆ ☆
Fit mechanical 'demand control' ventilation	€4088	☆ ☆ ☆
Switch to condensing gas boiler (incl. controls)	€4420	★ ★ ★
Change open fire for high efficiency wood fuel stove	€4659	★ ☆ ☆
Replace hot water cylinder with new factory insulated model	€1373	★ ☆ ☆
Fit low energy lighting throughout property	€137	★ ☆ ☆
Energy credits	€0	
Potential grants	€14300	
Total investment	€34625	

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Your options to achieve a more comfortable home

Medium Heat Pump

BER:	Fuel Bills:	Environmental Impact:	Payback:
B1	€-1828/yr	-5548 kgs CO_2/yr	19 yrs

	Cost	Impact
External wall insulation to solid wall. Target U-value is 0.27	€18670	★ ★ ☆
300mm attic insulation at ceiling level. Add to existing insulation where present.	€3059	★ ☆ ☆
Draught proofing - full fabric sealing	€1499	★ ☆ ☆
Replace windows with double glazed windows	€9501	★ ☆ ☆
Replace door with highly insulated door	€1514	★ ☆ ☆
Fit mechanical 'demand control' ventilation	€4088	☆ ☆ ☆
Install air to water heat pump, new cylinder and controls	€10131	★ ★ ★
Change open fire for high efficiency wood fuel stove	€4659	★ ☆ ☆
Change existing rads to low temperature radiators	€4280	★ ☆ ☆
Fit low energy lighting throughout property	€137	★ ☆ ☆
Energy credits	€0	
Potential grants	€22100	
Total investment	€35445	

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Your next 5 easy steps to a more comfortable home

Arrange a home energy survey: | Get quotes for the work | Appoint a contractor | Complete upgrade | Get a warmer home

Your options to achieve a more comfortable home

Deep Heat Pump

BER:	Fuel Bills:	Environmental Impact:	Payback:
A2	↓ €-2166/yr	↓ -6341 kgs CO_2/yr	21 yrs

	Cost	Impact
External wall insulation to solid wall. Target U-value is 0.27	€18670	★ ★ ☆
300mm attic insulation at ceiling level. Add to existing insulation where present.	€3059	★ ☆ ☆
Draught proofing - full fabric sealing	€1499	★ ☆ ☆
Replace windows with triple glazed windows	€11700	★ ☆ ☆
Replace door with highly insulated door	€1514	★ ☆ ☆
Fit mechanical ventilation with heat recovery	€6835	★ ☆ ☆
Install air to water heat pump, new cylinder and controls	€10131	★ ★ ★
Change open fire for high efficiency wood fuel stove	€4659	★ ☆ ☆
Change existing rads to low temperature radiators	€4280	★ ☆ ☆
Fit low energy lighting throughout property	€137	★ ☆ ☆
Install 2kWp solar electric panels	€6592	★ ☆ ☆
Energy credits	€0	
Potential grants	€23900	
Total investment	€45182	

Powered by RetroKit Sustainable Energy Retrofit Planning Toolkit

Your next 5 easy steps to a more comfortable home

Arrange a home energy survey: → Get quotes for the work → Appoint a contractor → Complete upgrade → Get a warmer home

Energy in Transport

Background

Transport in Ireland is currently deeply dependent on imported fossil fuels. Emissions from transport fuelled by fossil fuels were by far the largest source of energy-related CO_2 in 2020, being responsible for 40% of the total and 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 modal shift is critical.

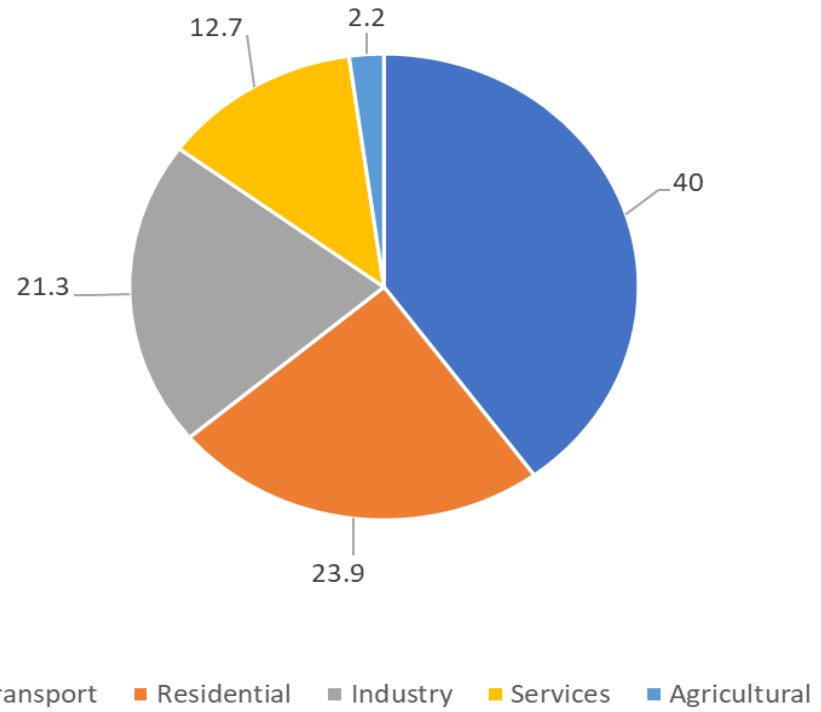


Figure 15– Percentage share of Energy Related CO_2 by sector for 2020 in Ireland

Whilst it's important to note that Figure 15 doesn't account for overall greenhouse gas emissions for each sector, it is reflective of the work needed to reduce Transport emissions. 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 to appropriate public transport links serving the needs of the 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.

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 with entrenched behavioural patterns that will be a challenge 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 Skerries 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 Skerries SEC with 55% of workers either driving or being driven by car. This sits below the national average and is a positive sign of the variety of modes of transport used by the SEC.

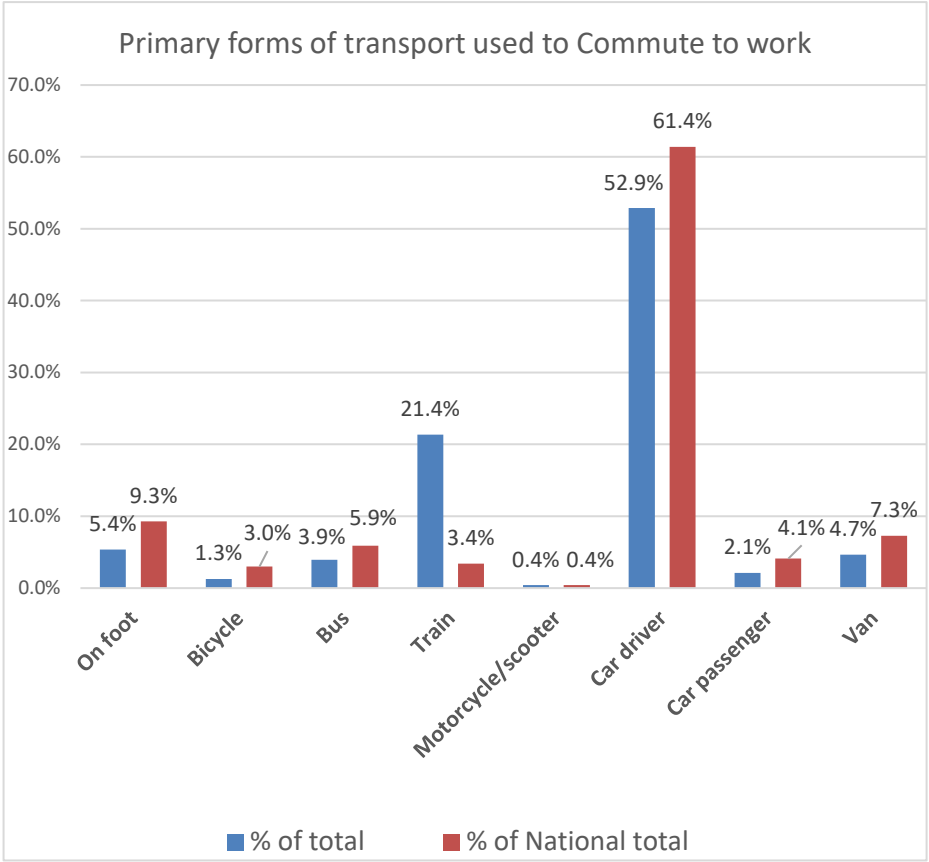


Figure 16 – Primary forms of transport used to commute to work

Skerries lags behind national averages in active transport (On foot and bicycle) usage for commuting to work. Increasing this rate will be challenging given the commercial profile of Skerries and the fact that most industry exceeds the distance that could be feasibly cycled. To shift commuters away from driving fossil fueled cars, the SEC could try to encourage commuters to utilize the rail services to the surrounding area, especially by highlighting the 20% decrease in selected public transport services announced earlier this year.

Services such as Local Link operate successful services to isolated and vulnerable people within the community, as well as offering an alternative means of transport within the region. Local Link buses form a network of affordable bus services for everyone who wants to travel to travel to or from local towns and villages. There are two different types of Local Link service: Regular Rural Bus Services along fixed routes and Door-to-Door Bus Services which operate on a pre-booking system.

In recent times, a 'Community Car' Service has been launched in Skerries as part of a partnership with LocalLink, to deliver a new community transport initiative for older people who are unable to drive. The service allows elderly members of the Skerries SEC without a car to remain active in their community and to attend medical appointments. It is important to circulate the operation of such services through as many means as possible such as social media, local newsagents etc. This scheme has the added benefit of utilizing two Electric Vehicles, recognizing the community's commitment to Climate Change Action.

Reducing car journeys through remote working

The impact of COVID-19 on the nature of transport in Skerries 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%. Skerries 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 community a new lease of life.

The Building Block [12] 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. It is noted that this process is underway in Skerries with funding announced to convert a previously unused building on Church Street into a shared community hub with remote working facilities.[13]

[12] *https://tinyurl.com/9d756vrx*

[13] *New remote working hub to open in Skerries - Independent.ie*

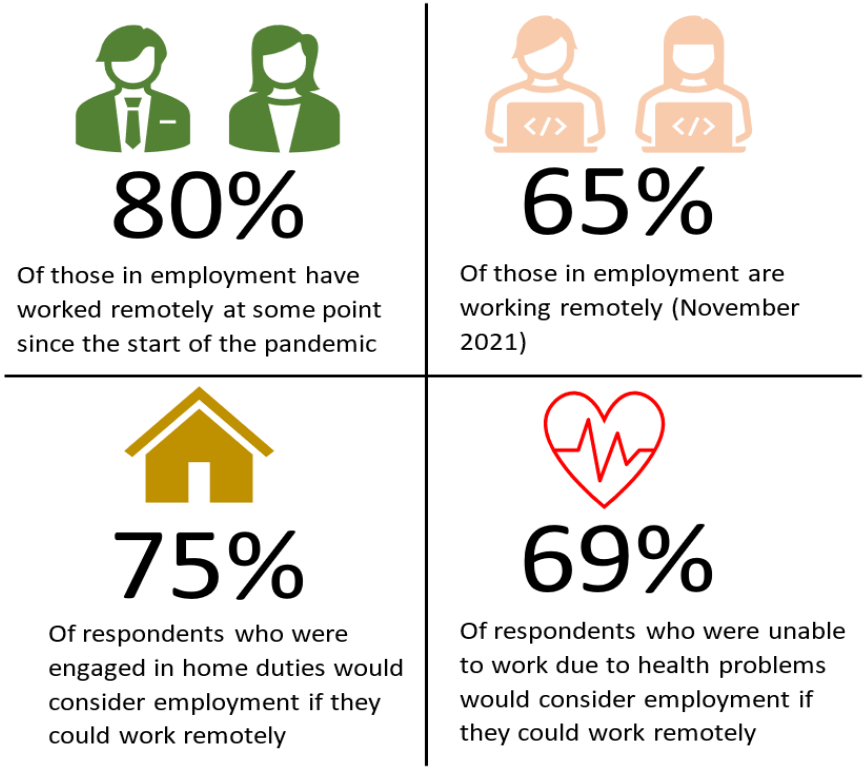


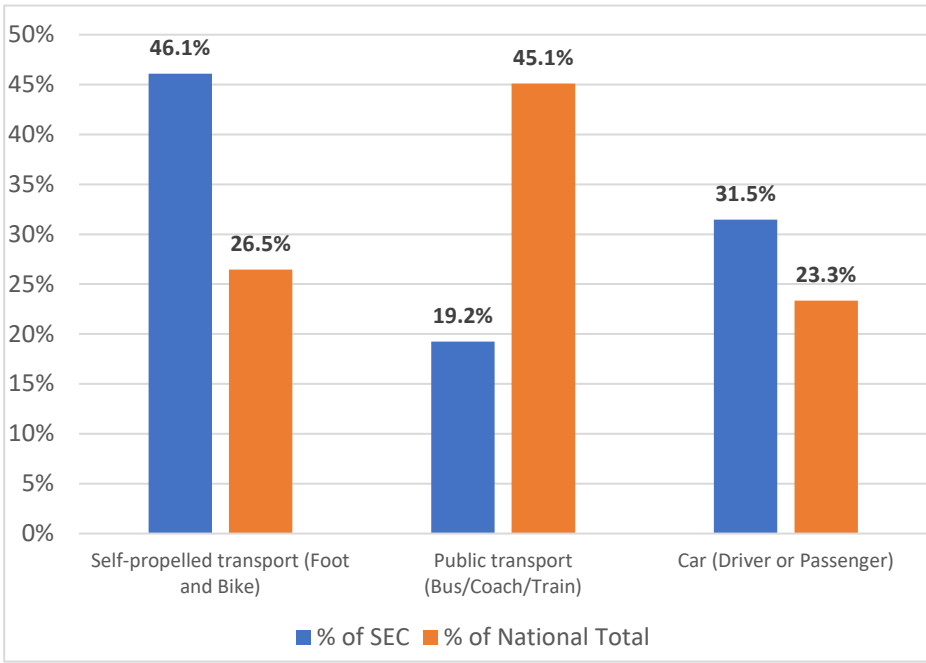
Figure 17 – Results from the CSO 'Our Lives Online: Remote Work' survey from November 2021

Commuting to school or college

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 Skerries SEC's usage over 25% 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 an improved public transport and cycling services.

Figure 18 – Primary forms of transport for primary, secondary and college students



In direct contrast to the low levels of active transport for commuting to work, Skerries has an exceptionally high level of students who either walk or cycle to school, sitting almost 20% above the national average. To increase this rate even further the 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 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 Skerries SEC catchment areas. 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.[14] As already referenced, the Census data shows that the majority of commutes within the Skerries SEC catchment area are by car or van.

Table 10 – Means of commuting in the SEC

Commuting to work	No. of people	% of total
On foot	264	5.4%
Bicycle	63	1.3%
Bus	194	3.9%
Train	1050	21.4%
Motorcycle/scooter	20	0.4%
Car driver	2598	52.9%
Car passenger	104	2.1%
Van	229	4.7%
Other	17	0.3%
Work from home	230	4.7%
Not stated	145	3.0%
Total	**4914**	**100%**

[14] 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 on vehicle ownership within the catchment area, 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 11 – Private Vehicle Transport Energy and CO_2 impacts

		National average annual km	kWh/km (TPER)	gCO_2/km
	Petrol	12,113	0.73	167
Car	**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 the Table below.

Table 12 - SEC Transport Energy, CO_2 and Spend

	Electricity	Fossil Fuel	Total
Total Primary Energy (kWh)	51,171	32,536,424	32,587,595
Total CO_2 (tonnes)	8.75	8,213	8,221
Total Spend (€)	€15,300	€4,207,650	€4,222,950

Switch to electrical vehicles

An analysis of the impact of changing 40% of the existing private vehicle fleet to battery electric vehicles is detailed in Table 13. It indicates a CO_2 reduction of 2,101 tonnes and a reduction in energy spend of approximately €3,311 per annum.

These are savings which can be recirculated in the local economy, creating a more economically sustainable community. If the Skerries 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 13 - SEC Transport Energy, CO_2 and Spend with 40% Electric Vehicles

	Electricity	Fossil Fuel	Total
Total Primary Energy (kWh)	5,117,062	22,345,825	27,462,887
Total CO_2 (tonnes)	875	5,245	6,120
Total Spend (€)	€1,530,002	€2,689,637	€4,219,639

A significant increase in the availability of long-range electrical vehicles (EV) has made this mode of transport more suitable for rural environments. 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.[15]

Table 14 - 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 Skerries SEC should consider a public EV awareness event to promote the suitability of electrical vehicles for suburban environments. Whilst the one-off purchase cost can be more expensive than a fossil fueled 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 [16]

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 short term the Skerries SEC should focus on implementing the 'Avoid-Shift-Improve' or ASI model for transport within the community.

Table 15– 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

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

[16] 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 5,751 cars between the 8,890 people who are legally of age to drive in the Skerries SEC (17 and over). This means there are 646 cars per 1000 adults in Skerries. 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 much lower.

If we assume that all drivers in Skerries operate diesel powered vehicles, then the annual average CO_2 emissions per driver is 2.22 tonnes. (Based off the County Dublin average annual km driven in 2019 [17]). 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 4125 homes in Skerries as per the 2016 census, meaning there are 1.39 cars available for every home in Skerries, with 26.7% of homes owning more than one car. Skerries SEC could try to appeal to those home owners with more than one car to replace it with an e-bike. 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 2.06 tonnes of CO_2 emissions annually per driver (based on earlier assumption of 2.22 tonnes of CO_2 per driver). If approximately half of the 2 car households (765 homes) made this swap, the SEC would save roughly 1,576 tonnes. For context this equates to 19% of Skerries SEC transport emissions.

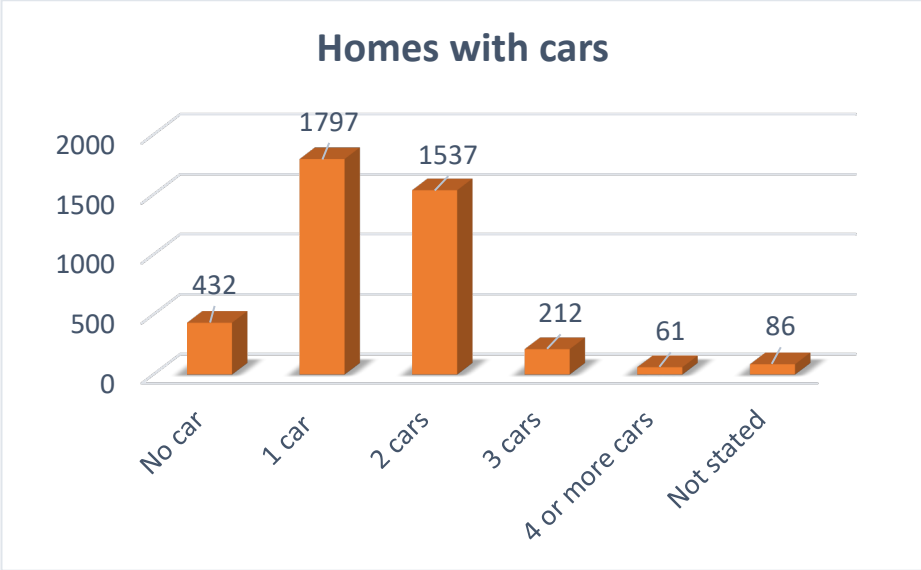


Figure 19 – Bar chart evidencing the number of cars each home in the SEC owns

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

Commuting, car ownership and usage

It is extremely difficult to accurately calculate the mean car mileage for the Skerries 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.

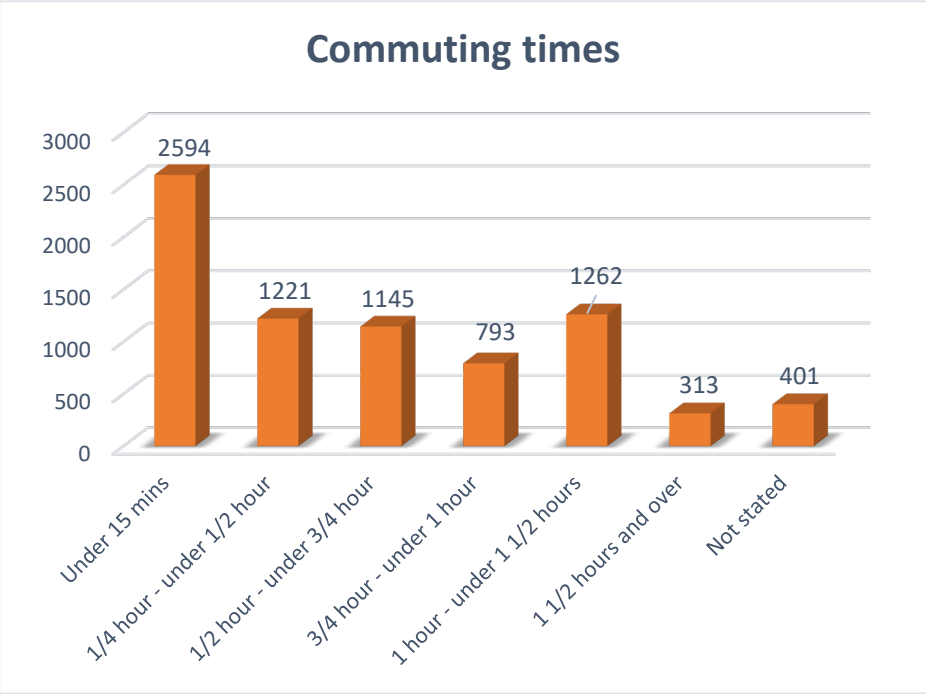


Figure 20 – Bar chart evidencing the commute time for residents of the SEC to education or work

There are 5,751 cars in circulation within the Skerries SEC. From that total 2598 are used for commuting to work, with 81 students commuting to school or college via car, meaning 2679 cars are used to commute for college or work purposes.

This means that there are approximately 3072 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.

It is difficult 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.

E-bikes

Electric bikes (e-bikes) have risen in popularity in urban environments over the past decade and now represent a real alternative to more mature forms of transport when it comes to shorter journeys (<5km). As the name suggests, an e-bike is one with an electric motor. There are many types of e-bikes, from those that only have a small motor to assist the rider's pedal-power, or more powerful e-bikes that do not need to be pedalled at all.

E-bikes can be purchased by users from retailers, but their rise in popularity can mainly be attributed to private companies operating dockless shared schemes. In these shared schemes, private companies make e-bikes and e-scooters available to use for short-term rentals.

These are typically "dockless", meaning that they do not have a fixed home location and are dropped off and picked up from certain locations in the service area.

It is noted that bike share rental schemes already exists in Skerries in the form of Bleeper bikes. Skerries, along with neighbouring towns Balbriggan, Rush, Donabate, Portrane received 70 bikes over the last year as part of the scheme, with 15 of those going directly into Skerries.

Now that there is an established presence of a bike share rental scheme within the town, there is an opportunity to expand this model to e-bikes. Whilst more expensive, e-bikes would open up cycling to members of the community who perhaps don't feel confident enough in their cycling ability to navigate the town and surrounding area on a traditional self-propelled bicycle.

It also negates one of the traditional criticisms of bicycles, that when compared to a car that they take longer/are not as convenient, as studies have shown e-bikes to reduce journey times by at least a fifth and up to 45%. This in turn means that longer journeys are more feasible for e-bike users, as less physical effort is required to cycle from place to place. Introducing e-bikes to the SEC would also tie in with the creation of the 'Fingal Coastal Way' - a proposed greenway extending from Newbridge Demesne in Donabate to the Fingal County boundary, north of Balbriggan, which includes Skerries.

Skerries SEC could follow the example of the Mulranny SEC who earlier this year announced the launch of a community e-bike rental scheme. What makes the Mulranny SEC scheme stands out is that the e-bikes are charged using electricity generated from Solar PV panels with battery storage at Mulranny's Tourist Office. Outdoor sockets, powered by the Solar PV array are also available to the public as a free E-bike charging point. Mulranny is located along the Great Western Greenway route, so there are parallels to be drawn with Skerries if the future Fingal Coastal Way proceeds as planned.

If a similar scheme were implemented in Skerries, whether it be through a community owned e-bike rental scheme, or by outsourcing it to a private company, could reduce emissions associated with tourists in the area. By encouraging more people to use bicycles, investing in bicycle infrastructure and getting people in the habit of seeing and using e-bikes will encourage intergenerational cycling.

'Bolt' is one such example of a 'ride-sharing' company that has begun operating in Sligo Town. The 100-bike pilot scheme will trial a range of parking options for the e-bikes, with the aim of 'dockless' parking, i.e., being able to park a rented bicycle across the town area after a user is done with it. Skerries SEC should monitor progress in Sligo and if they deem that it could be replicated across their town, should lobby Bolt or a similar service provider to see if they would consider setting up in Skerries. It's noted that in neighbouring towns such as Malahide, dockless e-bikes have been introduced very recently, which if successful, would provide Skerries with a template to build on.

Figure 21 – An example of a dockless parking station for the Bolt e-bikes in Sligo

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 Skerries, were almost 30% of the local population lies between the ages of 15-39 as per the last census results. Skerries 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.

Promotion of public transport services

Skerries is in the quite fortunate geographical position of being located inside Dublin's sphere of influence when it comes to public transport, with an Iarnrod Eireann station and Dublin Bus services regularly servicing the town 7 days a week. The rail service in particular has been embraced by the town, with 21.5% of commuters utilising it, compared to a national average of 3.4% which is highly commendable.

However, bus services remain underutilised and actually sit below the national average. It is noted in feedback from local representatives that the bus network around Skerries 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 Fingal 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.

Recently Bus Eireann and Dublin Bus both announced reductions in fares to combat the rising cost of living. This has resulted in fares for adults travelling within the Dublin Metropolitan Area being as low as €2.00 for a 90-minute journey that includes unlimited transfers within the allocated time. Unfortunately, Skerries along with Balbriggan currently sits outside of the TFI 90-minute zone and instead is charged the fares associated with Irish Rail Zone 5.

This has been highlighted by local TD's in recent months and it's hoped that both Skerries and Balbriggan will be included in the 90 minute zone in the near future. Despite the discrepancy between Skerries and other neighbouring towns in the TFI 90 minute zone, given the rising cost of fuel, coupled with an absence of toll booth payments, this is an affordable option for those commuters who would traditionally drive towards Dublin City and also allows unlimited transfers within a journey.

TFI Leap Card Fares (from 9th of May)

TFI Leap Card Fares (from 9th of May)	Adult	Young Adult (19-23)	Child (5-15) and (16-18)
Short	€1.30	€0.65	€0.65
TFI 90 Minute	€2.00	€0.65	€0.65
X Services	€2.40	€1.00	€1.00
Irish Rail Zone 5	€3.00	€0.65	€0.65
Irish Rail Zone 6	€3.90	€0.65	€0.65

Figure 22 – An overview of the reductions in Leap Card Fares from May 2022

Whilst it will be difficult for Skerries SEC to have any meaningful impact on the fuel choice used by the likes of Bus Eireann or Dublin Bus services, 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.

Skerries SEC could lobby Fingal County Council to replicate this initiative over the coming years and should be able to justify multiple Electric Buses given the population of Skerries and surrounding towns.

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
- Social and inclusive
- Suitable for longer distance commutes daily
- Suitable for school runs as the start and finish times are defined

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 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.

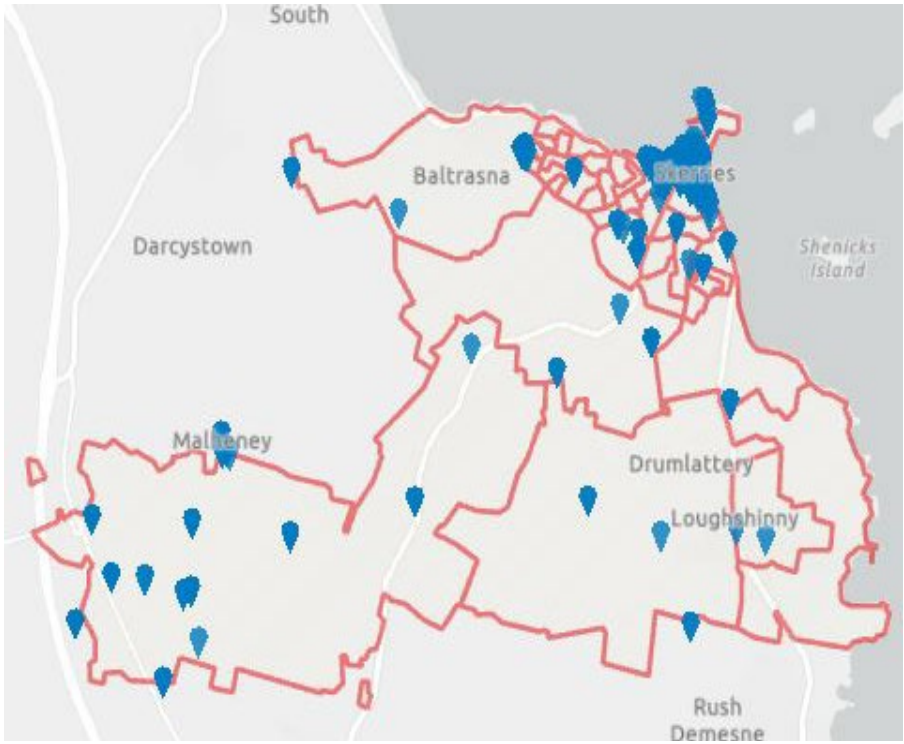


Figure 23 – The spread of commercial businesses in the Skerries SEC

Method

An analysis of commercial/business energy consumption within the SEC catchment was carried out using various data sources including 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 "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 Skerries four non-domestic premises were audited to Ashrae level 1 to identify any opportunities within these premises for energy efficiency measures. 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 detailed in the following list and a detailed report was provided to each of the property owners the results of which are located within the Appendices:

- Skerries Community Centre
- Réalt na Mara (Skerries Primary School)
- Skerries Town FC
- Skerries Sailing Club

Results and Analysis

Below is an overview of the estimated total energy usage, emissions and spend from the Commercial/Business sector within the Skerries SEC. This helps the 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 16 – 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 (€)
1322	3865	728	734	1463	€5,918,334

Support for SMEs

Aside from the recommendations contained within the EMP and supplementary non-domestic audits, businesses can utilize the recently created ClimateToolKit [18] 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 [19]. 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 Skerries SEC which can be developed into energy efficiency projects. The standout projects are:

- **Skerries Town FC**
  - Pumped cavity wall insulation should be implemented particularly in the area surrounding and adjacent to the meeting room.

- **Skerries Sailing Club**
  - Upgrade to a condensing oil boiler which would greatly increase the efficiency of the boiler. Typically this can reduce energy use by an estimated 17-20%

- **Réalt na Mara**
  - Energy Monitoring equipment should be installed on the site so that the targeted interventions can be made on significant energy users

- **Skerries Community Centre**
  - All lighting across the site should be upgraded to energy efficient LED light fittings.

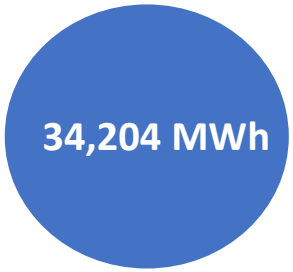
[18] *climatetoolkit4business.gov.ie*

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

Renewable Energy

Where a 20% reduction in electricity consumption could be achieved there would remain a residual demand in the catchment area of 34,204 MWh. In order to offset this residual demand 15 MW of wind power or 39 MW of solar power would be required to service the catchment area.

Residual Energy Demand



A community-led project under the Renewable Electricity Support Scheme (RESS) 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 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)[20] 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 and below 5MW 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.

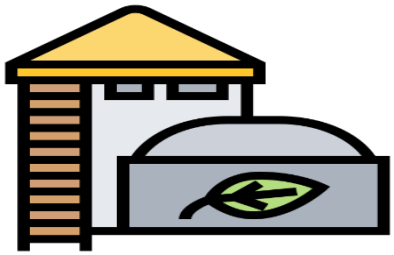
In total, about 3,000 ‘gigawatt-hours’ will be put up for auction by the state. The most cost-efficient bidder will be the first picked, the second most cost-efficient will be the second picked and so on until all the gigawatt-hours are accounted for. In essence this means only the most efficient project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

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

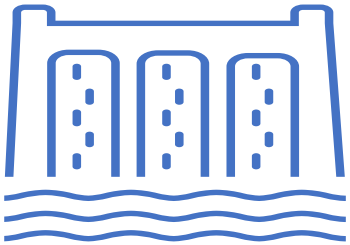
Eligible technologies under the RESS scheme include:

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 or biogas



Hydroelectric

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

- Community Led Projects
- Community Benefit Funds
- Community Enabling Framework

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 SEC.
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 up until 2040. 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 Enabling Framework

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 SEAI (or another 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.

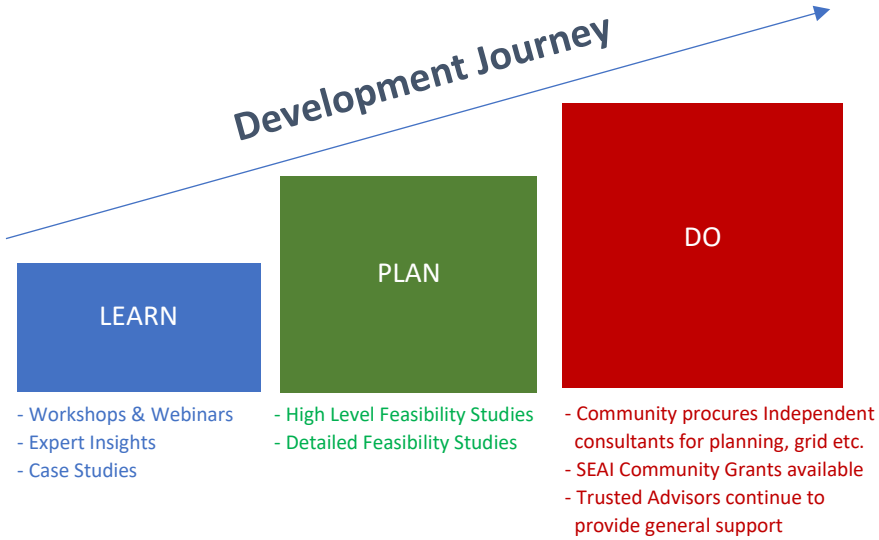
One of the key community provisions as part of RESS is the Community Enabling Framework which provides end-to-end support to create a community energy sector in Ireland that can flourish sustainably over time and one that will deliver meaningful impact to communities nationwide. SEAI have been appointed by the Department of Environment, Climate & Communications (DECC) as the implementation body for this Framework which will provide a range of supports including:

1. **Trusted Intermediary:** this is effectively the RESS community team within SEAI. This is the first place that communities go to seek help with their RESS projects. The contact email is: CommunityRESS@seai.ie

2. **Information warehouse**: SEAI have developed a number of toolkits to help communities understand the RESS journey[21]. Toolkits include: onshore wind, solar PV, the planning process and grid connection. There are several more in development. The Toolkits 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.

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

3. The **Trusted Advisor** (TA) service from SEAI is now available for communities who want to develop their own electricity generation projects. The TAs will help the SECs through the development stages of a generation project. This will include two free feasibility studies to determine if the community generation project is viable.



4. **Financial supports**: this is the community RESS enabling grant. The total grant available is 80% of eligible costs up to a maximum of €180,000. Entry to the grant programme is based on the successful completion of the feasibility stage conducted by an SEAI appointed TA from above. The grants can be drawn down in €25,000 tranches on completion of key milestones. A requirement before drawing down the second tranche is the undertaking of a public engagement event to ensure that the generation project is socialised within the community.

Proximity to substations

The use of energy is supported and influenced by the presence of specific energy infrastructure in the local area. In terms of electricity supply, Figure 24 evidences the sub stations that are within 10km of Skerries SEC, which is generally seen as the limit for any non-utility (major development) scale developments.

Fortunately, Skerries is in the position of having three substations within 10km of the SEC. It's important to be aware that all substations have a certain amount of capacity for electrical generation.

In simple terms, this means we cannot build and connect an unlimited amount of Renewable Energy generating projects to the electricity grid without first upgrading it so that there is sufficient capacity available.

Whilst the substation within the Skerries SEC currently does not have any spare capacity, the two substations North of Skerries SEC have approximately 18.1 MW of spare capacity available at the time of writing which is enough for multiple community-owned projects.

This would be a very attractive prospect for a renewable energy project that would fall under the RESS scheme. This data is based on the ESB Network Capacity map which is intermittently updated to reflect the capacity of substations across the country. It must be noted that a more detailed study would be required to determine any other constraints in the network.

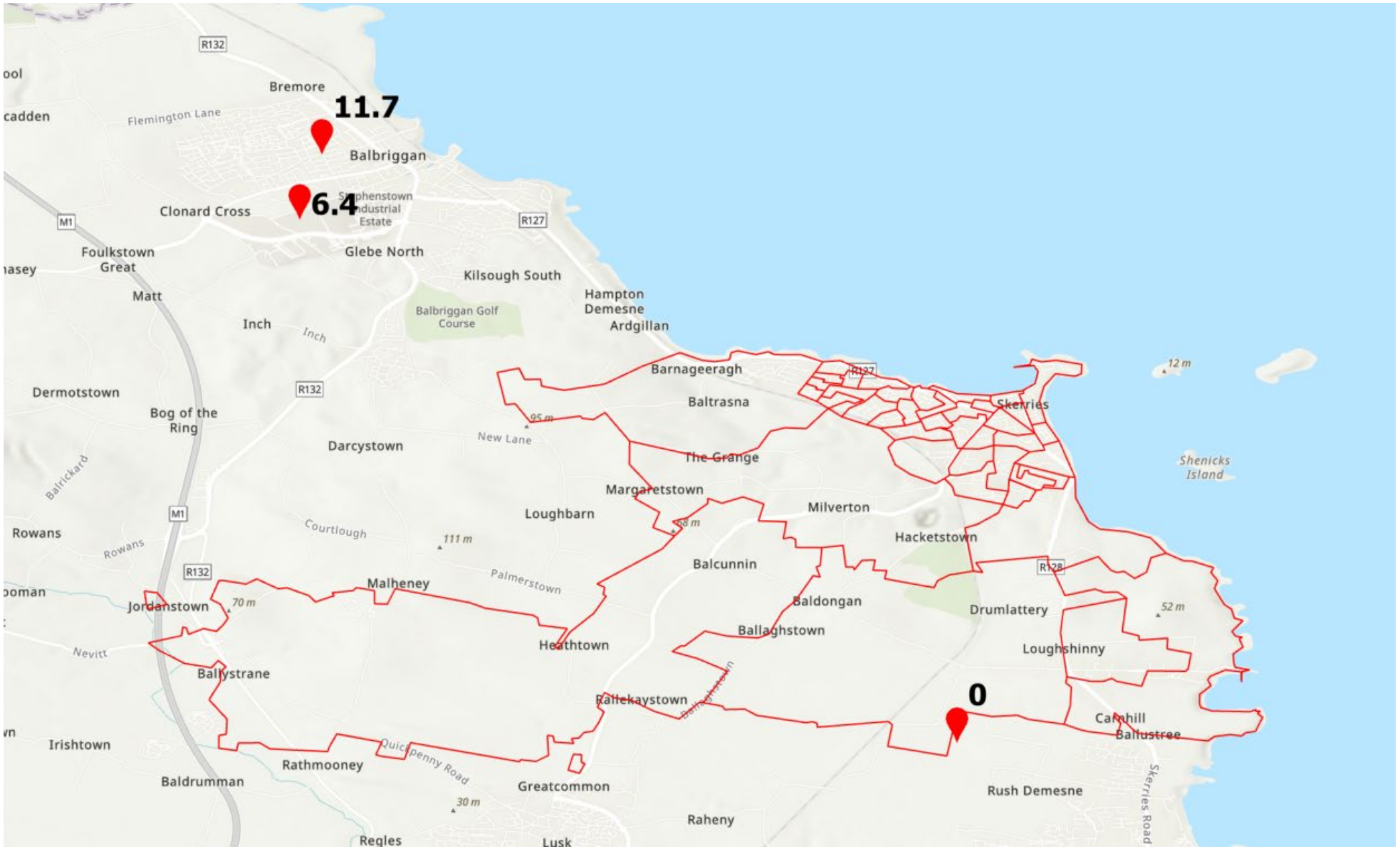


Figure 24 - Skerries SEC proximity to existing sub stations (10km buffer). The red point denotes a substation & the number refers to the capacity (Megawatts) at the substation

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 SEC to reach each of its targets: 30% energy reduction and a transition to a majority of its energy being generated renewably by 2030.

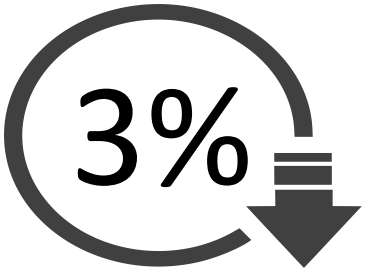
These targets have been broken down in each of the sectors detailed in the table below.

Table 17:- 3% Annual reduction in the Carbon Footprint for Skerries SEC

Community CO2	
tCO2	**35,572**
% Annual CO2 Reduction	3%
Year	**tCO2**
2022	34,505
2023	33,470
2024	32,466
2025	31,492
2026	30,547
2027	29,631
2028	28,742
2029	27,879
2030	27,043
2031	26,232
2032	25,445

Table 18 - Skerries SEC Plan to 2030

	Number of Projects	**Primary Energy Savings (kWh)**	**CO_2 Savings (tonnes)**
Community owned and Private Sector Wind Projects	15.6	34,204,049	10,118
Residential Housing Upgrades to B2 Medium Heat Pump (20%)	825	7,623,000	3,557
Electrical Car Ownership (40% Change)	40% Change	5,124,708	2,101
Reduction in Car Journeys though remote working	40% Change	10,985,155	2,448
Total		**57,936,911**	**18,224**



Annual Reduction in the Carbon Footprint for Skerries SEC

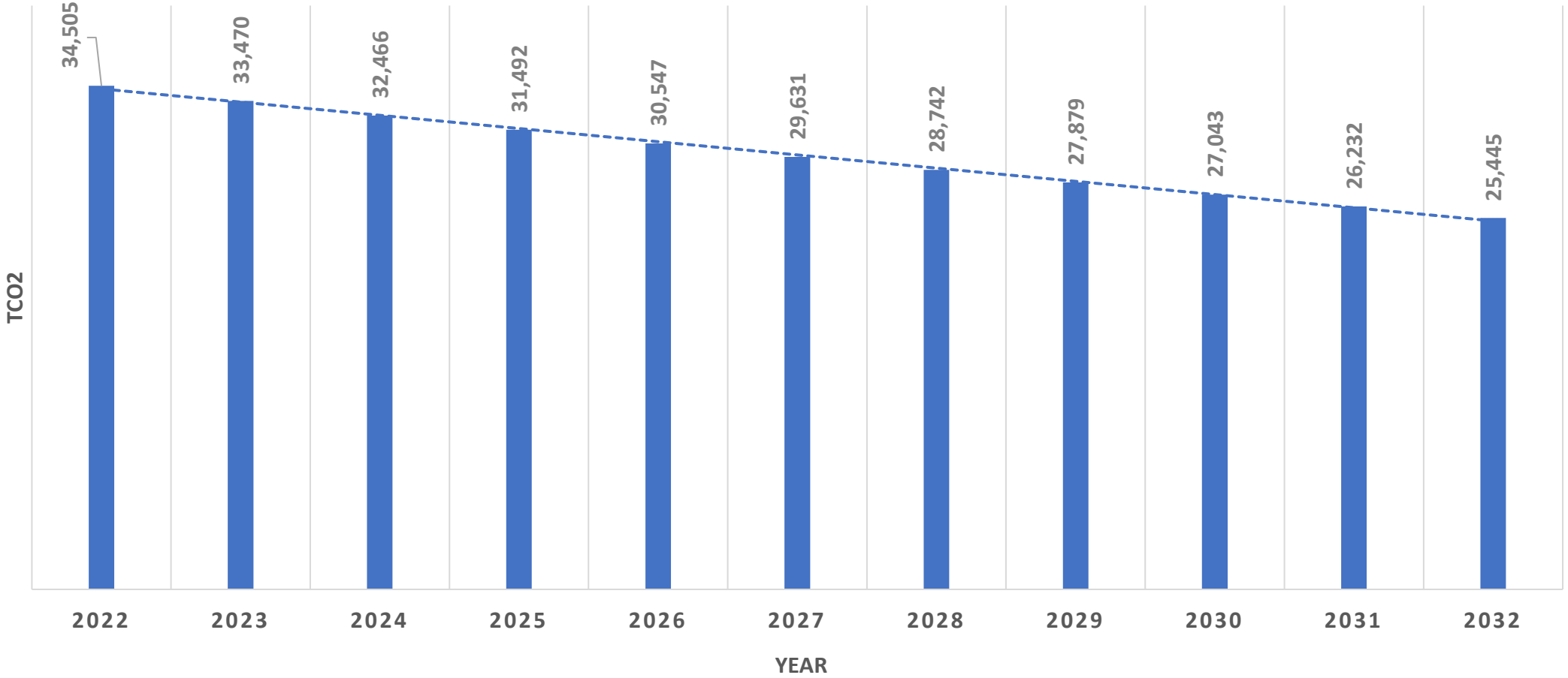


Figure 25 – The reduction in tonnes of CO_2 annually if the SEC reduces its Carbon footprint by 3%

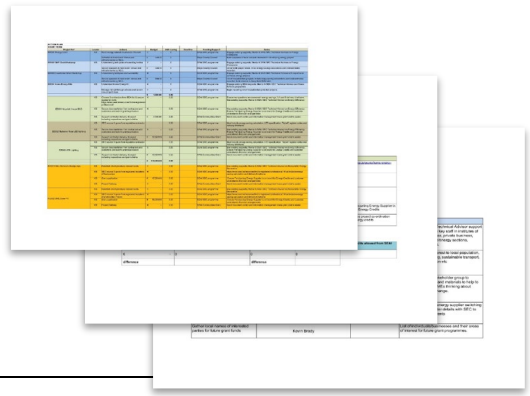
Register of Opportunities (RoO)

The Register of Opportunities (RoO)[22] developed for Skerries SEC provides a list of projects in three categories which have been identified within the community.

Behavior and Energy Efficiency and Renewable Energy Projects have been identified, which have both short- and medium-term timescales. The RoO provides for a detailed project-specific planning tool including project cost, energy impact and carbon savings.

The Register of Opportunities (RoO) is a live document used to identify, evaluate, and plan your energy projects. The SEC owns this document and is responsible for using, editing and improving the content in order to match its ambitions.

The RoO is presented in an excel workbook because some parts contain formulas to calculate financial and energy savings.
* Example of Register of Opportunities Document



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

As part of the scope of works for the Energy Master Plan for Skerries SEC, a number of domestic energy audits and non-domestic audits were carried out on buildings selected within the community. Sections of the register of opportunities was generated from these audits based on the information available.

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 community?

Standout projects are listed below with a full breakdown included in the Appendix:

- 6kWp Solar PV system at Skerries Sailing Club
- 6kWp Solar PV system at Skerries Community Centre
- Community EV Charging Points
- Feasibility study for a Renewable Energy Support Scheme (RESS) community power project in the Skerries SEC

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

Action Plan for Skerries SEC

Capacity Building

One of the key elements in the development of a success SEC 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 SEC's 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.

Please refer to Appendix A for more information on BEC grants. 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.

Low Lying Fruit First

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.

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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 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 2006. 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 make, 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. Registered contractors 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**
Attic 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

For more information and to get in contact with a One Stop Shop, please visit - https://www.seai.ie/grants/home-energy-grants/one-stop-shop/registered-providers/

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 but 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 €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.[23]

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