XD Consulting
Sustainable Energy Engineers

Synergy CU SEC Energy Master Plan

Second Interim Report

Client:	Consultancy Team	Date
Synergy Credit Union SEC	Xavier Dubuisson, XD Consulting	03/10/24

Funded by the SEAI Community Energy Grant programme & Supported by Synergy Credit Union.

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

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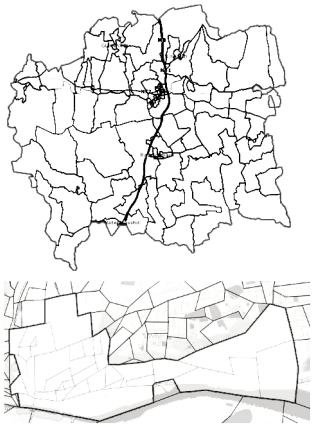
ENERGY MASTER PLAN FOR SYNERGY COMMON BONDS

Commissioned by the Synergy Credit Union SEC and funded by SEAI

OVERALL AIM

Provide a roadmap for the transition of Synergy CU Common Bonds to sustainable energy, by and for the community.



The specific objectives of the study conducted by XD Consulting were to:

- **Establish a baseline** of energy use in the county and associated CO_2 emissions.
- **Identify renewable energy opportunities** and scope those suitable for community initiatives.
- **Define a register of opportunities** and **a strategic plan** to reduce energy demand and transition to renewable energy by 2030.

BASELINE ENERGY BALANCE ANALYSIS 2022

TOTAL ENERGY USE
1.1 terawatt hours/year
=
647 thousand barrels of oil

TOTAL ENERGY EXPENDITURE
€129 million/year
=
annual earnings of 2,480 workers in Cork

CO_2 EMISSIONS
0.3 million tonnes
=
110 return flights Dublin ➡ Sydney

CO2 EMITTERS

26%	20%	34%
Transport	Homes	Industry

ENERGY USE

68%	26%	6%
Fossil fuel 15% coal & peat	Electricity	Renewable energy

Energy units explained:

A terawatt hour (TWh) is a billion kWh (the energy unit used on your electricity bills) and is equivalent to 588 thousand barrels of oil in energy content.

A tonne of CO_2 is a common unit for greenhouse gas emissions. The fuel burnt during a return Dublin-Sidney flight emits approx. 2500 tonnes of CO_2 (tCO_2).

ZOOMING IN ON HOUSES

Baseline Energy Use

13,889 homes

AVERAGE ENERGY PERFORMANCE

- Average BER: C3 (national: C2)
- 77% of houses with BER C or worse
- Average emissions: 4.1 tonnes CO_2/dwelling/year for heating, appliances, lights, hot water,...
- Average energy bill: €2,500/year
- Generally, homes are heated below appropriate comfort levels

SUSTAINABLE ENERGY ROADMAP

HOME ENERGY UPGRADE SCENARIOS

A RANGE OF ENERGY UPGRADE OPTIONS WERE ANALYSED TO IDENTIFY A PATHWAY TO ACHIEVING THE NATIONAL CLIMATE ACTION PLAN TARGET OF BER B2, FROM AN AVERAGE BASELINE OF C3.

BRONZE	SILVER	GOLD
investment €9,000	**investment €25,000**	**investment €66,000**
BER C1	**BER B3**	**BER A3**
-30% CO_2 emissions	**-40% CO_2 emissions**	**-80% CO_2 emissions**
Basic insulation (attic & cavity walls)	Bronze +	Silver +
Draughtproofing measures	Full central heating upgrade	External wall + roof insulation
Modern heating controls	New condensing gas boiler	Triple glazed windows & new doors
Wood stove		Air source heat pump
100% LED lighting		
2,800 homes (20%)	**4,200 homes (30%)**	**4,200 homes (30%)**

29,700 tCO_2/yr. (-40%) at a total capital cost of 362 million euro

POTENTIAL

RENEWABLE ENERGY SOLUTIONS & COMMUNITY INITIATIVES

SOLAR

- Very strong roof-top PV potential (up to 30 MW). Local campaigns to drive installation on farms, schools and homes.
- Medium-term potential for community-based solar farm developments (up to 2 x 5 MW).

HYDROPOWER

7 potential sites in and around the Fermoy
Total potential capacity of 620 kW
Impact: -1500 tCO_2/yr.

BIOMASS

- Biomass boilers for public & community buildings, as well as businesses with high heat demand. (20% of energy use)
- Promote local bioenergy supply chain development.

DISTRICT HEATING

District Heating Candidate Area in Fermoy
Total heat demand of 5,000 MWh/yr.
80 potential connections

WIND

- 35 MW wind farm in Barranafaddock, producing 30% of the common bonds' electricity consumption.

AQUATHERMAL

Large heat pump
Blackwater as heat source
Connected to Fermoy district heating
Impact: -580 tCO_2/yr.

Realising these renewable energy opportunities would result in 83,000 tCO2/yr avoided (-30% of total emissions).

NON-RESIDENTIAL & TRANSPORT

Energy efficiency and renewable energy measures to achieve the following Climate Action Plan targets for 2030:

NON-RESIDENTIAL

- -45% carbon savings in businesses
- -50% carbon savings in the public sector
- -35% carbon savings in the industrial sector
- **Achieving this would result in 60,000 tCO_2 avoided (-40% of emissions in these sectors)**

TRANSPORT

- Assuming a 40% switch to EV's (35,450 vehicles)
- 60% carbon saving compared to diesel/petrol
- **Achieving this would result in 17,000 tCO_2 avoided (-25% of emissions in transport)**

SUSTAINABLE ENERGY ROADMAP
SUMMARY

ANNUAL CO_2 EMISSIONS (BASELINE)
283,000 tCO_2/year

RENEWABLE ENERGY
-83,000 tCO_2/year
-30%

ENERGY EFFICIENCY
-69,000 tCO_2/year
-25%

CO_2 REDUCTION MEASURES

PROJECTED ANNUAL CO2 EMISSIONS 2030
131,000 tCO_2/year

REGISTER OF OPPORTUNITIES

INTEGRATED ENERGY RETROFIT DELIVERY MODEL AT COMMUNITY LEVEL

Funding supports & grants available for sustainable energy projects undertaken by

Homes Businesses Community projects

… from local, national and EU funding bodies

Ireland's CAP Strategic Plan LEADER 2023 – 2027
Ballyhoura Development North Cork

It takes a village!
This Energy Master Plan was supported by the following partners:

synergy Credit Union Limited where community matters

SUSTAINABLE ENERGY COMMUNITIES

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

BALLYHOURA DEVELOPMENT CLG

XD Consulting

The study underlying this Energy Master Plan was undertaken by **XD Sustainable Energy Consulting** Ltd (XDC in short) an integrated sustainability consultancy providing multi-disciplinary services in the area of renewable energy and energy efficiency. Our mission is to empower our clients for their transition to a low-carbon and resilient future.

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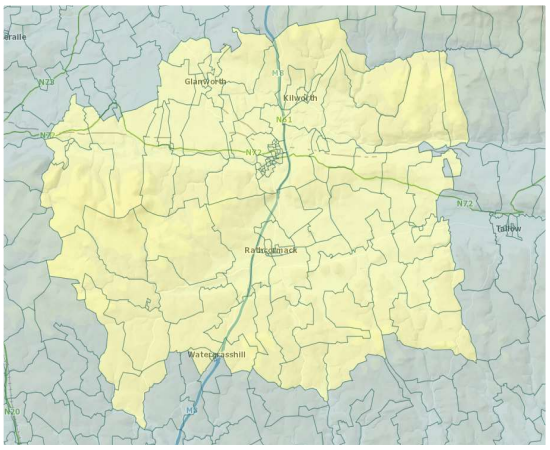
1. Introduction

This (preliminary) report presents the Energy Maser Plan (EMP) prepared by XD Sustainable Energy Consulting Ltd and e-Townz for the Synergy CU SEC. The EMP aims to achieve the following objectives:

- Provide a baseline of sectoral energy usage, current energy sources and energy-related CO_2 emissions for the study area, with a breakdown between thermal, electricity and transport use. This will be expressed in final & primary energy terms, energy costs and CO_2 emissions.
- Establish a Sustainable Energy Roadmap, a Register of Opportunities for the reduction of energy demand and the transition to renewable energy supply, a Project Development Strategy.

The geographic study area for this EMP encompasses the Synergy Credit Union's Common Bond Area including areas in Northeast Cork (Fermoy area) and Cork City:



Fermoy Common Bond area includes Araglen, Ballyduff, Ballyhooly, Castlelyons, Castletownroche, Conna, Glanworth, Glenville, Fermoy, Kilworth, Kildorrery, Leamlara, Rathcormac, Watergrasshill and surrounding areas.

Cork City Common Bond area includes Tivoli, Lower Glanmire Road, Middle Glanmire Road, Horgans Quay, Patricks Quay, McCurtain Street, Leitrim Street, Richmond Hill, Rathmore Park, Popes Road, Thomas Kent Park, Old Youghal Road, St Lukes and surrounding areas.

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e-Townz: (also trading as eConcepts) is a digital services company that specialises in enabling stakeholders in the community development sector, including local development groups, county councils and national organisations who deliver services through communities.

2. Baseline Analysis

A. Residential Sector

XD Sustainable Energy Consulting Ltd has commissioned its sister company RetroKit Ltd to assist with the development of the Synergy CU Sustainable Energy Community's Energy Master Plan with funding from the Sustainable Energy Authority of Ireland. This report presents the results of the analysis conducted by RetroKit to support the planning of a roadmap for the energy upgrade of homes in the study area. The overall objective for the roadmap is to provide strategic insights into how the housing stock within the study area is currently performing and the energy upgrade options to bring the residential sector to a B2 rating and ultimately decarbonise it by 2050. The implementation of the roadmap will result in the following impacts:

A) Reducing energy usage and increased share of renewable energy.
B) Alleviating fuel poverty by reducing energy costs.
C) Minimising energy-related CO_2 emissions and moving towards the decarbonisation of the housing stock.

RetroKit is a team of energy experts and software engineers based in Ireland. We have developed a software platform combining a powerful data management system, big data analytics and a modelling tool to support housing providers in making investment decisions and planning their home energy upgrade strategy.

The specific objectives of the study underlying this Energy Master Plan are:

- Conduct a baseline energy performance analysis of its housing stock, based on the available BER data, for 2022 as the reference baseline year for the EMP.
- Model a range of home energy upgrade scenarios with a view to identify the optimal strategy to renovate the housing stock, considering key targets, constraints and funding opportunities.
- Create a detailed Home Energy Upgrade Plan for the most representative dwelling types in the housing stock.
- Define a Home Energy Upgrade Roadmap and Register of opportunity focusing on the medium-term (2030) objectives.
- Recommend next steps to kick-start the implementation of the Energy Master Plan and engagement activities with key stakeholders.

1. Energy performance data used and modelling methodology

The data underpinning the analysis of the housing stock within the study area in RetroKit is drawn from a number of sources:

- SEAI BER Research Tool which provides anonymised BER data for the dwellings that have been assessed in County Cork and Cork City.
- CSO Population Census data for 2022 which provides key characteristics on the housing stock including age of construction, dwelling type, main heating fuel, at a Small Area resolution[1].
- SEAI's BER map which provides insights as to how dwellings that have been assessed in a given Small Area perform.

From the BER research tool County & City data above, RetroKit first 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 study area. The CSO SAP MAP data is used 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.

Of the 240 potential archetypes, only those found in the county & city-wide BER data (in the BER research tool) are taken into consideration. RetroKit uses the BER research tool data to determine the likely spread of wall types and fuel types across the age bands and dwelling types. For example, solid walls are more likely to be found in older dwellings. Electric heating (particularly direct electric heating) is more likely to be found in apartments than in detached houses. The resulting "sample factors" denote how many of each of the above "archetype dwellings" exist in the study area.
Once the study area dwelling stock is compiled as outlined above, RetroKit evaluates the residential energy use, fuel costs and carbon dioxide emissions for the full study area. RetroKit's calculations are based on the calculations underpinning the Building Energy Rating (BER) for Irish homes and gives an estimate of the BER grade. The calculation uses standard assumptions for occupancy levels, heating schedules and temperatures and hot water demand, climate , as well as electricity use for lighting, pumps and fans. The stock sample built for RetroKit is based on "typical" archetypes derived as outlined above.

Correction is made to the results to reflect likely shorter heating schedules and lower indoor temperatures. Homes with lower levels of insulation and less efficient heating systems (typically older homes) will usually have much lower

[1] Census Small Area (CSA) generally cover 65-90 households.

energy usage than the standardised value, indicating that those homes are often inadequately heated in reality. The "expected" energy usage referenced here is based on a comprehensive study carried out by RetroKit in conjunction with the CSO on modelled versus actual energy usage in housing[2].

Energy use in small and large appliances and cooking, (which are outside for the scope of the BER methodology) are broadly estimated using CSO data for metered electricity use in the residential sector in the county, city and nationally[3], as well as SEAI Energy in Ireland report for 2022, are also included in the baseline energy balance and performance analysis presented hereafter.

2. Baseline Energy Balance and Performance Analysis

The current performance of the study area's housing stock was analysed using RetroKit following the methodology outlined above. The platform's helps characterise the stock and provides a baseline analysis in the form of KPIs at individual archetype dwelling level and across the housing stock within the EMP study area. A summary of this baseline analysis is presented in the following graphs and tables.

a) Characterizing the housing stock

Overall the analysis covers 13,889 dwellings distributed across 144 Small Areas. The average BER grade across the study area was a C3 compared to a C2 across the nation. The average energy annual expenditure was estimated at €2,546.

The Cork City Common Bond Area includes 3,122 dwellings (22%) with an average D1 BER rating and an average expenditure estimated at €2,123. This compares to a an average C2 BER rating in the Fermoy Common Bond Area, with an average energy expenditure estimated at €2,660.

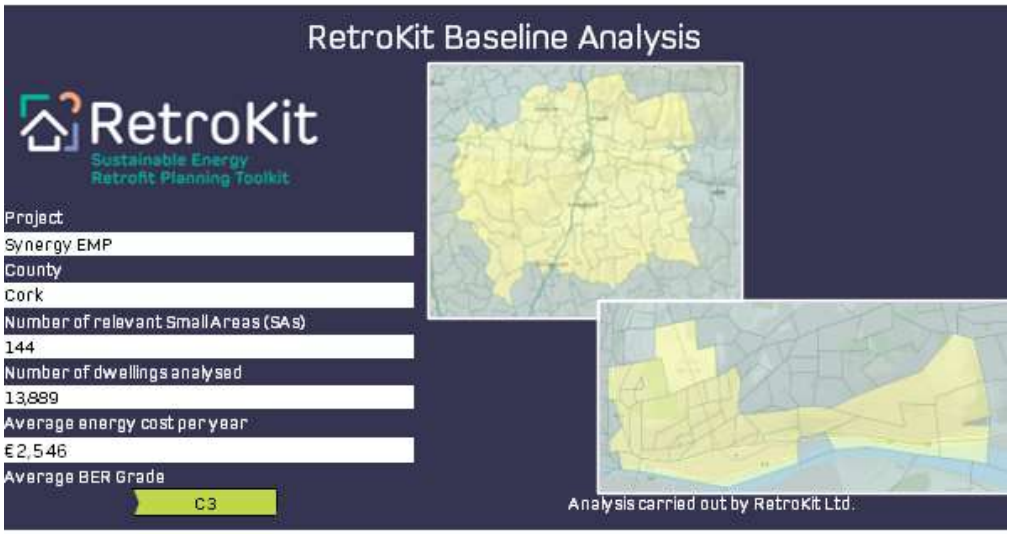


Figure 1: Energy baseline overview

Figure 2 presents a breakdown of the housing stock according to key characteristics including age of construction, dwelling type, main heating fuel and wall type. These characteristics are used to classify the dwellings in 'archetypes' (coherent groups of dwellings with similar properties).

[2] The correction factor applied are derived from a study of anonymised metered energy use (gas and electricity) across 8000 dwellings were compared to 'modelled' energy use derived from the BER data for these dwellings.
[3] https://data.cso.ie/table/MEC03 and https://data.cso.ie/table/DBEREL01 & https://data.cso.ie/table/DBEREL02

Age band	Age band count	Dwelling type	Dwelling type count	Fuel type	Fuel type count	Wall type	Wall type count
0 - 1970	5,111	Apartment	3,082	Solid Fuel	1,073	Timber frame	1,284
1971 - 1990	2,162	Terraced house	3,616	Electricity	3,110	Cavity	7,578
1991 - 2000	1,498	SemiD house	2,322	Heating oil	4,909	Solid/Unknown	5,027
2001 - 2010	4,000	Detached	4,869	Gas/LPG	4,797		
2011 - 2022	1,118						
Total	13,889					Avg floor area	112m2

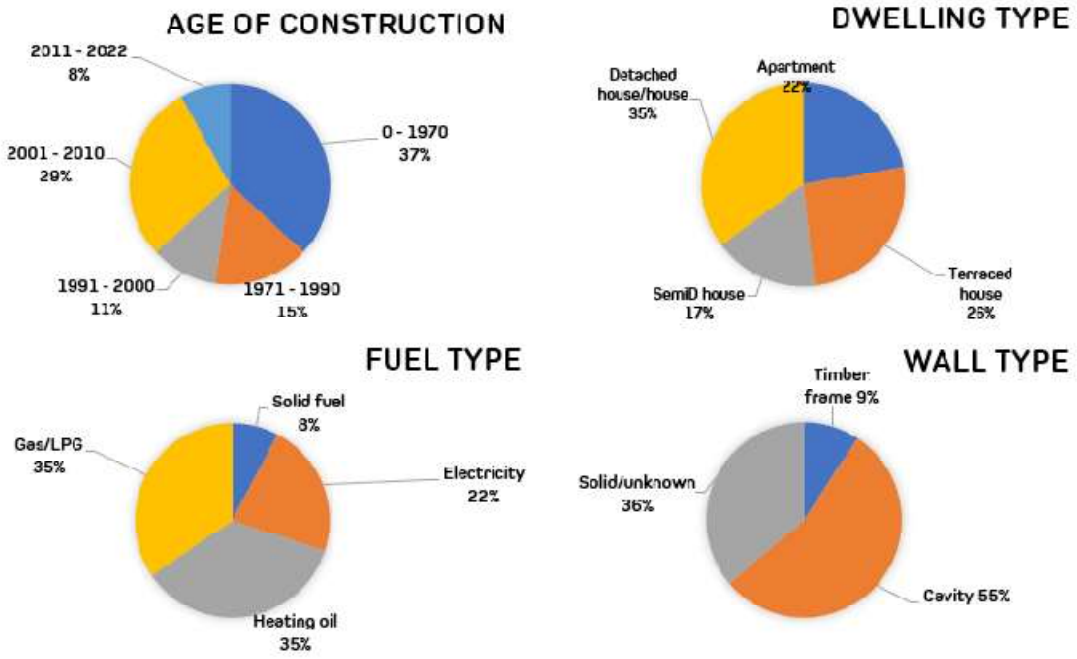


Figure 2: Breakdown of the housing stock archetypes.

Over 37% of the housing stock has been built since 2000, including 8% post 2011 when significant improvements in energy standards were introduced in the Building Regulations. Another 37% of the stock was built prior to 1970, at a time when there was no requirement for energy conservation in the building regulations. The remaining 26% was built before 2000 predating major improvements energy performance, but when some modern construction techniques such as cavity wall would have been common.

Given the nature of the study area, the stock has a mixed urban and rural morphology with about half of the dwellings being apartments or terraced homes, and the other half is semi-detached or detached homes. Equally, we see similar proportions of dwellings heated primarily by gas boilers and oil boilers (35% of dwellings each). Thankfully, a minority of dwellings (8%) are heated by solid fuels such as coal and turf typically in inefficient appliances, which pose a problem in terms of **CO_2** emissions and air quality.

Electricity is also used as a primary source of heating in 22% of all dwellings, many of which are likely to be in smaller dwellings in an urban area. Direct electrical heating is typically more expensive than other fuels (day rate electricity is currently over three times the price of natural gas per unit delivered to the premises), it results in a higher primary energy usage[4], BER rating[5] and CO_2 emissions.

[4] Primary energy refers covers both the energy content of the fuel delivered and the energy required to produce and distribute this fuel. The Dwelling Energy Assessment Procedure (DEAP) methodology assumes that for every unit of electricity used, 2.08 units of primary energy is consumed (a mix of coal, oil, natural gas, wind energy, etc.). Natural gas and oil have a primary energy factor of 1.1 by comparison.

[5] The BER rating is determined according to a dwelling specific primary energy usage (kWh per m2 of treated floor area per year), according to standardised conditions (typical occupancy, Dublin's climate, etc.). As a result, dwellings using electricity for heating will have a worse BER rating than a gas or oil heated dwelling with a similar level of heat demand.

The main wall type is classified as 'cavity' (55%), another 36% are classified as solid walls (or unknown) and there is also a significant number of dwellings built with timber frame construction.

While the EMP analysis will not be broken down between the Cork City and Fermoy Common Bond Areas, we can identify the following key differences:

- Cork City's dwellings are obviously more urban, smaller (78 m2 total floor) and are mostly apartments (48%) and terraced homes (36%). Fermoy's dwellings are larger (122 m2) and mostly detached (42%) or semi-detached (20%).
- Cork City's dwellings have an older profile (67% built before 1970), with solid walls the most common wall type (63%). Around Fermoy, dwellings are more recently built (55% post 2000) with cavity walls (61%) or timber frames (11%).
- Cork City's dwellings are using either natural gas (50%) or electricity (42%) as their main heating fuels. Fermoy dwellings are mostly oil heated (42), but gas is also used significantly in this common bond area (30%).

b) Energy Performance Overview

In terms of energy performance, RetroKit's baseline performance analysis tool uses the datasets outlined above to calculate Key Performance Indicators at dwelling archetypes level and then aggregating them across at overall stock level. These KPIs include:

- The amount of renewable energy produced at the house site e.g. with solar energy, a heat pump, a wood stove, etc. in kWh or MWh (1,000 kWh) per year (one of the reference energy units used across the report). This doesn't factor the renewable portion of the electricity delivered by the grid to the house.
- The specific primary energy consumption which is calculated by dividing the overall primary energy (kWh per year) in a dwelling as calculated with the DEAP methodology[4] by the total floor area of a dwelling (m2). This is used to derive the BER grade of a dwelling. This KPI is benchmarked against the specific primary energy requirement range for a B2 rating.
- The distribution of BER grades across the study area, with the number of dwellings in each grade.
- The delivered energy which estimates the amount of electricity and fuels supplied and consumed at the house level, in kWh or MWh per year.
- Energy expenditure for the electricity and fuels consumed, in euros or thousand per year.
- **CO_2** emissions in kg or tonne of **CO_2** per year.

The graphs in Figures 3 and 4 present these KPIs broken down by age of construction groups. There is usually a good correlation between age of construction and energy performance levels, reflecting improving energy efficiency standards in the Building Regulations over time, as well as the introduction of new construction and heating techniques. If required, RetroKit can provide the same KPIs broken down by dwelling types, wall types and main heating fuels.

The first set of graphs (Figure 3) presents the following KPIs as average per dwelling for the different age of construction groups as well as for the whole housing stock. The second set of graphs (Figure 5) presents the same KPIs as totals for the housing stock in the study area.

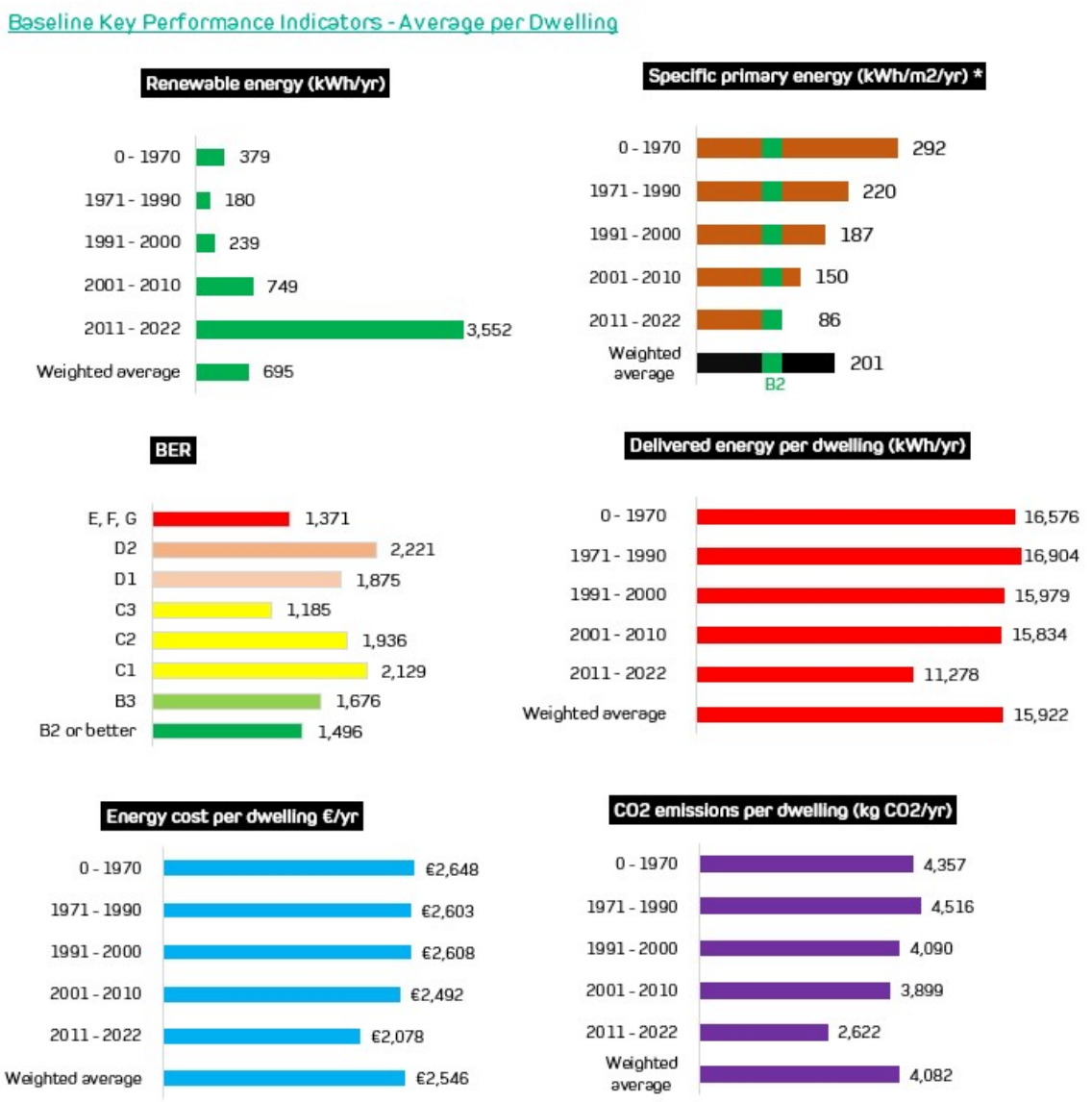


Figure 3: Average baseline key performance indicators by dwelling type.

The key findings presented in Figure 3 to be highlighted include:

- The average BER rating across the dwellings' BER data analysed is C3, just below the national average of C2.
- c.90% of dwellings have a BER below B2, which represents a significant challenge in terms of the improving energy performance.
- 10,717 dwellings have an estimated BER C or worse and should be prioritised for upgrade.
- The average estimated energy usage is 15,922 kWh/yr per dwelling, with only 5% being supplied from on-site renewable energy sources.
- The associated CO_2 emissions have been estimated at an average of 4.1 tonnes per dwelling per year.
- The average energy bill per household (excluding transport fuels) was estimated at €2,542 per year. Given the strong inflation on energy price currently experienced by Irish households, energy poverty is a very real risk.

It is worth noting that the correction factors applied to energy use data as modelled with DEAP to obtain better estimates of 'actual' energy use (we refer to these as 'predicted' energy use), appear to reduce the variation in energy

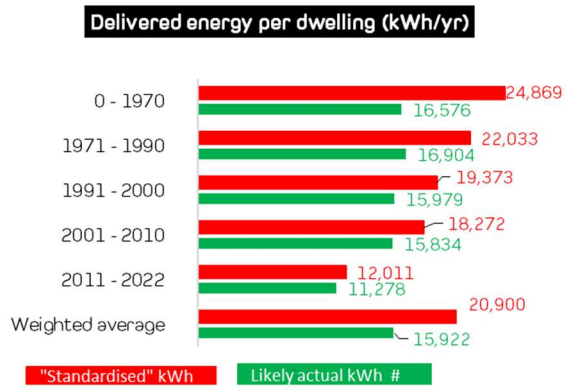
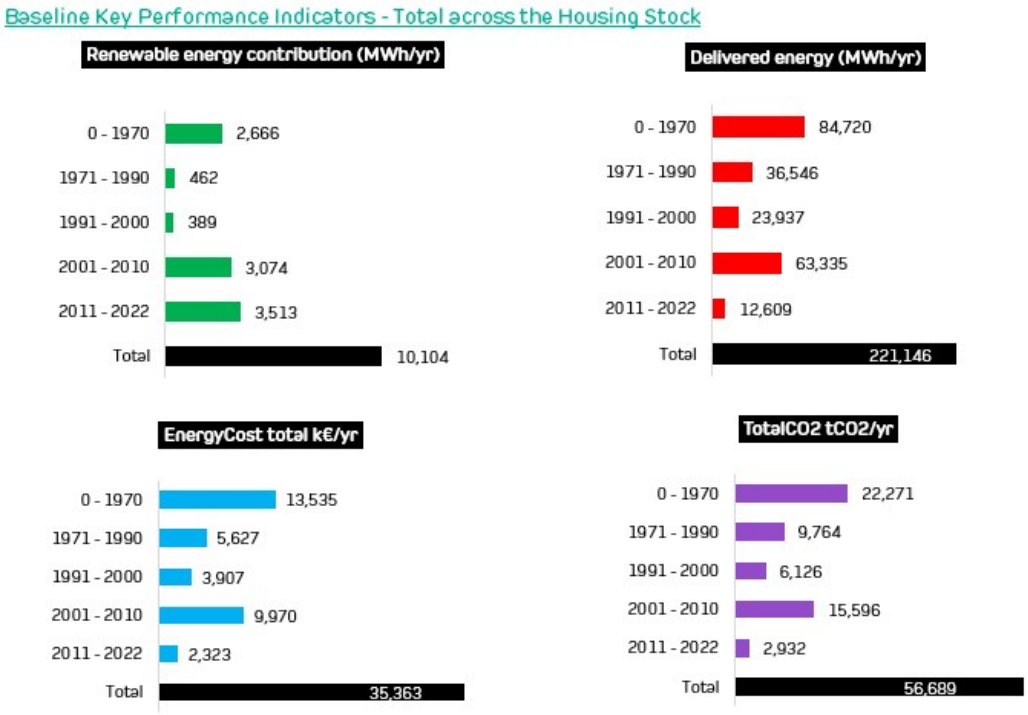


Figure 4: Difference between modelled and predicted energy use among age of construction groups.

use between age of construction groups (see 'delivered energy' graph above). This more than likely reflects the fact that energy costs and households' disposable income (ability to pay for energy) is a stronger determining factor of energy use than the energy performance of their house. The graph herewith illustrates the difference between modelled and predicted energy per age group, showing stronger contrast in predicted energy use between age groups. There is about 25% difference between modelled and predicted energy use across the stock, and the older the dwellings, the bigger the gap. This indicates that households heat their house less than they should to maintain the level of comfort assumed as standard. Households living in older dwellings are particularly vulnerable to inadequate heating, a key indicator of energy poverty.

Looking at aggregated baseline energy use data in Figure 5 (next page), the findings to be highlighted include:

- Total delivered energy is estimated at 221 gigawatt hour per year (1 GWh = 1 thousand MWh = 1 million kWh), 66% or so in dwellings built before 2001.
- The total CO_2 emissions is estimated at 57 thousand tonnes per year, with about 33% in dwellings built post 2001.
- The annual energy expenditure in the residential sector is estimated at close to 35.4 million euros.
- Renewable energy produced at the house location (excludes green electricity supplied by the grid) represents about 4.5% of the overall energy use in the housing stock.
- About a quarter of the dwellings analysed are considered "heat pump ready" according to the requirements of SEAI funding programmes, (HLI below 2.0)[6].



[6] A further 26% have a heat loss indicator between 2.0-2.3 which may be heat pump ready subject to meeting certain backstop values for fabric and ventilation performance. The remaining 50% need some fabric and ventilation heat loss reduction before achieving heat pump readiness (and to be eligible for SEAI heat pump grant funding).

The heat loss indicator is calculated as part of the BER assessment and is an overall indication of fabric heat loss performance. This graph shows the number of dwellings that are heat pump ready (green), close to heat pump ready (yellow) and not heat pump ready (red).
A heat pump requires lower fabric heat loss to perform efficiently.

74% of dwellings in this study are not heat pump ready

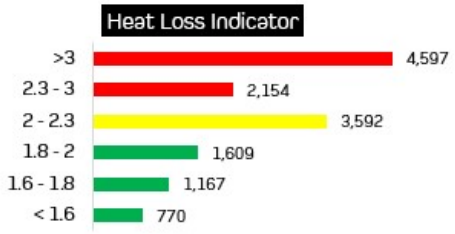


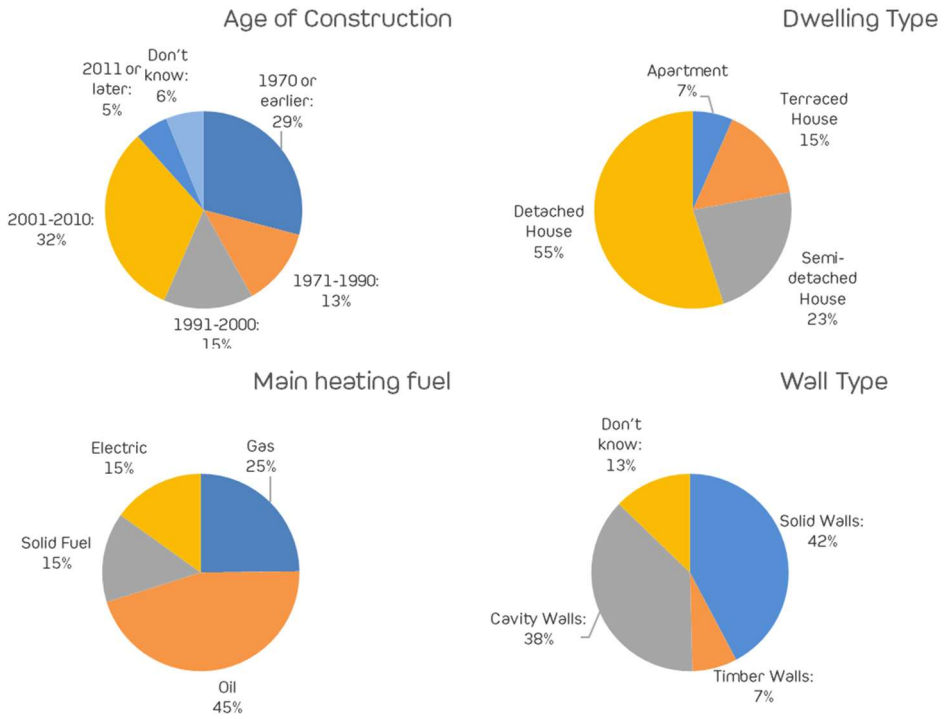
Figure 5: Baseline key performance indicators across the housing stock.

c) Results of the household survey conducted by the SEC

This section presents the results of the survey conducted by the Synergy CU SEC amongst households in the community. The total number of respondents was 258, a good level of response for such a survey. 73% of respondents own their home, the others are renting. In terms of awareness about grant support for home energy upgrades, a significant number of respondents are unaware of them (45%), and many say that the Warmer Homes Scheme doesn't apply to them (not in receipt of some form of social welfare support). Also, about 45% do not know what the BER of their home is, and another 17% say they do not have one.

The following graphs present the breakdown of answers on key characteristics of their home including:

- Age of construction: 43% of dwellings were built post 2000 and should have decent standards of energy conservation. A very significant amount (42%) of dwellings would have been built when no insulation standards applied.
- Dwelling type: over half of the respondents live in detached homes, which are more typical of rural areas. 45% live in urban or semi-urban areas, and smaller dwellings.
- Heating fuels: oil heating is the most common source of heating (45%), again typically associated with more rural homes.
- Wall type: the fact that solid walls (stone or brick) are most common is in line with the fact that a lot of the housing stock is old. Cavity walls are the second most common wall type among respondents at 38%, compared to 55% among all dwellings in the study area. Respondents indicated that 70% of cavity walls have a 'filled' cavity, a very sensible 'low hanging fruit' insulation measure.



In terms of their windows' energy performance, 44% of respondents have double glazed windows dating prior to 2004, and another 7% have single glazed windows. While there might not always be a case to replace windows from a cost-effectiveness point of view, this cohort of respondents should consider it in the context of a deep energy retrofit, especially if external wall insulation is applied.

Most respondents have declared experiencing an 'average' level of draughtiness in their house, and another 6% have said their house is very draughty. This is a key concern in terms of heat loss and concern, and draught-proofing homes should be part of the energy upgrade measures promoted locally.

Two thirds of respondents have one or more fireplaces in their homes, and among these 70% have a stove or a range. There seems to be a limited number of open fireplaces left in these houses. This is interesting in that stoves are much more efficient at burning solid fuel than open fireplaces, and also limit the level of air leakage compared to open fireplaces.

9% of respondents have a heat pump which is encouraging as this would be a key solution to upgrade the housing stock towards higher energy performance and using less fossil fuel. Equally, 17% of respondents use solar energy for electricity generation or hot water production. 50% of respondents declare having a roof with a southern orientation, a great starting point when considering solar energy for your home. 8% of respondents have an EV. Between renewable energy users and EV owners, this is a cohort of households to mobilise as exemplars and potential advocates for sustainable energy solutions.

Generally, there is a strong interest for more information on energy upgrade options and grants among respondents. 141 respondents (55%) are interested in energy information sessions, which is really encouraging and a demand that should be capitalised on to offer follow on services. Having said that, the survey results indicate that less than 30% of respondents wish to be contacted directly as a follow up. This may be an anomaly, but future engagement activities should consider how to encourage people to be open to receive further communication from the SEC.

d) Summary of the baseline analysis for the residential sector

The following table provides a summary of baseline energy consumption indicators across the housing stock in the study area, with the associated breakdown by energy source (fuels and electricity).

Table 1: Summary of residential energy baseline analysis for 2022.

	Electricity	Natural Gas	Heating oil	Turf & Coal	Renewable fuels	Total
Delivered energy (MWh/yr.)	64,514	48,418	71,022	34,954	2,238	**221,146**
Energy Expenditure (Mio€/yr.)	19,999,444	3,873,435	8,522,609	2,796,353	170,880	**35,362,722**
Primary energy (MWh/yr.)	112,900	53,260	78,124	39,045	2,461	**285,790**
CO2 emissions (tCO2/yr.)	14,451,211	9,828,842	19,317,914	13,034,868	55,939	**56,688,775**

The following graphs illustrate the breakdown of the above energy baseline indicators by energy source. They demonstrate the importance of electricity in the overall energy use of homes in the study area, in particular in terms of energy expenditure and primary energy – one kWh of electricity costs double the price of heating oil and it takes 1.75 units of primary energy to produce 1 unit of electricity. Heating oil remains a large part of energy use and expenditure in homes in the study area, despite the fact that natural gas is distributed in urban areas. Solid fuels such as turf and coal remain a significant contribution to the residential energy mix in terms of energy use (16%) but most importantly in terms of **CO_2** emissions. By comparison, the contribution of renewable energy produced on site is minimal.

Given that the share of renewable electricity at 36.8% in 2022 will continue to grow significantly, the national target is to achieve an 80% renewable electricity share by 2030, the switch from fossil fuels for heating to electrical heat pumps is an important policy objective nationally and should be at the core of the study area's sustainable energy strategy.

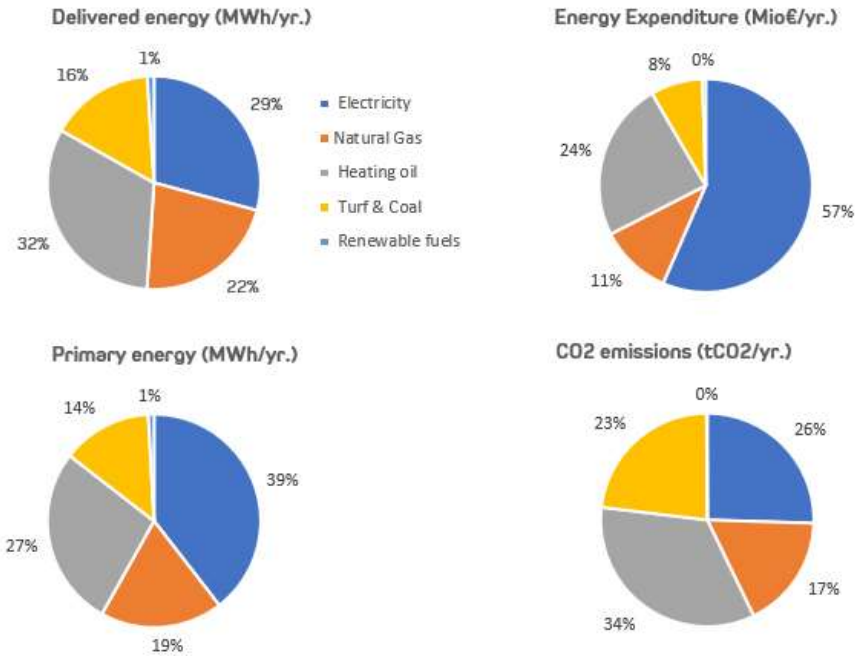


Figure 6: Breakdown of energy baseline indicators by energy source.

The next step in the analysis underlying the residential element of Synergy CU SEC's Energy Master Plan includes modelling different energy upgrade scenario of the housing stock in the study area and to conduct a cost/benefit analysis of these scenarios against the baseline energy performance baseline established above. The results of this analysis are presented in section **Error! Reference source not found.** page **Error! Bookmark not defined.** of this report.

B. Tertiary & Industry Sectors

1. Methodology

The tertiary sector includes public services and commercial services. The energy use accounted for in the sector encompass mostly energy used in buildings (offices, hospitals, schools, etc.) as well as public infrastructure such as public lighting, wastewater treatment and waste management.

Persons at work by industry	Persons at Work	% of working population
Agriculture, forestry and fishing	1181	6.5%
Building and construction	919	5.1%
Manufacturing industries	3211	17.7%
Commerce and trade	3893	21.5%
Transport and communications	1284	7.1%
Public administration	790	4.4%
Professional services	4090	22.6%
Other	2727	15.1%
Total	**18095**	**100%**

The methodology applied to derive baseline energy use estimates for the tertiary & industry sectors is based on apportioning the 2022 national energy balance data for the relevant sub-sectors according to the share of employees in each subsector in the study area versus at national level. An energy intensity factor is calculated by dividing the total final energy consumption of each subsector by the number of employees nationally in that subsector according to the CSO[7]. Multiplying these energy intensity factors by the number of employees in each subsector in the study area will give an estimate of the total energy supplied to that subsector. The Population Census 2022 data for 'Persons at Work' by Industry available at Small Area level was used as a basis for this calculation. The following table indicates how employment is distributed by industry in the area. It is

[7] https://data.cso.ie/table/EB027

noticeable that the manufacturing subsector is an important source of employment in the area (18% compared to 11% nationally). Equally, professional services and commerce and trade employ about 22% each of the working population.

Some adjustments were made to have a degree of correspondence with the national energy balance breakdown of the commercial sector by NACE categories.

2. Breakdown of energy use in the tertiary sector

The following table provides a breakdown of the commercial and public services' energy use by energy source in line with the national energy use distribution in the sector.

Table 2: Energy use breakdown by fuels in public & commercial services.

Public & Commercial Services	FINAL ENERGY CONSUMPTION [MWh/yr]								
		Fossil fuels							
	Electricity	Natural gas	Liquid gas	Heating oil	Diesel	Coal	Other fossil fuels	Renewables	**Total**
Sub-sectors:									
Publics Services	4,871	2,820	566	550	827	-	4	335	9,974
Wholesale and retail trade; repair of motor vehicles	17,121	3,231	1,312	278	1,187	1	-	257	23,387
Transportation and Storage	8,854	2,740	550	229	3,324	-	-	24	15,721
Accommodation and Food Services	17,773	5,956	1,805	573	266	35	-	666	27,073
Information and Communication	43,392	2,588	40	14	127	0	-	14	46,177
Financial, Insurance and Real Estate Activities	9,508	3,641	25	198	129	0	-	355	13,856
Other Services Sectors	13,844	9,021	830	216	1,544	0	-	3,988	29,445
Total	**115,363**	**29,996**	**5,129**	**2,058**	**7,404**	**37**	**4**	**5,640**	**165,632**
Primary energy (MWh/yr)	219,190	32,996	5,642	2,264	8,145	40	4	2,529	270,811
Energy expenditure (€Mio/yr)	21.2	1.5	0.5	0.2	0.6	0.0	0.0	0.1	24.0
Energy related emissions (tCO2 eq./year)	**38,808**	**6,140**	**1,176**	**529**	**1,954**	**12**	**1**	**-**	**48,621**

The total final energy use in the services sector was estimated at 165,632 MWh/yr in 2022, of which 70% was electricity and 18% natural gas. Over 24 million euros was spent on energy in the services sector, and it was responsible for c. 49 thousand tonnes of **CO_2** emissions that same year. Electricity is by far the biggest contributor in terms of primary energy use (80%), energy expenditure (88%) and emissions (80%). On a per employee basis, the average energy consumption in the sector is close to 13 thousand kWh, and 3.8 tonnes of **CO_2**.

3. Breakdown of energy use in industry

4130 people work in industry and construction according to Census 2022 (c.1.3% of the national total), or less than a quarter of the services sector. While construction is taken as part of the 'industry' sector, the vast majority of the energy use is in manufacturing. While it employs a lot less people than the services sector, the industrial sector's energy intensity is about 9 times higher. The total final energy use of 387,125 MWh per year, more than double that of services. The following table presents the breakdown of energy use in the industrial sector by fuel type, excluding transport fuels accounted for separately.

Industry	FINAL ENERGY CONSUMPTION [MWh/yr]								
		Fossil fuels							
	Electricity	Natural gas	Liquid gas	Heating oil	Diesel	Coal	Other fossil fuels	Renewables (biomass)	**Total**
Sub-sectors:									
Mining and quarrying (B)	-	-	-	-	-	-	-	-	-
Manufacturing (C)	103,132	168,096	13,089	591	9,374	35,949	14,802	35,893	380,927
Construction (F)	1,069	389	75	91	4,574	-	-	-	6,198
Total industry	**104,201**	**168,485**	**13,164**	**682**	**13,948**	**35,949**	**14,802**	**35,893**	**387,125**
Primary energy (MWh/yr)	197,981	185,333	14,481	751	15,343	39,544	16,282	39,483	509,198
Energy expenditure (€Mio/yr)	10.7	6.5	1.2	0.1	1.0	0.6	1.0	1.4	22.6
Energy related emissions (tCO2/year)	35,053	34,489	3,019	175	3,681	12,244	5,405	-	94,066

The total primary energy use is estimated at about 509,198 MWh/yr in 2022, the total energy expenditure 23 million euro and the energy-related emissions 94 thousand tonnes of **CO_2** emissions. Here electricity and gas are the dominant

energy sources in terms of primary energy (39% and 36% respectively), expenditure (48% and 29%) and emissions (37% each).

C. Transport

1. Methodology

Transport energy consumption figures were compiled based on national transport energy use by SEAI, CSO Transport Omnibus (THA17) & Commuting (E6011) statistics for 2022. We have apportioned the national transport energy use data using commuting data from the CSO's E6011 dataset. The following table presents the results of the Population Census 2016 on the means of travel people use for their daily commute in the study area. Motor cars are by far the main means of daily commute for people in the SEC. Low-carbon individual and public modes of transport represent 17% of daily commutes.

Table 3: Means of travel for daily commute in the study area. Source: https://data.cso.ie/table/E6011

Means of travel in Synergy for daily commute (Cork City & County Areas 2022)		
	(# people)	% of total
On foot	1669	9%
Bicycle	229	1%
Bus, minibus or coach	688	4%
Train, DART or LUAS	77	0%
Motorcycle or scooter	42	0%
Motor car: Driver	9639	54%
Motor car: Passenger	737	4%
Van	1136	6%
Other, incl. lorry	117	1%
Work mainly at or from home	2176	12%
Not stated	1333	7%
All means of travel	17843	

The following table presents the Transport Omnibus data in terms of million of km travelled by type of vehicle[8] apportioned from the Cork City and County data to the study area only. This data is then used to apportion the national transport energy use by the different vehicle categories to determine their respective energy use by fuel type.

Table 4: Millions of km travelled by vehicle type in 2022.

km travelled (2022, Mio)	All fuel types	Petrol	Diesel	Other fuel types
All vehicle types	**365**	**82**	**266**	**17**
Private cars	273	79	178	16
Goods vehicles	67	0	67	0
Motorcycles	1	1	0	0
Tractors & Machinery	12	0	12	0
Small PSVs	3	0	3	0
Large PSVs	1	0	1	0
Exempt vehicles	3	1	2	0
Other vehicles	4	1	3	0

[8] PSVs are public service vehicles, small (e.g. taxis, minivans) and large (e.g. buses, trains, etc.).

2. Breakdown of energy use in transport

The following table presents the results of the baseline energy use in transport in the study area for 2022, considering a 4.7% share of biofuels at national level. The total final energy use is estimated at 289,388 MWh/yr, with diesel representing 76% of fuel use. The transport emissions are estimated at 440,167 tonnes of CO_2 per year, 81% coming from diesel combustion. Energy expenditure for transport is estimated at 40.3 million euro.

Table 5: Breakdown of energy use in transport in the study area in 2022, by fuel type and vehicle categories.

Transport energy usage (MWh/yr)	Diesel	Gasoline	Biofuel	Total
Local authority	-	-	-	-
Private cars	113,328	53,631	10,239	177,199
Small PSVs	1,045	495	94	1,634
Large PSVs incl. rail	1,269	-	78	1,346
Goods Vehicles	102,899	-	6,310	109,209
Total transport	**218,541**	**54,126**	**16,722**	**289,388**
Primary energy (MWh/yr)	240,395	59,538	18,394	318,327
Energy expenditure (€Mio/yr)	29.8	8.2	2.3	40.3
Energy related emissions (tCO2/year)	57,673	13,634	-	71,307

3. Agriculture & Fisheries

1. Methodology

Energy use data for agricultural sector at national level is taken from SEAI's Energy Balance 2022 and apportioned to the study area based on the area farmed according to the Agricultural Census 2022 (https://data.cso.ie/table/AVA32) versus the total national agricultural land (https://data.cso.ie/table/AVA44).

There are a significant number of farms in the study area, estimated at 1575. The total farm area is 63 thousand hectares, with an average farm size of circa 39 ha. 83% of the farmland is grassland, and there is a significant amount dedicated to producing grass silage. That and the fact that 33% of the cattle herd in the study area are dairy cows (33 thousand cows), strongly indicates that dairy farming is the main farming enterprise. Dairy farming is a relatively intensive farming enterprise in terms of land use and inputs, including energy, and also the most profitable one.

2. Breakdown of energy use in agriculture and fisheries

The breakdown of energy use in agriculture is presented in below. The total final energy use is estimated at 66,419 MWh/yr for 2022. The associated energy expenditure is estimated 31 million euros, and 53,480 tonnes of CO_2 emissions. It is assumed there is no fisheries in the area.

Table 6: Breakdown of energy use by fuel in agriculture in the study area, 2022.

Final energy (MWh/yr)	Electricity	Diesel	Biofuel	Total
Agriculture	14,730	48,697	2,986	66,413
Total	**14,730**	**48,697**	**2,986**	**66,413**
Primary energy (MWh/yr)	27,986	53,566	3,285	73,054
Energy expenditure (€Mio/yr)	2.7	2.4	0.3	5.1
Energy related emissions (tCO2/year)	4,955	-	611	15,228

4. Overall baseline energy use in the Synergy CU SEC common bond area

The following tables and graphs present a summary of the baseline energy use analysis conducted at sectoral level and reported on above. The data is presented in such a way that it is compatible with the Covenant of Mayors' Baseline Emission Inventory methodology and reporting format. This also meets the requirements of the specification

document for this EMP project. The tables present a breakdown by sector and by energy source, for the following key performance indicators, for the 2022 baseline:

- Delivered energy in MWh per year
- Primary energy in MWh per year
- Energy expenditure in million euro per year
- Energy related CO_2 emissions in tCO2 per year

Table 7: Breakdown of 2022 baseline final energy by energy source and sectors.

Sectors	FINAL ENERGY CONSUMPTION [MWh/yr]										
		Fossil fuels							Renewables		
	Electricity	Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Coal	Other solid fuels	Biofuel	Biomass, Solar, Geothermal	Total
Residential	64,514	48,418	-	71,022	-	-	5,965	28,989	-	2,238	221,146
Services	115,363	29,996	5,129	2,058	7,404	-	37	4	-	5,640	165,632
Industry	104,201	168,485	13,164	682	13,948	-	35,949	14,802	-	35,893	387,125
Transport	-	-	-	-	218,541	54,126	-	-	16,722	-	289,388
Agriculture and fisheries	7,634				26,781				1,642		36,058
Total	**291,712**	**246,899**	**18,293**	**73,762**	**266,675**	**54,126**	**41,951**	**43,795**	**18,364**	**43,771**	**1,099,349**

The overall final energy use in Study area has been estimated at 1.01 TWh/yr for the 2022 baseline. Electricity, diesel for transport, and natural gas for industry are by far the biggest energy sources. The industrial sector is the largest contributor to final energy consumption, ahead of transport and the residential sector.

Table 8: Breakdown of 2022 baseline primary energy by energy source and sectors.

Sectors	PRIMARY ENERGY CONSUMPTION [MWh/yr]										
		Fossil fuels							Renewables		
	Electricity	Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Coal	Other solid fuels	Biofuel	Biomass, Solar, Geothermal	Total
Residential	112,900	53,260	-	78,124	-	-	7,157	31,888	-	2,461	285,790
Services	219,190	32,996	5,642	2,264	8,145	-	40	4	-	2,503	270,811
Industry	197,981	185,333	14,481	751	15,343	-	39,544	16,282	-	39,483	509,198
Transport	-	-	-	-	240,395	59,538	-	-	18,394	-	318,327
Agriculture and fisheries	14,504				29,460				1,807		45,771
Total	**544,576**	**271,589**	**20,123**	**81,138**	**293,343**	**59,538**	**46,741**	**48,174**	**20,201**	**44,447**	**1,429,896**

The overall primary energy use in study area has been estimated at 1.43 TWh/yr for the 2022 baseline. Electricity is by far the biggest contributor given its high primary energy factor, ahead of diesel for transport, and natural gas for industry. Industry remains the top energy user in terms of primary energy.

Table 9: Breakdown of 2022 baseline energy expenditure by energy source and sectors.

Sectors	ENERGY EXPENDITURE [€Mio/yr]										
		Fossil fuels							Renewables		
	Electricity	Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Coal	Other solid fuels	Biofuel	Biomass, Solar, Geothermal	Total
Residential	20.0	3.9	-	8.5	-	-	0.5	2.3	-	0.2	35.4
Services	21.2	1.5	0.5	0.2	0.6	-	0.0	0.0	-	0.1	24.0
Industry	10.7	6.5	1.2	0.1	1.0	-	0.6	1.0	-	1.4	22.6
Transport	-	-	-	-	29.8	8.2	-	-	2.3	-	40.3
Agriculture and fisheries	1.4				4.1				0.1		5.6
Total	**54.2**	**12.0**	**1.8**	**8.8**	**35.6**	**8.2**	**1.1**	**3.3**	**2.4**	**1.7**	**129.1**

In terms of energy expenditure, an estimated total of 129 million euro was spent on energy, primarily on diesel for transport, followed by electricity in residential and services' buildings.

Table 10: Breakdown of 2022 baseline CO_2 emissions by energy source and sectors.

Sectors	ENERGY-RELATED EMISSIONS [tCO2/yr]										
	Electricity	Fossil fuels							Renewables		Total
		Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Coal	Other solid fuels	Biofuel	Biomass, Solar, Geothermal	
Residential	14,451	9,829	-	19,318	-	-	2,338	10,697	-	56	56,689
Services	38,808	6,140	1,176	529	1,954	-	12	1	-	-	48,621
Industry	35,053	34,489	3,019	175	3,681	-	12,244	5,405	-	-	94,066
Transport	-	-	-	-	57,673	13,634	-	-	-	-	71,307
Agriculture and fisheries	2,568				7,068				-		9,636
Total	**92,519**	**51,035**	**4,325**	**20,164**	**70,594**	**13,634**	**14,595**	**16,105**	**-**	**56**	**283,026**

The overall CO_2 emissions associated with energy use in the study area have been estimated at almost 2.83 thousand tonnes. The analysis indicates that industry is the largest contributor, followed by transport and then the residential sector. In terms of energy source, electricity is the biggest contributor.

The follow graphs show the breakdown of baseline energy KPIs by sector and by energy source. They illustrate the importance of transport and industry in the overall energy demand (22% and 36% of the total primary energy use respectively) and CO_2 emissions in the study area (26% and 34% of total emissions respectively). Buildings in the residential and services sectors represent together a total of 39% of primary energy use and 37% of CO_2 emissions, and they carry a heavy share (47%) of the overall energy expenditure in the study area. The majority of the energy used in the study area is in the form of liquid and solid fossil fuels (57% of primary energy use and 67% of CO_2 emissions). Renewable energy only represents 6% of the primary energy used, without considering the share of renewables in the electricity used in the study area (about 35% of electricity generated in 2022 at national level).

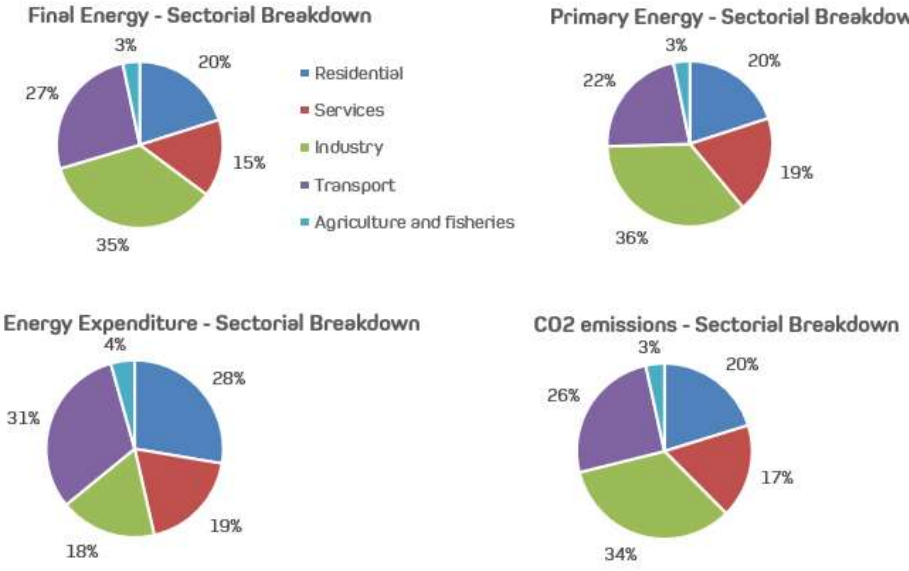


Figure 7: Breakdown of 2022 energy baseline KPIs by sector.

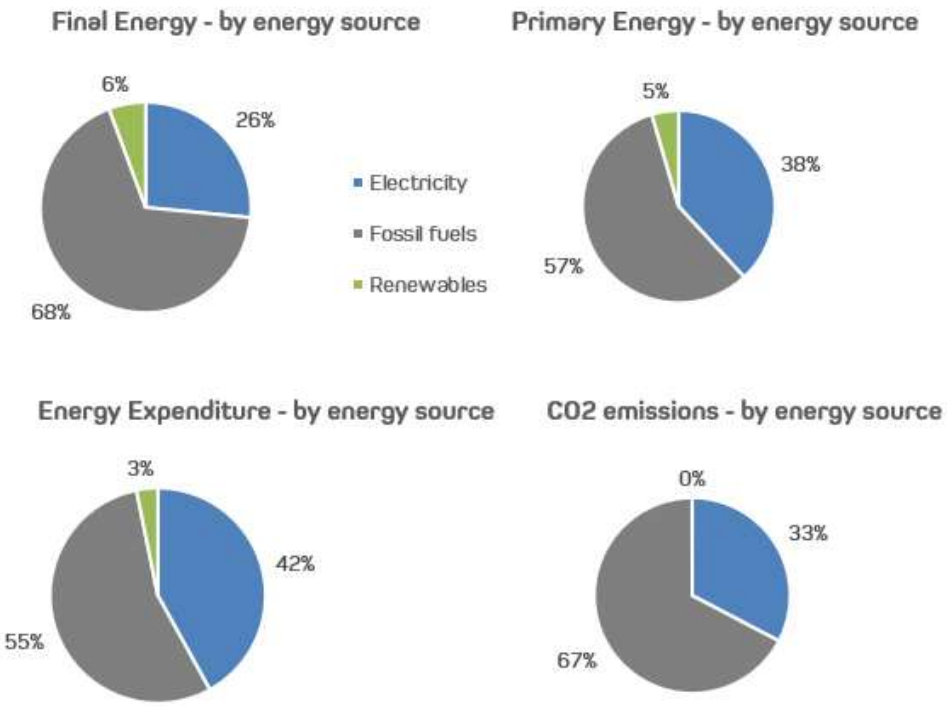


Figure 8: Breakdown of 2022 energy baseline KPIs by energy source.

5. Sustainable Energy Roadmap

The purpose of the Sustainable Energy Roadmap is to give the community an informed perspective on the scale of the challenge faced by their community in moving from their baseline to achieving 2030 reduction targets. These reduction targets have been set as 30% CO_2 reduction, 50% energy reduction and 30% renewable energy generation by 2030. The next sections will outline how the following sectors can contribute to achieving these targets:

- Home energy upgrades, building on the modelling done with RetroKit to identify the number of dwellings to be upgraded, the capital cost and impacts.
- Renewable energy, based on a high-level assessment of the resources potentially available in the county, considering applications that are suited to the SEC needs and resources
- Potential contributions from the commercial, industrial and public sectors in line with government policy and the Sustainable Energy Roadmap targets identified above.
- The estimated potential contribution from Electric Vehicles in the area.

A. Home Energy Upgrade Roadmap

1. Results of the energy upgrade scenario analysis

The next step in the study was to define a strategy for the energy renovation of the housing stock in the common bond area. A range of energy upgrade options (referred to as 'scenarios') were analysed, with the overall target to achieve a minimum energy performance standard of a B2 Building Energy Rating (BER) across the stock by 2030, resulting in the following impacts:

A) Reducing energy usage and increased share of renewable energy.

B) Alleviating fuel poverty by reducing energy costs.

C) Minimising energy-related CO_2 emissions and moving towards the decarbonisation of the housing stock.

Energy upgrade measures to consider include insulating the building fabric (walls, roof, floor, windows & doors), upgrading its heating and ventilation systems, and installing renewable energy systems.

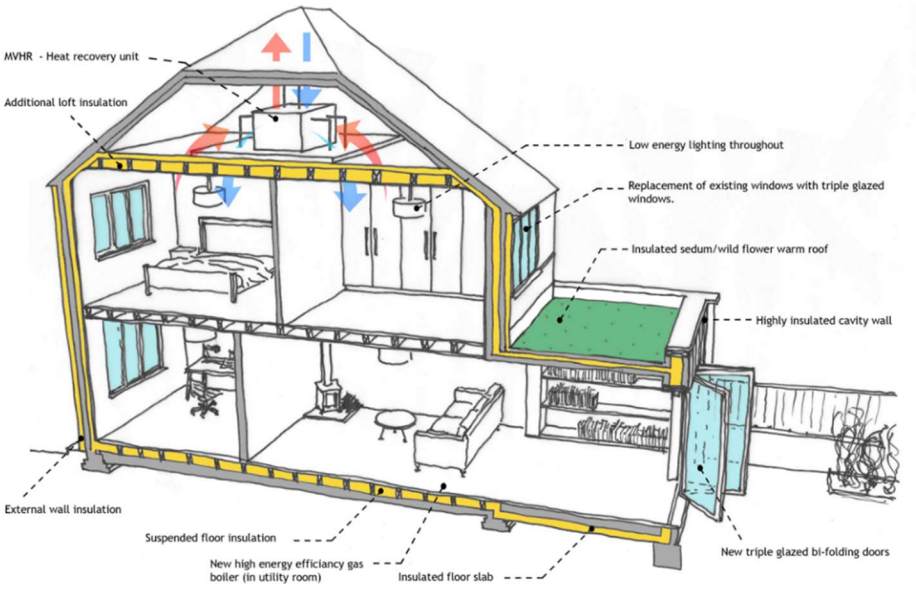


Figure 9: Housing upgrade illustration.

The following energy upgrade scenarios were modelled onto the archetype dwellings defined in the previous sections, to provide a detailed representation of the energy performance of the housing stock after their energy renovation:

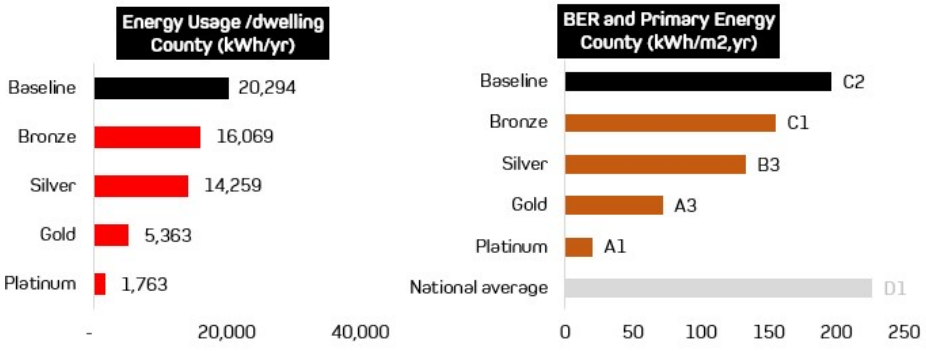
- The '**bronze'** energy upgrade scenario is a great first step in addressing the low hanging fruit and focuses on improving the insulation of the envelope of a home (walls and roofs), reduce draughts (unwanted air leakage), install an efficient wood-burning stove, upgrade the heating system controls and fit low-energy lighting throughout the house.
- The '**silver'** scenario builds on the bronze retrofit measures to add the upgrade of any inefficient fossil fuel boilers with new models.
- The '**gold'** scenario builds on the bronze retrofit measures to further insulate the walls with external wall insulation, the roofs' sloped ceilings where it applies, replace windows and doors, complete a deeper sealing of air leakage around the house, upgrade the central heating to a heat pump system including new radiators where necessary, and install a mechanical demand control ventilation system.
- The '**platinum'** scenario adds a solar photovoltaic system to the measures included in the gold package.

The following table provides an inventory of the measures applied in each of the three scenarios above.

Table 11: Measures applied in each of the four scenarios.

Measure description	Bronze	Silver	Gold	Platinum
Cavity wall insulation	☑	☑		
Cavity and external wall insulation			☑	☑
External insulation to solid wall			☑	☑
Attic insulation	☑	☑	☑	☑
Internal insulation to uninsulated sloping ceiling			☑	☑
Floor insulation				
Draught proofing - windows, doors and attic hatch	☑	☑	☑	☑
Draught proofing - full fabric sealing				
Fit chimney draught excluder	☑	☑	☑	☑
Replace door with highly insulated door			☑	☑
Replace windows with double glazed windows				
Replace windows with triple glazed windows			☑	☑
Fit Extraction Fans and Passive Vents				
Fit mechanical 'demand control' ventilation			☑	☑
Insulate hot water cylinder and pipework	☑			
Fit Digital heating Controls	☑	☑		
Change open fire for high efficiency wood stove	☑	☑	☑	☑
Fit Pipework, Pumps and Valves for Central Heating		☑	☑	☑
New Radiators and Central Heating Pump		☑		
Change existing rads to low temperature radiators			☑	☑
New condensing boiler including controls		☑		
Air to water heat pump, new cylinder and controls			☑	☑
Fit low energy lighting throughout property	☑	☑	☑	☑
Install 4kWp solar electric panels				☑

The modelling exercise conducted by RetroKit provides projections on what the impacts of the above energy upgrade scenarios would be compared to the baseline energy performance, in terms of energy use, CO_2 emissions, BER rating and energy expenditure. Please note that the modelling results were corrected to reflect the likely actual energy use post-retrofit. The graphs hereafter provide a summary of the average key performance indicators across all the dwellings occupied permanently in the town common bonds areas, designated as 'city' and 'county' in the following graphs.



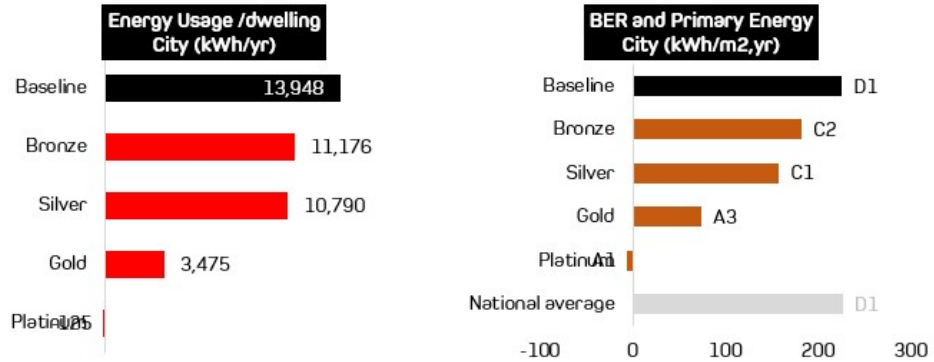


Figure 10: Comparison of average energy use and BER rating before (baseline) and after selected energy upgrade scenarios.

Figure 10 shows the significant drop in energy use expected after the implementation of the gold (-74% overall) and platinum upgrade (-93% overall) scenarios. Energy use is lower in the 'city' dwellings and is reduced so much in the platinum scenario that energy use becomes negative (more energy produced than what the house needs). The drop after the bronze is less dramatic at about 21% but this reflects the fact that there is a level of "comfort taking" by occupants i.e. the full energy efficiency gains haven't been realised because people can afford to heat their house to a more comfortable level than before. The average BER rating drops from a C2 to a C1 in a bronze retrofit for 'county' homes, and from D1 to C2 in 'city' homes. It is improved beyond the B2 target and lands in A rating territory in the gold and the platinum scenarios.

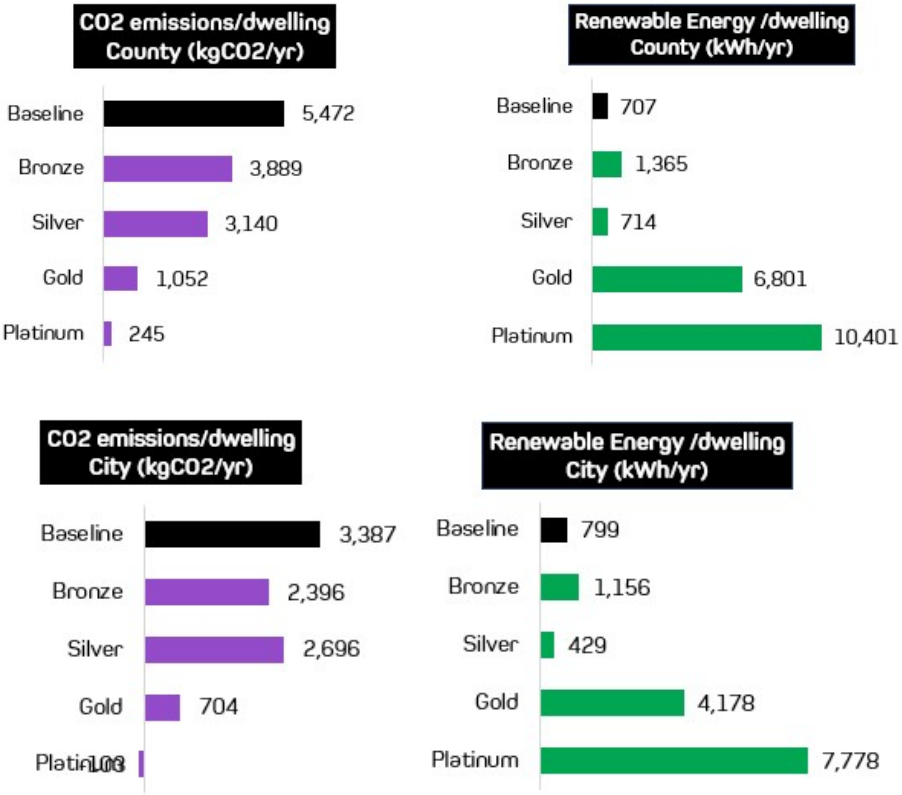


Figure 11: Average renewable energy & CO2 emissions before and after selected energy upgrade scenarios.

Figure 11 shows that the level of renewable energy increases dramatically with the application of a heat pump in the gold scenario and surpasses (almost in county) the remaining energy use in the platinum scenario with a solar PV system. Equally, CO_2 emissions are reduced by 81% and 95% in the gold and platinum scenario respectively in the county area. The gold scenario results in 80% **CO_2** emission reductions in the city, and the platinum scenario results in negative emissions. Any remaining emissions in the gold and platinum scenarios are associated with the use of electricity from the grid which has a fossil fuel content in its generation mix.

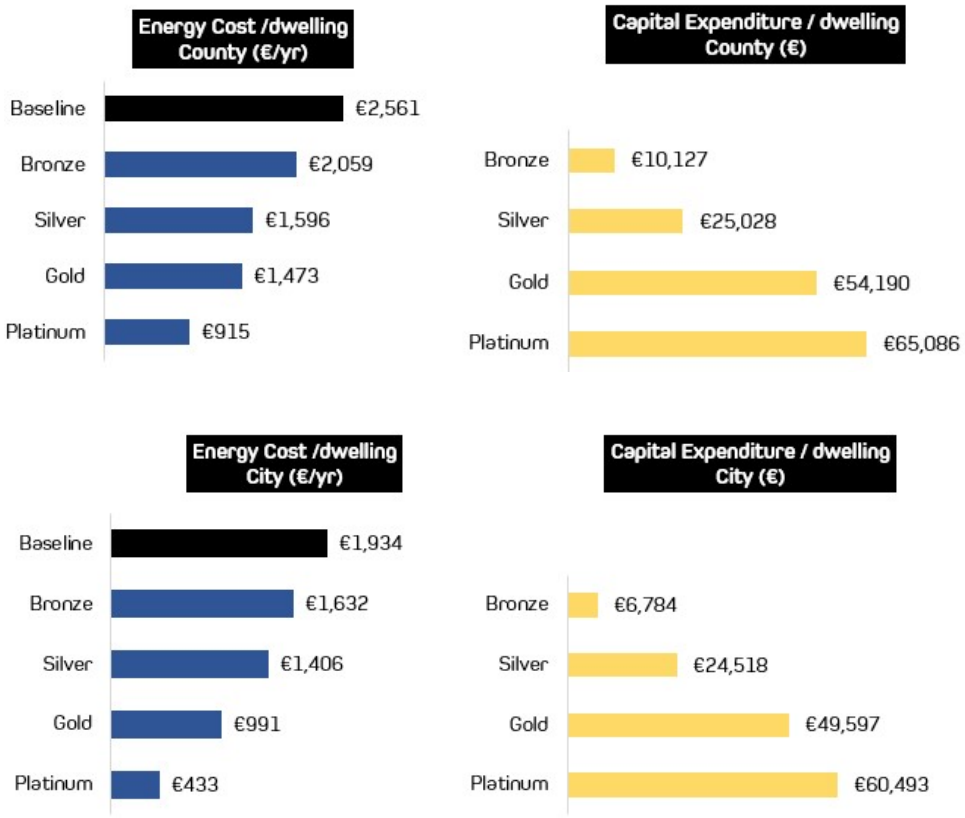


Figure 12: Energy costs per dwelling before and after retrofit, average capital expenditure for each scenario.

Figure 12 presents the change in average energy costs per dwelling before (baseline) and after the modelled energy upgrade scenarios. The anticipated energy savings vary from €300-500 for the bronze package upgrade, to €1500-1600 for the Platinum scenario. On the other side, the estimated capital investment required to implement these energy upgrades vary from €6,800-10,100 for a bronze upgrade to €60,500-65,000 for the deepest upgrade analysed. These capital investment values do not include grants available from SEAI which can amount to about 25% to 30% of the capital cost. For households in receipt of a social welfare payment, many of the measures considered can be fully funded. See https://www.seai.ie/grants/home-energy-grants/ for details on grants available from SEAI for home energy upgrades.

While the capital investment is very significant for home energy upgrades, and the payback period can be very long, there is a lot more benefits to improving the energy efficiency of your home. Improved comfort and well-being, increase in the value of your home, resilience against future rise in energy costs, lower your carbon footprint, etc. It's also worth mentioning that a deep energy retrofit can be completed in stages over a number of years, availing of grants for individual eligible measures as you do so.

A selection of brochures produced by RetroKit has been made available for this EMP with generic home energy upgrade plans for the most common house types in the study area. These are very useful to communicate with householders about their home energy upgrade options in a way that relates to the kind of house they live in.

B. Commercial, Industrial & Public Sector Energy Efficiency

According to the baseline emissions inventory the commercial, industrial and public sectors account for 50% of the total primary energy consumption and carbon emissions for the study area, with industry having the lion's share (35%). There is significant potential to impact total emissions through energy efficiency and a switch to renewable energy in these sectors. While it is beyond the scope of this project to have a more granular understanding of how individual facilities perform, we can refer to the National Climate Action plan targets for these sectors as minimal requirements

in terms of reduction in primary energy use and **CO_2** emissions to be achieved by 2030: 45% for commercial sector, 50% from public buildings and 35% from industry[9].

In this Register of Opportunity, we have taken a simple assumption that carbon emissions can be reduced by 35% in the services sector (public buildings & businesses) through energy efficiency measures such as buildings' insulation, LED lighting, efficient heating, ventilation and air conditioning systems (HVAC), best practice energy management practices, etc. We have also assumed a 20% reduction in the industrial sector through similar technical solutions with a focus on processes and energy management. It is worth noting that energy use in the industrial sector has been relatively stable over the last 5 years and has grown in the services sector (by approx. 10%) at national level. Achieving these levels of energy demand reduction through efficiency and rationale use of energy will therefore be challenging.

We have made provisions for significant uptake of renewable heat in both sectors in the Register of Opportunities, as discussed in the previous section, to complement energy reduction solutions and achieve the overall decarbonisation targets set by the Climate Action Plan for industry and services. These include a switch to renewable heat pumps and bioenergy to replace fossil fuels (51% share and 25% share in the services and industry respectively), see next section for more details. Overall, the Register of Opportunities has made a provision for energy efficiency and renewable energy solutions resulting in **322 thousand MWh of annual primary energy savings** and **59,600 tonnes of CO_2** reductions in public services, businesses and industry.

While it may be beyond the reach of Synergy CU SEC to drive initiatives among large employers, it may take advantage of its community connections to engage with them and partner with them in participating in local initiatives. Large companies have increasingly focused on their Environmental, Social and Governance responsibilities and reporting requirements over the last number of years. This may create opportunities for their employees to proactively engage with the SEC and its initiatives, contribute financially through sponsoring events or projects, as well as dedicated personnel to help with project development and coordination.

Synergy CU can also work closely with local SMEs and their representatives (e.g. the Chambers of Commerce) to drive awareness-raising and training initiatives, and promote available supports from SEAI, the Local Enterprise Office and the local development companies.

[9] https://www.environet.ie/news/hopeful-climate-action-plan-2023

C. Renewable energy potential

This section addresses the renewable potential in the study area (taken as Synergy CU's bonds) focusing on three principle renewable technologies, wind, solar and biomass. In assessing the potential we have drawn on Cork City and County Councils' Development Plans[10], SEAI's renewable energy maps and other data sources. The focus is on renewable energy development opportunities by farmers and community groups.

1. Local Policy Framework

Items of note in the County Development Plan 2022 (CDP) regarding sustainable energy include the 'ET 13-2 Renewable Energy' objective:

- "b) Support and facilitate renewable energy proposals that bring about a direct socio-economic benefit to the local community. The Council will engage with local communities and stakeholders in energy and encourage developers to consult with local communities to identify how they can invest in/gain from significant renewable energy development."
- "d) To promote the potential of micro renewables where it can be demonstrated that that it will not have adverse impacts on the surrounding environment (including water quality), landscape, biodiversity or amenities."

Cork City Development Plan 2022 outlines a number of relevant objectives, including:

- 5.17: To support the use of heat pumps in new build residential, commercial and public buildings considering amenity, conservation and heritage considerations.
- 5.18: To support the incorporation of photovoltaic and/or solar thermal collector panels for electricity generation/storage and water heating on new residential, commercial and public buildings considering amenity, glint and glare, conservation and heritage considerations.
- 5.19: To support sustainable energy generation projects and pilot schemes where such proposals adhere to any relevant national or local guidelines and guidance and do not significantly impact on the surrounding environment.
- 5.20: To lead on the preparation of the Cork City District Energy Action Plan. Objective 5.21 also refers to the All future planning applications for development schemes of 50 or more homes or 1,000sqm of commercial floorspace at the following strategic locations will be required to be supported by an assessment of district heating opportunities and how these will be taken forward as part of the development unless it is demonstrated to be technically unfeasible or unviable. It refers to the Tivoli area.

2. Wind

The CDP Objective ET 13-5: Wind Energy Projects:

- "Support a plan led approach to wind energy development in County Cork through the identification of areas for wind energy development. The aim in identifying these areas is to ensure that there are minimal environmental constraints, which could be foreseen to arise in advance of the planning process.
- On-shore wind energy projects should focus on areas considered 'Acceptable in Principle' and 'Areas Open to Consideration' and generally avoid "Normally Discouraged" areas as well as sites and locations of ecological sensitivity."

According to the Wind Energy Strategy Map of the CDP, the Fermoy Bond Area falls within a 'Normally Discouraged' zone (normally not suitable for commercial wind farm developments due to their overall sensitivity arising from ecological) and an 'Open to Consideration' zone (locations that may have potential for wind farm developments but

[10] Cork County Development Plan 2022-2028: https://www.corkcoco.ie/en/resident/planning-and-development/cork-county-development-plan-2022-2028
Cork City Development Plan 2022-2028: https://www.corkcity.ie/en/cork-city-development-plan/

there are also some environmental issues to be considered[11]). However, it is worth noting that the CDP Objective ET 13-12: Small Scale Wind Energy Development will *"consider proposals relating to the potential for relatively small-scale wind energy developments within urban and industrial areas, and for small community-based proposals outside the key areas that are identified as being appropriate for wind energy development. Community ownership of wind energy projects enables local communities to benefit directly from local wind energy resources being developed in their local areas, ensuring long-term income for rural communities."*

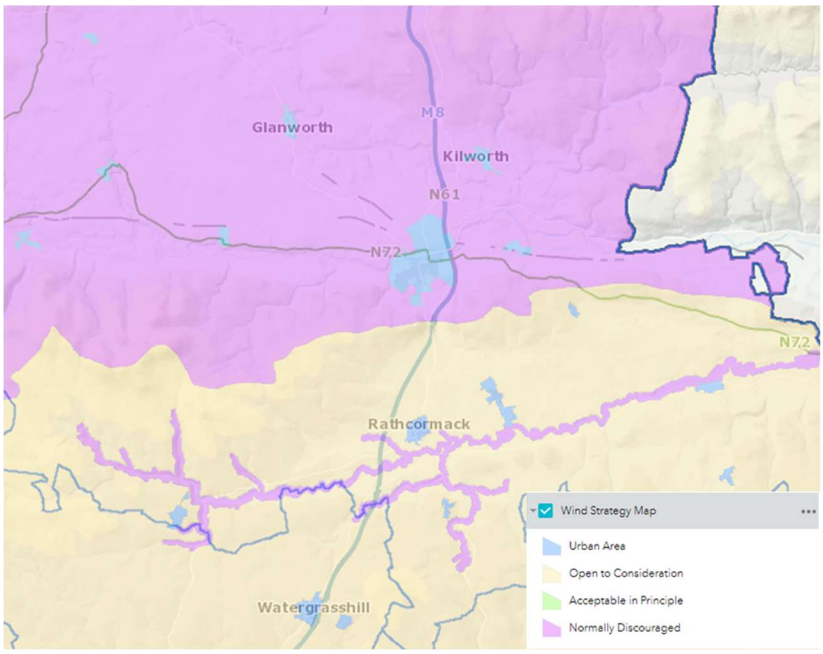


Figure 13: Cork County Development Plan Wind Strategy Map, extract covering the Fermoy Common Bonds area.

The Cork City Common Bond area falls fully within Cork City's urban with high-density housing as well as areas designated as 'Areas of High Landscape Value'[12]

Figure 14: Extract of Cork City Development Plan 2022 Zoning Maps for the Cork City Common Bond area.

The following maps provide estimates of wind speeds above the Fermoy Common Bonds area, at 20, 50 and 100 m hub height. 20 m height is suitable to assess wind speeds for micro-generation turbines (say less than 10 kW generation capacity), 50 m would be representative of small/medium scale turbines (say less than 1 MW capacity) and 100 m would be representative of modern, utility-scale turbines (say above 2 MW). The higher the average annual wind speed, the more wind energy will be produced by a given turbine.

[11] Within areas that are 'Open to Consideration' please note that urban areas, metropolitan/town green belts, and Natural Heritage Areas (NHA's) within this area are not generally considered suitable for wind farm developments. This is definitely the case for the urban area of Fermoy and the surrounding areas zoned as Green Belts.

[12] The City Development Plan objective 6.1.3 states that there will be "presumption against development where it causes significant harm or injury to the intrinsic character of the Area of High Landscape Value…".

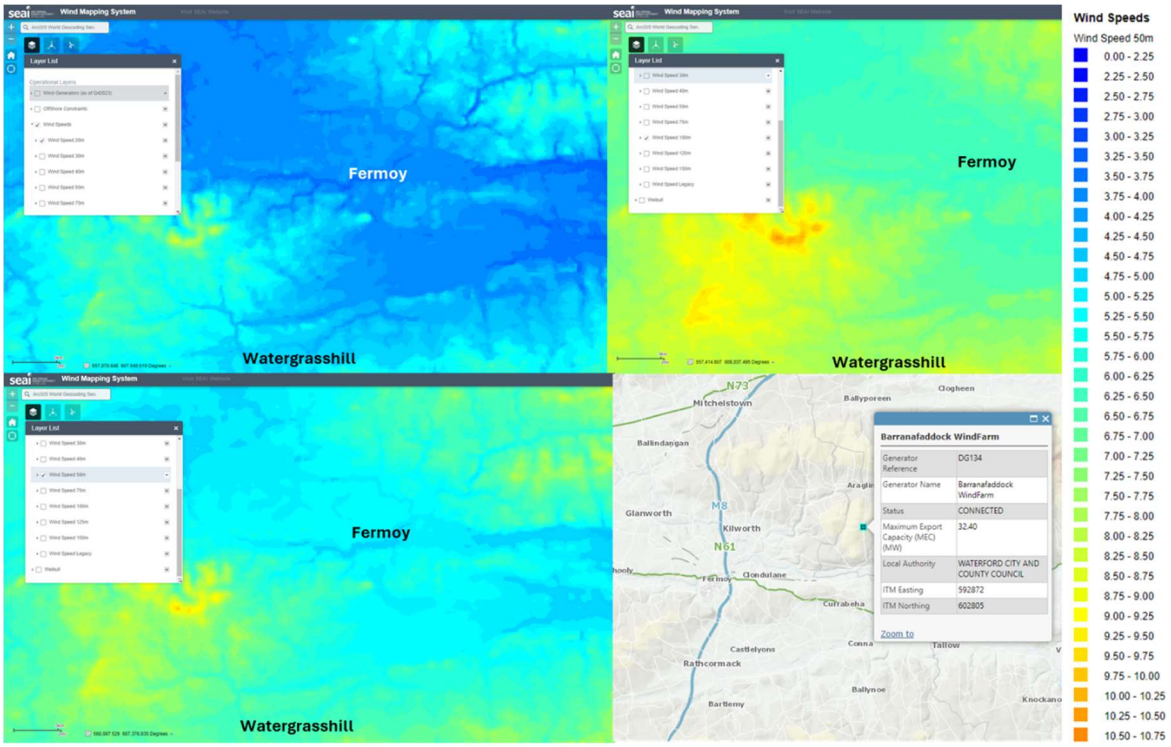


Figure 15: Wind speed map in the study area. Source: SEAI.

Average wind speeds at a given site increase exponentially with turbine height. According to Teagasc's guidelines[13], the minimum average annual speed required for a commercial wind energy project to be feasible is 7 meter per second (m/s). Considering the above wind speed map and the CDP Wind Strategy Map above, the potential for commercial wind energy development would be limited to the areas south-east (Rathcormac and Ballybrowney mountains) and East of Watergrasshill, where they would be in a 'Open to Consideration' zone.

Currently, Barranafaddock wind farm, owned by Statkraft and commissioned in 2015, is the only operational commercial wind project within the vicinity of the Fermoy Common Bonds area. with a total capacity of 34.9 MW which would be producing an estimated 77,000 MWh/yr. of electricity, resulting in a reduction of 146,000 MWh/yr. in primary energy use and 26,000 tCO_2/yr. emissions.

3. Solar

The Fermoy and Cork City Common Bonds areas enjoy good levels of solar irradiation, with an annual average of c.950 kWh of raw solar energy hitting a horizontal 1 m2 surface. As a simplistic comparison, a house with a roof area of 100 m2 would receive annually the solar irradiation equivalent to about 6 times its annual heating fuel requirement. However, what really matters is the amount of useful energy a solar system can convert from the sun's radiation.

The SEAI Solar Atlas provides a practical way of assessing how much a solar photovoltaic[14] system could produce annual, expressed as kWh of solar electricity that can be potentially produced by 1 kW of solar PV panels. In the Fermoy Common Bonds and Cork Common Bonds areas, this averages at about 945-950 kWh per kW per year. For reference, a 4-kW system (about 18 m2 of solar panels) on a house in Fermoy would produce 3,800

[13] https://www.teagasc.ie/media/website/rural-economy/rural-development/diversification/Energy-11-Wind-Energy.pdf
14 A solar PV system converts solar radiation into electricity using solar photovoltaic panels, that can be used to power homes, business, farms, etc.

kWh of electricity per year, equivalent to over 80% of an average household electricity consumption (4500 kWh/yr. in 2022 according to SEAI).

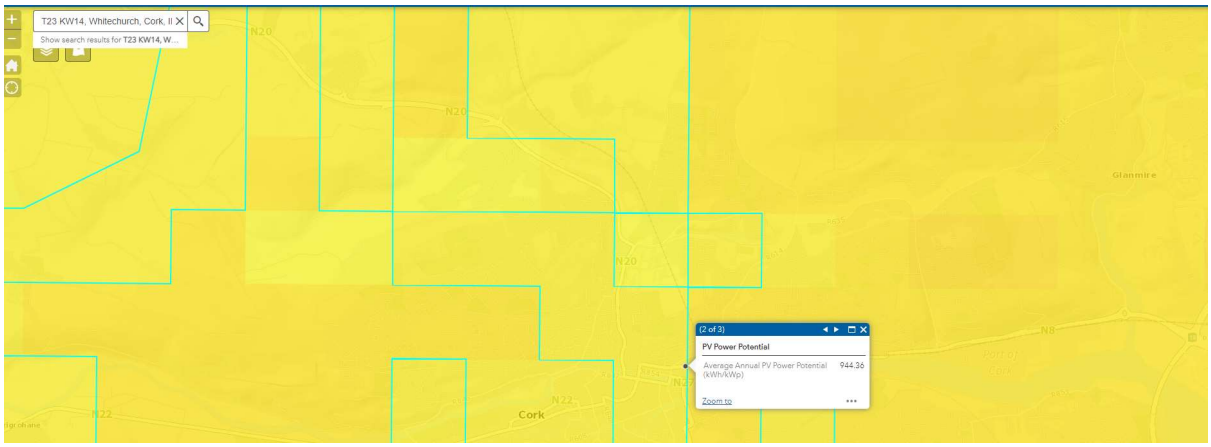


Figure 16: SEAI Solar Atlas, potential solar PV output (945 kWh/kW/yr.) at the Synergy CU St. Patrick's branch in Cork City.

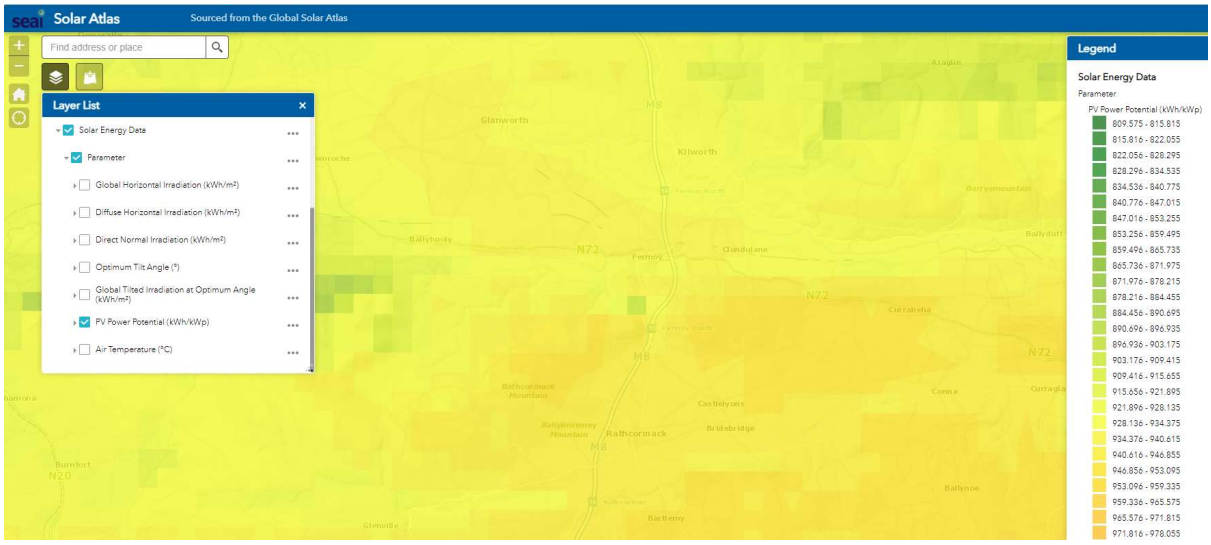


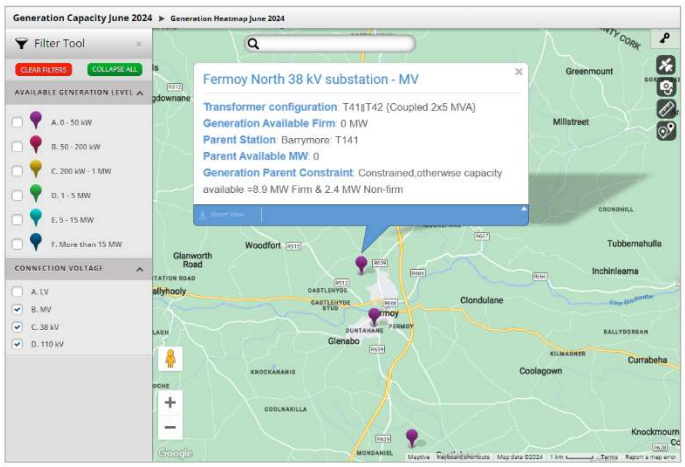
Figure 17: SEAI Solar Atlas, potential solar PV output per kW installed, Fermoy Common Bonds.

Solar PV is also well suited for farm applications. A 100-cow dairy farm could be using 15,000 kWh of electricity per year for milk cooling (31%), the milking machine (20%), and water heating (23%), with a higher demand in the summer when milk production peaks. A 16-kW solar PV system would produce the same amount of electricity per year. Equally, solar PV has become popular with pig and poultry farms where the electricity demand is pretty constant during the year and the sheds have plenty of roof space where solar panels can be installed.

From a community perspective, schools are a great opportunity to demonstrate solar power and educate children about renewable energy in a very tangible way. Based on a quick Google Maps search, we estimate that there about 25 schools in the study area, each would be eligible for the grant from the Department of Education 'Schools Photovoltaic Programme'[15], for an installation of up to 6 kW. Solar power is also in high demand in industrial facilities or services buildings where electricity demand is high throughout the year, for example in food processing plants, hotels and swimming pools, refrigerated warehouses, etc. with installations going to up to 1000 kW in installed capacity.

[15] See https://www.gov.ie/en/publication/562dd-schools-photovoltaic-programme/ for details.

Overall, the Climate Action sets a target of 2.5 GW of solar power capacity installed 'beyond the meter' in homes, public services, businesses and industrial facilities by 2030, which could produce about 8% of the national electricity demand (as of 2022). If we scale it back to the study area, this represents a total potential of 25 MW installed on roofs.



At the higher end of the scale, solar farms are starting to become part of the energy landscape in Ireland. A cursory search in Cork County Council's planning portal indicates that there is one substantial application submitted in August 2024 for a 20 MW project near Castlelyons, Fermoy. Elsewhere, the Fermoy North 38kV substation (medium voltage) could have a generation capacity available of a total of 11.3 MW (see screenshot of ESB Network's available capacity map below). This might be suitable for connecting 1 or two smaller community solar farms of 5 MW each, developed close to these substations.

Again, if we take the Climate Action Plan target of 5.5 GW for utility-scale solar power as a reference, this would translate in a c.55 MW target for solar farms in this study area. This would go beyond what's in the planning pipeline and available grid connection capacity on the local substations for smaller solar farms and would require significant upgrades to the grid infrastructure in the study area. We have therefore set the potential for utility-scale solar in the Register of Opportunities at 30 MW for 2030.

Overall, the potential for solar PV in the study area is estimated at 55 MW of installed capacity in the study area by 2030, with a combination of 25 MW roof-top systems and 30 MW in solar farms. A reasonable target for the residential sector would be to reach a total solar power capacity installed of 5 MW or about 2700 homes installed with solar panels (at an average of 2 kW per home). The balance of roof-top systems (20 MW) would be on public buildings, businesses and factories. Overall, 55 MW of solar power could reduce the current **primary energy demand by close to 100,000 MWh/yr**. and avoid **15,600 tCO2 emissions per year.**

For those interested to check the potential for solar PV at their home, farm, school, etc. should check the following app promoted by the Irish Solar Energy Association: https://www.irishsolarenergy.org/solar-calculator. This webpage also lists the association's members and provides a link to SEAI's Register of solar PV installers. For those interested in exploring further the potential for community solar farm development in the area, SEAI's Community Energy Toolkit for solar PV here.

4. Hydropower

The Blackwater River flowing through Fermoy, and its tributaries, are rich in hydroelectricity potential. Hydroelectricity is power from water in motion. Turbines capture kinetic energy from a stream of fast-flowing water or falling water. This generates renewable electricity.

According to SEAI's Hydropower Map, 7 sites have been identified around Fermoy with a total potential capacity of 618 MW and an estimated annual hydroelectricity production potential of 4439 MWh/yr. If all this hydroelectricity potential was realised, that could result in an estimated c.1500 tCO_2 avoided per year.

The Mill Road site right in the town of Fermoy has a capacity of 179 MW (1268 MWh/yr. potential output) and the Clondulane site has a capacity of 281 kW (2828 MWh/yr.), have by far the largest potential and are associated with existing weirs.

5. Renewable Heat Pumps, Aquathermal and District Heating

Renewable heat pumps use naturally occurring, renewable heat sources such as the ambient air, water bodies or the ground (they are sometimes referred to as geothermal heat sources). This heat, typically available at a low temperature, is harnessed with a heat exchanger and upgraded to a suitable temperature using a heat pump system. Heat pumps have been traditionally used in buildings for space heating (and/or cooling) and water heating. However, the recent advent of large-scale heat pumps, capable of producing higher output temperatures, has enabled industrial applications for process heat as well as district heating applications.

The opportunity of displacing fossil fuel-based heating systems with heat pumps in homes in the study area has already been considered in our assessment of the residential energy upgrade potential above. The opportunity for heat pumps in the public buildings, businesses and industry is considered here based on the forecast of SEAI's National Heat Study for the penetration of heat pumps in the thermal energy supply of these sectors i.e. 41% in the services sector and 3% in the industrial sector by 2030. This would result in the displacement of a total of c.30,140 MWh/yr. in primary energy and 5,730 tCO_2/yr. in avoided emissions.

Aquathermal energy refers to the extraction, storage and distribution of heat from water sources including wastewater, drinking water and surface water. Heat is extracted from these water sources to provide heating and cooling to buildings. The WaterWarmth project, funded by the Interreg NorthWest Europe programme, aims to demonstrate the use of aquathermal energy in cooperative projects, including in Ireland where a potential site has been identified in Fermoy using the Blackwater River as a heat source.

The proposed demonstrator is associated with the body of water accessible right in the centre of Fermoy provided the river Blackwater, and the adjacent area identified as '**District Heating Candidate Area'** in the framework of SEAI's National Heat Study. SEAI has carried out an initial, modelled analysis to identify the towns and cities with the highest potential for developing Ireland's first district heating networks. District heating systems use a pipe network to distribute heat across urban areas, supplied by a central heat generation plant typically using renewable energy or waste heat (e.g. from a data centre). SEAI's study has identified a total heat demand of 4921 MWh/yr. suitable for district heating in the Fermoy Candidate Area. This heat demand, combining residential, commercial and public heat users, presents an ideal opportunity for a district heating system combined with an aquathermal system to convert a very significant section of Fermoy to renewable heating, resulting in 1,007 tCO_2 of avoided emissions.

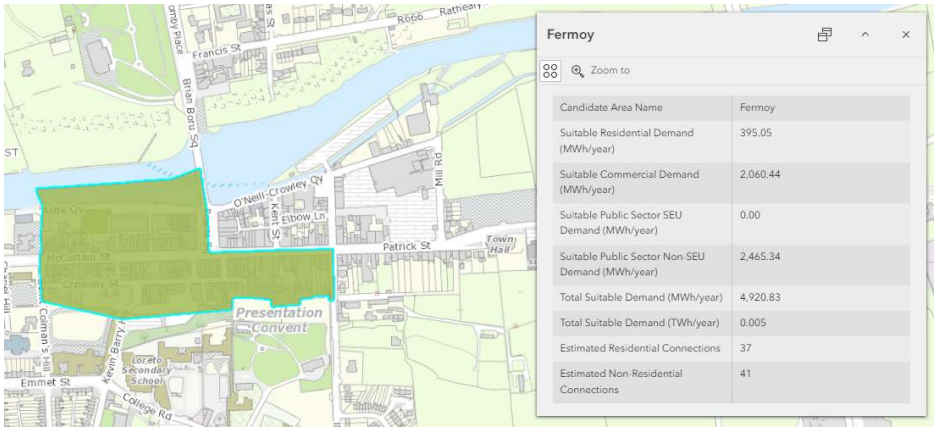


Figure 18: Fermoy district heating candidate area. Source: SEAI, 2024.

6. Bioenergy

Bioenergy comes in many forms of fuels (referred to as biomass), including solid (e.g. firewood), liquid (e.g. HVO) and gaseous (e.g. biomethane). While no specific data was available on the potential for bioenergy in the study area, the following opportunities should be highlighted:

a) Wood fuels:

There is a substantial amount of forestry in North Cork, with a well-established supply chain for wood fuels, and by extension in the Commons area around Fermoy. **Firewood** (logs or briquettes) is mostly used as a secondary heat source in homes and should be readily available locally. However , it is essential for it to be of high quality and dry and used in efficient and clean wood stoves. We recommend households to source firewood from certified suppliers under the Wood Fuel Quality Assurance Scheme (check the scheme's map for local suppliers). SEAI has a really good brochure on Ecodesign compliant wood stoves to help householders choose the right wood stove.

Wood chips are typically used in large biomass boilers to supply heat to buildings with a high heat demand (e.g. hotels with a swimming pool) and to industrial facilities for process heat. Again, sourcing high quality wood fuels and using efficient, well designed and maintained biomass boilers is essential for the success of biomass heating systems. SEAI provides a wealth of information on biomass heating systems and offers financial support through the Support Scheme for Renewable Heat.

b) Biomethane and bioLPG

Biomethane is a refined form of biogas, a renewable gas produced by anaerobic digestion of organic materials from agricultural sources (grass silage and slurry primarily in Ireland), municipal waste (food waste mainly) and industrial waste (from food processing plants mostly). Biomethane can readily be used as a replacement for natural gas for heating applications in buildings or as process heat in industry, or as a transport fuel (typically in larger vehicles). The market and supply chain for biomethane is under development in Ireland but should know accelerate growth in the coming years. A Request for Information conducted by Gas Networks Ireland has uncovered a large amount of biomethane production project in Cork County & City (1,442 GWh/yr.) and the Fermoy area, with its connection to the natural gas network is well placed to attract project development. We anticipate that up to 80 GWh/yr. of biomethane production could be established in the study area, which would be equivalent to 30% of the local natural gas consumption.

BioLPG is a liquified gas produced from a blend of sustainably sourced waste materials and renewable vegetable oils and can deliver between 50% and 90% carbon emission reductions compared to equivalent fuels. In Ireland, bioLPG is available to consumers for cooking or central heating and is a direct substitute for fossil LPG.

c) Biofuels:

Biofuels such as biodiesel and bioethanol can be produced from a wide range of biomass sources, typically in large industrial facilities, and are used primarily as a transport fuel. In Ireland, a biofuel blending obligation has been in place since 2010 and, since then, increasing volumes of biofuels have been introduced to Ireland's transport fuel supply. The obligation ensures that a certain percentage (currently 13% by volume) of the motor fuel placed on the market by fuel suppliers is biofuel (for example: bioethanol and biodiesel)[16]. The Climate Action Plan 2021 (CAP21) contains a target to raise the blend proportion of biofuels in road transport to at least B20 (biodiesel) in diesel and E10 (Ethanol) in petrol as part of the measures to achieve a 51% reduction in carbon emissions by 2030[17].

[16] https://www.gov.ie/en/publication/69944-what-are-renewable-transport-fuels/
[17] https://www.gov.ie/pdf/?file=https://assets.gov.ie/262016/0f9661c4-30d8-4ecd-ae1d-eaa5b313d225.pdf#page=null

Hydrotreated vegetable oil (HVO) is derived from vegetable oil, processed with hydrogen, to create a diesel substitute product. Like other biofuels, HVO must originate from sustainable sources, such as waste oils or advanced biofuels feedstocks like agricultural waste. Use of unsustainable feedstocks could lead to significant environmental impacts, including deforestation and impact on food production[18]. HVO from sustainable sources is a finite resource that must be used for most effective in terms of decarbonisation, in particular for heavy goods vehicles. Fermoy is a pioneer in the deployment of HVO which is on offer at the Inver forecourt alongside super-fast EV chargers.

d) Overall bioenergy potential in the study area

Without specific data on the potential for bioenergy in the study area in terms of resources and suitable energy demand, we refer to SEAI's National Heat Study and the modelling it has done on different scenarios of bioenergy development and uptake. The Balanced Scenario ("progresses steadily and comprises a mix of cost-effective deployment of low-carbon technologies, achieving net zero by 2050") provides for an overall share of bioenergy of 8% in the total national energy demand by 2030, mostly used in the industrial sector to decarbonise process heat. When translating this into the local energy mix for 2030, we forecast close to **60,000 MWh/yr. in bioenergy use** in industry, public services and businesses in the study area, resulting in **12,300 tCO_2 avoided per year**.

7. Summary of Renewable Energy Opportunities & Suitability for Community Development

The following table summarises the opportunities for renewable energy from a **community development perspective** in the study area, based on the review above.

Local Renewable Energy Suitability				
Technology	Scale Range (kW, MW)	Target Application	Community Suitability (RYG rating)	Rationale
Wind	Medium-scale Wind Farm	Either auto-consumption (industrial/commercial sites) or community-led renewable generation projects.	Medium Potential	There are significant constraints on the local distribution grid in terms of grid-connection, and wind generation for auto-consumption at industrial site might be a more feasible option. Obtaining planning permission for a wind farm pauses significant challenges.
	Large-scale Windfarm	Large-scale commercial windfarm developments.	Low Potential	
Solar PV	Rooftop, micro to small-scale (up to 500 kW)	Schools, community, commercial & public buildings.	High Potential	Significant potential for rooftop solar across study area.
	Medium scale solar farms (0.5 MW to 5 MW)	Industrial rooftop, brownfield or farmland	Medium Potential	Projects can vary in size & deliver benefits directly to local communities and businesses. Limited potential for grid-connection of community solar farms. Obtaining planning permission less challenging than for a wind farm.
	Utility-scale solar farms (> 5MW)	Brownfield or farmland	Low Potential	Large solar farms developments are capital intensive and are more complex to develop in terms of grid connection & planning.

[18] https://www.seai.ie/blog/hvo-can-be-part-of-our-cl/

Biomass	50 kW to 500 kW	Biomass boilers for community & public facilities	High Potential	Requires a well-established, reliable supply chain for biomass (woodchip). Particularly suitable for facilities with a high, constant heat demand.
	0.5 to 3 MW	Industrial biomass plants for thermal or CHP applications	Medium Potential	
Biogas	<40 GWh/yr. biomethane output.	Agriculture-based AD plants GWh/yr.) using grass silage & slurry.	Medium Potential	Potential for community owned AD plants, likely to be primarily using agricultural feedstocks.
	> 40 GWh/yr. biomethane output	Semi-industrial AD plants using agricultural feedstocks + municipal & industrial organic waste.	Low Potential	

D. Electric Vehicles & Transport

Transport emissions account for 27% of primary energy consumption and a similar portion of carbon emissions. The average commute time for county residents is 26 minutes and 80% of commutes were reported to be less than 60 minutes in the latest census[19]. About 60% of this derives from private vehicles and small public service vehicles that are suitable to transition to EVs.

The Government are targeting 1 million EVs on Irish roads by 2030, about 40% of the current vehicle stock. EV's deliver approximately 60% reduction in emissions per km travelled and this will continue to improve as the carbon intensity of grid electricity reduces[20]. There are 18,285 cars and small public vehicles (e.g. taxis) in the study area. Assuming a 40% switch to EV's (7304 EVs) and a 60% carbon saving in average, the resulting emission reduction would be **10,500 tonnes of CO_2**. Considering the improved efficiency of EVs vs the higher primary energy factor of grid electricity the primary energy saving is **47,200 MWh.**

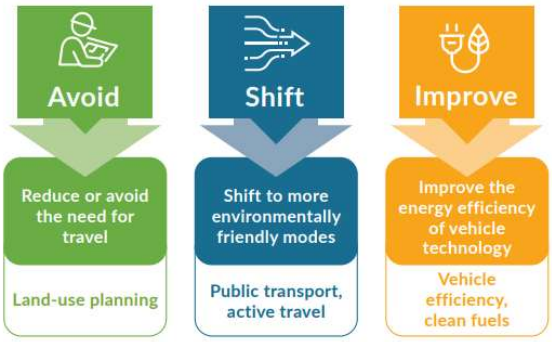


Figure 19: Key principles of the national sustainable mobility strategy.

While this is substantial, it is very short of Ireland's overall requirement to achieve a 51% reduction in greenhouse gas emissions by 2030 as part of the National Climate Action Plan. Further measures will be required following the 'Avoid-Shift-Improve' principles set out in the National Sustainable Mobility Policy, as illustrated herewith. We have made an additional 'other mobility measures' allocation in the Sustainable Energy Roadmap hereafter.

Beyond EVs there is also the potential for modal shifts around transport. About 22% of journeys in Cork County and City are less than 15 minutes and could be undertaken by walking, cycling or taking public transport instead of by private car. If 50% of these short journeys could be shifted to active travel and public transport, another **4,820 tonnes of CO_2** and **21,640 MWh** of primary energy could be saved.

Together, driving the uptake of EVs and a shift to environmentally friendly modes of mobility for short journeys could avoid 15,320 tonnes of **CO_2** emissions per year and a reduction of 68,840 MWh/yr. in primary energy use. The Credit

[19] CSO (2022) https://data.cso.ie/table/F7068
[20] SEAI https://www.seai.ie/technologies/electric-vehicles/why-drive-electric/the-environment/

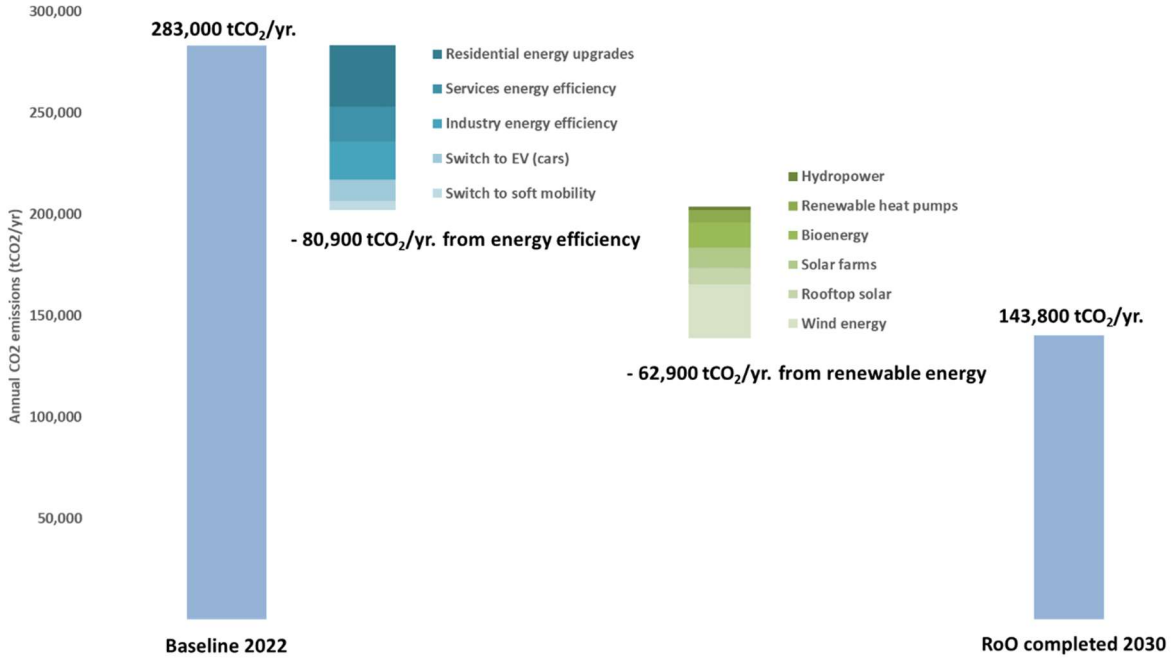
Union could play an important role in enabling the switch to EV and the adoption of E-Bikes through awareness raising and education, as well as making them more financially accessible for their customers through improved loan rates and so on.

E. Summary of the Sustainable Energy Roadmap

The following table summarises the recommended measures to form part of Synergy Credit Unions' Sustainable Energy Roadmap, including energy demand reduction measures first and renewable energy production measures second. The ambition for each measure reflects sectorial targets set in the national Climate Action Plan, as well as the renewable energy potential identified above.

Sustainable Energy Roadmap - Plan to 2030			
	Number of projects	*Primary Energy Saving (MWh/yr.)*	*CO2 Saving (tCO2/yr.))*
Baseline 2022		1,429,896	283,026
Energy Demand Reduction Measures			
Energy renovation in the residential sector (#homes)	11,111	99,811	29,716
Energy demand reduction in services (%)	-35%	94,784	17,017
Energy demand reduction in industry (%)	-20%	101,840	18,813
EV Potential (private cars replacement, %)	40%	47,212	10,516
Other Sustainable Mobility Measures (short journeys' substitution)	11%	21,639	4,820
Total impact of energy demand reduction measures		***365,285***	***80,882***
(% of baseline primary energy use and CO2 emissions)		-26%	-29%
Renewable Energy Development Projects			
Commercial wind farm 35 MW (MWh/yr..)	76650	145,635	25,785
Residential solar (MW)	5	9,025	1,598
Non-residential solar (MW)	20	36,100	6,392
Commercial solar farms (MW)	20	36,100	6,392
Community solar farms (MW)	10	18,050	3,196
Hydropower (MW)	618	8,434	1,493
Bioenergy in services (MWh/yr.)	5,062	5,196	988
Bioenergy in industry (MWh/yr.)	54,245	59,669	11,314
Renewable heat pumps in services (MWh/yr.)	20,572	21,114	4,016
Renewable heat pumps in industry (MWh/yr.)	8,205	9,026	1,712
Total impact of renewable energy measures above		348,349	62,885
(% of baseline primary energy use and CO2 emissions)		-24%	-22%
Total Saving Potential		**713,633**	**143,768**
(% of baseline primary energy use and CO2 emissions)		49.9%	50.8%

The following graph illustrates the projected impact of the proposed Sustainable Energy Roadmap in terms of **CO_2** emission reductions from the 2022 baseline, resulting from the implementation of the energy efficiency & renewable energy opportunities identified above by 2030.



Overall, the energy efficiency and renewable energy opportunities identified above represent a **total reduction of 713,600 MWh/yr. in primary energy and 143,800 tCO2/yr**., approximately -50% compared to the baseline for 2022.

6. Register of Opportunities

A. Funding supports available for sustainable energy projects.

The following grants are available from SEAI for homeowners for **home energy upgrade projects**:

Individual Energy Upgrade Grants are for homeowners or landlords who want to upgrade their homes on a step-by-step basis. They will manage their own project but will need to select a contractor from the SEAI register to be eligible. This is a step- by-step approach so there is no need to reach a particular BER rating after your upgrade, however most grants will require a post-works BER to be published before you can draw the money down from the SEAI.

The One Stop Shop Service is for homeowners and private landlords who want to do multiple energy upgrades at the same time and will upgrade to a minimum of a B2 BER rating with 100kWh/m2 uplift in the BER. They are looking for a fully managed solution where the grants and project is managed by the One Stop Shop, and they will only have to pay for the works net of the eligible grant.

Fully Funded Energy Upgrade (comprising Warmer Homes) for qualifying homeowners). This programme is managed by SEAI and is available for people in receipt of certain welfare benefits: Fuel Allowance, Job Seekers Allowance for over six months with a child under seven, Working Family Payment, One-Parent Family Payment, Domiciliary Care Allowance, Carers Allowance, Disability Allowance for over six months with a child under seven. All the surveys and works are organised by SEAI. There is a long waiting list (approx. two years) but all the more reason to register sooner rather than later on the SEAI's website if you are eligible.

Quality assurance for the SEAI grant funded work is provided by an installer accreditation scheme and all work must comply with The National Standards Association of Ireland, (NSAI) Code of Practice for the Energy Efficiency Retrofit of Buildings, SR54. SEAI also requires compliance with its Domestic Technical Standards and Specifications. However SEAI do not provide any warranty for the work completed and only carry out spot checks on a sample of installations. In the case of the One Stop Shop service, quality is managed by the One Stop Shop.

In addition, the Community Energy Grant is available to communities to support new approaches to achieving energy efficiency and typically covers 30-50% of the costs. This funding programme brings together groups of buildings under the same retrofit programme, so that community-wide energy improvements can be achieved more efficiently and cost effectively than might otherwise be possible. Projects typically include a mix of community buildings such as sports hall, community centre and private GAA clubs and other sports facilities, local authorities, retail outlets, factories, community centres, not-for-profit organisations and charities, hotels, public sector facilities and schools. You will need to contact a registered Project Coordinator who may be able to include your community project in an existing application or apply on your behalf. Each community project should include at least 10 individual homes so it is possible to group a number of houses together in an area and approach a project coordinator to see if they can coordinate the application on your behalf. More recently, new streams in the Community Energy Grant scheme can fund residential only projects.

A number of supports are available from SEAI **for small and medium businesses**, as outline here after:

Non-Domestic Microgen Scheme: The Non-Domestic Microgen Grant (NDMG) provides financial assistance to help businesses and other sectors (farms, public buildings, schools, community centres, non-profit societies) to install solar PV panels to generate electricity on site. This technology reduces commercial electricity costs and increases security of supply, while enhancing a positive sustainability image. Grant funding is available, ranging from €700 to €200 per kW installed, depending on the size of the system.

Support Scheme for Energy Audits: SEAI's Support Scheme for Energy Audits (SSEA) will offer SMEs a €2,000 voucher towards the cost of a high-quality energy audit. In most cases, this will cover the total cost of the audit. Application to the scheme is easy, with automatic approval for eligible businesses. This could be of interest to eligible businesses (see criteria on SEAI's website) that have not been audited (e.g. Sherkin House) or those who would like a deeper energy audit (this could be used to draw up a set of specifications and get preliminary costings from contractors).

Accelerated Capital Allowance (ACA): a tax incentive scheme that promotes investment in energy efficient products & equipment. The ACA is based on the long-standing 'Wear and Tear Allowance' for investment in capital plant and machinery, whereby capital depreciation can be compensated through a reduction in an organisation's tax liability.

The following website details the nature of the supports for businesses provided and the grants available: https://www.seai.ie/business-and-public-sector/business-grants-and-supports/

The Targeted Agriculture Modernisation Schemes (TAMS 3) provide grants to farmers to build and/or improve a specified range of farm buildings and equipment on their holding. The Solar Capital Investment Scheme will be ring fenced with its own investment ceiling of €90,000 and will be grant aided at the enhanced rate of 60%.

B. Options and recommendations for an integrated energy retrofit delivery model at community level

A coordinated approach to develop and deliver energy retrofit projects would help achieve scale and impact in your community.

The 'energy retrofit one-stop-shop' is an emerging model in Ireland, bringing under the same roof a range of support services for community-scale retrofit projects, going from awareness-raising and advice to project management and finance.

The core function of such an organisation is to support householders and other beneficiaries in the community along their 'customer journey' and to act as a coordinator between all the stakeholders involved.

The diagram below explains the typical steps for a "one stop shop" customer:

Figure 20: Key functions of an energy retrofit one-stop-shop. Source: Energy-cities.

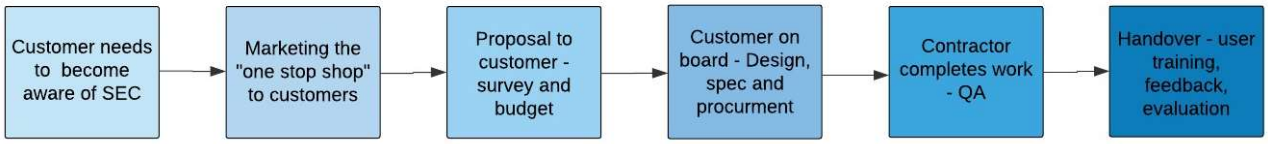


Figure 21: Customer journey through the "one stop shop" retrofit model.

The different steps involved:

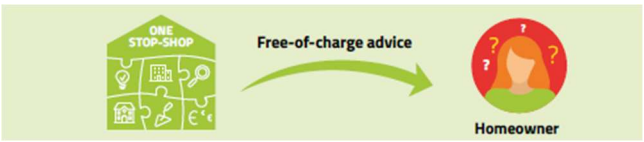
- Awareness-raising in the community around the benefits of energy retrofits, the funding available and the services provided by one stop shop, using social media, local media, information evenings, and other relays in the community.
- Once the customer contacts the "one stop shop" a Retrofit Coordinator (RC) needs to be appointed, a home survey and BER assessment completed and a project budget established, with information on relevant grants.
- Once the customer is on board, the RC then needs to complete the project design and specification including a whole house retrofit plan and procure the work through accredited installers, likely through competitive tendering.
- Work is completed by the installer quality assurance provided by the RC. Once finished there needs to be a formal handover including any necessary user training for the customer and on a broader scale feedback and evaluation of the retrofit work.

The one-stop-shop model often includes coordination of project funding e.g. from SEAI under schemes such as the Community Grants. The services provided in that regard would include preparation and submission of funding applications, management of payments to contractors and funding claims.

C. Different models of project development support services:

In Ireland, the One Stop Shop Model is linked to the SEAI funded programme - One Stop Shops which is an end to end solution where the One Stop Shop works with homeowners from start to finish and even looks after getting the grants which it discounts off the whole price. This is what is referred to as the "Integration Model" below.

However, there are other models of delivering **support services** at a local level, with many examples across Ireland and Europe of services run by communities or local authorities. The service delivery model can be flexible and evolve over time, responding to the needs and capability of your community. Here is an outline of a few options:

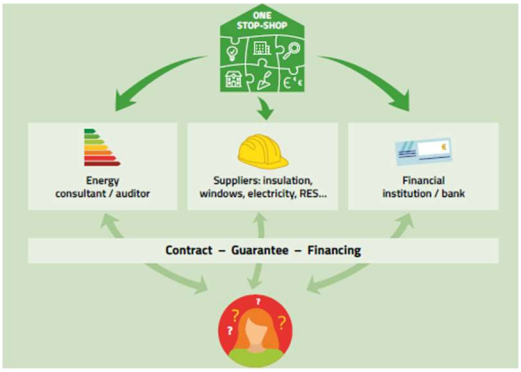


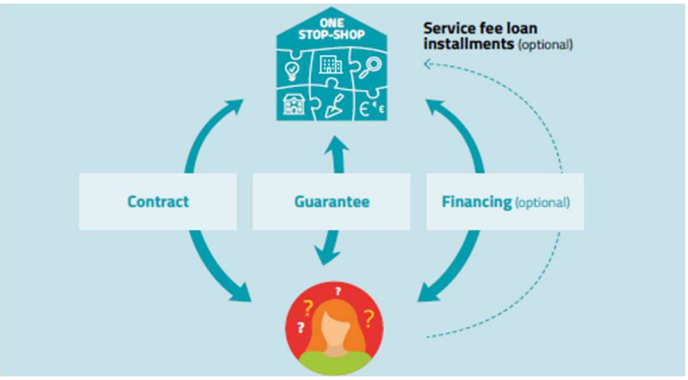
Facilitation Model:

Offers initial retrofit advice to homeowners, sign-posts towards available supports but responsibility for the retrofit process lies with the property owner (Example CHERIS West Cork)

Coordination Model

Offers advice, coordinates funding applications and possibly finance. Might assist with overall project management, but contractual responsibility for retrofit works rests with property owners and contractors. (Example Energy Team, ECTC, SEAI Community Energy Programme Coordinators





Fully Integrated Model

Full one stop shop offer under one roof, providing a single point of contact for property owner. One stop shop provides advice, contract management & quality assurance, funding & finance offering, etc.

Example: SEAI funded One Stop Shops

One model could also be a starting point e.g. you could start with a facilitation model and move to a coordination model once you have built up skills and experience.

Setting up a local service in the community based on one of these models could take the following steps:

1. Feasibility/market research
2. Business Plan
3. Coordinate with the different stakeholders
4. Secure funding for the establishment of a service
5. Launch the Service
6. Celebrate!

D. Key Local Stakeholders & Potential Partnership

The following stakeholders were identified as having a potential role in the EMP's development and implementation (where known, the names of relevant contact persons have been included in the list below):

- Cork County Council & Cork City Council: the Councils play a number of key roles relevant to the EMP as local authorities in the study area, notably in terms of spatial planning, social housing provider, environmental management, local leisure and tourism services, and community development. As owner/occupier of a number of facilities and buildings throughout the area, the councils are large users of energy and have a remit for energy management. The Councils also run a number of grant schemes relevant to sustainable energy initiatives including the Community Climate Action Programme (CCAP) in the County and the City.
- Community organisations and networks include:
    - The Public Participation Network (PPN) is a network of community, voluntary, social inclusion and environmental organisations, working to build better communities across the county and the city. Cork County PPN has more than 400 members and Cork City Council has 200 groups. They include community-based groups, organisations, associations, clubs, societies and charities. The PPN works to empower the community to be represented in decision making processes that impact citizens through representation on Council committees, consultation processes, policy submissions and more.
- Agricultural organisations and networks include:
    - The Irish Farmers Association (IFA), Farmers are custodians of most of the land in the Fermoy and manage a large proportion of natural resources available for sustainable energy production in terms of agricultural crops and by-products, forestry, wind & solar energy, etc. They also are also energy users in their own homes and farming operations, notably on dairy farms.

- Teagasc: Plays a key role in advising farmers, research and innovation in agriculture, training and education, both at national and local levels.
- Department of Agriculture, Food and the Marine: the DAFF has an office in Cavan that deals with Veterinary, Livestock and AES issues. The DAFF generally speaking plays a central role in policymaking for agriculture, overseeing relevant state departments involved in research and innovation, education, regulation, monitoring, etc.; and is responsible for the administration of relevant support schemes. It is also likely that the DAFF would have data and information on the agricultural sector in Galway.

- Education & Innovation organisations and networks include:
  - There are approximately 25 primary and secondary schools in the SEC area which can be important partners for awareness raising and education on environmental issues. There is a growing movement among older students in Ireland and internationally for climate action advocacy, which is increasingly influential at all levels of society. The Green Schools initiative is an important forum to engage with local schools. Schools can also receive specific funding for sustainable energy initiatives including installing solar power systems.
  - The Munster Institute of Technology and University College Cork offer a variety of courses in the area of sustainable energy and is an important stakeholder in growing skills & knowledge for the sustainable energy transition in the SEC area. They would be ideal partners for education and innovation initiatives.
  - The Cork Education and Training Board delivers education, training and ancillary services to all age-groups and communities that contribute to the intellectual, social and economic life of Cork City and County. CorkETB offers a number of apprenticeship and community training programmes which would be relevant to sustainable energy trades.
- Business and community organisations and networks include:
  - The Cork Chamber of Commerce is a good organisation to network and engage with the business community in Cork city and council. There is a growing trend of local businesses in Ireland to play and active role in the sustainable energy transition, and to capture economic and employment creation opportunities locally and internationally. The Sustainable Cork Programme run by the Chamber of Commerce is a testimony to this commitment.
  - The Local Enterprise Office offers support services and funding for SMEs (training, mentoring, market research, feasibility grants, etc.) and can be instrumental in supporting enterprise development and business innovation in the field of sustainable energy. Notably, LEO administers the Green for Business and the Energy Efficiency Grant schemes.
  - SEAI operates a Registration scheme for a number of relevant professions, with many of them in the SEC area.
- The Synergy Credit Union is a key stakeholder and driver for the SEC. The Synergy CU coordinated the development of this Energy Master Plan and will continue to play a key role in its implementation. It also supports its members with green finance for their investment in sustainable energy solutions and will support community groups wanting to avail of Leader funding from Avondhu Blackwater Partnership CLG.
  - The local development companies acting in the SEC area include the Cork City Partnership and Avondhu Blackwater Partnership CLG. Community and Voluntary groups can access a broad range of services from their local development partnership companies, such as LEADER Rural Development Programme Funding and labour resources through the Rural Social Scheme and TÚS.

7. Recommendations for Project Development Strategy

The Synergy CU SEC is ideally placed to have a practical role in supporting the development of local sustainable energy initiatives and projects. Central to this will be the resourcing of a team to deliver the required support services over a defined project period. The team should bring together key stakeholders as mentioned above and draw from existing sources of funding and support, at a local level (e.g. Leader, the LEO) and national level (e.g. SEAI, the Department of Agriculture, etc.). The project duration should be a minimum of 4 years to coincide with the duration of the next SEAI SEC mentoring programme (2025-2028).

The remit of the team would be to support initiatives such as:

- Awareness-raising activities at a community level, aimed at households, businesses and community organisations, leveraging the Credit Union members and their communities. The Synergy CU website, newsletter and other information tools should consistently disseminate case studies, best practice projects, news, etc. among the networks.
- Sign-posting and aiding groups and individuals apply for grant funding from SEAI and other bodies. Many community groups are quite experienced in this regard and should collaborate when seeking funding.
- Developing community-based sustainable energy projects in the context of SEAI's Community Energy Grant programme.
- Supporting group purchasing initiatives for homes, schools and farms, such as the Solar Meitheal.
- Promoting and supporting the demonstration of innovative community approaches to sustainable energy development, such as Community Wide Carpooling/Ridesharing, Community Renewable, Solar Roof Leasing, etc.

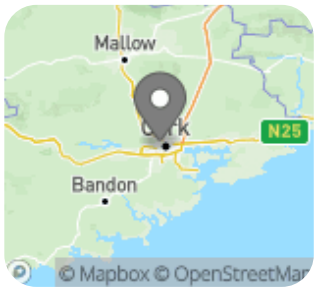
Home energy upgrades were a focus in this EMP and should be prioritised for project development. Different models of project development support services were outlined in the Register of Opportunity section. The Local Development Companies are ideally placed to collaborate with a view to set up a Local Energy Agency. There are great examples of such initiatives, for example the LEAP project in the North and West of Ireland. This is an excellent example of how support services for home energy upgrades can be delivered locally by a partnership of local authorities, research organisations and local development companies. The LEAP partners, led by ATU, are being supported by the European Union, through the EU LIFE Clean Energy Transition programme, for a 3-year pilot phase to establish 3 Local Energy Agencies and develop a pipeline of area-base home retrofitting projects.

Overall, a key next step for the Synergy CU SEC should be to reflect on the EMP and its Register of Opportunity and Roadmap and regroup to flesh out the strategy outlined above. Compiling a business plan for its execution would be a great foundation to engage with partners and to secure funding from SEAI and other bodies. With funding in place and a team resourced, the Galway PPN will be well placed to take a big leap into the ACTION phase of its SEC journey.

XD Sustainable Energy Consulting and its sister company RetroKit would like to express their gratitude for the Synergy CU SEC's support during the development of this EMP. We would like to reaffirm here our commitment to continue supporting the SEC in the next step on their sustainable energy journey.

Home Energy Assessment

RetroKit



Urban

Apartment

45m2

Built:1901

Electricity

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	Bronze	Silver	Platinum
BER	D1	D1	C3	A1
Uplift				
Comfort Level				
Roof				
External Wall				
Windows				
Doors				
Floor				
Draughts				
Main Heating				
Water Heating				
Heating Controls				
Lighting				
Ventilation				

Your Options to Achieve a More Comfortable Home

Bronze

BER:	Fuel Bills:	Environmental Impact:	Payback:
D1	↓ €-30/yr	↓ -21 kgs CO_2/yr	25 yrs

	Cost	Impact
Fit Low Energy Lighting	€142	★ ★ ★
Shallow Draught Proofing	€599	★ ★ ☆
Energy credits	€0	
Potential grants	€0	
Total investment	€741	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Silver

BER:	Fuel Bills:	Environmental Impact:	Payback:
C3	€-806/yr	717 kgs CO_2/yr	20 yrs

	Cost	Impact
Switch to Condensing Gas Boiler Including Controls	€4420	☆ ☆ ☆
Fit Low Energy Lighting	€142	★ ★ ★
Fit Pipework, Pumps and Valves for Central Heating	€2554	☆ ☆ ☆
Shallow Draught Proofing	€599	★ ★ ☆
Switch to Condensing Oil Boiler Including Controls	€7832	☆ ☆ ☆
New Radiators and Central Heating Pump	€1816	☆ ☆ ☆
Energy credits	€0	
Potential grants	€1400	
Total investment	€15963	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Platinum

BER:	Fuel Bills:	Environmental Impact:	Payback:
A1	↓ €-1924/yr	↓ -1794 kgs CO_2/yr	20 yrs

	Cost	Impact
Install 4kWp solar PV	€10896	★ ★ ★
Fit Low Energy Lighting	€142	★ ☆ ☆
Fit Pipework, Pumps and Valves for Central Heating	€2554	☆ ☆ ☆
External Insulation to Solid Wall	€8480	★ ★ ☆
Air to Water Heat Pump, New Cylinder and Controls	€19295	★ ★ ★
Change to Low Temperature Radiators	€2554	☆ ☆ ☆
Fit Mechanical Demand Control Ventilation	€4949	☆ ☆ ☆
Replace Windows with Triple Glazed	€4072	★ ☆ ☆
100mm Internal Insulation to Uninsulated Sloping Ceiling	€2739	★ ☆ ☆
Shallow Draught Proofing	€599	★ ☆ ☆
Energy credits	€481	
Potential grants	€17100	
Total investment	€38701	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

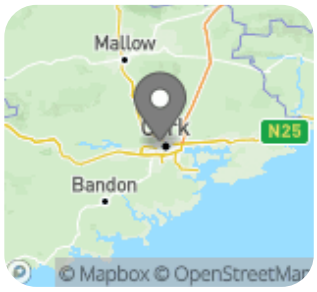
Healthier home

Warmer home

Better for our planet

Home Energy Assessment

RetroKit



Urban

Terraced house

80m2

Built:1922

Gas or LPG

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	Bronze	Silver	Platinum
BER	D2	C3	C2	A1
Uplift				
Comfort Level				
Roof				
External Wall				
Windows				
Doors				
Floor				
Draughts				
Main Heating				
Water Heating				
Heating Controls				
Lighting				
Ventilation				

Your Options to Achieve a More Comfortable Home

Bronze

BER:	Fuel Bills:	Environmental Impact:	Payback:
C3	€-423/yr	-1730 kgs CO_2/yr	23 yrs

	Cost	Impact
Fit Low Energy Lighting	€227	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€1737	★ ★ ★
Fit Digital Heating Controls	€2838	★ ★ ★
Shallow Draught Proofing	€758	★ ☆ ☆
Energy credits	€0	
Potential grants	€1900	
Total investment	€9618	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Silver

BER:	Fuel Bills:	Environmental Impact:	Payback:
C2	↓ €-105/yr	↓ -1297 kgs CO_2/yr	246 yrs

	Cost	Impact
New Condensing Gas Combi Boiler Including Controls	€3556	★ ★ ★
Fit Low Energy Lighting	€227	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€1737	★ ★ ☆
Fit Digital Heating Controls	€2838	★ ★ ☆
Shallow Draught Proofing	€758	★ ☆ ☆
Switch to Condensing Oil Boiler Including Controls	€7832	★ ★ ★
New Condensing Oil Boiler Including Controls	€6980	★ ★ ★
Energy credits	€0	
Potential grants	€4000	
Total investment	€25887	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Platinum

BER:	Fuel Bills:	Environmental Impact:	Payback:
A1	↓ €-1310/yr	↓ -4625 kgs CO_2/yr	35 yrs

	Cost	Impact
Install 4kWp solar PV	€10896	★ ★ ☆
Fit Low Energy Lighting	€227	☆ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
Replace Door	€2136	★ ☆ ☆
300mm Attic Insulation on Ceiling	€1737	★ ☆ ☆
External Insulation to Solid Wall	€12025	★ ★ ☆
Air to Water Heat Pump, New Cylinder and Controls	€19295	★ ★ ★
Change to Low Temperature Radiators	€4086	★ ☆ ☆
Fit Mechanical Demand Control Ventilation	€4949	☆ ☆ ☆
Replace Windows with Triple Glazed	€7587	★ ☆ ☆
Shallow Draught Proofing	€758	★ ☆ ☆
Energy credits	€1747	
Potential grants	€21400	
Total investment	€46510	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

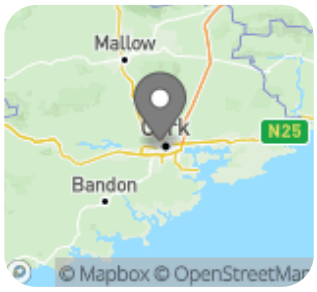
Healthier home

Warmer home

Better for our planet

Home Energy Assessment

RetroKit



Rural

Detached house

147m2

Built:1944

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	Bronze	Silver	Platinum
BER	D1	C1	B3	A2
Uplift				
Comfort Level				
Roof				
External Wall				
Windows				
Doors				
Floor				
Draughts				
Main Heating				
Water Heating				
Heating Controls				
Lighting				
Ventilation				

Your Options to Achieve a More Comfortable Home

Bronze

BER:	Fuel Bills:	Environmental Impact:	Payback:
C1	€-1304/yr	-3825 kgs CO_2/yr	10 yrs

	Cost	Impact
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4247	★ ★ ☆
Fit Digital Heating Controls	€2838	★ ★ ★
Cavity Insulation to Partially Filled Cavity Wall	€2683	★ ★ ★
Shallow Draught Proofing	€1066	★ ☆ ☆
Energy credits	€0	
Potential grants	€3900	
Total investment	€13177	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Silver

BER:	Fuel Bills:	Environmental Impact:	Payback:
B3	€-2291/yr	-5691 kgs CO_2/yr	11 yrs

	Cost	Impact
Switch to Condensing Gas Boiler Including Controls	€4420	★ ★ ★
New Condensing Gas Combi Boiler Including Controls	€3556	★ ★ ★
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4247	★ ★ ☆
Fit Digital Heating Controls	€2838	★ ★ ☆
Cavity Insulation to Partially Filled Cavity Wall	€2683	★ ★ ☆
Shallow Draught Proofing	€1066	★ ☆ ☆
New Condensing Oil Boiler Including Controls	€6980	★ ★ ★
Energy credits	€0	
Potential grants	€6000	
Total investment	€26034	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Platinum

BER:	Fuel Bills:	Environmental Impact:	Payback:
A2	↓ €-2727/yr	↓ -8662 kgs CO_2/yr	25 yrs

	Cost	Impact
Install 4kWp solar PV	€10896	★ ☆ ☆
Fit Low Energy Lighting	€284	☆ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
Replace Door	€2401	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4247	★ ☆ ☆
Cavity and External Wall Insulation	€27282	★ ☆ ☆
Air to Water Heat Pump, New Cylinder and Controls	€19295	★ ★ ★
Change to Low Temperature Radiators	€5108	★ ☆ ☆
Fit Mechanical Demand Control Ventilation	€4949	☆ ☆ ☆
Replace Windows with Triple Glazed	€17839	★ ☆ ☆
Shallow Draught Proofing	€1066	★ ☆ ☆
Energy credits	€2792	
Potential grants	€28400	
Total investment	€68134	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

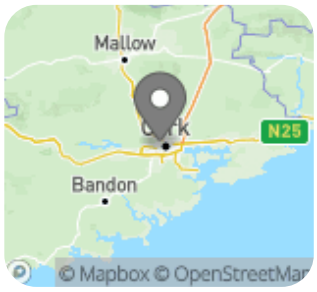
Healthier home

Warmer home

Better for our planet

Home Energy Assessment

RetroKit



Rural

Detached house

135m2

Built:1915

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	Bronze	Silver	Platinum
BER	E1	D1	C2	A2
Uplift				
Comfort Level				
Roof				
External Wall				
Windows				
Doors				
Floor				
Draughts				
Main Heating				
Water Heating				
Heating Controls				
Lighting				
Ventilation				

Your Options to Achieve a More Comfortable Home

Bronze

BER:	Fuel Bills:	Environmental Impact:	Payback:
D1	€-1082/yr	-3607 kgs CO_2/yr	11 yrs

	Cost	Impact
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€3489	★ ★ ★
Fit Digital Heating Controls	€2838	★ ★ ★
Shallow Draught Proofing	€1008	★ ☆ ☆
Energy credits	€0	
Potential grants	€2200	
Total investment	€11377	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Silver

BER:	Fuel Bills:	Environmental Impact:	Payback:
C2	↓ €-2405/yr	↓ -6135 kgs CO_2/yr	10 yrs

	Cost	Impact
Switch to Condensing Gas Boiler Including Controls	€4420	★ ★ ★
New Condensing Gas Combi Boiler Including Controls	€3556	★ ★ ★
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€3489	★ ★ ☆
Fit Digital Heating Controls	€2838	★ ★ ☆
Shallow Draught Proofing	€1008	★ ☆ ☆
New Condensing Oil Boiler Including Controls	€6980	★ ★ ★
Energy credits	€0	
Potential grants	€4300	
Total investment	€24234	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Platinum

BER:	Fuel Bills:	Environmental Impact:	Payback:
A2	↓ €-3348/yr	↓ -10114 kgs CO_2/yr	19 yrs

	Cost	Impact
Install 4kWp solar PV	€10896	★ ☆ ☆
Fit Low Energy Lighting	€284	☆ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
Replace Door	€2504	★ ☆ ☆
300mm Attic Insulation on Ceiling	€3489	★ ☆ ☆
External Insulation to Solid Wall	€26610	★ ★ ☆
Air to Water Heat Pump, New Cylinder and Controls	€19295	★ ★ ★
Change to Low Temperature Radiators	€5108	★ ☆ ☆
Fit Mechanical Demand Control Ventilation	€4949	☆ ☆ ☆
Replace Windows with Triple Glazed	€13687	★ ☆ ☆
Shallow Draught Proofing	€1008	★ ☆ ☆
Energy credits	€3354	
Potential grants	€28400	
Total investment	€62036	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

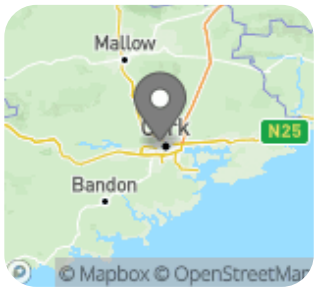
Healthier home

Warmer home

Better for our planet

Home Energy Assessment

RetroKit



Rural

Detached house

150m2

Built:1981

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	Bronze	Silver	Platinum
BER	C3	C1	B3	A2
Uplift				
Comfort Level				
Roof				
External Wall				
Windows				
Doors				
Floor				
Draughts				
Main Heating				
Water Heating				
Heating Controls				
Lighting				
Ventilation				

Your Options to Achieve a More Comfortable Home

Bronze

BER:	Fuel Bills:	Environmental Impact:	Payback:
C1	↓ €-834/yr	↓ -2636 kgs CO_2/yr	16 yrs

	Cost	Impact
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4683	★ ★ ☆
Fit Digital Heating Controls	€2838	★ ★ ★
Cavity Insulation to Partially Filled Cavity Wall	€2429	★ ★ ☆
Shallow Draught Proofing	€1076	★ ☆ ☆
Energy credits	€0	
Potential grants	€3900	
Total investment	€13369	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Silver

BER:	Fuel Bills:	Environmental Impact:	Payback:
B3	€-1842/yr	-4546 kgs CO_2/yr	14 yrs

	Cost	Impact
Switch to Condensing Gas Boiler Including Controls	€4420	★ ★ ★
New Condensing Gas Combi Boiler Including Controls	€3556	★ ★ ★
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4683	★ ☆ ☆
Fit Digital Heating Controls	€2838	★ ★ ☆
Cavity Insulation to Partially Filled Cavity Wall	€2429	★ ☆ ☆
Shallow Draught Proofing	€1076	★ ☆ ☆
New Condensing Oil Boiler Including Controls	€6980	★ ★ ★
Energy credits	€0	
Potential grants	€6000	
Total investment	€26226	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Platinum

BER:	Fuel Bills:	Environmental Impact:	Payback:
A2	€-2282/yr	-7538 kgs CO_2/yr	30 yrs

	Cost	Impact
Install 4kWp solar PV	€10896	★ ☆ ☆
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
Replace Door	€2366	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4683	★ ☆ ☆
Cavity and External Wall Insulation	€24699	★ ☆ ☆
Air to Water Heat Pump, New Cylinder and Controls	€19295	★ ★ ★
Change to Low Temperature Radiators	€5108	★ ☆ ☆
Fit Mechanical Demand Control Ventilation	€4949	☆ ☆ ☆
Replace Windows with Triple Glazed	€19391	★ ☆ ☆
Shallow Draught Proofing	€1076	★ ☆ ☆
Energy credits	€2366	
Potential grants	€28400	
Total investment	€67942	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

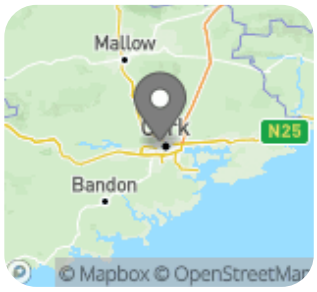
Healthier home

Warmer home

Better for our planet

Home Energy Assessment

RetroKit



Rural

Detached house

172m2

Built:1996

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	Bronze	Silver	Platinum
BER	C2	B3	B2	A2
Uplift				
Comfort Level				
Roof				
External Wall				
Windows				
Doors				
Floor				
Draughts				
Main Heating				
Water Heating				
Heating Controls				
Lighting				
Ventilation				

Your Options to Achieve a More Comfortable Home

Bronze

BER:	Fuel Bills:	Environmental Impact:	Payback:
B3	↓ €-742/yr	↓ -2385 kgs CO_2/yr	17 yrs

	Cost	Impact
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4736	★ ★ ☆
Fit Digital Heating Controls	€2838	★ ★ ★
Shallow Draught Proofing	€1178	★ ☆ ☆
Energy credits	€0	
Potential grants	€2200	
Total investment	€12796	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Silver

BER:	Fuel Bills:	Environmental Impact:	Payback:
B2	€-1744/yr	-4273 kgs CO_2/yr	15 yrs

	Cost	Impact
Switch to Condensing Gas Boiler Including Controls	€4420	★ ★ ★
New Condensing Gas Combi Boiler Including Controls	€3556	★ ★ ★
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4736	★ ☆ ☆
Fit Digital Heating Controls	€2838	★ ★ ☆
Shallow Draught Proofing	€1178	★ ☆ ☆
New Condensing Oil Boiler Including Controls	€6980	★ ★ ★
Energy credits	€0	
Potential grants	€4300	
Total investment	€25653	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Platinum

BER:	Fuel Bills:	Environmental Impact:	Payback:
A2	€-2098/yr	-7269 kgs CO_2/yr	25 yrs

	Cost	Impact
Install 4kWp solar PV	€10896	★ ☆ ☆
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
Replace Door	€2693	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4736	★ ☆ ☆
Air to Water Heat Pump, New Cylinder and Controls	€19295	★ ★ ★
Change to Low Temperature Radiators	€6129	★ ☆ ☆
Fit Mechanical Demand Control Ventilation	€4949	☆ ☆ ☆
Replace Windows with Triple Glazed	€19473	★ ☆ ☆
Shallow Draught Proofing	€1178	★ ☆ ☆
Energy credits	€2245	
Potential grants	€20400	
Total investment	€52949	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

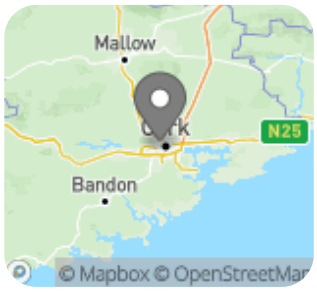
Healthier home

Warmer home

Better for our planet

Home Energy Assessment

RetroKit



Rural

Terraced house

95m2

Built:2005

Gas or LPG

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	Bronze	Silver	Platinum
BER	B3	B3	B2	A1
Uplift				
Comfort Level				
Roof				
External Wall				
Windows				
Doors				
Floor				
Draughts				
Main Heating				
Water Heating				
Heating Controls				
Lighting				
Ventilation				

Your Options to Achieve a More Comfortable Home

Bronze

BER:	Fuel Bills:	Environmental Impact:	Payback:
B3	↓ €-176/yr	↓ -693 kgs CO_2/yr	44 yrs

	Cost	Impact
Fit Low Energy Lighting	€227	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ★
Chimney Draught Excluder	€284	★ ★ ☆
300mm Attic Insulation on Ceiling	€1891	★ ★ ☆
Shallow Draught Proofing	€826	★ ★ ☆
Energy credits	€0	
Potential grants	€1200	
Total investment	€7704	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Silver

BER:	Fuel Bills:	Environmental Impact:	Payback:
B2	↑ €102/yr	↓ -290 kgs CO_2/yr	-236 yrs

	Cost	Impact
New Condensing Gas Combi Boiler Including Controls	€3556	★ ★ ☆
Fit Low Energy Lighting	€227	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€1891	★ ☆ ☆
Shallow Draught Proofing	€826	★ ★ ☆
Switch to Condensing Oil Boiler Including Controls	€7832	★ ★ ★
New Condensing Oil Boiler Including Controls	€6980	★ ★ ★
Energy credits	€0	
Potential grants	€3300	
Total investment	€23973	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Platinum

BER:	Fuel Bills:	Environmental Impact:	Payback:
A1	€-579/yr	-2728 kgs CO_2/yr	57 yrs

	Cost	Impact
Install 4kWp solar PV	€10896	★ ★ ☆
Fit Low Energy Lighting	€227	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
Replace Door	€1912	★ ☆ ☆
300mm Attic Insulation on Ceiling	€1891	★ ☆ ☆
Air to Water Heat Pump, New Cylinder and Controls	€19295	★ ★ ★
Change to Low Temperature Radiators	€4086	★ ☆ ☆
Fit Mechanical Demand Control Ventilation	€4949	☆ ☆ ☆
Shallow Draught Proofing	€826	★ ☆ ☆
Energy credits	€868	
Potential grants	€16100	
Total investment	€33075	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

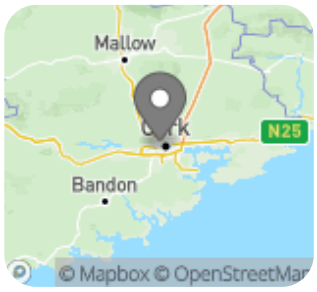
Healthier home

Warmer home

Better for our planet

Home Energy Assessment

RetroKit



Rural

Semi-d house

106m2

Built:2004

Gas or LPG

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	Bronze	Silver	Platinum
BER	C1	B3	B2	A1
Uplift				
Comfort Level				
Roof				
External Wall				
Windows				
Doors				
Floor				
Draughts				
Main Heating				
Water Heating				
Heating Controls				
Lighting				
Ventilation				

Your Options to Achieve a More Comfortable Home

Bronze

BER:	Fuel Bills:	Environmental Impact:	Payback:
B3	↓ €-202/yr	↓ -831 kgs CO_2/yr	39 yrs

	Cost	Impact
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ★
Chimney Draught Excluder	€284	★ ★ ☆
300mm Attic Insulation on Ceiling	€2154	★ ★ ☆
Shallow Draught Proofing	€878	★ ★ ☆
Energy credits	€0	
Potential grants	€1300	
Total investment	€7975	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Silver

BER:	Fuel Bills:	Environmental Impact:	Payback:
B2	↑ €96/yr	↓ -427 kgs CO_2/yr	-253 yrs

	Cost	Impact
New Condensing Gas Combi Boiler Including Controls	€3556	★ ★ ☆
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€2154	★ ☆ ☆
Shallow Draught Proofing	€878	★ ☆ ☆
Switch to Condensing Oil Boiler Including Controls	€7832	★ ★ ★
New Condensing Oil Boiler Including Controls	€6980	★ ★ ★
Energy credits	€0	
Potential grants	€3400	
Total investment	€24243	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Platinum

BER:	Fuel Bills:	Environmental Impact:	Payback:
A1	€-625/yr	-3188 kgs CO_2/yr	55 yrs

	Cost	Impact
Install 4kWp solar PV	€10896	★ ★ ☆
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
Replace Door	€2180	★ ☆ ☆
300mm Attic Insulation on Ceiling	€2154	★ ☆ ☆
Air to Water Heat Pump, New Cylinder and Controls	€19295	★ ★ ★
Change to Low Temperature Radiators	€5108	★ ☆ ☆
Fit Mechanical Demand Control Ventilation	€4949	☆ ☆ ☆
Shallow Draught Proofing	€878	★ ☆ ☆
Energy credits	€1070	
Potential grants	€16200	
Total investment	€34433	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

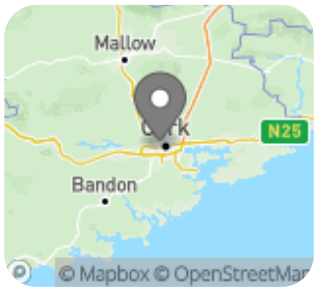
Healthier home

Warmer home

Better for our planet

Home Energy Assessment

RetroKit



Rural

Detached house

194m2

Built:2004

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	Bronze	Silver	Platinum
BER	C1	B3	B2	A2
Uplift				
Comfort Level				
Roof				
External Wall				
Windows				
Doors				
Floor				
Draughts				
Main Heating				
Water Heating				
Heating Controls				
Lighting				
Ventilation				

Your Options to Achieve a More Comfortable Home

Bronze

BER:	Fuel Bills:	Environmental Impact:	Payback:
B3	↓ €-542/yr	↓ -1886 kgs CO_2/yr	24 yrs

	Cost	Impact
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ★
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4824	★ ★ ☆
Fit Digital Heating Controls	€2838	★ ★ ★
Shallow Draught Proofing	€1277	★ ★ ☆
Energy credits	€0	
Potential grants	€2200	
Total investment	€12982	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Silver

BER:	Fuel Bills:	Environmental Impact:	Payback:
B2	€-1497/yr	-3662 kgs CO_2/yr	11 yrs

	Cost	Impact
Switch to Condensing Gas Boiler Including Controls	€4420	★ ★ ★
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4824	★ ☆ ☆
Fit Digital Heating Controls	€2838	★ ★ ☆
Shallow Draught Proofing	€1277	★ ☆ ☆
Energy credits	€0	
Potential grants	€2900	
Total investment	€16701	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

Healthier home

Warmer home

Better for our planet

Your Options to Achieve a More Comfortable Home

Platinum

BER:	Fuel Bills:	Environmental Impact:	Payback:
A2	€-1572/yr	-6503 kgs CO_2/yr	24 yrs

	Cost	Impact
Install 4kWp solar PV	€10896	★ ☆ ☆
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
Replace Door	€2908	★ ☆ ☆
300mm Attic Insulation on Ceiling	€4824	★ ☆ ☆
Air to Water Heat Pump, New Cylinder and Controls	€19295	★ ★ ★
Change to Low Temperature Radiators	€6129	★ ☆ ☆
Fit Mechanical Demand Control Ventilation	€4949	☆ ☆ ☆
Shallow Draught Proofing	€1277	★ ☆ ☆
Energy credits	€1893	
Potential grants	€16400	
Total investment	€38228	

Your Next 5 Easy Steps to a More Comfortable Home

Book your follow up consultation:

Money saved

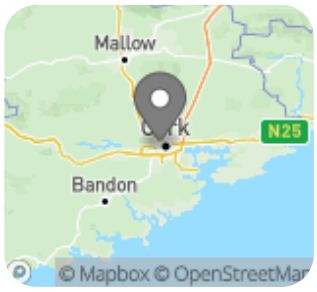
Healthier home

Warmer home

Better for our planet

Home Energy Assessment

RetroKit



Rural

Detached house

163m2

Built:2004

Gas or LPG

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	Bronze	Silver	Platinum
BER	B3	B3	B2	A2
Uplift				
Comfort Level				
Roof				
External Wall				
Windows				
Doors				
Floor				
Draughts				
Main Heating				
Water Heating				
Heating Controls				
Lighting				
Ventilation				

Your Options to Achieve a More Comfortable Home

Bronze

BER:	Fuel Bills:	Environmental Impact:	Payback:
B3	↓ €-279/yr	↓ -1199 kgs CO_2/yr	34 yrs

	Cost	Impact
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ★
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€3466	★ ★ ☆
Shallow Draught Proofing	€1135	★ ★ ☆
Energy credits	€0	
Potential grants	€1500	
Total investment	€9345	

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Silver

BER:	Fuel Bills:	Environmental Impact:	Payback:
B2	↑ €159/yr	↓ -587 kgs CO_2/yr	-161 yrs

	Cost	Impact
New Condensing Gas Combi Boiler Including Controls	€3556	★ ★ ☆
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ★ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
300mm Attic Insulation on Ceiling	€3466	★ ★ ☆
Shallow Draught Proofing	€1135	★ ☆ ☆
Switch to Condensing Oil Boiler Including Controls	€7832	★ ★ ★
New Condensing Oil Boiler Including Controls	€6980	★ ★ ★
Energy credits	€0	
Potential grants	€3600	
Total investment	€25613	

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Your Options to Achieve a More Comfortable Home

Platinum

BER:	Fuel Bills:	Environmental Impact:	Payback:
A2	€-641/yr	-4239 kgs CO_2/yr	57 yrs

	Cost	Impact
Install 4kWp solar PV	€10896	★ ★ ☆
Fit Low Energy Lighting	€284	★ ☆ ☆
Open Fire to Wood Fuel Stove	€5675	★ ☆ ☆
Chimney Draught Excluder	€284	★ ☆ ☆
Replace Door	€2677	★ ☆ ☆
300mm Attic Insulation on Ceiling	€3466	★ ☆ ☆
Air to Water Heat Pump, New Cylinder and Controls	€19295	★ ★ ★
Change to Low Temperature Radiators	€6129	★ ☆ ☆
Fit Mechanical Demand Control Ventilation	€4949	☆ ☆ ☆
Shallow Draught Proofing	€1135	★ ☆ ☆
Energy credits	€1526	
Potential grants	€16400	
Total investment	€36865	

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